OFFICE OF DEFECTS INVESTIGATION

PETITION FILE INDEX

DP00-001

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1-22	Petition: To Administrator, NHTSA from Mr. Dave Blum requesting "an investigation of hitch platforms and related hitching equipment to assess their compatibility with National Highway Safety Standards [sic] for materials and construction specifications."	P
	(01-31-00)	
23	**OPENING RESUME**	P
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24	Letter to Mr. Blum from ODI	P
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25-31	Letter to Mr. Frank Sonye, GM	P
32-46	ATTACHMENT	P
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47-55	Letter to ODI from GM. Response to ODI 2/16/00 letter	
56-85	ATTACHMENT A, B, C, AND D	P
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509	Letter to GM from ODI	P
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513-516	FAX to ODI from GM	P

Items identified by "O" in the classification column are exempt from public disclosure

OFFICE OF DEFECTS INVESTIGATION

PETITION FILE INDEX

DP00-001

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519	FAX to ODI from Chrysler	P
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520	Letter to the Federal Register	P
521-541	ATTACHMENT	P
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542	Letter to Mr. Blum from NHTSA Assoc. Administrator, K. Weinstein	P
543-552	ATTACHMENT	P
	(09-11-00)	
553	Letter to ODI from GM	P
554-569	ATTACHMENT	P
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570	CLOSING RESUME Petition denied	P
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571	MEMO TO FILE - ODI Survey @ WBCCI 44th International Rally	P
572	ATTACHMENT - Survey results	P
	(07-05-01)	
573	MEMO TO FILE - Concerning ODI's 6-28-01 presentation @ the WBCCI 44th International Rally in Sioux Falls, SD	P
574-670	ATTACHMENT - Presentation materials	P
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671-672	Letter from ODI to Mr. Ewart Phillips, WBCCI President	P
673	ATTACHMENT- Survey results	P

Items identified by "O" in the classification column are exempt from public disclosure

PUBLIC FILE

PETITION DP00-001

FROM

DAVE BLUM

CONCERNING

1993 - 1997 CHEVROLET AND GMC SUBURBAN

ALLEGED OEM HITCH RECEIVER PLATFORM CRACKING FAILURE

Petition DP00-001

N H T S A

EXECUTIVE SEC EXECUTIVE SEC. CORRESPONDRNCE UNIT PAGE 1
2000/02/04 - 15:28 **ROUTING SLIP**

Document: 178 Document Date: Susp Date: 2000/06/01
NHTSA #: ES2000020178 Received Date: 2000/02/01 4:07 **Due Date: 2000/06/01**
DOT #: Cross Ref:

Refer By: NHTSA EXEC SECRETARIAT **Closed Date:**
Action: REPLY
Doc Type: PETITION Signature: WEINSTEIN
Analyst: SHARRIS

551225

Remarks:

Synopsis: PETITION FOR INVESTIGATION OF HITCH PLATFORMS AND RELATED HITCHING EQUIPMENT TO ASSESS THEIR COMPATIBILITY WITH NHTSA STANDARDS FOR MATERIALS & CONSTRUCTION SPECIFICATIONS

Author: BLUM DAVE Org: WBCCI
5329 EAGLES NEST ROAD
FRUITLAND PARK FL

Comments:
SHARRIS - 2000/02/04
11:54AM PER NOTE "ANOTHER COPY OF THE PETITION LETTER WE PROVIDED ON 1/7/00"; EXEC SEC HAS NO REC OF RECEIVING THIS LTR ON 1/7/00; JC PROCESSED

DATE	OFFICE	A C T I O N	SUSPENSE	RETURNED
2000/02/04	NSA01	REPLY	2000/06/01	

TAD/ G. CRAMER

5329 Eagles Nest Road
Fruitland Park, FL 34731

Ms. Kathy Demeter, Assistant Administrator
Department of Transportation
National highway Traffic Safety Agency

400 7th Street Southwest, Room 5323
Washington, DC 20590

Dear Ms. Demeter,

Subject: Vehicle Hitch Platform Failures

In the course of our duties to our membership, we prepared a safety presentation that included an engineering analysis of where fatigue failures might occur on vehicle hitch platforms. We asked all members to take the time to check their vehicles for such evidence. Surprising to us, the numbers of fatigue failures found suggests that these failures are not isolated nor attributed to one auto maker.

We have been in contact with a Mr. Peter Ong of NHTSA to whom we have sent data and photos of failed hitch platforms. For some reason, his department has been slow to respond. Therefore, we are petitioning your agency to begin an investigation of hitch platforms and related hitching equipment to assess their compatibility with National Highway Safety Standards for materials and construction specifications.

It is our understanding that there is no federal requirement for manufacturers to dynamically test their hitching equipment, and thus it is a 'Buyer Beware' scenario where the consumer is at the mercy of the marketplace.

The use of substandard hitching equipment should not be an option to the trailer towing motorist.

Sincerely,

Dave Blum
WBCCI RV Safety Committee
djb

cc: WBCCI President
WBCCI RV/Safety Committee

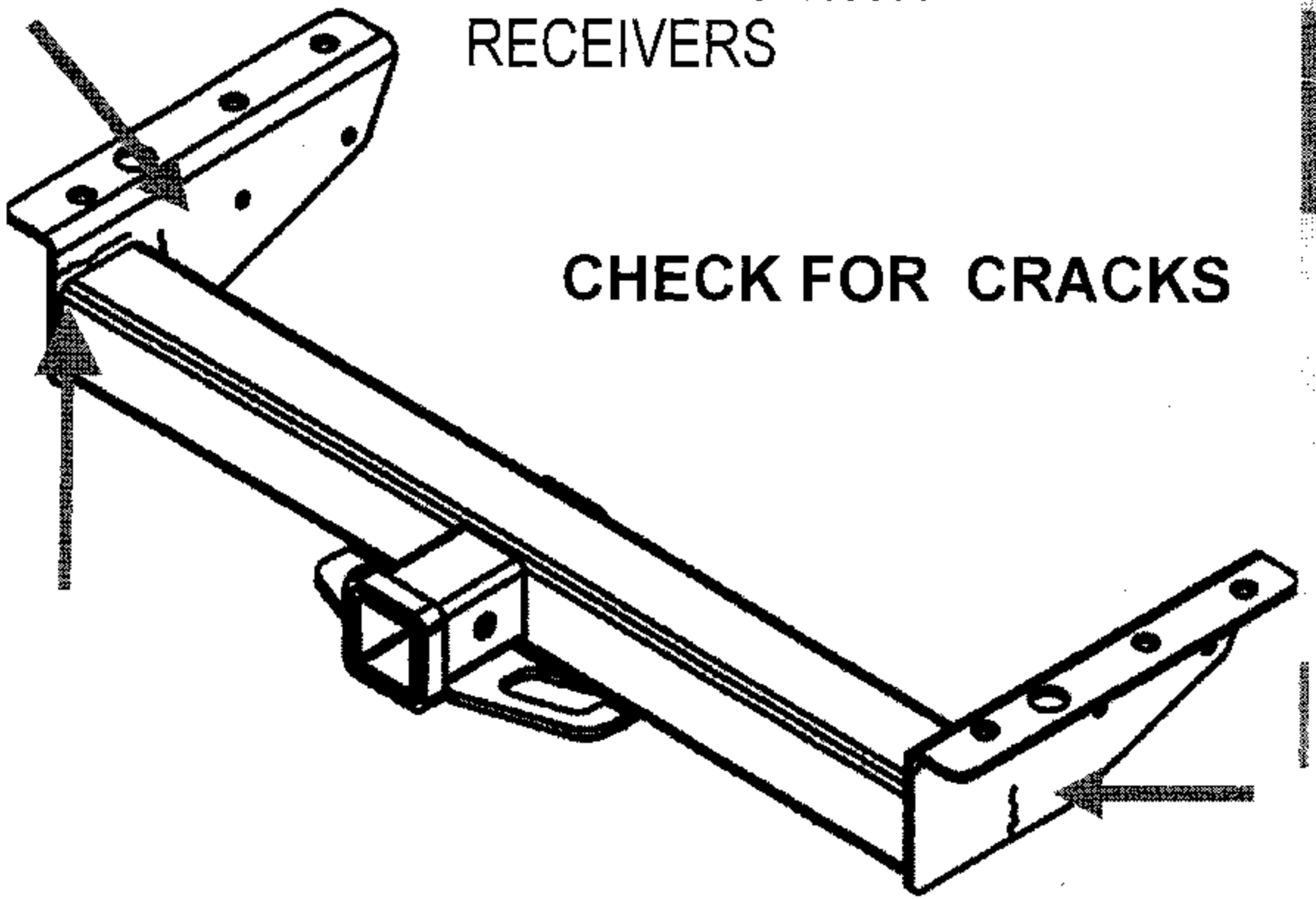
3
178
ES20000020178

CRACKED AND BROKEN RECEIVER (OEM)

Doug Showker
WBCCI SAFETY CHAIRMAN
(TRAVEL TRAILER)

Information Received during 12/99 - 1/00

PROBLEM AREAS WITH RECEIVERS

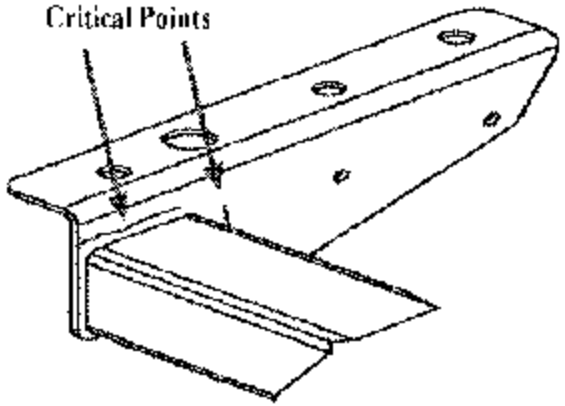


CHECK FOR CRACKS

PETER/NHTSA

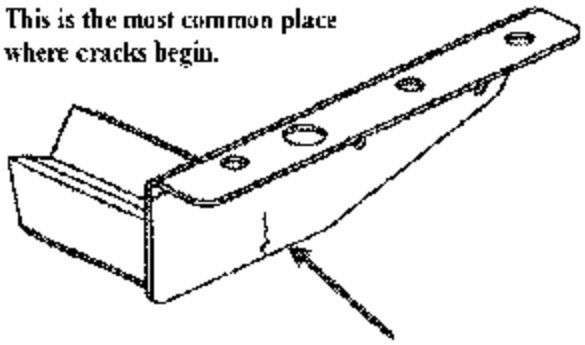
PROBLEM AREAS

Critical Points



PROBLEM AREAS

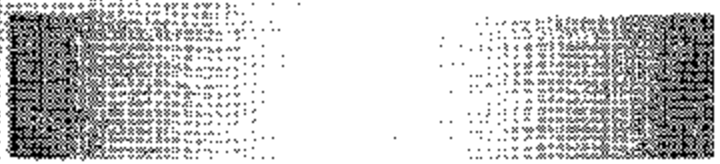
This is the most common place where cracks begin.



Critical Point

93 Suburban 3/4T 125,000 miles
TOWING MILES, APROX 50-60,000
VIN# 1GNGK26N7PJ324212

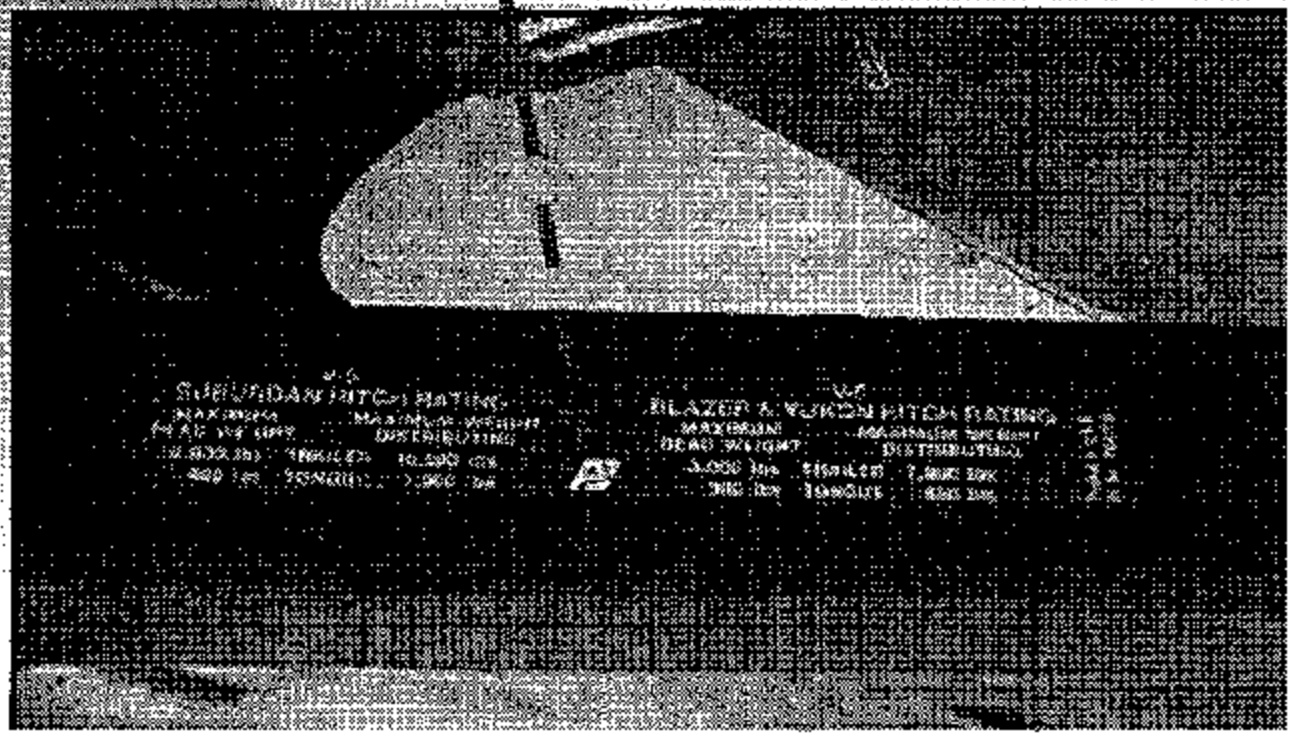
- Walter Berg
- 706-379-1526
- 5549 Shady Trail
- Young Harries Ga. 30582
- Slides #5, #6, #7



VIN#1GNGK26N7PJ324212

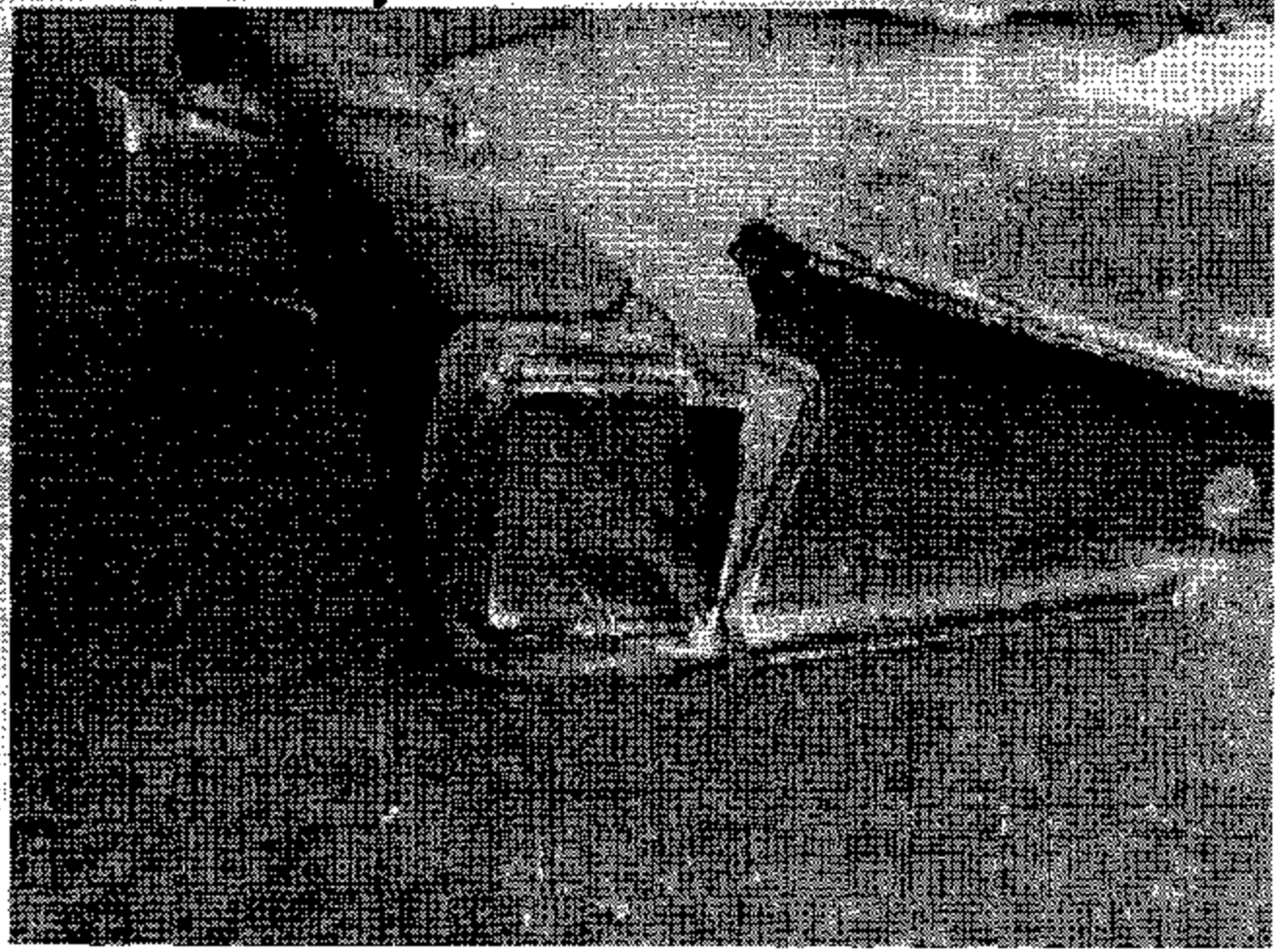
706-379-1526

- General Motors Receiver Idenication



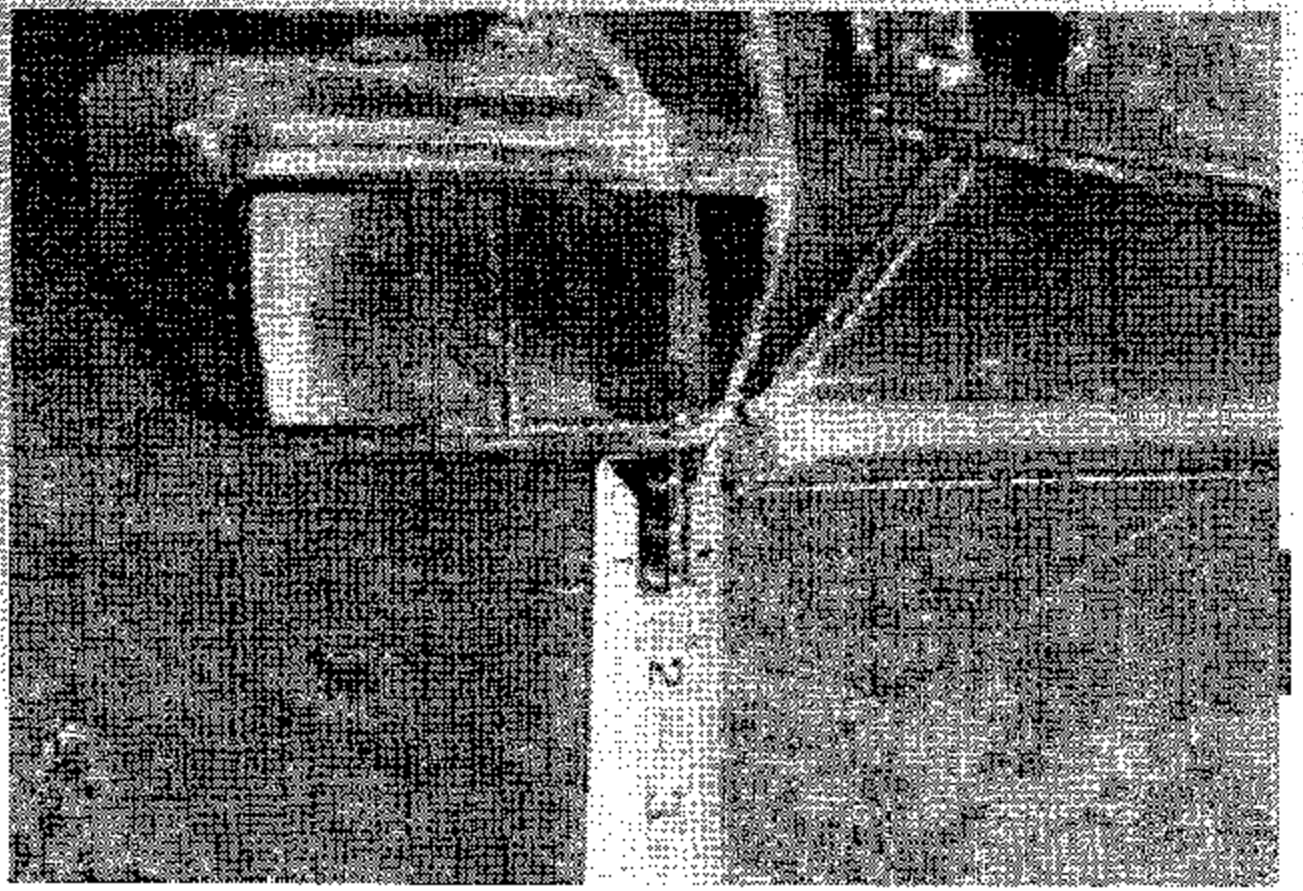
VIN# 1GNGK26N7PJ324212

This receiver was ready to fall off



VIN# 1GNGK2GN7PJ324212

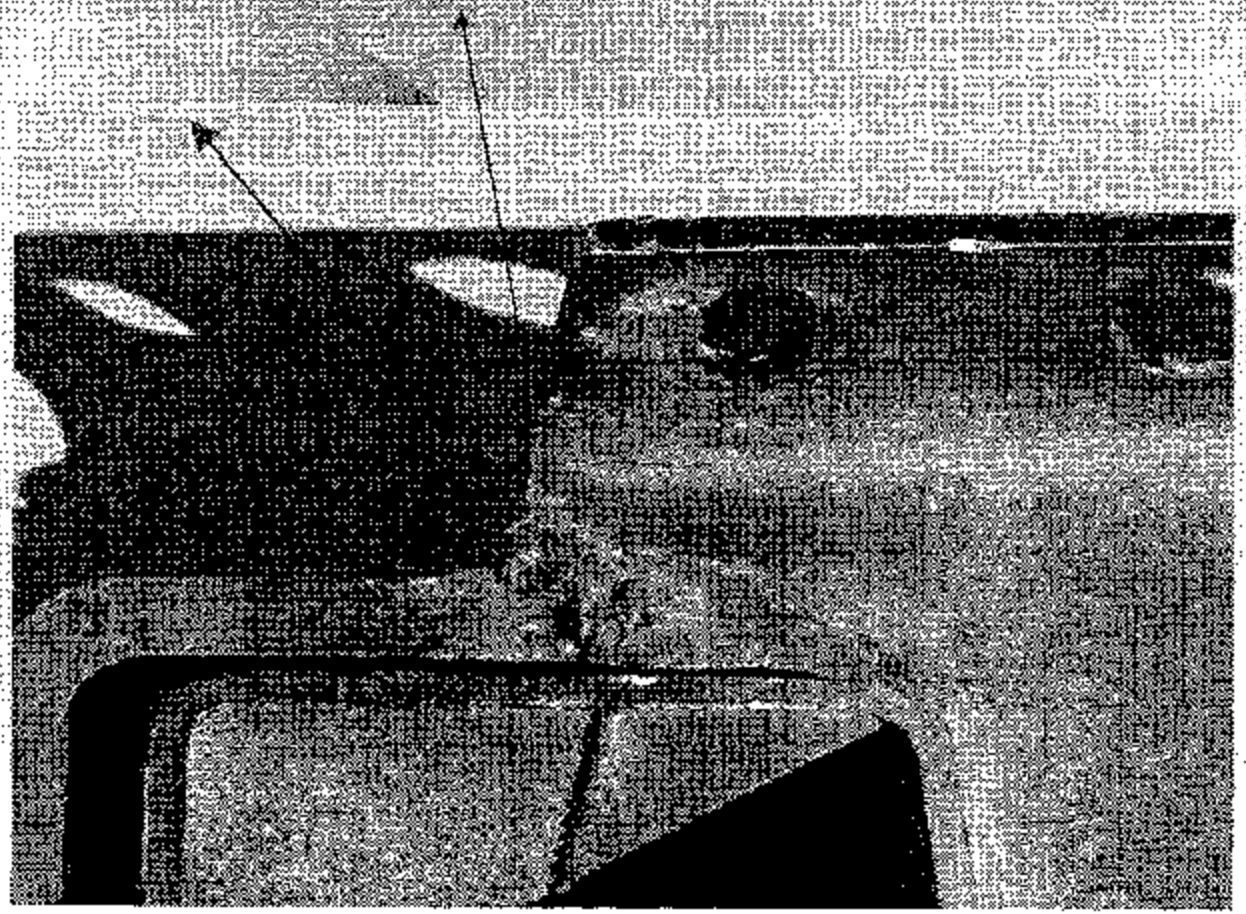
Only 1/4" holding receiver



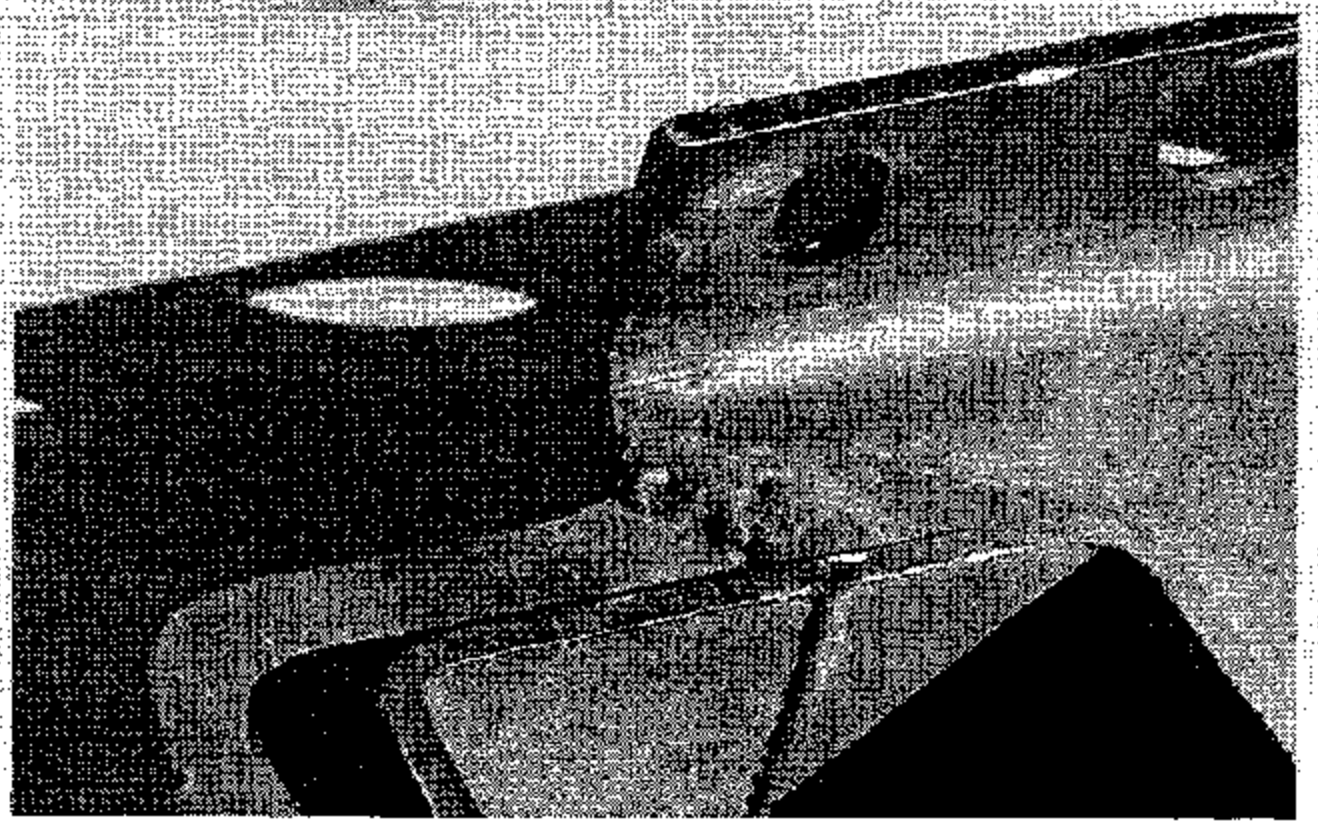
94 Suburban 3/4T 120,800 miles TOWING MILES, APROX 40,000 s VIN# 1GNGC26NXRJ399034

- Donald Kollenborn
- 805-508-3022
- P.O.Box 80533
- Bakersfield Calif. 93380
- SLIDES #9,10,11,12.

VIN#1GNGC26NXRJ399034
welded once -- see crack above weld (right side)

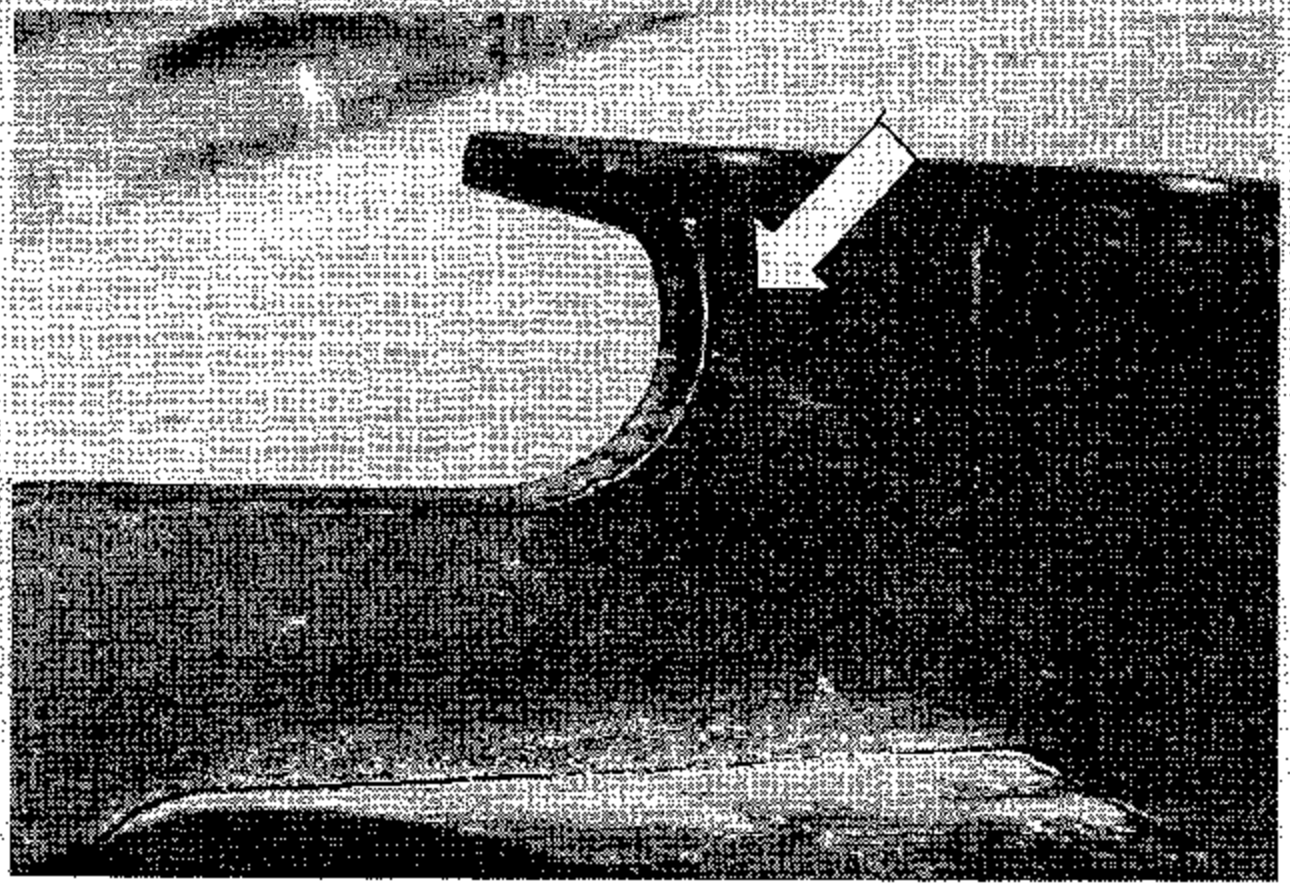


VIN# 1GNGC26NXRJ399034
WELDED & CRACKED = DIFFERENT ANGLE

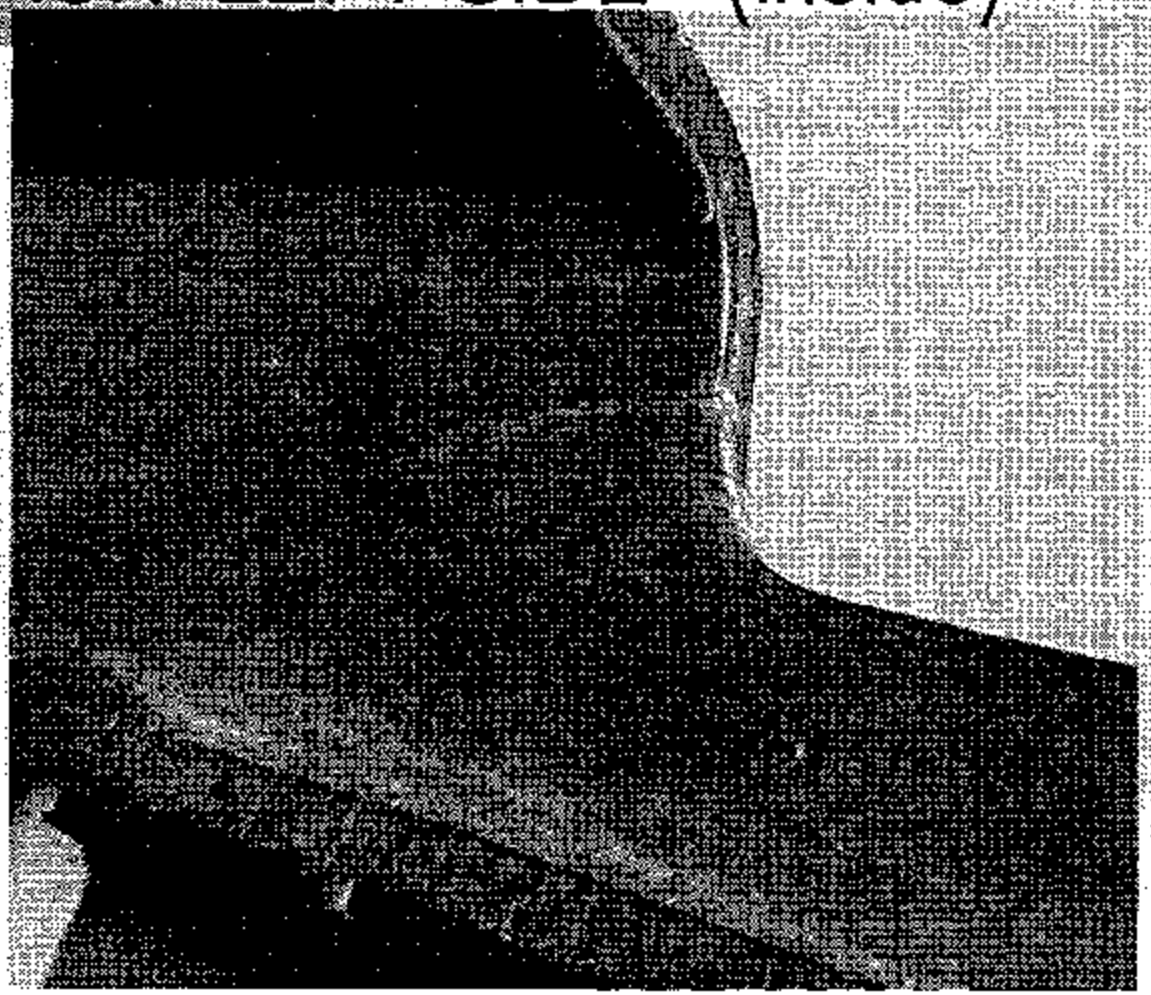


13

VIN# 1GNGC26NXRJ399034
CRACK COMPLETELY THROUGH
(left side)



VIN3 1GNGC26NXRJ399034
CRACK LEFT SIDE (inside)



7

1997 GMC SUBURBAN 3/4T 39,439 miles
TOWING APROX 33,000 miles
VIN# GKGC26J5VJ7733362

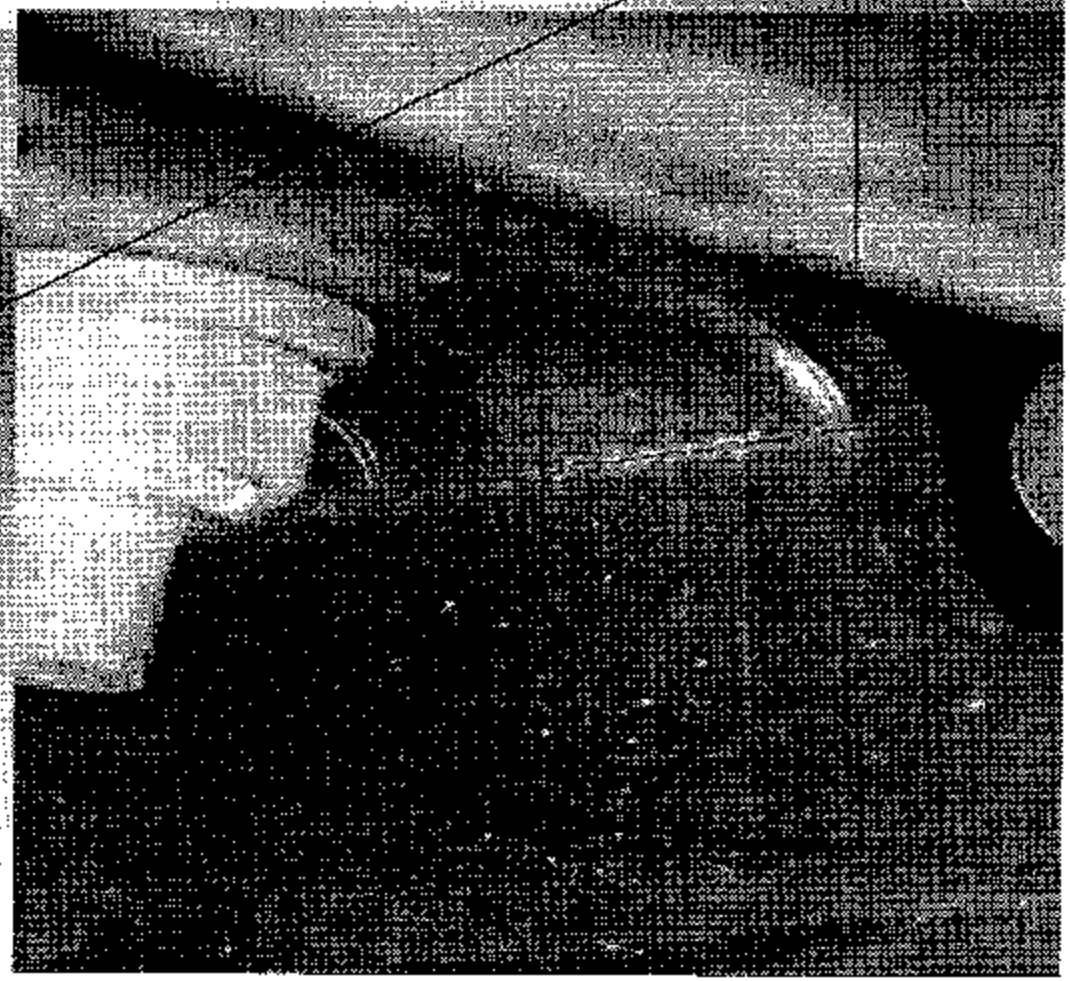
- Donald Kenney
- 727-863-4736
- 10645 Osceola Dr.
- New Port Richey, Fl. 34654
- Slide # 14

VIN #GKGC26J5VJ733362

- Haven't receive picture yet, you should have paper work by now.
- Will send photos as soon as I receive them. (ODI rcd pics in 1/00)

DON KENNEY
VIN#GKGC26J5VJ733362

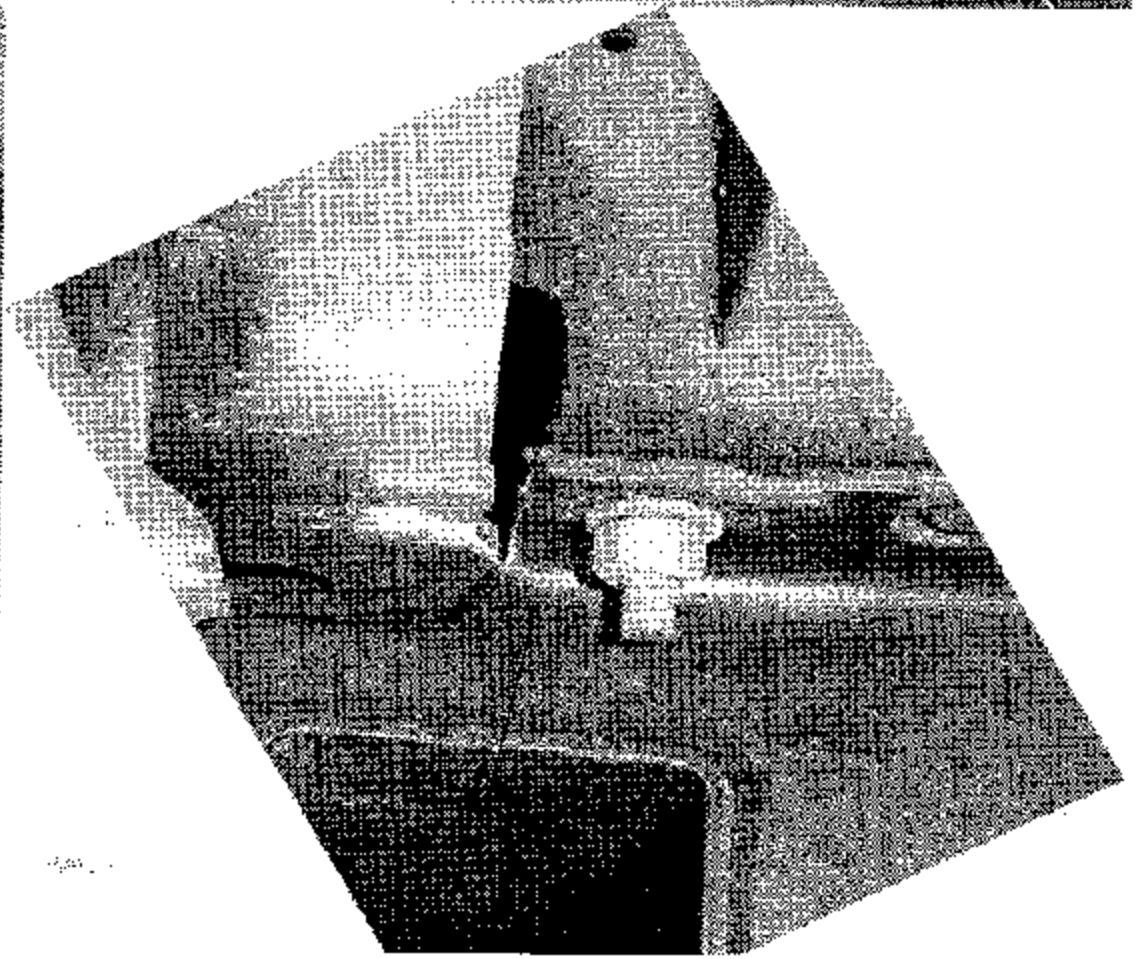
- ROAD SIDE (LEFT)
- BREAK IS ALL THE WAY THROUGHT 1/4 SIDE PLATE.



8

VIN# GKGC26J5VJ733362

- CURB SIDE (RIGHT)
- CRACK IS JUST STARTING



95 DODGE 3/4T 96,000 miles
TOWING MILES APROX 55-65,000
VIN# 3B7KC23C6SM107667

- Paul Hallstedt
- 727-937-9284
- 3240 Holiday Lake Dr. West
- Holiday, Fl. 34691-5012
- e-mail jm3240@juno.com.

28

95 DODGE 3/4T 96,000 miles
TOWING MILES APROX 55-65,000
VIN# 3B7KC23C6SM107667

- WILL HAVE PICTURES LATER, YOU SHOULD HAVE HIS FORM BY NOW. THIS RECEIVER WAS CRACKED ON BOTH SIDES. (ODI rcd pics in 1/00)

2

PAUL HALLSTEDT
VIN#3B7KC23C6SM107667

- ROAD SIDE (LEFT) CRACK IS CROSS PLATE.
- YOU SHOULD HAVE PAPER WORK ON THESE PIXES.

22

U.S. Department of Transportation
National Highway Traffic Safety Administration

ODI SCREEN RESUME

IDENTIFICATION: DP00-001 DATE OPENED: 31-Jan-00
SUBJECT: Alleged OEM Hitch Receiver Platform Cracking
PROMPTED BY: Consumer
INVESTIGATORS: Peter C. Ong

MANUFACTURER: General Motors Corp. MODEL: Chevrolet & GMC Suburbans
MODEL YEAR(S): 1993-1997
VEHICLE POPULATION: About 723,000 vehicles (the number with the OEM hitch receiver platform is unknown)

PROBLEM DESCRIPTION: The petition alleges that cracks in the hitch receiver platform may lead to separation of the trailer and loss of steering control.

FAILURE REPORT SUMMARY

	ODI	N/A	N/A
COMPLAINTS:	6*		
CRASHES:	0		
INJ CRASHES:	0		
# INJURIES:	0		
FAT CRASHES:	0		
# FATAL:	0		
OTHERS:	1**		

* Three of the six complaints have been received by ODI since closure of PE95-036 in 10/95 involving 1993-1995 Suburbans. ** The petitioner submitted information and pictures on a 1993, 1994, & 1997 Suburbans. In total, four of the six complaints were submitted by the RV club members.

ACTION: The petition has been assigned as DP00-001. The petition will be evaluated for a grant or denial decision.

ENGINEER: Peter C. Ong
DATE: Jan 31, 2000

DIVISION CHIEF: George Hiramiang
DATE: 1/31/2000

SUMMARY: The National Highway Traffic Safety Administration was petitioned to commence a defect investigation by a recreation vehicle (RV) club safety committee member in a letter signed by Dave Blum and dated 7-Jan-00. The petition alleges that some of the hitch platform and related towing equipment may not meet National Highway Safety Standards for material and construction specification. Specifically, cracks were found in the Class IV type hitch receiver platforms (capable of 10,000 lbs. towing weight when used with a weight distributing hitch system) on some of the club members' vehicles when towing an Airstream travel trailer. PE95-036 was opened as a result of four complaints on MY1992-1995 GM based SUVs and closed in 10/95 with four more complaints (1 from ODI & 3 from GM) with no further actions taken. Based on the information provided by the petitioner and complaints in the ODI database concerning hitch receiver platform cracking, this petition analysis will involve 1993-1997 GM Suburban vehicles.

Mr. Dave Blum
WBCCI RV Safety Committee
5329 Eagles Nest Road
Fruitland Park, FL 34731

NSA-12pco
DP00-001

Dear Mr. Blum:

This acknowledges receipt of your petition dated January 7, 2000, requesting that we investigate original equipment manufacturer (OEM) hitch platforms and related hitching equipment concerning fatigue failures (cracks) allegedly due to substandard hitching equipment.

In accordance with Title 49 CFR, Part 552, the National Highway Traffic Safety Administration will conduct a technical review of the available information and will notify you whether the petition is granted.

Sincerely,

Kathleen C. DeMeter, Director
Office of Defects Investigation
Safety Assurance

FEB 16 2000

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Frank C. Sonye Jr., Director
Product Investigations
Mail Code: 480-106-304
General Motors Corporation
30500 Mound Road
Warren, MI 48090-9055

NSA-14pco
DP00-001

Dear Mr. Sonye:

This letter is to advise you that the Office of Defects Investigation (ODI) of the National Highway Traffic Safety Administration (NHTSA) is conducting a Defect Petition Analysis concerning alleged cracks in the trailer hitch receiver platform in model years (MY) 1993 through 1997 Chevrolet and GMC Suburban vehicles and to request certain information.

ODI has received six Vehicle Owners Questionnaires (VOQ's) and the petitioner's letter. A copy of each of these reports is enclosed for your information.

The VOQs and the petitioner's information package reported that cracks were found in both the left and right vertical mounting brackets of the hitch receiver platform. The cracks appear to originate from the rear of the bracket and propagate toward the receiver crossbar.

Unless otherwise stated in the text, the following definitions apply to this information request.

- **Subject vehicles**: All MY 1993 through 1997 General Motors Chevrolet and GMC Suburban vehicles equipped with the factory installed (OEM) trailer hitch receiver platform manufactured for sale in the United States

- **GM**: General Motors Corporation all of its past and present officers and employees, whether assigned to its principal offices or any of its field or other locations, including all of its divisions, subsidiaries (whether or not incorporated) and affiliated enterprises and all of their headquarters, regional, zone and other offices and their employees, and all agents, contractors, consultants, attorneys and law firms and other persons engaged directly or indirectly (e.g., employee of a consultant) by or under the control of General Motors

25

Corporation (including all business units and persons previously referred to), who are or, in or after 1990, were involved in any way with any of the following related to the alleged defect in the subject vehicles:

a. design, engineering, analysis, modification or production (e.g., quality control);
b. testing, assessment or evaluation,
c. consideration, or recognition of potential or actual defects, reporting, record-keeping and information management, (e.g., complaints, field reports, warranty information, part sales), analysis, claims, or lawsuits, or
d. communication to, from or intended for zone representatives, fleets, dealers, or other field locations, including but not limited to people who have the capacity to obtain information from dealers.

- **Subject component**: OEM trailer hitch receiver platform used in the subject vehicles.

- **Alleged defect**: Any failure, malfunction, or otherwise unsatisfactory performance of the subject component on the subject vehicles. This includes, but is not limited to, cracks, fractures, deformation, bending, separation or weld failure in the hitch receiver

- **Document**: "Document(s)" is used in the broadest sense of the word and shall mean all original written, printed, typed, recorded, or graphic matter whatsoever, however produced or reproduced, of every kind, nature, and description, and all nonidentical copies of both sides thereof, including, but not limited to, papers, letters, memoranda, correspondence, communications, electronic mail (e-mail) messages (existing in hard copy and/or in electronic storage), faxes, mailgrams, telegrams, cables, telex messages, notes, annotations, working papers, drafts, minutes, records, audio and video recordings, data, databases, other information bases, summaries, charts, tables, graphics, other visual displays, photographs, statements, interviews, opinions, reports, newspaper articles, studies, analyses, evaluations, interpretations, contracts, agreements, jottings, agendas, bulletins, notices, announcements, instructions, blueprints, drawings, as-builts, changes, manuals, publications, work schedules, journals, statistical data, desk, portable and computer calendars, appointment books, diaries, travel reports, lists, tabulations, computer printouts, data processing program libraries, data processing inputs and outputs, microfilms, microfiches, statements for services, resolutions, financial statements, governmental records, business records, personnel records, work orders, pleadings, discovery in any form, affidavits, motions, responses to discovery, all transcripts, administrative filings and all mechanical, magnetic, photographic and electronic records or recordings of any kind, including any storage media associated with computers, including, but not limited to, information on hard drives, floppy disks, backup tapes, and zip drives, electronic communications, including but not limited to, the Internet and shall include any drafts or revisions pertaining to any of the foregoing, all other things similar to any of the foregoing, however denominated by GM, any other data compilations from which information can be obtained, translated if necessary, into a usable form and any other

documents. For purposes of this request, any document which contains any note, comment, addition, deletion, insertion, annotation, or otherwise comprises a nonidentical copy of another document shall be treated as a separate document subject to production. In all cases where original and any nonidentical copies are not available, "document(s)" also means any identical copies of the original and all nonidentical copies thereof. Any document, record, graph, chart, film or photograph originally produced in color must be provided in color. Furnish all documents whether verified by the manufacturer or not. If a document is not in the English language, provide both the original document and an English translation of the document.

In order for my staff to evaluate the alleged defect, certain information is required. Pursuant to 49 U.S.C. § 30166, please provide numbered responses to the following information requests. Please repeat the applicable request verbatim above each response. After GM's response to each request, identify the source of the information and indicate the last date the source updated the information prior to the preparation of the response. Insofar as GM has previously provided a document to ODI, GM may either produce it again, or identify the document, the document submission to ODI in which it was included and the precise location in that submission where the document is located. Previously submitted complaints and field reports do not need to be provided. When documents are produced, the documents shall be produced in an identified, organized manner that corresponds with the Information Request letter (including the subparts). When documents are produced and the documents would not, standing alone, be self-explanatory, the production of documents shall be supplemented and accompanied by explanation.

If GM cannot respond to any specific request or subpart thereof, please state the reason why it is unable to do so. If GM claims that any document or other information or material responsive to any of the following items need not be provided to NHTSA because it is privileged or the work product of an attorney, separately by information request number, for each document or other information or material, state the nature of that information or material and identify any document in which it is found by date, subject or title, name and position of the person from, and the person to whom it was sent, and the name and position of any other recipient. GM must also describe the basis for the claim, and explain why GM believes it applies.

1. Identify the total number of vehicles equipped with the subject component sold in the United States by make, model, and model year. If the subject components are not identical, please identify the total number of each and the vehicle on which they are equipped.

2. Identify the total number of vehicles, other than the subject vehicles, equipped with the subject component by make, model, and model year.

3. State the number and provide copies of all documents containing the following, from all sources, of which GM is aware and which relate, or could relate to the alleged defect in the subject vehicles:

a owner/fleet complaints;
b. field reports;
c crash/incident claims,
d subrogation claims;
e. lawsuits; and
f. third-party arbitration proceedings (where GM is a party to the arbitration).

Please list and collate your response for each category ("a" through "f") by date of claim. Please provide for each item in this response the incident date, mileage of vehicle at time of incident (if known), approximate age of vehicle or model year, vehicle build date, disposition of matter, and, where a fleet vehicle is involved, the name of the fleet, and the name and telephone number of a contact person at that fleet. For items "a" through "d," please provide all related information and reports whether or not GM has verified each one. For items "e" and "f," summaries are acceptable. Please identify in the summary the caption, court, docket number, and filing date of each lawsuit if a copy of the complaint initiating the lawsuit is not provided.

4. If GM has issued any service or technical bulletins, advisories, or other communications to dealers, zone offices, or field offices pertaining to the alleged defect in the subject vehicles, provide a copy of each such document. If no such documents have been issued, so state. For each item identified, please provide the following information:

   a. A complete chronology listing all activities or events including, but not limited to, incidents involving the subject component, which led GM to believe it needed to undertake the communication.
   b. A listing (in chronological order) of all information related to any testing through which the need for the communication was identified and/or assessed, even if the testing was being conducted for another purpose. Please provide a copy of each item listed.
   c. The number of repairs and/or replacements paid for by GM that resulted from the communication identified. List your response by repairing dealer.

5. State the number of all warranty claims, including extended warranty claims, and "goodwill," field or zone adjustments received by GM that relate to the alleged defect in the subject vehicles by calender year, calender month, and problem identification. Identify all owners by name, address, and telephone number, and all vehicles by vehicle identification number, model name, model year, date of manufacture, date of retail sales, date of incident, mileage at the time of the incident, and problem description.

6. Identify and provide copies of all documents pertaining to tests and inspection of the subject component including, but not limited to, standards, specifications and procedures.

7 Describe the tow capacities and limitations of the subject vehicles and subject component when used to tow a 8,000 pounds or larger RV trailer including:

a. any recommended or approved towing equipment;
b. any instructions given to the buyers;
c. any instructions as to how the additional towing equipment is to be installed whether by owner or by a trailer sales dealer;
d any restrictions or conditions imposed by GM on the attachment of and use of towing equipment (sway bars, distribution hitch, ball size etc . . .).

8. Identify and describe all modifications or changes made by, or on behalf of GM, to the trailer hitch receiver platform used in MY 1991 and later Chevrolet and GMC Suburban vehicles. The following information must be included for each such modification or change:

a. the date or approximate date on which the modification or change was incorporated into production;
b. a description of the modification or change;
c. the vehicles affected by the change;
d the reason for the modification or change;
e. the part number(s) for the part incorporating the change;
f. the date or approximate date the part incorporating the change was made available to retail parts departments as a service part;
g. disposition of unmodified parts and assemblies; and
h. a sample of the part incorporating the modification or change (where applicable).

Provide engineering drawings and specifications for the design and subsequent modifications over the subject vehicle years. The information shall include the material used, strength requirement or heat treatment and any testing or certification required as part of the production process.

9. Identify and describe all modifications or changes to the subject component and/or vehicles that have been or are being proposed, evaluated, or considered by GM to address the alleged defect. Do not repeat modifications or changes identified in response to Request # 8 above. The following information must be included for each such modification or change:

a. the date or approximate date on which the modification or change was initially considered;
b. a description of the modification or change;
c. the vehicles that would be affected by the change; and
d. the reason the modification was (or was not) adopted.

10. Identify and provide copies of all documents reflecting any test, inspection, study, survey, and investigation pertaining to the alleged defect that is known to GM. Include all pertinent documents, regardless of whether they are in interim, draft, or final form

11 Furnish GM's assessment of the alleged defect in the subject vehicles, including:

a. all causal or contributory factors;
b. the failure mode;
c. root cause of the failures; and
d. potential for future occurrences of the alleged defect in the subject vehicles.

This letter is being sent to GM pursuant to 49 U.S.C. § 30166, which authorizes NHTSA to conduct any investigation that may be necessary to enforce Chapter 301 of Title 49. GM's failure to respond promptly and fully to this letter could subject GM to civil penalties pursuant to 49 U.S.C. § 30165 or lead to an action for injunctive relief pursuant to 49 U.S.C. § 30163. Other remedies and sanctions are available as well.

GM's response to this letter, in duplicate, must be submitted to this office by March 03, 2000. Please include in GM's response the identification codes referenced on page one of this letter. If GM finds that it is unable to provide all of the information requested within the time allotted, GM must request an extension from Ms. Kathleen DeMeter at (202) 366-5202 no later than five business days before the response due date. If GM is unable to provide all of the information requested by the original deadline, it must submit a partial response by the original deadline with whatever information GM then has available, even if GM has received an extension.

If GM considers any portion of its response to be confidential information, 49 CFR Part 512, "Confidential Business Information," requires that GM submit two copies of those document(s) containing allegedly confidential information (except only one copy of blueprints) and one copy of the documents from which information claimed to be confidential has been deleted, to the Office of Chief Counsel, National Highway Traffic Safety Administration, Room 5219 (NCC-30), 400 Seventh Street, SW, Washington, D.C. 20590. In addition, GM must provide supporting information for the request for confidential treatment in accordance with part 512.4(b) and (e) and include the name, address, and telephone number of a representative to receive a response from the Chief Counsel.

If you have any technical questions concerning this matter, please call Peter C. Ong of my staff at (202) 366-0583.

Sincerely,

(CH)

Kathleen DeMeter, Director
Office of Defects Investigation
Safety Assurance

Enclosures: VOQ's (485010, 974430, 483951, 807295, 525405, 541000)
Petition ('93 Sub, '94 Sub, & '97 Sub)

NHTSA:NSA:ODI
NSA-14PONG
cc.
NSA-01
NSA-12 Subject/Chron
NSA-14
Document I:Ong/irltrDP00-001a

JAA

Form Approved: O.M.B. No. 2127-0006

US Department of Transportation
National Highway Traffic Safety Administration

AUTO SAFETY HOTLINE
VEHICLE OWNER'S QUESTIONNAIRE
NATIONWIDE 1-800-424-9393
DC METRO AREA 202-366-0123

FOR AGENCY USE ONLY

DATE RECEIVED

od-or ___ ___
rt-dt ___ ___
od-rt ___ ___
up-ltr ___ ___

REFERENCE NO.
465010

OWNER INFORMATION (TYPE OR PRINT)

NAME and ADDRESS

NEW HARTFORD CT.

DAY TIME TELEPHONE NO. (AREA CODE)

Do you authorize NHTSA to provide a copy of this report to the manufacturer of your vehicle? YES [✓] NO [ ]
In the absence of an authorization, NHTSA *WILL NOT* provide your name or address to the vehicle manufacturer.

SIGNATURE OF OWNER By TELEPHONE 6/14/95 J. ABBOTT — DATE

VEHICLE INFORMATION

VEHICLE IDENTIFICATION NO.*	VEHICLE MAKE	VEHICLE MODEL	MODEL YEAR
1GKGK26NTPJ701926		SUBURBAN	93

*LOCATED AT BOTTOM OF WINDSHIELD ON DRIVER'S SIDE

CURRENT ODOMETER READING: 29500

DATE PURCHASED: 9/92 — [✓] NEW [ ] USED

DEALER'S NAME, CITY & STATE: CAPUANO TORRINGTON CT. 203-496-2317

ENGINE SIZE (CID/CC/L): 5.7 — NO. CYLINDERS: 8 — [ ] TURBO [✓] DIESEL [ ] GAS [ ] FUEL INJECTN

TRANSMISSION TYPE: [ ] MANUAL [✓] AUTOMATIC

ANTILOCK BRAKES: [✓] YES [ ] NO

RESTRAINT SYSTEM: [ ] DRIVERSIDE AIRBAG [ ] MOTORBELT [ ] PASSENGERSIDE AIRBAG [ ] 3-POINT BELT [ ] 2-POINT BELT

CRUISE CONTROL: [ ] YES [ ] NO

DRIVETRAIN: [ ] FRONT [✓] REAR [ ] 4-WHEEL

BODY STYLE: STAWAG ___ 4 DR ___ 2 DR ___ HATCH BK ___ VAN ___ PK UP TRK ___ OTHER ___

FAILED COMPONENT(S)/PART(S) INFORMATION (REPORT TIRE INFORMATION ON BACK)

COMPONENT (VALVE): TRAILER HITCH.

PART NAME(S):

LOCATION: [ ] LEFT FRONT [ ] RIGHT [✓] REAR

FAILED PART(S): [ ] ORIGINAL [ ] REPLACEMENT

NO. OF FAILURES: 1

DATE(S) OF FAILURE(S): 5/25/95

MILEAGE AT FAILURE(S): 29,000

VEHICLE SPEED AT FAILURE(S):

MANUFACTURER CONTACTED: [✓] YES [ ] NO

NHTSA PREVIOUSLY CONTACTED: [ ] YES [✓] NO

APPLICABLE ACCIDENT INFORMATION

ACCIDENT	FIRE	NUMBER PERSONS INJURED	NUMBER OF FATALITIES	PROPERTY DAMAGE ESTS	POLICE REPORTED
[ ] YES [✓] NO	[ ] YES [ ] NO				[ ] YES [ ] NO

NARRATIVE DESCRIPTION OF FAILURE(S), ACCIDENT(S), INJURY(IES)

THE FACTORY INSTALLED TRAILER HITCH HAS 1/4 INCH LONG CRACKS ON BOTH THE LEFT AND RIGHT SIDE MOUNTING BRACKETS. THE CRACKS ARE AT THE TOP BEND SECTION OF THE BRACKET AND PROPAGATE DOWNWARD TOWARD THE CROSS BAR OF THE HITCH. A GM REPRESENTATIVE AUTHORIZED THE OWNER TO HAVE THE HITCH REPLACED WITH A NEW HITCH OF HIS CHOICE.

CONTINUE ON BACK IF NEEDED

The Privacy Act of 1974
Public Law 93-579

This information is requested pursuant to authority vested in the National Highway Traffic Safety Act and subsequent amendments. You are under no obligation to respond to this questionnaire. Your response may be used to assist the NHTSA in determining whether a manufacturer should take appropriate action to correct a safety defect. If the NHTSA proceeds with administrative enforcement or litigation against a manufacturer, your response, or a statistical summary thereof, may be used in support of the agency's action.

HS-Form 350 (Rev. 5-92)

Form Approved: O.M.B. No. 2127-0008

U.S. Department of Transportation
National Highway Traffic Safety

DOT Auto Safety Hotline

Vehicle Owner's Questionnaire (VOQ)

NATIONWIDE 1-888-DASH-2-DOT
1-888-327-4236
www.nhtsa.dot.gov/hotline

FOR AGENCY USE ONLY

Date Received: 02-NOV-1995

Od_dr
rt_dt
od_rt
up_ltr

Reference No.: 974430

Work Number
Home Number

Do you authorize NHTSA to provide a copy of report to the manufacturer of your vehicle? ☐ YES ☐ NO
In the absence of an authorization, NHTSA WILL NOT provide your name and address to the vehicle manufacturer.

Signature of Owner _____ Date ___/___/___

VEHICLE INFORMATION

Vehicle Ident. No. (VIN.) (Located at bottom of windshield on driver's side)	Vehicle Mak	Vehicle Mode	Vehicle Year	Current Odometer Readin
1GNGC26N2PJ356305	GMC	SUBURBAN	1993	

Purchase Date
☐ New ☐ Used

Dealer's Name_____
City_____ State_____ Zip Code_____

Engine Siz (CID/CC/L ___
No Cylinders _____
☐ Turbo ☐ Diesel ☐ Gas ☐ Fuel Injectio

Transmission Typ	Antilock Brakes	Restraint System	Cruise Contro	Drive Trai	Vehicle Type	Body Style
☐ Manual ☐ Automatic	☐ Yes ☐ No	☐ 3-Point Belt ☐ Motorbelt ☐ Driverside Airbag ☐ 2-Point Bel ☐ Passengerside Airbag	☐ Yes ☐ No	☐ Front ☐ Rear ☐ 4-Wheel	☐ Car ☐ Sport Ult ☐ Van ☐ Truck ☐ Minivan ☐ Motorcycle ☐ Other_____	☐ 2-Door ☐ 4-Door ☐ Stationwagon ☐ Pick Up Truck ☐ Other_

FAILED COMPONENT(S)/PART(S) INFORMATION

Component	Part Name(s	Location	Failed Part(s)
15902000	EQUIPMENT:OTHER PIECES:TRAILER HITCHES AND ATTACHMEN	☐ Left ☐ Right ☐ Front ☐ Rear	☐ Original ☐ Replacement

No of Failures		Failed Part(s) Available?	NHTSA Previously
	Date(s) of Failure(s) 26-SEP-1995 Mileage at Failure(s) 67000 Vehicle Speed at Failure(s)_____	☐ Yes ☐ No	☐ Yes ☐ No

APPLICATION INCIDENT INFORMATION

(Please describe in detail the incident(s), Failure(s), Crash(es), and injury(ies) on the back of this form)

Crash	Fire	Number of Persons Injured	Number of Fatalitie	Estimated Property Damag	Reported to Polic
☐ Yes ☐ No	☐ Yes ☐ No	0	0		☐ Yes ☐ No

NARRATIVE DESCRIPTION OF FAILURE(S), INCIDENT(S), INJURY(IES)

THE WELD ON THE TRAILER HITCH IS CRACKED WHICH CAUSES IT TO DROP THE TRAILER IT WAS TOWING. PLEASE DESCRIBE. TT

CONTINUE ON BACK IF NEEDED

Form Approved O.M.B. No. 2127-0004

U.S. Department of Transportation
National Highway Traffic Safety Administration

DOT Auto Safety Hotline

Vehicle Owner's Questionnaire (VOQ)

NATIONWIDE 1-888-DASH-2-DOT
1-888-327-4236
www.nhtsa.dot.gov/hotline

FOR AGENCY USE ONLY

Date Received	Od_or rt_dt od_rt up_ltr
11-SEP-1995	Reference No. 483951

Work Number

Home Number

e? ☐ YES ☐ NO

In the absence of an authorization, NHTSA WILL NOT provide your name and address to the vehicle manufacturer.

Signature of Owner _____ Date ___/___/___

VEHICLE INFORMATION

Vehicle Identif. No. (VIN.) (Located at bottom of windshield on driver's side)	Vehicle Mak	Vehicle Mode	Vehicle Year	Current Odometer Readin
16NGC26N8PJ377451	CHEVROLET TRUC	SUBURBAN	1993	

Purchase Date	Dealer's Name	Engine Siz (CID/CC/L	Turbo Diesel Gas Fuel Injectio
☐ New ☐ Used	City _____ State _____ Zip Code _____	No Cylinders _____	

Transmission Type	Antilock Brakes	Restraint System	Cruise Contro	Drive Trai	Vehicle Type	Body Style
☐ Manual ☐ Automatic	☐ Yes ☐ No	☐ 3-Point Belt ☐ Motorbelt ☐ Driverside Airbag ☐ 2-Point Bel ☐ Passengerside Airbag	☐ Yes ☐ No	☐ Front ☐ Rear ☐ 4-Wheel	☐ Car ☐ Sport Ut ☐ Van ☐ Truck ☐ Minivan ☐ Motorcycle ☐ Other	☐ 2-Door ☐ 4-Door ☐ Stationwagon ☐ Pick Up ☐ Truck

FAILED COMPONENT(S)/PART(S) INFORMATION

Component	Part Name(s	Location	Failed Part(s
15902000	EQUIPMENT:OTHER PIECES:TRAILER HITCHES AND ATTACHMEN	☐ Left ☐ Right ☐ Front ☐ Rear	☐ Original ☐ Replacement

No of Failures	Date(s) of Failure(s)	Failed Part(s)	NHTSA Previously
1	01-MAY-1993 Mileage at Failure(s) 42000 Vehicle Speed at Failure(s)	☐ Yes ☐ No	☐ Yes ☐ No

APPLICATION INCIDENT INFORMATION

(Please describe in detail the Incident(s), Failure(s), Crash(es), and injury(ies) on the back of this form)

Crash	Fire	Number of Persons Injured	Number of Fatalitie	Estimated Property Damag	Reported to Polic
☐ Yes ☐ No	☐ Yes ☒ No	0	0		☐ Yes ☐ No

NARRATIVE DESCRIPTION OF FAILURE(S), INCIDENT(S), INJURY(IES)

TRAILER HITCH CRACKED. *DSH

CONTINUE ON BACK IF NEEDED

The Privacy Act of 1974-Public Law 93-579 This information is requested pursuant to authority vested in the National Highway Traffic Safety Act and subsequent amendments. You are under no obligation to respond this questionnaire. Your response may be used to assist the NHTSA in determining whether a manufacturer should take appropriate action to correct a safety defect. If the NHTSA proceeds with administrative enforcement or litigation against a manufacturer, your response, or a statistical summary thereof, may be used in support of the agency's action.

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02

Form Approved: O.M.B. No. 2127-0008

U.S. Department of Transportation
National Highway Traffic Safety Administration

AUTO SAFETY HOTLINE
VEHICLE OWNER'S QUESTIONNAIRE
NATIONWIDE 1-800-424-9393
DC METRO AREA 202-366-0123

FOR AGENCY USE ONLY

DATE RECEIVED: RECEIVED 97 APR 15 OFFICE OF DEFECTS INVESTIGATION
112 8 Jan 1997
odi nr 95
odi nr 9
up nr
REFERENCE NO. 807295

OWNER INFORMATION (TYPE OR PRINT)

NAME and ADDRESS

SHOREWOOD MN

DAY TIME TELEPHONE NO. (AREA CODE)

Do you authorize NHTSA to provide a copy of this report to the manufacturer of your vehicle? YES [X] NO [ ]
In the absence of an authorization, NHTSA *WILL NOT* provide your name or address to the vehicle manufacturer.

SIGNATURE OF OWNER

DATE 1/31/97

VEHICLE INFORMATION

VEHICLE IDENTIFICATION NO.*	VEHICLE MAKE	VEHICLE MODEL	MODEL YEAR
1GNSK16KXFJ420453	CHEVROLET TRUCK	SUBURBAN	1996

*LOCATED AT BOTTOM OF WINDSHIELD ON DRIVER'S SIDE

CURRENT ODOMETER READING

DATE PURCHASED 10/95 [X] NEW [ ] USED

DEALER'S NAME, CITY & STATE

ENGINE SIZE (CID/CC/L) ___ NO. CYLINDERS ___ [ ] TURBO [ ] DIESEL [ ] GAS [ ] FUEL INJECTN

TRANSMISSION TYPE: [ ] MANUAL [X] AUTOMATIC

ANTILOCK BRAKES: [X] YES [ ] NO

RESTRAINT SYSTEM: [X] DRIVERSIDE AIRBAG [ ] MOTORBELT [ ] PASSENGERSIDE AIRBAG [X] 3-POINT BELT [ ] 2-POINT BELT

CRUISE CONTROL: [X] YES [ ] NO

DRIVETRAIN: [ ] FRONT [ ] REAR [X] 4-WHEEL

BODY STYLE: STAWAG ___ 4 DR ___ 2 DR ___ HATCH BK ___ VAN ___ PK UP TRK ___ OTHER [X]

FAILED COMPONENT(S)/PART(S) INFORMATION (REPORT TIRE INFORMATION ON BACK)

COMPONENT	PART NAME(S)	LOCATION	FAILED PART(S)
15902000	EQUIPMENT:OTHER PIECES:TRAILER HITCHES AND ATTACHMENTS	[ ] LEFT FRONT [ ] RIGHT [X] REAR	[X] ORIGINAL [ ] REPLACEMENT

NO. OF FAILURES

DATE(S) OF FAILURE(S)

MILEAGE AT FAILURE(S)

VEHICLE SPEED AT FAILURE(S)

MANUFACTURER CONTACTED: [ ] YES [X] NO

NHTSA PREVIOUSLY CONTACTED: [ ] YES [X] NO

APPLICABLE ACCIDENT INFORMATION

ACCIDENT	FIRE	NUMBER PERSONS INJURED	NUMBER OF FATALITIES	PROPERTY DAMAGE $$	POLICE REPORTED
[ ] YES [X] NO	[ ] YES [X] NO	0	0	___	[ ] YES [X] NO

NARRATIVE DESCRIPTION OF FAILURE(S), ACCIDENT(S), INJURY(IES)

*WHILE DRIVING, THE TRAILER HITCH BOLTS CAME LOOSE, CAUSING THE TRAILER TO DETACH FROM THE VEHICLE. *AK*

CONTINUE ON BACK IF NEEDED

The Privacy Act of 1974
Public Law 93-579
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HS Form 350 (Rev. 5-92)

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POSTED

Copied

Form Approved: O.M.B. No. 2127-0004

US Department of Transportation
National Highway Traffic Safety Administration

AUTO SAFETY HOTLINE
VEHICLE OWNER'S QUESTIONNAIRE
NATIONWIDE 1-800-424-9393
DC METRO AREA 202-366-0123

RECEIVED
97 NOV 25 PM 2:21
OFFICE OF DEFECTS INVESTIGATION

FOR AGENCY USE ONLY

DATE RECEIVED

od.or ___
rt.dt ___ ___
od.rt ___ ___
up.ltr ___ ___

REFERENCE NO.
525405

OWNER INFORMATION (TYPE OR PRINT)

NAME and ADDRESS

Alexandria, La.

DAY TIME TELEPHONE NO. (AREA CODE)

Do you authorize NHTSA to provide a copy of this report to the manufacturer of your vehicle? YES [X] NO [ ]
In the absence of an authorization, NHTSA *WILL NOT* provide your name or address to the vehicle manufacturer.

SIGNATURE OF OWNER

DATE 11/19/97

VEHICLE INFORMATION

VEHICLE IDENTIFICATION NO.*	VEHICLE MAKE	VEHICLE MODEL	MODEL YEAR
1GNEC26N5PJ359926	Chevrolet	Suburban	1993

*LOCATED AT BOTTOM OF WINDSHIELD ON DRIVER'S SIDE

CURRENT ODOMETER READING	DATE PURCHASED	DEALER'S NAME, CITY & STATE	ENGINE SIZE (CID/CC/L)	
78000	3/1/93 [X] NEW [ ] USED	Southern Chevrolet Alexandria, LA	7.4 Litr NO. CYLINDERS 8	[ ] TURBO [ ] DIESEL [ ] GAS [X] FUEL INJECTN

TRANSMISSION TYPE	ANTILOCK BRAKES	RESTRAINT SYSTEM	CRUISE CONTROL	DRIVETRAIN	BODY STYLE
[ ] MANUAL [X] AUTOMATIC	[X] YES [ ] NO	[ ] DRIVERSIDE AIRBAG [ ] MOTORBELT [ ] PASSENGERSIDE AIRBAG [X] 3-POINT BELT [ ] 2-POINT BELT	[X] YES [ ] NO	[ ] FRONT [X] REAR [ ] 4-WHEEL	STWAG X 4 DR ___ 2 DR ___ HATCH BK ___ VAN ___ PK UP TRK ___ OTHER ___

FAILED COMPONENT(S)/PART(S) INFORMATION (REPORT TIRE INFORMATION ON BACK)

COMPONENT	PART NAME(S)	LOCATION	FAILED PART(S)
Trailer Hitch	Factory installed trailer hitch	[ ] LEFT FRONT [X] RIGHT REAR	[X] ORIGINAL [ ] REPLACEMENT

NO. OF FAILURES	DATE(S) OF FAILURE(S)	MANUFACTURER CONTACTED	NHTSA PREVIOUSLY CONTACTED
1	discovered 5/3/96 cracks in hitch platform	[X] YES [ ] NO	[ ] YES [X] NO

MILEAGE AT FAILURE(S) 40,017

VEHICLE SPEED AT FAILURE(S)

APPLICABLE ACCIDENT INFORMATION

ACCIDENT	FIRE	NUMBER PERSONS INJURED	NUMBER OF FATALITIES	PROPERTY DAMAGE $$$	POLICE REPORTED
[ ] YES [X] NO	[ ] YES [X] NO	0#	0#	___	[ ] YES [ ] NO

NARRATIVE DESCRIPTION OF FAILURE(S), ACCIDENT(S), INJURY(IES)

If I had not discovered crack in hitch platform. It would have come loose while pulling my 31' trailer. Death, injury & destruction would have occured. I know many of these hitchs that have cracked on my Austrian Trails from Suburbans.

CONTINUE ON BACK IF NEEDED

The Privacy Act of 1974
Public Law 93-579
This information is requested pursuant to authority vested in the National Highway Traffic Safety Act and subsequent amendments. You are under no obligation to respond to this questionnaire. Your response may be used to assist the NHTSA in determining whether a manufacturer should take appropriate action to correct a safety defect. If the NHTSA proceeds with administrative enforcement or litigation against a manufacturer, your response or a statistical summary thereof, may be used in support of the agency's action.

HS-Form 350 (Rev. 5-92)

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Form Approved: O.M.B. No. 2127-0005

U.S. Department of Transportation

National Highway Traffic Safety Administration

AUTO SAFETY HOTLINE

VEHICLE OWNER'S QUESTIONNAIRE

NATIONWIDE 1-800-424-9393
DC METRO AREA 202-366-0123

POSTED

Copied

QC'd

FOR AGENCY USE ONLY

DATE RECEIVED
98 SEP 22 AM 10:00
OFFICE
DEFECTS INVESTIGATION

od.or ___ ___
rt.dt ___ ___
od.rt ___ ___
up-ltr ___ ___

REFERENCE NO.
541000

OWNER INFORMATION (TYPE OR PRINT)

NAME and ADDRESS

Salida, CO

DAY TIME TELEPHONE NO. (AREA CODE)

Do you authorize NHTSA to provide a copy of this report to the manufacturer of your vehicle? YES ☑ NO ☐
In the absence of an authorization, NHTSA WILL NOT provide your name or address to the vehicle manufacturer.

SIGNATURE OF OWNER

DATE 9/12/98

VEHICLE INFORMATION

VEHICLE IDENTIFICATION NO.*	VEHICLE MAKE	VEHICLE MODEL	MODEL YEAR
1GNGC26R6RJ422251	Chev.	Suburban	94

*LOCATED AT BOTTOM OF WINDSHIELD ON DRIVER'S SIDE

CURRENT ODOMETER READING	DATE PURCHASED	DEALER'S NAME, CITY & STATE	ENGINE SIZE (CID/CC/L)	
61722	7/94 ☑ NEW ☐ USED	Pro Lube Salida, CO	NO. CYLINDERS	☐ TURBO ☐ DIESEL ☑ GAS ☑ FUEL INJECTN

TRANSMISSION TYPE	ANTILOCK BRAKES	RESTRAINT SYSTEM	CRUISE CONTROL	DRIVETRAIN	BODY STYLE
☐ MANUAL ☑ AUTOMATIC	☑ YES ☐ NO	☐ DRIVERSIDE AIRBAG ☐ MOTORBELT ☐ PASSENGERSIDE AIRBAG ☑ 3-POINT BELT ☐ 2-POINT BELT	☑ YES ☐ NO	☐ FRONT ☑ REAR ☐ 4-WHEEL	STAWAG ___ 4 DR ☑ 2 DR ___ HATCH BK ___ VAN ___ PK UP TRK ___ OTHER Suburban

FAILED COMPONENT(S)/PART(S) INFORMATION (REPORT TIRE INFORMATION ON BACK)

COMPONENT	PART NAME(S)	LOCATION	FAILED PART(S)
Frame Hitch Receiver		☐ LEFT FRONT ☑ RIGHT REAR	☑ ORIGINAL ☐ REPLACEMENT

NO. OF FAILURES	DATE(S) OF FAILURE(S)	MANUFACTURER CONTACTED	NHTSA PREVIOUSLY CONTACTED
1	8/98	☑ YES ☐ NO	☐ YES ☑ NO

MILEAGE AT FAILURE(S) 40,000 towing

VEHICLE SPEED AT FAILURE(S) NA Miles

APPLICABLE ACCIDENT INFORMATION

ACCIDENT	FIRE	NUMBER PERSONS INJURED	NUMBER OF FATALITIES	PROPERTY DAMAGE ESTS$	POLICE REPORTED
☐ YES ☑ NO	☐ YES ☑ NO				☐ YES ☐ NO

NARRATIVE DESCRIPTION OF FAILURE(S), ACCIDENT(S), INJURY(IES)

On recent caravan of Airstream Trailer(35) we found 5 receivers with crack failures at each side [redacted] Rear where receiver bolts to frame. Each of us have a Suburban 94 through 97. Even though we welded the cracks - the receiver will again fail. We all will replace our Receivers (Chev)

CONTINUE ON BACK IF NEEDED

This information is requested pursuant to authority vested in the National Highway Traffic Safety Act and subsequent amendments. You are under no obligation to respond to this questionnaire. Your response may be used to assist the NHTSA in determining whether a manufacturer should take appropriate action to correct a safety defect. If the NHTSA proceeds with administrative enforcement or litigation against a manufacturer, your response, or a statistical summary thereof, may be used in support of the agency's action.

HS-Form 350 (Rev. 5-92)

Fold to show Return Address (no stamp needed) Fasten with tape or staple and mail

(INFORMATION ON TIRE FAILURE(S) (IF APPLICABLE))

TIRE IDENTIFICATION NO.*													MANUFACTURER/TIRE NAME	SIZE
D	O	T												

* The identification number consists of 7 to 10 letters and numerals following the letters DOT. It is usually located near the rim flange on the side opposite the whitewall or on either side of a blackwall tire.

NARRATIVE DESCRIPTION (CONTINUED)

I reported this to GM 1-800 and they were not the least bit interested in the possible disaster this could cause. Total failure could happen if not detected and major accident would result. All they were interested in was to tell me they would not replace the receiver because the odometer is out of warranty.
I have ordered a new "Reese" Reciever — I would not have another GM supplied receiver. Reese is a well known Mfg of receivers. I called the factory Tech Service People 1-800 444-8899 They claim they have seen many failures (cracks) like ours on GM units. Modifications must be done to have GM supply receivers that meet min specs to protect us purchasers. Here is a list of quality receiver Mfgs. —
Please tell Reese Mfg - Hwy 62 - Jeffersonville, Ohio 43128

U.S. Department of Transportation

National Highway Traffic Safety Administration

400 Seventh St., S.W.
Washington, D.C. 20590

Official Business
Penalty for Private Use $300

FLORIDA 13 SEP PM 1988

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 73173 WASHINGTON, D.C.

POSTAGE WILL BE PAID BY NATL HWY TRAFFIC SAFETY ADMIN.

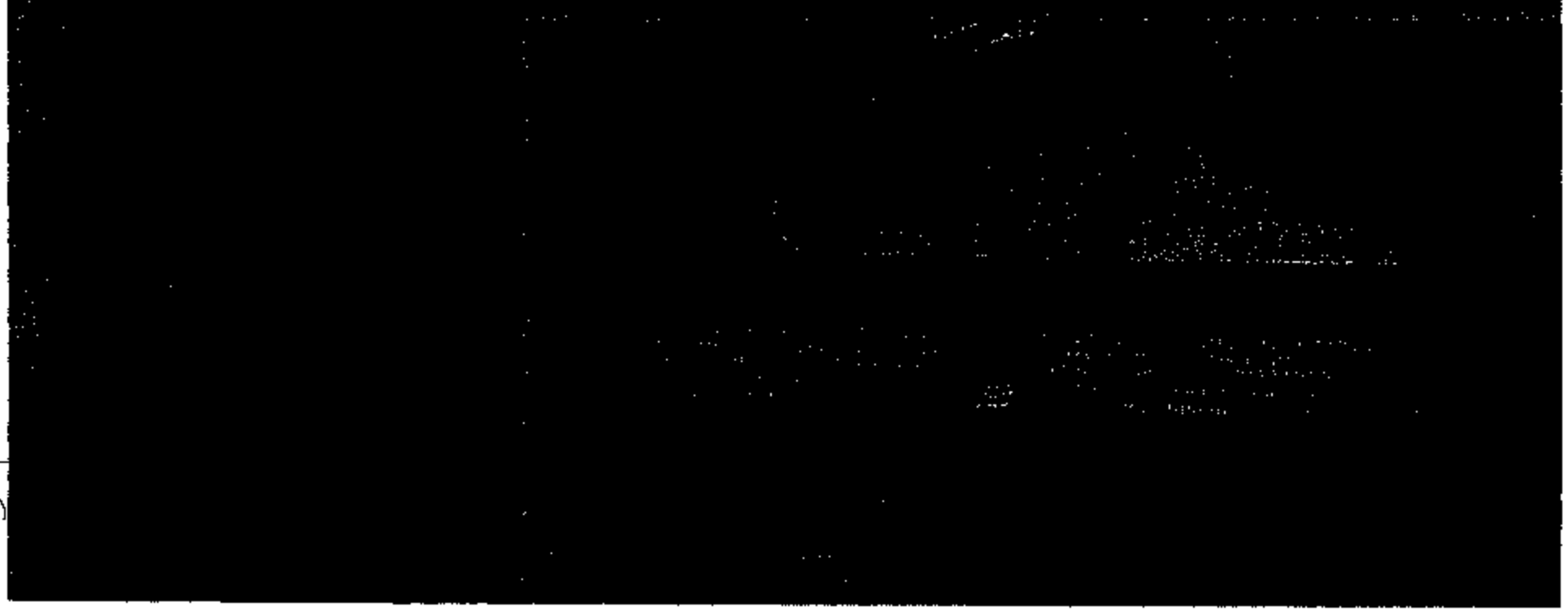
U.S. Department of Transportation
National Highway Traffic Safety Administration
Auto Safety Hotline, NEF-11 HL
400 7th Street, SW
Washington, DC 20590

38

VIN#1GNGK26N7PJ324212

[redacted]

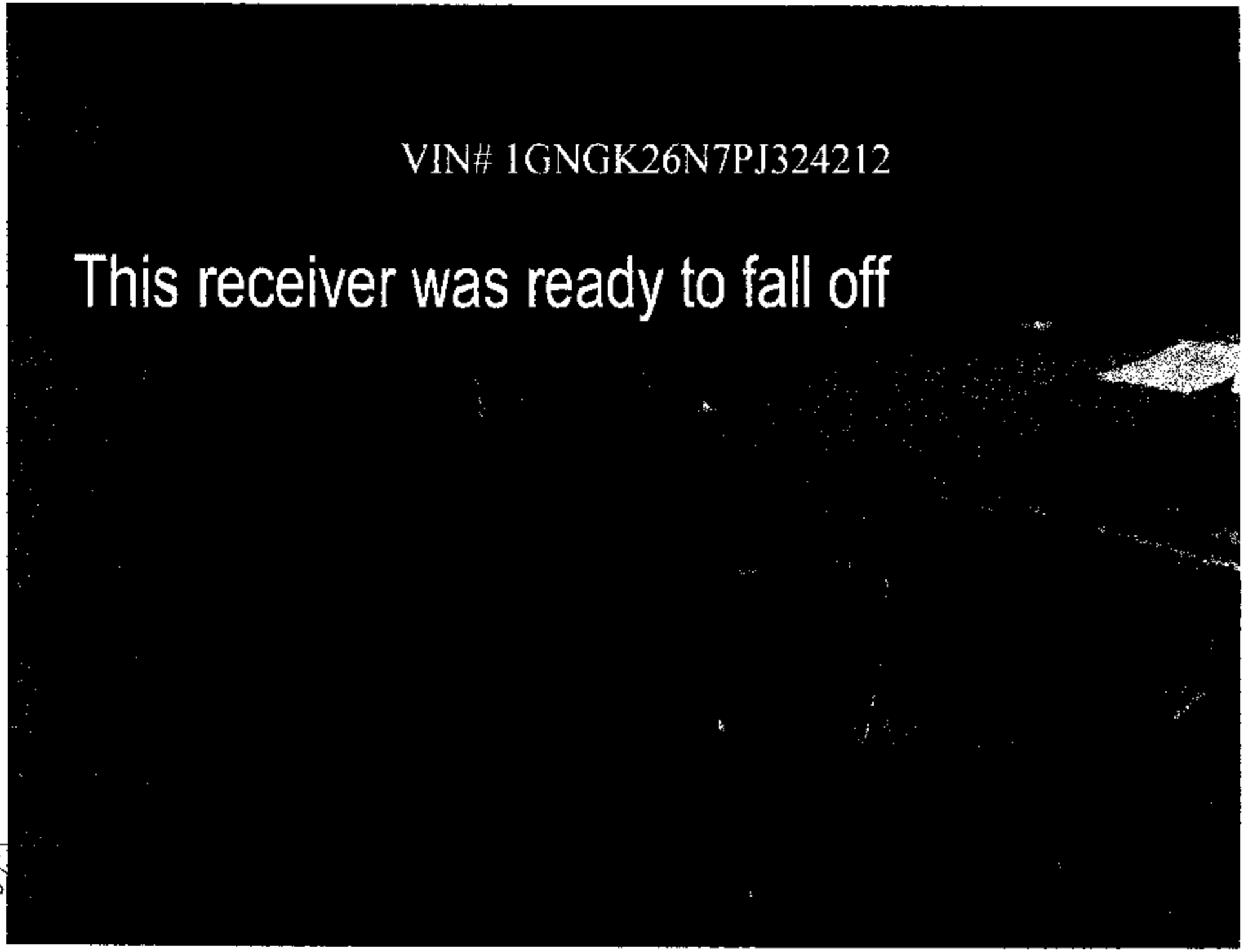
General Motors Receiver
Idenication



57

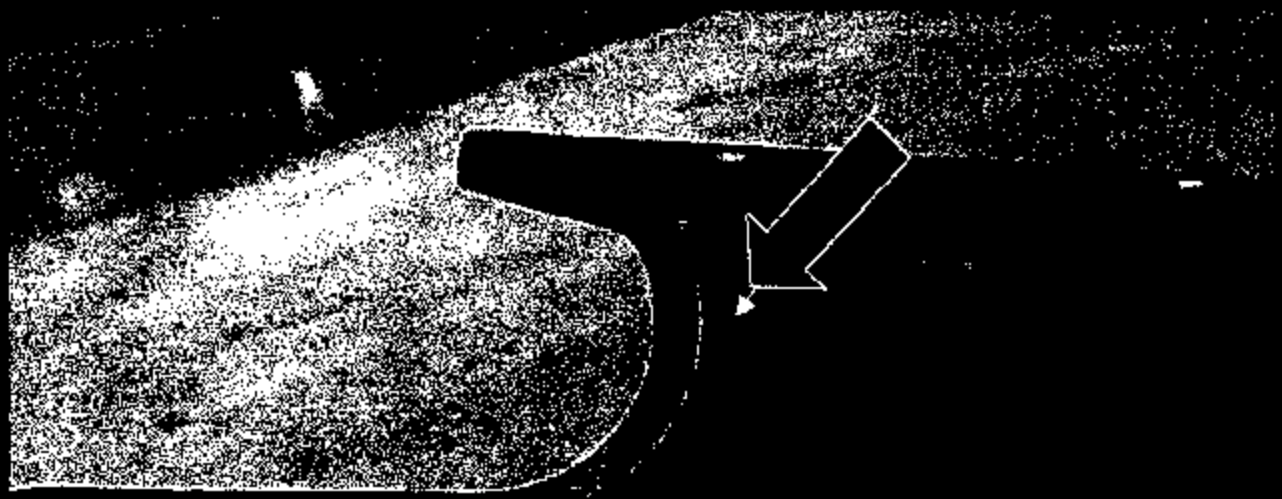
VIN# 1GNGK26N7PJ324212

This receiver was ready to fall off



VIN# 1GNGC26NXRJ399034
WELDED & CRACKED = DIFFERENT ANGLE

VIN# 1GNGC26NXRJ399034
CRACK COMPLETELY THROUGH
(left side)

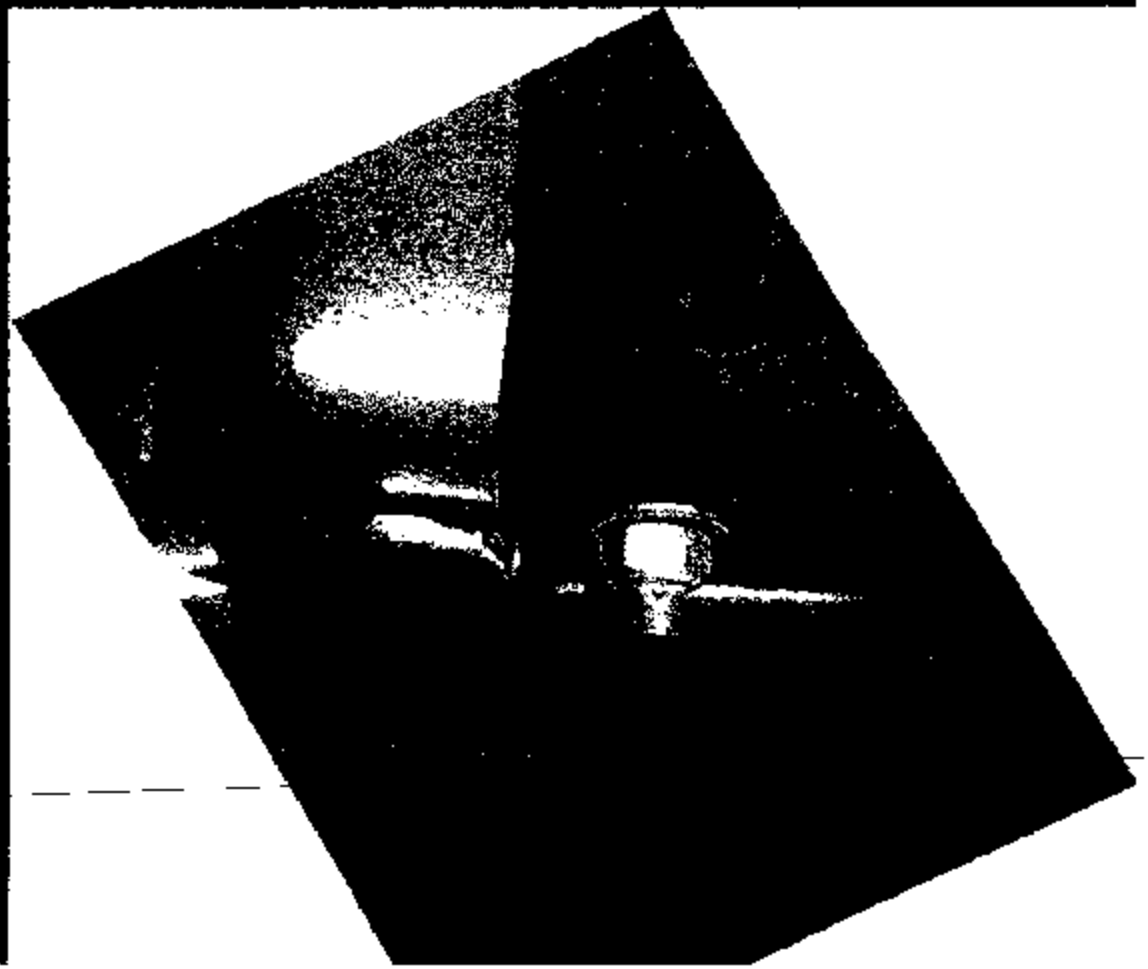


DON [redacted]
VIN#GKGC26J5VJ733362

- ROAD SIDE (LEFT)
- BREAK IS ALL THE WAY THROUGHT 1/4 SIDE PLATE.

VIN# GKGC26J5VJ733362

- CURB SIDE (RIGHT)
- CRACK IS JUST STARTING



Name [redacted]

Apt. No

City NEW PORT RICHEY | State FL

Do you authorize NHTSA to provide a copy of this report to the manufacturer of your vehicle? ☑ YES ☐ NO
In the absence of an authorization, NHTSA WILL NOT provide your name or address to the vehicle manufacturer.

Signature of Owner [redacted] Date 11/26/99

PRODUCT INFORMATION

Vehicle Identification No. (VIN.) (17 Digits) (Located at bottom of windshield on driver's side)	Make	Model	Year
1GKGC26J5VJ733362	GMC	SUBURBAN 2500	1997

Purchased Date: APRIL 1997 ☑ New ☐ Used

Dealer's Name: WES HARRIS

Dealer's City: BROOKSVILLE State: FL Zip Code: 34613

Engine Size (CID/CC/L): 454 No. Cylinders: 8 ☐ Turbo ☐ Diesel ☑ Gas ☑ Fuel Injection

Manufacture Date (on driver's door or pillar)	Transmission Type	Restraint System	Cruise Control	Drivetrain	Vehicle Type	Body Style
02/97	☐ Manual ☑ Automatic	☑ Driverside Air Bag ☐ Motorbelt ☑ Passengerside Air Bag ☑ 2-Point Belt ☐ 3-Point Belt	☑ Yes ☐ No	☐ Front ☑ RWD ☐ 4-Wheel	☐ Car ☑ Sport Utility ☐ Van ☐ Truck ☐ Minivan ☐ Motorcycle ☐ Other	☐ 2-Door ☑ 4-Door ☐ Stationwagon ☐ Pick Up Truck ☐ Other SUV

FAILED COMPONENT(S)/PART(S) INFORMATION

Part Name(s)	Location	Failed Part(s)	Handicap Adaptive Equip
TRAVEL TRAILER HITCH RECEIVER	☐ Left ☐ Right ☐ Front ☑ Rear	☑ Original ☐ Replacement	☐ Yes ☑ No

TO BE COMPLETED WHEN REPORTING A TIRE FAILURE

Tire Brand	Tire Name	Complete Tire Size

No. of Failures:

Date(s) of Failure(s):

Mileage at Failure(s):

Vehicle Speed at Failure(s):

Failed Part(s) Available? ☐ Yes ☐ No

NHTSA Previously Contacted? ☐ Yes ☐ No

APPLICABLE INCIDENT INFORMATION

(Please describe in detail the Incident(s), Failure(s), Crash(es), and Injury(ies). Attach photos if available.)

Crash	Fire	Number of Persons Injured	Number of Fatalities	Reported to Manufacturer
☐ Yes ☑ No	☐ Yes ☑ No	NONE	NONE	☑ Yes ☐ No

Narrative Description of Incident(s), Failure(s), Crash(es), and Injury(ies).

HITCH RECEIVER DEVELOPED CRACKS ON RIGHT & LEFT SIDES. IF CRACKS EXPAND, SEPARATION OF HITCH FROM TOW VEHICLE IS POSSIBLE, CAUSING LOSS OF TOWED TRAILER AND POSSIBLY EMMESHING OTHER VEHICLES & PERSONS IN AN ACCIDENT.

5329 Eagles Nest Road
Fruitland Park, FL 34731

Ms. Kathy Demeter, Assistant Administrator
Department of Transportation
National highway Traffic Safety Agency

400 7th Street Southwest, Room 5323
Washington, DC 20590

Dear Ms. Demeter,

Subject: Vehicle Hitch Platform Failures

In the course of our duties to our membership, we prepared a safety presentation that included an engineering analysis of where fatigue failures might occur on vehicle hitch platforms. We asked all members to take the time to check their vehicles for such evidence. Surprising to us, the numbers of fatigue failures found suggests that these failures are not isolated nor attributed to one auto maker.

We have been in contact with a Mr. Peter Ong of NHTSA to whom we have sent data and photos of failed hitch platforms. For some reason, his department has been slow to respond. Therefore, we are petitioning your agency to begin an investigation of hitch platforms and related hitching equipment to assess their compatibility with National Highway Safety Standards for materials and construction specifications.

It is our understanding that there is no federal requirement for manufacturers to dynamically test their hitching equipment, and thus it is a 'Buyer Beware' scenario where the consumer is at the mercy of the marketplace.

The use of substandard hitching equipment should not be an option to the trailer towing motorist.

Sincerely,

Dave Blum
WBCCI RV Safety Committee
djb

cc: WBCCI President
WBCCI RV/Safety Committee

GM Safety Center

March 30, 2000

Ms. Kathleen C. DeMeter, Director
Office of Defects Investigation
NHTSA Safety Assurance
400 Seventh Street, S.W.
Washington, D.C. 20590

GM-583

NSA-14pco
DP00-001

Dear Ms. DeMeter:

This letter is GM's response to your information request (IR) regarding the alleged cracks in the trailer hitch receiver platforms in model year 1993 through 1997 Chevrolet and GMC Suburban vehicles dated February 16, 2000.

Your questions and our corresponding replies are as follows:

1. **Identify the total number of vehicles equipped with the subject component sold in the United States by make, model, and model year. If the subject components are not identical, please identify the total number of each and the vehicle on which they are equipped.**

   Attachment A lists by model year the number of subject vehicles equipped with the subject OEM trailer hitch component that were produced for sale in the United States.

2. **Identify the total number of vehicles, other than the subject vehicles, equipped with the subject component by make, model, and model year.**

   Attachment B lists by make, model, and model year the number of vehicles equipped with the subject OEM trailer hitch component other than the subject vehicles.

3. **State the number and provide copies of all documents containing the following, from all sources, of which GM is aware and which relate, or could relate to the alleged defect in the subject vehicles:**

   a. **owner/fleet complaints;**
   b. **field reports;**
   c. **crash/incident claims;**
   d. **subrogation claims;**
   e. **lawsuits; and**
   f. **third-party arbitration proceedings (where GM is a party to the arbitration).**

   Please list and collate your response for each category ("a" through "f") by date of claim. Please provide for each item in this response the incident date, mileage of vehicle at time of incident (if known), approximate age of vehicle or model year, vehicle build date, disposition of matter, and, where a fleet vehicle is involved, the

Product Investigations
Mail Code: 480-16-304 • 30500 Mound Road • Warren, MI 48090-9055
Phone: (810) 986-8029 • Fax: (810) 947-2318
GM583 Fnl.doc

name of the fleet, and the name and telephone number of a contact person at that fleet. For items "a" through "d," please provide all related information and reports whether or not GM has verified each one. For items "e" and "f," summaries are acceptable. Please identify in the summary the caption, court, docket number, and filing date of each lawsuit if a copy of the complaint initiating the lawsuit is not provided.

General Motors responds with the following attachments:

Attachment	Report Type	# Provided
"C"	Owner Reports	12
"D"	Technical Assistance and Field Reports	1
"E"	Lawsuits	1
"F"	Accident Claims	1

Attachment C also contains one matching NHTSA Report.

4. **If GM has issued any service or technical bulletins, advisories, or other communications to dealers, zone offices, or field offices pertaining to the alleged defect in the subject vehicles, provide a copy of each such document. If no such documents have been issued, so state. For each item identified, please provide the following information:**

   a. **A complete chronology listing all activities or events including, but not limited to, incidents involving the subject component, which led GM to believe it needed to undertake the communication.**
   b. **A listing (in chronological order) of all information related to any testing through which the need for the communication was identified and/or assessed, even if the testing was being conducted for another purpose. Please provide a copy of each item listed.**
   c. **The number of repairs and/or replacements paid for by GM that resulted from the communication identified. List your response by repairing dealer.**

   A record search indicates no such documents concerning trailer hitches on the subject vehicles have been issued.

5. **State the number of all warranty claims, including extended warranty claims, and "goodwill," field or zone adjustments received by GM that relate to the alleged defect in the subject vehicles by calendar year, calendar month, and problem identification. Identify all owners by name, address, and telephone number, and all vehicles by vehicle identification number, model name, model year, date of manufacture, date of retail sales, date of incident, mileage at the time of the incident, and problem description.**

   A warranty search for the labor operation "hitch, trailer – R&R" disclosed a total of 140 reports. The warranty system does not contain vehicle owner's names, addresses, or phone numbers. Attachment G contains the other requested warranty information.

Warranty numbers provided have limited analytical value in analyzing the field performance of a motor vehicle component because the records do not contain sufficient information to establish the condition of the part at the time of the warranty correction, and discrepancy trouble codes selected by service personnel for the same type of problem on different vehicles are not necessarily consistent. Warranty numbers represent claims by our dealers for reimbursement for parts and labor costs incurred in performing warranty service for our customers.

6. Identify and provide copies of all documents pertaining to tests and inspection of the subject component including, but not limited to, standards, specifications and procedures.

The following attachments contain the requested documents:

Attachment H contains the following test procedures:
- General Motors Uniform Test Specification (GMUTS) R-15-31, Desert Proving Ground Trailer Towing Durability Test.
- GMUTS L-14L-1, Automotive Type Trailer Hitch Test, revised February, 1977.
- GMUTS L-14L-1, Automotive Type Trailer Hitch Test, revised June, 1994.

Attachment I contains the following test reports:
- Analysis report on the subject component dated November 20, 1989, conducted per GMUTS L-14L-1.
- Test report 12R29-100, dated August 7, 1990.
- Test report 12R28-100, dated September 10, 1990.
- Test report 12R48-100, dated October 13, 1990.
- Test report 12R47-100, dated November 7, 1990.
- Test report dated May 31, 1995, per GMUTS R-15-31.

Attachment J contains the following test incident reports:
- Test Incident Report (TIR) TB-92C-02--0001TL, dated July 6, 1990, final response approved August 15, 1990, and referenced in test report 12R28-100.
- TIR TB-92K-14L-0001TL, dated July 25, 1990, final response approved August 31, 1990, and referenced in test report 12R29-100.
- TIR TB-92C-14--0001TL, dated July 6, 1990, final response approved July 26, 1990, and referenced in test report 12R28-100.
- TIR TB-92K-14--0001TL, dated August 13, 1990, final response approved August 31, 1990, and referenced in test report 12R47-100.
- TIR TB-92K-14--0002TL, dated August 13, 1990, final response approved August 14, 1990, and referenced in test report 12R47-100.

7. Describe the tow capacities and limitations of the subject vehicles and subject component when used to tow a 8,000 pounds or larger RV trailer including:

a. any recommended or approved towing equipment;
b. any instructions given to the buyers;

c. any instructions as to how the additional towing equipment is to be installed whether by owner or by a trailer sales dealer;
d. any restrictions or conditions imposed by GM on the attachment of and use of towing equipment (sway bars, distribution hitch, ball size etc . . .).

GM trailering capacities and limitations can be found in each of three different publications: Owner's Manual, Chevrolet sales brochure and GMC Trailering Guide. The Owner's Manual began to identify trailer ratings by model in the 1996 model year. Instructions, guidelines and restrictions to owner/operators are identified in these publications. GM does not recommend or approve any specific trailering equipment, or indicate how or by whom it should be installed. The following attachments contain these publications:

Attachment K: 1993 through 1997 Chevrolet Suburban Owners Manuals, "Towing a Trailer" section (GMC manuals are identical). "Towing a Trailer" can be found at the end of Section 4, "Your Driving and the Road".

Attachment L: 1993 through 1997 Chevrolet Suburban sales brochures (trailering references only). Trailering information is confined to a specific trailering section, and only that section is provided.

Attachment M: 1993 through 1997 GMC Trailering Guides

8. Identify and describe all modifications or changes made by, or on behalf of GM, to the trailer hitch receiver platform used in MY 1991 and later Chevrolet and GMC Suburban vehicles. The following information must be included for each such modification or change:

a. the date or approximate date on which the modification or change was incorporated into production;
b. a description of the modification or change;
c. the vehicles affected by the change;
d. the reason for the modification or change;
e. the part number(s) for the part incorporating the change;
f. the date or approximate date the part incorporating the change was made available to retail parts departments as a service part;
g. disposition of unmodified parts and assemblies; and
h. a sample of the part incorporating the modification or change (where applicable).

Provide engineering drawings and specifications for the design and subsequent modifications over the subject vehicle years. The information shall include the material used, strength requirement or heat treatment and any testing or certification required as part of the production process.

There has been one modification to the subject component since its initial release. This Engineering Work Order (EWO) W6654 is provided in Attachment N.

a. Start of production, 1996 model year.
b. Revised trailer rating label format and positioning requirements.

c. All 1996 through 2000 model year Chevrolet and GMC models C10516, C10706, C10906, C20906, K10516, K10706, K10906 and K20906 equipped with Z82 Trailer Provisions Special Equipment, HD.
d. To clarify information on the trailer rating label and improve appearance.
e. Part number 15643953 for model years 1992 through 1995 and part number 15724874 for model years 1996 through 2000.
f. General Motors Service Parts Operations first had part number 15724874 units in its distribution inventory on March 26, 1966.
g. Any unused old label stock was discarded.
h. Attachment O contains drawing number 15643953 (Hitch w/original label) and Attachment P contains drawing number 15724874 (Hitch w/modified label).

9. **Identify and describe all modifications or changes to the subject component and/or vehicles that have been or are being proposed, evaluated, or considered by GM to address the alleged defect. Do not repeat modifications or changes identified in response to Request # 8 above. The following information must be included for each such modification or change:**

a. the date or approximate date on which the modification or change was initially considered;
b. a description of the modification or change;
c. the vehicles that would be affected by the change; and
d. the reason the modification was (or was not) adopted.

Ideas for enhancement of the subject component may exist as do ideas for the enhancement of many vehicle parts; however, no change proposals are known to be formalized.

10. **Identify and provide copies of all documents reflecting any test, inspection, study, survey, and investigation pertaining to the alleged defect that is known to GM. Include all pertinent documents, regardless of whether they are in interim, draft, or final form.**

Attachment Q contains documents responsive to this request:

- Memo dated September 15, 1995, summarizing meeting discussion. GM requested hitch platform strain measurements and comparison to finite element analysis. GM also acknowledged that the initial fatigue analysis (using the loads from Table 1 in the 1977 version of GMUTS L-14L-1) could subject the hitch platform to yield, and that the most highly stressed areas did match the crack locations in the NHTSA photos.

- Memo dated September 22, 1995, indicating the range of hitch shanks to be used. GM had seen one instance of a cracked hitch platform, and the hitch shank appeared exceptionally long. Review of aftermarket catalogs indicated only a reasonable variation in readily available shank lengths.

- Informal note (undated) to test engineer indicating how hitch shank length is measured.

- Analysis report per PROP (project plan) JAB08 (no specific report number issued), dated December 12, 1995. Analysis was conducted per GMUTS L-14L-1 loads (June 1994 revision), using a 10 inch shank, and again with a 14 inch shank. Stresses exceeded yield limit of 262 Mpa in some load cases, but never exceeded ultimate stress limit. Plots of worst case load conditions are included.

- Informal supplement (undated) from analysis engineer including plots of all load cases conducted in analysis above. In the case of the highest stress load, the moment case, fatigue analysis was conducted, indicating that with 10 inch shank, the static proof moment load from SAE J684 would have to be applied approximately 39200 times to generate material separation. With a 14 inch shank, the static proof moment load would have to be applied approximately 14700 times to generate material separation.

- Analysis report JAB08-10B dated February 4, 1997. Strain measurement data and subsequent analysis indicated that the 14 inch hitch shank length imposed less severe loading into the hitch platform than the 10 inch shank length did. (At this time it is believed that this report may not correctly represent the variation in stress level and fatigue life related to variation is shank length).

11. Furnish GM's assessment of the alleged defect in the subject vehicles, including:

a. all causal or contributory factors;
b. the failure mode;
c. root cause of the failures; and
d. potential for future occurrences of the alleged defect in the subject vehicles.

GM has an ongoing investigation and is unable to provide a definitive answer at this time.

All test and analysis documents within GM's possession indicate that the subject component will perform without failure in the field if load limitations are met. GM believes that loaded trailer weights in the field may exceed 10,000 lbs and that loaded trailer tongue weights in the field may exceed 1000 lbs. It is GM's belief that if the hitch platform is used within the confines as described by GM in various, readily available trailering usage documents, the subject component will perform without failure.

***

General Motors requests that the document stamped "GM Confidential" included in Attachments H, O, and P be afforded confidential treatment by the NHTSA. This information is not customarily made public by General Motors and contains trade secrets and commercial information which is privileged or confidential under 5 U.S.C. Section 552(b)(4), 49 CFR Part 512 and 49 U.S.C. Section 30167(a).

Attachments H, O and P contain engineering drawings. These drawings have commercial value that can only be obtained independently at considerable cost. This information can be used by competitors to identify quality and performance problems or differences, thereby enabling them to improve their own products, without the expenditures associated with the evaluation of products, all

at the expense of General Motors. Attachments H, O, and P contain commercial information the disclosure of which would likely result in substantial competitive harm.

General Motors treats the above material as confidential proprietary information available only to authorized General Motors personnel and not otherwise available to the public. The document is maintained under a record-keeping system which is intended to control dissemination of this material within General Motors, and to assure that it is not disseminated outside the Corporation, except as described in the attached certification made pursuant to 49 CFR Part 512.4(e).

To the best of our knowledge, no prior determinations of the confidentiality of this document has been made by the NHTSA, other Federal Agencies, or the Federal Courts. Documents contained in Attachments H, O, and P however, have, to the best of our knowledge, normally been granted confidential treatment by the NHTSA in the past. The drawings in Attachments H, O, and P are of a type for which a class determination of confidentiality has been made under 49 CFR Part 512, Appendix B.

The document for which confidential treatment is being requested, with a copy of this letter, is being submitted to your Office of the Chief Counsel. It is requested that notice concerning the Agency's determination of confidentiality for this material and any questions relating to confidentiality be addressed to Steven Selander, Attorney, GM Legal Staff, MC 480-106-304, 30500 Mound Rd., Warren, MI 48090; [(810) 986-8424]. Confidential treatment of this material is requested for an indefinite period.

The document subject to this request for confidentiality has been clearly stamped "GM CONFIDENTIAL". If a request for disclosure of any or all of this information is received by the NHTSA, General Motors requests notification of receipt of each such request and, if necessary, an opportunity to further explain the reasons why such material is trade secret and commercial information which should not be disclosed under the applicable statutes and regulations.

GM claims that certain information, in documents that are part of claims files maintained by the GM Legal Staff, is attorney work product and/or privileged. That information includes notes, memos, reports, photographs, and evaluations by attorneys (and by claims analysts, investigators, and engineers working at the request of attorneys). GM is producing responsive documents from claims files that are neither attorney work product nor privileged and withholding those that are attorney work product and/or privileged.

This response is based on searches of General Motors Corporation (GM) locations where documents determined to be responsive to your request would ordinarily be found. As a result, the scope of this search did not include, nor could it reasonably include, "all past and present officers and employees, whether assigned to its principle offices or any of its field or other locations, including all of its divisions, subsidiaries (whether or not incorporated) and affiliated enterprises and all of its headquarters, regional, zone, and other offices and their employees, and all agents, contractors, consultants, attorneys and law firms and other persons engaged directly or indirectly (e.g., employee of a consultant) by or under the control of GM (including all business units and persons previously referred to) who are or, in or after 1990, were involved in any way with (a) design, engineering, analysis, modification, or production; (b) testing, assessment, evaluation; or (c) record-keeping, claims, or lawsuits relating to the alleged defect in the subject vehicles".

This response was compiled and prepared by this office upon review of the documents produced by various GM locations, and does not include documents generated or received at those GM locations subsequent to their searches.

Please contact me if you require further information about this response or the nature or scope of our searches.

Sincerely,

Frank C. Sonye, Jr.
Director
Product Investigations

attachments

CERTIFICATE IN SUPPORT OF REQUEST FOR CONFIDENTIALITY
DP00-004/GM583

I, Frank C. Sonye, Jr., pursuant to the provisions of 49 CFR Part 512 state as follows:

(1) I am Director of Product Investigations, and I am authorized by General Motors Corporation (GM) to execute documents on its behalf;

(2) The information stamped "GM Confidential" contained in Attachments H, O, and P to this document is confidential and proprietary data and is being submitted with the claim that it is entitled to confidential treatment of 5 USC §552(b)(4), 49 U.S.C. Section 30167(a) and implemented in 49 CFR Part 512;

(3) I, or members of my staff, have personally inquired of the responsible GM personnel who have authority in the normal course of business to release the information for which a claim of confidentiality has been made to ascertain whether such information has ever been released outside GM;

(4) Based upon such inquiries to the best of my knowledge, information and belief, the information for which GM has claimed confidential treatment has never been released or become available outside GM, except as hereinafter specified: None.

(5) I make no representations beyond those contained in this certificate and in particular, I make no representations as to whether this information may become available outside GM because of unauthorized or inadvertent disclosure except as stated in Paragraph 4; and,

(6) I certify under penalty of perjury that the foregoing is true and correct. Executed on this the 30 day of May 2000.

F. C. Sonye Jr.
Frank C. Sonye, Jr.
Director
Product Investigations

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ATTACHMENT "A"

Alleged Unsatisfactory Performance of the OEM Trailer Hitch
1993-97 C/K Suburban
IR GM-583

Vehicles Built for Sale in the U.S.

Question #1

	1993	1994	1995	1996	1997	Total
Chevrolet	48,248	61,449	64,610	56,496	71,098	301,901
GMC	22,202	26,352	26,882	29,715	33,386	138,537
Total Vehicles	**70,450**	**87,801**	**91,492**	**86,211**	**104,484**	**440,438**

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General Motors Corporation

DP00-001; GM583

Attachment A

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ATTACHMENT "B"

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Alleged Unsatisfactory Performance of the OEM Trailer Hitch
1993-97 C/K Suburban
IR GM-583

Vehicles Built for Sale in the U.S.

Question #2

Chevrolet	1992	1993	1994	1995	1996	1997	1998	1999	2000	Total
Suburban	20,954	11,453	16,954	13,813	12,737	10,379	38,869	167,595	0	227,418
2-dr. Utility	9,433	0	0	47,092	63,292	75,542	7,231	13,422	0	95,422
4-dr. Utility	0						47,080	146,783	12,805	392,594
Sub-Total Chev	**30,387**	**11,453**	**16,954**	**60,905**	**76,029**	**85,921**	**93,180**	**327,800**	**12,805**	**715,434**

GMC	1992	1993	1994	1995	1996	1997	1998	1999	2000	Total
Suburban	9,806	4,620	7,234	6,786	2,737	2,945	19,475	65,899	0	95,180
2-dr. Utility	2,893	0	0	17,253	21,373	26,837	8	0	0	27,223
4-dr. Utility	0						17,752	76,318	11,855	171,388
Sub-Total GMC	**12,699**	**4,620**	**7,234**	**24,039**	**24,110**	**29,782**	**37,235**	**142,217**	**11,855**	**293,791**

Cadillac	1992	1993	1994	1995	1996	1997	1998	1999	2000	Total
4-dr. Utility	0	0	0	0	0	0	0	19,355	17,900	37,255
Sub-Total GMC	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**19,355**	**17,900**	**37,255**

Total Vehicles	**43,086**	**16,073**	**24,188**	**88,934**	**104,131**	**119,697**	**134,411**	**493,370**	**46,560**	**1,046,480**

GM583 Att # 2001

jtf 2/29/00

ATTACHMENT C

General Motors Corporation

DP00-001; GM583

Attachment B

General Motors Corporation

DP00-001; GM583

Attachment C

CASE NO:	9913226701	VIN:	3GKGC26JXTG502455
DATE OPENED:	06/23/1999	MODEL YR:	96
DATE CLOSED:	07/26/1999	SERIES:	SUBURBAN 2/WD (
SOURCE:	PHONE	MILEAGE:	006114
CUSTOMER:	H	STATE:	IA
ADDRESS:			
HOME PHONE:			

COMMENTS

COMPLAINT CODE:
J08 ENGINE NOISE (GAS)

OPENING COMMENTS:
TICK IN MOTOR

CAUSE CODE: P PRODUCT CONCERN

DEALER CLOSING COMMENTS:

REGION CLOSING COMMENTS:
CRM WAS ADVISED BY THE SVC MGR THE NOISE IN THE ENGINE HAS NOT BEEN DUPICATED.

COMPLAINT CODE:
R31 TRAILER HITCH

OPENING COMMENTS:
HITCH IS CRACKED

CAUSE CODE: P PRODUCT CONCERN

DEALER CLOSING COMMENTS:

REGION CLOSING COMMENTS:
CUST WAS AWARDED 100% GOODWILL ASSISTANCE FOR THE REPAIR OF THE TRAILER HITCH.

COMPLAINT CODE:
S13 REIMBURSMENT REQUEST

OPENING COMMENTS:
CUST SEEKS REPLACEMENT OF HITCH

GM583 Att C 3001

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CAUSE CODE: P PRODUCT CONCERN

DEALER CLOSING COMMENTS:

REGION CLOSING COMMENTS:
THE CUST'S HITCHED WILL NOT BE REPLACED...HOWEVER THE CUST WILL RECEIVE 100% GOODWILL ASSISTANCE FOR THE REPAIR OF THE TRAILER HITCH.

SERVICING DEALER: 48-30656
HOAK MOTORS, INCORPORATED
P. O. BOX 958
SIOUX CITY IA 51102

DELIVERY DATE: 01/25/96 CASE TYPE: X
RESPONSIBLE PARTY: LESTER, SOHONNIE CLOSURE CODE: S
REGN CLOSE DATE: 00/00/00

GENERAL COMMENTS: 07/26/99 02:47P LESTER SOHONNIE
CRM CONTACTED THE SVC MGR AND WAS ADVISED THE CUST WILL RECIEVE 100% GOODWILL ASSISTANCE ON THE REPAIR OF THE TRAILER HITCH AND THE TURN SIGNAL.. HOWEVER HAS NOT DUPLICATED THE NOISE IN THE ENGINE.
SOHONNIE LESTER/PHOENIX CENTER

GENERAL COMMENTS: 06/23/99 03:50P LESTER SOHONNIE
CRM CONTACTED CUST AND ADVISED HIM THAT AT THIS POINT THE SVC ADV, DANNY WILL HAVE TO GET PERMISSION FROM THE SVC MGR WHO IS ON VACATION. THE SVC ADV TRIED TO CONTACT THE ASM TO GET PERMISSION TO COVER THE REPAIRS WITH GOODWILL ASSISTANCE BUT THE ASM IS ON VACATION AS WELL...CRM ADVISED THE CUST THAT BEFORE A REVIEW CAN TAKE PLACE THE SVC MGR HAS TO BE CONTACTED SO AT THIS POINT WE WILL HAVE TO WAIT UNTIL THE SVC MGR COMES BACK FROM HIS VACATION.
.
CUST STATES WILL CONTACT DLR IN A COUPLE OF DAYS.
.
.

GENERAL COMMENTS: 06/23/99 03:00P STUART BETTY
CUST CALLED SEEKING AN UPDATE ON TRAILER HITCH. WOULD LIKE SOHONNIE LESTER TO CALL HIM, CUST STATES WILL CALL BACK.

GENERAL COMMENTS: 06/23/99 01:48P LESTER SOHONNIE
CUST STATES DLR HAS TO CONTACT ASM TO APPROVE WARRANTY COVERAGE BECAUSE HE'S OUTSIDE OF WARRANTY BY 5 MOS..STATES ASM IS ON VACATION.
.
CUST SEEKS TO HAVE TRAILER HITCH (WHICH HAS A CRACK) REPLACED, PROBLEM WITH HAZZARD LIGHTS AND NOISE IN ENGINE ADDRESSED BY GM.
.
CRM CONTACTED SVC ADV DANNY HARMS (SVC MGR MICHAEL DICKSON IS ON VACATION) TO KNOW WHY HE HAS TO CONTACT THE ASM...THE SVC ADV WAS OUT TO LUNCH AND THE CUST STATES HE WILL CALL CAC BACK SO THAT WE MAY CONTACT DANNY ONE HE HAS

RETURNED.
.

GENERAL COMMENTS: 06/23/99 01:24P FRANCES LOREN
CUST STATES DEALER ASKED HIM TO CONTACT US..DEALER HAS BEEN WORKING W/ FIELD
REP TO AUTHORIZE NEW TRAILER HITCH..CUST SEEKS REPLACEMENT OF HITCH, AND RE
PAIR OF ENGINE NOISE AND HAZARD LIGHT..CRM ADVISED RECALL # 96047, AND
TRANSF TO TIER 2, SOHONNI LESTER..LOREN FRANCES/TAMPA

CASE NO: 9917977801
DATE OPENED: 08/05/1999
DATE CLOSED: 08/05/1999
SOURCE: PHONE
CUSTOMER: M
ADDRESS:
HOME PHONE:

VIN: 1GKGC26NXRJ730899
MODEL YR: 94
SERIES: SUBURBAN 2/WD (
MILEAGE: 160000
STATE: CA

COMMENTS

COMPLAINT CODE:
R31 TRAILER HITCH

OPENING COMMENTS:
CUSTOMER STATES THE TRAILER HITCH TORE OFF

CAUSE CODE: P PRODUCT CONCERN

DEALER CLOSING COMMENTS:

REGION CLOSING COMMENTS:
UNABLE TO ASSIST DUE TO VEH. BEING MORE THAN TWO YEARS AND 124,000 MILES OUTSIDE OF WARRANTY.

COMPLAINT CODE:
T95 TAMPA TRANSFER TO TIER 2

OPENING COMMENTS:
TAMPA TRANSFER

CAUSE CODE: C .

DEALER CLOSING COMMENTS:

REGION CLOSING COMMENTS:
UCC CODE FOR TRACKING PURPOSES ONLY

SERVICING DEALER: 48-42300
RANCHO GRANDE MOTORS, INC.
PO BOX 4960
SAN LUIS OBISPO CA 93403

GM583 Att C 3004

00000067

* * * G M R E S T R I C T E D * * *

DELIVERY DATE: 02/05/94 CASE TYPE: X
RESPONSIBLE PARTY: ALLEN, EUREKA CLOSURE CODE: S
REGN CLOSE DATE: 08/05/99

GENERAL COMMENTS: 08/05/99 06:18P CHASE GALA
CALLED DLR. AND REQUESTED THAT CUST BE CONTACTED NEXT TIME ASM WAS AT DLR.
DLR. ADVISED THAT THEY WOULD DO SO.
NO FURTHER ACTION REQUIRED BY CAC.

GENERAL COMMENTS: 08/05/99 06:10P CHASE GALA
ADVISED CUST THAT NO RECALLS AS TO HITCH WERE APPLICABLE TO HIS VEH.
ADVISED THAT HIS VEH. WAS MORE THAN TWO YEARS AND 124,000 MILES OUTSIDE OF WARRANTY AND THEREFORE WE WOULD BE UNABLE TO ASSIST.
CUST DEMANDED AN ASM.
ADVISED THAT I WOULD CONTACT DLR. AND ASK THAT CUST BE CONTACTED NEXT TIME ASM WAS AT DLR.
GALA CHASE/PHOENIX CENTER

GENERAL COMMENTS: 08/05/99 05:56P ALLEN EUREKA
CUSTOMER STATES THE TRAILER HITCH TORE COMPLETELY OFF WHILE THE VEHICLE WAS BEING LOADED; IT WAS UNDER THE TOWING CAPACITY OF 10000 LBS; HE FEELS THAT IS A MANUFACTURING DEFECT AND WANTS SOMETHING DONE ABOUT IT.
CUSTOMER STATES THE SPECIALIST WHERE HE HAD THE TRAILER HITCH REPAIRED TOLD HIM THAT IT WAS A KNOW FACT THAT THEY FAILED
CUSTOMER SEEKS REASON FOR THE FAILURE OF THE TRAILER HITCH HE BELIEVES THAT IT IS A MANUFACTURES DEFECT AND THE COST OF THE REPAIR WHICH WAS $900.00
CRM TRANSFERED TO TIER II GALA CHASE
EUREKA ALLEN/TAMPA

CASE NO: 9921446101
DATE OPENED: 09/13/1999
DATE CLOSED: 10/13/1999
SOURCE: PHONE
CUSTOMER: C
ADDRESS:
HOME PHONE:

VIN: 1GKGC26N2RJ725258
MODEL YR: 94
SERIES: SUBURBAN 2/WD (
MILEAGE: 175000
STATE: CA

COMMENTS

COMPLAINT CODE:
R31 TRAILER HITCH

OPENING COMMENTS:
CUST STATES THE TRAILER HITCH RECEIVER BROKE.

CAUSE CODE: P PRODUCT CONCERN

DEALER CLOSING COMMENTS:

REGION CLOSING COMMENTS:
CUST WILL CONTACT A GMC DEALER.

COMPLAINT CODE:
T01 PRODUCT ALLEGATION

OPENING COMMENTS:
CUST STATES A MALFUNCTION IN HITCH

CAUSE CODE: P PRODUCT CONCERN

DEALER CLOSING COMMENTS:

REGION CLOSING COMMENTS:
BAD TRAILER HITCH

SERVICING DEALER: 48-40133
NORTH COUNTY GMC
1501 AUTO PARK WAY SOUTH
ESCONDIDO CA 92025

GM583 Att C 3006

00000069

* * * G M R E S T R I C T E D * * *

DELIVERY DATE: 00/00/00 CASE TYPE: X
RESPONSIBLE PARTY: DORSEY, JOHNNIE CLOSURE CODE: S
REGN CLOSE DATE: 00/00/00

GENERAL COMMENTS: 10/08/99 12:13P KERSEY ANGELA
TO PREVIOUS CRM, PAR HAS REVIEWED THIS FILE AND DETERMINED THAT IT DOES NOT QUALIFY FOR A PAR CASE. IN ORDER TO QUALIFY FOR A PAR CASE THE CUSTOMER MUST ALLEGE THAT A COMPONENT OF THE VEHICLE WAS NOT OPERATING AS DESIGNED, AND THAT IT CAUSED A COLLISION, PROPERTY DAMAGE, BODILY INJURY, THERMAL EVENT, OR FATALITY. PAR HAS CONSULTED WITH GM MANAGEMENT, AND DUE TO AGE AND MILEAGE PARAMETERS, THIS SHOULD BE HANDLED AS TIER 2. THANKS. ANGELA KERSEY/TAMPA PAR.

GENERAL COMMENTS: 09/14/99 12:49P DORSEY JOHNNIE
CUST STATES THAT THEY WILL BE OUT OF TOWN FROM 09-15-99 TO 09-27-99. CUST HAS THE VEHICLE AT THE DEALER FOR FRAME REPAIR.

JOHNNIE DORSEY TAMPA/TIER 2.

GENERAL COMMENTS: 09/13/99 11:54A DORSEY JOHNNIE
CONT...
OWNERS DESCRIPTION OF WHAT HAPPENED: CUST WAS TURNING INTO DRIVEWAY OF APARTMENT COMPLEX AND HEARD A LOUD NOISE AND SAW THAT THE HITCH BROKE ON THE RIGHT SIDE AND TORE NEARLY OFF ON THE LEFT. CUST HAS BEEN USING THE VEHICLE TO TOW A 28 FOOT TRAILER. CUST IS TAKING VEHICLE TO NORTH COUNTY JEEP-GMC IN ESCONDIDO,CA. FOR THE REPAIR.

JOHNNIE DORSEY TAMPA/TIER 2.

GENERAL COMMENTS: 09/13/99 11:50A DORSEY JOHNNIE
CUST STATES THE TRAILER HITCH RECEIVER BROKE WHILE PULLING A TRAILER.
DETAILS ARE:
1. INCIDENT DATE IS 09-10-99. TIME 3:00 PM.
2.LOCATION-NEAR COMPLEX HOUSING ENTRYWAY.
3.WHO WAS DRIVING-CHARLES REDIFER.
4.ROAD SURFACE-BRICK. CONDITION-DRY.
5.PEOPLE IN VEHICLE: 1. NO BODILY INJURIES-NO.7.NO OTHER VEHICLES INVOLVED.
8.PROPERTY DAMAGE TO THE TRAILER BEING TOWED AND THE HITCH.
9.COMPONENT ALLEGED DEFECTIVE: TRAILER HITCH RECEIVER.10. VEHICLE IS GOING TO GMC DEALERSHIP ON 09-13-99. 11. NO POLICE REPORT MADE. 12.MAINTENANCE NORMALLY DONE AT INDEPENDENT GARAGE. 13. INSURANCE-AMICA 1(800)24-AMICA

CASE NO:	9927787001	VIN:	1GKGC26N0SJ705709
DATE OPENED:	11/15/1999	MODEL YR:	95
DATE CLOSED:	11/15/1999	SERIES:	SUBURBAN 2/WD (
SOURCE:	PHONE	MILEAGE:	045200
CUSTOMER:	R	STATE:	CO
ADDRESS:			
HOME PHONE:			

COMMENTS

COMPLAINT CODE:
A04 POSSIBLE SAFETY CONCERN

OPENING COMMENTS:
CUSTOMER STATES HE LEARNED ABOUT DEFECT IN THE HITCH HE PURCHASED WITH HIS GMC VEHICLE. CUSTOMER STATES WHEN HE INSPECTED HIS HITCH, IT WAS COMPLETELY BROKEN ON ONE SIDE AND CRACKED 1/2 WAY ON THE OTHER SIDE.

CAUSE CODE: P PRODUCT CONCERN

DEALER CLOSING COMMENTS:

REGION CLOSING COMMENTS:
CRM THANKED CUSTOMER FOR LETTING US KNOW OF THE PROBLEM AND THAT SVC MGR STATED IT WOULD HAVE BEEN COVERED BY 3YR/36K MILE WARRANTY.

COMPLAINT CODE:
R31 TRAILER HITCH

OPENING COMMENTS:
CUSTOMER STATES HE LEARNED ABOUT A DEFECT ON TRAILER HITCH SUPPLIED BY GMC. CUSTOMER STATES WHEN HE INSPECTED HIS HITCH IT WAS COMPLETELY BROKEN ON ONE SIDE AND CRACKED 1/2 WAY THROUGH ON THE OTHER SIDE.

CAUSE CODE: P PRODUCT CONCERN

DEALER CLOSING COMMENTS:

REGION CLOSING COMMENTS:
CRM ADVISED CUSTOMER THAT SVC MGR STATED THE HITCH WAS COVERED BY THE 3YR/36K WARRANTY. CRM THANKED CUSTOMER FOR ADVISING US OF PROBLEM.

SERVICING DEALER: 48-44614
BURT BUICK-PONTIAC-GMC TRUCK, INC.
5850 S BROADWAY
LITTLETON CO 80121

GM583 Att C 3008

* * * G M R E S T R I C T E D * * *

DELIVERY DATE: 00/00/00 CASE TYPE: X
RESPONSIBLE PARTY: SAIER, KARL CLOSURE CODE: S
REGN CLOSE DATE: 00/00/00

GENERAL COMMENTS: 11/15/99 02:01P SAIER KARL
CRM SPOKE TO SVC MGR MARK TUNSTED WHO ADVISED HE WAS NOT AWARE OF ANY PROBLEM WITH THE TRAILER HITCHES. SVC MGR STATED HE CANNOT RECALL EVER HAVING TO REPLACE ONE. SVC MGR STATED THAT HE WOULD HAVE TO SEE WHAT THE CUSTOMER IS TOWING TO DETERMINE IF IT'S WITH THE SPECS BUT IF IT WAS HE FELT SURE THE HITCH WOULD BE COVERED BY THE 3YR/36K MILE BUMPER TO BUMPER WARRANTY. CRM LEFT MESSAGE ON CUSTOMERS VOICE MAIL ADVISING HIM WHAT SVC MGR STATED. CRM WILL CLOSE FILE AT THIS TIME.....KARL SAIER/ TAMPA

GENERAL COMMENTS: 11/15/99 01:11P SAIER KARL
CUSTOMER CALLED TO ADVISE GMC THAT THERE IS A SAFETY DEFECT ON THE TRAILER HITCHES THEY WERE OR STILL ARE PROVIDING ON GMC VEHICLES. CUSTOMER STATES HE TOWS AN AIRSTREAM TRAILER AND LEARNED ABOUT THE DEFECT IN AN AIRSTREAM CLUM NEWSLETTER. CUSTOMER STATES HE LEARNED THAT THE HITCHES ARE CRACKING AND BREAKING. CUSTOMER STATES WHEN HE INSPECTED THE HITCH ON HIS VEHICLE, IT WAS COMPLETELY BROKEN ON ONE SIDE AND CRACKED HALFWAY THROUGH ON THE OTHER SIDE. CUSTOMER STATED THIS IS A SAFETY ISSUE AND GMC SHOULD KNOW ABOUT IT. CUSTOMER STATED HE SPOKE TO THE DEALER AND WAS ADVISED THAT THE HITCH IS NOT COVERED UNDER WARRANTY SINCE IT IS NOT A GMC PRODUCT. CRM THNAKED CUSTOMER FOR LETTER GMC KNOW ABOUT THIS PROBLEM.....KARL SAIER/TAMPA

CHEVROLET MOTOR DIVISION

CASE NO:	00-0070183	VIN:	1GNGC26F6RJ339924
DATE OPENED:	02/10/2000	MODEL YR:	94
DATE CLOSED:	02/11/2000	SERIES:	C3 4X2 SUBURBAN
SOURCE:	PHONE	MILEAGE:	67000
CUSTOMER:	E D		
ADDRESS:			
HOME PHONE:			

******************** GENERAL COMMENTS *******************

CUST STS HE IS A MEMBER OF AN R.V. CLUB AND RECEIVED INFO THAT STS OWNERS SHOULD CHECK THE TRAILER HITCH PLATFORMS ON THEIR VEHS.
CUST STS HE CHECKED HIS AND FOUND THE PLATFORM IS CRACKED, THE INFO HE RECEIVED STS THIS HAS OCCURRED ON OTHER VEHS, CUST SEEKS TO FIND OUT WHO SUPPLIER OF HITCH PLATFORM IS AND IF THERE IS ANY WRNTTY ON THIS.
CRM CALLED WATSON CHEV, CUST IS CURRENTLY IN AZ. CRM SPOKE W/SVC MGR ED, HE STS THIS IS THE 1ST HE HAS HEARD OF THIS, SHOULD NOT HAPPEN IF WHAT IS BEING TOWED IS W/IN LIMITATIONS FOR VEH. CRM THANKED MIKE.
CRM ADVISED CUST THAT DLR IS UNAWARE OF ANY PBLMS W/HITCH PLATFORMS.
CRM ADVISED CUST THAT IF THERE IS A CAMPAIGN IN THE FUTURE ON THIS CUST WOULD RECEIVE NOTIFICATION, BUT AT THIS X NO CAMPAIGNS, CUST GAVE # ON PART.... AE V-5, CUST SEEKS TO SEE WHO IS SUPPLIER OF HITCH.
CRM CALLED PARTS DEPT, PARTS DEPT STS THAT W/VIN THEY CAN LOOK UP
>>>

>>>>>>>>>>>>>>>>>
PART AND IT GIVES GM PART #, AND SINCE THIS IS FACTORY INSTALLED HITCH, IT IS PBLY A GM PART.
CRM ADVISED CUST OF THIS, CUST STS HE UNDERSTANDS, CRM ADVISED THIS WOULD BE DOCUMENTED, CRM GAVE FILE #, THANKED CUST.

CAROLYN CANALES/TX

**************** REQUEST CODE AND COMMENTS **************

CDE # DESC	CDE COMMENTS
R31 0 TRAILER HITCH	HITCH CRACKED CASE CLOSED BY SYSTEM

C H E V R O L E T M O T O R D I V I S I O N

CASE NO:	00-0124571	VIN:	1GNGC26N3PJ336449
DATE OPENED:	03/15/2000	MODEL YR:	93
DATE CLOSED:	03/17/2000	SERIES:	C3 4X2 SUBURBAN
SOURCE:	LETTER	MILEAGE:	92125
CUSTOMER:	F		
ADDRESS:			
HOME PHONE:			

********** GENERAL COMMENTS **********

P8396
CUST STATES CRACKED TRAILER HITCH. CUST STATES HAS HEARD OF NHSTA TAKING PICTURES OF THEM SO MAY BE CASE. CUST HAS HEARD OF QUITE A FEW OTHER PEOPLE W/SAME CONCERN. CRM ADVISED CUST DLRSHP WOULD HAVE TO SEE. CUST WILL TAKE FOR INSPEC AND ASK SM IF COVERED UNDER LIFE TIME WARR. CUST W/C/B IF ANY MORE CONCERNS. LESLIE HUSSEINI/PORTLAND.

********** REQUEST CODE AND COMMENTS **********

CDE #	DESC	CDE COMMENTS
R31	0 TRAILER HITCH	CUST STATES CRACKED TRAILER HITCH
		CASE CLOSED BY SYSTEM

CHEVROLET MOTOR DIVISION

CASE NO:	99-0430994	VIN:	1GNEC16R4TJ348267
DATE OPENED:	08/02/1999	MODEL YR:	96
DATE CLOSED:	08/02/1999	SERIES:	C3 4X2 SUBURBAN
SOURCE:	PHONE	MILEAGE:	42000
CUSTOMER:	C		
ADDRESS:			
HOME PHONE:			

********** GENERAL COMMENTS **********

08/02/99*****
ORIGINAL OWNER CALLED REQUESTING GOODWILL ASSISTANCE WITH LISTED... OWNER STATES WAS TRAVELING & TRAILERING HITCH BROKE OFF, & HE LOST HIS CAMPER...OWNER STATES NO EXTENDED SERVICE CONTRACT PURCHASED... OWNER STATES VEHICLE IS CURRENTLY AT DEALER...OWNER STATES HAS OWNED ONLY CHEVROLETS SINCE 1932 & HAS NEVER EXPERIENCED A PROBLEM LIKE THIS BEFORE...OWNER STATES IS ONLY 7000 MILES OUT OF WARRANTY & WAS ADVISED BY DEALER THAT THIS WAS A DEFECT...OWNER STATES WILLING TO PARTICIPATE IN REPAIR COSTS & WILL TAKE WHATEVER ASSISTANCE HE CAN GET...CRM REVIEWS WITH RUSS...CRM CALLS DEALER & SPEAKS TO SERVICE MANAGER SCOTT WHO ADVISES THAT HE IS WILLING TO ASSIST 50%...CRM ADVISES THAT CHEVROLET IS WILLING TO ASSIST 75%...SCOTT ACKNOWLEDGES...SCOTT ADVISES WILL ADVISE OWNER OF NEWS...SCOTT & CRM THANK EACH OTHER...CRM ADVISES OWNER OF FILE # & PURPOSE...CRM ADVISES OWNER TO SPEAK WITH SCOTT FOR DETAILS...OWNER & CRM THANK EACH OTHER.....>>>>>>>>>>>>>>>

>>>>>>>>>
TONNILLE WILLIAMS/TROY SITE

********** REQUEST CODE AND COMMENTS **********

CDE #	DESC	CDE COMMENTS
R31	0 TRAILER HITCH	FOR T06, HITCH FELL OFF
		CCAC TO SUPPORT 75% G/W
T06	0 GOODWILL ADJUS	FOR R31, CCAC TO SUPPORT 75% G/W
		CCAC TO SUPPORT 75% G/W

GM583 Att C 3012

00000075

C H E V R O L E T M O T O R D I V I S I O N

CASE NO:	99-0614148	VIN:	1GNGC26NXRJ349203
DATE OPENED:	12/17/1999	MODEL YR:	94
DATE CLOSED:	12/17/1999	SERIES:	C3 4X2 SUBURBAN
SOURCE:	LETTER	MILEAGE:	57000
CUSTOMER:	I L		
ADDRESS:			
HOME PHONE:			

********** GENERAL COMMENTS **********

12-17-99****
CRM RECEIVED CORRESPONDENCE DATED 12-01-99 ADDRESSED TO CCAC...OWNER REQUESTING REIM FOR REPLACED TRAILER HITCH...OWNER STATES IF HE HAD NOT DISCOVERED CRACKS MAY HAVE LOST HIS AIRSTREAM MOTOR HOME....
OWNER STATES FEELS PART IS DEFECTIVE AND REQ RIEM...OWNER ENCLOSED FOLLOWING DOCS:

** CC INVOICE, ANCIRA CHEVROLET, ILLEGIBLE, DATED 11-23-99
** CC PAGE FROM GMPP REGARDING WHAT REPAIRS ARE/ARE NOT COVERED
** CC LIGHT DUTY WARRANTY CARD
** CC GMPP CONTRACFT
CRM NOTES VEH TOO FAR OUTSIDE WARR FOR GOODWILL ASSISTANCE...
CRM CONTACTED OWNER WHO ADVISED TO PUT POSITION IN WRITING
CRM ATTACHED ICORR
SUSAN NGOLINO, TROY SITE

********** REQUEST CODE AND COMMENTS **********

CDE #	DESC	CDE COMMENTS
R31	0 TRAILER HITCH	FOR S13, T06, REPLACED
		FOR DLR INFO
S13	0 REIMBURSEMENT	FOR R31, T06
		DENIED DUE TO AGE/MILEAGE
T06	0 GOODWILL ADJUS	FOR R31, S13
		DENIED DUE TO AGE/MILEAGE

TOTAL REPORTS PRINTED: 000005

GM593 Att C 3913

00000076

CASE NO: 0005351001 VIN: 1GKGC26K9PJ727463
DATE OPENED: 03/03/2000 MODEL YR: 93
DATE CLOSED: 03/06/2000 SERIES: SUBURBAN 2/WD (
SOURCE: PHONE MILEAGE: 117000
CUSTOMER: L A STATE: FL
ADDRESS:
HOME PHONE:

COMMENTS

COMPLAINT CODE:
R31 TRAILER HITCH

OPENING COMMENTS:
CUST STATES NEEDS TO KNOW IF ANY OPEN CAMPAIGNS ON VEHHITCH: IT BROKE

CAUSE CODE: P PRODUCT CONCERN

DEALER CLOSING COMMENTS:

REGION CLOSING COMMENTS:
CRM ADVISED NO OPEN CAMPAIGNS AT THIS TIME.

SERVICING DEALER: 48-17183
LANE PONTIAC-BUICK-GMC, INC.
510 E NASA BLVD
MELBOURNE FL 32901

DELIVERY DATE: 02/04/93 CASE TYPE: X
RESPONSIBLE PARTY: HARVEY, RALPH CLOSURE CODE: S
REGN CLOSE DATE: 00/00/00

GENERAL COMMENTS: 03/06/00 10:57A RIVERO JOSE
CRM DENYING CST COST ASSISTANCE DUE TO:
**********BUSINESS SUMMARY**********
1:CST OUTSIDE OF 3YR/36K MILE BUMPER TO BUMPER WARRANTY.
2:EXCESSIVE AGE/MILEAGE ON VEH.
3:SVC DEPT HAS NO WAY OF DETERMINING WHY THIS HITCH IS CRACKED.
4:NO OPEN CAMPAIGNS OR SP POL OUT ON THIS CONCERN.
5:SVC MGR FEELS THIS SHOULD NOT RECEIVE ANY COST ASSISTANCE.
****
CRM ADVISED CST OF DECISION MADE BY GMC CAC.JOSE E RIVERO/TAMPA.

GM583 Att C 3814

GENERAL COMMENTS: 03/06/00 10:55A RIVERO JOSE
CRM ADVISED SVC MGR TOM CAR REFERENCE CST'S CONCERNS. MR CAR STATES THEY LOO
KED AT THE HITCH AND THEIR IS NO WAY TO DETERMINE WHY THIS HITCH CRACKED. MR
CAR STATES DUE TO AGE/MILEAGE ALONE HE WOULD NOT SUGGEST ANY ASSISTANCE ON B
EHALF OF GMC. MR CAR STATES THAT THIS IS OUT OF HIS EMPOWERMENT SO HE CANNOT

MAKE ANY DECISION ON CST'S SITUATION.JOSE E RIVERO/TAMPA.

GENERAL COMMENTS: 03/06/00 10:48A RIVERO JOSE
CST CALLING INTO CAC SEEKING TO UPDATE HIS FILE. CST STATES TOOK VEH INTO LA
NE GMC AND THEY LOOKED AT HIS VEH. CST STATES DEALERSHIP ADVISED HIM THEIR I
S NOTHING THAT THEY CAN DO AFTER FIVE YEARS UNLESS GMC APPROVES IT. CST STAT
ES HE FEELS GMC SHOULD APPROVE THIS REPAIR. CST SEEKS TO HAVE THIS REPAIR CO
NDUCTED AT NO CHARGE TO HIM. CRM ADVISED CST DEALERSHIP SVC MGR TOM CARRE WO
ULD BE CONTACTED FOR FURTHER INPUT ON THIS SITUATION.JOSE E RIVERO/TAMPA.

GENERAL COMMENTS: 03/03/00 10:45A HARVEY RALPH
CUST STATES TRAILER HITCH BROKE . CUST STATES NEEDS TO KNOW IF ANY
OPEN CAMPAIGN ON VEH. CRM ADVISES NO OPEN CAMPAIGNS ON VEH AT THIS TIME.
CUST STATES HE HEARD THERE IS A CLASS ACTION SUIT ABOUT HITCHES ON VEH.
CRM ADVISES TO BRING VEH IN TO AUTHORIZED GMC DEALER.
CUST ASKS IF CRM CAN RETURN CALL AFTER SERVICE. CRM STATES , YES
AND ADVISES WILL CALL MARCH 6, 2000 AT 10:30 AM.
RALPH HARVEY/TAMPA

* * * G M R E S T R I C T E D * * *

CASE NO: 9913010101 VIN: 3GKGK26J2TG514103
DATE OPENED: 06/21/1999 MODEL YR: 96
DATE CLOSED: 06/21/1999 SERIES: SUBURBAN 4/WD
SOURCE: PHONE MILEAGE: 040000
CUSTOMER: J STATE: PA
ADDRESS:
HOME PHONE:

COMMENTS

COMPLAINT CODE:
R31 TRAILER HITCH

OPENING COMMENTS:
THE CUST CLAIMS PULLING A TRAILER THE RECEIVER OF THE HITCH BROKE. A SAFETY FACTOR HE STATED. CUST IS SEEKING REIMBURSMENT FOR A NEW TRAILER HITCH.

CAUSE CODE: P TRAILER HITCH

DEALER CLOSING COMMENTS:

REGION CLOSING COMMENTS:
NO COST ASSISTANCE ON NEW TRAILER HITCH.

SERVICING DEALER: 48-26080
DEALER NOT FOUND
510 E NASA BLVD
MELBOURNE FL 32901

DELIVERY DATE: 00/00/00 CASE TYPE: X
RESPONSIBLE PARTY: WILLIAMS, MARION CLOSURE CODE: S
REGN CLOSE DATE: 06/21/99

GENERAL COMMENTS: 06/28/99 09:28A WILLIAMS MARION
THE SVC MGR, DAVID O'LEARY, CALLED STATED THIS IS A BAD TRAILOR HITCH. HE STATED THIS CUST SHOULD HAVE COST ASSISTANCE. HE STATED HE INSPECTED THIS HITCH AND IT IS DEFECTIVE. HE IS TO CALL THE CUST AND TO REIMBURSE HIM.

GENERAL COMMENTS: 06/25/99 12:45P NEELY DANYALE
SVC MGR CONTACTED OFFICE SEEKING UPDATE W/ CUST FILESVC MGR STATED HE NEEDS TO W/ MARION WILLIAMS.CRM ADVISED SVC MGR WILL TRY AND LOCATE CRM FOR HIM. DANYALE NEELY/PHOENIX CENTER.

GM5B3 Att C 3016

GENERAL COMMENTS: 06/21/99 11:55A WILLIAMS MARION
I CALLED THE SVC MGR, DAVE O'LEARY, AND HE IS ON VACATION. I SPOKE TO A SVC PERSON WHO IS FILLING IN FOR THE SVC MGR. HE STATED ABSOLUTELY NO COST ASSISTANCE SINCE THE VEH IS 3 YEARS AND 40,000 MILES OLD. I CALLED THS CUST AND TOLD HIM NO COST ASSISTANCE. HE STATED HE GOES TO A LOT OF

RALLIES FOR TRALIERS AND THEY ARE ALL CONCERNED ABOUT THIS TRAILER PACKAGE.

GENERAL COMMENTS: 06/21/99 11:51A WILLIAMS MARION
THE CUST CLAIMS TOWING A TRAILER THE RECEIVER OF THE HITCH BROKE. HE STATED THE METAL CRACKED. HE STATED A SAFETY FACTOR. HE DID HAVE A NEW HITCH INSTALLED TO DRIVE HOME. HE STATED WENT TO THE DLR AND THEY WERE NOT CONCERNED SINCE THE VEH IS OUTSIDE THE MFG WARRANTY. CUST IS SEEKING DOCUMENTATION AND COST ASSISTANCE WITH THIS NEW TRAILER HITCH.

OR

TRUCK AND BUS GROUP

NO: 9500306101
OPENED: 10/25/1994
CLOSED: 10/25/1994
CE:
OMER: M
ESS:
PHONE:

VIN: 1GKFK16K6PJ709768
MODEL YR: 93
SERIES: SUBURBAN 4/WD
MILEAGE: 016000

GMC TRUCK COMMENTS

PLAINT CODE:
TOWING INQUIRY

NING COMMENTS:
ST CALIMS THAT TOW HITCH PULLED AWAY FROM WELDING AND WAS HELD ON BY
LTS. CUST STATES SHE IS CONCERNED ABOUT POTENTIAL DAMAGE TO THEM AND
ER DRIVERS.

OSING COMMENTS:

RVICING DEALER: 48-51219
LER OLDSMOBILE-GMC TRUCK
BOX 7698
ANDRIA LA 71306

LIVERY DATE: 01/07/93
SPONSIBLE PARTY: BOULAY, TIM
AC CLOSE DATE: 10/25/94

CASE TYPE: X
CLOSURE CODE: S

NERAL COMMENTS: 05/25/95 11:07A LENHARDT KAREN
R EXPLAINED THAT WHEREEVER CUSTOMER BOUGHT VEHICLE, VEH CAME WITH A
CTORY HITCH.

FT MESSAGE FOR CUSTOMER ON HOME ANSWERING MACHINE STATING THAT WE CAN
PLACE HITCH UNDER WARRANTY BUT NOT EXCHANGE IT FOR A DIFFERENT ONE.
ATED THAT DLR WAS UNAWARE OF PAINT CONCERN AND TO BRING UP SPECIFIC
NCERN TO DLR WHEN THEY COME BACK IN.

NERAL COMMENTS: 05/22/95 05:26P LENHARDT KAREN
ALKED WITH SERVICE MANAGER WHO STATED THAT CUSTOMER DOES HAVE A GM HITCH
ND COVERED UNDER WARRANTY. STATED DLR REPAIRING HITCH RIGHT NOW STATED
EY DID NOT KNOW ANYTHING ABOUT THE PAINT.

ENERAL COMMENTS: 05/22/95 04:44P LENHARDT KAREN
ERVICE MANAGER CALLED BACK TWICE AND LEFT MESSAGE. INFORMED HIM OF CUSTOMER

ENERAL COMMENTS: 05/22/95 11:17A LENHARDT KAREN
ALLED SERVICE MANAGER REGARDING CUSTOMER, LEFT MESSAGE.

REPORTS PRINTED: 000001

GM583 Att C 3018

00000051

GENERAL MOTORS NORTH AMERICA
Safety Center

To: KATHY DEMETER
ATTN: PETER C. ONG

From: AL FRANCE
Group: REPORT ANALYSIS
Phone: (810) 986-8007 (8-226)
Fax: (810) 947-2318 (8-227)
Date: 4/2/00
Pages including cover: 5

Comments:

PER TELEPHONE CONVERSATION OF 4/2/00 WITH MR. PETER C. ONG, ATTACHED IS THE MATCHING NHTSA REPORT MISSING FROM DP00-001, ATTACHMENT C (QUESTION #3).

THANKS
AL FRANCE

Report Analysis
Mail Code: 480-106-304 • 500 Mound Road • Warren, MI 48090-9055
FAX_RA.DOC

ATTACHMENT D

General Motors Corporation

DP00-001; GM583

Attachment D

TECHNICAL ASSISTANCE SYSTEM

CASE NO:	3407127	VIN:	1GCHC33N05F005881
DATE OPENED:	08/20/1999	MODEL YR:	95
DATE CLOSED:	08/20/1999	SERIES:	C3
SOURCE:		MILEAGE:	048286
DEALER CODE:	B28483		
ADDRESS:	PROGRESSIVE CHEVROLEMASSILLON		OHCHEVRO
HOME PHONE:	330 8338564	BUS. PHONE:	EXT:

SYMPTOM ABSTRACT---- BOLT BREAK FRAME HITCH HITCH BROKE FRAME WHOL
RESOLUTION ABSTRACT- NORMAL CONDITON
UCC CODE 1----------
UCC-1 DESCRIPTION--- BODY AND ACCESSORIES
UCC CODE 2----------
UCC-2 DESCRIPTION---
UCC CODE 3----------
UCC-3 DESCRIPTION---

08/20/1999 11:08:44 SED TEMPLATE - SCOTT
STRATEGY BASED DIAGNOSTICS
_1_ NUMBER OF TIMES IN FOR THE SAME CONDITION
_?_ NUMBER OF DAYS VEHICLE IN DEALERSHIP FOR SAME CONDITION
_Y_ (Y/N) IS THE VEHICLE IN THE DEALERSHIP
_N_ (Y/N) IS THE VEHICLE MODIFIED/NON-PRODUCTION ACCESSORIES (IF YES LIST) FACTORY TRAILER HITCH
_Y_ (Y/N) CAN COMPLAINT BE DUPLICATED (IF YES, FREQ., HOT, COLD, ETC.)
__ (Y/N) HAVE YOU COMPARED THIS WITH AN IDENTICAL VEHICLE
_Y_ (Y/N) CAN YOU ISOLATE THE AREA OF THE CUSTOMERS COMPLAINT
__ (Y/N) S/M SEARCH COMPLETED (IF YES, LIST SECTION, PG.)
_Y_ (Y/N) BULLETIN OR PI SEARCH PERFORMED:
_Y_ (Y/N) IS THE CUSTOMER CONCERN THE SAME AS SYMPTOM DESCRIPTION (IF NO LIST)
_N_ (Y/N) CONDITION DETAILS (LIST DTC'S, ETC.)
_N_ (Y/N) DIAGNOSIS (PARTS REPLACED, VEH. HISTORY, ETC.)
08/20/1999 11:08:44 HISTORY - SCOTT SM JOHN STS THAT CUST COMPLAINS THAT HIS TRAILER HITCH IS BROKEN AND THE WHOLES FOR THE BOLTS TO THE FRAME ARE PULLING THROUGH. CUST THAT THAT HE PULLS A 26' BOX TRAILER BUT ONLY PULLS 2 JET SKI'S IN IT AND HAS THE EQUALIZER BAR.
SM STS THAT VEH IS OUT OF WARRANTEE AND HE CAN SEE WHERE THE HITCH WAS BROKEN AND WELDED AND REBROKEN.

ADVISED SM JOHN.
1 THERE IS MORE WEIGHT BEING PUT ON THAT HITCH THAN THE CUST IS WILLING TO ADMIT TO.
2 TOLD SM HE SHOULD CONTACT HE DSM AND GET HIM INVOLVED BECAUSE I DON'T HAVE AND BULLETINS OR CASE ON THIS CONCERN.

ATTACHMENT E

General Motors Corporation

DP00-001; GM583

Attachment E

20

Robert / v.
General Motors Corporation
District Court, 202nd Judicial District
Bowie County, Texas, Docket No.: 96-C0519-202

1993 Chevrolet Suburban, 4X4, VIN 1GNFK16K7PJ362843

On October 5, 1993, plaintiff was towing a 7,000 lb., 34 foot 1990 Airstream RV trailer and he claimed that he heard a "pop" noise as he turned left at a stop sign in Gruene, Texas. After traveling 100 yards, plaintiff heard the trailer bouncing behind him. The trailer hitch allegedly separated from the vehicle, and the trailer rolled down a hill. Plaintiff alleged that a defective weld caused the trailer hitch to break. The vehicle and the trailer sustained approximately $15,000 in damages.

The new vehicle invoice indicates that the vehicle was equipped with heavy duty trailering equipment (Z82).

An expert retained by the subrogating insurance carrier, Allstate, inspected the vehicle on or about May 10, 1994. The expert claimed that multiple, low-magnitude forces caused the receiver socket to separate from the main hitch body. The expert noted that a label on the main hitch body indicated that the V-5 hitch was rated for 10,000 lb distributed weight. The expert also claimed that small amounts of fatigue cracking emanated from the multiple sharp weld toes, porosity, and lack of fusion discontinuities. The expert further claimed that inadequate fusion and poor control of crown contour promoted rapid fatigue cracking of the hitch components from the onset of use, and that poor weld fusion also elevated the local stresses at the connections and dramatically shortened the time to complete failure. The expert also noted that larger and well-fused welds were apparently intended in the hitch design. The expert believed that the stronger welds would have increased the time to detect joint cracks and would have provided more structural redundancy.

Plaintiff filed a complaint on April 3, 1996, alleging that the vehicle's trailer hitch was defectively designed. Plaintiff filed a notice of nonsuit on December 4, 1998, and this case was dismissed on January 5, 1999.

PONTIAC-GMC DIVISION

EPORT OF PRELIMINARY INVESTIGATIO

Serious incidents sh..d be immediately reported by telephone to Central Office, roduct Compliance.

Date of Incident: 11/14 19 96 Hour 6:30 PM

I OWNER CLAIMANT

Name of Owner: Age: Home Phone:

Addres Bus. Phone:

C State Zip Code:

Name of Dri Age: Home Phone:

Add Bus. Phone:

Name of Clai Age: Home Phone:

Address: same Bus. Phone:

Is claimant represented by an attorney? ☐ Yes ☒ No

If "Yes", give name and address:

II VEHICLE

Make: GMC Truck V.I.N. 1GKGK26F8SJ716033 Year: 1995 Model: Suburan

Trans.: AUTO Axle: 4.10 Engine: 6.5L Turbo Diesel Mileage: 47,251

Date of Del.: 01-10-95 New, Used or Demo: used License No.: State: MI

Dealer: Superior Buick -GMC Truck, Inc. Address: Dearborn, MI

Inspection Sticker No.: None Inspection Station No.: none Expiration Date: none

Principal uses of vehicle: Personal used

Special vehicle features or equipment: Electric Trailer

If vehicle is a truck, state gross pay load & location and description of load at time of incident: Trailer at 4000 founds and load of pumpkins est . 4000 total 8000 pounds.

Nature and extent of damages to vehicle and estimaged cost of repairs. (Attach copy of estimate.):

Rear bumper Rt Quarter panel

Insurance Company's name and address:

Agent's Name: Phone Number:

Adjuster's Name: Phone Number:

Policy Number: Claim Number:

Is vehicle subject to any product campaign(s)? ☒ Yes ☐ No Was campaign performed? ☐ Yes ☐ No

If "yes", identfy campaign(s): 95C45 SIR Label Non Compliance

III PROPERTY DAMAGE

Property Damage: None ☐ or LIST ALL VEHICLES INVOLVED

Was another vehicle involved? State make and model of vehicle:

Other vehicle speed estimate: MPH By whom:

Name and address of owner:

Name and address of driver:

Extent of damage:

Was property (other than a motor vehicle) damaged? (state kind, name of owner and extent of damage):

Yes, customer states he lost a pair of eye glassed during incident. Customer has receipt from your eye site, Inc. ?

IV BODILY INJURY

ANY INJURED PARTY MAY FILE A CLAIM OR LAWSUIT INDEPENDENTLY OF THE OWNER, DRIVER OR CLAIMANT. ALL INJURED PARTIES MUST BE IDENTIFIED BELOW.

Bodily Injury: None ☐

Indicate following information on injuries and whether the injured person(s) were riding in (A) owner's vehicle,(B) other vehicle, (C) pedestrian or (D) other.

(1) Name and address:

Age: Code A, B, C, or D: Seating position:

Nature of injuries:

Where were injured treated and by whom?

(2) Name and address:

Age: Code A, B, C, or D: Seating position:

Nature of injuries:

Where were injured treated and by whom?

(3) Name and address:

Age: Code A, B, C, or D: Seating position:

Nature of injuries:

Where were injured treated and by whom?

GM583 Att E 5062

00000089

1241-2 Claim: Richard Strauss

V INVESTIGATION

How, when, and by whom was zone notified of incident? Telephone November 18, 1996, Claimant

Location of incident (Designate exact location) US 23 Northbound Near Fenton, MI

Kind and Condition of road: (or not relevant ☐)

Kind of road:	x	concrete	___	gravel	___	asphalt	___	crushed rock	___ dirt
Condition of road:	___	wet	x	dry	___	icy	___	other	
Kind of shoulder:	x	concrete	___	gravel	___	asphalt	___	crushed rock	___ dirt
Condition of shoulder:	___	wet	x	dry	___	icy	___	other	

Nature of weather: Clear Vision obstruction (if any, describe) none

Name and address of dealer who towed (include tow driver's name), stored and/or provided temporary service to damaged vehicle:

Tow bill 165.00 Location and driver not obtained.

Where can vehicle be seen? in owners possession

Did vehicle turn over? ☐ Yes ☒ No Vehicle speed estimate MPH 55

Source of speed estimate claimant Posted speed limit 65 MPH

Brand and size tires Firestone LT245/75R16

Condition of tires:	R.F.	x	Good	___	Poor	___	Flat	R.R.	x	Good ___ Poor ___ Flat
	L.F.	x	Good	___	Poor	___	Flat	L.R.	x	Good ___ Poor ___ Flat

Other (truck or spare) LT245/75R16

Did your search of the vehicle service history produce service repair orders: ☒ Yes ☐ No

If "Yes", attach copies of all R.O.s. (indicate how many 9) If "No", explain

Police report attached? ☐ Yes ☒ No If "No", what station or officer made report? (☐ No report filed)

Names and address of witnesses: (or None ☐)

Were photos taken? ☒ Yes ☐ No If "Yes", how many: 16 By whom (name and address):

Lee A Bates, EA. Assoc. 2061 Michael Dr. Sterling Hts, MI owner also supplied four photo's.

If "No", explain:

VI DESCRIPTION OF CLAIM

Driver's description as to how incident happened and his statement of the cause.

See attached addendum.

Did you personally speak with driver? ☒ Yes ☐ No If "No", give source of driver's description.

Was vehicle inspected? ☒ Yes ☐ No If "Yes", identify all parties

What vehicle components are allegedly defective? Trailer Hitch

Who made allegation of defect? Claimant

If the alleged defective part has been removed from the vehicle, indicate exact parts, present location and who is custodian.

In owners possession. Replaced by owner prior to inspection.

Information from further investigation of incident, including examination of vehicle and scene of incident.

See attached addendum.

Date matter was concluded with claimant?

How and when was matter left with claimant? No apparent defect. See attached addendum.

DATE OF INVESTIGATION 12/4/96
DATE SIGNED 12/5/96

PRINTED NAME Lee A. Bates
SIGNED Lee A Bates (DW)
Divisional Representative Completing Investigation
General Motors Corporation

(Note: Continue answers on another sheet if necessary.)

Addendum
Mr. Richard
Case 96017597-02

December 5, 1996

The vehicle involved, a 1995 Suburban, was inspected at Detroit Hitch, 651 Rochester Road, Troy, MI on Wednesday, December 4, 1996. The inspection was performed at this location due to its convenience for Mr. and me to facilitate the inspection at the earliest possible date.

Mr. has had the hitch replaced with a heavier model from that supplied as the factory hitch. The replacement hitch was installed by Mike's trailer Service, Inc. 448 West Eight Mile Road, Hazel Park, MI. Telephone (313) 546-5600.

Owner's description of the incident:
Mr. states he was transporting a second load of pumpkins in his snow mobile trailer traveling northbound about 55 MPH on U.S. 23 near Fenton, MI. Suddenly, the front of the trailer dropped and the vehicle was difficult to control. He managed to stop the Suburban and trailer, but not before the trailer hit the right end of the rear bumper damaging the bumper and the trailer. A trucker stopped to offer assistance and a tow truck was called to assist. The trailer is equipped with three axles and the center and rear tires on the left side dismounted from the wheels.

indicates the Interstate trailer is modified by adding a third axle to raise the Gross Weight Rating to 9500 pounds. He indicates the trailer weighs 4000 pounds and the trailer had approximately 150 pumpkins at 15-20 pounds each on the trailer at the time of the incident. His initial estimate of total trailer weight to GMC was 8000 pounds, but now believes the weight to be closer to 7000 pounds.

Mr. indicates the trailer is equipped with electrically operated brakes on all three axles and are controlled by a Micro Control H.D. Plus. He indicates the brakes were connected and operating at the time of the incident.

Damage to the Suburban is estimated at $1081.91 to replace the rear bumper and repair the right quarter panel where the bumper contacted the quarter panel. The bumper has been pulled out to allow access through the right rear door. Repair to the Interstate trailer is estimated at $120.00 to replace an aluminum trim piece and front door at the right front of the trailer. The trailer was not available for inspection.

Inspection of failed hitch:
The replaced hitch was retained by the owner and stored in the rear of the suburban. The replaced hitch is identified as a V-5 model hitch for the Suburban with Maximum trailer dead weight of 4000 pounds and maximum tongue dead weight of 400 pounds. Maximum distributing weight ratings are 10,000 trailer and 1000 tongue.

Both attaching plates have torn at the upper radius leading to the frame mounting flange and the tear has radiated downward to the square tube. The attaching plates have opened at the tears and the welds at the top and rear sides of the tubing joining the plates to the tubing are torn. This allowed the square holes of the plates to open and the tubing to drop down under the weight of the trailer.

There is sufficient corrosion on the torn metal surfaces to indicate this was not a sudden failure. This appears to be a fatigue failure of the metal resulting in failure of both attaching plates. The mounting flange surfaces are distorted , but there is no indication of the flanges coming loose from the frame and the bolt holes are intact.

Vehicle inspection:
Mr. has had a heavier Reese Hitch installed prior to the inspection. The vehicle currently has 47,251 miles on the odometer. Mr. states he has driven approximately 4000 miles since the reported incident.

Overall, the vehicle is very dirty both inside and out. The vehicle is in below average condition for its age and mileage.

Mr. states he purchased the vehicle used from Superior Buick-GMC Truck. It is not known how many miles were on the vehicle at the time of purchase.

How this matter was left with the owner:
Mr. was advised the failure of the mounting plates was consistent with what would be expected from excessive tongue weight and that there was no apparent defect. He was advised to retain the hitch until the matter is resolved.

He indicated he was looking for assistance in this matter and was willing to sign a release. Anything short of a positive response will result in litigation.

Mr. called me on Thursday, December 5, 1996 to indicate his math was wrong when he originally indicated the pumpkins weighed 4000 pounds. Again, he reiterated the load was 150 pumpkins at 15-20 pounds each so he could not have been overloaded when the incident occurred.

He was advise the hitch speaks for itself and GMC Truck will review the information gathered and the photographs to develop their final position in this matter. A letter stating the final position of GMC Truck in this matter was requested by Mr. Strauss.

Lee A. Bates
Service Associate
Engineering Analysis Associates
2061 Michael Drive
Sterling Heights, MI 48310

Enclosures:
Four photographs supplied by owner prior to hitch replacement. (No negatives supplied)
16 photographs with negatives
Receipt from Detroit Hitch
Repair estimate for trailer from Mike's Trailer Service

ESTIMATE OF REPAIR COSTS

01705

MIKE'S TRAILER SERVICE, INC.

444 W. 8 MILE

HAZEL PARK, MICHIGAN 48030

PHONE: 313 / 546-5600

Date 12-2-96

Phone

Make Interstate Mfg.

Serial

Year 1995

Size 28' x Tiltall

Owner /

Address

Appraised For

Claim No.

Policy No.

Quan.	PARTS NECESSARY AND ESTIMATE OF LABOR REQUIRED	PAINT COST ESTIMATE	PARTS COST ESTIMATE	LABOR COST ESTIMATE
1	Molding 59" X 1 5/8" Alum		40 97	
	Str & straighten metal on Doors & replace alum molding			80 00
	Rob & R & R trailer Hitch P-TH41911		168.97	60 00
1	D.T. Complet Adj. Headach. # 3815		184 08	Done
1	Bar 2 5/16"		18 05	
		$	$411.10	

Remarks: Interstate Mfg 68938 Union St White Pigeon MI 48099

Labor	$ 160 00
Parts	411 10
Paint	
TOTALS	$ 571 10
Sales Tax	24 66
ESTIMATED GRAND TOTAL	$ 595.76

PARTS PRICES BASED ON STANDARD CATALOG PROCUREMENT PRICE LISTS SUBJECT TO CHANGE WITHOUT NOTICE. PROCUREMENT AND DELIVERY CHARGES MAY BE ADDED FOR SPECIAL SERVICE ON ITEMS NOT AVAILABLE LOCALLY. OLD PARTS REMOVED, WILL BE JUNKED, UNLESS OTHERWISE INSTRUCTED IN WRITING.

(Sales taxes, where applicable, to be added to invoice) GM583 Att. E 5987

YOU ARE AUTHORIZED TO PROCEED AS ABOVE X SIGNED

This estimate is based on our inspection and belief. It does not include additional parts or labor which may be required after the work has been opened up. Often defective parts are discovered which were not evident on initial examination. For this reason the estimate is not guaranteed unless so indicated on the face hereof. THIS IS AN ESTIMATE good for thirty days from date; thereafter it is subject to confirmation. It is not an authorization to proceed with the work.

INSURANCE CO.

00000094

Detroit Hitch Co.

651 ROCHESTER ROAD
CLAWSON, MI 48017-1789
810-583-4112
800-424-5232
FAX 810-589-5250

INVOICE #:
DATE: 12/04/96
SLSMN: CARRY

QUOTATION

PAGE 1

BILL TO: 201
*** OPEN ITEMS ***
MUST HAVE TAX FORM SIGNED

SHIP TO:
STRAUS BLDG. + DEV. INC.
MUST HAVE TAX FORM SIGNED

UPS: 2 ROUTE: 1

PURCHASE ORDER	DATE SHIPPED	SHIPPED VIA	F.O.B. POINT	TERMS –	ORDER #
	12/04/96	Cust pick		C.O.D	104509

QUAN ORDERED	SHIPPED	BACK ORDERED	PART NUMBER	DESCRIPTION	COST $ EACH	NORMAL $ TOTAL	NET $ TOTAL
1			119-45001	RECEIVER, REESE TITAN CL 5 FB	156.50		156.50
1			968-3823	HITCH BALL 3000-01 DT 4.3/8	75.95	75.95	
1			119-3045	PIN ON 3/4 DT PDL TRL W/CLIP	16.05		16.05

IT MAY TAKE YOUR DISCOUNT IF PAYMENT IS POSTMARKED BY THE 8th OF THE NEXT MONTH.
TER THE 10th THERE WILL BE A 1.5% CARRYING CHARGE PER MONTH FOR AN ANNUAL RATE
18%.

CEIVED BY _____

0-0000095

	75.95	172.55
SUB-TOTAL		248.50
TAX		14.91
FREIGHT		263.41
TOTAL		

CHARGE
CASH AMOUNT
CHECK AMOUNT
CHECK NUMBER

GM583 Att E 5008

SHIP IN ORIGINAL CARTON OR CRATE

DATE : 97/03/09 VEHICLE-FINANCIAL HISTORY SYSTEM (VF) PAGE : 01
VEHICLE DATA ON-REQUEST VEHICLE HISTORY SUB-SYSTEM (VF04) SECTION : A

INQUIRY FOR : VIN : 1 G K G K 2 6 F 8 S J 7 1 6 0 3 3 DEPARTMENT :
JONES,CAROL NISM/ 326997

VIN YEAR	: S	BUILT DATE	: 94/12/19
PLANT CODE	: J	ORIG. SHIP DATE	: 94/12/21
PLANT NAME	: JANESVILLE	ORIG. INVOICE DATE	: 94/12/21
V.I.N.	: 1GKGK26F8SJ716033	CURR. INVOICE DATE	: 00/00/00
MODEL CODE	: TK 20906 040	CURR. TRANSFER DATE	: 00/00/00
SERIAL NUMBER	: 716033	RETAIL SALE DATE	: 95/01/10
I.D. NUMBER	: 857073	OUT OF SERVICE DATE	: 00/00/00
ORDER NUMBER	: 857073	WAREHOUSE DATE	: 00/00/00
MODEL YEAR	: 1995	DEALER ORDER DATE	: 94/10/14
DLR ACTIVITY RPT DT	: 95/01/10	ORDER RECEIVED DATE:	00/00/00
WARR START MILES	: 10	WARRANTY START DATE	: 95/01/10
WARRANTY BLOCK CODE	:	WARRANTY BLOCK DATE	: 00/00/00
PRE-DELAY MILES	: 0	PRE-DELAY DATE	: 00/00/00
POST SERVICE MILES	: 0	POST SERVICE DATE	: 00/00/00
BUYBACK MILES	: 0	BUYBACK DATE	: 00/00/00
VOCATIONAL INFO.	: 3- - - - -		
EXTENSION DEALER CDE	: - -	WARR EXTENSION DATE	: 00/00/00
		WARR EXTENSION MILES:	10
DEMO/PEP/BUYBACK	:	LINE NUMBER BUILT ON:	
ENGINE SERIAL #	:	KEY NUMBER 1	: 7M70
EZ-SPEC ORDER #	:	KEY NUMBER 2	: 7M70
TIRE MANUFACTURER 1	: VA-FIRESTONE	TOTAL INVOICE AMOUNT:	$31,970.71
TIRE MANUFACTURER 2	:	TOTAL INVOICE BASE	: $21,966.00
TIRE MANUFACTURER 3	: VA-FIRESTONE	TOTAL INVOICE OPTION:	$10,004.71
GVW RATING (LBS.)	: 8,600	MAJOR GROUP CODE	: L
TRUCK WEIGHT (LBS)	: 6,443	OUT OF SERVICE CODE	:
SPECIAL ORDER #	:	PRODUCT TYPE CODE	: 1-GMC UNIT
DRIVELINE NUMBER	:		
RAIL CAR NUMBER	:	ROUTING CODE	: FR
NOISE CODE ASSN'ED	: 0000000		
ENGINEERING YEAR	: 5	ELIGIBLE-DEALER PREP:	YES
ORDER TYPE	:	FACTORY PREP'ED ??	: NO
INVOICE TERMS	: A - GMAC TERMS		
ENGINEERING BOOK	: 01	ORIG. BAIL./POOL DLR:	
TOTAL OPTION COUNT	: 74	INVOICE NUMBER	: 5AD45778797
CUSTOMER NAMES (Y/N)	: Y	PAID WARRANTY CASES	: 12
CNT OF CAMPAIGNS	: 01		
SPECIAL OPTIONS	: NO	DETAIL WARRANTY CNT	: 5
GVW INFO. PRESENT	: NO	CANCELLED CASE COUNT:	0
DATE LAST UPDATED	: 97/03/01		

ORIG. CLASS OF SALE : D- 13C CLASS DESCRIPTION: FRANCHISE DEALERS
ACCTG. PRODUCT CODE : 042 DESC: LIGHT- SUBURBAN UNITS DIESEL

ORIG. INVOICE DEALER : G 21 140
SUPERIOR BUICK-GMC TRUCK, INC.
15101 MICHIGAN AVENUE
DEARBORN , MI 48126

CURR. SHIP-TO DEALER : G 21 140
SUPERIOR BUICK-GMC TRUCK, INC.
15101 MICHIGAN AVENUE
DEARBORN , MI 48126

RETAIL DEALER(DLR ACT): G 21 140
SUPERIOR BUICK-GMC TRUCK, INC.
15101 MICHIGAN AVENUE
DEARBORN , MI 48126

GM5803 #44 E 5009

DATE : 97/03/09 VEHICLE-FINANCIAL HISTORY SYSTEM (VF) PAGE : 02
OPTION DATA ON-REQUEST VEHICLE HISTORY SUB-SYSTEM (VF04) SECTION : B

INQUIRY FOR : VIN : 1GKGK26FBSJ716033 DEPARTMENT :
JONES,CAROL NISN/ 326997

OPTION	C	OPTION PRICE	FAM CODE	OPTION DESCRIPTION
AG9010	R	$0.00	SBR	ADJUSTER SEAT, POWER, 6 WAY (* USAGE 1995 MODEL Y
AJ1030	R	$0.00	GDT	WINDOW TINTED DEEP, ALL EXCEPT W/S AND DRS
AS3010	R	$0.00		SEAT RR SUBURBAN
AT5010	R	$0.00		SEAT RR CTR, FLDG
AUCD20	R	$0.00		LOCK CONTROL REMOTE ENTRY
AU3010	R	$0.00		LOCK CONTROL SIDE DR, ELEC
AXP010	R	$0.00		VIN IDENT POSITION, MULTI-PURPOSE VEHICLE
A31010	R	$0.00		WINDOW POWER OPERATED, SIDE
A95070	R	$0.00	STS	SEAT FRT BUCKET, HIGH BACK, PASS & DRIVER RECL
B33020	R	$0.00	FMR	COVERING REAR FLOOR MATS, AUX
B37010	R	$0.00		COVERING FLOOR MATS, FRT & RR AUX
B85010	R	$0.00	BSM	MOLDING B/S EXTERIOR, BRIGHT
C36010	R	$0.00		HEATER AUXILIARY
C49007	R	$0.00	DEF	DEFOGGER RR WINDOW, ELECTRIC
C6P010	R	$0.00		GVW RATING 8600 LBS
C60010	R	$0.00	HTR	AIR CONDITIONING.
C69005	R	$0.00		HVAC SYSTEM RR AIR CONDITIONER
DD7020	R	$0.00	RVM	MIRROR I/S R/V LT SENSITIVE, COMPASS
DK6010	R	$0.00		CONSOLE ROOF INTERIOR
D4B010	R	$0.00	MIR	MIRROR O/S REM CONT, ELEC, COLOR
D55010	R	$0.00	CSL	CONSOLE FRT COMPT, FLOOR
FE9010		$0.00		CERTIFICATION EMISSION, FEDERAL
FFB010	R	$0.00		ARM TORS BAR SPRING ADJ (G)
FF9010	R	$0.00		ARM TORS BAR SPRING ADJ (H)
F60010	R	$0.00		SPRING FRONT HEAVY DUTY
GT5040	R	$0.00	RAX	AXLE REAR 4.10 RATIO (DUP WITH GTB)
GB0010	R	$0.00		AXLE POSITRACTION LIMITED SLIP
JAN010	R	$0.00	PLT	PLANT CD JANESVILLE WI, T.
JD7010	R	$0.00		BRAKE HYD POWER, DISC/DRUM, 8400 LBS
KNP010	R	$0.00		COOLING SYSTEM HD, TRANS
K34005	R	$0.00		CRUISE CONTROL AUTOMATIC, ELECTRONIC
K68010	R	$0.00	GEN	GENERATOR 105 AMP
L65020		$0.00	ENG	ENGINE DIESEL, 8 CYL, 6.5L. TURBO, HO
MT1010	R	$0.00	TRN	4L80-E 4-SPEED AUTO TRANS.
AA5015		$0.00	EMS	FEDERAL EMISSIONS CERT.
NP5010	R	$0.00	SWL	STEERING WHEEL LEATHER WRAPPED
NY1010	R	$0.00		SHIELD FUEL TANK
NZZ030	R	$0.00		SALES PACKAGE SKID PLATE OFF ROAD SPOT
N33010	R	$0.00	SCL	STEERING COLUMN TILT TYPE
P06020	R	$0.00		TRIM DISCS WHEEL
QIW010	T	$0.00	TIR	TIRE ALL LT245/75R16/E BL R/PE ST TL OOR
R9B010	R	$0.00		CONTROL SALES ITEM NO. 77
SLM010	R	$0.00		SALES STOCK ORDERS
TFE010	R	$0.00		SALES INCENTIVE COMMITMENT PLUS
UL0040	R	$0.00	RDO	RADIO AM/FM STEREO, SEEK/SCAN, AUTO REV MUSIC SEA
UQ3010	R	$0.00	SPR	SPEAKER SYSTEM PERFORMANCE ENHANCED AUDIO
VK3010	R	$0.00		LICENSE PLATE FRT MOUNTING PKG
VR4010	R	$0.00	TRL	TRAILER HITCH WEIGHT DISTRIBUTING PLATFORM

GM5B3 444 E 5015 0000 0000 0097

INQUIRY FOR : VIN : 1GKGK26F8SJ716033 DEPARTMENT :
JONES,CAROL NISM/ 326997

OPTION	C	OPTION PRICE	FAM CODE	OPTION DESCRIPTION
VXS010	R	$0.00		VEHICLE COMPLETE
V22010	R	$0.00	GRL	GRILLE CHROME, RADIATOR
V27005	R	$0.00		GUARDS BUMPER, FRT,
V54002	R	$0.00	LUG	LUGGAGE CARRIER ROOF, PAINTED
V73010	R	$0.00	VCS	VEHICLE STATEMENT US/CANADA
XGK040	R	$0.00	FTR	TIRE FRONT LT245/75R16/E BL R/PE ST OOR
YD3010	R	$0.00		AXLE (BASE EQUIP) FOR SCHEDULING GVW PLATE
YD6010	R	$0.00		SPRING REAR, BASE EQUIPMENT
YE9050	R	$0.00		CONVENIENCE PKG COMFORT & DECOR LEVEL #3
YGK05U	R	$0.00	RTR	TIRE REAR LT245/75R16/E BL R/PE ST OOR
ZGK030	R	$0.00	SPT	TIRE SPARE LT245/75R16/E BL R/PE ST OOR
ZQ2010	R	$0.00		SALES PACKAGE DRIVER CONVENIENCE
ZQ3005	R	$0.00		SALES PACKAGE DRIVER CONVENIENCE II
ZW9020	R	$0.00	BDS	BODY EQUIPMENT BASE BODY OR CHASSIS
ZY2015	R	$0.00		COLOR COMB TWO TONE.
Z82020	R	$0.00	TPK	TRAILER PROVISIONS SPECIAL EQUIPMENT, N.O.
Z88010	R	$0.00		CONVERSION NAME PLT "GMC TRUCK"
1SB040		$0.00	SPP	PACKAGE OPTION 02
1SZ330	R	$0.00		DISCOUNT OPTION PACKAGE
260010	T	$0.00	TRM	TRIM COMBINATION CLOTH, NAVY (D) (94)
261010	R	$0.00	CCM	INTERIOR TRIM NAVY (1) (94)
39U060		$0.00	CCU	PRIMARY COLOR EXTERIOR, INDIGO MET (93)
6GL010	R	$0.00	FLH	COMPONENT FRT LH COMPUTER SEL SUSP (6GL)
7GL010		$0.00	FRH	COMPONENT FRT RH COMPUTER SEL SUSP (7GL)
96L010		$0.00	CCL	SECONDARY COLOR EXTERIOR, ULTRA SILVER MET (91)
K20906040	C			CHASSIS OPTION

--->---> NO SPECIAL OPTIONS ON THIS UNIT <---<---

GMSB 444 5 5411

8600000

INQUIRY FOR : VIN : 1 G K G K 2 6 F 8 S J 7 1 6 0 3 3 DEPARTMENT :
JONES,CAROL NISM/ 326997

PAID DEALER NEW VEHICLE PREPARATION INFORMATION

-->--> PAID NVI WILL HAVE A T7015 OR A Z7000 LABOR OP <--<--

PAID DEALER WARRANTY CASE INFORMATION

PAID WARRANTY DEALER : G21140 SUPERIOR BUICK-GMC TRUCK, INC.
DEARBORN , MI 48126

REPAIR ORDER NUMB :	026606	TOTAL CASE AMT :	$221.77
DATE OF REPAIR :	97/02/17	TOTAL LABOR AMT:	$166.77
CREDIT MEMO DATE :	97/02/24	TOTAL PARTS AMT:	$.00
FAILED LABOR OPER.:	J5955	TOTAL MISC. AMT:	$55.00
FAILED PART NUMBER:		TOTAL LABOR TIM:	3.0 HOURS
WARRANTY CLASS :	10	ADMINISTRATION :	03 - ENGINE EXPENSE
WARRANTY COVERAGE :	AQ	COST CATEGORY :	H - EXTENDED FULL
MILEAGE INDICATOR :	M	FAILED MILEAGE :	52,994
CLAIM TYPE :		TRBL/DMG CODE :	2L PN
SUBMISSION DOC. # :	52001	COST CAT DETAIL:	
DOCUMENT SOURCE :	01 - NO TABLE DESC	OBDII CODE :	
WARS PRESENT :	N	OVERRIDE SOURCE:	0090
TOTAL DEDUCT AMT. :	$100.00		
REPIAR STATE :	MI	SPEC.COND.CODE :	
ADVISOR SSN :	368902278	TECH. SSN :	362629229

PAID WARRANTY DEALER : G21140 SUPERIOR BUICK-GMC TRUCK, INC.
DEARBORN , MI 48126

REPAIR ORDER NUMB :	016964	TOTAL CASE AMT :	$139.46
DATE OF REPAIR :	96/02/19	TOTAL LABOR AMT:	$45.00
CREDIT MEMO DATE :	96/02/26	TOTAL PARTS AMT:	$94.46
FAILED LABOR OPER.:	N0120	TOTAL MISC. AMT:	$.00
FAILED PART NUMBER:	12549136	TOTAL LABOR TIM:	.9 HOURS
WARRANTY CLASS :	07	ADMINISTRATION :	02 - BRAKE EXPENSE
WARRANTY COVERAGE :	AC	COST CATEGORY :	G - BASE
MILEAGE INDICATOR :	M	FAILED MILEAGE :	30,102
CLAIM TYPE :		TRBL/DMG CODE :	0J
SUBMISSION DOC. # :	54017	COST CAT DETAIL:	
DOCUMENT SOURCE :	01 - NO TABLE DESC	OBDII CODE :	
WARS PRESENT :	N	OVERRIDE SOURCE:	
TOTAL DEDUCT AMT. :	$.00		
REPIAR STATE :	MI	SPEC.COND.CODE :	
ADVISOR SSN :	371402673	TECH. SSN :	362629229

INQUIRY FOR : VIN : 1GKGK26F8SJ716033 DEPARTMENT :
JONES,CAROL NTSM/ 326997

PAID WARRANTY DEALER : G21140 SUPERIOR BUICK-GMC TRUCK, INC.
DEARBORN , MI 48126
REPAIR ORDER NUMB : 017371 TOTAL CASE AMT : $25.05
DATE OF REPAIR : 96/03/05 TOTAL LABOR AMT: $20.00
CREDIT MEMO DATE : 96/03/11 TOTAL PARTS AMT: $5.05
FAILED LABOR OPER.: J0950 TOTAL MISC. AMT: $.00
FAILED PART NUMBER: 12345795 TOTAL LABOR TIM: .4 HOURS
WARRANTY CLASS : 08 ADMINISTRATION : 03 - ENGINE EXPENSE
WARRANTY COVERAGE : AQ COST CATEGORY : G - BASE
MILEAGE INDICATOR : M FAILED MILEAGE : 32,419
CLAIM TYPE : TRBL/DMG CODE : VN
SUBMISSION DOC. # : 69014 COST CAT DETAIL:
DOCUMENT SOURCE : 01 - NO TABLE DESC OBDII CODE :
WARR PRESENT : Y OVERRIDE SOURCE:
TOTAL DEDUCT AMT. : $.00
REPIAR STATE : MI SPEC.COND.CODE :
ADVISOR SSN : 586267244 TECH. SSN : 378802026

PAID WARRANTY DEALER : G21140 SUPERIOR BUICK-GMC TRUCK, INC.
DEARBORN , MI 48126
REPAIR ORDER NUMB : 017748 TOTAL CASE AMT : $240.00
DATE OF REPAIR : 96/03/19 TOTAL LABOR AMT: $.00
CREDIT MEMO DATE : 96/04/15 TOTAL PARTS AMT: $.00
FAILED LABOR OPER.: 27906 TOTAL MISC. AMT: $240.00
FAILED PART NUMBER: TOTAL LABOR TIM: .0 HOURS
WARRANTY CLASS : 29 ADMINISTRATION : 00 - MISC EXPENSE
WARRANTY COVERAGE : CT COST CATEGORY : N - CUSTOMER ENTN.
MILEAGE INDICATOR : N FAILED MILEAGE : 33,961
CLAIM TYPE : TRBL/DMG CODE : MJ
SUBMISSION DOC. # : 96006 COST CAT DETAIL:
DOCUMENT SOURCE : 02 - NO TABLE DESC OBDII CODE :
WARR PRESENT : N OVERRIDE SOURCE: 8303
TOTAL DEDUCT AMT. : $.00
REPIAR STATE : NI SPEC.COND.CODE :
ADVISOR SSN : 368902278 TECH. SSN : 378802026

GM583 414 E 5813
0 0 0 0 0 0 0

INQUIRY FOR : VIN : 1 G K G K 2 6 F 8 S J 7 1 6 0 3 3 DEPARTMENT :
JONES,CAROL NISM/ 326997

PAID WARRANTY DEALER : G21140 SUPERIOR BUICK-GMC TRUCK, INC.
DEARBORN , MI 48126

REPAIR ORDER NUMB :	006457	TOTAL CASE AMT :	$125.00
DATE OF REPAIR :	95/01/06	TOTAL LABOR AMT:	$125.00
CREDIT MEMO DATE :	95/01/17	TOTAL PARTS AMT:	$.00
FAILED LABOR OPER.:	27000	TOTAL MISC. AMT:	$.00
FAILED PART NUMBER:		TOTAL LABOR TIM:	2.5 HOURS
WARRANTY CLASS :		ADMINISTRATION :	00 - MISC EXPENSE
WARRANTY COVERAGE :	AA	COST CATEGORY :	1 - NVI/PDI
MILEAGE INDICATOR :	M	FAILED MILEAGE :	0
CLAIM TYPE :	00	TRBL/DMG CODE :	00
SUBMISSION DOC. # :	887265601	COST CAT DETAIL:	
DOCUMENT SOURCE :	N TRUCK-GMT425-DLD	OBDII CODE :	
WARR PRESENT :	N	OVERRIDE SOURCE:	HOB
TOTAL DEDUCT AMT. :	$.00		
REPIAR STATE :	MI	SPEC.COND.CODE :	A1
ADVISOR SSN :	0	TECH. SSN :	0

PAID WARRANTY DEALER : G21140 SUPERIOR BUICK-GMC TRUCK, INC.
DEARBORN , MI 48126

REPAIR ORDER NUMB :	006684	TOTAL CASE AMT :	$69.35
DATE OF REPAIR :	95/01/17	TOTAL LABOR AMT:	$42.30
CREDIT MEMO DATE :	95/01/30	TOTAL PARTS AMT:	$27.05
FAILED LABOR OPER.:	F2010	TOTAL MISC. AMT:	$.00
FAILED PART NUMBER:	1052358	TOTAL LABOR TIM:	.9 HOURS
WARRANTY CLASS :		ADMINISTRATION :	06 - REAR AXLE
WARRANTY COVERAGE :	AA	COST CATEGORY :	G - BASE
MILEAGE INDICATOR :	M	FAILED MILEAGE :	1,500
CLAIM TYPE :	01	TRBL/DMG CODE :	2N
SUBMISSION DOC. # :	897954101	COST CAT DETAIL:	
DOCUMENT SOURCE :	Q TRUCK-DCS-ONLINE	OBDII CODE :	
WARR PRESENT :	Y	OVERRIDE SOURCE:	
TOTAL DEDUCT AMT. :	$2.70		
REPIAR STATE :	MI	SPEC.COND.CODE :	
ADVISOR SSN :	368902278	TECH. SSN :	378802026

GM583 #14 E 5015

00000101

INQUIRY FOR : VIN : 1 G K G K 2 6 f B S J 7 1 6 0 3 3 DEPARTMENT :
JONES,CARDL NISN/ 326997

PAID WARRANTY DEALER : G21140 SUPERIOR BUICK-GMC TRUCK, INC.
DEARBORN , MI 48126

REPAIR ORDER NUMB :	006684	TOTAL CASE AMT :	$.35
DATE OF REPAIR :	95/01/17	TOTAL LABOR AMT:	$.00
CREDIT MEMO DATE :	95/01/30	TOTAL PARTS AMT:	$.00
FAILED LABOR OPER.:	25000	TOTAL MISC. AMT:	$.35
FAILED PART NUMBER:		TOTAL LABOR TIM:	.0 HOURS
WARRANTY CLASS :		ADMINISTRATION :	00 - MISC EXPENSE
WARRANTY COVERAGE :	ZZ	COST CATEGORY :	M - EXTENDED FULL
MILEAGE INDICATOR :	M	FAILED MILEAGE :	1,500
CLAIM TYPE :	01	TRBL/DMG CODE :	95
SUBMISSION DOC. # :	897954704	COST CAT DETAIL:	
DOCUMENT SOURCE :	2 TRUCK-DCS-ONL	NEOBDII CODE :	
WARR PRESENT :	N	OVERRIDE SOURCE:	
TOTAL DEDUCT AMT. :	$.00		
REPIAR STATE :	MI	SPEC.COND.CODE :	
ADVISOR SSN :	368902278	TECH. SSN :	378802026

PAID WARRANTY DEALER : G21140 SUPERIOR BUICK-GMC TRUCK, INC.
DEARBORN , MI 48126

REPAIR ORDER NUMB :	006878	TOTAL CASE AMT :	$55.34
DATE OF REPAIR :	95/01/26	TOTAL LABOR AMT:	$37.60
CREDIT MEMO DATE :	95/02/13	TOTAL PARTS AMT:	$17.74
FAILED LABOR OPER.:	T7280	TOTAL MISC. AMT:	$.00
FAILED PART NUMBER:	25160561	TOTAL LABOR TIM:	.8 HOURS
WARRANTY CLASS :		ADMINISTRATION :	00 - MISC EXPENSE
WARRANTY COVERAGE :	AA	COST CATEGORY :	G - BASE
MILEAGE INDICATOR :	M	FAILED MILEAGE :	2,200
CLAIM TYPE :	01	TRBL/DMG CODE :	95
SUBMISSION DOC. # :	908333401	COST CAT DETAIL:	
DOCUMENT SOURCE :	2 TRUCK-DCS-ONL	NEOBDII CODE :	
WARR PRESENT :	Y	OVERRIDE SOURCE:	
TOTAL DEDUCT AMT. :	$2.40		
REPIAR STATE :	MI	SPEC.COND.CODE :	A5
ADVISOR SSN :	371402673	TECH. SSN :	371402673

INQUIRY FOR : VIN : 1 G K G K 2 6 F 8 S J 7 1 6 0 3 3 DEPARTMENT :
JONES,CAROL MISM/ 326997

PAID WARRANTY DEALER : G21140 SUPERIOR BUICK-GMC TRUCK, INC.
DEARBORN , MI 48126
REPAIR ORDER NUMB : 007973 TOTAL CASE AMT : $168.77
DATE OF REPAIR : 95/03/15 TOTAL LABOR AMT: $80.00
CREDIT MEMO DATE : 95/05/01 TOTAL PARTS AMT: $46.02
FAILED LABOR OPER.: 03083 TOTAL MISC. AMT: $42.75
FAILED PART NUMBER: 15982001 TOTAL LABOR TIM: 1.6 HOURS
WARRANTY CLASS : ADMINISTRATION : 05 - A/C & HEATING
WARRANTY COVERAGE : AA COST CATEGORY : G - BASE
MILEAGE INDICATOR : M FAILED MILEAGE : 11,000
CLAIM TYPE : 01 TRBL/DMG CODE : 3Z
SUBMISSION DOC. # : 964989001 COST CAT DETAIL:
DOCUMENT SOURCE : Q TRUCK-DCS-ONLINE OBDII CODE :
WARR PRESENT : Y OVERRIDE SOURCE:
TOTAL DEDUCT AMT. : $.00
REPIAR STATE : MI SPEC.COND.CODE :
ADVISOR SSN : 368902278 TECH. SSN : 374645352

PAID WARRANTY DEALER : G21140 SUPERIOR BUICK-GMC TRUCK, INC.
DEARBORN , MI 48126
REPAIR ORDER NUMB : 009681 TOTAL CASE AMT : $398.28
DATE OF REPAIR : 95/05/30 TOTAL LABOR AMT: $60.00
CREDIT MEMO DATE : 95/06/12 TOTAL PARTS AMT: $295.53
FAILED LABOR OPER.: 04440 TOTAL MISC. AMT: $42.75
FAILED PART NUMBER: 1134328 TOTAL LABOR TIM: 1.2 HOURS
WARRANTY CLASS : ADMINISTRATION : 05 - A/C & HEATING
WARRANTY COVERAGE : AZ COST CATEGORY : G - BASE
MILEAGE INDICATOR : M FAILED MILEAGE : 21,300
CLAIM TYPE : 01 TRBL/DMG CODE : 6G
SUBMISSION DOC. # : 996429101 COST CAT DETAIL:
DOCUMENT SOURCE : Q TRUCK-DCS-ONLINE OBDII CODE :
WARR PRESENT : N OVERRIDE SOURCE:
TOTAL DEDUCT AMT. : $.00
REPIAR STATE : MI SPEC.COND.CODE :
ADVISOR SSN : 368902278 TECH. SSN : 374645352
TOTAL VEHICLE WARRANTY EXPENSE : $1,735.71

[I INQUIRY FOR : VIN : 1GKGK26FBSJ716033 DEPARTMENT :
JC JONES,CAROL NISN/ 326997

PAID DEALER WARRANTY DETAIL INFORMATION

PAID WARRANTY DEALER : G21140 SUPERIOR BUICK-GMC TRUCK, INC.
DEARBORN , MI 48126
SUBMISSION DOC. # : 897954101 DOCUMENT LINE #: 002
WRO NUMBER : 006684
FAILED LABOR OPER.: PART NUMBER : 1052271

PAID WARRANTY DEALER : G21140 SUPERIOR BUICK-GMC TRUCK, INC.
DEARBORN , MI 48126
SUBMISSION DOC. # : 897954101 DOCUMENT LINE #: 003
WRO NUMBER : 006684
FAILED LABOR OPER.: PART NUMBER : 26012845

PAID WARRANTY DEALER : G21140 SUPERIOR BUICK-GMC TRUCK, INC.
DEARBORN , MI 48126
SUBMISSION DOC. # : 908333401 DOCUMENT LINE #: 002
WRO NUMBER : 006878
FAILED LABOR OPER.: PART NUMBER : 12345634

PAID WARRANTY DEALER : G21140 SUPERIOR BUICK-GMC TRUCK, INC.
DEARBORN , MI 48126
SUBMISSION DOC. # : 964989001 DOCUMENT LINE #: 002
WRO NUMBER : 007973
FAILED LABOR OPER.: PART NUMBER : 12345923

PAID WARRANTY DEALER : G21140 SUPERIOR BUICK-GMC TRUCK, INC.
DEARBORN , MI 48126
SUBMISSION DOC. # : 69014 DOCUMENT LINE #: 000
WRO NUMBER : D17371
FAILED LABOR OPER.: J0950 PART NUMBER : 23500361

INQUIRY FOR :
JONES,CAROL

VIN : 1 G K G K 2 6 F 8 5 J 7 1 6 0 3 3

DEPARTMENT :
NISM/ 326997

CANCELLED WARRANTY CASE INFORMATION

GM583 Rev E 5019

00000105

INQUIRY FOR : VIN : 1GKGK26F8SJ716033 DEPARTMENT :
JONES,CAROL NISM/ 326997

---------- CAMPAIGN CURRENT DEALER RESPONSIBLE INFORMATION ----------

CURRENT DEALER RESP. : G 21 140 SUPERIOR BUICK-GMC TRUCK, INC.
15101 MICHIGAN AVENUE
EFFECTIVE DATE OF CH 95/01/10 DEARBORN , MI 48126

---------- CAMPAIGN INFORMATION ----------

ORIG. DEALER ASSIGNED : G 21 140 SUPERIOR BUICK-GMC TRUCK, INC.
15101 MICHIGAN AVENUE
DEARBORN , MI 48126
CAMPAIGN NUMBER : 95C45 DESCR : N/A
CAMPAIGN STATUS : 1 REPAIR ORDER # :
DESCRIPTION LETTER : MICROFILM # :
LAST ACTIVITY DATE : 95/07/25
LAST SOURCE TO UPDATE: M DESCR : NEW CAMPAIGN ADDS FROM SUB-SYSTEM VF070000

---------- CUSTOMER NAME INFORMATION ----------

RETAIL DEALER(DLR ACT): G 21140 SUPERIOR BUICK-GMC TRUCK, INC.
15101 MICHIGAN AVENUE
DEARBORN , MI 48126
RETAIL SALE DATE CUSTOMER NAME :A MERESS
95/01/10 CUSTOMER ADDRESS :23694 GLENWOOD
POINTS: CUSTOMER CITY,STATE :CLINTON TWP , MI 48035
CUSTOMER NAME TYPE : DESCR : FIRST RETAIL CUSTOMER NAME-DEALER ACTIVITY
CUSTOMER NAME SOURCE: R DESCR : DEALER ACTIVITY RETAIL SALE INFORMATION

EFFECTIVE DATE CURR. CUST. NAME :R
96/02/29 CURR. CUST.
WARRANTY FORM: CURR. CUST.
CUSTOMER NAME TYPE - DESCRIPTION: CUSTOMER DATA FROM R.L. POLK

9010000

GM5828 Att E 5828

VINCAMPI DISPLAY VIN\RELATED CAMPAIGNS KIPSA06I

03/10/1997 18:35

VIN: 1GKGK26F8SJ716033 OPEN\CLOSED STATUS:

SEL CODE	CAMPAIGN NUMBER	STATUS	REPAIR DATE	REPAIR DEALER	PREV. NUMBER	CAMPAIGN TYPE
	95042	OPEN	/ /		95C45	NON-COMPLIANCE

SIR LABEL NON-COMPLIANCE

INQUIRY COMPLETE PW:

PF 10 MANT 11 VHCP 12 DLRA 13 AUDT 14 XREF 15 DESC 16 ADST 17 NADR 18 DELT
19 PERF 20 21 22 23 24 PF SELECT: GOTO:

AUDTHIST "AINTENANCE AUDIT HISTORY KIPSA08I

03/10/1997 18:35

VIN: 1GKGK26F8SJ716033 CAMPAIGN NUMBER: 95042
SIR LABEL NON-COMPLIANCE
** RECORDS ARE DISPLAYED IN DATE, TIME SEQUENCE **

STATUS: OPEN UPDATED: 1996/12/09 PGM: KIPP4C03 USER:
DIVISION: GMC TRUCK SUBGROUP: Z ASSIGNED GMBA: 00000118496
RO DATE: / / RO NUMBER: DEALER: LABOUR-OP:
CYCLE: COMMENTS:

STATUS: UPDATED: PGM: USER:
DIVISION: SUBGROUP: ASSIGNED GMBA:
RO DATE: RO NUMBER: DEALER: LABOUR-OP:
CYCLE: COMMENTS:

STATUS: UPDATED: PGM: USER:
DIVISION: SUBGROUP: ASSIGNED GMBA:
RO DATE: RO NUMBER: DEALER: LABOUR-OP:
CYCLE: COMMENTS:
INQUIRY COMPLETE PW:
PF 10 MANT 11 VHCP 12 DLRA 13 AUDT 14 XREF 15 DESC 16 ADST 17 NADR 18 DELT
19 PERF 20 21 22 23 24 PF SELECT: GOTO:

00000108

GM583 Att E 5927

VEHMAINT CAMPAIGN VEHICLE MAINTENANCE KIPSAI8U

03/10/1997 18:35

VIN: 1GKGK26F8SJ716033 **CAMPAIGN NUMBER:** 95042 **CAMPAIGN TYPE:** NON-COMPLIANCE
SIR LABEL NON-COMPLIANCE

ACTION:

DIVISION: 48 GMC TRUCK
ORIGINAL MAIL DATE: 1995/08/10
MOST RECENT MAIL: 1995/08/10
CURRENT DEALER ASSIGNMENT: 21140
ORIGINAL GMBA: 00000118496
LAST UPDATED: 1996/12/09

PREVIOUS CAMPAIGN: 95C45
SUBGROUP: Z
LETTER TYPE: E EXTERNAL
DEALER TYPE: SELLING/DELIVERING

AUDIT DATA AVAILABLE: N

STATUS: 00 OPEN OPEN
REPAIR ORDER/EFFECTIVE DATE:
CREDIT MEMO CYCLE:
COMMENTS:

CLAIM DEALER:
REPAIR ORDER NUMBER:
LABOUR OPERATION:

INQUIRY COMPLETE **PW:**

PF 10 MANT 11 VHCP 12 DLRA 13 AUDT 14 XREF 15 DESC 16 ADST 17 NADR 18 DELT
19 PERF 20 21 22 23 24 PF SELECT: GOTO:

GM583 Att E 5823 00000109

Mary - Please Research This Clmt very upset.

CUSTOMER INQUIRY

1/31/97

NAME OF PERSON CALLING : _____

PHONE NUMBER : _____

WHO REFERRED YOU TO US : GMC -

WHEN REPORTED TO GM : _____ WHEN INSPECTED : (?)

WERE YOU ADVISED BY GM WHAT THEIR FINDINGS WERE ? ☐ YES ☒ NO

IF SO, WHAT WERE THEIR FINDINGS ? _____

D / E : 11-14-96 LOCATION OF INCIDENT: MI

OWNER / DRIVER : Richard'

ADDRESS : _____

VEHICLE / YEAR / MAKE / MODEL: GMC (95) Suburban

VIN : 1GKGK26F8SJ716003 GM CAC # : (?)

ALLEGATION : Factory Installed Hitch Brake

WHERE IS VEH ? Was Veh INJURIES ? ☐ YES ☒ NO

NAME OF INJURED PERSON (S) : TYPE OF INJURIES :

BRIEF DESCRIPTION OF INCIDENT : Clmt driving Veh Hitch brake (come from GM) If no satisfaction will go to small Claims Court. ($1800 worth of damages)

****

WAS IT MENTIONED THAT AN ATTORNEY IS INVOLVED ? ☐ YES ☒ NO

IF SO, NAME OF ATTORNEY: _____

DATE TAKEN : 1-31-97 TAKEN BY : Elenor Schrock

SEARCHED: ___ 1241 ✓ FAA ✓ OMNI DATE TO SETUP : 1/31/97

ASSIGNED TO : Owner of GMC DATE : GM583 Att 0E 5024

FLD-605812 Walter Schwartz HOUSY (317) 846-0040 (owner of Superior Buick GMC TRUCK)

Walter from the Vehicles that

Michelle A. Picard
GM Claim Administrator

ESIS

An Insurance Services Company

PO Box 02489
Detroit, MI 48202
Telephone 313-556-2633
Facsimile 313-974-7389

February 20, 1997

Mr. Richard

Our Claim Number:	326997
Our Client:	General Motors Corporation
Date of Event:	11/14/96
Vehicle:	1GKGK26F8SJ716033

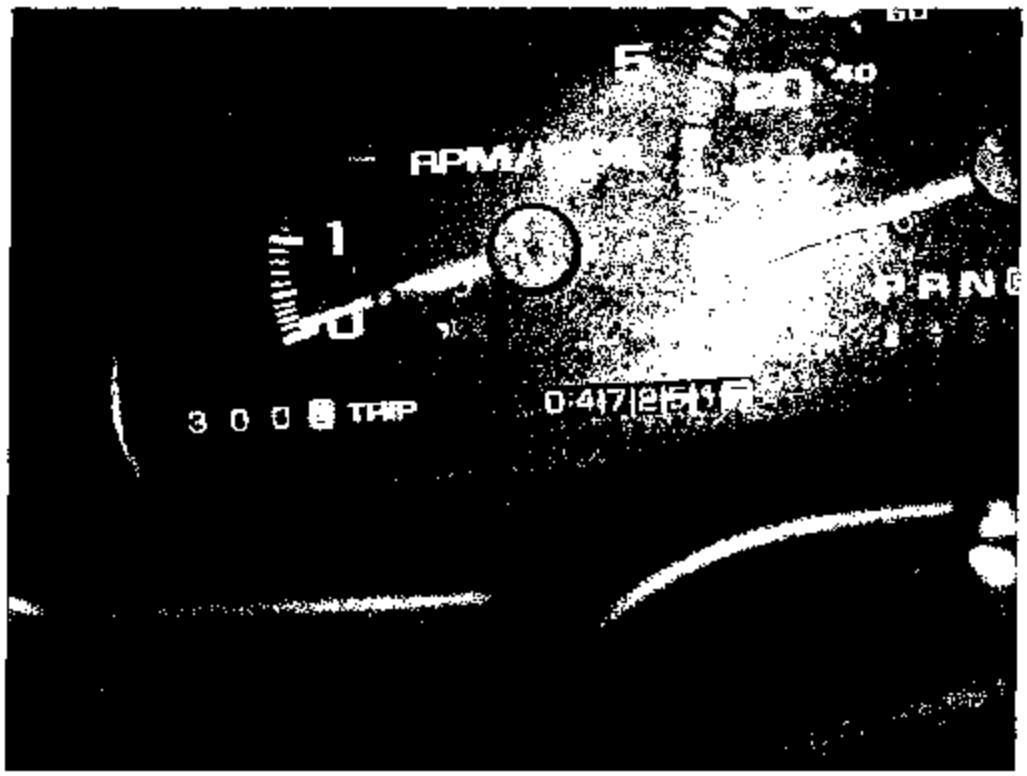
Dear Mr. '

A review of the above-referenced claim for recovery has been completed. It has been determined by GMC that there is no evidence to support the allegations of a defect as the cause of the damages claimed. Accordingly, General Motors Corporation is not in a position at this time to honor your claim.

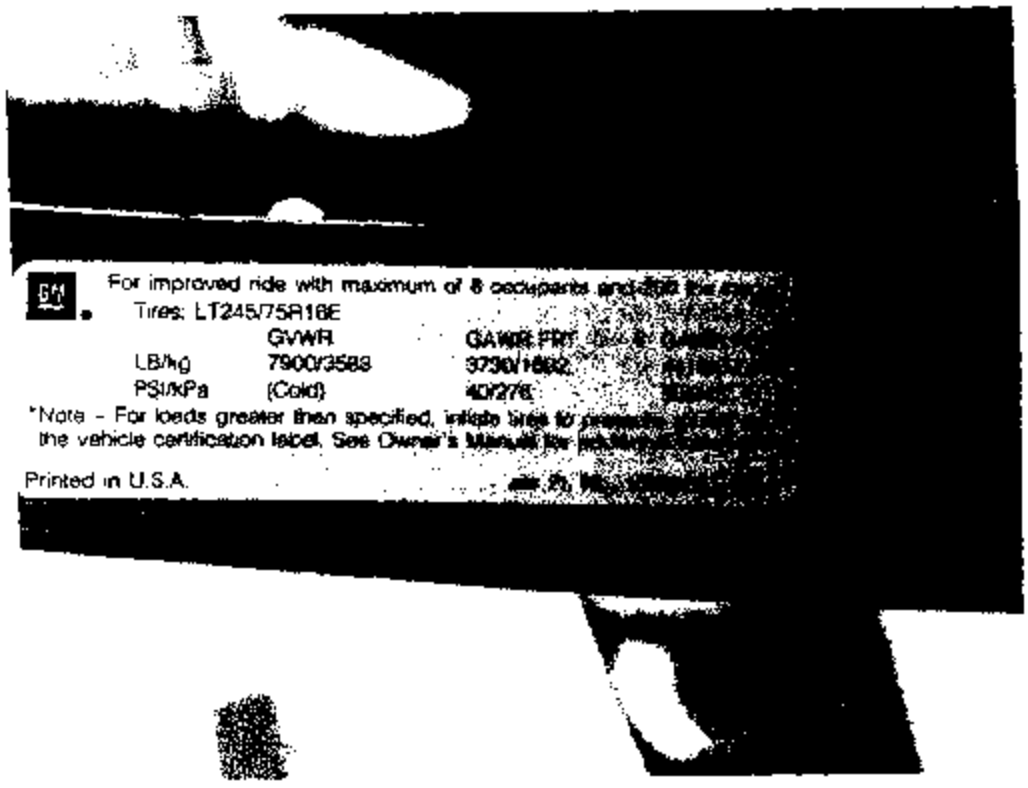
Thank you for your time and attention in this regard

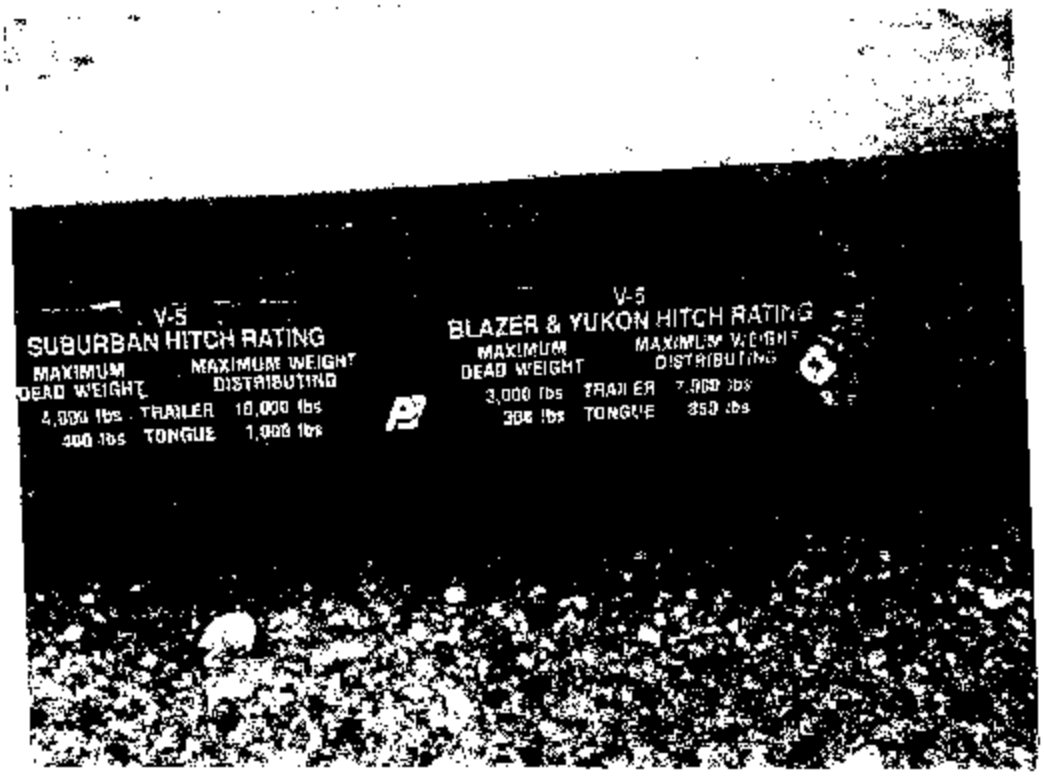
Sincerely,

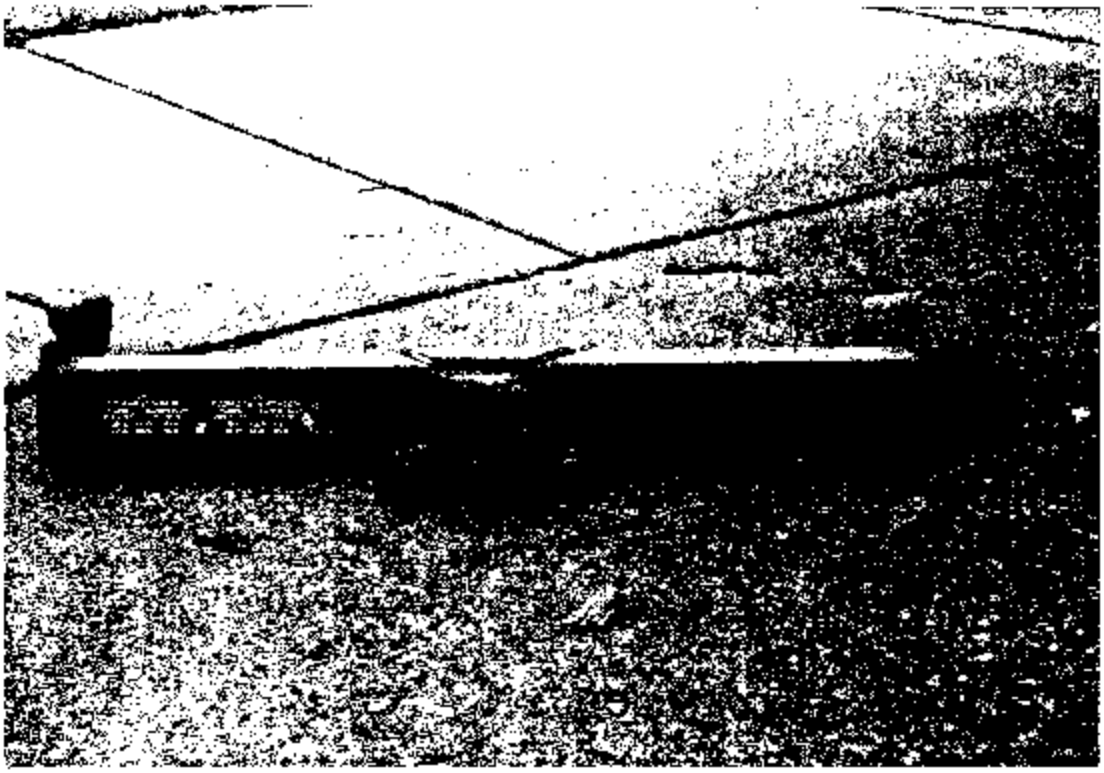
Michelle A. Picard




GMC

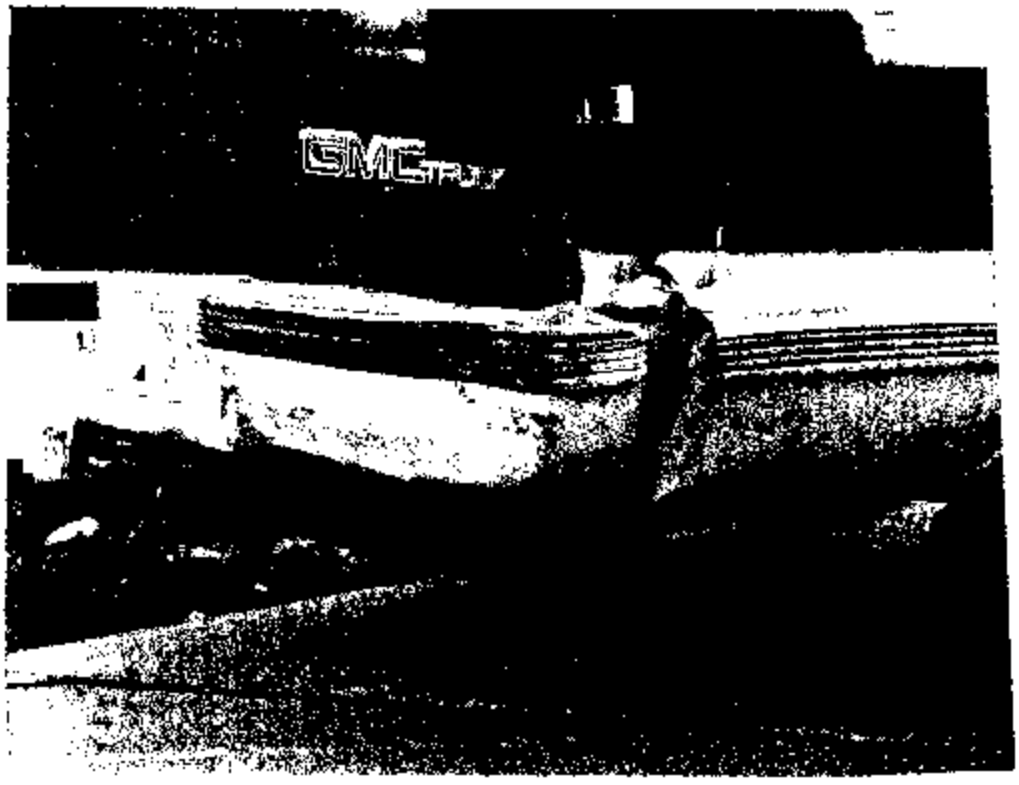

For improved ride with maximum of 6 occupants
Tires: LT245/75R16E
GVWR
LB/kg
7900/3583
PSI/kPa
(Cold)
*Note - For loads greater than specified,
the vehicle certification label. See Owner's
Printed in U.S.A.

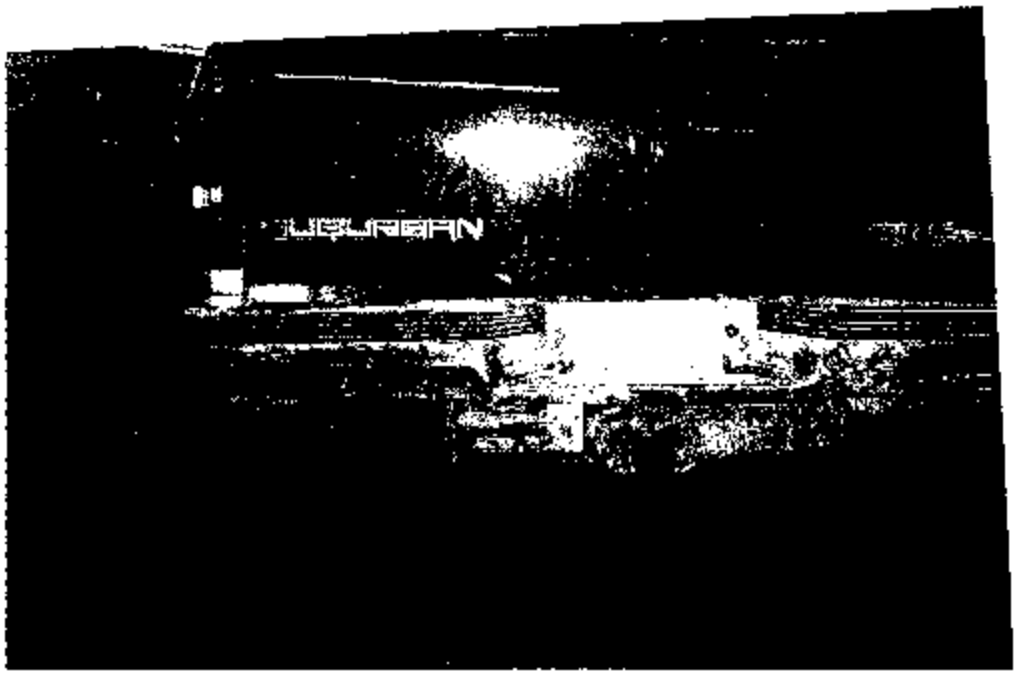

V-6
SUBURBAN HITCH RATING
MAXIMUM DEAD WEIGHT
MAXIMUM WEIGHT DISTRIBUTING
4,000 lbs TRAILER 10,000 lbs
400 lbs TONGUE 1,000 lbs
V-6
BLAZER & YUKON HITCH RATING
MAXIMUM DEAD WEIGHT
MAXIMUM WEIGHT DISTRIBUTING
3,000 lbs TRAILER 7,000 lbs
300 lbs TONGUE 350 lbs

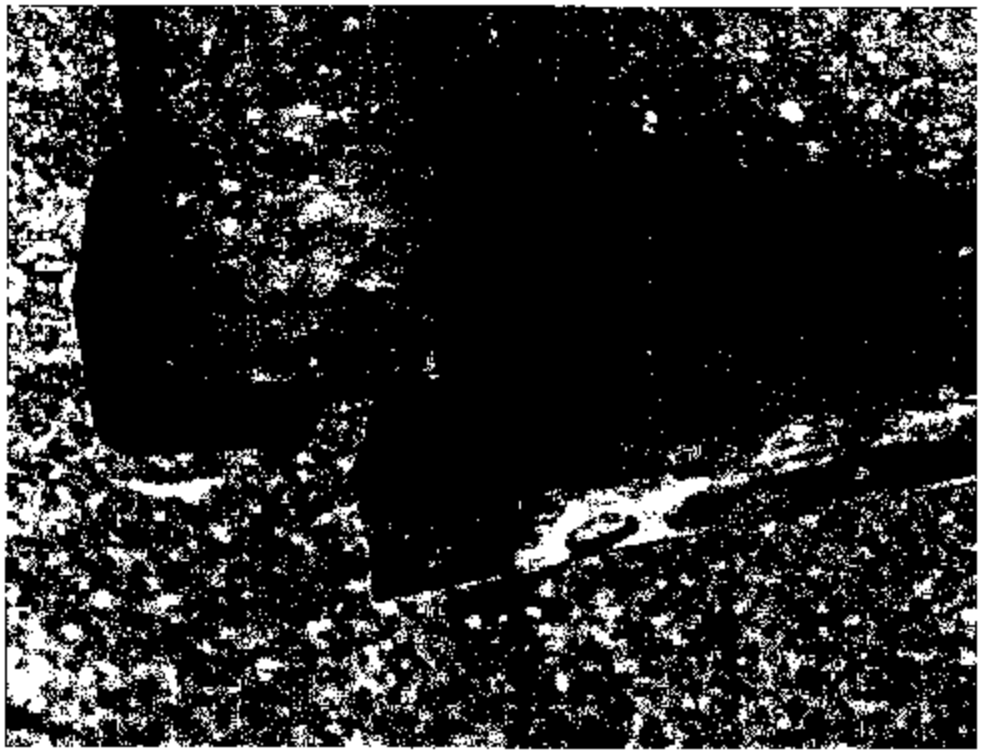


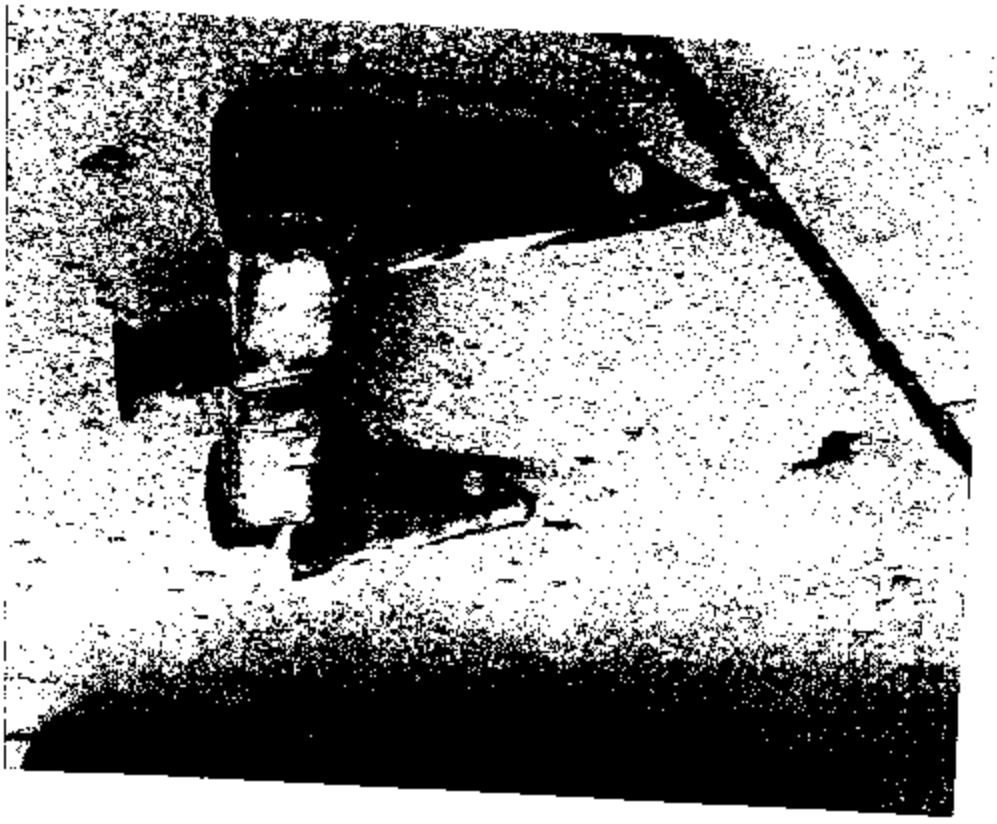
GM:H3 A1 E 5030

00000116









General Motors Corporation

DP00-001; GM583

Attachment F

1241A

PI92539
R00-050

GENERAL MOTORS CORPORATION

DIVISION: PONTIAC - GMC

ZONE: North Central

DATE: 1/10/97

ESIS UNIT
GM Central Claims
P.O. Box 02489
Detroit, MI 48202

RE: Claimant: Richard

Date of Incident: 11/14/96

CAC File No.: 96017597

Gentlemen:

Form GM 1241 (Pages 1 & 2 is attached, reporting information on the above captioned incident. This Report of Preliminary Investigation is submitted to you for the reason(s) indicated below:

1. (x) The attached report is for your information and record.
2. ( ) We believe this claim may deserve further investigation by you.
3. ( ) Other:

We have checked the above items based upon the information we have at this time. If you do not agree, or if subsequent facts come to your attention indicating the advisability of a different approach, we would appreciate being advised promptly.

Forward claim acknowledgments to:

Product Investigation Coordinator
Pontiac-GMC Division
M.C. 483-050-376
One Pontiac Plaza
Pontiac, MI 48340-2952

Further inquiries regarding this claim should be directed to the undersigned.

Very truly yours,

PONTIAC-GMC DIVISION
General Motors Corporation

Customer Service Center Supervisor
One Pontiac Plaza
M.C. 483-050-376
Pontiac, MI 48340-2592

Enclosures:
Repair Orders
Inspectors Notes
Photos
Customer Photos

GH583 A1& F 6001

00000124

UTECAPA032497017334 68-PI92539

PONTIAC-GMC DIVISION
REPORT OF PRELIMINARY INVESTIGATION

Serious incidents should be immediately reported by telephone to Central Office, Product Compliance.

Date of Incident: 11/14 19 96 Hour 6:30 PM

I OWNER CLAIMANT

Name of Owner: _____ Age: _____ Home Phone: _____
Address: _____ Bus. Phone: _____
City: _____ State: MI Zip Code: _____
Name of Driver: _____ Age: _____ Home Phone: _____
Address: _____ Bus. Phone: _____
Name of Claimant: _____ Age: _____ Home Phone: 247-
Address: same Bus. Phone: _____

Is claimant represented by an attorney? ☐ Yes ☒ No
If "Yes", give name and address: _____

II VEHICLE

Make: GMC Truck V.I.N. 1GKGK26F8SJ716033 Year: 1995
Trans.: AUTO Axle: 4.10 Engine: 6.5L Turbo Diesel
Date of Del.: 01-10-95 New, Used or Demo: used License No.: _____
Dealer: Superior Buick -GMC Truck, Inc. Address: Dearborn, MI
Inspection Sticker No.: None Inspection Station No.: none Expiration Date: none
Principal uses of vehicle: Personal used
Special vehicle features or equipment: Electric Trailer
If vehicle is a truck, state gross pay load & location and description of load at time of incident: Trailer at 4000 founds and load of pumpkins est. 4000 total 8000 pounds.
Nature and extent of damages to vehicle and estimaged cost of repairs. (Attach copy of estimate.):
Rear bumper Rt Quarter panel
Insurance Company's name and address: _____

Agent's Name: _____ Phone Number: _____
Adjuster's Name: _____ Phone Number: _____
Policy Number: _____ Claim Number: _____
Is vehicle subject to any product campaign(s)? ☒ Yes ☐ No Was campaign performed? ☐ Yes ☐ No
If "yes", identify campaign(s): 95C45 SIR Label Non Compliance

III PROPERTY DAMAGE

Property Damage: None ☐ or LIST ALL VEHICLES INVOLVED
Was another vehicle involved? State make and model of vehicle: _____
Other vehicle speed estimate: _____ MPH By whom: _____
Name and address of owner: _____
Name and address of driver: _____
Extent of damage: _____
Was property (other than a motor vehicle) damaged? (state kind, name of owner and extent of damage):
Yes, customer states he lost a pair of eye glassed during incident. Customer has receipt from your eye site, Inc. 856 Nova Rd, Daytona Beach, Fl. 32117 Cost $205.00.

IV BODILY INJURY

ANY INJURED PARTY MAY FILE A CLAIM OR LAWSUIT INDEPENDENTLY OF THE OWNER, DRIVER OR CLAIMANT. ALL INJURED PARTIES MUST BE IDENTIFIED BELOW.

Bodily Injury: None ☐
Indicate following information on injuries and whether the injured person(s) were riding in (A) owner's vehicle,(B) other vehicle, (C) pedestrian or (D) other.

(1) Name and address: _____
Age: _____ Code A, B, C, or D: _____ Seating position: _____
Nature of injuries: _____
Where were injured treated and by whom? _____

(2) Name and address: _____
Age: _____ Code A, B, C, or D: _____ Seating position: _____
Nature of injuries: _____
Where were injured treated and by whom? _____

(3) Name and address: _____
Age: _____ Code A, B, C, or D: _____ Seating position: ~~GM582 Att P 6902~~
Nature of injuries: _____
Where were injured treated and by whom? _____

00000125

I241-2 Claimant: Richard Strauss

V INVESTIGATION

How, when, and by whom was zone notified of incident? Telephone November 18, 1996, Claimant

Location of incident (Designate exact location) US 23 Northbound Near Fenton, MI

Kind and Condition of road: (or not relevant ☐)

Kind of road:	x	concrete	____	gravel	____	asphalt	____	crushed rock	____ dirt
Condition of road:	____	wet	x	dry	____	icy	____	other	
Kind of shoulder:	x	concrete	____	gravel	____	asphalt	____	crushed rock	____ dirt
Condition of shoulder:	____	wet	x	dry	____	icy	____	other	

Nature of weather: Clear Vision obstruction (if any, describe) none

Name and address of dealer who towed (include tow driver's name), stored and/or provided temporary service to damaged vehicle:

Tow bill 165.00 Location and driver not obained.

Where can vehicle be seen? in owners possession

Did vehicle turn over? ☐ Yes ☒ No Vehicle speed estimate MPH 55

Source of speed estimate claimant Posted speed limit 65 MPH

Brand and size tires Firestone LT245/75R16

Condition of tires:	R.F.	x	Good	____ Poor	____ Flat	R.R.	x	Good	____ Poor ____ Flat
	L.F.	x	Good	____ Poor	____ Flat	L.R.	x	Good	____ Poor ____ Flat

Other (truck or spare) LT245/75R16

Did your search of the vehicle service history produce service repair orders: ☒ Yes ☐ No

If "Yes", attach copies of all R.O.s. (indicate how many 9) If "No", explain

Police report attached? ☐ Yes ☒ No If "No", what station or officer made report? (☐ No report filed)

Names and address of witnesses: (or None ☐)

Were photos taken? ☒ Yes ☐ No If "Yes", how many: 16 By whom (name and address):

Lee A Bates, EA. Assoc. 2061 Michael Dr. Sterling Hts, MI owner also supplied four photo's.

If "No", explain:

VI DESCRIPTION OF CLAIM

Driver's description as to how incident happened and his statement of the cause.

See attached addendum.

Did you personally speak with driver? ☒ Yes ☐ No If "No", give source of driver's description.

Was vehicle inspected? ☒ Yes ☐ No If "Yes", identify all parties

What vehicle components are allegedly defective? Trailer Hitch

Who made allegation of defect? Claimant

If the alleged defective part has been removed from the vehicle, indicate exact parts, present location and who is custodian.

In owners possession. Replaced by owner prior to inspection.

Information from further investigation of incident, including examination of vehicle and scene of incident.

See attached addendum.

Date matter was concluded with claimant?

How and when was matter left with claimant? No apparent defect . See attached addendum.

DATE OF INVESTIGATION 12/4/96
DATE SIGNED 12/5/96

PRINTED NAME Lee A. Bates
SIGNED Lee A Bates (RW)
Divisional Representative Completing Investigation
General Motors Corporation

(Note: Continue answers on another sheet if necessary.)

GM503 Att F 00000126

UTECAPA032497017334 70-P|92539

Addendum
Mr. Richard
Case 96017597-02

December 5, 1996

The vehicle involved, a 1995 Suburban, was inspected at Detroit Hitch, 651 Rochester Road, Troy, MI on Wednesday, December 4, 1996. The inspection was performed at this location due to its convenience for Mr. Strauss and me to facilitate the inspection at the earliest possible date.

Mr. has had the hitch replaced with a heavier model from that supplied as the factory hitch. The replacement hitch was installed by Mike's trailer Service, Inc. 448 West Eight Mile Road, Hazel Park, MI. Telephone (313) 546-5600.

Owner's description of the incident:
Mr. states he was transporting a second load of pumpkins in his snow mobile trailer traveling northbound about 55 MPH on U.S. 23 near Fenton, MI. Suddenly, the front of the trailer dropped and the vehicle was difficult to control. He managed to stop the Suburban and trailer, but not before the trailer hit the right end of the rear bumper damaging the bumper and the trailer. A trucker stopped to offer assistance and a tow truck was called to assist. The trailer is equipped with three axles and the center and rear tires on the left side dismounted from the wheels.

Mr. indicates the Interstate trailer is modified by adding a third axle to raise the Gross Weight Rating to 9500 pounds. He indicates the trailer weighs 4000 pounds and the trailer had approximately 150 pumpkins at 15-20 pounds each on the trailer at the time of the incident. His initial estimate of total trailer weight to GMC was 8000 pounds, but now believes the weight to be closer to 7000 pounds.

M indicates the trailer is equipped with electrically operated brakes on all three axles and are controlled by a Micro Control H.D. Plus. He indicates the brakes were connected and operating at the time of the incident.

Damage to the Suburban is estimated at $1081.91 to replace the rear bumper and repair the right quarter panel where the bumper contacted the quarter panel. The bumper has been pulled out to allow access through the right rear door. Repair to the Interstate trailer is estimated at $120.00 to replace an aluminum trim piece and front door at the right front of the trailer. The trailer was not available for inspection.

Inspection of failed hitch:
The replaced hitch was retained by the owner and stored in the rear of the suburban. The replaced hitch is identified as a V-5 model hitch for the Suburban with Maximum trailer dead weight of 4000 pounds and maximum tongue dead weight of 400 pounds. Maximum distributing weight ratings are 10,000 trailer and 1000 tongue.

Both attaching plates have torn at the upper radius leading to the frame mounting flange and the tear has radiated downward to the square tube. The attaching plates have opened at the tears and the welds at the top and rear sides of the tubing joining the plates to the tubing are torn. This allowed the square holes of the plates to open and the tubing to drop down under the weight of the trailer.

There is sufficient corrosion on the torn metal surfaces to indicate this was not a sudden failure. This appears to be a fatigue failure of the metal resulting in failure of both attaching plates. The mounting flange surfaces are distorted , but there is no indication of the flanges coming loose from the frame and the bolt holes are intact.

Vehicle Inspection:
Mr. has had a heavier Reese Hitch installed prior to the inspection. The vehicle currently has 47,251 miles on the odometer. Mr. , states he has driven approximately 4000 miles since the reported incident.

Overall, the vehicle is very dirty both inside and out. The vehicle is in below average condition for its age and mileage.

Mr. states he purchased the vehicle used from Superior Buick-GMC Truck. It is not known how many miles were on the vehicle at the time of purchase.

How this matter was left with the owner:
Mr. was advised the failure of the mounting plates was consistent with what would be expected from excessive tongue weight and that there was no apparent defect. He was advised to retain the hitch until the matter is resolved.

He indicated he was looking for assistance in this matter and was willing to sign a release. Anything short of a positive response will result in litigation.

Mr. called me on Thursday, December 5, 1996 to indicate his math was wrong when he originally indicated the pumpkins weighed 4000 pounds. Again, he reiterated the load was 150 pumpkins at 15-20 pounds each so he could not have been overloaded when the incident occurred.

He was advise the hitch speaks for itself and GMC Truck will review the information gathered and the photographs to develop their final position in this matter. A letter stating the final position of GMC Truck in this matter was requested by Mr. Strauss.

Lee A. Bates
Service Associate
Engineering Analysis Associates
2061 Michael Drive
Sterling Heights, MI 48310

Enclosures:
Four photographs supplied by owner prior to hitch replacement. (No negatives supplied)
16 photographs with negatives
Receipt from Detroit Hitch
Repair estimate for trailer from Mike's Trailer Service

ESTIMATE OF REPAIR COSTS

01705

MIKE'S TRAILER SERVICE, INC.

444 W. 8 MILE

HAZEL PARK, MICHIGAN 48030

PHONE: 313 / 546-5600

Date 12-2-96

Phone

Make Interstate Mfg.

Serial

Year 1995

Size 28' x Flatbed

Owner

Address

Appraised Fr.

Policy No.

Quan.	PARTS NECESSARY AND ESTIMATE OF LABOR REQUIRED	PAINT COST ESTIMATE	PARTS COST ESTIMATE	LABOR COST ESTIMATE
1	Molding 59" X 1 5/8" alum		40 97	
	Str & straighten metal on doors & replace alum Molding.			80 00
	Str & R & R Trailer Hitch P.# 7#41911		168.97	60.00
1	D.T. complete adj. Headache # 3815		184 08	Done
1	Bolt 2 7/8"		18 05	
		$	$411.10	

Remarks: Interstate Mfg 68938 Union St Washington Twp MI 48095

Labor	$ 160	00
Parts	411	10
Paint		
TOTALS	$ 571	10
Sales Tax	24	60
ESTIMATED GRAND TOTAL	$ 595	70

PARTS PRICES BASED ON STANDARD CATALOG PROCUREMENT PRICE LISTS SUBJECT TO CHANGE WITHOUT NOTICE. PROCUREMENT AND DELIVERY CHARGES MAY BE ADDED FOR SPECIAL SERVICE ON ITEMS NOT AVAILABLE LOCALLY. OLD PARTS REMOVED, WILL BE JUNKED, UNLESS OTHERWISE INSTRUCTED IN WRITING.

(Sales taxes, where applicable, to be added to invoice)

YOU ARE AUTHORIZED TO PROCEED AS ABOVE X SIGNED

This estimate is based on our inspection and belief. It does not include additional parts or labor which may be required after the work has been opened up. Often defective parts are discovered which were not evident on initial examination. For this reason the estimate is not guaranteed unless so indicated on the face hereof. THIS IS AN ESTIMATE good for thirty days from date; thereafter it is subject to confirmation. It is not an authorization to proceed with the work.

INSURANCE CO.

GM583 Att F 6007

0000130

UTEGAPA022493011733474-PI92539

Detroit Hitch Co.
651 ROCHESTER ROAD
CLAWSON, MI 48017-1789
810-583-4112
800-424-5232
FAX 810-589-5250

INVOICE #: QUOTATIO
DATE: 12/04/96
SLSMN: LARRY PAGE 1

BILL TO: 201
*** OPEN ITEMS ***
MUST HAVE TAX FORM SIGNED

SHIP TO:
STRAUS BLDG. + DEV. INC.
MUST HAVE TAX FORM SIGNED

UPS: 2 ROUTE: 1

PURCHASE ORDER	DATE SHIPPED	SHIPPED VIA	F.O.B. POINT	TERMS –	ORDER #
	12/04/96	Cust pick		C.O.D	154509

QUAN. ORDERED	SHIPPED	BACK ORDERED	PART NUMBER	DESCRIPTION	COST $ EACH	NORMAL $ TOTAL	NET $ TOTAL
1	1		119-45001	RECEIVER, REESE TITAN CL 5 F2	156.50		156.5
1	1		960-3623	HEAD ASSY BOLT-ON DT #3623	75.95	75.95	
1	1		960-3645	FASTENER PKG DT ADJ TRUN HEAD	16.05		16.0

YOU MAY TAKE YOUR DISCOUNT IF PAYMENT IS POSTMARKED BY THE 8th OF THE NEXT MONTH. AFTER THE 10th THERE WILL BE A 1.5% CARRYING CHARGE PER MONTH FOR AN ANNUAL RATE OF 18%

RECEIVED BY _____

	75.95 172.7
SUB TOTAL	248.51
TAX	14.0
FREIGHT	
TOTAL	263.4

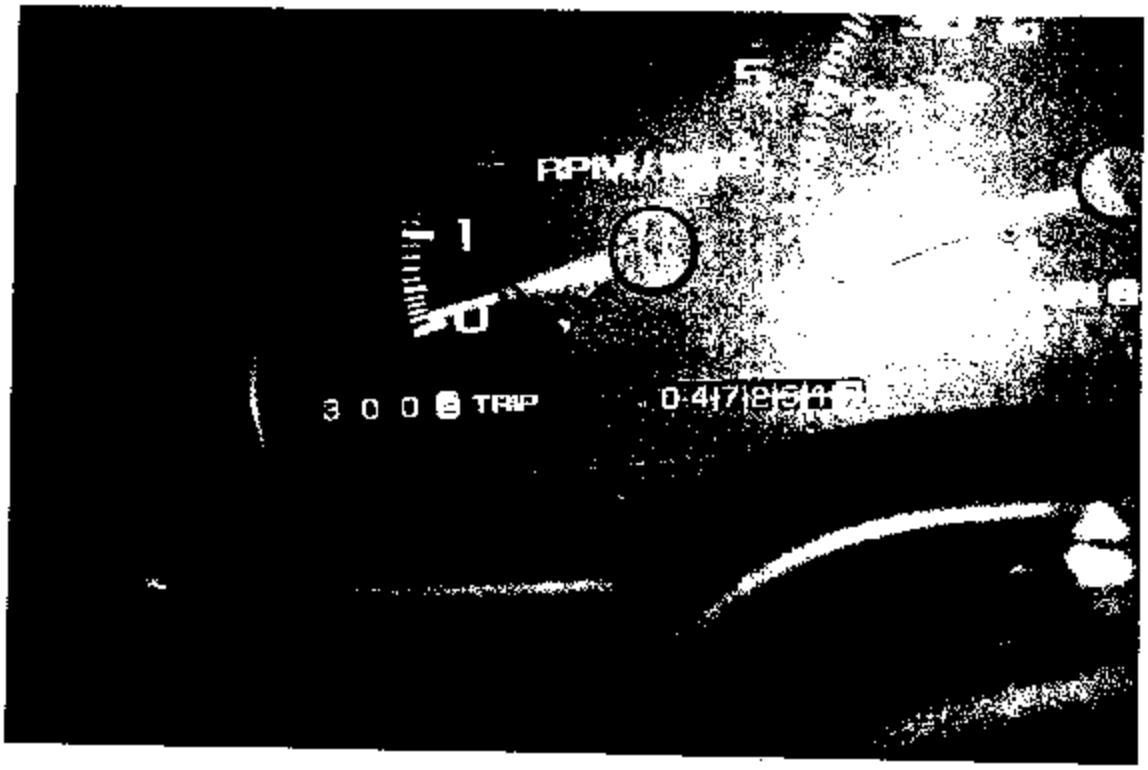
CHARGE
CASH AMOUNT
CHECK AMOUNT
CHECK NUMBER

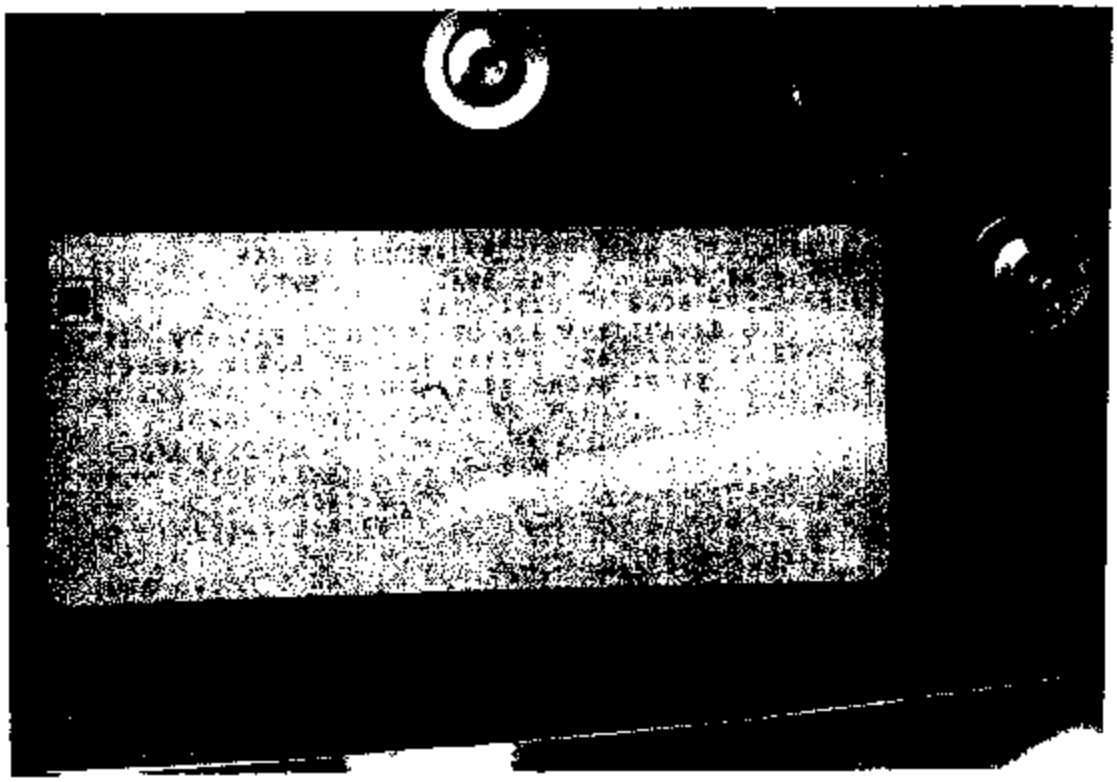
00000131

ENTER IN CHECK OR CASH

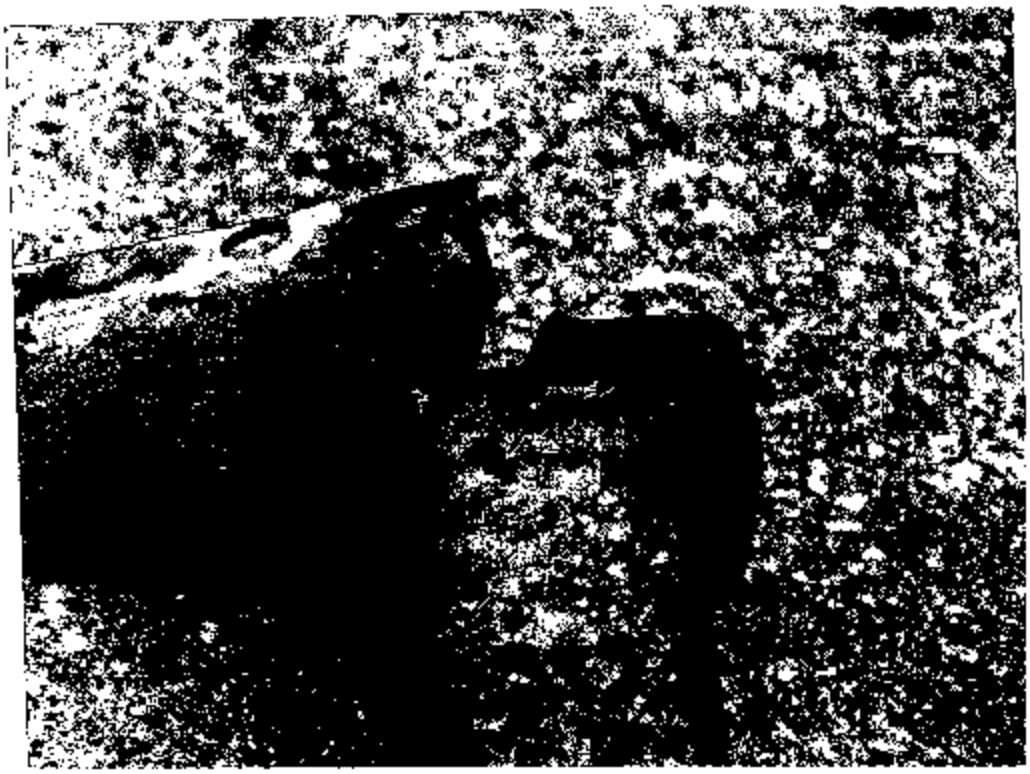
GM583 Att F 6000

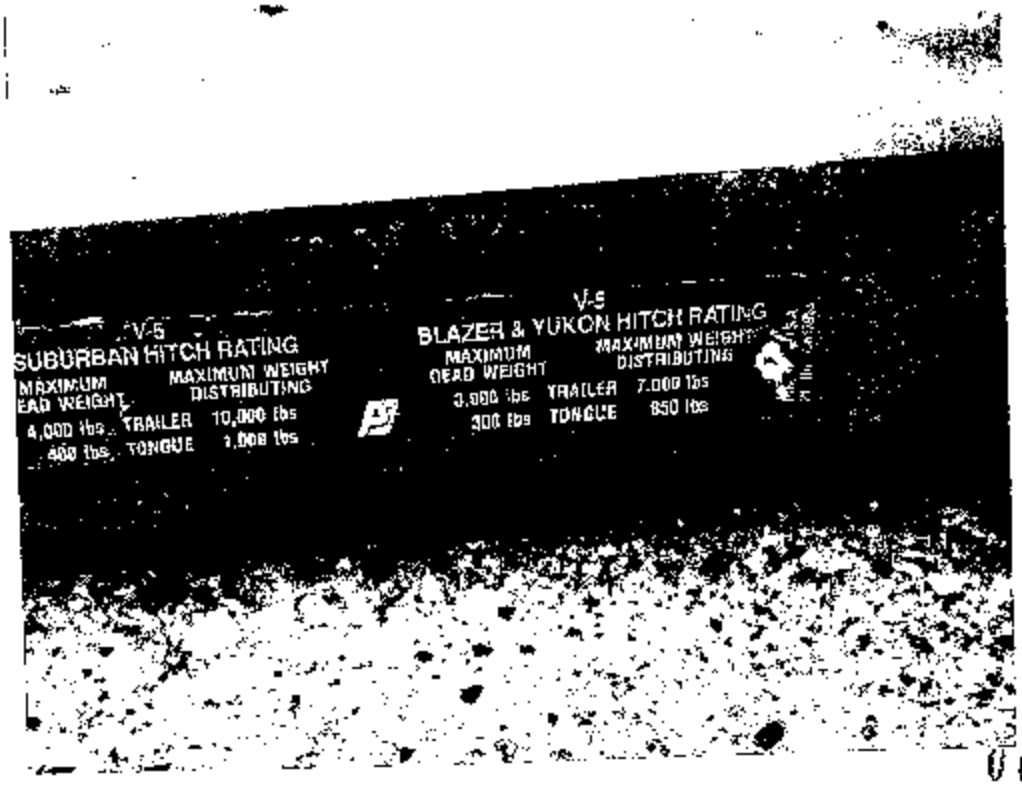
UTECAPA03249701733475-PI92539





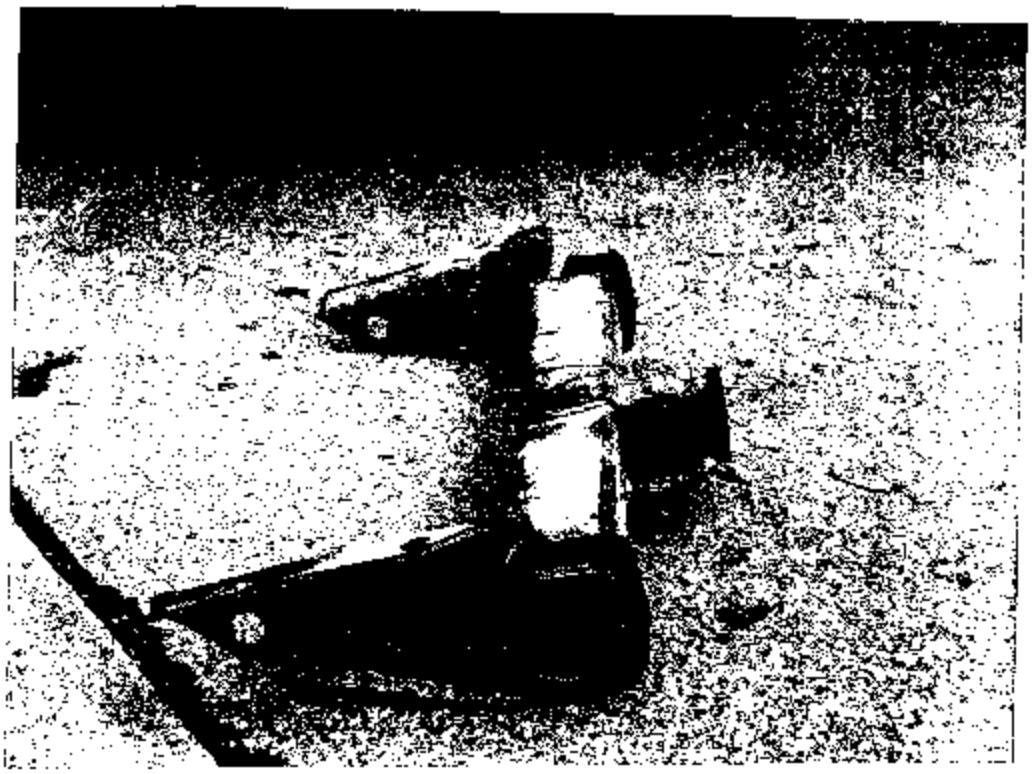
GM683 Att: F 6059

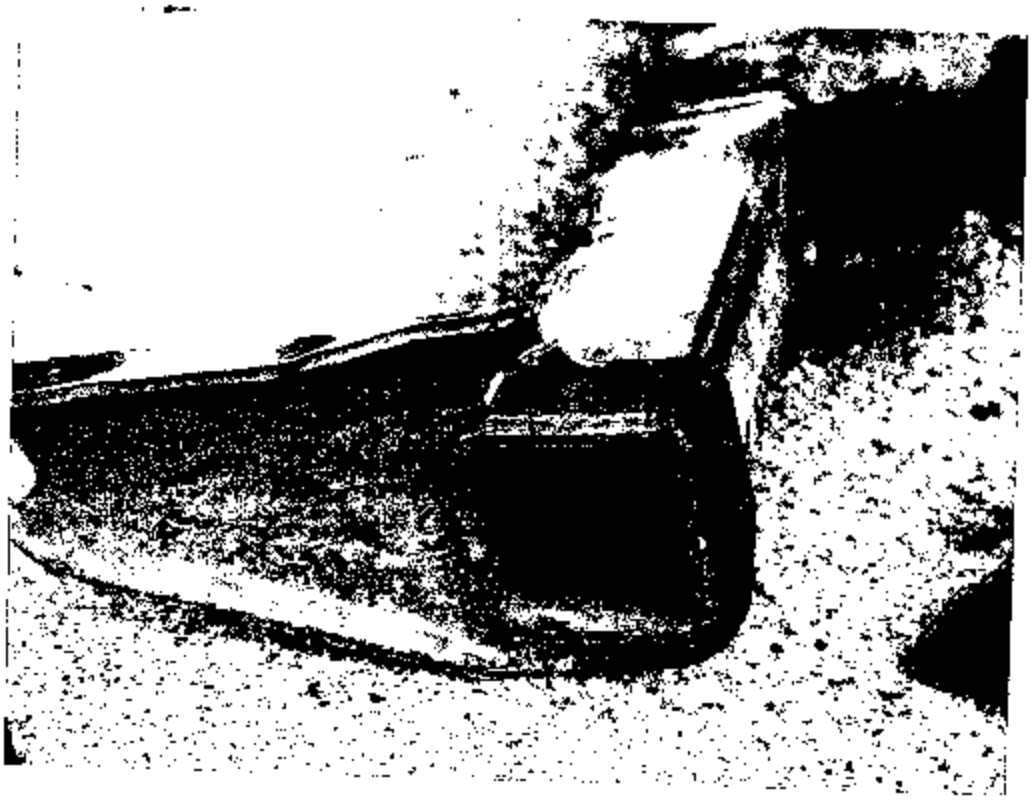


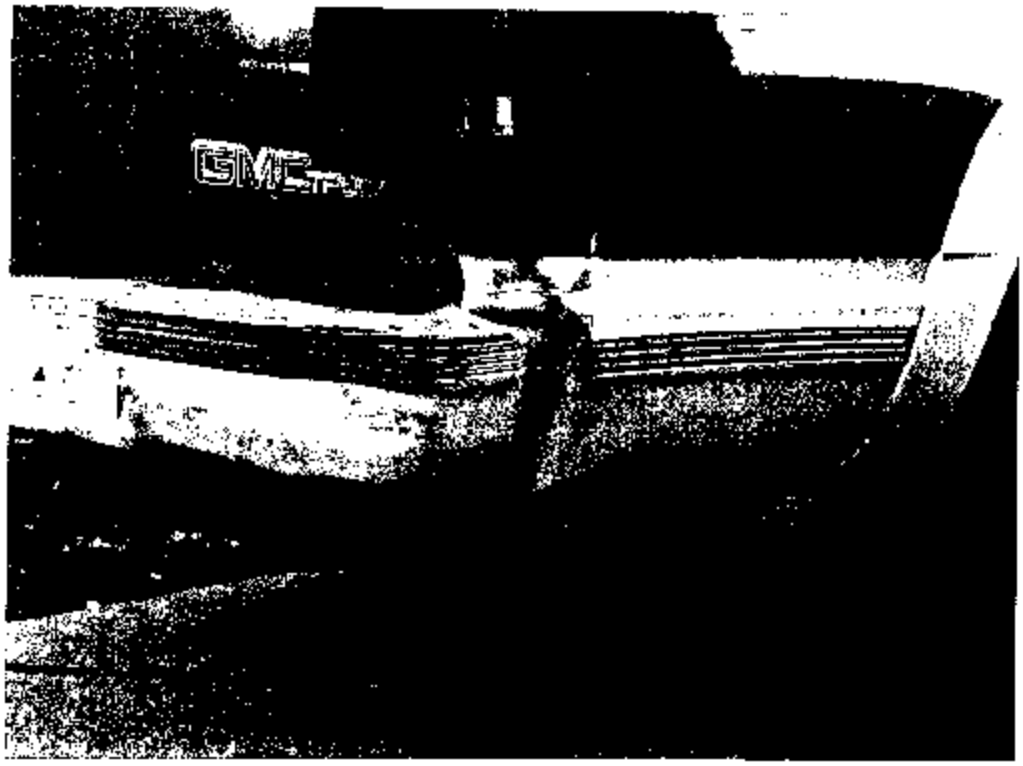


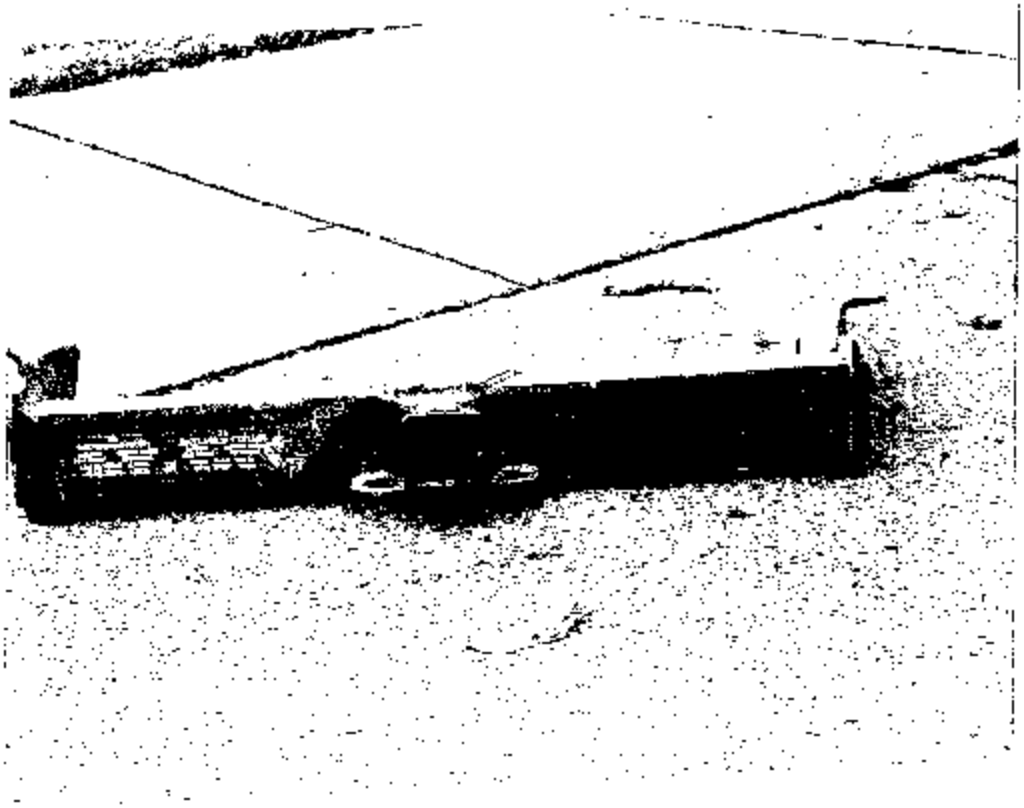
00000133

GM5028 6-1 F 6810



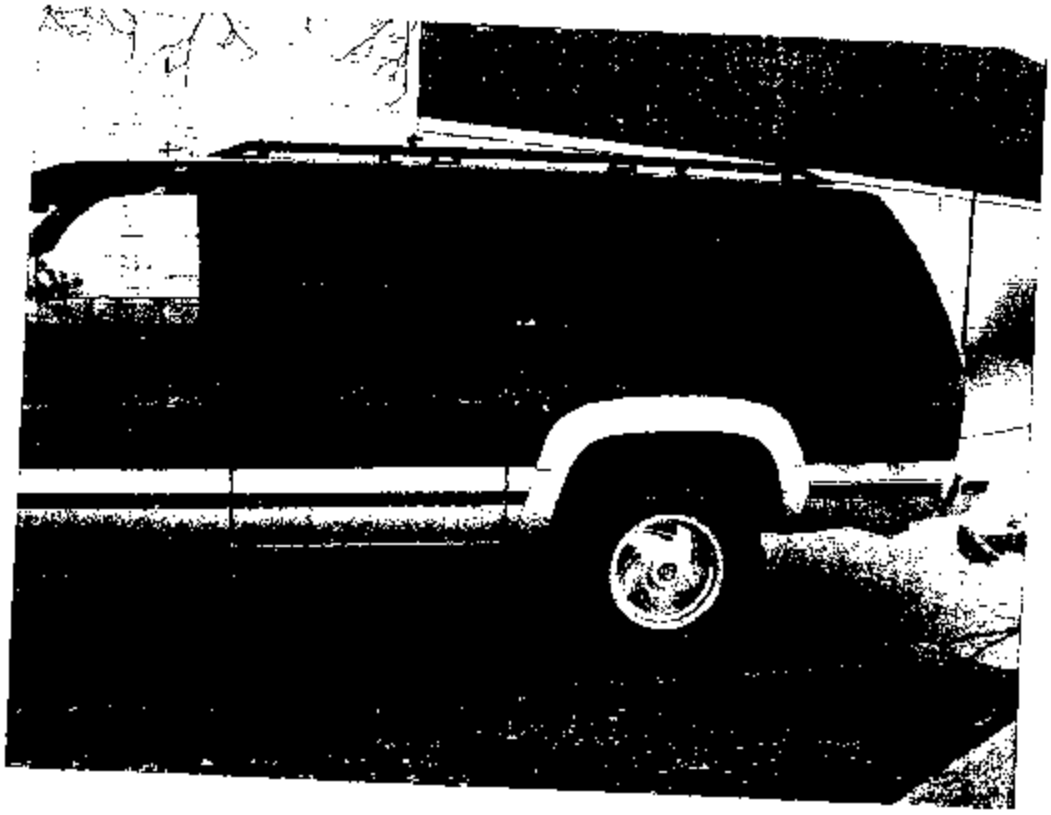


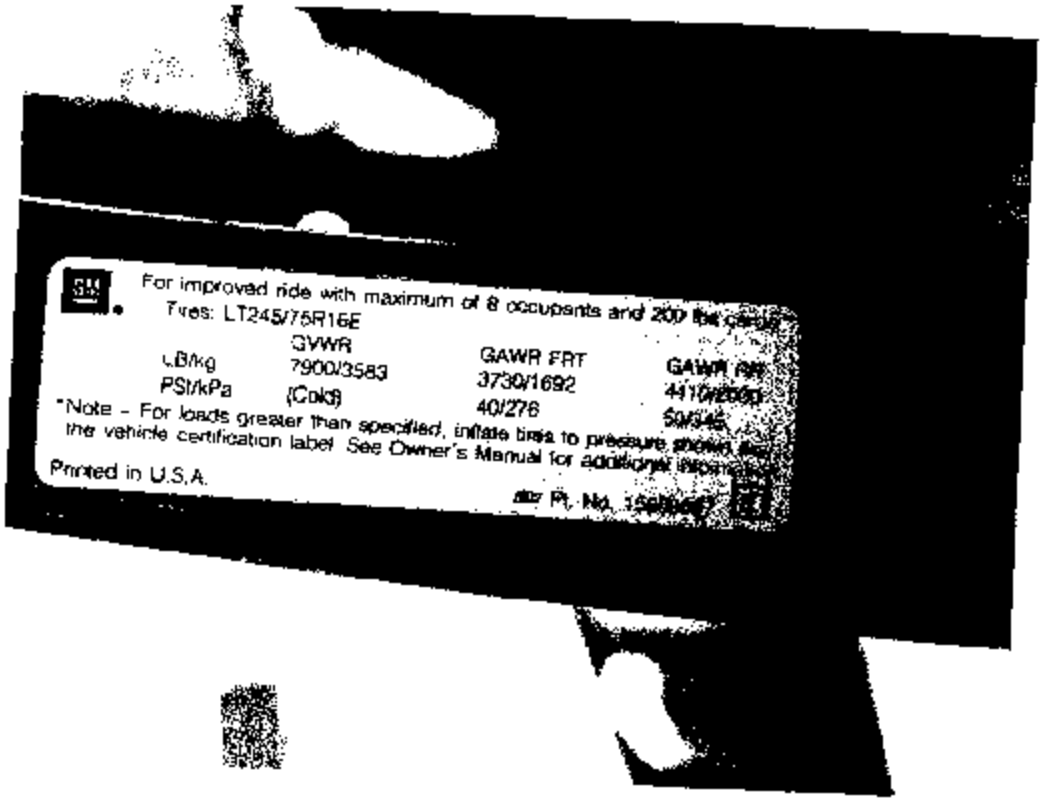




GM583 ALL F 6812


SUBURBAN






GMC

ATTACHMENT "G"

General Motors Corporation

DP00-001; GM583

Attachment G

LABOR OPERATION - B1160 - HITCH,TRAILER-R&R

QUESTION #5

---------- LABOR*OP=B1160 LABOR*OP*DESCRIPTION=HITCH,TRAILER-R&R-RP ----------

TROUBLE CODE	TROUBLE CODE DESCRIPTION	VIN	MODEL	MODEL YEAR	BUILD DATE	DELIVERY DATE	WORK ORDER DATE	MILES
1K	CRACKED	1GNEC16K8NJ335088	C1	1992	1992-05-12	1992-05-19	1992-11-23	170
1K	CRACKED	1GNGC26N5NJ334991	C2	1992	1992-05-12	1992-05-29	1994-11-21	324
1K	CRACKED	1GNGC26N2NJ332311	C2	1992	1992-05-01	1992-07-06	1995-04-07	407
2H	IMPROPERLY INSTALLED	1GNGK26N7NJ329956	K2	1992	1992-04-23	1992-05-02	1992-12-22	94
2W	LOOSE	1GNGC26K3NJ336387	C2	1992	1992-05-15	1992-05-27	1994-11-22	459
3N	POOR MACHINING	1GNGC26N4NJ332178	C2	1992	1992-04-30	1992-07-24	1994-05-02	201
3R	POROSITY	1GNGK26N9NJ331921	K2	1992	1992-04-30	1992-05-15	1994-08-15	340
4S	WELD OMITTED OR POOR WELD	1GNEC16K9NJ335875	C1	1992	1992-05-14	1992-05-30	1993-10-13	404
4S	WELD OMITTED OR POOR WELD	1GNEC16KXNJ340406	C1	1992	1992-06-02	1992-10-22	1993-06-17	70
4X	WORN	1GNGC26N2NJ359783	C2	1992	1992-08-15	1993-02-08	1994-09-21	286
5W	RUSTED OR CORRODED	1GKFK16K0NJ730466	K1	1992	1992-08-20	1992-09-28	1995-09-12	307
6C	COMPONENT-INOPERATIVE	1GKEC16K3NJ701312	C1	1992	1991-11-19	1992-04-09	1992-05-06	34
6C	COMPONENT-INOPERATIVE	1GKGK26M7NJ712356	K2	1992	1992-04-05	1992-04-09	1993-06-07	178
6C	COMPONENT-INOPERATIVE	1GNFK16K3NJ308524	K1	1992	1992-01-10	1992-01-24	1992-05-13	37

N = 14

00000142

QUESTION #5

LABOR*OP=B1160 LABOR*OP*DESCRIPTION=HITCH,TRAILER-R&R-RP

TROUBLE CODE	TROUBLE CODE DESCRIPTION	VIN	MODEL	MODEL YEAR	BUILD DATE	DELIVERY DATE	WORK ORDER DATE	MILES
1A	BENT	1GKFK16K3SJ741649	K1	1995	1995-05-09	1995-09-26	1995-09-26	0
1A	BENT	1GKFK16K0RJ766891	K1	1994	1994-08-17	1994-09-17	1994-12-29	24
1A	BENT	1GNFK16R0VJ315955	K1	1997	1996-10-02	1996-10-11	1997-01-29	56
1A	BENT	1GNGK26N4RJ395953	K2	1994	1994-05-02	1994-05-19	1995-02-16	148
1A	BENT	1GNGC26N0PJ334612	C2	1993	1992-11-18	1992-11-30	1993-09-13	184
1A	BENT	1GNEC16K0PJ345715	C1	1993	1992-12-23	1993-02-15	1993-11-03	81
1A	BENT	1GNGC26N1SJ300221	C2	1995	1994-09-22	1994-10-12	1997-06-02	267
1B	BINDS	1GKGK26J2TJ754184	K2	1996	1996-08-13	1996-09-05	1996-09-06	0
1D	BROKEN	1GNEC16K8PJ389655	C1	1993	1993-04-29	1993-05-15	1995-10-10	352
1D	BROKEN	3GNGK26J6TG147242	K2	1996	1996-05-31	1996-07-06	1996-08-16	0
1D	BROKEN	1GNGC26K6SJ338033	C2	1995	1995-01-12	1995-01-26	1996-05-14	395
1D	BROKEN	1GNGK26K4SJ321928	K2	1995	1994-11-30	1994-12-17	1996-06-17	76
1D	BROKEN	1GNEC16K1SJ332321	C1	1995	1994-12-21	1995-01-05	1997-06-24	231
1D	BROKEN	1GKFK16K0SJ715994	K1	1995	1994-12-19	1995-01-06	1996-09-25	228
1D	BROKEN	1GNGK26N0PJ365670	K2	1993	1993-02-24	1993-03-10	1993-09-23	103
1H	CLOGGED OR RESTRICTED	3GNGK26J8TG140471	K2	1996	1996-05-08	1996-06-14	1997-04-14	89
1H	CLOGGED OR RESTRICTED	1GNFK16R5VJ442958	K1	1997	1997-07-24	1997-07-31	1997-10-27	50
1K	CRACKED	1GKFK16K7SJ746692	K1	1995	1995-06-08	1995-08-25	1995-09-25	36
1K	CRACKED	1GNEC16K1SJ378456	C1	1995	1995-04-12	1995-04-25	1995-05-23	13
1K	CRACKED	1GNFK16K8SJ338964	K1	1995	1995-01-13	1995-02-04	1995-06-21	57
1K	CRACKED	1GNGC26NXRJ349203	C2	1994	1993-12-21	1994-01-04	1994-06-14	37
1K	CRACKED	1GNGC26F7RJ344873	C2	1994	1993-12-07	1993-12-20	1995-07-13	314
1K	CRACKED	1GNGC26N2RJ379506	C2	1994	1994-03-21	1994-04-07	1995-07-13	198
1K	CRACKED	1GNGK26N7PJ383454	K2	1993	1993-04-13	1993-06-08	1994-06-08	351
1K	CRACKED	1GNGC26N8PJ392483	C2	1993	1993-05-06	1993-07-22	1995-04-27	361
1K	CRACKED	1GNGC26N8PJ377451	C2	1993	1993-03-25	1993-04-14	1995-05-31	343
1K	CRACKED	1GNGK26N2PJ325445	K2	1993	1992-10-23	1992-11-24	1995-12-30	445
1K	CRACKED	1GNGC26N7PJ402159	C2	1993	1993-06-02	1993-06-12	1996-05-06	349
1K	CRACKED	1GNFK16K7SJ383734	K1	1995	1995-04-26	1995-05-09	1996-07-29	270
1K	CRACKED	3GKGC26F9TG511918	C2	1996	1996-04-19	1996-05-21	1998-08-26	351
1K	CRACKED	3GKGC26M0SG506117	C2	1995	1995-10-19	1995-11-30	1999-04-05	684
1K	CRACKED	1GKGC26N6PJ714888	C2	1993	1992-11-10	1993-02-06	1996-05-10	536
1R	DOES NOT MATCH	3GNEC16R9VG195521	C1	1997	1997-08-06	1997-09-16	1997-11-03	18
1R	DOES NOT MATCH	1GNGK26F2RJ433298	K2	1994	1994-08-16	1994-09-29	1995-02-09	59
2C	IMPROPER CLEARANCE-EXCESSIVE	1GNGK26N4PJ344031	K2	1993	1992-12-17	1992-12-24	1994-04-04	102
2E	IMPROPER CLEARANCE-EXCESSIVE	1GNGC26N1RJ375043	C2	1994	1994-03-09	1994-03-25	1995-07-27	231
2E	IMPROPER CLEARANCE-EXCESSIVE	1GNGK26N2PJ327079	K2	1993	1992-10-29	1992-11-30	1994-10-03	262
2E	IMPROPER CLEARANCE-EXCESSIVE	1GNEC16K5PJ418268	C1	1993	1993-07-15	1993-09-23	1994-04-08	59
2E	IMPROPER CLEARANCE-EXCESSIVE	1GNEC16K5SJ332306	C1	1995	1994-12-21	1995-01-17	1997-02-17	148
2E	IMPROPER CLEARANCE-EXCESSIVE	1GNFK16K3RJ320687	K1	1994	1993-09-23	1993-10-01	1997-02-17	305
2F	IMPROPER CLEARANCE-TOO TIGHT	3GNFK16R1VG119587	K1	1997	1996-11-23	1997-01-03	1997-02-26	30
2F	IMPROPER CLEARANCE-TOO TIGHT	1GNEC16R5TJ382198	C1	1996	1996-05-10	1996-06-13	1996-10-11	61
2F	IMPROPER CLEARANCE-TOO TIGHT	1GNFK16K0SJ456829	K1	1995	1995-10-11	1995-10-18	1995-11-02	4
2F	IMPROPER CLEARANCE-TOO TIGHT	1GKGC26J8VJ713610	C2	1997	1996-11-12	1997-03-20	1997-04-07	11
2F	IMPROPER CLEARANCE-TOO TIGHT	1GKFK16RXVJ715485	K1	1997	1996-11-20	1996-11-29	1997-05-21	41
2G	IMPROPERLY CUT	1GKGC26N8SJ715520	C2	1995	1994-12-16	1994-12-28	1997-10-09	343
2G	IMPROPERLY CUT	3GKFK16R5TG502880	K1	1996	1995-12-19	1996-02-01	1997-04-17	355
2H	IMPROPERLY INSTALLED	1GKEC16K5SJ744691	C1	1995	1995-05-24	1995-06-08	1995-12-12	176
2W	LOOSE	1GKGC26N2PJ718274	C2	1993	1992-12-02	1992-12-21	1994-11-10	322

QUESTION #5

LABOR*OP=B1160 LABOR*OP*DESCRIPTION=HITCH,TRAILER-R&R-RP
(continued)

TROUBLE CODE	TROUBLE CODE DESCRIPTION	VIN	MODEL	MODEL YEAR	BUILD DATE	DELIVERY DATE	WORK ORDER DATE	MILES
ZW	LOOSE	1GNFK16KXSJ336746	K1	1995	1995-01-10	1995-01-23	1995-07-05	37
ZW	LOOSE	3GKGC26RXTG510688	C2	1996	1996-04-09	1996-04-12	1997-11-14	340
3A	MISADJUSTED	1GNFK16K5SJ332958	K1	1995	1995-01-03	1995-02-15	1996-04-29	306
3A	MISADJUSTED	1GKGK26JXTJ753350	K2	1996	1996-08-09	1997-01-11	1997-04-30	68
3A	MISADJUSTED	3GKEC16R0TG500480	C1	1996	1995-11-18	1996-03-11	1997-09-25	298
3D	MISSING	1GNFK16K1SJ353029	K1	1995	1995-02-17	1995-02-28	1995-03-14	0
3D	MISSING	3GNFK16R0TG148589	K1	1996	1996-06-05	1996-07-02	1996-09-03	19
3G	NOT DRILLED	1GDGK26N0PJ714606	K2	1993	1992-11-09	1993-02-13	1993-07-26	48
3G	NOT DRILLED	1GNGK26F3VJ344933	K2	1997	1996-12-11	1996-12-23	1997-07-01	31
3G	NOT DRILLED	3GNEC16R0TG117495	C1	1996	1996-02-08	1996-03-06	1996-05-28	64
3G	NOT DRILLED	1GNFK16RXTJ373343	K1	1996	1996-04-24	1996-04-29	1997-10-03	249
3G	NOT DRILLED	1GKGK26JZVJ711810	K2	1997	1996-10-28	1997-02-14	1998-08-17	371
3G	NOT DRILLED	3GKFK16R5TG521591	K1	1996	1996-08-17	1996-10-25	1996-11-07	0
3G	NOT DRILLED	1GKFK16R4VJ733531	K1	1997	1997-02-28	1997-04-11	1997-07-09	47
3G	NOT DRILLED	1GKFK16K7SJ729648	K1	1995	1995-03-08	1995-03-22	1997-05-30	495
3M	OUT OF ROUND	1GNGK26N4PJ344031	K2	1993	1992-12-17	1992-12-24	1995-05-04	175
3N	POOR MACHINING	1GNFK16K0PJ353000	K1	1993	1993-01-25	1993-04-06	1994-12-14	343
3N	POOR MACHINING	1GNGK26JXVJ310279	K2	1997	1996-09-19	1996-09-30	1996-10-04	0
3N	POOR MACHINING	1GNEC16R8TJ380154	C1	1996	1996-05-07	1996-06-06	1996-06-07	4
3N	POOR MACHINING	1GKFK16R9TJ706502	K1	1996	1995-12-12	1996-01-23	1998-07-22	410
3N	POOR MACHINING	1GNEC16K6SJ370756	C1	1995	1995-03-28	1995-04-10	1996-11-06	223
3N	POOR MACHINING	1GNFK16K4RJ309794	K1	1994	1993-08-30	1993-10-08	1993-12-13	21
3N	POOR MACHINING	3GNFK16R5VG170428	K1	1997	1997-05-20	1997-06-12	1997-06-27	2
3N	POOR MACHINING	1GNGK26N1RJ301611	K2	1994	1993-08-05	1993-09-21	1993-09-08	0
3N	POOR MACHINING	1GKFK16R0VJ706598	K1	1997	1996-10-03	1996-10-18	1996-11-08	18
3N	POOR MACHINING	1GNGK26N9SJ333468	K2	1995	1994-12-23	1995-01-11	1995-06-01	35
3N	POOR MACHINING	3GNFK16R3VG189236	K1	1997	1997-07-19	1997-09-04	1997-09-03	0
3N	POOR MACHINING	1GKFK16K1SJ761284	K1	1995	1995-09-06	1995-12-20	1997-02-07	253
3X	REGISTERS INCORRECTLY	3GNGC26R2TG124589	C2	1996	1996-03-07	1996-05-23	1998-02-02	223
4A	SCORED	1GNEC16K2RJ300889	C1	1994	1993-08-04	1993-09-28	1993-10-20	9
4N	WARPED/WAVY	3GNFK16R1VG103924	K1	1997	1996-09-27	1996-11-02	1997-01-16	36
4N	WARPED/WAVY	1GNEC16K5RJ361629	C1	1994	1994-02-04	1994-02-24	1995-10-19	186
4N	WARPED/WAVY	1GNEC16R8TJ331911	C1	1996	1996-01-20	1996-01-31	1996-05-30	66
4N	WARPED/WAVY	3GKGK26F3TG509133	K2	1996	1996-03-13	1996-04-15	1996-05-24	32
4R	WELD BROKEN	1GKGC26J2VJ714722	C2	1997	1996-11-18	1996-11-26	1998-01-23	101
4R	WELD BROKEN	1GNFK16K6SJ332581	K1	1995	1994-12-22	1995-01-10	1995-03-07	25
4R	WELD BROKEN	1GNGK26N1SJ346893	K2	1995	1995-01-30	1995-02-23	1996-02-08	166
4R	WELD BROKEN	1GKFK16K2SJ737057	K1	1995	1995-04-13	1995-04-28	1995-10-25	39
4R	WELD BROKEN	1GNEC16R4TJ348267	C1	1996	1996-02-21	1996-03-01	1999-08-02	431
4R	WELD BROKEN	1GNEC16K9PJ344806	C1	1993	1992-12-18	1993-01-11	1993-07-02	37
4R	WELD BROKEN	1GNGC26N3PJ344485	C2	1993	1992-12-18	1993-01-09	1994-07-05	483
4R	WELD BROKEN	1GNGK26J0TJ314936	K2	1996	1995-12-07	1995-12-20	1999-09-23	655
4R	WELD BROKEN	3GKFK16R3VG518157	K1	1997	1997-04-10	1997-04-26	1997-05-06	7
4S	WELD OMITTED OR POOR WELD	3GNFK16R4VG172879	K1	1997	1997-05-27	1997-10-16	1998-01-03	124
4X	WORN	1GNEC16K2PJ318662	C1	1993	1992-10-07	1992-10-12	1995-10-13	431
4X	WORN	1GNGC26N7RJ345450	C2	1994	1993-12-08	1993-12-22	1995-05-22	276
4X	WORN	1GKGC26N7PJ702216	C2	1993	1992-09-08	1992-09-14	1996-05-21	118
4Z	WRONG PART	3GNGK26J5TG107301	K2	1996	1995-12-18	1996-01-19	1996-07-16	71

QUESTION #5

LABOR*OP=B1160 LABOR*OP*DESCRIPTION=HITCH,TRAILER-R&R-RP
(continued)

TROUBLE CODE	TROUBLE CODE DESCRIPTION	VIN	MODEL	MODEL YEAR	BUILD DATE	DELIVERY DATE	WORK ORDER DATE	MILES
42	WRONG PART	3GNFK16RSVG133508	K1	1997	1997-01-16	1997-03-13	1998-03-09	165
5G	PAINT-CRAZE,CRACK,CHALK	1GNFK16K6PJ415726	K1	1993	1993-07-08	1993-08-03	1994-10-26	145
5M	PAINT PEEL BTW B.C. & PRIMER	1GKFK16K5RJ708078	K1	1994	1993-10-05	1993-12-27	1994-11-03	185
5R	PAINT-PRIMER SHOWS THROUGH	1GNEC16K5SJ382400	C1	1995	1995-04-24	1995-05-08	1997-09-25	337
5W	RUSTED OR CORRODED	1GKFK16K1PJ752205	K1	1993	1993-06-07	1993-07-13	1994-11-09	332
5W	RUSTED OR CORRODED	1GKFK16K8PJ751794	K1	1993	1993-06-07	1993-06-30	1995-01-17	347
5W	RUSTED OR CORRODED	1GNGK26F6SJ375525	K2	1995	1995-04-06	1995-04-17	1997-04-10	168
5W	RUSTED OR CORRODED	1GNGK26N2SJ378834	K2	1995	1995-04-18	1995-04-27	1996-03-18	64
5W	RUSTED OR CORRODED	1GNFK16K3PJ403307	K1	1993	1993-06-04	1993-08-31	1994-10-06	66
5W	RUSTED OR CORRODED	1GNFK16K5PJ403678	K1	1993	1993-06-04	1993-06-14	1995-06-12	197
5W	RUSTED OR CORRODED	1GNFK16K4PJ405454	K1	1993	1993-06-10	1993-07-03	1995-08-14	231
5W	RUSTED OR CORRODED	1GNFK16K7PJ404332	K1	1993	1993-06-07	1993-06-30	1995-09-19	419
5W	RUSTED OR CORRODED	1GKFK16K7SJ741430	K1	1995	1995-05-08	1995-05-24	1996-05-30	140
5W	RUSTED OR CORRODED	1GKFK16K3RJ709715	K1	1994	1993-10-11	1993-12-02	1995-12-27	345
5W	RUSTED OR CORRODED	1GKEC16K5PJ757805	C1	1993	1993-07-10	1993-08-27	1995-10-19	323
5W	RUSTED OR CORRODED	1GNFK16K6SJ331074	K1	1995	1994-12-19	1995-01-03	1996-06-13	172
5W	RUSTED OR CORRODED	1GNFK16K2SJ330911	K1	1995	1994-12-19	1994-12-29	1997-05-15	276
5W	RUSTED OR CORRODED	1GNGK26N4SJ393934	K2	1995	1995-05-18	1995-05-25	1999-11-11	445
5W	RUSTED DR CORRODED	1GNEC16K6RJ378432	C1	1994	1994-03-18	1994-03-26	1996-11-11	254
5W	RUSTED OR CORRODED	1GKFK16K0SJ716806	K1	1995	1994-12-22	1995-01-09	1997-09-11	450
5W	RUSTED OR CORRODED	1GKFK16KXSJ738280	K1	1995	1995-04-24	1995-05-11	1997-12-29	367
5W	RUSTED OR CORRODED	1GKFK16K7SJ741055	K1	1995	1995-05-05	1995-06-22	1996-08-09	184
5W	RUSTED OR CORRODED	1GNFK16K5RJ326653	K1	1994	1993-10-11	1994-02-10	1995-09-21	282
5W	RUSTED OR CORRODED	1GNFK16K6RJ325298	K1	1994	1993-10-06	1994-02-02	1996-05-17	417
5W	RUSTED OR CORRODED	1GNGK16F7SJ379450	K1	1995	1995-04-18	1995-05-06	1996-04-09	201
6C	COMPONENT-INOPERATIVE	1GKFK16K4SJ714024	K1	1995	1994-12-08	1994-12-19	1995-07-06	77
6C	COMPONENT-INOPERATIVE	1GKEC16K7RJ770171	C1	1994	1994-09-06	1994-10-13	1994-11-18	21
6C	COMPONENT-INOPERATIVE	1GKGK26F4RJ768740	K2	1994	1994-08-27	1994-11-10	1994-12-07	17
6C	COMPONENT-INOPERATIVE	3GNGK26JXTG111D775	K2	1996	1996-01-13	1996-02-02	1996-02-19	6
6C	COMPONENT-INOPERATIVE	1GNFK16R2VJ337360	K1	1997	1996-11-21	1997-01-17	1997-05-22	52
6C	COMPONENT-INOPERATIVE	3GNEC16R0VG143260	C1	1997	1997-02-19	1997-03-15	1997-06-12	90
6C	COMPONENT-INOPERATIVE	1GNFK16RXVJ304820	K1	1997	1996-09-09	1996-09-28	1997-07-16	152
6C	COMPONENT-INOPERATIVE	1GNFK16R1TJ382738	K1	1996	1996-05-13	1996-05-21	1996-1[illegible]-21	64
6C	COMPONENT-INOPERATIVE	3GNFK16R0TG154263	K1	1996	1996-06-26	1996-08-12	1997-08-11	224
6C	COMPONENT-INOPERATIVE	1GNGC26J5TJ375244	C2	1996	1996-04-29	1996-05-04	1997-08-21	138
6C	COMPONENT-INOPERATIVE	1GNFK16K7SJ424606	K1	1995	1995-08-09	1995-08-18	1997-03-27	218
6C	COMPONENT-INOPERATIVE	3GKGC26R6VG508679	C2	1997	1996-12-20	1997-01-08	1997-06-17	71
6C	COMPONENT-INOPERATIVE	3GKGC26N2SG506467	C2	1995	1995-10-20	1996-01-27	1996-05-23	53
6C	COMPONENT-INOPERATIVE	1GNEC16RBTJ300206	C1	1996	1995-10-30	1995-12-17	1996-03-14	29
6C	COMPONENT-INOPERATIVE	1GNGC26N7RJ373815	C2	1994	1994-03-07	1994-03-22	1995-03-16	140
6C	COMPONENT-INOPERATIVE	1GNGC26N4PJ376281	C2	1993	1993-03-23	1993-04-03	1994-11-10	328
6C	COMPONENT-INOPERATIVE	1GKGK26J4TJ700370	K2	1996	1995-11-01	1995-12-05	1999-02-11	317
98	DAMANGED IN SHIPMENT	1GNGK26J2TJ307468	K2	1996	1995-11-20	1996-04-19	1999-12-10	787

N = 140

ATTACHMENT "H"

00000146

General Motors Corporation

DP00-001; GM583

"GM CONFIDENTIAL" MATERIAL HAS BEEN REMOVED FROM THIS ATTACHMENT AND SUPPLIED TO THE OFFICE OF THE CHIEF COUNSEL.

Attachment H

ATTACHMENT "I"

00001148

General Motors Corporation

DP00-001; GM583

Attachment I

GM583 Att I 9000

00000149

Truck & Bus Group

Inter-Organization

MLC: CK
M1 4x. 92
UPC: 14L
910 Pages 112

SUBJECT: 1992 C/K 10-20 06 Weight Distributing Hitch Structural Analysis

November 20, 1989

FROM: M. A. Siepierski 1902-108

TO: W. L. Sherry 1902-105

OBJECTIVE:

To determine the structural integrity of the 1992 C/K weight distributing hitch when subjected to established hitch loads.

FORWARD:

Analysis was requested to determine the performance of a new hitch design. The performance criteria was based on past field experiences and allowed some plastic deformation (stresses above yield strength) but required all stresses to be below ultimate stress.

CONCLUSIONS:

The results indicate that the revised design meets the stress performance objectives. Some permanent deformation is expected for the vertical and lateral load conditions.

RECOMMENDATIONS:

Design information only.

GM583 Att 1 9801

00000150

LOADS/CRITERIA:

The following hitch loads were provided by design for use in this analysis. The performance objective was to have the maximum hitch stress below ultimate stress for all the load cases but stresses above yield strength (plastic deformation area) were considered acceptable.

Longitudinal	-39234 N	(-8823#)
Vertical	13082 N	(-2941#)
Lateral +	+13082 N	(+2941#)
Lateral -	-13082 N	(-2941#)
Moment	+997 N-m	(+2206# at 40")

RESULTS:

Table 1

Stress Results For The New C/K Hitch

Load Case	Description	Maximum Stress (MPa)	(ksi)
1	-8823# Longitudinal	246.0	35.7
2	+2941# Vertical	312.0	45.3
3	+2941# Lateral	286.0	41.5
4	-2941# Lateral	286.0	41.5
5	+22050 in-lb Moment	231.0	33.5

DISCUSSION:

As a complete hitch model did not exist, a new model of PN 15643953 was constructed using layout #TL31446. This hitch model was rigidly constrained at the flange bolt holes and loads 1 through 4 were applied at the ball while the moment load was applied by means of a vertical 9812N (2206#) force applied at the end of a bar extended 101.6 cm (40 inches) outward from the hitch. It is important to note that the flanges were also constrained from movement in the vertical direction to simulate the metal to metal contact with the vehicle frame. Absence of this vertical constraint generated excessively high stresses at the bolt holes due to local warping of the flange, a condition not observed curing testing. Figures 1-9 show this and the stress contours for the various load conditions.

Material Properties used in this analysis;

SAE 1008-1010 Steel Material Average Properties:

Ultimate Strength	360 MPa	(52.2 ksi)
Yield Strength	250 MPa	(36.3 ksi)
Modulus of Elasticity	203 GPa	(29.0 Msi)
Poisson's Ratio	0.28	
Density	0.00783 kg/cm**3	(0.282#/cui)

This finite element model is stored in EAMODEL under

'EEA.ADM.V5292.U14L.GMT435.CK1020.HITCH'.

Michael A. Siepierski
Michael A. Siepierski
Structural Analysis

cc: G. T. Pierce 1902-108
T. Voss 1902-105
Microfiche

1992 C/K HITCH

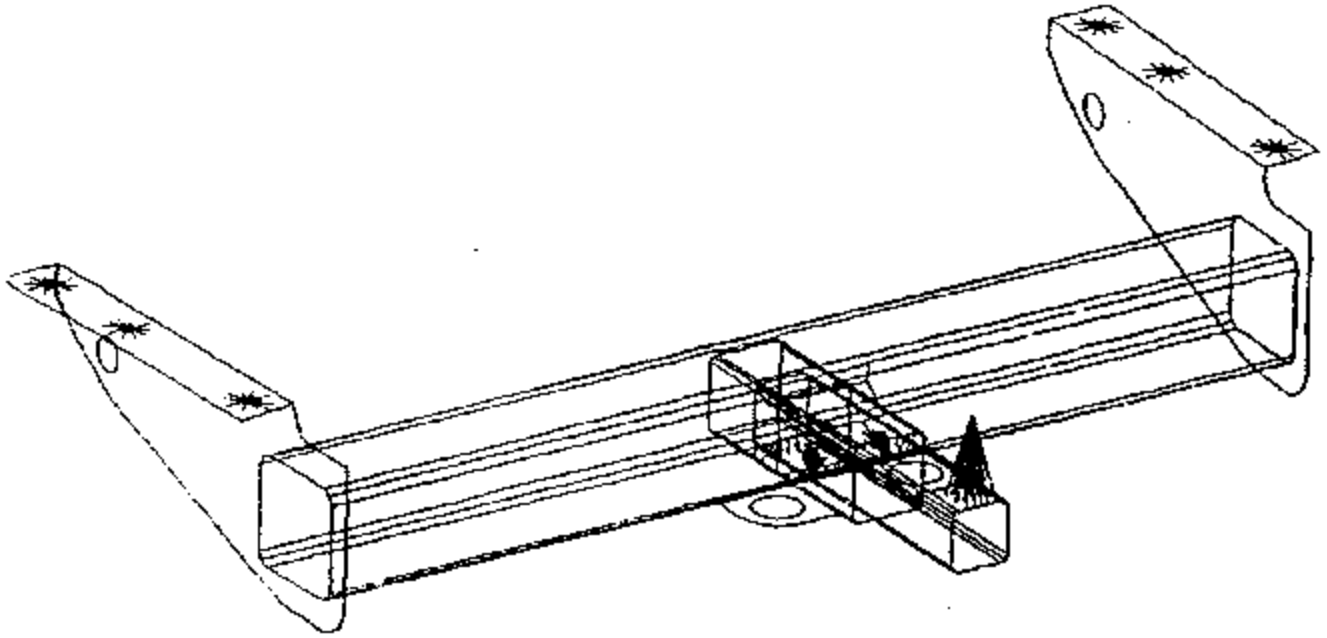


FIGURE 1.

FINITE ELEMENT MODEL OF HITCH

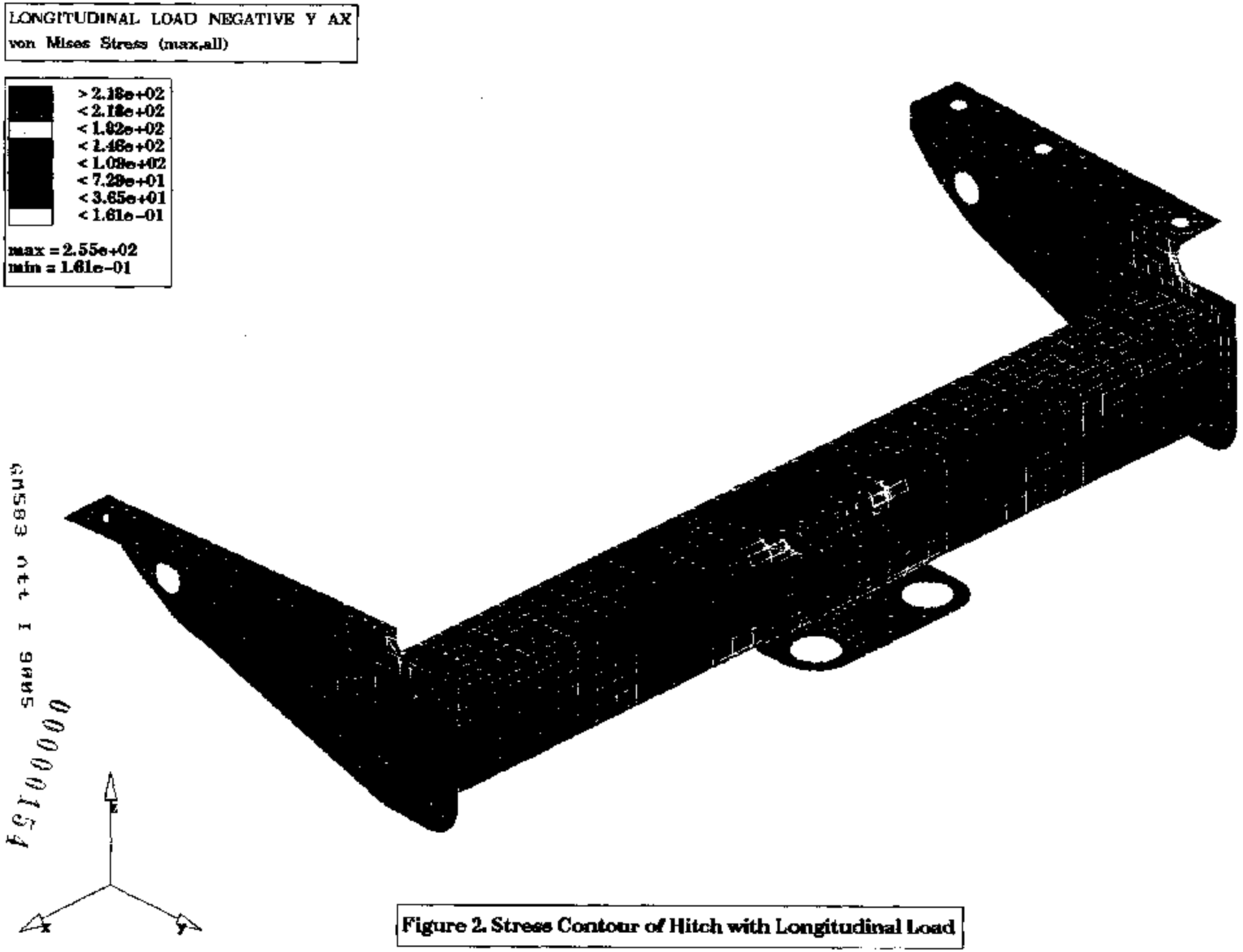


Figure 2. Stress Contour of Hitch with Longitudinal Load

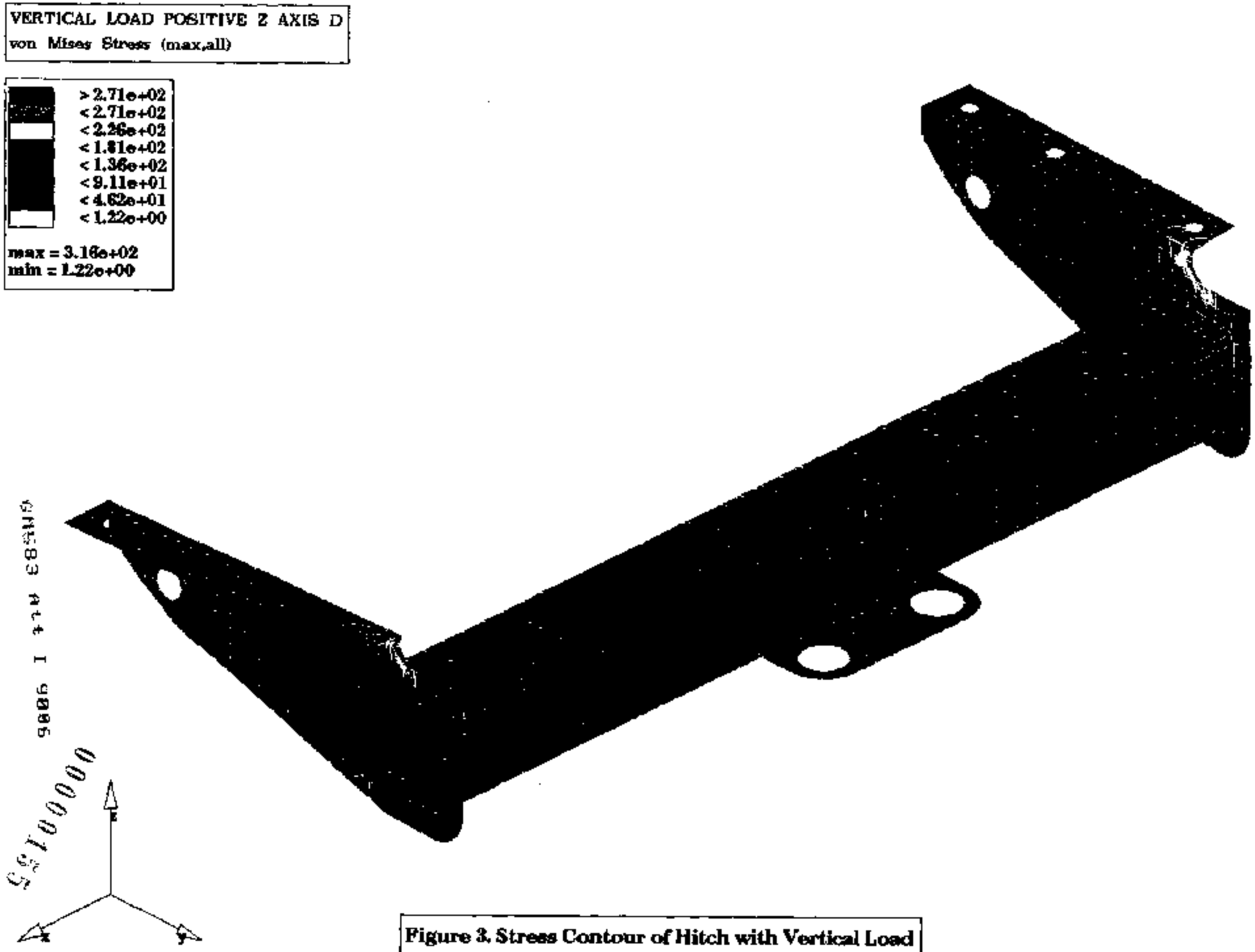


Figure 3. Stress Contour of Hitch with Vertical Load

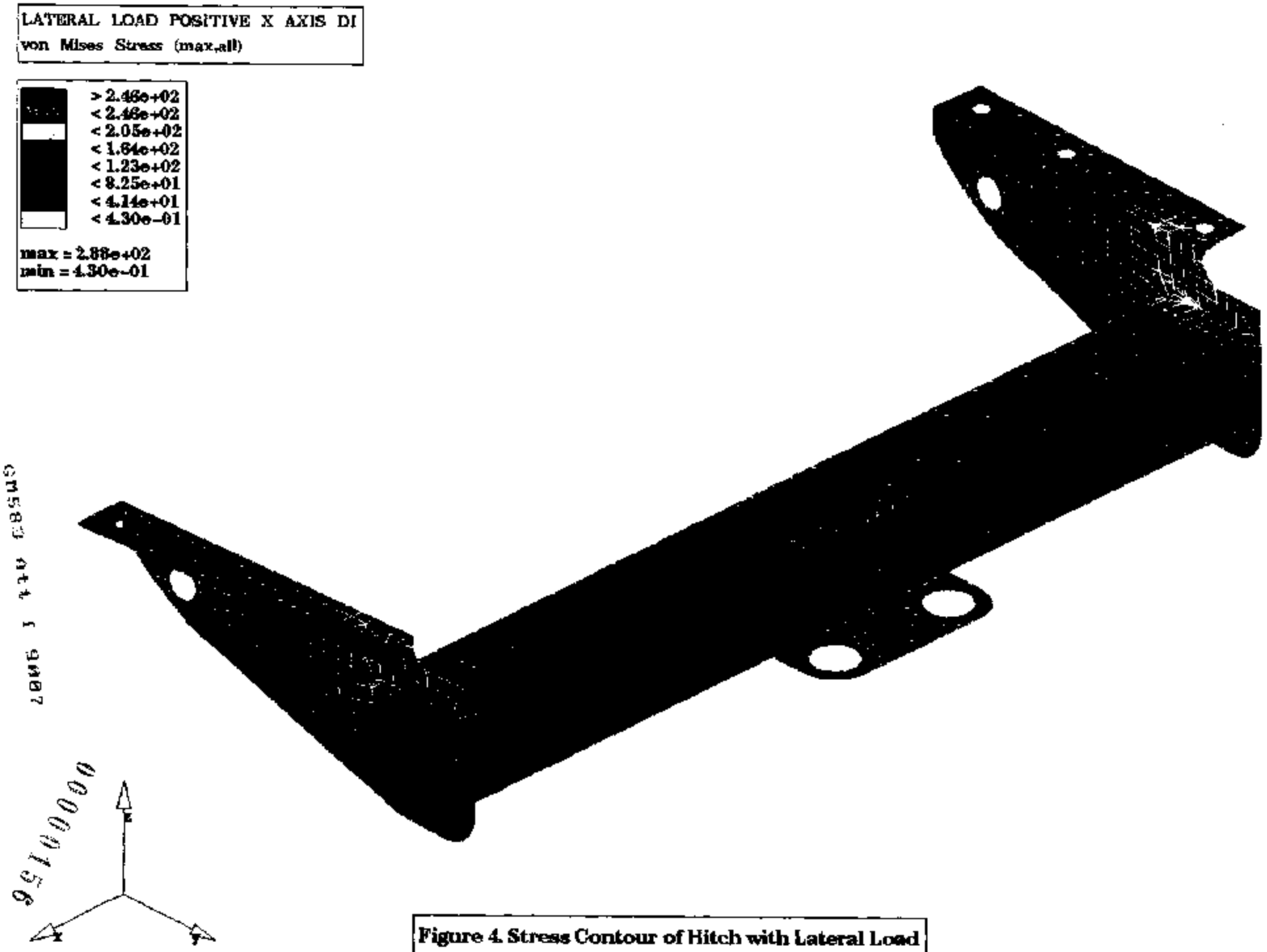


Figure 4. Stress Contour of Hitch with Lateral Load

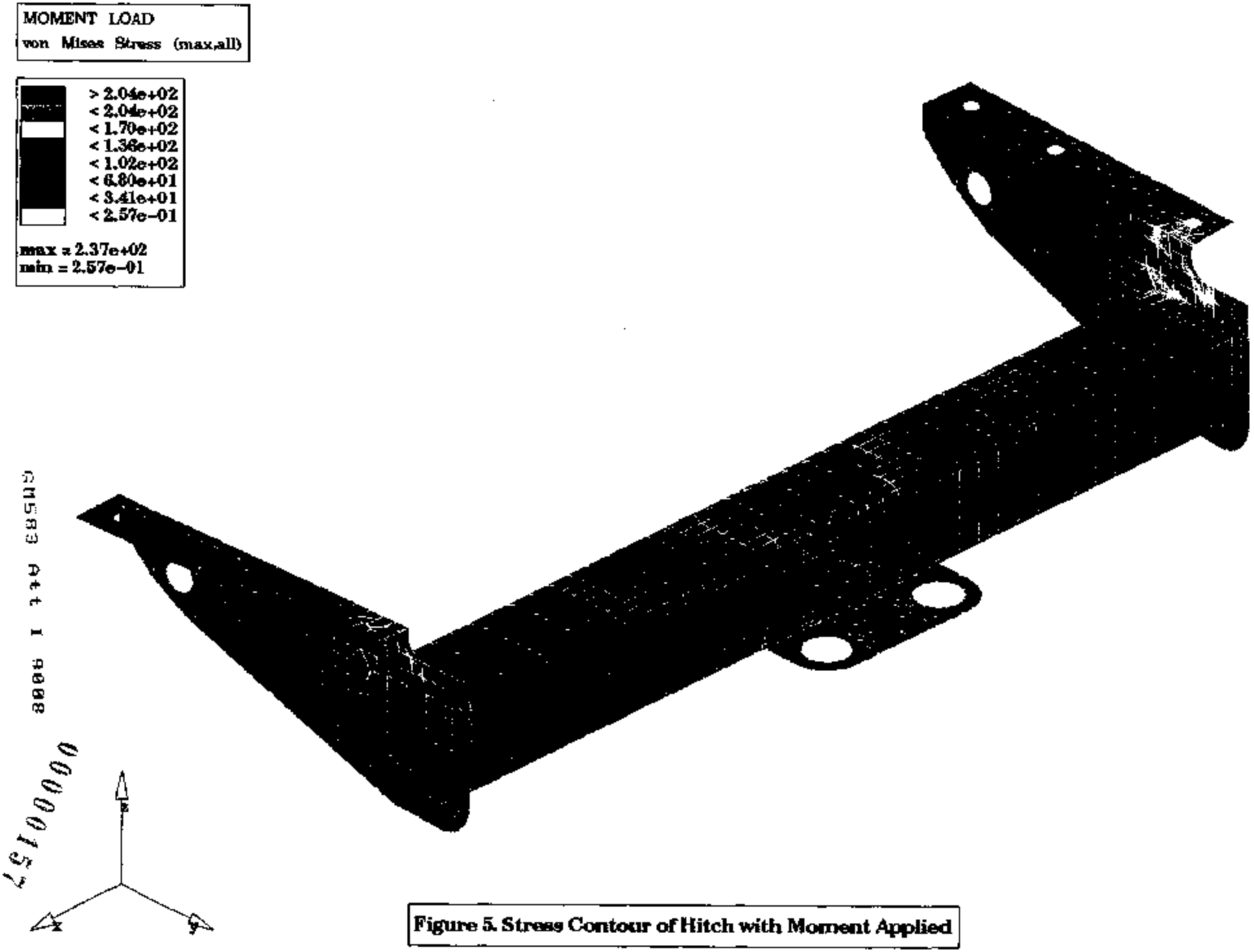


Figure 5. Stress Contour of Hitch with Moment Applied

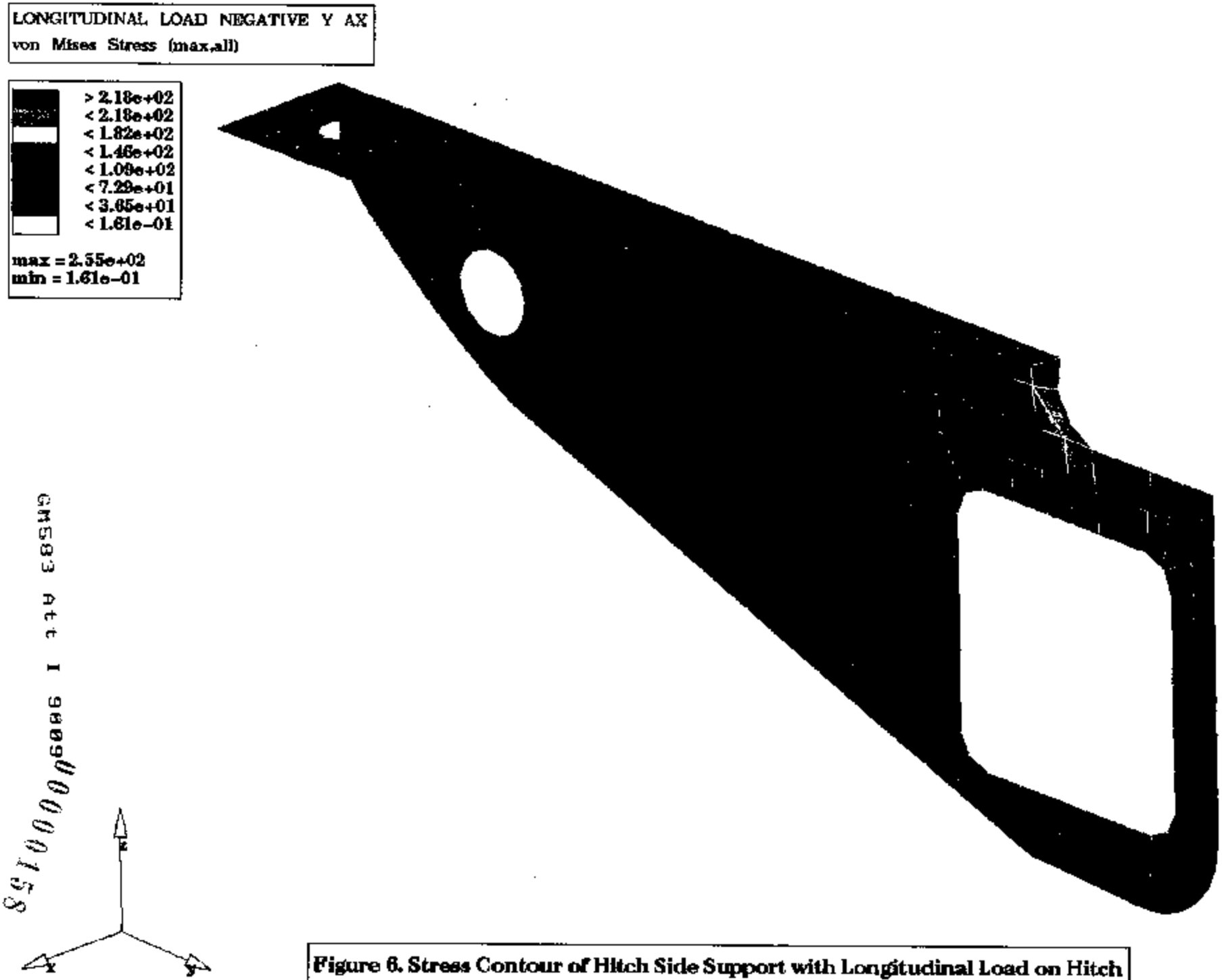


Figure 6. Stress Contour of Hitch Side Support with Longitudinal Load on Hitch

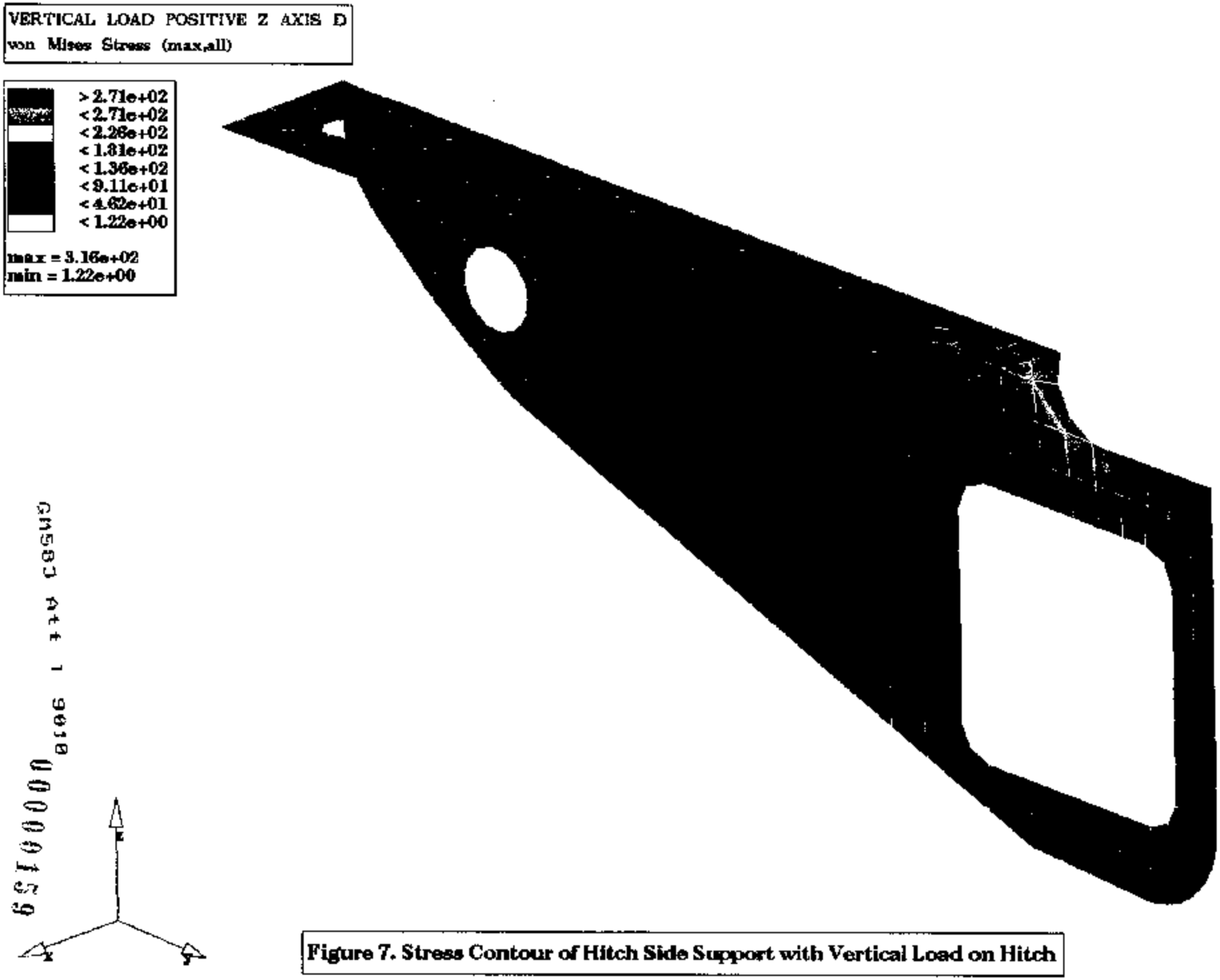


Figure 7. Stress Contour of Hitch Side Support with Vertical Load on Hitch

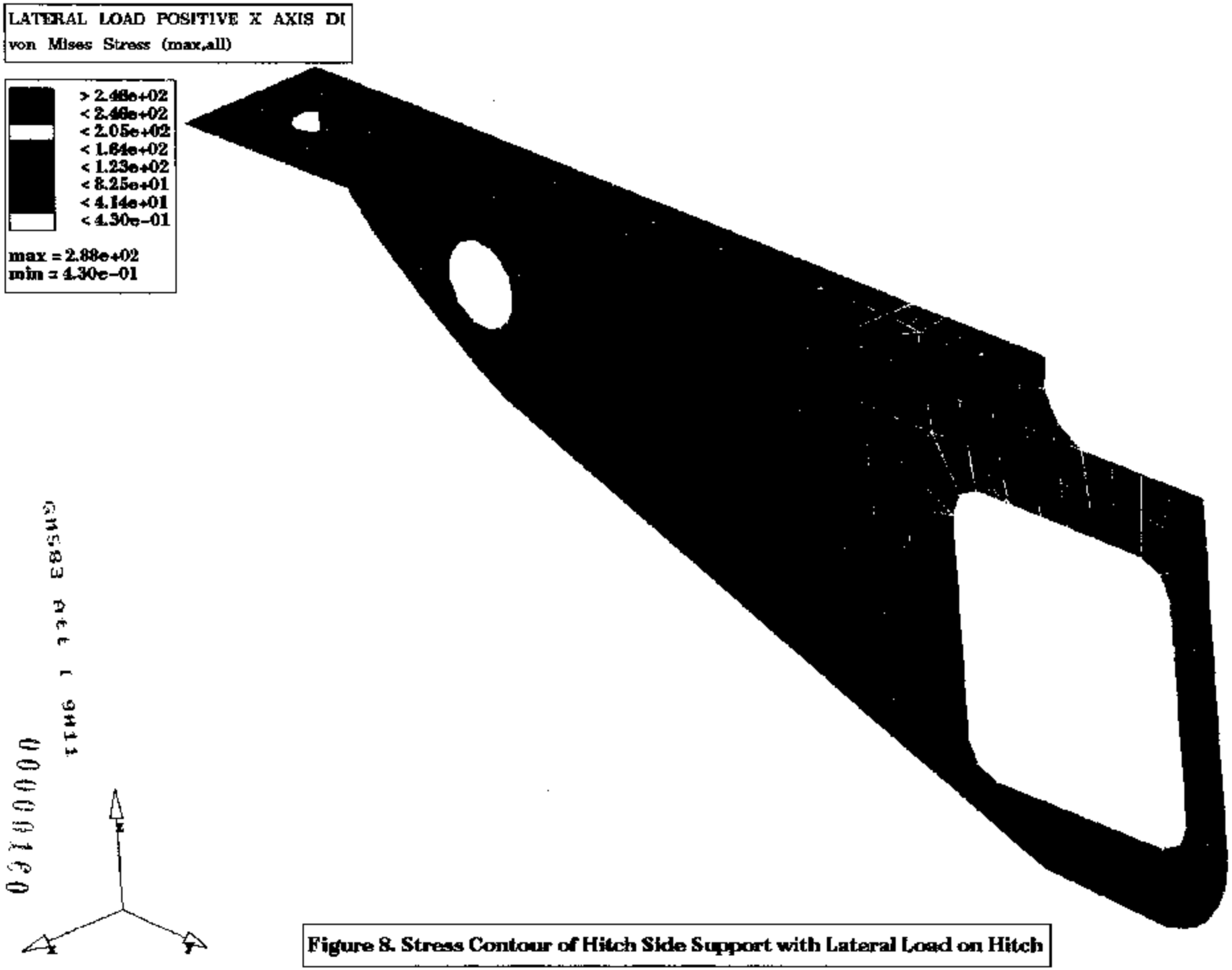


Figure 8. Stress Contour of Hitch Side Support with Lateral Load on Hitch

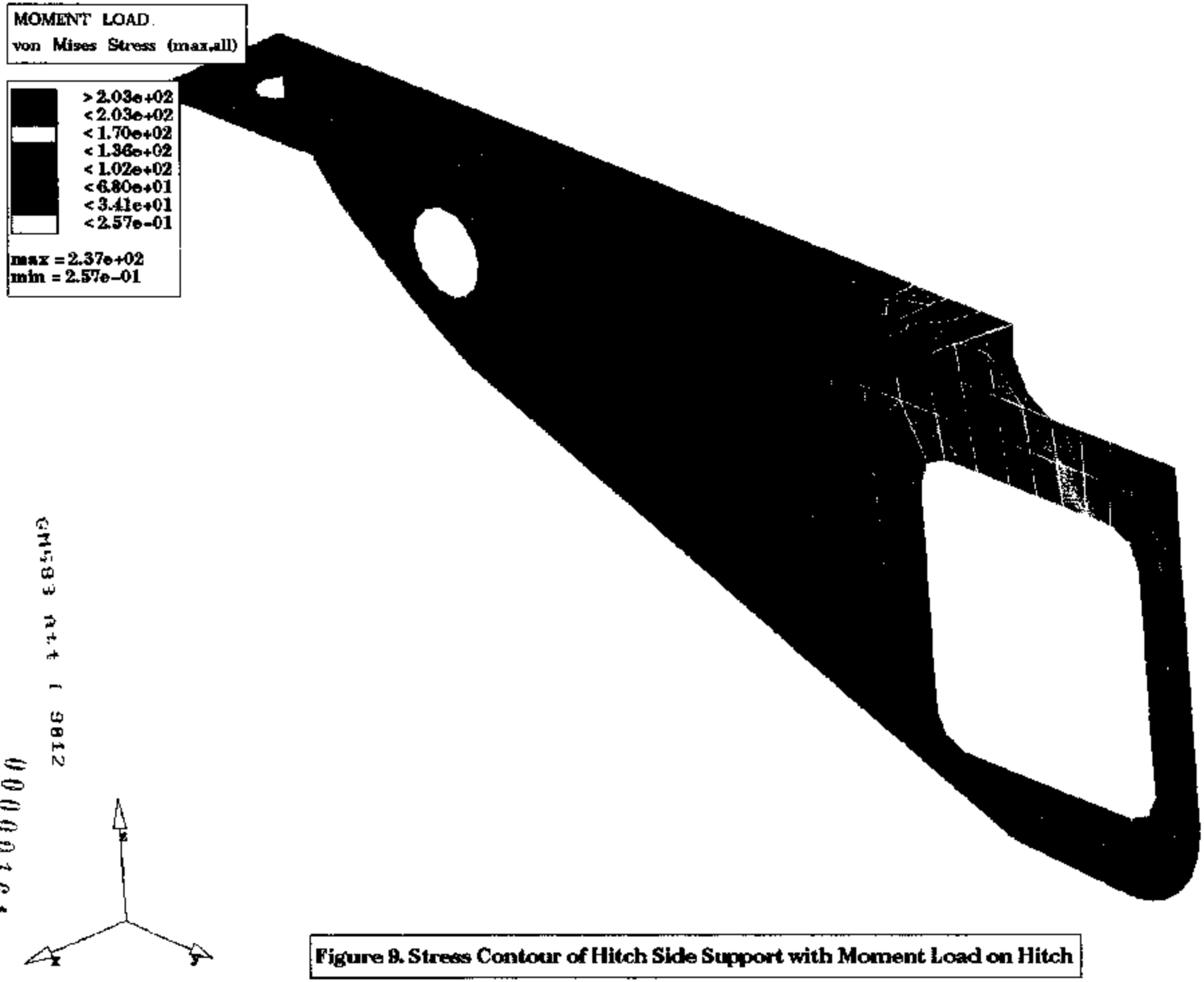


Figure 9. Stress Contour of Hitch Side Support with Moment Load on Hitch

PROVING GROUND TEST REPORT

DISTRIBUTION LIST

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SUBJECT: E.O.T. REPORT FOR VEHICLE KU2005

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Truck & Bus Group

ENGINEERING OPERATIONS

ENGINEERING REPORT
DESERT PROVING GROUND

Inter-Organization

T.W.O. NO.: 12R29-100

SUBJECT: E.O.T. REPORT FOR VEHICLE KU2005

TO: O. S. Carey

FROM: Daen C. Hendrickson

T.W.O. NO.: 12R29-100 SEQ.: ALL MODEL LINE: K10516 MODEL YEAR: 1992

PROCEDURE/FMVSS: 9968 UPC: 148 VEH. NO.: KU2005 ENGINE: 6.2L(L14)

DATE EVALUATED FROM: 07-11-90 TO: 07-26-90 DATE PUBLISHED: 08-07-90

E.O.T. REPORT [X] PROGRESS REPORT [ ] REISSUE [ ]

REISSUE DATE: _____ REASON FOR REISSUE: _____

_____

OBJECTIVE:

To provide trailer towing durability characteristics on 1992 product assurance GMT 410 vehicle.

RESULTS:

Vehicle KU2005 completed 6,476.4 test miles. There was a total of 4 TIR's written against T.W.O. 12R29-100. Attached to this report is Appendix A is a one line summary of all TIR incidents. Appendix C contains temperature data, Appendix D contains measurement data, and Appendix E contains performance data.

MATERIAL:

Please see Appendix B for a physical description of the vehicle as tested.

PROCEDURE:

The test plan consisted of subjecting the vehicle to the following Desert Proving Ground schedule:

6,476.4 test miles were conducted on the R-15-31 light duty trailer towing durability schedule.

Listed below is the ballast condition of the vehicle as tested:

KU2005 Ballast condition

1,456 Lbs.	Left Front
1,404 Lbs.	Right Front
1,276 Lbs.	Left Rear
1,238 Lbs.	Right Rear
2,860 Lbs.	Front Axle
2,514 Lbs.	Rear Axle
5,374 Lbs.	Total Weight

TRAILER TL8503 BALLAST CONDITION

6,352 Lbs.	Axle Weights
640 Lbs.	Tongo Weight
6,992 Lbs.	Total Weight
12,366 Lbs.	Combined Vehicle Weight
150 Lbs.	Vehicle Ballast
12,516 Lbs.	Combined Gross Vehicle Weight

Please see Appendix F for a copy of the test work order. The end of test hitch platform attaching fastener torque is listed in Appendix G. One incident was observed involving a loose hitch platform fastener. This is listed in Appendix A.

This closes T.W.O. # 12R29-100.

Daen C. Hendrickson — Date
Test Engineer
Desert Proving Grounds
8-674-5528

K. H. Schmitz — Date
Engineering Operations
Desert Proving Grounds
8-674-5195

DCH/gb

APPENDIX A

TIR VEHICLE SUMMARY
(AS OF 08-02-90)

TIRMF71 OR RESTRICTED

PAGE 1

TIR NUMBER	ISSUE/ RETISSUE DATE	VEHICLE NUMBER	FLEET	VEHICLE/PART ODO	SPC/FNA DESCRIPTION	TROUBLE DESCRIPTION	DIV ADAR	51
T8-92K-01A-00437L	02AUG90	RU2005	PROTO	5,287 MI/ 3,862 MI	HOSE ASM-R/HDO MA PUMP	COLLAPSED	T8	10
T8-92K-01A-00437L	01AUG90	RU2005	PROTO	4,337 MI/ 2,658 MI	CONTROL ASM-HTR 3 A/C	MALFUNCTION	DE	10
T8-92K-01A-00437L	01AUG90	RU2005	PROTO	4,337 MI/ 2,658 MI	SWITCH ASM-INSHOT PDSN	DIAGNOSTIC CODE STORED	DD	09
T8-92K-08A-00047L	01AUG90	RU2005	PROTO	4,337 MI/ 2,658 MI	BRKT/SCRFM-TRLR WI DI STR MITCH	LOOSE	T8	09
T8-92K-14L-00031L	25JUN90	RU2005	PROTO	5,287 MI/ 3,557 MI				

APPENDIX B

PHYSICAL DESCRIPTION OF VEHICLE KU2005

KU2005 is equipped as follows:

Model	K10516
Description	1992 GMT 410 1/2 Ton Utility
Engine	LL4 6.2L Diesel/Federal
Transmission	MD8 700R4 Automatic
Brakes	Power
Steering	Power
Rear Axle	4.10:1 / 8.5 inch
Tires	LT 225/75R16 M/S
GVW Rating	6250 Lbs.

APPENDIX C

LOCATION:	1 GRILL AMB	2 TOP TANK	3 ENG OIL	4 TRAN OIL	5 REAR AXLE	6 P/S	7 FRNT AXLE	8 TRANS CASE
GONZALES PASS	96	214	235	250	289	208	148	175
SUPERIOR UNDERPASS	95	206	219	241	286	193	148	170
TRUCK PULL-OUT(231)	88	213	246	243	315	218	147	177
SUTTON SUMMIT	87	204	240	252	313	212	152	175
DPG	103	198	208	224	241	182	142	152
APACHE JUNCTION	104	214	219	245	230	201	155	169
TORTILLA FLAT(TOP OF HILL)	100	213	211	243	236	203	156	172
HUNT HWY.	101	207	205	225	225	177	194	160
DPG	114	210	210	225	253	184	148	163
APACHE JUNCTION(SRC)	107	214	213	238	221	196	153	168
TORTILLA FLAT	106	212	210	235	212	197	159	165
GONZALES PASS	94	207	232	221	272	202	142	170
SUPERIOR UNDERPASS	93	205	216	233	276	196	146	171
TRUCK PULL-OUT(231)	86	211	243	242	319	215	148	177
SUTTON SUMMIT	86	205	230	249	324	211	151	174
TOP OF HILL(278.5)	87	217	246	237	280	210	144	169
NORTH RIM SRC(298.5)	81	202	242	239	287	211	138	167
SOUTH RIM SRC(288)	81	208	241	254	309	217	141	164
[illegible]	88	206	242	242	322	213	144	169
MILE [illegible]	85	202	225	236	275	199	138	162
DPG	99	202	212	220	200	185	144	163

NOTE: Max TEMPERATURE TAKEN DURING R-15-31 TEST.

APPENDIX D

KU2005 MEASUREMENTS

FRONT WHEEL ALIGNMENT BEFORE TEST: ODOMETER 1,212

CASTER:	L	0.95	DEG	R	0.10 DEG
CAMBER:	L	2.69	DEG	R	2.30 DEG
TOE:	L	0.12	DEG	R	0.12 DEG

FRONT WHEEL ALIGNMENT AFTER TEST: ODOMETER 8,706

CASTER:	L	1.00	DEG	R	0.27 DEG
CAMBER:	L	2.09	DEG	R	2.99 DEG
TOE:	L	0.11	DEG	R	0.11 DEG

TRIM HEIGHTS - MM

	P		R	
ODOMETER	L	R	L	R
1212	860	859	859	863
8706	881	888	880	887

Z & D MEASUREMENTS - MM

	Z		D	
	L	R	L	R
SOT:	148.0	155.5	149.5	160.0
EOT:	NOT AVAILABLE		154.5	155.0

B-C HEIGHTS - MM

SOT: L - 69 R - 75
EOT: L - 69 R - 76

BODY MOUNT HELMET HEIGHTS - MM

	SOT		EOT	
	L	R	L	R
RAD.SUPT.	1.194	1.268	1.191	1.197
#1	0.802	1.654	0.816	1.654
#2	1.493	1.480	1.441	1.472

BUMPER HEIGHTS - MM

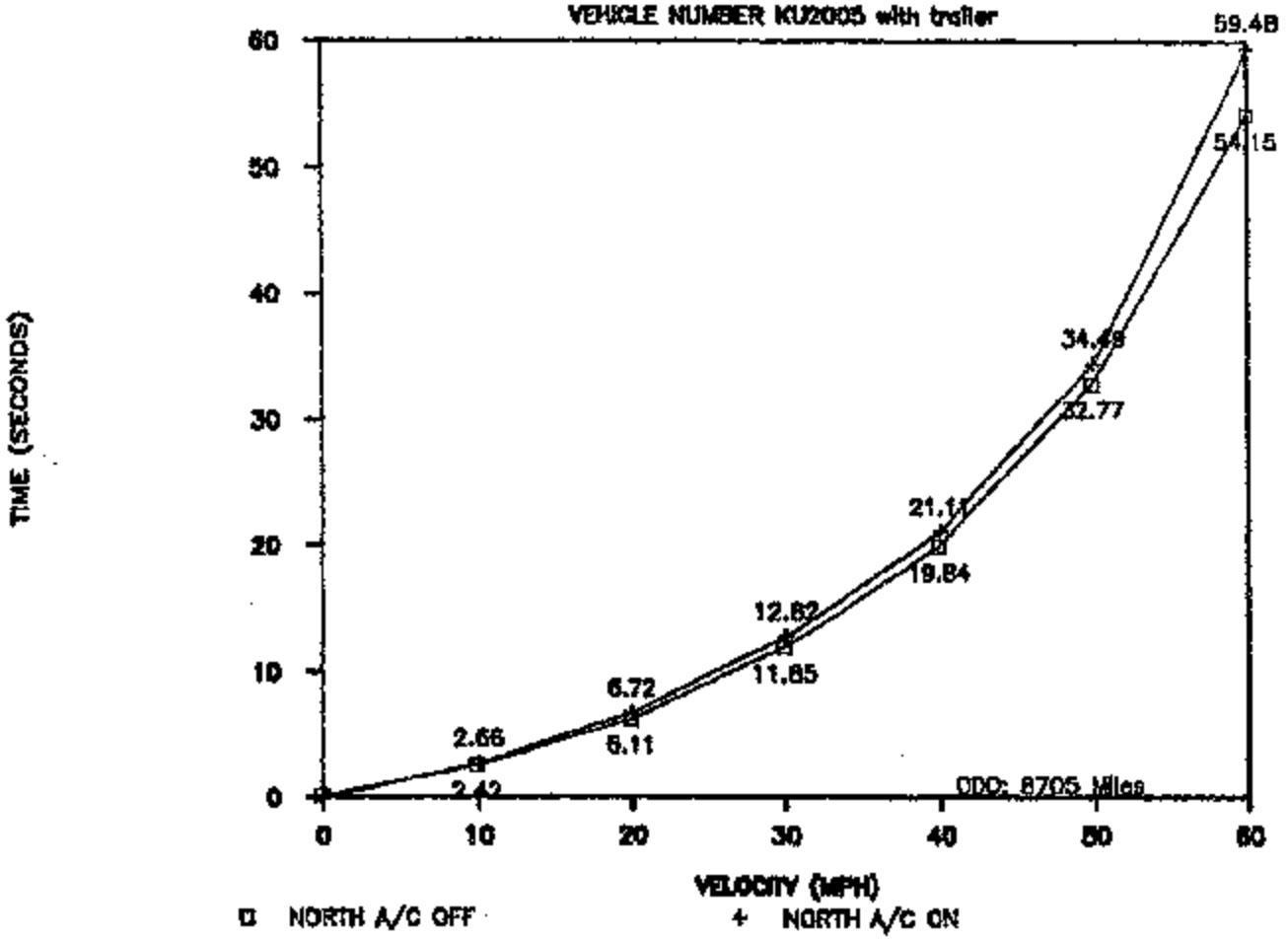
EOT: L/FRT 634.2 L/RR 630.9
R/FRT 640.1 R/RR 634.8

FRAME - DRIVE LINE ANGLES

EOT:	FRAME:	L/H	0.3	R/H	0.2
	SHAFTS:	FRT	0.8	RR	9.2

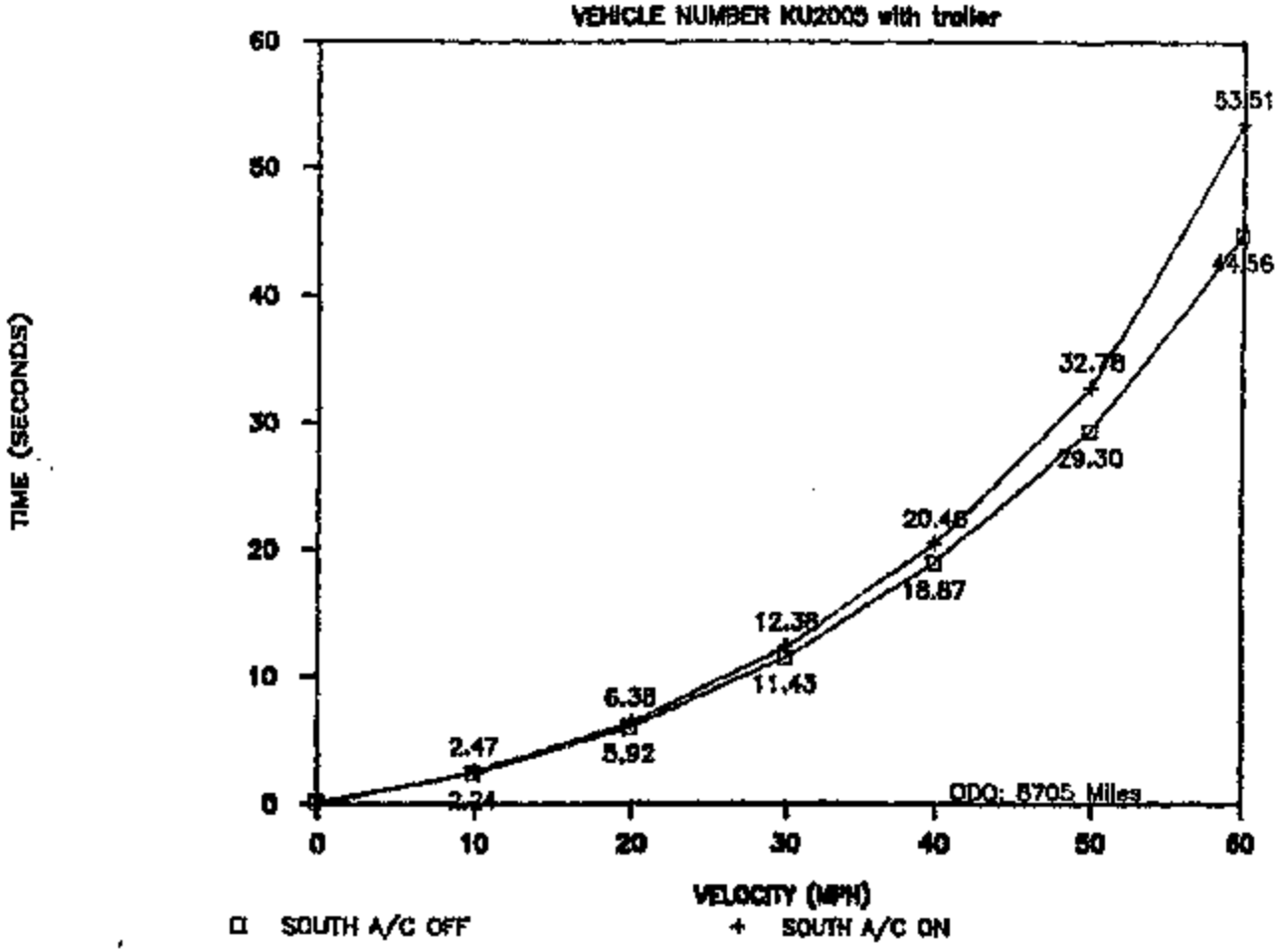
APPENDIX E

ACCELERATION PERFORMANCE TEST



ACCELERATION PERFORMANCE TEST

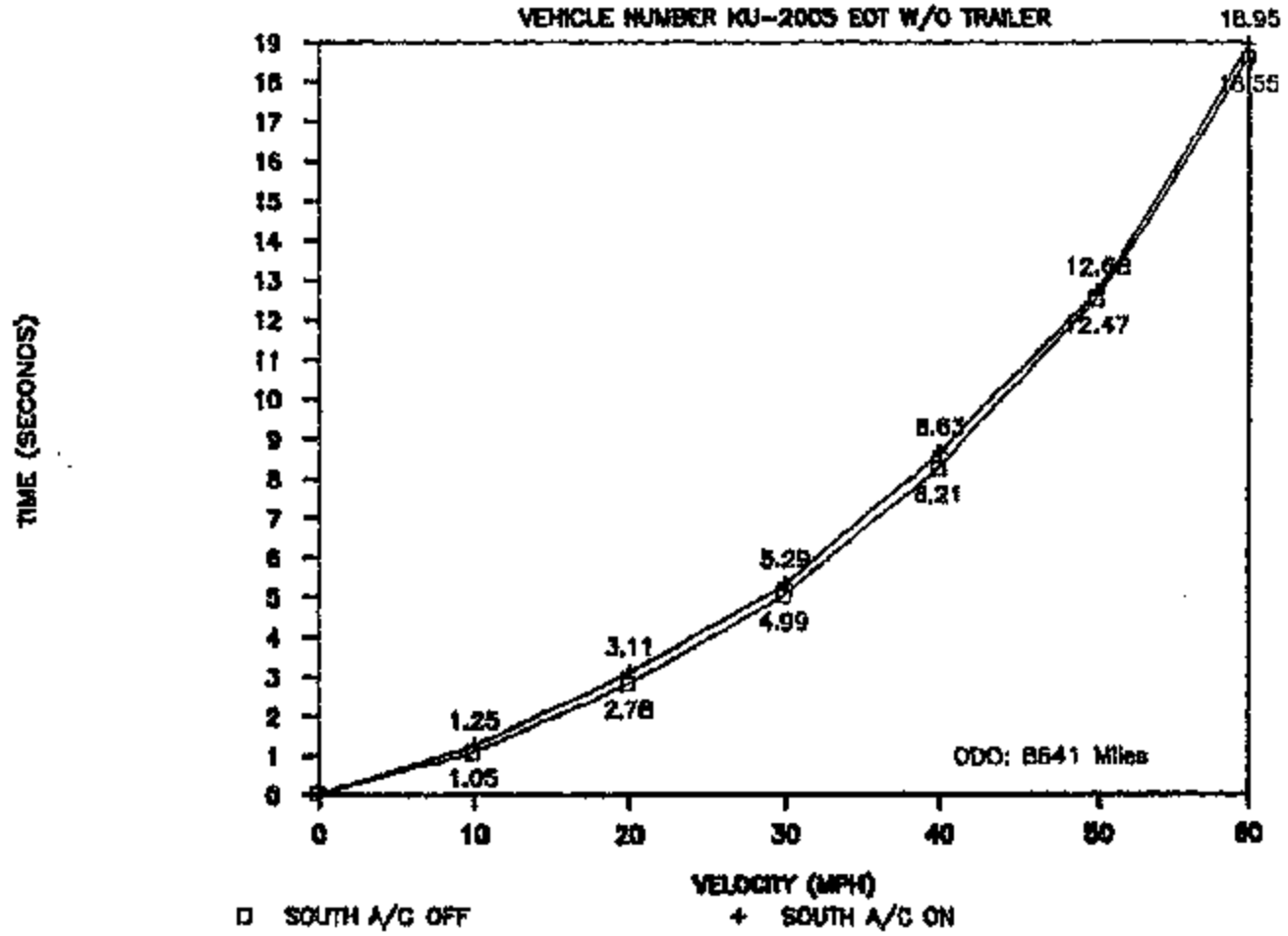
VEHICLE NUMBER KU2005 with trailer



VEHICLE [illegible] C-[illegible] [illegible] [illegible] T.M.O. NO.: 12B29-100
COMPUTER [illegible] GST W/O TRAILER

	0 RUN 1 NORTH A/C OFF
[illegible]	10
[illegible]	20
[illegible]	30
[illegible]	40
11.24	50
16.45	62
	0 RUN 2 NORTH A/C OFF
1.07	10
2.77	20
4.61	30
7.87	40
11.43	50
16.60	60
	0 RUN 3 NORTH A/C ON
1.74	10
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
	0 RUN 6 SOUTH A/C ON
[illegible]	10
[illegible]	20
5.34	32
8.73	46
13.96	58
19.37	69
	0 RUN 7 SOUTH A/C OFF
[illegible]	10
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

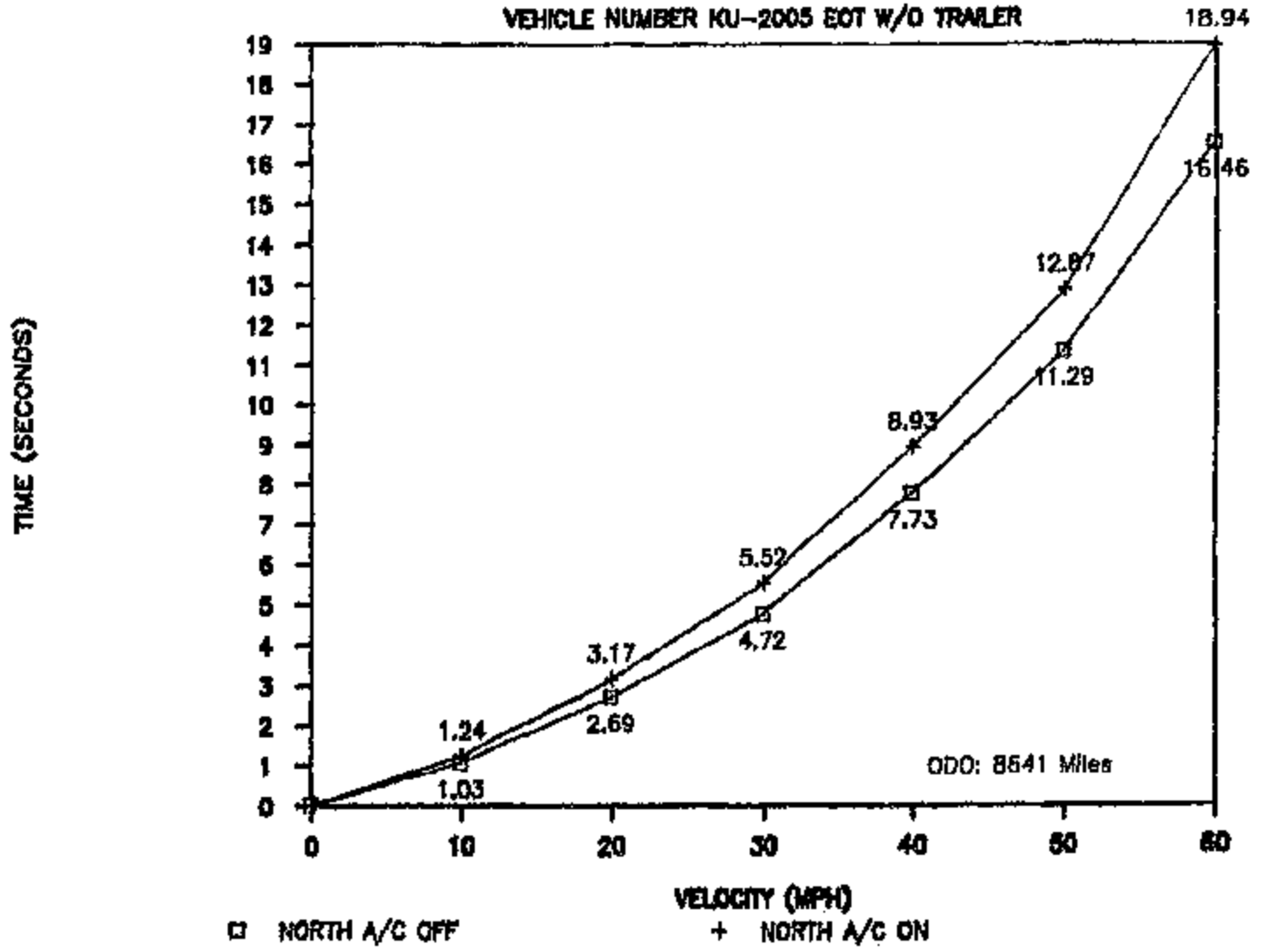
ACCELERATION PERFORMANCE TEST



S.W.O. NO.: 12825-190

Page 17

ACCELERATION PERFORMANCE TEST



T.W.O. NO.: 12R29-100

VEHICLE NO. 6547 PLANT: DATE: 07 6-8-87 ROAD: 1215 Miles
CONFIGURATION: Without trailer

	0	RUN 1 NORTH A/C OFF
1.07	10	
2.60	20	
4.74	30	
7.16	40	
11.02	50	
16.00	60	
	0	RUN 2 NORTH A/C OFF
1.04	10	
2.65	20	
4.75	30	
7.66	40	
11.19	50	
16.42	60	
	0	RUN 3 NORTH A/C ON
1.15	10	
2.62	20	
5.01	30	
8.74	40	
12.91	50	
19.54	60	
	0	RUN 4 NORTH A/C ON
1.10	10	
2.67	20	
5.11	30	
8.69	40	
13.03	50	
18.74	60	
	0	RUN 5 SOUTH A/C ON
1.14	10	
2.93	20	
5.17	30	
8.30	40	
12.89	50	
17.91	60	
	0	RUN 6 SOUTH A/C ON
1.17	10	
2.92	20	
5.19	30	
8.38	40	
12.34	50	
18.35	60	
	0	RUN 7 SOUTH A/C OFF
1.02	10	
2.71	20	
4.92	30	
8.08	40	
12.05	50	
17.78	60	
	0	RUN 8 SOUTH A/C OFF
1.01	10	
2.71	20	
4.91	30	
8.07	40	
11.92	50	
17.64	60	

T.W.O. NO.: 12R29-100

ACCELERATION PERFORMANCE TEST

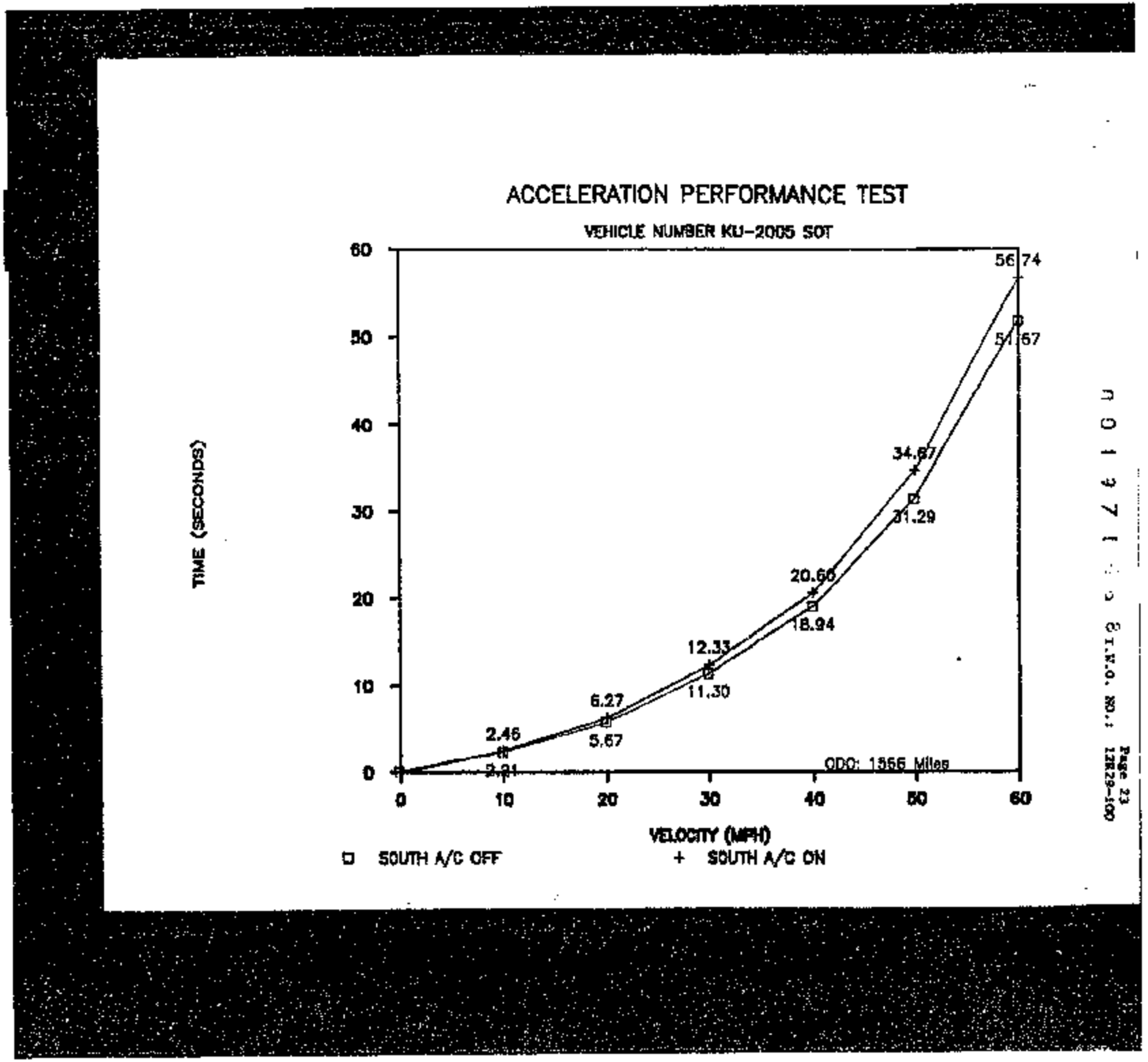
VEHICLE NUMBER KU2005 without trailer

ODO: 1315 Miles

ACCELERATION PERFORMANCE TEST
VEHICLE NUMBER KU2005 without trailer
ODO: 1315 Miles
VELOCITY (MPH)
+ NORTH A/C ON
□ NORTH A/C OFF
TIME (SECONDS)
0
10
20
30
40
50
60
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
18.58
16.32
12.67
11.00
8.70
7.56
5.37
4.70
3.03
2.67
1.19
1.03

VEHICLE NUMBER: KU-2005 DATE: 07/10/90 T.W.O. NO.: 12829-100
CONFIGURATION: SOT ODO: 1556 Miles

	0	RUN 1 NORTH A/C OFF
2.22	10	
5.74	20	
11.38	30	
19.56	40	
32.86	50	
54.05	60	
	0	RUN 2 NORTH A/C OFF
2.28	10	
5.87	20	
11.50	30	
19.43	40	
32.12	50	
52.20	60	
	0	RUN 3 NORTH A/C ON
2.41	10	
6.24	20	
12.31	30	
20.39	40	
33.34	50	
56.97	60	
	0	RUN 4 NORTH A/C ON
2.56	10	
6.55	20	
12.91	30	
21.39	40	
34.30	50	
58.73	60	
	0	RUN 5 SOUTH A/C ON
2.46	10	
6.27	20	
12.13	30	
20.67	40	
34.67	50	
58.74	60	
	0	RUN 6 SOUTH A/C ON
2.59	10	
6.56	20	
12.76	30	
21.17	40	
35.23	50	
64.92	60	
	0	RUN 7 SOUTH A/C OFF
2.21	10	
5.67	20	
11.30	30	
18.94	40	
31.29	50	
51.67	60	
	0	RUN 8 SOUTH A/C OFF
2.29	10	
5.81	20	
11.[illegible]	30	
19.[illegible]	40	
31.82	50	
56.69	60	



ACCELERATION PERFORMANCE TEST
VEHICLE NUMBER KU-2005 SOT
ODO: 1566 Miles
VELOCITY (MPH)
+ NORTH A/C ON
□ NORTH A/C OFF
TIME (SECONDS)
58.73
52.20
34.30
32.12
21.39
19.43
12.91
11.50
6.55
5.07
2.56
2.28
0
10
20
30
40
50
60

APPENDIX F

APPENDIX G

TBE-417-N REV. 3/88
t9119avf(OPH/HO) /11

T.W.O. NO.: 12R29-100

Truck & Bus Group | ENGINEERING OPERATION

RECEIVED
ENGINEERING OPERATIONS
1989 NOV 21 P 2:50
MILFORD PROVING GROUNDS

TEST WORK ORDER

DJN

d03505-1035

TWO: 12R29-100
PAGE: 1 OF: 1
P.A. NO.: 38R100
EPN: 38100
PRIORITY:
DATE CLOSED:

TO: Proving Grounds
DATE ISSUED: 19AUG89 REISSUED: TARGET: TSR
TEST TITLE: Trailer Towing Durability

TEST PROCEDURE NO: 9968

COMPLIANCE	YES	NO
EMISSIONS		X
NOISE		X
INTERNAT'L STD.		X
CAT. III (GMPCF)		X

INTERNAT'L STD. NO:
FMVSS NO. CAT. I: CAT. II:

VALIDATION REQUIRED
PROD. ASSUR. (DESIGN): X SOURCE:

REFERENCES
MODEL YR./VEH. LINE: [illegible] Utility)
UPC GROUPS:
OTHER:

COMMITTED EXPENDITURES

GROUP	CC	HRS
DESIGN ENGINEER		
LAB TEST & DEV	300	
DYNA LAB (SAL)	301	
DYNA LAB (HRLY)	301K	
PROVING GROUND		
PG DURABILITY (L.D.)	2970	192
PG TEST ENGINEER	E	
PG DEV. TECHNICIANS	V	
PG SP TECH-PROD ASSUR.	S	
PG MEAS. ENGINEERING	M	
(OTHER) PLVS	9452	$16,390
DOMESTIC TRAVEL	9432	$

TRIAL
PROVIDED BY: BNO NO:
TMPO: PLANT:
TYPE: EXP: PROTO: PILOT:
LEAD UNIT BUILD: PROD.:
VEHICLE REQUIRED: YES: X NO:
VEHICLE NO: KU2005 (K10516) or Equivalent Vehicle

INFORMATION COPIES TO:

QTY	LAST NAME	MAIL CODE
1	M. Prater	0973-103
1	V. Haas	0926-N
1	G. Larson	1901-203

TEST DESCRIPTION:

Perform Trailer Towing Durability per GMTAB Procedure 9968 (GMUTS R-15-31P-81). Use Travel Trailer loaded to 7,000 lbs. with 840 lbs. Torque Load. Ballast Vehicle to obtain 12,000 lbs. GCW.

Use platform part number 15643952
No work is to begin against this work order until after 1-01-90
REASON FOR TEST: Test vehicle and validation of GMT 410 Weight Distribution Platform Hitch.

COMMITMENTS ENTERED IN CHECKBOOK? YES: ✓ NO:

SOURCE LOCATION	RESOURCE SUPERVISOR	RESOURCE COORDINATOR
DOG	JWB 2930	BMJ / P. Oesch

DESIGN RESPONSIBLE
ENGR: H. L. Sherry
TL CODE: 1902-105 PHONE: 8-353-5513
SIGNATURE: DATE:

REQUESTED BY OTHER THAN DES. RESP.
ENGR: T. M. Jambeck
MAIL CODE: 1901-203 PHONE: 8-353-5064
SIGNATURE: DATE:

PRODUCT VALIDATION: J. S. Carey
SIGNATURE:

APPROVED BY: R. Voss
SIGNATURE:

OCT 17 1989

GM543 Att I 9039

KU2005 HITCH PLATFORM
ATTACHING FASTENER TORQUE AT E.O.T.

	L	R
FRONT	94 NM	48 NM
MIDDLE	68 NM	54 NM
REAR	68 NM	34 NM

S.O.T. TORQUE WAS SET TO PDM MINIMUM SPECIFICATION OF 80 NM.

X 0 0 1 9 7 1 [illegible] 5 D38019

PROVING GROUND TEST REPORT

DISTRIBUTION LIST

T.W.O. NO.: 12R2B-100 SEQUENCE NO.: ALL

SUBJECT: E.O.T. REPORT FOR VEHICLE CS2603

DISTRIBUTION		CIRCULATION	
Central Records	1901-205	D. L. Kline	3301-133
C. E. Fisher	1901-201	R. K. Leverenz	2201-104
S. M. Cohoon	3301-115		
P. J. Oesch	8028		
W. L. Sherry	1902-105		
D. S. Carey	1901-203		
T. M. Jambeck	1901-203		
D. Hunter	1902-105		
M. Prater	0973-103		
V. Haas	0926-H		
G. Larson	1901-203		
D. J. Noriega	8028		

[illegible]

Truck & Bus Group

ENGINEERING OPERATIONS

ENGINEERING REPORT
DESERT PROVING GROUND

Inter-Organization

T.W.O. NO.: 12R28-100

SUBJECT: E.O.T. REPORT FOR VEHICLE CS2603

TO: D. S. Caroy

FROM: David Noriega

T.W.O. NO.: 12R28-100 SEQ.: ALL MODEL LINE: CS20906 MODEL YEAR: 1992

PROCEDURE/FMVSS: 9968 UPC: 161 VEH. NO.: CS2603 ENGINE: L19

DATE EVALUATED FROM: 08-06-90 TO: 08-27-90 DATE PUBLISHED: 09-10-90

E.O.T. REPORT [X] PROGRESS REPORT [ ] REISSUE [ ]

REISSUE DATE: _____ REASON FOR REISSUE: _____

OBJECTIVE:

Total vehicle and validation of GNT 430 weight distribution platform hitch and transfer case at GCW.

RESULTS:

Vehicle CS2603 completed an R-15-31 trailer towing test which accumulated 6,476.4 total test miles. There were 8 TIR's written against the vehicle. There were no TIR's written against the rear platform hitch. Please see Appendix A for a one line summary of the TIR incidents written against the vehicle. Also attached to this report on Appendix C, D, and E is temperature data, measurement data, and performance data that was recorded during the test.

Speed up superior grade range from 30 to 43 mph.

MATERIAL:

Please see Appendix B for a physical description of the vehicle as tested.

PROCEDURE:

R-15-31. Trailer towing durability was performed per GMT & B procedure 9968 (GMUTS R-15-31P-81) using an Airstream Travel Trailer loaded to 10,000 lbs. with 1,000 lbs tongue load. The vehicle was ballast to obtain 17,000 lbs. GCW. The vehicle was equipped with a 4.10 rear axle ratio.

Please see Appendix F for a copy of the test work order.

This closes T.W.O. I2R28-100.

David Noriega 9/21/90
David Noriega Date
Test Engineer
Desert Proving Grounds
8-674-5496

Karl H Schmitz 7-10-90
K. H. Schmitz Date
Engineering Operations
Desert Proving Grounds
8-674-5195

DJN/gb

APPENDIX A

TIR NUMBER	ISSUE/ REISSUE DATE	VEHICLE NUMBER	FLEET	VEHICLE/PART ODO	SPC/FNA DESCRIPTION	TROUBLE DESCRIPTION	DIV CODE	ST
TB-922-014-00187L	8-10-90	C52603	PROTO	1,765 MI/ 0 MI	COMPRESSOR ASM-A/C	SEIZED	TB	05
TB-922-014-00191L	08SEP90	C52603	PROTO	6,222 MI/ 6,476 MI	HOSE ASM-AUX HTR INL & OTLT	BROKEN	TB	05
TB-922-02--00017L	30JUL90	C52603	PROTO	MI/ MI	* 2 *FRAME	BENT	TB	20
TB-922-038-00017L	30JUL90	C52603	PROTO	2,414 MI/ 471 MI	SEAL-FRT WHL JNR BRG	DETERIORATED	TB	20
TB-922-05--00017L	30JUL90	C52603	PROTO	2,414 MI/ 47: MI	SENSOR ASM-FRT WHL SPD (W/BRK	MISADJUST	TB	20
TB-922-05--00039L	24AUG90	C52603	PROTO	5,970 MI/ 3,636 MI	MODULE ASM-ELEM BRF CONT	MALFUNCTION	TB	20
TB-922-12--00044L	20AUG90	C52603	PROTO	5,970 MI/ 3,636 MI	ODOMETER ASM-TRIP	OUT OF RESTRICT	TB	10
TB-922-14--00017L	06JUL90	C52603	PROTO	MI/	*14 *BUMPERS & MISCELLANEOU	BENT	TB	54

APPENDIX B

MATERIAL

VEHICLE:	CS2603
MODEL:	CS20906
ENGINE:	L19 GAS 8 CYL, 7.4L
ENGINE EMISSIONS:	NAS FED
TRANSMISSION:	MT1 AUTO 4SP, THM R2
AXLE:	GTB 4.10 RATIO
BRAKES:	JBB HYD POWER, DISC/DRUM
STEERING:	N40 POWER
FRONT TIRES:	--- LT245/75R16 M&S
REAR TIRES:	--- LT245/75R16 M&S
AIR CONDITIONING:	C60 FRT & RR HVAC SYSTEM

APPENDIX C

LOCATION:	1 GRILL AMB	2 TOP TANK	3 ENG OIL	4 TRAN OIL	5 REAR AXLE	6 P/S	7 FRNT AXLE	8 TRANS CASE
GONZALES PASS	100	215	239	245	223	198		
SUPERIOR UNDERPASS	94	209	231	241	227	193		
TRUCK PULL-OUT(231)	92	210	244	254	270	199		
SUTTON SUMMIT	87	209	237	250	281	195		
DPG	100	208	213	218	206	177		
APACHE JUNCTION	103	219	233	247	207	196		
TORTILLA FLAT(TOP OF HILL)	101	216	231	249	224	198		
HUNT HWY.	107	205	220	219	210	185		
DPG	105	207	222	218	207	184		
APACHE JUNCTION(SRC)	98	212	225	240	163	188		
TORTILLA FLAT	97	215	223	248	197	187		
GONZALES PASS	87	211	235	248	213	200		
SUPERIOR UNDERPASS	87	209	226	249	213	189		
TRUCK PULL-OUT(231)	77	206	237	256	242	197		
SUTTON SUMMIT	71	208	230	257	245	189		
TOP OF HILL(278.5)	66	207	231	256	255	193		
NORTH RIM SRC(298.5)	74	213	231	257	262	185		
SOUTH RIM SRC(288)	70	208	232	262	270	190		
TOP OF HILL(SOUTH OF 285)	69	207	230	252	277	186		
MILE POST(265.5)	72	218	220	250	247	188		
DPG	85	206	205	217	174	172		

NOTE: AVG TEMPERATURE TAKEN DURING R-15-31 TEST.

APPENDIX D

FRONT WHEEL ALIGNMENT BEFORE TEST: Odometer 1,757 miles

CASTER:	L	2.99	R	2.45 DEG
CAMBER:	L	0.69	R	0.39 DEG
TOE:	L	0.16	R	0.11 DEG

FRONT WHEEL ALIGNMENT AFTER TEST: Odometer 9,223 miles

CASTER:	L	2.83	R	2.23 DEG
CAMBER:	L	0.68	R	0.20 DEG
TOE:	L	0.12	R	0.12 DEG

TRIM HEIGHTS - MM

	J		P		K		R	
ODOMETER	L	R	L	R	L	R	L	R
1,757	369	403	890	882	451	446	920	915
9,223	387	381	867	858	410	405	890	891

BUMPER HEIGHTS - MM

SOT	L/FRT:	654	R/FRT:	654
	L/RR:	902	R/RR:	902
EOT	L/FRT:	632	R/FRT:	630
	L/RR:	713	R/RR:	712

Z & D MEASUREMENTS - MM

	Z		D	
SOT:	L	R	L	R
	99.5	101.5	207.5	202.5
EOT:	97.0	99.5	203	202.5

B-C HEIGHTS - MM

SOT: L - 83 R - 81
EOT: L - 82 R - 81

FRAME DRIVELINE ANGLES

SOT:	FRAME:	L/H	+1.7	R/H	+1.6
	SHAFTS:	FRT	-3.7		
EOT:	FRAME:	L/H	+0.7	R/H	+0.7
	SHAFTS:	FRT	-4.5		

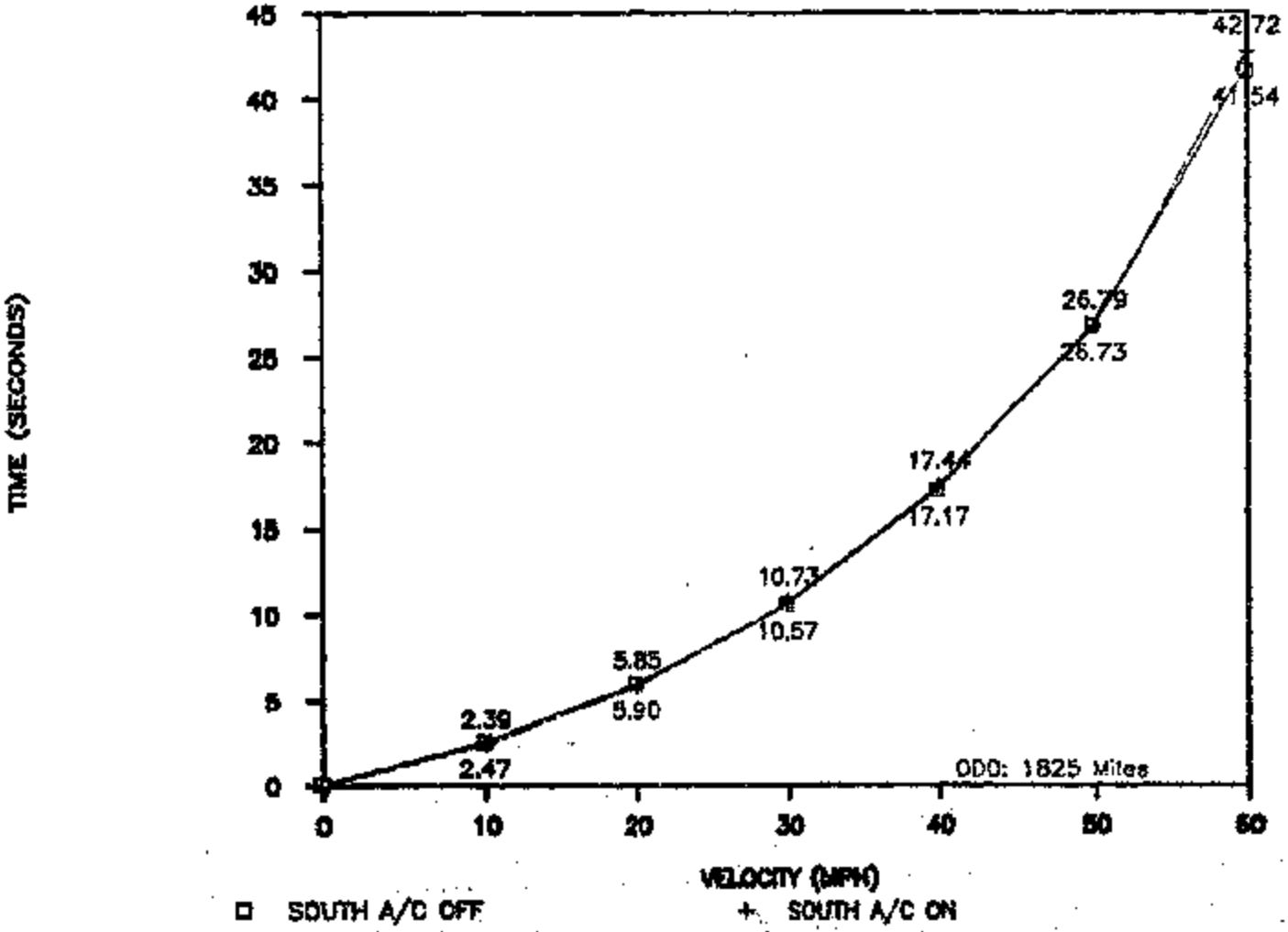
BODY MOUNT HELMET HEIGHTS - INCHES

	SOT		EOT	
	L	R	L	R
RAD SUPT	1.619	1.597	1.100	1.098
#1	.829	1.680	.826	1.586
#2	1.531	1.560	1.509	1.539
#3	1.377	1.400	1.351	1.353
#4	1.209	1.249	1.200	1.239
#5	1.850	1.733	1.795	1.717

APPENDIX E

ACCELERATION PERFORMANCE TEST

VEHICLE NUMBER CS2603 with trailer



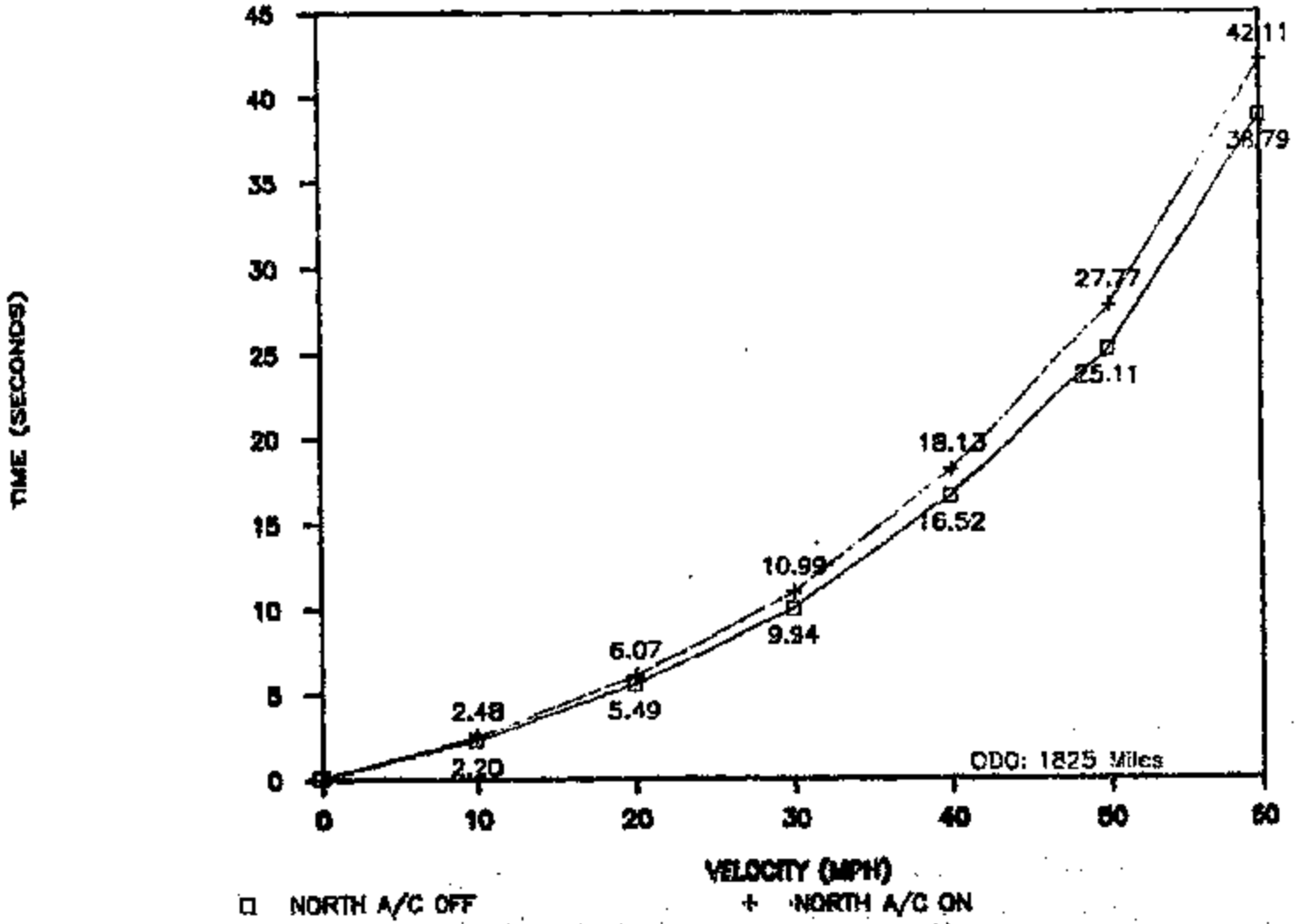
T.H.O. NO.: 12828-100

Page 15

CH583 Att 1 9855

ACCELERATION PERFORMANCE TEST

VEHICLE NUMBER CS2603 with trailer



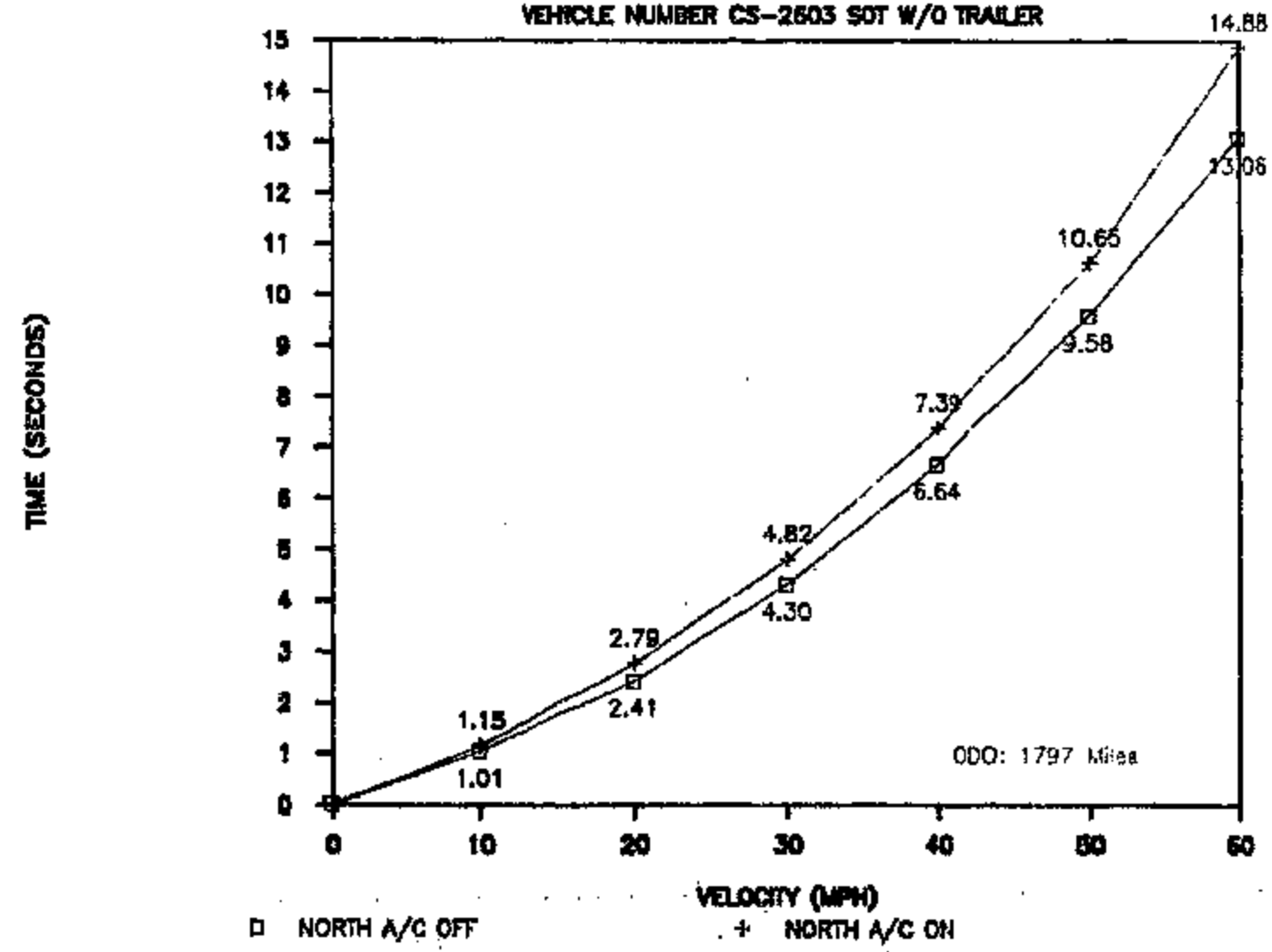
T.M.O. NO.: 12X28-100 Page 15

GM583 Att 1 9056

VEHICLE NUMBER: GS-1503 DATE: 08/03/90 T.W.O. NO.: 12R28-100
CONFIGURATION: 30T W/O TRAILER ODO: 1797 Miles

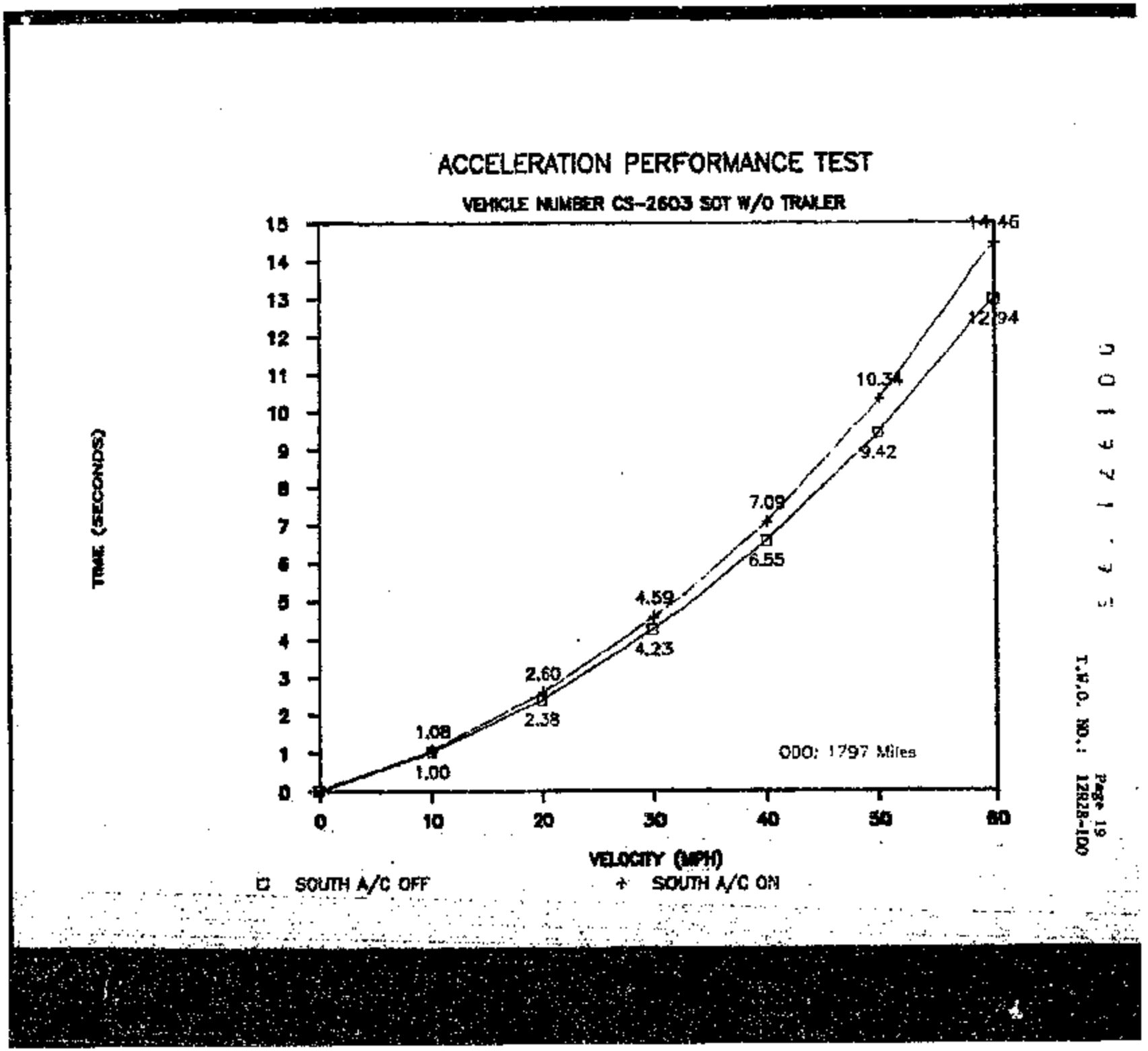
	0	RUN 1 NORTH A/C OFF
1.04	10	
2.56	20	
4.67	30	
7.41	40	
10.82	50	
15.37	60	
	0	RUN 2 NORTH A/C OFF
1.01	10	
2.41	20	
4.30	30	
6.64	40	
9.58	50	
13.06	60	
	0	RUN 3 NORTH A/C ON
1.18	10	
2.84	20	
5.06	30	
8.08	40	
11.41	50	
15.53	60	
	0	RUN 4 NORTH A/C ON
1.15	10	
2.75	20	
4.51	30	
7.34	40	
10.68	50	
14.57	60	
	0	RUN 5 SOUTH A/C ON
1.08	10	
2.61	20	
4.58	30	
7.09	40	
10.34	50	
14.46	60	
	0	RUN 6 SOUTH A/C ON
1.11	10	
2.69	20	
4.78	30	
7.41	40	
10.82	50	
14.73	60	
	0	RUN 7 SOUTH A/C OFF
1.04	10	
2.57	20	
4.65	30	
7.37	40	
10.80	50	
15.26	60	
	0	RUN 8 SOUTH A/C OFF
1.40	10	
2.38	20	
4.23	30	
6.55	40	
9.42	50	
13.04	60	

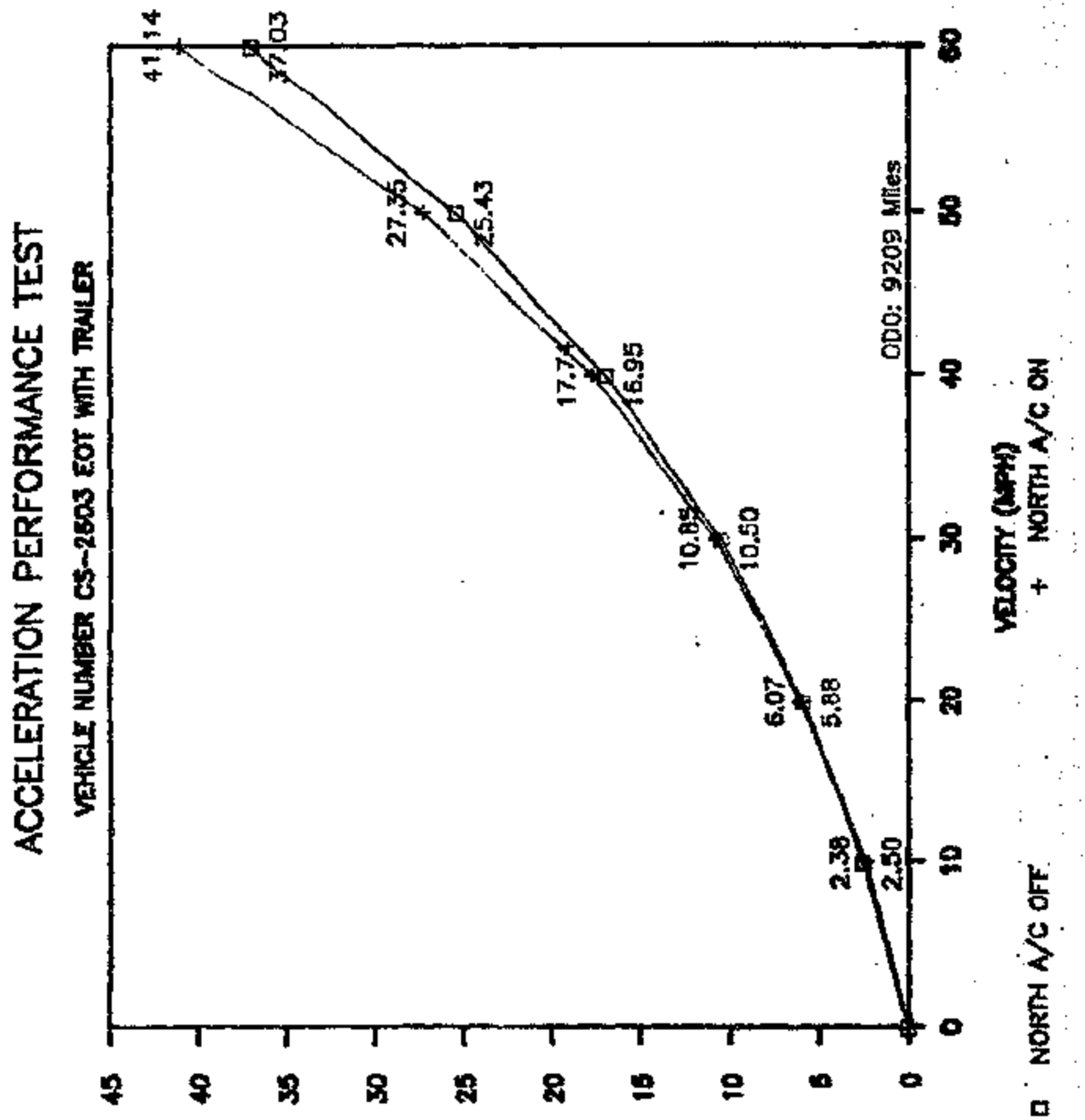
ACCELERATION PERFORMANCE TEST



T.M.O. NO.: 12828-100

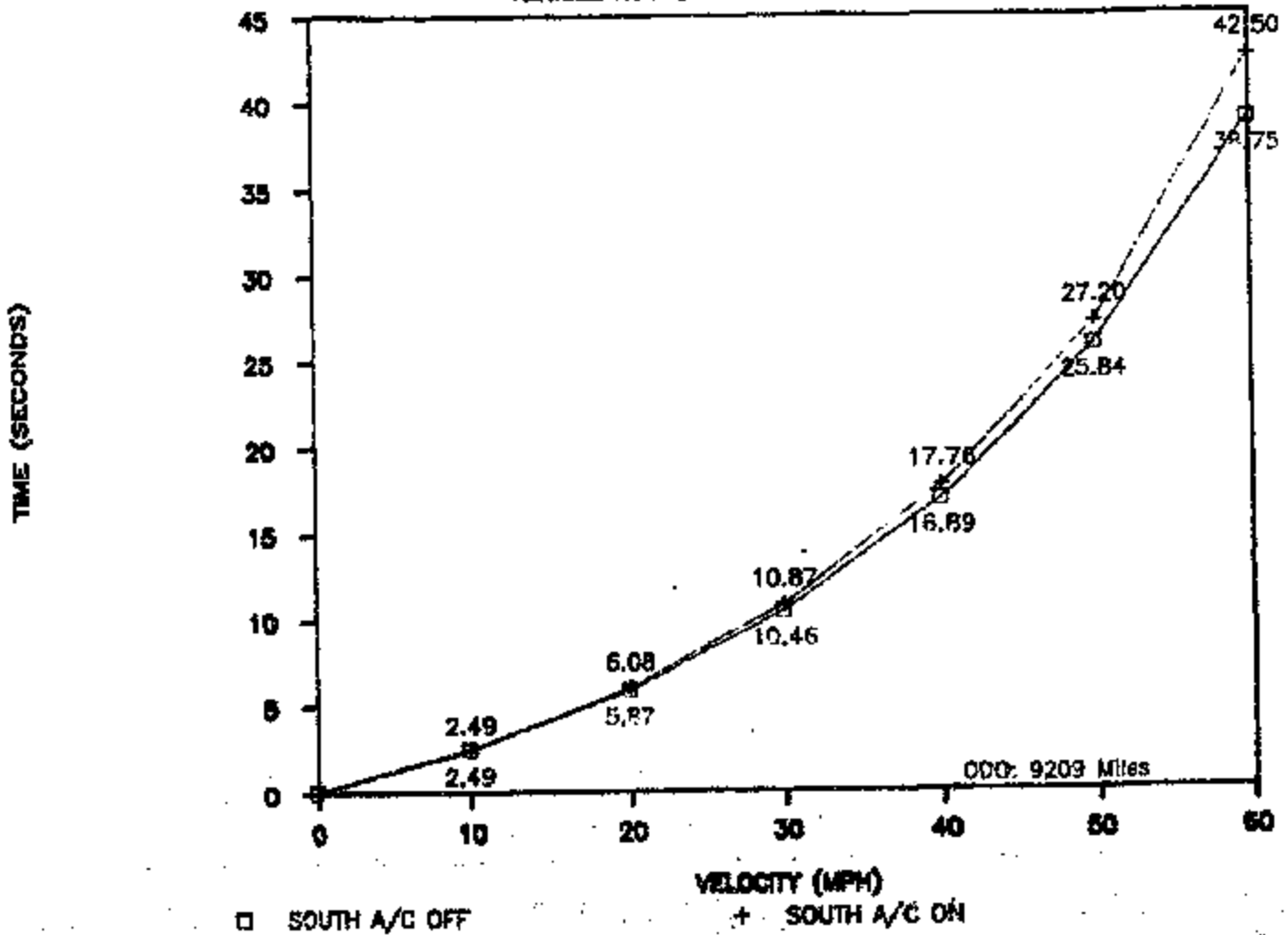
Page 18




ACCELERATION PERFORMANCE TEST
VEHICLE NUMBER CS-2503 EOT WITH TRAILER
ODO: 9209 Miles
VELOCITY (MPH)
+ NORTH A/C ON
□ NORTH A/C OFF
TIME (SECONDS)
0
10
20
30
40
50
60
0
5
10
15
20
25
30
35
40
45
41.14
37.03
27.35
25.43
17.74
16.95
10.85
10.50
6.07
5.88
2.38
2.50

ACCELERATION PERFORMANCE TEST

VEHICLE NUMBER CS-2603 EOT WITH TRAILER



T.R.O. NO.: 12828-100 Page 22

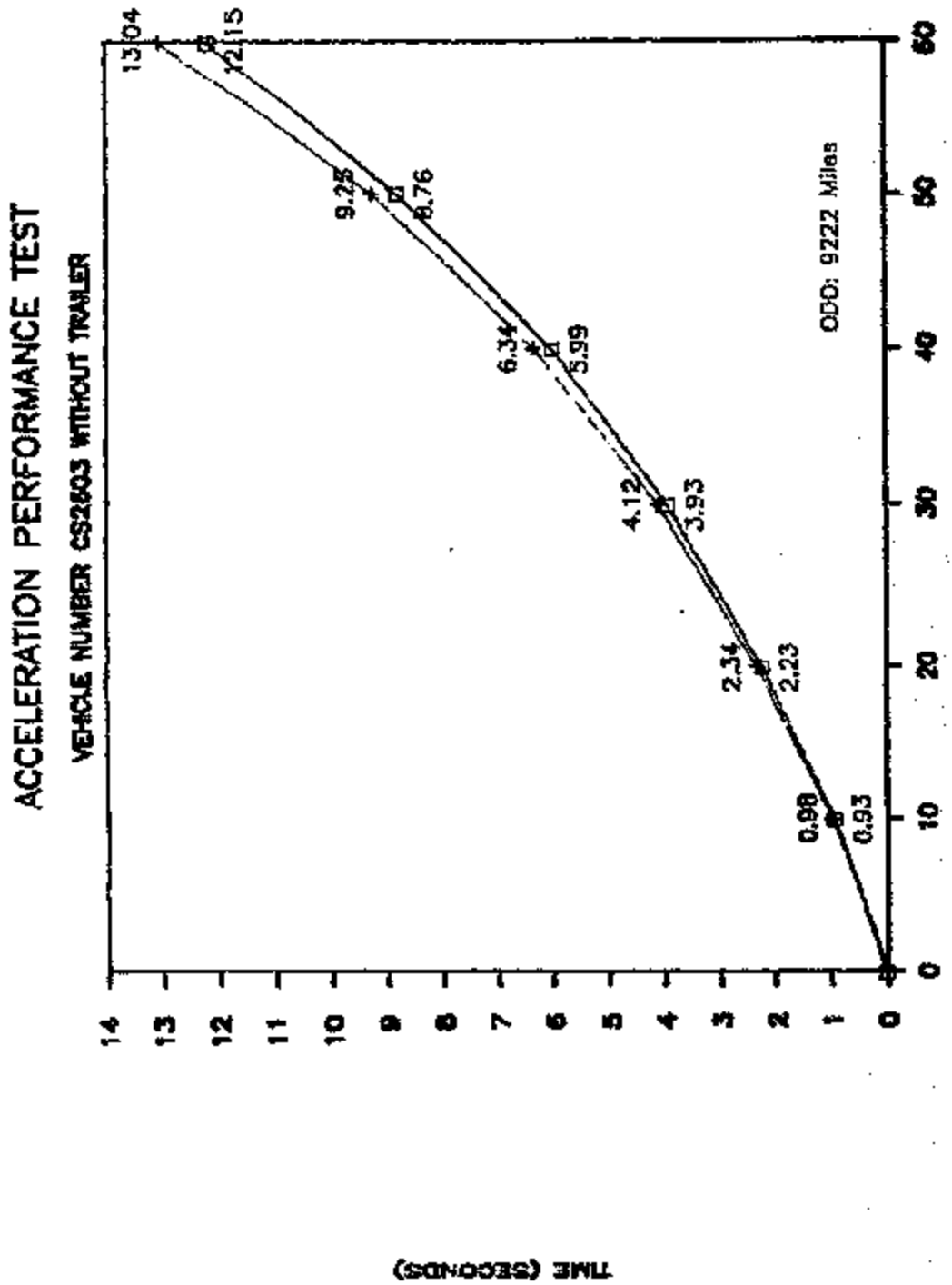
0 0 1 9 7 1 5

CM583 0++ 1 9862

1120000

ACCELERATION PERFORMANCE TEST

VEHICLE NUMBER CS2603 WITHOUT TRAILER


ACCELERATION PERFORMANCE TEST
VEHICLE NUMBER CS2503 WITHOUT TRAILER
ODO: 9222 Miles
VELOCITY (MPH)
TIME (SECONDS)
NORTH A/C OFF
NORTH A/C ON
13.04
12.15
9.25
8.76
6.34
5.99
4.12
3.93
2.34
2.23
0.98
0.93

APPENDIX F

TBE-417-W REV. 3/88
t9119avf(DPH/MO) /10

Buick & GMC Group ENGINEERING OPERATION

RECEIVED
GMT & B

ENGINEERING OPERATION WORK ORDER

1990 JUL 17 P 5:11

MILFORD PROVING GROUNDS

Supersession of: 1
TWO: 12R28-100
PAGE: 1 OF: 1
P.A. NO.: 37N100
EPN: 37100
PRIORITY:
DATE CLOSED:

TO: Proving Grounds
DATE ISSUED: 19AUG9 REISSUED: 18MY90 TARGET: TSR
TEST TITLE: Trailer Towing Durability

TEST PROCEDURE NO: 9968

COMPLIANCE	YES	NO
EMISSIONS	___	X
NOISE	___	X
INTERNAT'L STD	___	X
CAT. III (GMPCP)	___	X

INTERNAT'L STD. NO:
FMVSS NO. CAT. I: CAT. II:

VALIDATION REQUIRED
PROD. ASSUR. (DESIGN): X SOURCE:

REFERENCES
MODEL YR./VEH. LINE: 1992 GMT 430 (Suburban)
UPC GROUPS: 14L
OTHER:

MATERIAL
PROVIDED BY: GMO NO:
TMPO: OTHER:
TYPE: EXP: PROTO: PILOT:
LEAD UNIT BUILD: PROD.:
VEHICLE REQUIRED: YES: X NO:
VEHICLE NO: CS2603 (C20906 w/7.4L-R2-4.10 Axle)

COMMITTED EXPENDITURES

GROUP	CC	HRS
DESIGN ENGINEER		
LAB TEST & DEV	300	
DYNA LAB (SAL)	301	
DYNA LAB (NRLY)	301N	
PROVING GROUND		
PG DURABILITY (L.O.)	297D	192
PG TEST ENGINEER	E	
PG DEV. TECHNICIANS	V	
PG SP TECH-PROD ASSUR	S	
PG MEAS. ENGINEERING	M	
(OTHER) PLVS 9452		$16,380
DOMESTIC TRAVEL	9442	$

INFORMATION COPIES TO:

QTY	LAST NAME	MAIL CODE
1	M. Prater	0925-103
1	V. Haas	0926-W
1	G. Larson	1901-203

TEST DESCRIPTION: Supersede T.W.O. 12R28-100 dated 19AUG9 to change rear axle ratio and vehicle GCW weight.
Perform Trailer Towing Durability per GMT&B Procedure 9968 (GRUTS R-15-31P-91).
Use Travel Trailer Loaded to 10,000 lbs. with 1,000 lbs. Tongue Load. Ballast Vehicle to obtain 17,000 lbs. GCW. Vehicle must be equipped with a 4.10 axle ratio.

Use platform part number 15643952.
No work is to begin against this work order until after 1-01-90.
REASON FOR TEST: Total vehicle and validation of GMT 430 Weight Distribution Platform Hitch and Transfer Case at GCW.

COMMITMENTS ENTERED IN CHECKBOOK? YES: X NO:

SOURCE LOCATION	RESOURCE SUPERVISOR	RESOURCE COORDINATOR
DPG	KHS 2970	Y. Cesch

DESIGN RESPONSIBLE	REQUESTED BY OTHER THAN RES. RESP.
ENGR: M. L. Sherry	ENGR: T. M. Jambeck
MAIL CODE: 1902-105 PHONE: 8-353-5513	MAIL CODE: 1901-203 PHONE: 8-353-5064
SIGNATURE: DATE: 12/4/90	SIGNATURE: DATE: 30APR90
PRODUCT VALIDATION: D. S. Carey	APPROVED BY: D. Hunter
SIGNATURE:	SIGNATURE: 5/4/90

GM503 Att 1 9067
00000216

0019717 33 D38508

X

LAB REPORT

DISTRIBUTION

REPORT NUMBER: 12R48-100

SUBJECT: GMT 430 TRAILER HITCH STRENGTH TESTS

C/K TRUCK

DISTRIBUTION		CIRCULATION	
D. W. Hunter	1902-105	D. L. Kline	3301-133
C. E. Fisher	1901-201	W. E. Von Kampen	2501-115
J. C. Skelley	3301-115	A. D. Hummert	2501-119
R. B. Bradshaw	2501-150	N. V. Nicolac	0926-S
K. Wlinowski	0971-81	R. K. Leverenz	2201-104
R. L. Todd	1901-203	E. A. Roumld	1901-205
M. G. Ellis	2203-17	J. H. Peters	3301-195
		S. L. Tankeley	3301-92
		H. B. Patterson	3301-92
		T. T. Yohra	3301-92

NOTE: MAIL ORIGINAL REPORT TO: Test Admin. Records 1901-205

RECEIVED
OCT 17 P 4:18

FOR ANY CHANGES CONTACT: GRACE KARROUSKY 8-396-7325
Litigation

REV. 05CC90

GM583 Att I 9068
00009217

SUBJECT: GMT 430 TRAILER HITCH STRENGTH TESTS

TO: V. L. SHERRY 1902-105

FROM: C. A. ASKIN 3301-92

T.W.O. NO. 12R48-100 MODEL LINE GMT 430 SUBURBAN MODEL YR 1992

PROCDR/PRVSS: 0689 UPC 14 VEH. CS2603 ENGINE

DATE EVAL. FROM 09SEPT90 TO 12SEPT90 DATE PUBLISHED 130c90

FINAL REPORT (X) PROGRESS REPORT ( ) SUPPLEMENT NO. ( )

OBJECTIVE

Statically test the trailer hitch installation under vertical, forward, rearward, lateral, and moment loading.

CONCLUSIONS

The trailer hitch, vehicle frame, and related hardware, as documented in the Test Material section of this report, sustained the required loads per sections 3.1.1 through 3.1.5 and 3.2.1 through 3.2.4 of Procedure No. 0689 (GMUTS L-14L-1).

MATERIAL

Test Material:

* 10,000 lb. rated trailer hitch platform #15643953 (photo page 8)
* Trailer hitch installation per TL 31446
* #15644104 frame assembly per EGA #59365 (photo page 9)
* GMT 430 prototype vehicle #CS2603, a C20906 model Suburban (photo page 10)

Instrumentation:

* IL3905 - Lebow 20,000 lb. load cell
* IL7712 - Hydraulic actuator
* IL7712 - Rayelco X-T plotter
* IL5994 - 2877 Ectron amplifiers

Test Fixtures:

* #0502 Fixture Design Bill of Material

TEST PROCEDURE

GMT&B Procedure No. 0689 (GMUTS L-14L-1) trailer hitch tests. Hitch static load tests per sections 3.1.1 through 3.1.5 and hitch moment test per sections 3.2.1 through 3.2.4.

The trailer hitch was installed on GMT 430 #CS2603, a C20906 model Suburban. Loading was applied to the trailer hitch at a point 19.5 inches above level ground as measured on an empty vehicle full of fuel.

Refer to photos on pages 11 through 13 for the method used to secure the GMT 430 Suburban to the bedplate.

For test setup, refer to photos on pages 14 through 16.

TEST RESULTS

The following are the results from the static load tests run per section 3.1.1 through 3.1.5 and weight distributing hitch moment test per section 3.2.1 through 3.2.4 of Procedure No. 0689:

TRAILER HITCH LOADING DESCRIPTION	DESIRED LOAD (LBS.)	LOAD (LBS.) SUSTAINED FOR 30 SECONDS
Longitudinal - Tension (rearward pull) Photo page 14, graph page 1	15,000	15,000
Longitudinal Compression (forward push) Photo page 14, graph page 4	15,000	15,000
Transverse (lateral) - Right	5,000	5,000
Transverse (lateral) - Left	5,000	5,000
Upward Vertical - Tension Photo page 15, graph page 5	5,000	5,000
Downward Vertical - Compression Photo page 15, graph page 6	5,000	5,000
Moment Test Photo page 16, graph page 7	4,000	4,000

C. A. Askin
Senior Project Engineer
Product Test and
Development Laboratories

H. B. Patterson
Supervisor, C/K Testing
Product Test and
Development Laboratories

L10100bss

Two #12R48-100 Page #2A

| TRUCK & BUS GROUP | GM | ENGINEERING OPERATION PROCEDURE

SECTION	SUBJECT	TSR
TESTING FUNCTION	Design Validation Testing	P-280

VALIDATION TEST ENGINEER AUDIT APPROVAL

GNUTS L-14L-1

TEST WORK ORDER 12R48-100 PROCEDURE NO. T4B #8689

VEHICLE MODEL 1992 GMT 430 SUBURBAN TEST VEH. NUMBER CS2603

TEST OBJECTIVE:

STATICALLY TEST THE TRAILER HITCH INSTALLATION UNDER VERTICAL, FORWARD, REARWARD, LATERAL AND MOMENT LOADING.

"The Test System described has been inspected and is found to be representative of the released Design for the purposes of this Validation Test."

TEST SYSTEM DESCRIPTION:

* 1992 GMT 430 SUBURBAN PROTOTYPE #CS2603.
* 10,000 LB RATED TRAILER HITCH #15643953.
* #15644104 FRAME ASSEMBLY PER ECA #59365.

DESIGN ENGINEER M. L. SHERRY

SIGNATURE [signature]

DATE 23 Sept 92

#1544/04 Frame per Eng #'s 5785 Longitudinal / Rearward Load
#1543/03 53 Trailer Hitch - 10,000 lb rated
#CS2603 GMT 430
11 Sept 90

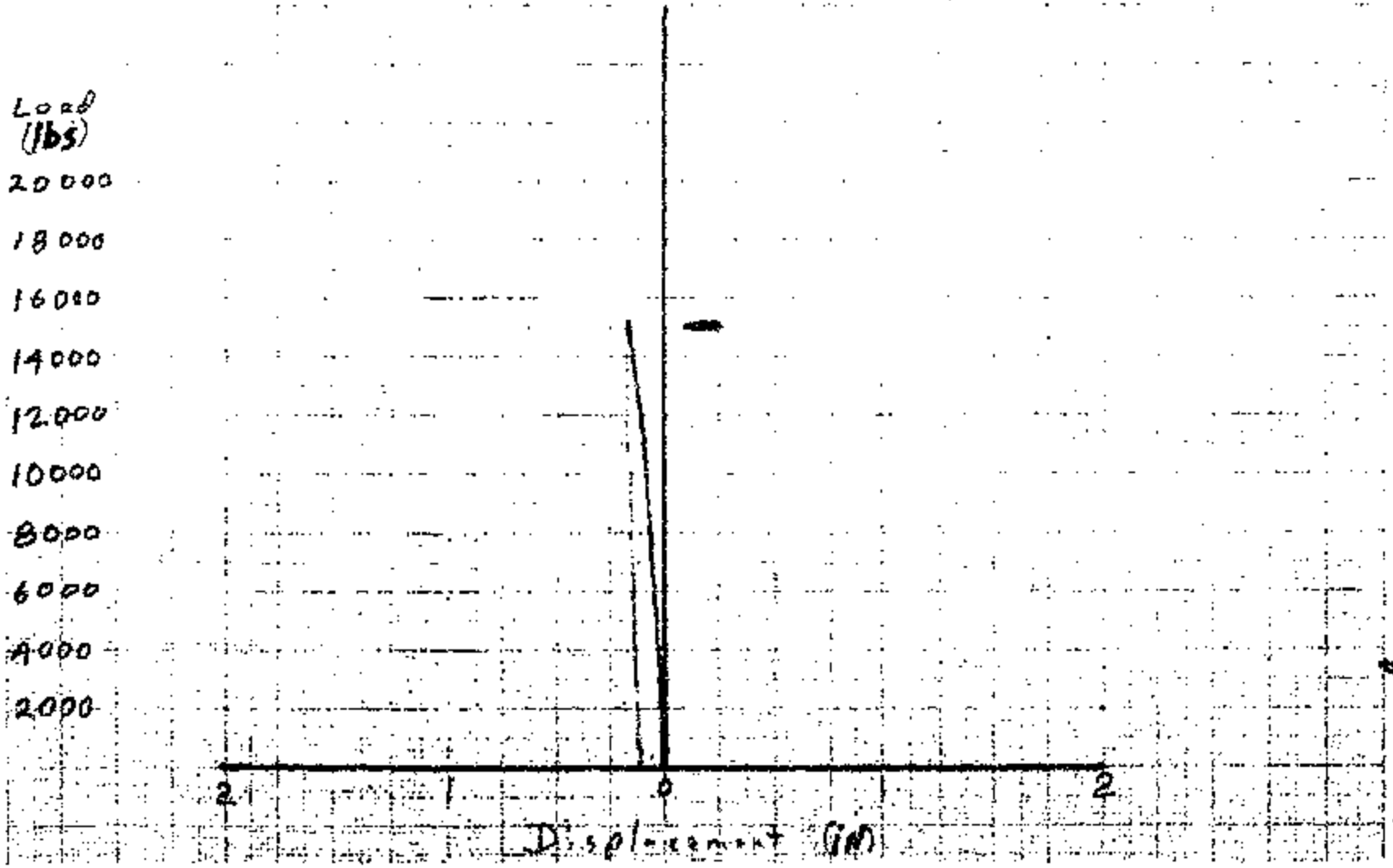
Two #'s 12A98-1003 Page #3

GM583 Att I 9872

00000221

#15644104 Frame
per ECA #59365

Longitudinal Forward Load
#15643953 Trailer Hitch - 10,000 lb. rating
#CS2603 6MT 430
11 Sept 90



Two #15644118-100

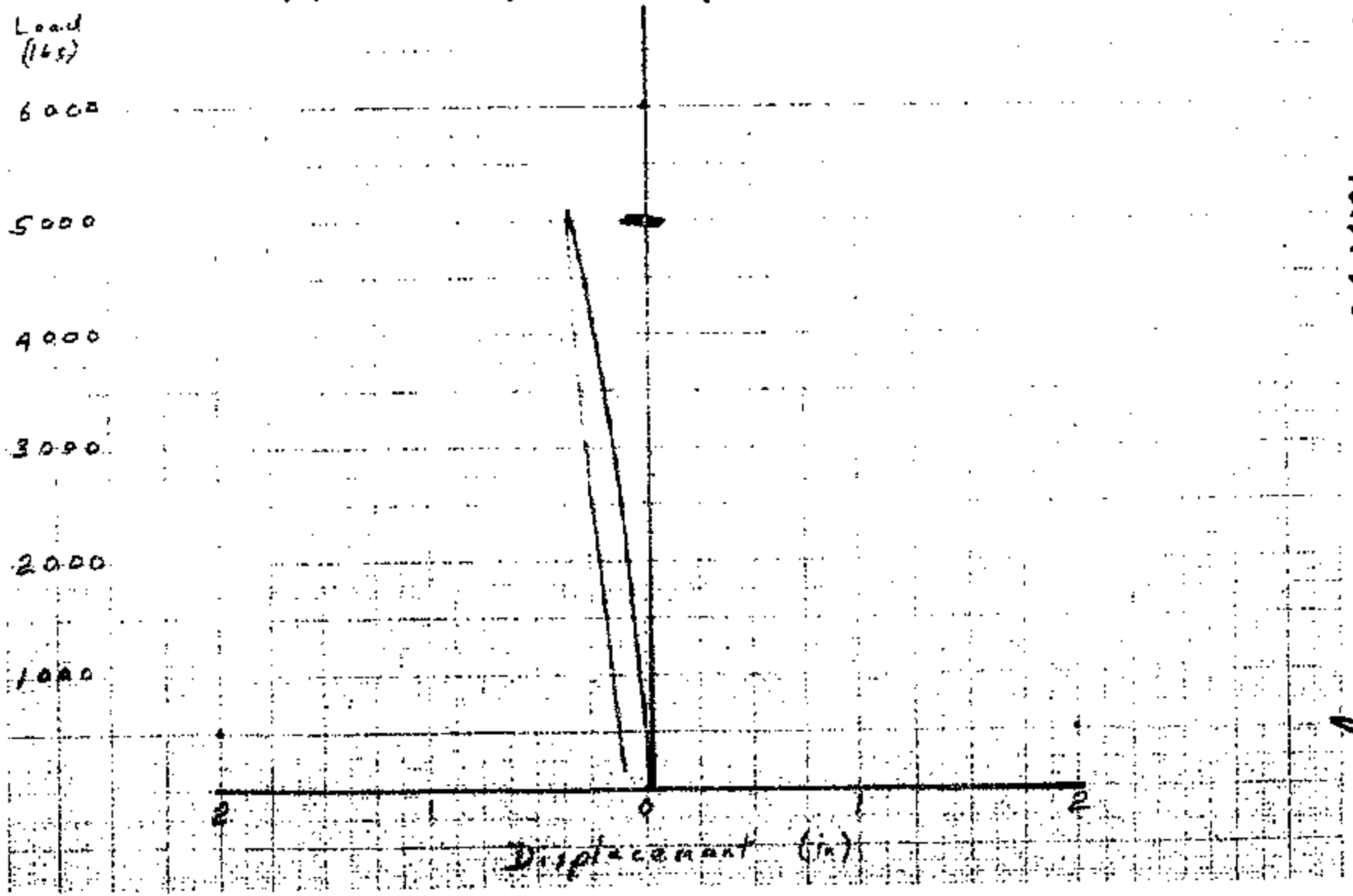
Page #4

GM582 444 1 9873

00000222

Vertical/Tension Load
#15643953 trailer hitch - 10,000 lb rating
#C52603 6mT 430
#15644104 Frame per ECA #59365

Vertical/
Upward
12 Sept 90



Two #12 AWG 8+100 ft

Page #5

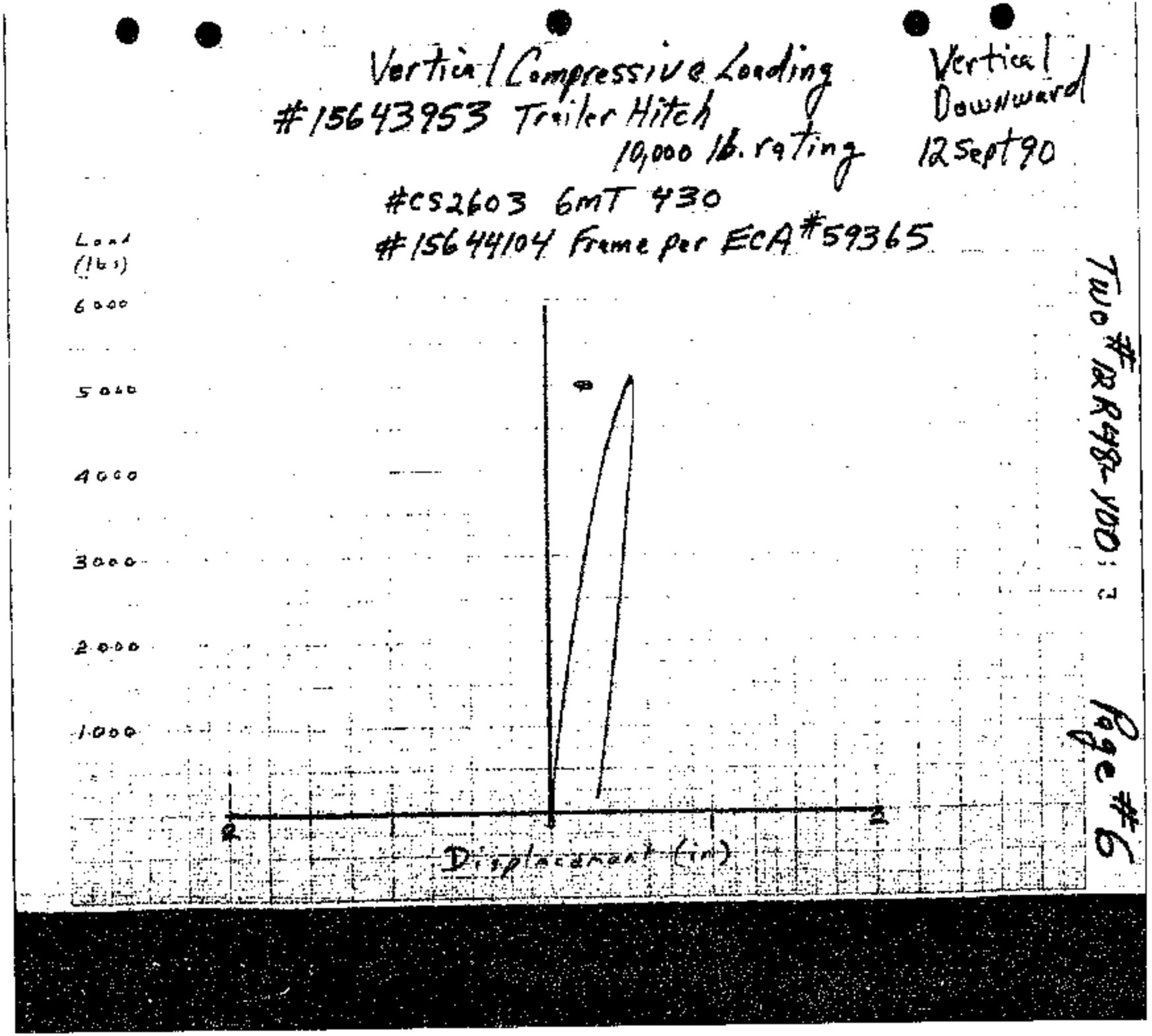
GM5583 Att I 9874

0000000

Vertical Compressive Loading
#15643953 Trailer Hitch
10,000 lb. rating

Vertical Downward
12 Sept 90

#CS2603 6MT 430
#15644104 Frame per ECA #59365



Two #1R R48-100 2

Page #6

GM583 4EE 1 9875

0000924

Page #7

Two #12R48 - 1003

#15643953 trailer hitch
10,000 lb. rated
#15643104 Frame per ECO #'s

Hitch Moment Test
#cs 2603 Cust 4330
9-11-90

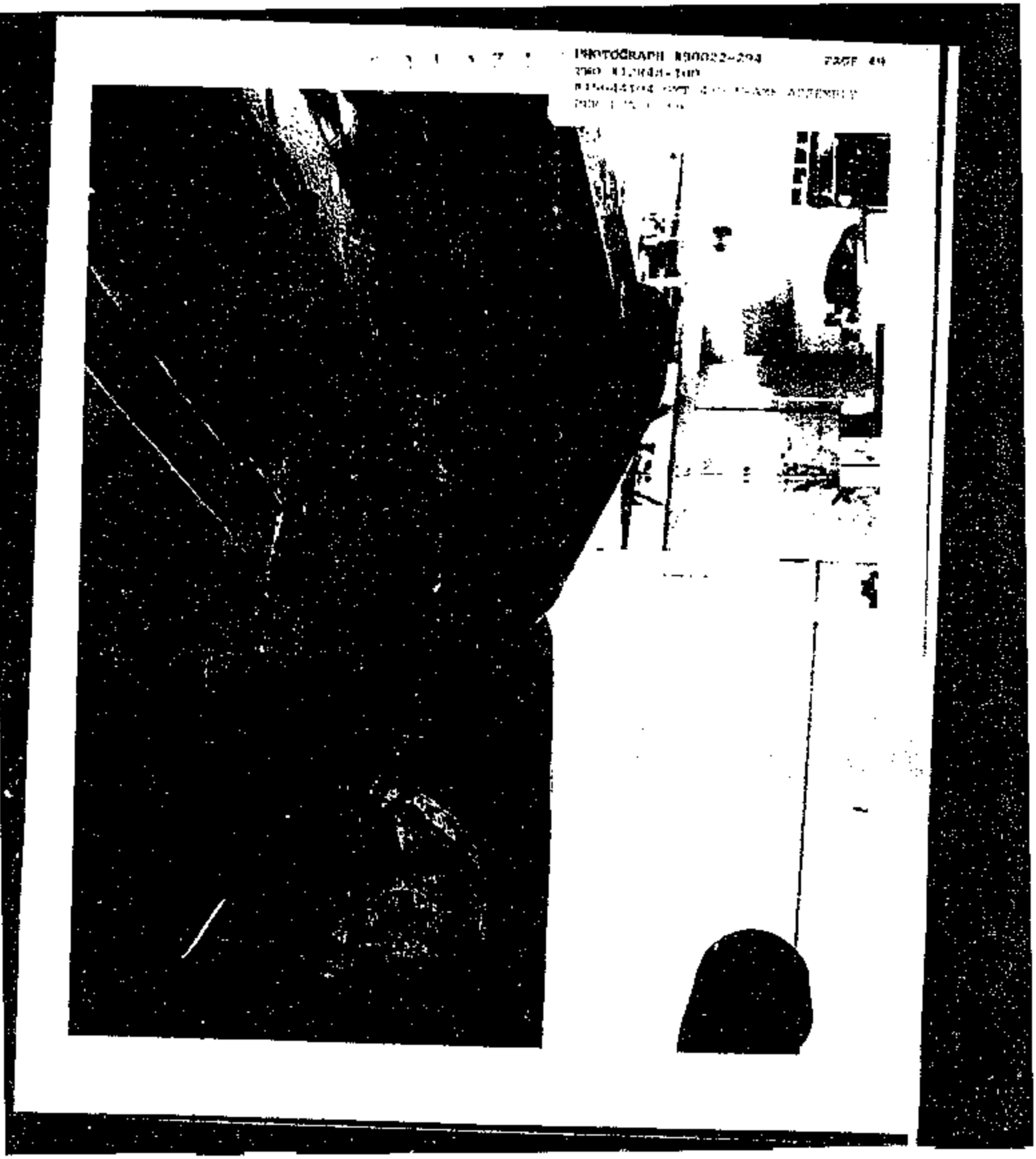
Load (lbs)

6000
5000
4000
3000
2000
1000

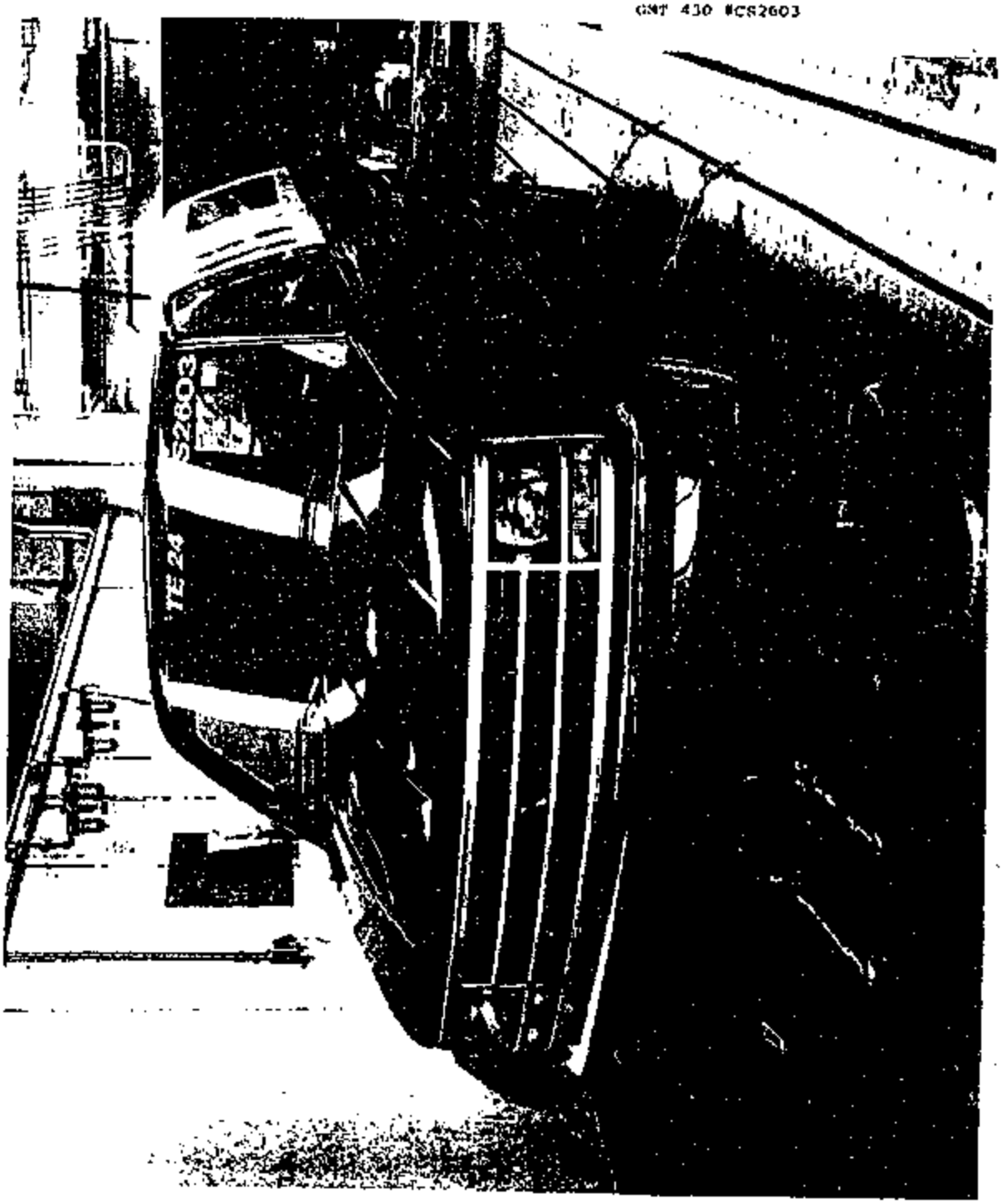
2 1 0 1 2

Displacement (in)

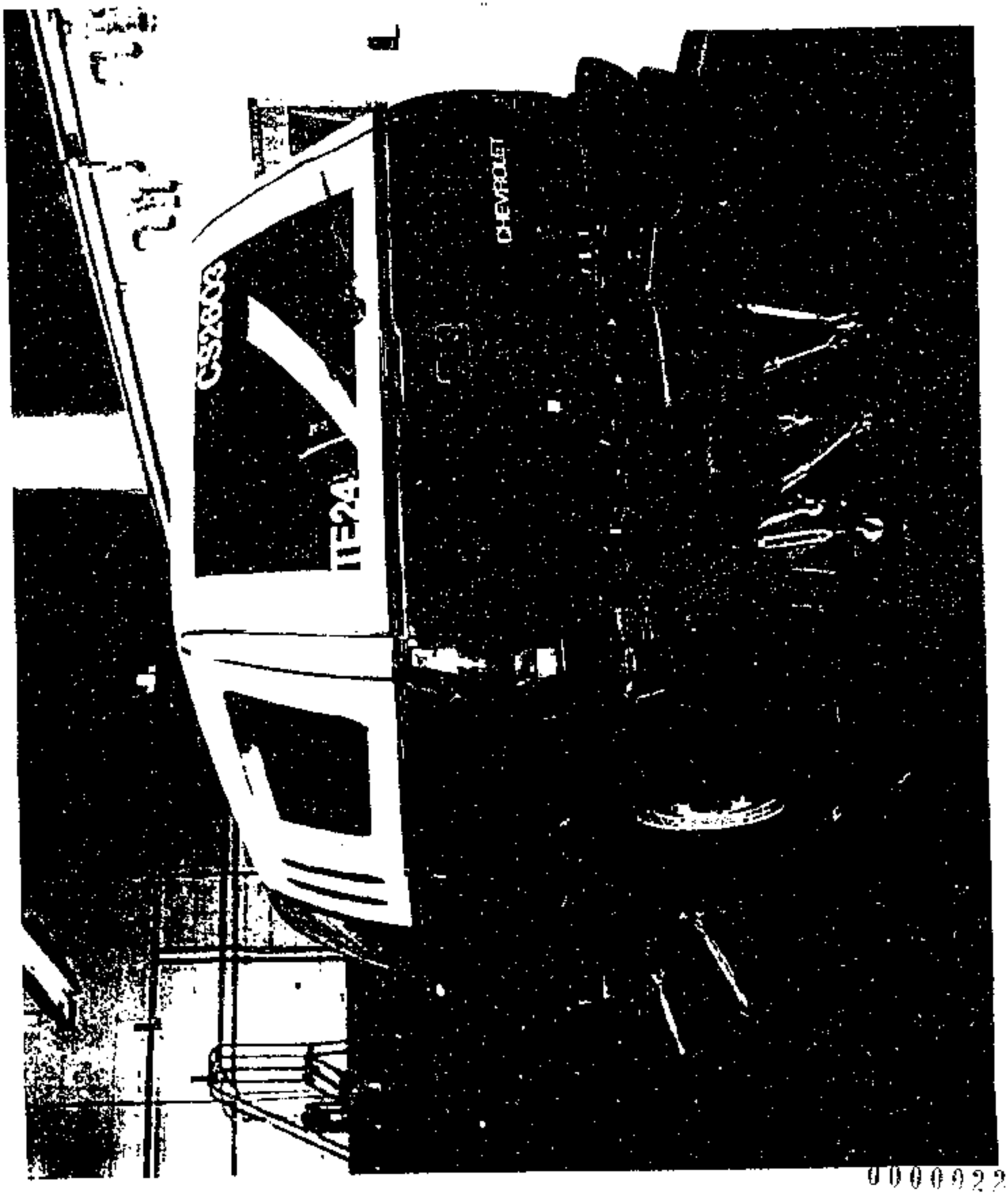
PHOTOGRAPH #90022-295 PAGE #8
TWO 1T2R48-100
#15643953 GMT 430 TRAILER HITCH


PHOTOGRAPH
PAGE 49

PHOTOGRAPH #90022-275 PAGE #10
TWO #12R4B-100
GMT 430 #CS2603



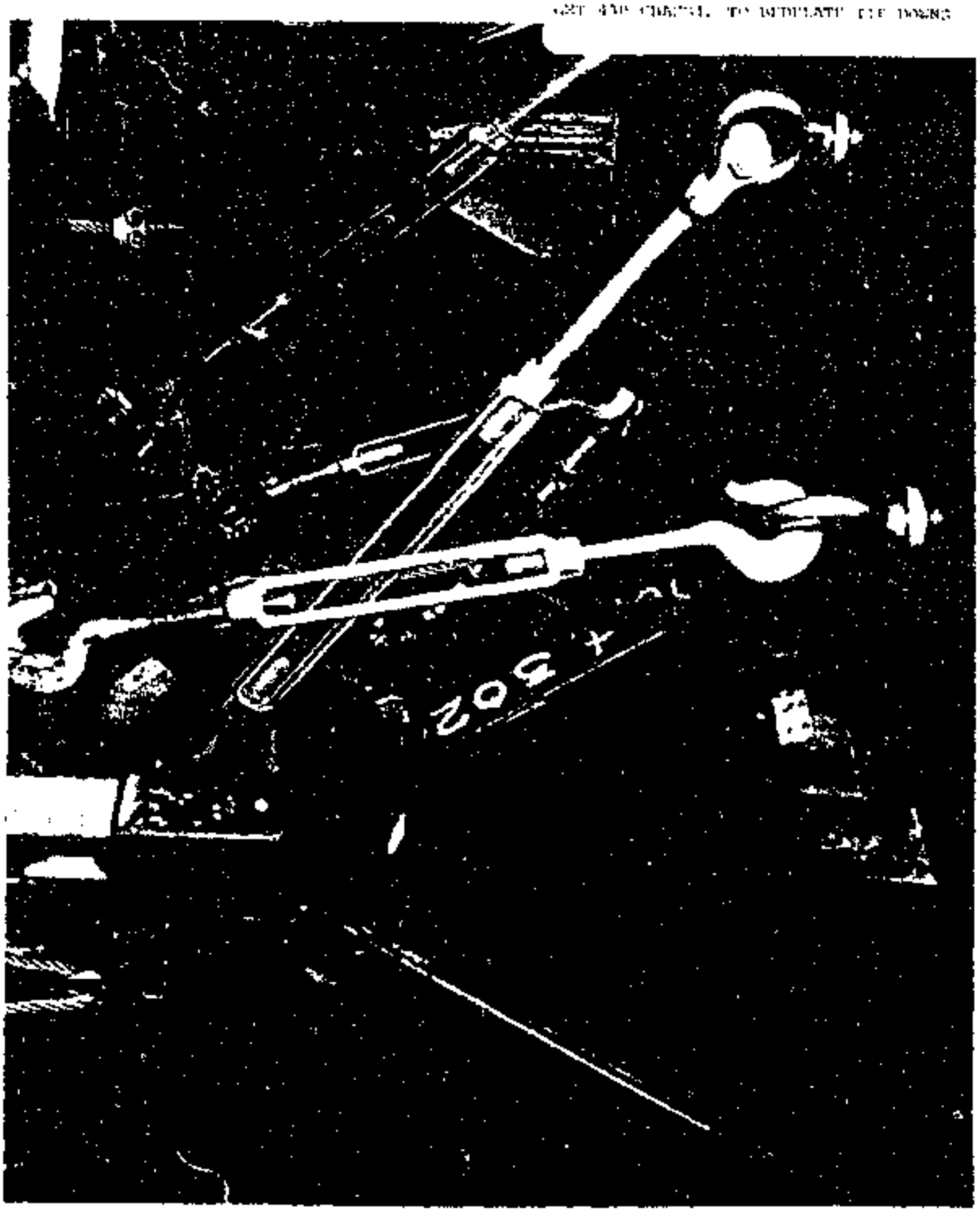
TWO 1/2x48-400
ONE 430 CHASSIS TO BEDPLATE TIE DOWNS

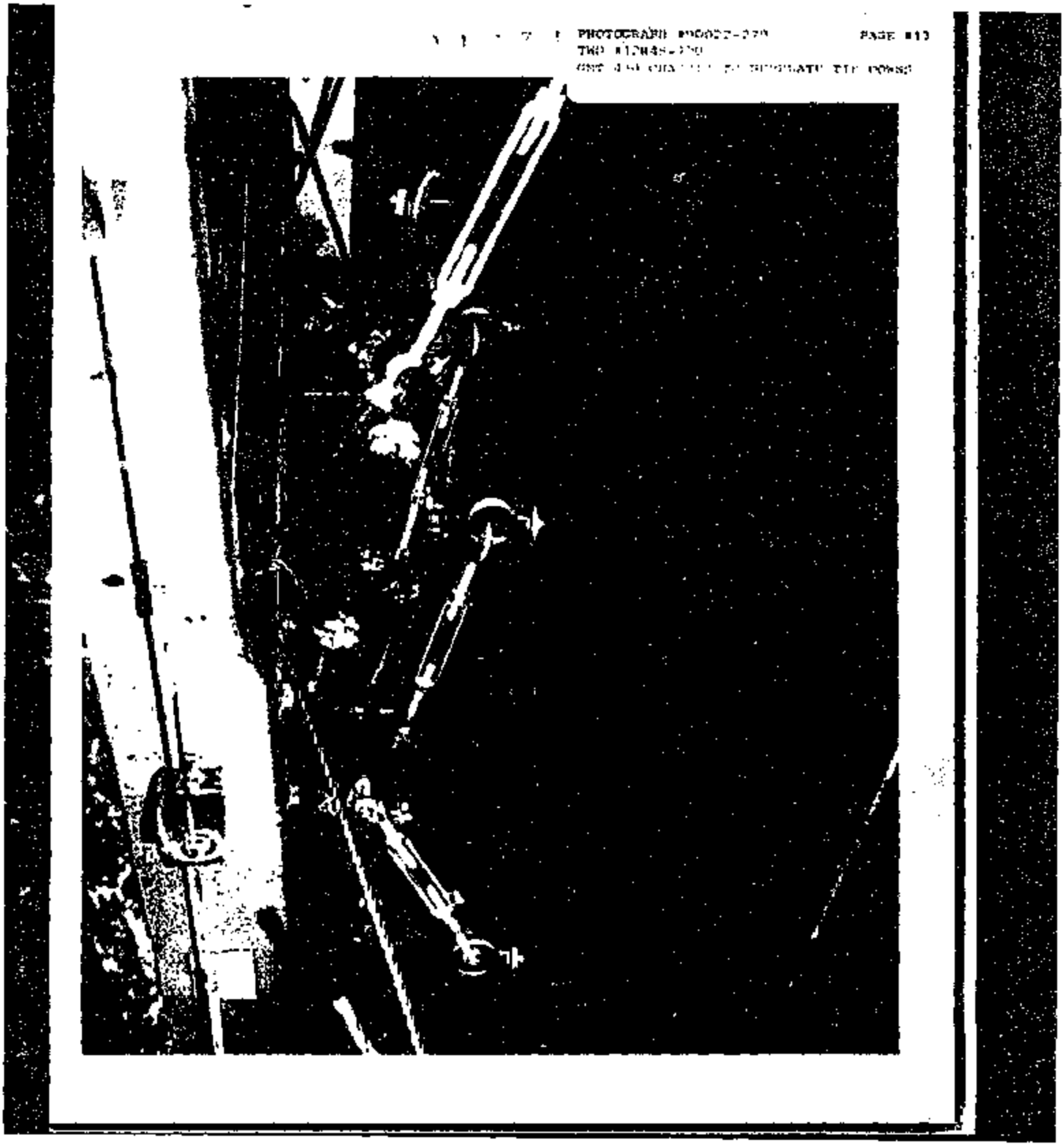


00000229

GM583 Att I 9080

PHOTOGRAPH #0022-207 PAGE #12

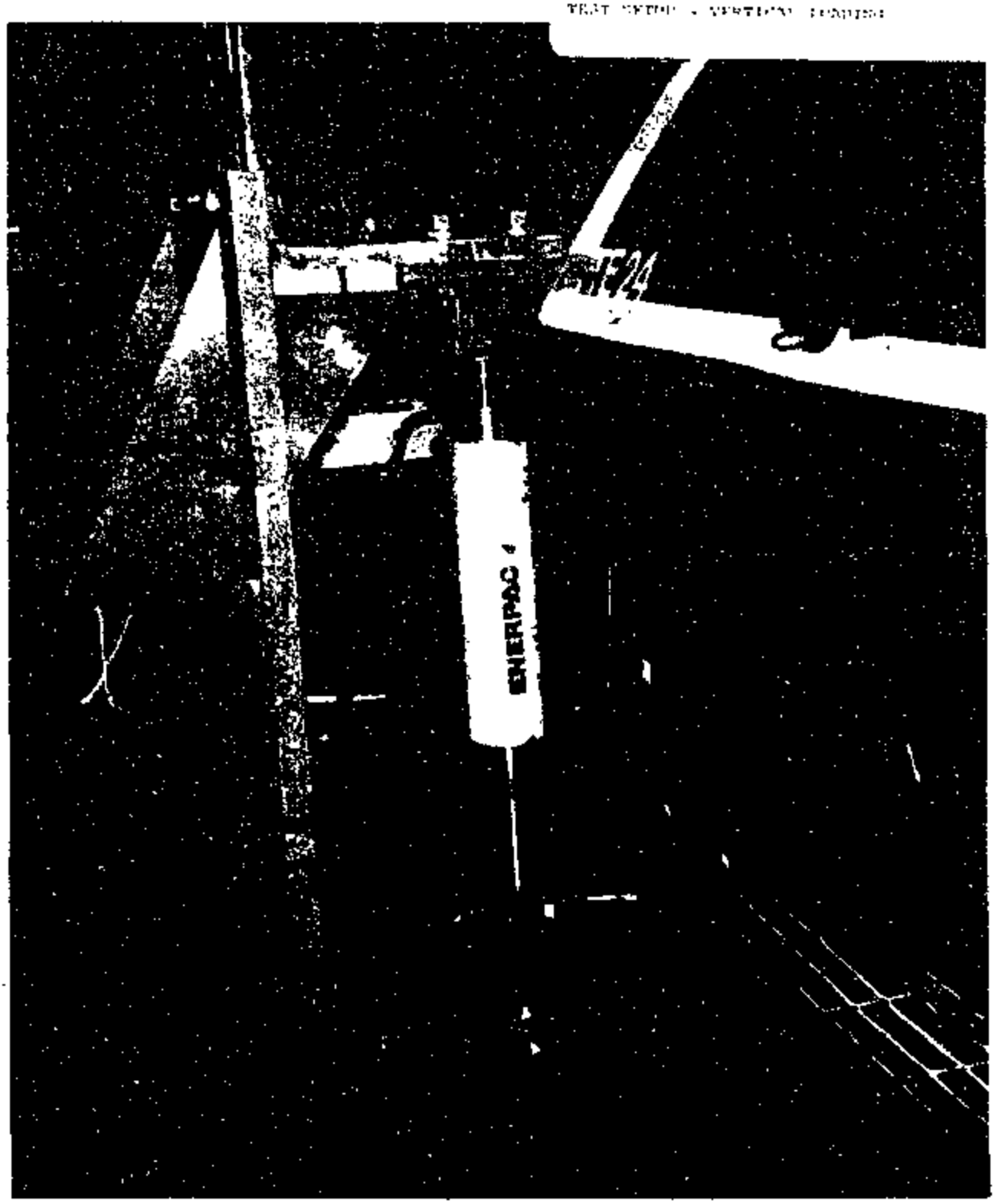




TSO 61748 [01]

Test Setup Longitudinal Loading

GM583 Att 1 9883



00000233

PHOTOGRAPH
TWO #1284R-109
TEST SETUP - MOMENT LOADING

0 0 1 9 7 1 1 1 0

D38685

LAB REPORT

DISTRIBUTION

REPORT NUMBER: 12R47-100

SUBJECT: GMT 410 TRAILER HITCH STRENGTH TESTS

C/K TRUCK

DISTRIBUTION		CIRCULATION	
D. W. Hunter	1902-105	D. L. Kline	3301-133
VSPLL	1901-201	W. E. Von Kampen	2501-115
J. C. Skelley	3301-115	A. D. Mummert	2501-119
R. B. Bradshaw	2501-150	N. V. Niemiec	0926-S
K. Vilamovski	0973-81	R. K. Leverenz	2201-104
R. L. Todd	1903-203	E. A. Revald	1901-205
M. O. Ellis	2203-17	J. H. Peters	3301-195
		S. L. Tanksley	3301-92
		H. B. Patterson	3301-92
		T. T. Vohra	3301-92

NOTE: MAIL ORIGINAL REPORT TO: Test Admin. Records
1901-205

[redacted]

FOR ANY CHANGES CONTACT: DRACE KARPOUSKY 8-396-7318
10160das

Rev. 31oct90

GM593 Att I 9000

0000225

Truck & Bus Group

Inter-Organization

PRODUCT EVALUATION & DEVELOPMENT
ENGINEERING EVALUATION REPORT

SUBJECT: GMT 410 TRAILER HITCH STRENGTH TESTS

TO: W. L. SHERRY 1902-105

FROM: C. A. ASKIN 3301-92

T.V.O. NO. 12R47-100 MODEL LINE GMT 410 BLAZER MODEL YR 1992

PROCDR/PMVSS: 0689 UPC 14 VEH. KU2015 ENGINE

DATE EVAL FROM 30JL90 TO 03AU90 DATE PUBLISHED 07 NO 90

FINAL REPORT (X) PROGRESS REPORT ( ) SUPPLEMENT NO. ( )

OBJECTIVE

Statically test the trailer hitch installation under vertical, forward, rearward, lateral and moment loading.

FORWORD

The GMT 430 Suburban equipped with rear frame reinforcements per ECA No. 59365 sustained a 15,000 lb. longitudinal compressive load applied to the trailer hitch (TVO No. 12R48-100). The GMT 410 Blazer and GMT 430 Suburban share the same trailer hitch assembly and relative frame designs. The GMT 410 frame assembly will be released with the Suburban type rear frame reinforcements per ECA Nos. 59849 and 59365.

CONCLUSIONS

The GMT 410 Blazer trailer hitch, vehicle frame, and related hardware sustained the desired loads per all applicable sections of the GM Truck & Bus Procedure No. 0689 (GMUTS L-14L-1).

The GMT 410 Blazer trailer hitch, vehicle frame, and related hardware was validated for the desired longitudinal compressive forward load by the testing performed on a GMT 430 Suburban equipped with ECA No. 59365 rear frame reinforcements (reference TVO No. 12R48-100).

L10:60dss

MATERIAL

Test Material
* 7,000 lb. rated trailer hitch platform #15643953.
* Trailer hitch installation per TL-31446.
* #15644101 frame assembly without rear frame reinforcements per ECA Nos. 59849 and 59365.
* GMT 410 prototype vehicle #KU2015, a K10516 model Blazer (photo on page 11).

Instrumentation
* IL3905 Lebow 20,000 lb. load cell.
* 20,000 lb. Enerpac hydraulic actuator.
* IL4541 Rayelco X-Y plotter.
* IL5994, 2877 Ectron amplifiers.

Test Fixtures
#0502 Fixture Design Bill of Material.

TEST PROCEDURE

All applicable sections of GM Truck & Bus Procedure No. 0689 (GMUTS L-14L-1) trailer hitch tests.

The trailer hitch was installed on GMT 410 #KU2015, a K10516 model utility Blazer. Loading was applied to the trailer hitch at a point 19.5 inches above level ground as measured on an empty vehicle full of fuel.

Refer to photos on pages 12 through 14 for the method used to secure the GMT 410 Blazer to the bedplate.

For test setup refer to photos on pages 15 through 17.

TEST RESULTS

The following are the results from the static load tests run per section 3.1.1 through 3.1.5 and weight distributing hitch moment test per section 3.2.1 through 3.2.4 of Procedure No. 0689:

TRAILER HITCH LOADING DESCRIPTION	DESIRED LOAD (LBS.)	LOAD (LBS.) SUSTAINED FOR 30 SECONDS
Longitudinal - Tension (rearward pull) Photo page 15, graph page 4	10,500	10,500
Longitudinal - Compression (forward push) Photo page 15, graph page 5	10,500	49,500

* Reference ETIR #TB-92K-14--0001TL
ETIR #TB-92K-14--0002TL

TEST RESULTS - (Continued)

TRAILER HITCH LOADING DESCRIPTION	DESIRED LOAD (LBS.)	LOAD (LBS.) SUSTAINED FOR 30 SECONDS
Transverse (lateral) - Right Graph page 6	3,500	3,500
Transverse (lateral) - Left Graph page 7	3,500	3,500
Upward Vertical - Tension Photo page 16, graph page 8	3,500	3,500
Downward Vertical - Compression Photo page 16, graph page 9	3,500	3,500
Moment Test Photo page 17, graph page 10	4,000	4,000

Charles A. Askin
Senior Project Engineer
Product Test and
Development Laboratories

Hugh B. Patterson
Supervisor
Product Test and
Development Laboratories

L19160dss

TRUCK & BUS GROUP	GM		ENGINEERING OPERATION PROCEDURE
SECTION TESTING FUNCTION	SUBJECT Design Validation Testing		TBE F-280

VALIDATION TEST ENGINEER AUDIT APPROVAL

GMUTS L-14L-1
#0689

TEST WORK ORDER 12R47-100 PROCEDURE NO. T&B ~~#0689~~

VEHICLE MODEL 1992 GMT 410 BLAZER K10516 VEHICLE NUMBER XG2015

TEST OBJECTIVE:

PERFORM TRAILER HITCH STRENGTH AND STATIC MOMENT TESTS PER GM T&B PROCEDURE #0689 (GMUTS #L-14L-1).

"The Test System described has been inspected and is found to be representative of the released Design for the purposes of this Validation Test."

TEST SYSTEM DESCRIPTION:

* 1992 GMT 410 BLAZER (UTILITY) WEIGHT DISTRIBUTION TRAILER HITCH ASSEMBLY. PLATFORM #15643953, 7,000 LB TRAILER RATING.

DESIGN ENGINEER R. J. KROUSE
W. L. SHERRY

SIGNATURE R J Krouse for WLS

DATE 3/5/98

Two #12R47-100 Page #4

TWO #12R47-100
01 AUG 90 Ph I Qual Test of Nozzle Dam / Coupling Assy
Lot # 15643 953 / 2009 lb Part 2

KU2015

Load (lbs)
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0

Displacement (in)
0
2
2

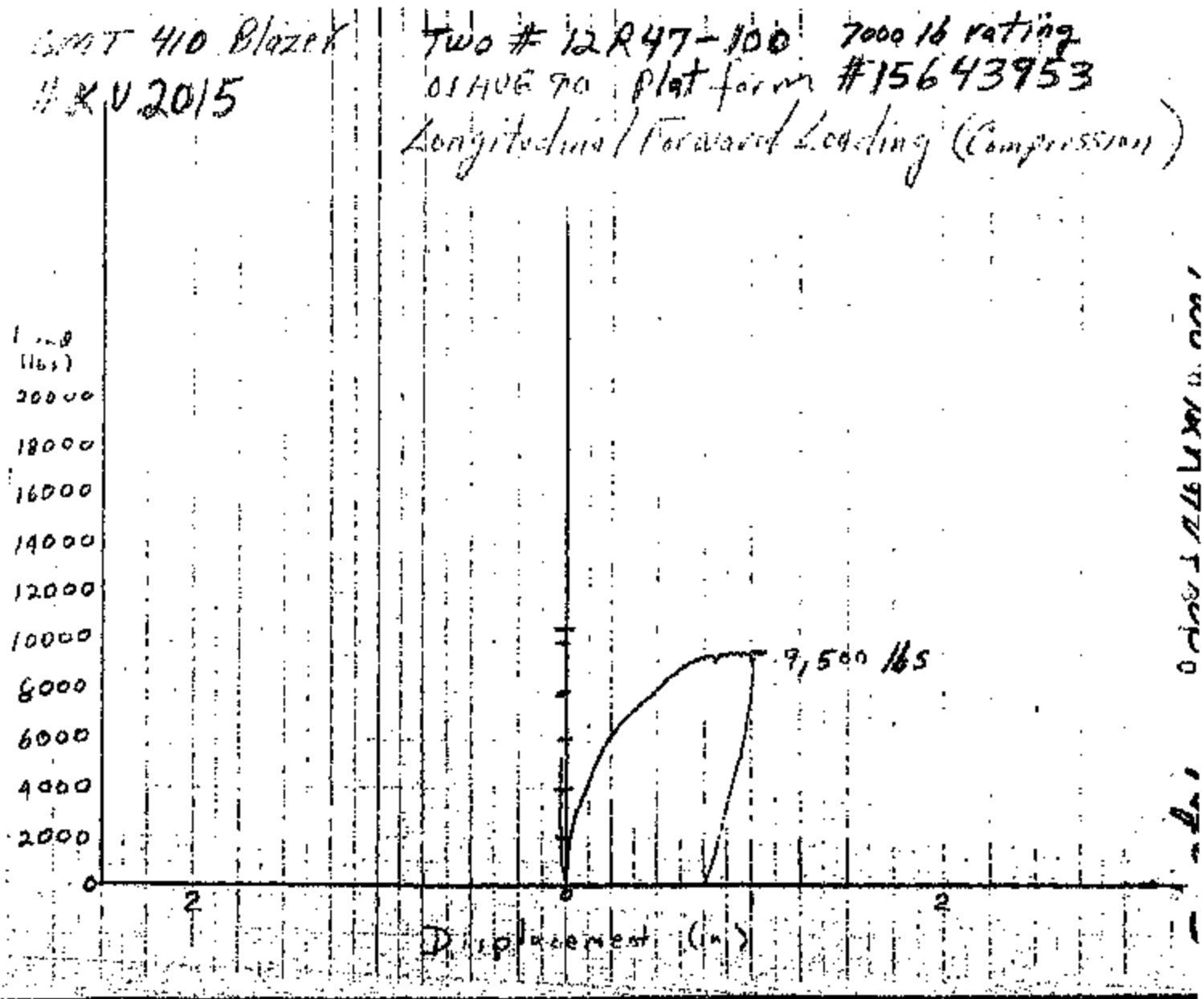
10,503 lbs

GM583 Att 1 9091

00000240

GMT 410 Blazer
KV 2015

Two # 12R47-100 7000 lb rating
01HUG70 Platform #15643953
Longitudinal / Forward Loading (Compression)



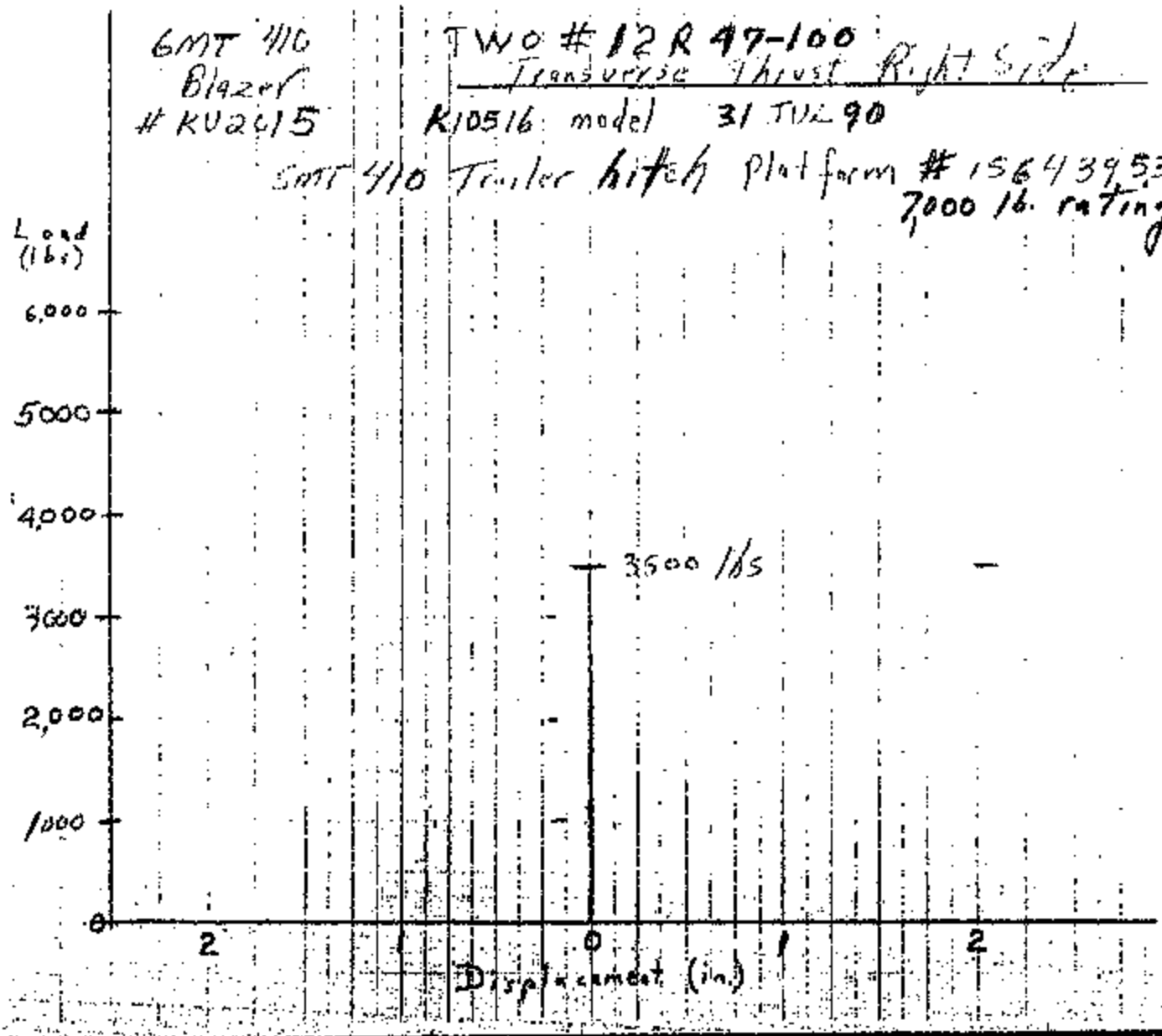
GM583 Att. I 9092

GMT 410
Blazer
KV2615

TWO #12R 97-100
Transverse Thrust Right Side

K10516 model 31 JUL 90

GMT 410 Trailer hitch plat form # 15643953
7,000 lb. rating



Page 6

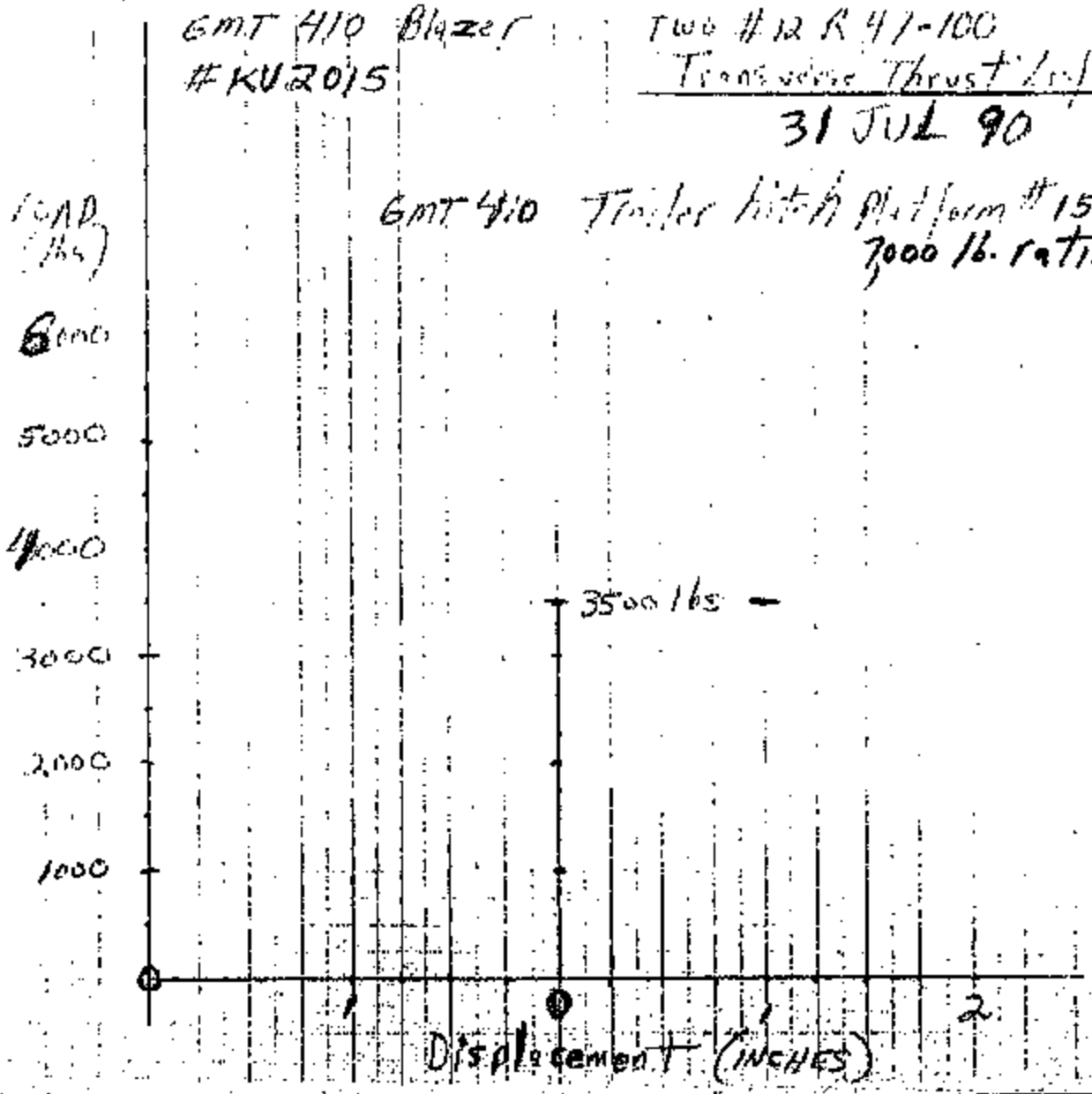
GM583 Att I 9093

00000242

GMT 410 Blazer
#KU2015

Two #12 R 47-100
Transverse Thrust Left Side
31 JUL 90

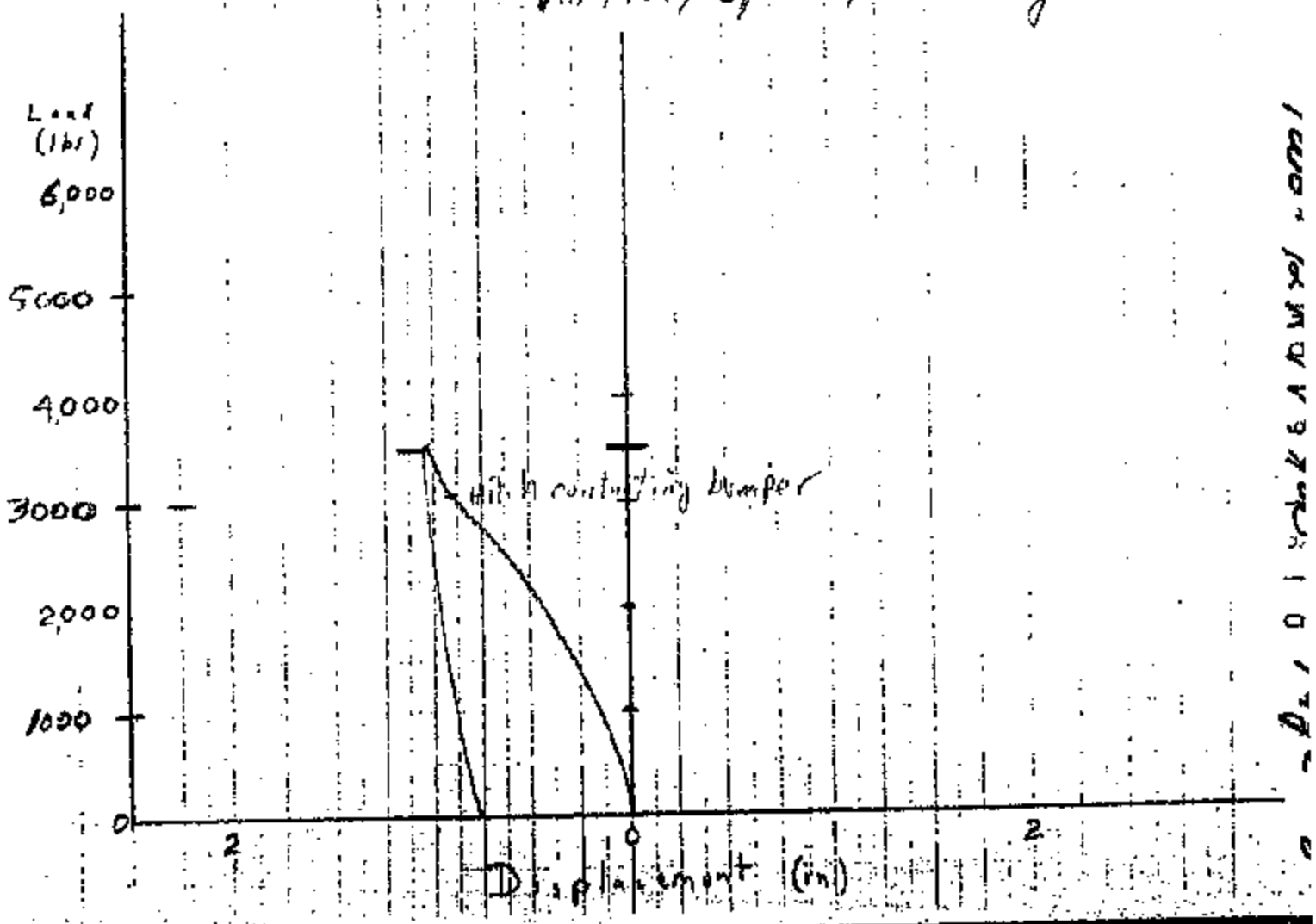
GMT 410 Trailer hitch Platform #15643953
7,000 lb. rating



Page 1 of 1

GMT 410 Blazer
#KU2015

TWO #12 R47-100
31 July 90 Platform #15643953/7000 lb rating
Vertical Upward Loading

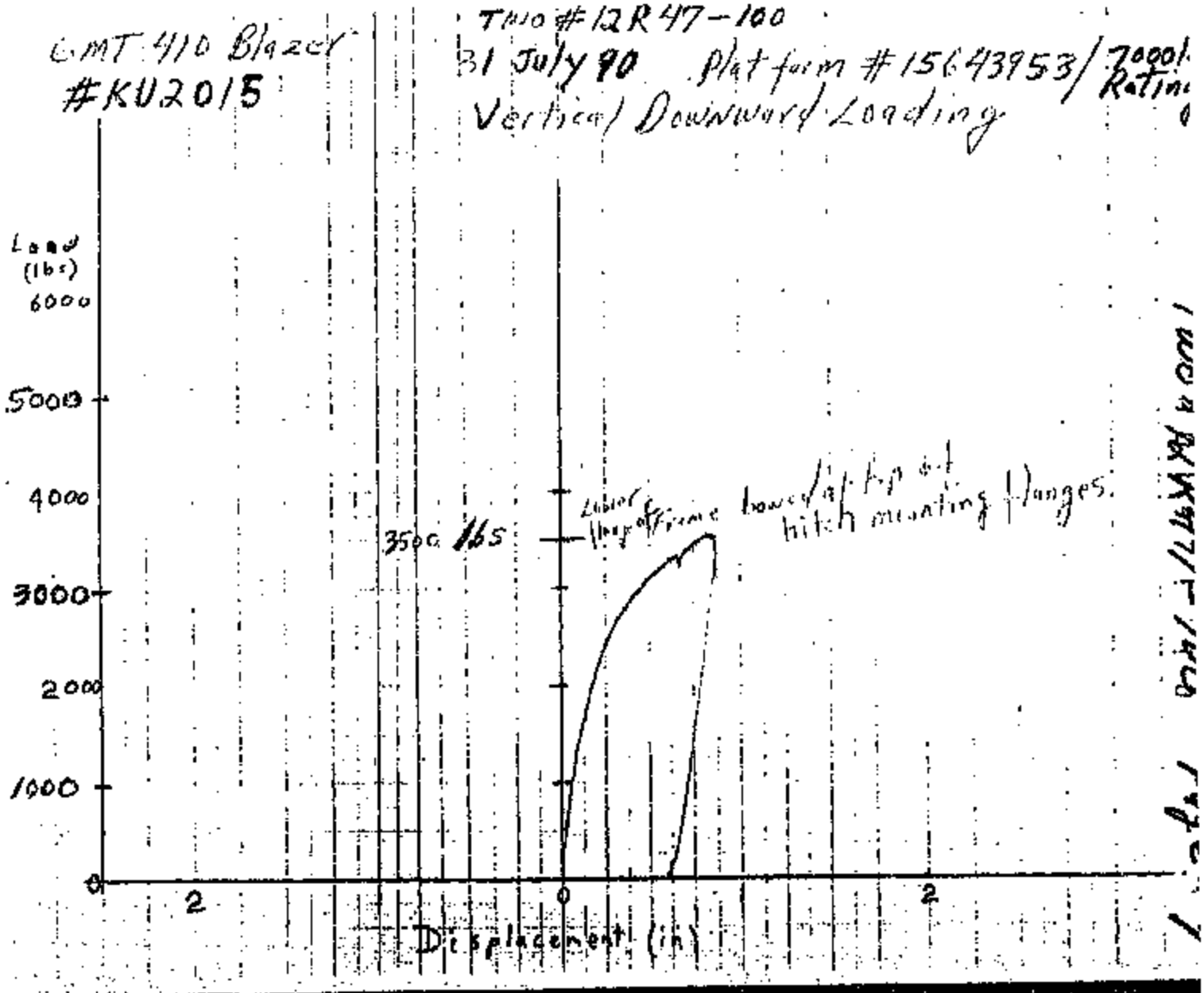


GM503 Att I 9895

00000244

GMT 410 Blazer
#KU2015

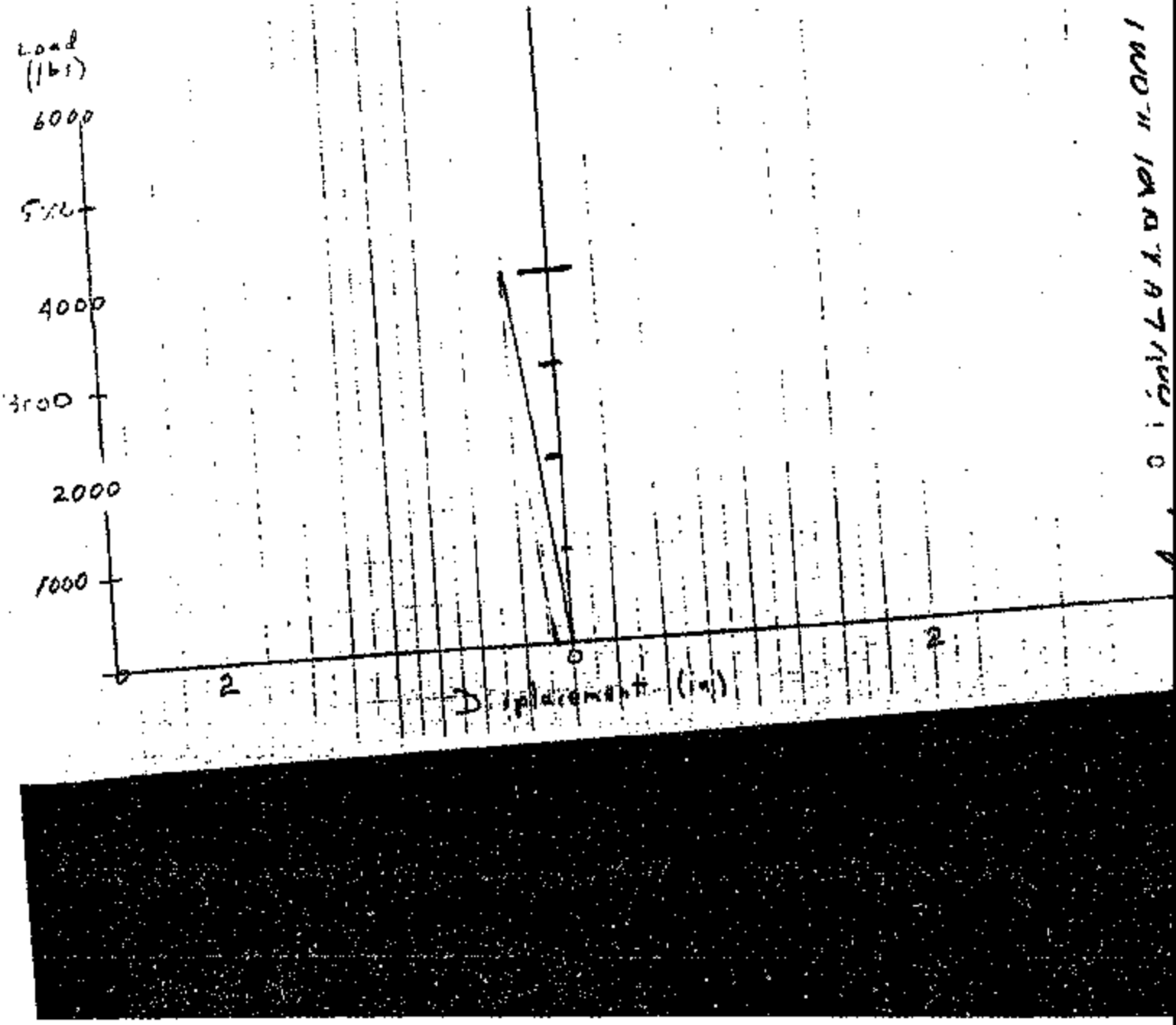
TMO #12R47-100
31 July 90 Platform #15643953/ Zoool Rating
Vertical Downward Loading



GM583 Att I 9096

GMT 410 Blazer
KV2015

Two #12R 47-100 7000 lb. rating
31 JULY 90 platform #1564395
Trailer hitch moment Test



Two #12R47-100 Page #4

TWO #12R47-100
01 AUG 90 Pull Form # 15643 953/7000 lb Ratio
Longitudinal / Warp / Loop Tensile Strength

Load (lbs)
20 000
18 000
16 000
14 000
12 000
10 000
8000
6000
4000
2000
0

2 2

Displacement (in)

0 2

10,500 lbs

KV1015

Two #12R447-100G

Page #5

GMT 4/0 Blazer

Two #12R447-100

7000 lb rating

#1564395 3

#KV2015

Load (lbs)

20000
18000
16000
14000
12000
10000
8000
6000
4000
2000

0 2 2

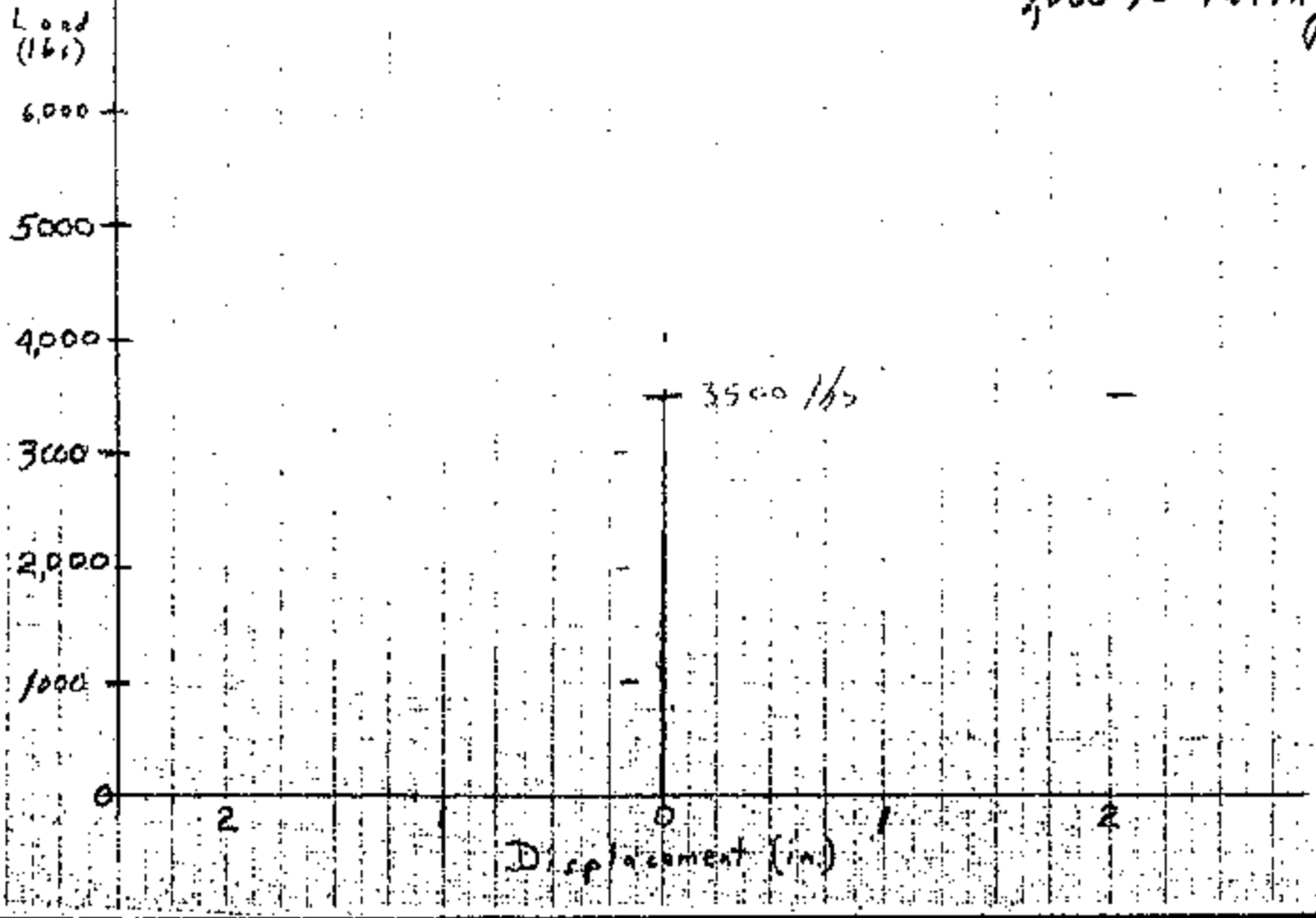
9,500 lbs

GMT 410
Blazer
KU0015

TWO #12R47-100
Transverse Thrust Right Side

K10516 model 31 TUL 90

GMT 410 Trailer hitch Platform # 15643953
7,000 lb. rating

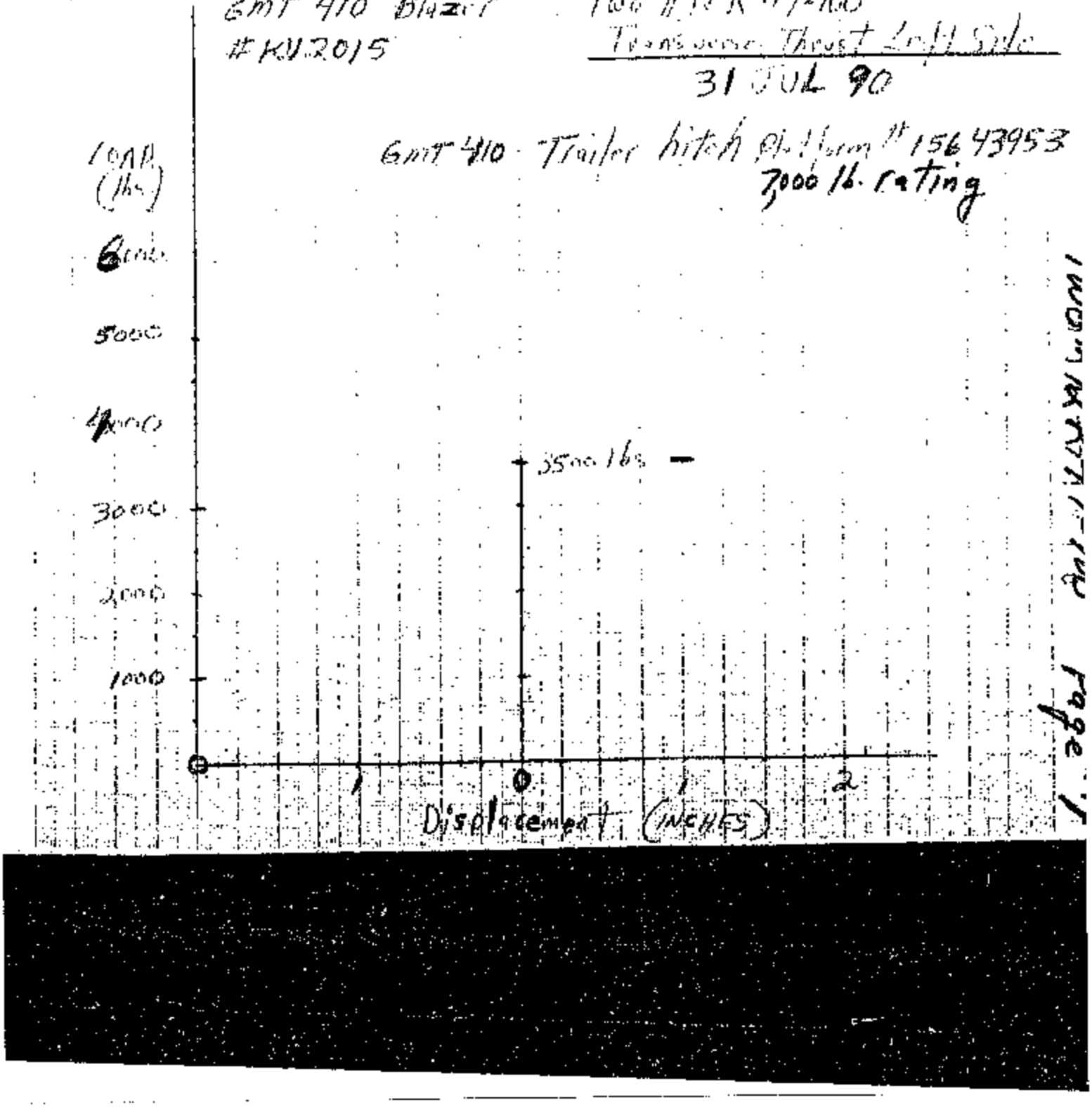


Page 6

GMT 410 Blazer
#KU2015

Two #10 R 17-100
Transverse Thrust Left Side
31 JUL 90

GMT 410 Trailer hitch Part Num # 15643953
7000 lb. rating

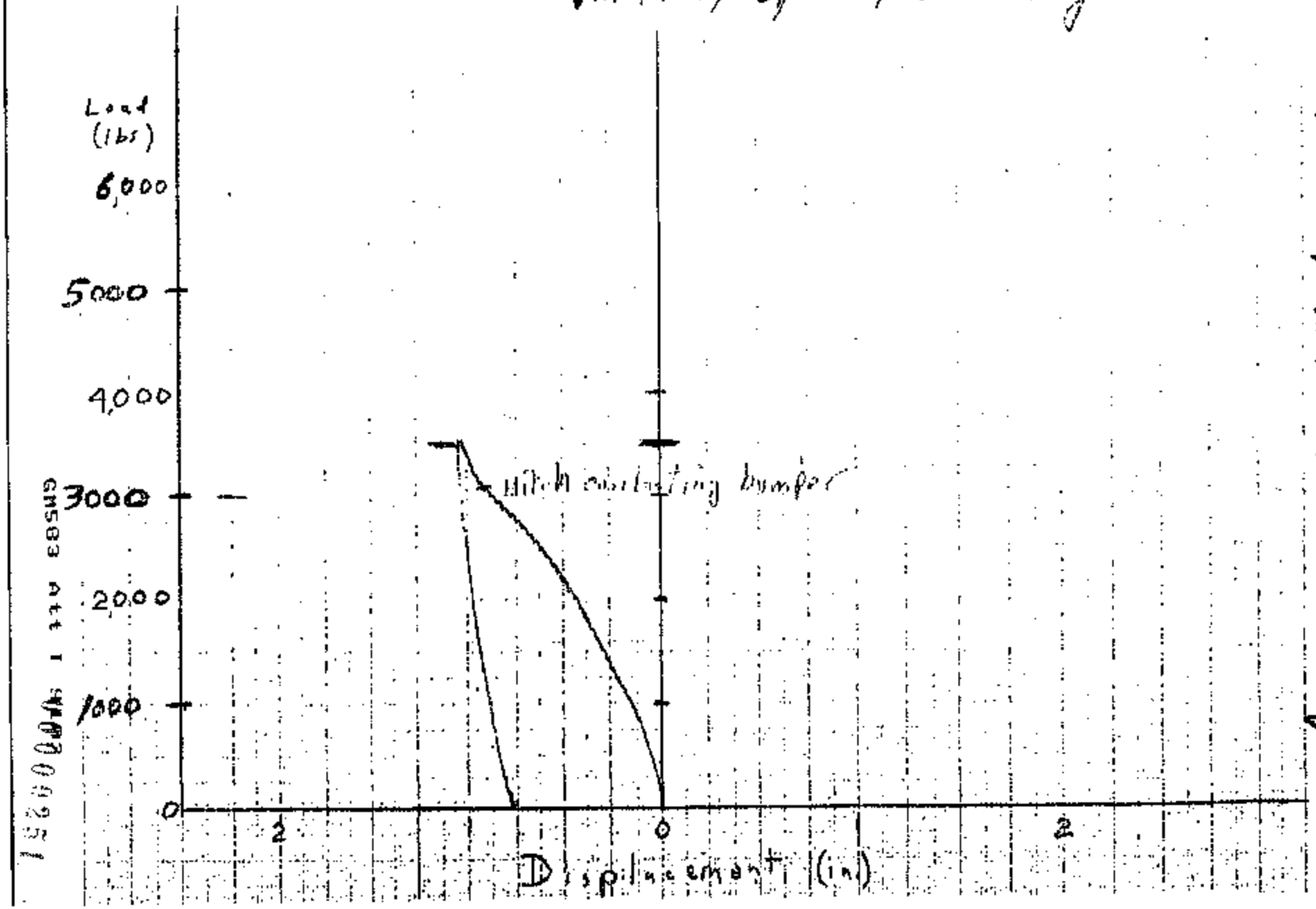


Page 1 of 1

GM583 Att I 9101

GMT 410 Blazer
#KV2015

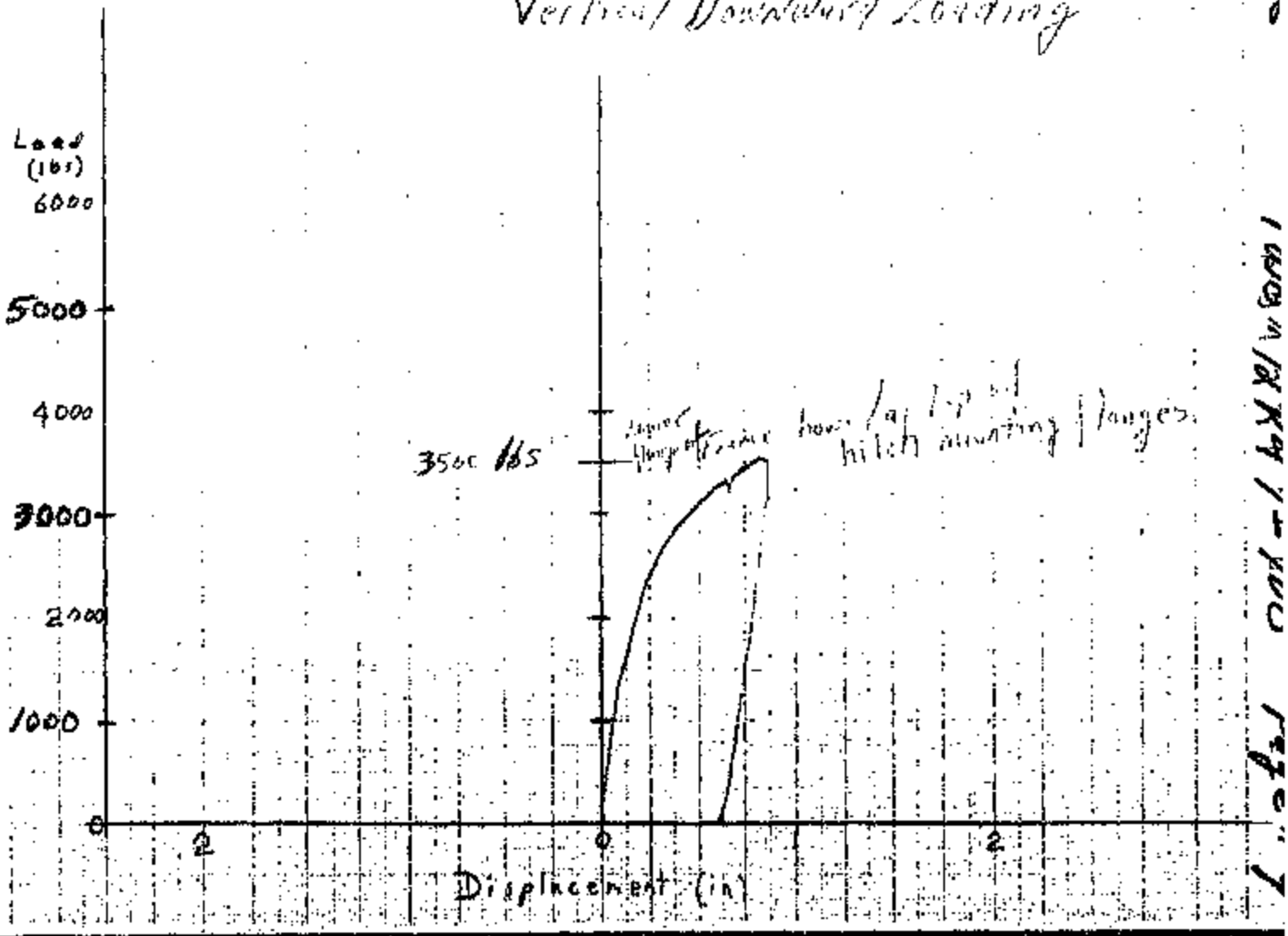
TWO #12R47-100
31 July 90 plat form #15643953/7000 lb rating
Vertical / Upward Loading



Two #12R47-100 Page #8

GMT 410 Blazer
#KU2015

Two #12R47-100
31 July 90 Platform #15643953/ 7000lb Rating
Vertical Downward Loading



GM583 Att I 9103

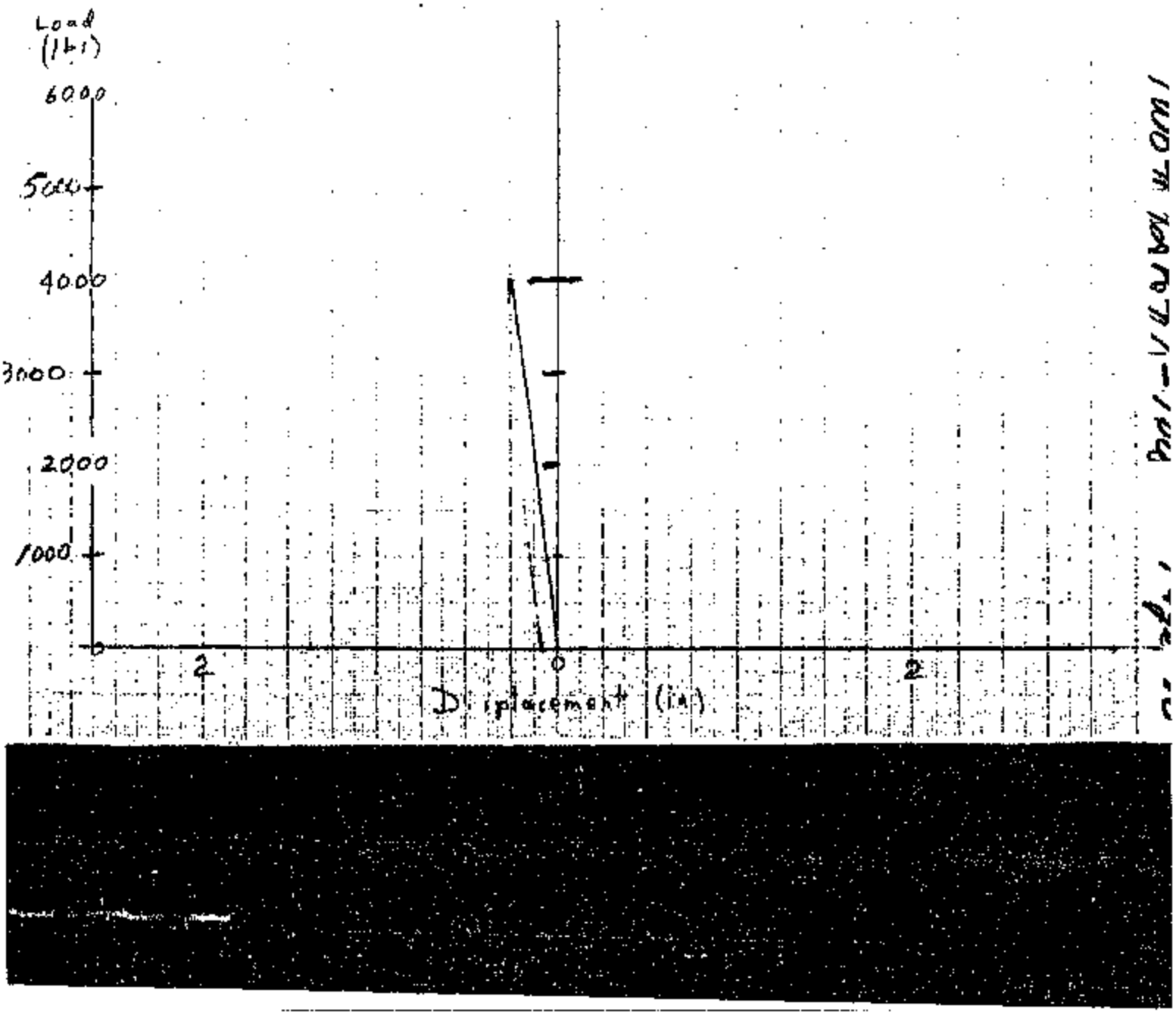
00000252

GMT 410 Blazer
KV2015

static Moment

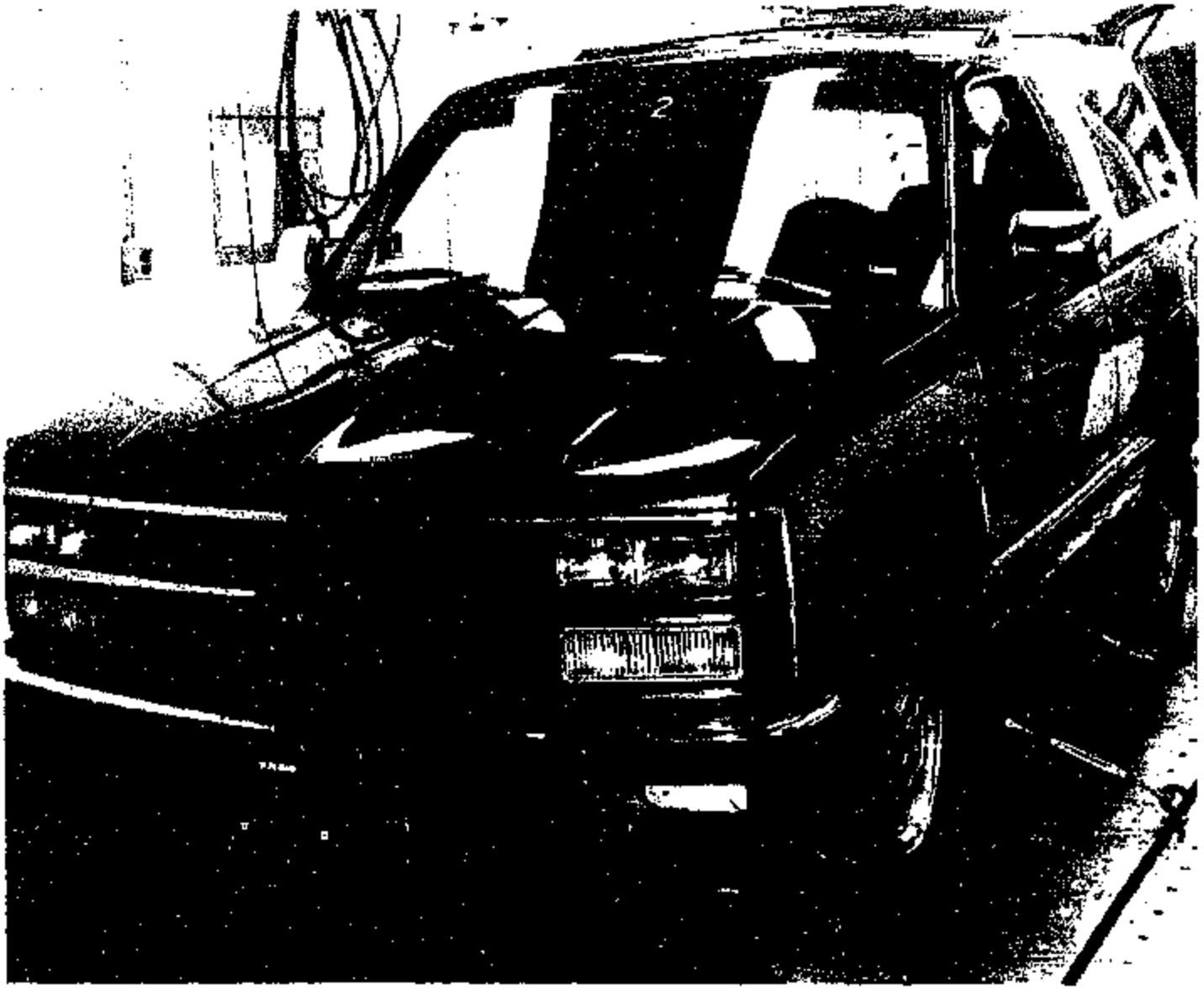
Two #12K47-100 7,000 lb. rating
31 Tuxy 20 Ply-rim #15(4375)

Trailer Hitch moment Test



CM583 Att 1 9184

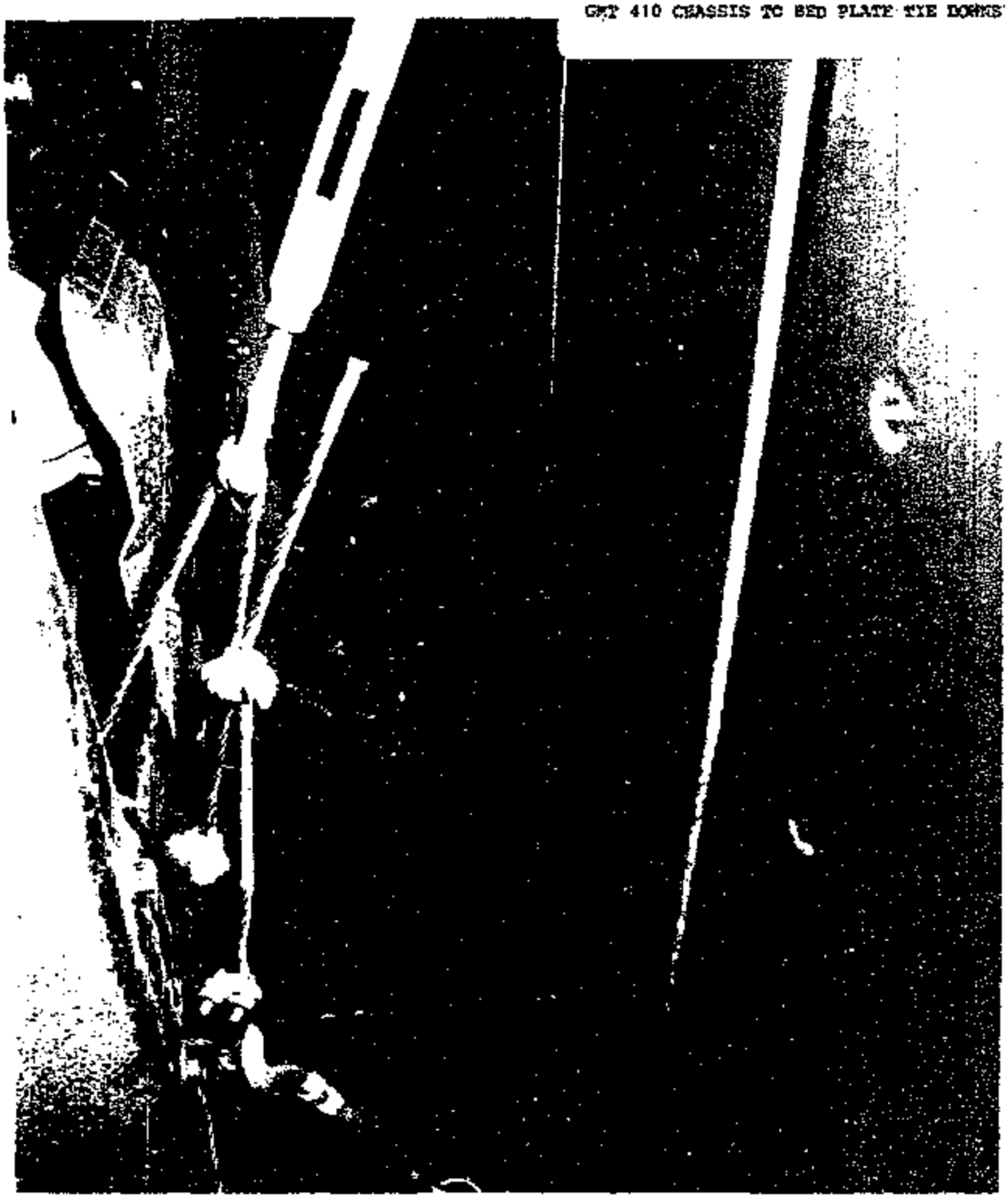
[redacted]



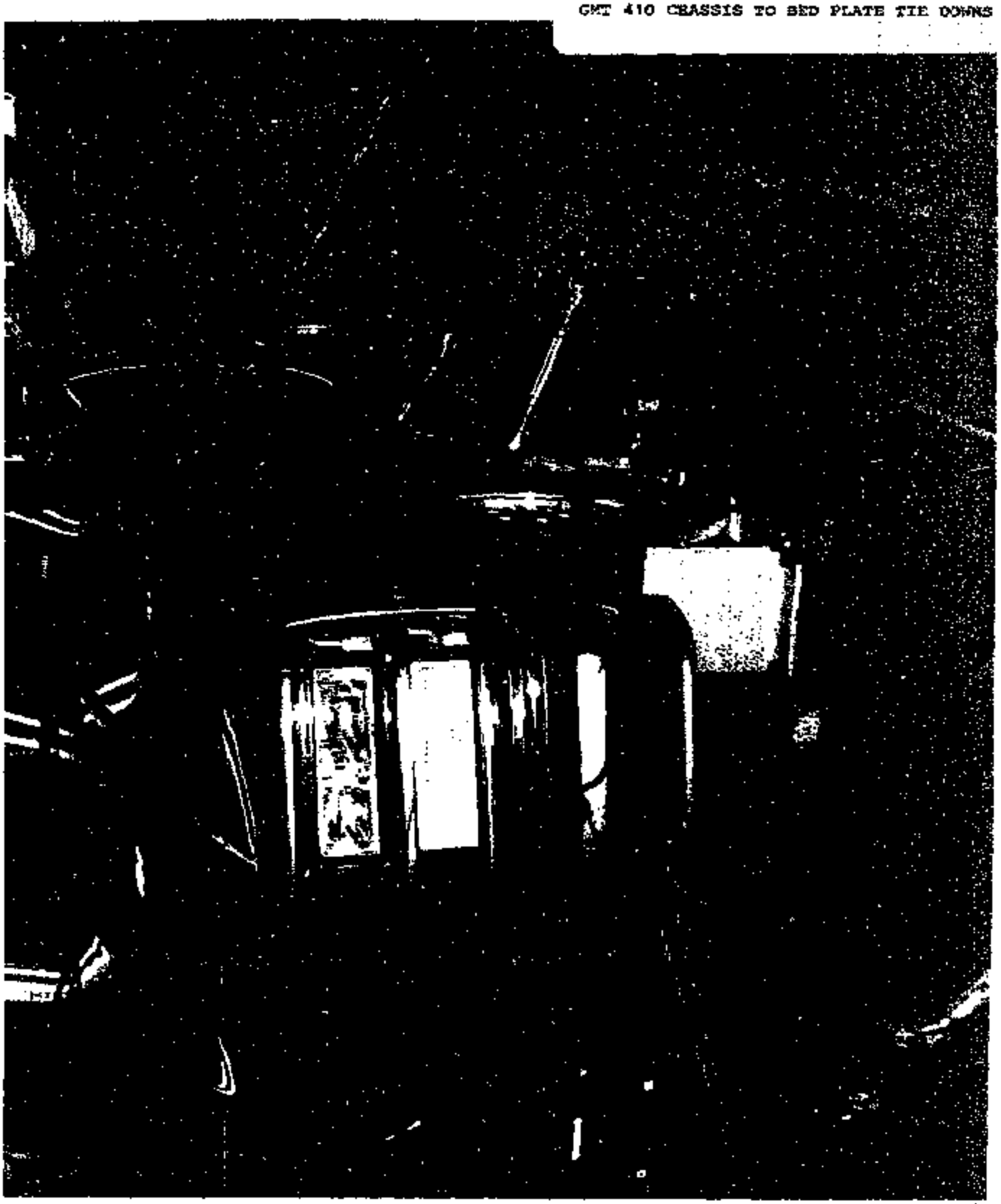
TNO 812R43-100
GMI 410 PROTOTYPE #XD2015

[redacted]

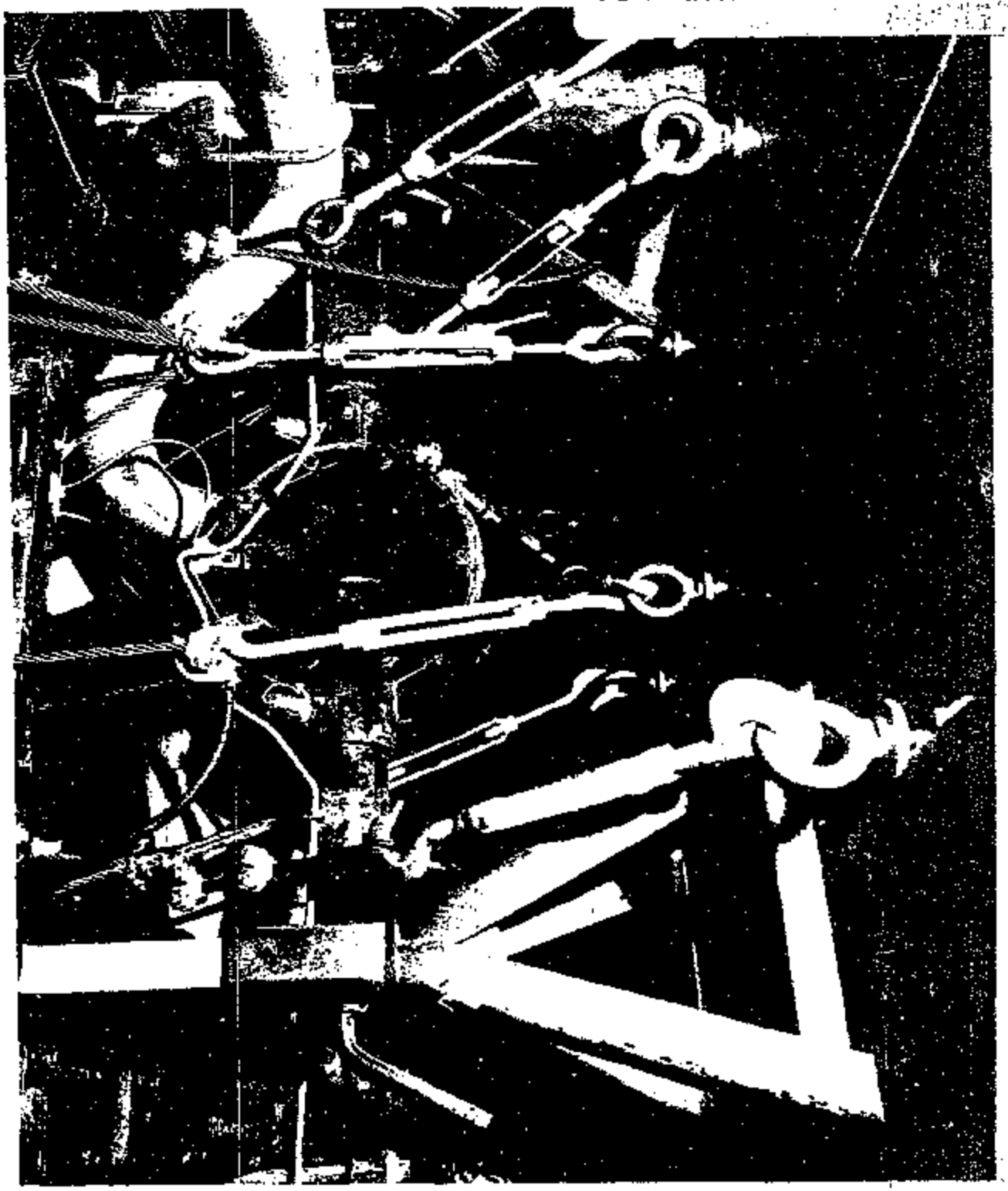
PHOTOGRAPH #90021-774 PAGE #12
TWO #12R47-100
GMT 410 CHASSIS TO BED PLATE TIE DOWNS



PHOTOGRAPH #90021-776 PAGE #13
TMO #12R47-100
GMT 410 CHASSIS TO BED PLATE TIE DOWNS

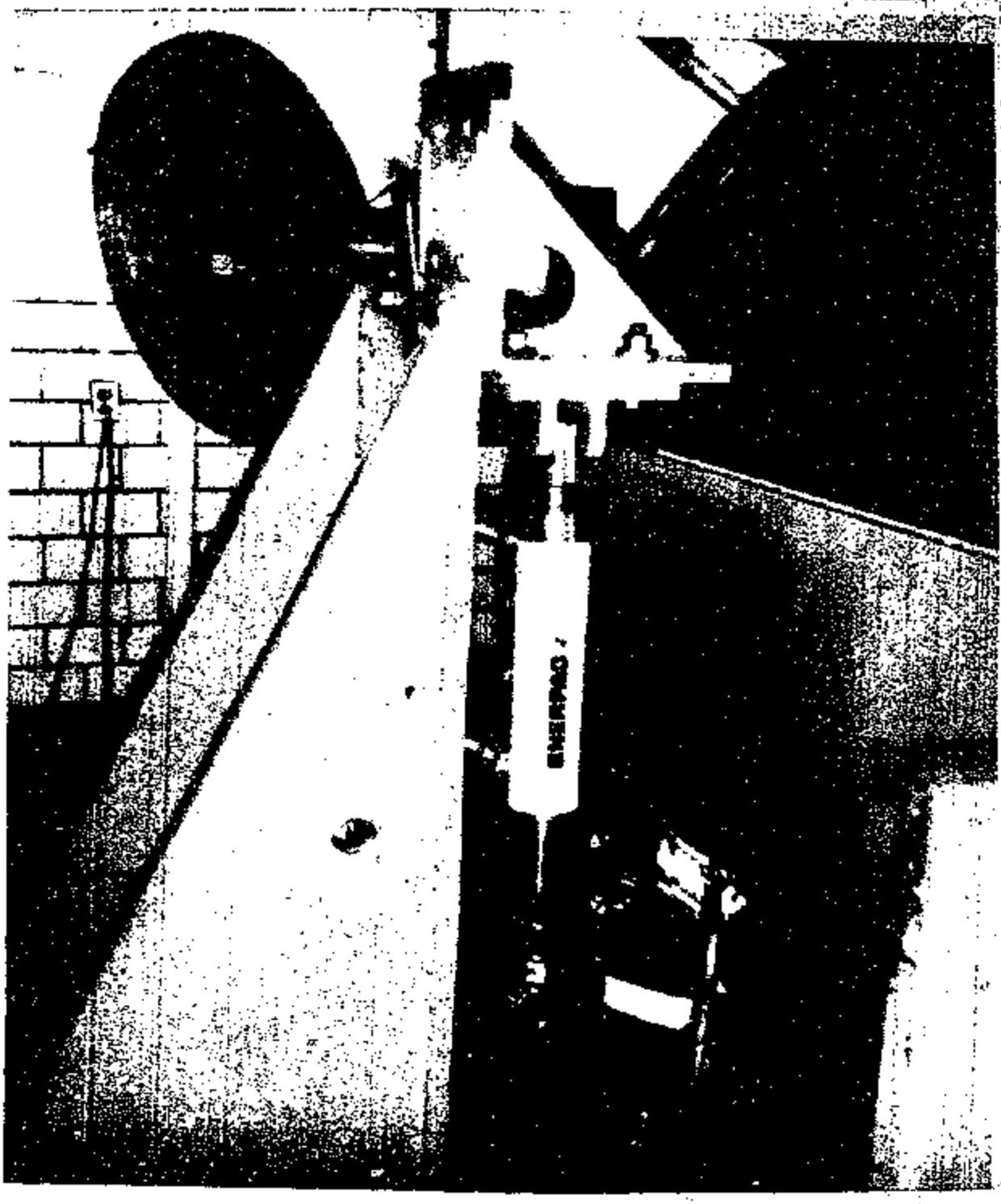


PHOTOGRAPH #30021-777 PAGE 814
TWO #12R47-100
GMI 410 CHASSIS TO BED PLATE TIE RODS

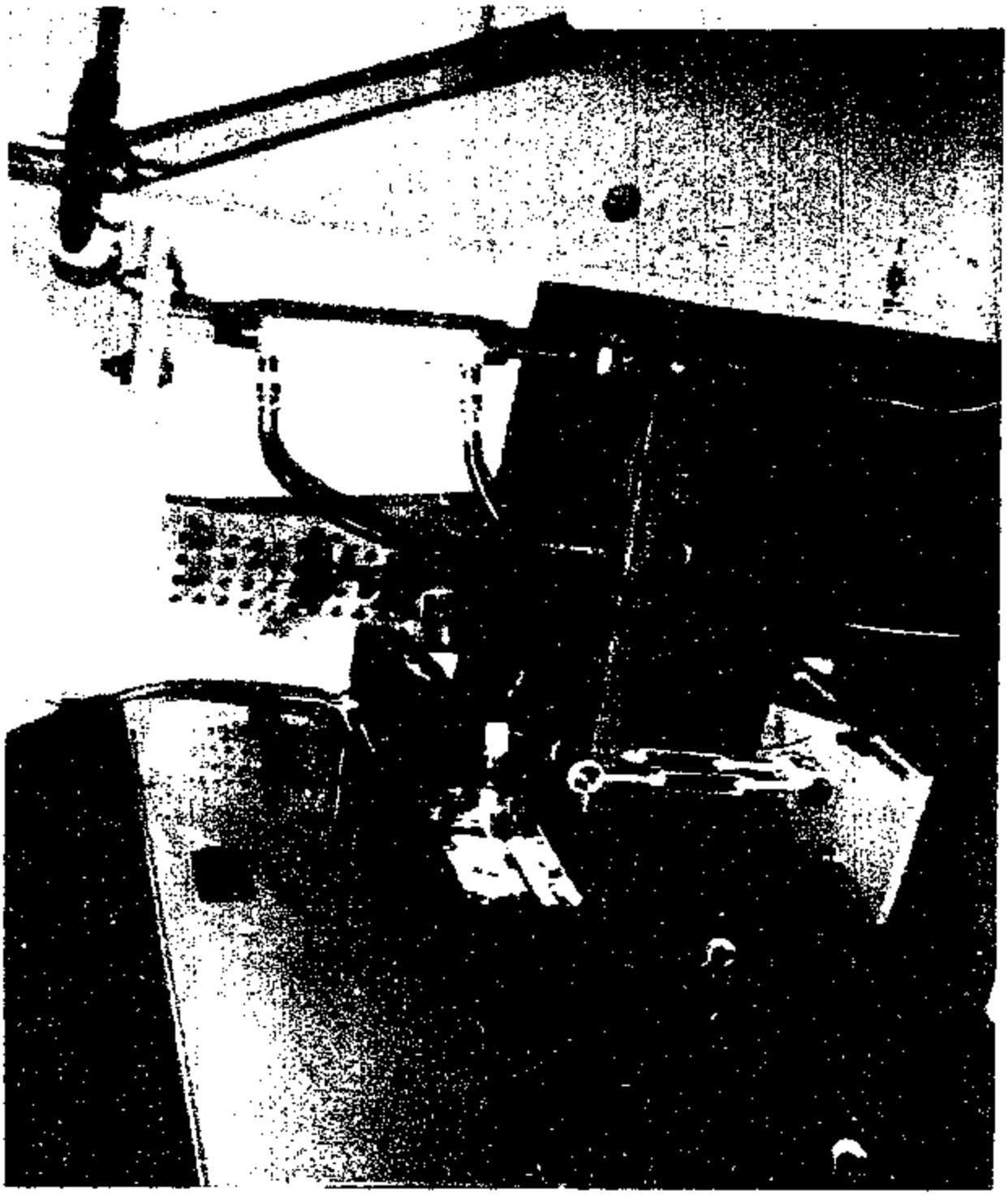


PHOTOGRAPH #90021-769 PAGE #29
TRO #12847-100
TEST SETUP - LONGITUDINAL LOADING

PHOTOGRAPH
TWO 812847-100
TEST SETUP - VERTICAL LANDING



PHOTOGRAPH
TWO #12R47-100
TEST SETUP - MOMENT LOADING



ENGINEERING REPORT

DISTRIBUTION

T.W.O. NO.: 16501-43B **SEQUENCE NO.:** 005

SUBJECT: END OF TEST REPORT FOR R-15-31 TRAILER TOW TEST ON VEHICLE KS4608

DISTRIBUTION		CIRCULATION	
CENTRAL RECORDS	1901-201	N. V. NIEMIEC	483-326-106
PCLL	1901-201	D. L. KLINE	3301-121
PRODUCT VALIDATION	1901-203	K.H. SCHMITZ	8028
R. J. KROUSE	1902-123	TEST RESOURCES	483-326-106
B. A. KURTH	8028		
D. W. WACHTEL	1902-123		
B. SARESH	1901-200		

NOTE: MAIL ORIGINAL REPORT TO: Central Test Records
Krystal A. Curl, 1901-201

GM North American Truck Platforms

ENGINEERING OPERATIONS
DESERT PROVING GROUND
ENGINEERING REPORT

SUBJECT: R-15-31 DURABILITY TEST ON KS4608

TO: ROBERT KROUSE

FROM: BRIAN KURTH

T.W.O. NO.: 16501-43B SEQ. NO.: 005 MODEL LINE: K MODEL YEAR: 94

PROCDR/FMVSS: 9968 UPC: 14L VEH. NO.: KS4608 ENGINE: L65

DATE EVAL FROM: 16MAY95 TO: 26MAY95 DATE PUBLISHED: 31MAY95

FINAL REPORT (X) PROGRESS REPORT ( ) REISSUE ( ) DATE:

REASON FOR REISSUE:

OBJECTIVE

The objective of the evaluation was to subject the 1994 vehicle to a complete R-15-31 (6875 test miles) durability test schedule to validate proposed fastener changes. There were no memo supplements issued.

RESULTS

The vehicle completed the R-15-31 durability schedule without a loss of function of the trailer hitch fasteners. No Test Incident Reports were written against the parts under test.

MATERIAL

Model:	K20906
Description:	3/4 ton Suburban
Engine:	L65 6.5L Turbo Diesel Federal
Transmission:	MT1 Automatic
Axle Ratio:	GU6 Rear 3.42 ratio
GVW Rating:	C6P 8600 lbs.
Tires:	LT245/75R16
Trailering:	Z82 Trailering package
Interior Color:	24 Blue Cloth
Exterior Color:	22 Blue/96 Silver
Trim Level:	YE9 Silverado

Additional RPO's

AJ1, AK9, AS3, AT5, AU3, AU6, A31, A52, A82, B3J, B37, B85, C25, C49, C60, D45, E55, G80, JD7, KC4, K34, K60, NA5, NK3, NY1, NZZ, N33, N67, TR9, UX1, UY7, U01, U16, U88, VR4, V02, V22, V27, V73, ZP6, ZQ2, ZQ3, Z88.

PROCEDURE

Per Engineering direction, hot wax was applied to the frame at the hitch contact areas to simulate a new frame. Two plate assemblies, two bolts, six washers, and six nuts were installed to secure the trailer hitch. The nuts were torqued to 80 Nm and torque indexed. The torque index markings of the six nuts were monitored for the duration of the test.

The vehicle's ballast schedule was to pull a 10,000 lb trailer with a 1,000 lb tongue weight. No ballast was added to the vehicle for the duration of the test. Refer to Appendix I for the GMT 583 forms issued.

The durability evaluation was conducted to the R-15-31 test schedule.

Brian A. Kurth 31 MAY 95
Brian A. Kurth Date
Test Engineer
Desert Proving Ground
Phone 8-674-5912

6-6-95
Karl H. Schmitz Date
Supervisor
Desert Proving Ground
Phone 8-674-5195

APPENDIX I

VALIDATION TEST AND VEHICLE REVIEW

TEST WORK ORDER: 16501-43B P.A. NO.:

TEST OBJECTIVE: Perform an R-15-31 Trailer Tow Test using vehicle KS4608.

The vehicle model number is K20906 and is equipped with the Z82 trailering package.

TEST PROCEDURE FMVSS NO.: R-15-31 OTHER:

SPECIAL CONDITIONS OF TEST AND EXPLANATION: The frame will be cleaned and hot waxed at the hitch mount location to simulate a new frame. The hitch mounting fasteners will be torqued to 80 Nm and torque indexed. The fasteners will be monitored during the test for a loss of torque condition.

MATERIAL UNDER TEST:

Hitch	15643953	Bolt	10114662
Stud Plate	15650133	Washer	15650984
		Nut	11516073

The undersigned agree that the test set-up, and when applicable, the test vehicle, data acquisition vehicle, test buck, and test material have been inspected and found to be representative of the released design and are appropriate for use in the test described above.

Brian Kurth	Brian A. Kurth	11MAY95		
Test Engineer	Signature	Date		
Robert Krause	R Krause	12MAY95	14L	Hitch Fasteners
Design Responsible Engineer	Signature	Date	UPC	Content Description
	/	/		
Design Responsible Engineer	Signature	Date	UPC	Content Description
	/	/		
Design Responsible Engineer	Signature	Date	UPC	Content Description
	/	/		
Design Responsible Engineer	Signature	Date	UPC	Content Description

NOTE: If additional space is required, please attach a second sheet.

TBE 583 Rev 4/94

VALIDATION TEST AND VEHICLE REVIEW

TEST WORK ORDER: 16501-43B P.A. NO.:

TEST OBJECTIVE: Perform an R-15-31 Trailer Tow Test using vehicle KS4005.

The vehicle model number is K20905 and is equipped with the Z82 trailering package.

TEST PROCEDURE FMVSS NO.: R-15-31 OTHER:

SPECIAL CONDITIONS OF TEST AND EXPLANATION: No ballast will be placed in the vehicle. An Airstream trailer will be ballasted to 10,000 lbs with a tongue weight of 1,000 lbs.

No ballast changes will done during the test.

MATERIAL UNDER TEST: Trailer hitch mounting fasteners.

The undersigned agree that the test set-up, and when applicable, the test vehicle, data acquisition vehicle, test buck, and test material have been inspected and found to be representative of the released design and are appropriate for use in the test described above.

Brian Kurth	/ Brian A. Kurth /	11MAY95		
Test Engineer	Signature	Date		
Robert Krause	/ [signature] /	12MAY95	14L	Hitch Fasteners
Design Responsible Engineer	Signature	Date	UPC	Content Description
	/	/		
Design Responsible Engineer	Signature	Date	UPC	Content Description
	/	/		
Design Responsible Engineer	Signature	Date	UPC	Content Description
	/	/		
Design Responsible Engineer	Signature	Date	UPC	Content Description

NOTE: If additional space is required, please attach a second sheet.

GM583 Att 1 9119

** TOTAL PAGE.03 **

ATTACHMENT "J"

00000269

General Motors Corporation

DP00-001; GM583

Attachment J

GENERAL MOTORS CORPORATION
TEST INCIDENT REPORT

INCIDENT

REPORT NUMBER	TB-92C-02--0001TL
ISSUE DATE	06JUL90
RESPONSE REQUIRED	YES
VEHICLE NUMBER	TB CS2603
INCIDENT DATE	03JUL90
DIV REF NUMBER	
TEST WORK ORDER	12R48-100

TO (DIVISION)	ADDRESSEE
GM – TRUCK ENGINEERING	D. F. JEWSBURY

FROM (DIVISION)	INITIATOR	MATERIAL DISPOSITION
GM – TRUCK ENGINEERING	C. A. ASKIN 8+396-7293 03JUL90	PART KEPT BY INITIATOR

UPC/FNA 2 /***** * 2 *FRAME
TROUBLE 0102 BENT

PART YEAR/LINE	PART NUMBER	SERIAL NUMBER	ODOMETER MI /CYCLES/HOURS	PART MI /CYCLES/HOURS
92/C	15644104A	00000000	/ 0 /	/ 0 /

SCHEDULE	SCHEDULE % COMPLETE	RR SIMULATION HOURS	VEHICLE TEST MI /CYCLES/HOURS	PART DURABILITY MI /CYCLES/HOURS
GMUTS L-14L-1	100.	0	/ 0 /	/ 0 /

VEHICLE YEAR/LINE/DIV	FLEET	MODEL NUMBER	BODY BUILD DATE	VIN	ENGINE NUMBER
92/C/CHEVROLET	PROTOTYPE	C20906	NONE	EXP1024	

ENGINE RPO/DISP.	TRANSMISSION RPO/TYPE	AXLE RATIO/SIZE	TIRE SIZE	WHEEL SIZE	MASS
L19/7.4	MX1/7	/	?	?	5,702 LB

POWER STEERING	POWER BRAKE	A/C	CRUISE	SUSPENSION	CLASS
NXR	JA2	C34	K34	FL6	

REQUIRED FORMAT: (1. INCIDENT CONDITION, 2. INCIDENT ANALYSIS, 3. ACTION TAKEN, 4. ADDITIONAL OBSERVATIONS)

THE FOLLOWING INCIDENT OCCURRED WHILE PERFORMING A TRAILER HITCH VALIDATION TEST PER GMUTS L-14-1 (T&B PROCEDURE #0689) ON CS2603 A 1992 PROTOTYPE 2500 SERIES SUBURBAN:
THE LOWER FRAMERAIL FLANGES AT THE TRAILER HITCH MOUNTING SURFACE AS WELL AS THE TRAILER HITCH MOUNTING FLANGES YIELDED AND BENT (FRAME FLANGES DOWNWARD, HITCH MOUNTING FLANGES UPWARD) AFTER REACHING 13,500 LBS LONGITUDINAL COMPRESSIVE (FORWARD) TRAILER HITCH LOAD. CRITERIA WAS TO SUSTAIN 15,000 LBS FOR 30 SECONDS. 13,000 LBS LOAD COULD NOT BE SUSTAINED. UPON REMOVAL OF THE LOAD A ONE INCH HITCH TO REAR BUMPER PERMANENT SET WAS NOTED.

RESPONSE (IF REQUIRED)

RESPONSE ADDRESSEE	APPROVAL
E. A. REWALD	H. B. PATTERSON 8+396-3754

UPC/FNA 2 /***** * 2 *FRAME
TROUBLE 0102 BENT

RESPONSE STATUS	FINAL DUE BY	PART NUMBER	DIV REF NUMBER	ENGINEERING CHANGE	MATERIAL RECVD DATE
CLOSED	04SEP90	15644104A			

REQUIRED FORMAT: (1. ROOT CAUSE, 2. CORRECTIVE ACTION, 3. CORRECTIVE ACTION VERIFICATION, 4. IMPLEMENTATION DATE)

** FINAL RESPONSE ENTERED BY: D. F. JEWSBURY OF DIV. (TB) ON 14AUG90
** FINAL RESPONSE APPROVED BY: M. BAILEY OF DIV. (TB) ON 15AUG90
Please reference response to TIR TB-92K--14-0002TL and close this TIR.

ANSWERING UNIT			PLATFORM RESPONSIBLE UNIT
RESPONDENT ENGINEER	D. F. JEWSBURY 8+238-2215	14AUG90	RELEASE ENGINEER APPROVAL
MANAGEMENT APPROVAL	M. BAILEY 8+366-6122	15AUG90	MANAGEMENT APPROVAL

GM CONFIDENTIAL

GM583 Att J 10000271

INCIDENT COMMENTS CONTINUED FOR TIR TB-92C-02--0001TL

THE LOAD WAS APPLIED TO THE TRAILER HITCH AT A POINT 19.5 INCHES ABOVE LEVEL GROUND.
10,000 LB RATED TRAILER HITCH PLATFORM #15643952 WAS INSTALLED TO #15644104A SUBURBAN FRAME ASSEMBLY PER TL-31446.
W.L.SHERRY WITNESSED THE INCIDENT. THE HITCH AND FRAME WAS BENT BACK TO NEAR ORIGINAL SHAPE BEFORE PHOTOS COULD BE TAKEN.

GENERAL MOTORS CORPORATION
TEST INCIDENT REPORT

INCIDENT

REPORT NUMBER	TB-92K-14L-0001TL
ISSUE DATE	25JUL90
RESPONSE REQUIRED	YES
VEHICLE NUMBER	TB KU2005
INCIDENT DATE	20JUL90
DIV REF NUMBER	
TEST WORK ORDER	12R29-100
MATERIAL DISPOSITION	PART LEFT ON TEST UNIT

TO (DIVISION)	ADDRESSEE
GM - TRUCK ENGINEERING	W. L. SHERRY
FROM (DIVISION)	**INITIATOR**
GM - TRUCK ENGINEERING	D. C. HENDRICKSON 8+674-5369 21JUL90

UPC/FNA 14L /0305A BOLT/SCREW-TRLR WT DISTR HITCH PLTF
TROUBLE 0517 LOOSE

PART YEAR/LINE	PART NUMBER	SERIAL NUMBER	ODOMETER MI /CYCLES/HOURS	PART MI /CYCLES/HOURS
92/K	15643953C	NSN	5,282 / /	3,552 / /
SCHEDULE	**SCHEDULE % COMPLETE**	**RR SIMULATION HOURS**	**VEHICLE TEST MI /CYCLES/HOURS**	**PART DURABILITY MI /CYCLES/HOURS**
R-15-31	54.6	0	3,552 / /	3,552 / /

VEHICLE YEAR/LINE/DIV	FLEET	MODEL NUMBER	BODY BUILD DATE	VIN	ENGINE NUMBER
92/K/CHEVROLET	PROTOTYPE	K10516	NONE	EXP1052	
ENGINE RPO/DISP.	**TRANSMISSION RPO/TYPE**	**AXLE RATIO/SIZE**	**TIRE SIZE**	**WHEEL SIZE**	**MASS**
LL4/6.2	MD8/AUTO	04.10/D8.50	LT225/75R16	16X8	6,250 LB
POWER STEERING N41	POWER BRAKE J86	A/C C60	CRUISE K34	SUSPENSION STD	CLASS

REQUIRED FORMAT: (1. INCIDENT CONDITION, 2. INCIDENT ANALYSIS, 3. ACTION TAKEN, 4. ADDITIONAL OBSERVATIONS)

Daily inspection revealed that the right and left rear most hitch platform attaching bolts had broken index and were at approximately 90% of minimum PDM torque (80 nm). All hitch platform attaching fasteners were torqued to PDM minimum spec at SOT. The fasteners were left as is (not retorqued) per request of addressee. Fastener condition will be closely monitored for the remainder of test.

1992 GMT-410 TRAILER TOW

RESPONSE (IF REQUIRED)

RESPONSE ADDRESSEE	APPROVAL
M. BRACKETT	K. H. SCHMITZ 8+674-5195

UPC/FNA 14L /0305A BOLT/SCREW-TRLR WT DISTR HITCH PLTF
TROUBLE 0517 LOOSE

RESPONSE STATUS	FINAL DUE BY	PART NUMBER	DIV REF NUMBER	ENGINEERING CHANGE	MATERIAL RECVD DATE
CLOSED	23SEP90	15643953C	TL	59849	

REQUIRED FORMAT: (1. ROOT CAUSE, 2. CORRECTIVE ACTION, 3. CORRECTIVE ACTION VERIFICATION, 4. IMPLEMENTATION DATE)

** FINAL RESPONSE ENTERED BY: W. L. SHERRY OF DIV. (TB) ON 28AUG90
** FINAL RESPONSE APPROVED BY: D. W. HUNTER OF DIV. (TB) ON 31AUG90
frame reinforcements are being added per listed eca to the inner side of the frame rails 6.0mm thick. longer bolts are also being added. this will stiffen the attachment and also give it more compliance. no retest to be run since vehicle was still full functional at end of test. the above changes will minimize torque loss.

ANSWERING UNIT		PLATFORM RESPONSIBLE UNIT	
RESPONDENT ENGINEER	W. L. SHERRY 8+353-5513 28AUG90	RELEASE ENGINEER APPROVAL	TB / W. L. SHERRY 8+353-5513 04SEP90
MANAGEMENT APPROVAL	D. W. HUNTER 8+238-2861 31AUG90	MANAGEMENT APPROVAL	

GENERAL MOTORS CORPORATION
TEST INCIDENT REPORT

INCIDENT

REPORT NUMBER	TB-92C-14—0001TL
ISSUE DATE	06JUL90
RESPONSE REQUIRED	YES
VEHICLE NUMBER	TB CS2603
INCIDENT DATE	03JUL90
DIV REF NUMBER	
TEST WORK ORDER	12R48-100

TO (DIVISION)	ADDRESSEE
GM – TRUCK ENGINEERING	W. L. SHERRY

FROM (DIVISION)	INITIATOR	MATERIAL DISPOSITION
GM – TRUCK ENGINEERING	C. A. ASKIN 8+396-7293 03JUL90	PART KEPT BY INITIATOR

UPC/FNA 14 /***** *14 *BUMPERS & MISCELLANEOUS FINAL ASM ITEMS
TROUBLE 0102 BENT

PART YEAR/LINE	PART NUMBER	SERIAL NUMBER	ODOMETER MI /CYCLES/HOURS	PART MI /CYCLES/HOURS
92/C	15643952	00000000	/ 0 /	/ 0 /

SCHEDULE	SCHEDULE % COMPLETE	RR SIMULATION HOURS	VEHICLE TEST MI /CYCLES/HOURS	PART DURABILITY MI /CYCLES/HOURS
GMUTS L-14L-1	100.	0	/ 0 /	/ 0 /

VEHICLE YEAR/LINE/DIV	FLEET	MODEL NUMBER	BODY BUILD DATE	VIN	ENGINE NUMBER
92/C/CHEVROLET	PROTOTYPE	C20906	NONE	EXP1024	

ENGINE RPO/DISP.	TRANSMISSION RPO/TYPE	AXLE RATIO/SIZE	TIRE SIZE	WHEEL SIZE	MASS
L19/7.4	MX1/7	/	?	?	5,702 LB

POWER STEERING	POWER BRAKE	A/C	CRUISE	SUSPENSION	CLASS
NXR	JA2	C34	K34	FL8	

REQUIRED FORMAT: (1. INCIDENT CONDITION, 2. INCIDENT ANALYSIS, 3. ACTION TAKEN, 4. ADDITIONAL OBSERVATIONS)

THE FOLLOWING INCIDENT OCCURRED WHILE PERFORMING A TRAILER HITCH VALIDATION TEST PER GMUTS L-14-1 (T&B PROCEDURE #0689) ON CS2603 A 1992 PROTOTYPE 2500 SERIES SUBURBAN:
THE LOWER FRAMERAIL FLANGES AT THE TRAILER HITCH MOUNTING SURFACE AS WELL AS THE TRAILER HITCH MOUNTING FLANGES YIELDED AND BENT (FRAME FLANGES DOWNWARD, HITCH MOUNTING FLANGES UPWARD) AFTER REACHING 13,500 LBS LONGITUDINAL COMPRESSIVE (FORWARD) TRAILER HITCH LOAD. CRITERIA WAS TO SUSTAIN 15,000 LBS FOR 30 SECONDS. 13,500 LBS LOAD COULD NOT BE SUSTAINED. UPON REMOVAL OF THE LOAD A ONE INCH HITCH TO REAR BUMPER PERMANENT SET WAS NOTED.

RESPONSE (IF REQUIRED)

RESPONSE ADDRESSEE	APPROVAL
E. A. REWALD	H. B. PATTERSON 8+396-3764

UPC/FNA 14 /***** *14 *BUMPERS & MISCELLANEOUS FINAL ASM ITEMS
TROUBLE 0102 BENT

RESPONSE STATUS	FINAL DUE BY	PART NUMBER	DIV REF NUMBER	ENGINEERING CHANGE	MATERIAL RECVD DATE
CLOSED	04SEP90	15643952	TB	NONE	

REQUIRED FORMAT: (1. ROOT CAUSE, 2. CORRECTIVE ACTION, 3. CORRECTIVE ACTION VERIFICATION, 4. IMPLEMENTATION DATE)

** FINAL RESPONSE ENTERED BY: W. L. SHERRY OF DIV. (TB) ON 18JUL90
** FINAL RESPONSE APPROVED BY: D. W. HUNTER OF DIV. (TB) ON 26JUL90
the rear of the frame is being boxed and 1 brackets are also being added inside the frame rail to the rear attaching holes for the hitch platform. the platform will be retested using buck 4. these modifications should assure our meeting our requirements.

ANSWERING UNIT		PLATFORM RESPONSIBLE UNIT	
RESPONDENT ENGINEER	W. L. SHERRY 8+353-5513 18JUL90	RELEASE ENGINEER APPROVAL	
MANAGEMENT APPROVAL	D. W. HUNTER 8+238-2861 26JUL90	MANAGEMENT APPROVAL	

INCIDENT COMMENTS CONTINUED FOR TIR TB-92C-14--0001TL

THE LOAD WAS APPLIED TO THE TRAILER HITCH AT A POINT 19.5 INCHIS ABOVE LEVEL GROUND.
10,000 LB RATED TRAILER HITCH PLATFORM #15643952 WAS INSTALLED TO #1564410A SUBURBAN FRAME ASSEMBLY PER TL-31446.
W.L.SHERRY WITNESSED THE INCIDENT. THE HITCH AND FRAME WAS BENT BACK TO NEAR ORIGINAL SHAPE BEFORE PHOTOS COULD BE TAKEN.

GENERAL MOTORS CORPORATION
TEST INCIDENT REPORT

INCIDENT

REPORT NUMBER	TB-92K-14--0001TL
ISSUE DATE	13AUG90
RESPONSE REQUIRED	YES
VEHICLE NUMBER	TB 12R47100
INCIDENT DATE	07AUG90
DIV REF NUMBER	
TEST WORK ORDER	12R47-100

TO (DIVISION)	ADDRESSEE	MATERIAL DISPOSITION
GM - TRUCK ENGINEERING	W. L. SHERRY	PART KEPT BY INITIATOR
FROM (DIVISION)	**INITIATOR**	
GM - TRUCK ENGINEERING	C. A. ASKIN 8+396-7293 07AUG90	

UPC/FNA 14 /***** *14 *BUMPERS & MISCELLANEOUS FINAL ASM ITEMS PHOTO
TROUBLE 0102 BENT

PART YEAR/LINE	PART NUMBER	SERIAL NUMBER	ODOMETER MI /CYCLES/HOURS	PART MI /CYCLES/HOURS
92/K	15643953	00000000	/ 1 /	/ 1 /
SCHEDULE	**SCHEDULE % COMPLETE**	**RR SIMULATION HOURS**	**VEHICLE TEST MI /CYCLES/HOURS**	**PART DURABILITY MI /CYCLES/HOURS**
GMUTS L-14L-1	100	0	/ 1 /	/ 1 /

VEHICLE YEAR/LINE/DIV	FLEET	MODEL NUMBER	BODY BUILD DATE	VIN	ENGINE NUMBER
92/K/BLAZER	PROTOTYPE	GMT410	NONE	KU2015	
ENGINE RPO/DISP.	**TRANSMISSION RPO/TYPE**	**AXLE RATIO/SIZE**	**TIRE SIZE**	**WHEEL SIZE**	**MASS**
LL4/6.2	MX0/7	/	??	??	KG
POWER STEERING NXU	**POWER BRAKE** JA5	**A/C** CNA	**CRUISE** K30	**SUSPENSION** FL6	**CLASS**

REQUIRED FORMAT: (1. INCIDENT CONDITION, 2. INCIDENT ANALYSIS, 3. ACTION TAKEN, 4. ADDITIONAL OBSERVATIONS)

THE FOLLOWING INCIDENT OCCURRED WHILE PERFORMING A TRAILER HITCH VALIDATION TEST PER GMUTS L-14L-1 (T&B PROCEDURE #0689) ON KU2015 , 1992 PROTOTYPE K10516 MODEL BLAZER:
THE REAR SECTION OF THE LOWER FRAMERAIL FLANGES AT THE TRAILER HITCH MOUNTING AS WELL AS THE REAR SECTION OF THE TRAILER HITCH MOUNTING FLANGES YIELDED AND BENT (FRAME FLANGES DOWNWARD, HITCH MOUNTING FLANGES UPWARD) AFTER REACHING 9,500 LBS LONGITUDINAL COMPRESSIVE (FORWARD) TRAILER HITCH LOAD. CRITERIA WAS TO SUSTAIN 10,500 LBS FOR 30 SECONDS. UPON REMOVAL OF THE LOAD A .75 INCH VERTICAL HITCH TO BUMPER PERMANENT SET WAS NOTED

RESPONSE (IF REQUIRED)

RESPONSE ADDRESSEE	APPROVAL
E. A. REWALD	H. B. PATTERSON 8+396-3754

UPC/FNA 14 /***** *14 *BUMPERS & MISCELLANEOUS FINAL ASM ITEMS
TROUBLE 0102 BENT

RESPONSE STATUS	FINAL DUE BY	PART NUMBER	DIV REF NUMBER	ENGINEERING CHANGE	MATERIAL RECVD DATE
CLOSED	12OCT90	15643953	TB	59849	

REQUIRED FORMAT: (1. ROOT CAUSE, 2. CORRECTIVE ACTION, 3. CORRECTIVE ACTION VERIFICATION, 4. IMPLEMENTATION DATE)

** FINAL RESPONSE ENTERED BY: W. L. SHERRY OF DIV. (TB) ON 28AUG90
** FINAL RESPONSE APPROVED BY: D. W. HUNTER OF DIV. (TB) ON 31AUG90
the above eca releases inner frame rail reinforcements 6.0mm thick. it also adds longer attaching bolts. this will stiffen these locations and provide inproved compliance to the joint. no retest is necessary since the platform was full functional at end of durability test. a suburban with these reinforcements is running durability now at higher loads 10,000# trailer vs 7,000# for the blazer. also the lab. strength test will be rerun on the suburban at the higher loads.

ANSWERING UNIT		PLATFORM RESPONSIBLE UNIT	
RESPONDENT ENGINEER	W. L. SHERRY 8+353-6513 28AUG90	RELEASE ENGINEER APPROVAL	GM583 Att J 10006
MANAGEMENT APPROVAL	D. W. HUNTER 8+238-2861 31AUG90	MANAGEMENT APPROVAL	

INCIDENT COMMENTS CONTINUED FOR TIR TB-92K-14--0001TL

. THE LOAD WAS APPLIED TO THE HITCH AT A POINT 19.5 INCHES ABOVE LEVEL GROUND.
7,000 LB RATED TRAILER HITCH PLATFORM #15643953 WAS INSTALLED TO THE GMT 410 BLAZER FRAME PER TL-31446.

INCIDENT ATTACHMENTS FOR TIR TB-92K-14--0001TL

THERE IS(ARE) 01 ATTACHMENT(S) ASSOCIATED WITH TIR TB-92K-14--0001TL
THE ORIGINALS ARE LOCATED AT CORPORATE FILES

ATTACHMENT DESCRIPTION(S):
PHOTO #90021-826 BENT TRAILER HITCH AND FRAME FLANGES

GM Truck Group

NHTSA IR: GM-583; DP00-01: 1993-1997 Chevrolet & GMC Suburbans
- Alleged Cracking of Trailer Hitch Receiver Platform

ATTACHMENT 6S

GENERAL MOTORS CORPORATION
TEST INCIDENT REPORT

INCIDENT

CORRECTED

REPORT NUMBER	TB-92K-14--0002TL
ISSUE DATE	13AUG90
RESPONSE REQUIRED	YES
VEHICLE NUMBER	TB 12R47100
INCIDENT DATE	07AUG90
DIV REF NUMBER	
TEST WORK ORDER	12R47100

TO (DIVISION)	ADDRESSEE
GM - TRUCK ENGINEERING	D. F. JEWSBURY

FROM (DIVISION)	INITIATOR	MATERIAL DISPOSITION
GM - TRUCK ENGINEERING	C. A. ASKIN 8+396-7293 07AUG90	PART LEFT ON TEST UNIT

UPC/FNA 14 /***** *14 *BUMPERS & MISCELLANEOUS FINAL ASM ITEMS PHOTO
TROUBLE 0102 BENT

PART YEAR/LINE	PART NUMBER	SERIAL NUMBER	ODOMETER MI /CYCLES/HOURS	PART MI /CYCLES/HOURS
92/K	15644101	000000	/ 1 /	/ 1 /
SCHEDULE	**SCHEDULE % COMPLETE**	**RR SIMULATION HOURS**	**VEHICLE TEST MI /CYCLES/HOURS**	**PART DURABILITY MI /CYCLES/HOURS**
GMUTS L-14L-1	100	0	/ 1 /	/ 1 /

VEHICLE YEAR/LINE/DIV	FLEET	MODEL NUMBER	BODY BUILD DATE	VIN	ENGINE NUMBER
92/K/BLAZER	PROTOTYPE	GMT410	NONE	KU2015	
ENGINE RPO/DISP.	**TRANSMISSION RPO/TYPE**	**AXLE RATIO/SIZE**	**TIRE SIZE**	**WHEEL SIZE**	**MASS**
LL4/6.2	MX0/?	/	??	??	KG
POWER STEERING NXU	**POWER BRAKE** JA5	**A/C** CNA	**CRUISE** K30	**SUSPENSION** FL6	**CLASS**

REQUIRED FORMAT: (1. INCIDENT CONDITION, 2. INCIDENT ANALYSIS, 3. ACTION TAKEN, 4. ADDITIONAL OBSERVATIONS)

THE FOLLOWING INCIDENT OCCURRED WHILE PERFORMING A TRAILER HITCH VALIDATION TEST PER GMUTS L-14L-1 (T&B PROCEDURE #0689) ON KU2015 A 1992 PROTOTYPE K10516 MODEL GMT 410 BLAZER:
THE REAR SECTION OF THE LOWER FRAMERAIL FLANGES AT THE TRAILER HITCH MOUNTING AS WELL AS THE REAR SECTION OF THE TRAILER HITCH MOUNTING FLANGES YIELED AND BENT (FRAME FLANGES DOWNWARD, HITCH MOUNTING FLANGES UPWARD) AFTER REACHING 9,500 LBS LONGITUDINAL COMPRESSIVE (FORWARD) TRAILER HITCH LOAD. CRITERIA WAS TO SUSTAIN 10,500 LBS FOR 30 SECONDS. UPON REMOVAL OF THE LOAD A .75 INCH HITCH TO REAR BUMPER PERMANENT SET WAS NOTED. THE LOAD WAS APPLIED TO THE TRAILER HITCH AT A POINT 19.5

RESPONSE (IF REQUIRED)

RESPONSE ADDRESSEE	APPROVAL
E. A. REWALD	H. B. PATTERSON 8+396-3754

UPC/FNA 14 /***** *14 *BUMPERS & MISCELLANEOUS FINAL ASM ITEMS
TROUBLE 0102 BENT

RESPONSE STATUS	FINAL DUE BY	PART NUMBER	DIV REF NUMBER	ENGINEERING CHANGE	MATERIAL RECVD DATE
CLOSED	12OCT90	15644101			

REQUIRED FORMAT: (1. ROOT CAUSE, 2. CORRECTIVE ACTION, 3. CORRECTIVE ACTION VERIFICATION, 4. IMPLEMENTATION DATE)

** FINAL RESPONSE ENTERED BY: D. F. JEWSBURY OF DIV. (TB) ON 14AUG90
** FINAL RESPONSE APPROVED BY: M. BAILEY OF DIV. (TB) ON 14AUG90
To prevent yielding described in this TIR, "L" brackets, welded to each frame siderail at the bottom outboard corners, have been released tp add necessary stiffness to this area. This design revision is identical to that incorporated on C/K20906 frames for the identical purpose. Therefore, due to the corrective action taken, please close this TIR.

GM593 Act J 10009

ANSWERING UNIT		PLATFORM RESPONSIBLE UNIT
RESPONDENT ENGINEER	D. F. JEWSBURY 8+238-2215 14AUG90	RELEASE ENGINEER APPROVAL
MANAGEMENT APPROVAL	M. BAILEY 8+366-6122 14AUG90	MANAGEMENT APPROVAL

INCIDENT COMMENTS CONTINUED FOR TIR TB-92K-14--0002TL

INCHES ABOVE LEVEL GROUND.
7,000 LB RATED TRAILER HITCH PLATFORM #15643953 WAS INSTALLED TO #15644101 K BLAZER FRAME PER TL-31446.

INCIDENT ATTACHMENTS FOR TIR TB-92K-14--0002TL

THERE IS(ARE) 01 ATTACHMENT(S) ASSOCIATED WITH TIR TB-92K-14--0002TL
THE ORIGINALS ARE LOCATED AT CORPORATE FILES

ATTACHMENT DESCRIPTION(S):
PHOTO #90021-826_BENT TOWING HITCH AND FRAME FLANGES

ATTACHMENT "K"

General Motors Corporation

DP00-001; GM583

Attachment K

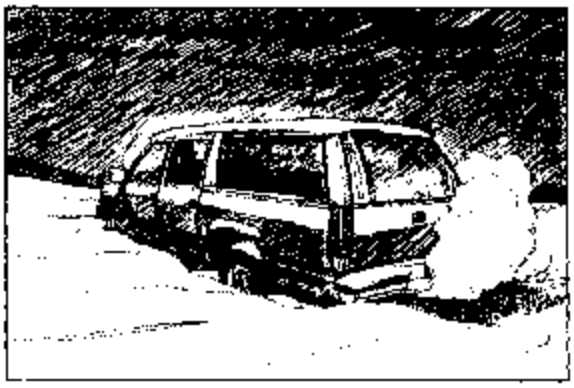
00000282

1 9 9 3

YUKON SUBURBAN

Owner's Manual

GMC TRUCK



AN480044

Run your engine only as long as you must. This saves fuel. When you run the engine, make it go a little faster than just idle. That is, push the accelerator slightly. This uses less fuel for the heat that you get and it keeps the battery charged. You will need a well-charged battery to restart the vehicle, and possibly for signaling later on with your headlights. Let the heater run for awhile. Then, shut the engine off and close the window almost all the way to preserve the heat. Start the engine again and repeat this only when you feel really uncomfortable from the cold. But do it as little as possible. Preserve the fuel as long as you can. To help keep warm, you can get out of the vehicle and do some fairly vigorous exercises every half hour or so until help comes.

If You're Stuck in Deep Snow

This manual explains how to get the vehicle out of deep snow without damaging it. See "Rocking Your Vehicle" in the Index.

Towing a Trailer

CAUTION

If you don't use the correct equipment and drive properly, you can lose control when you pull a trailer. For example, if the trailer is too heavy, the brakes may not work well—or even at all. You and your passengers could be seriously injured. Pull a trailer only if you have followed all the steps in this section.

NOTICE

Pulling a trailer improperly can damage your vehicle and result in costly repairs not covered by your warranty. To pull a trailer correctly, follow the advice in this section.

Every vehicle is ready for some trailer towing. If it was built with trailering options, as many are, it's ready for heavier trailers. But trailering is different than just driving your vehicle by itself. Trailering means changes in handling, durability, and fuel economy. Successful, safe trailering takes correct equipment, and it has to be used properly.

That's the reason for this section. In it are many time-tested, important trailering tips and safety rules. Many of these are important for your safety and that of your passengers. So please read this section carefully before you pull a trailer.

If You Do Decide To Pull A Trailer

If you do, here are some important points.

- There are many different laws having to do with trailering. Make sure your rig will be legal, not only where you live but also where you'll be driving. A good source for this information can be state or provincial police.
- Consider using sway control with a utility model if your trailer will weigh 3,000 pounds (1361 kg) or less, or with a wagon model if your trailer will weigh 4,000 pounds (1800 kg) or less. You should always use sway control with a utility model if your trailer will weigh more than 3,000 pounds (1361 kg), or with a wagon model if your trailer will weigh more than 4,000 pounds (1800 kg). You can ask a hitch dealer about sway controls.
- Don't tow a trailer at all during the first 500 miles (800 km) your new vehicle is driven. Your engine, axle, or other parts could be damaged.

  Then, during the first 500 miles (800 km) that you tow a trailer, don't drive over 50 mph (80 km/h) and don't make starts at full throttle. That will help your engine and other parts of your vehicle wear in at the heavier loads.

- Three imponant considerations have to do with weight:

Weight of the Trailer

How heavy can a trailer safely be?

- For utility vehicles, a trailer should never weigh more than 7,000 pounds (3175.2 kg).
- For wagon models, a trailer should never weigh more than 10 000 pounds (6125.6 kg).

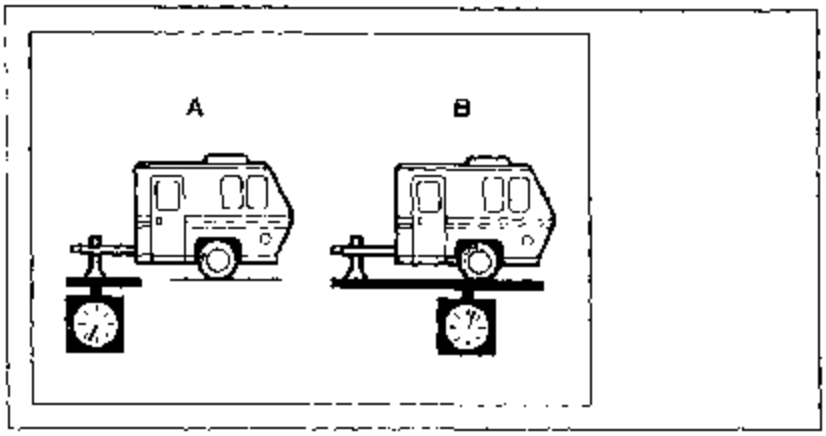
But even that can be too heavy. It depends on how you plan to use your rig. For example, speed, altitude, road grades, outside temperature, and how much your vehicle is used to pull a trailer all are important. And, it can also depend on any special equipment that you have on your vehicle. You can ask your dealer for our trailering information or advice, or you can write us at the address listed in your Warranty and Owner Assistance Information Booklet.

In Canada, write to:

General Motors of Canada Limited
Customer Assistance Center
1908 Colonel Sam Drive
Oshawa, Ontario L1H 8P7

Weight of the Trailer Tongue

The tongue load (A) of any trailer is an important weight to measure because it affects the total, gross weight of your vehicle. The gross vehicle weight (GVW) includes the curb weight of the vehicle, any cargo you may carry in it, and the people who will be riding in the vehicle. And if you will tow a trailer, you must add the tongue load to the GVW because your vehicle will be carrying that weight, too. See "Loading Your Vehicle" in the Index for more information about your vehicle's maximum load capacity.



PN490002

If you're using a "dead-weight" hitch, the trailer tongue (A) should weigh 10% of the total loaded trailer weight (B). If you have a "weight-distributing" hitch, the trailer tongue (A) should weigh 12% of the total loaded trailer weight (B). After you've loaded your trailer, weigh the trailer and then the tongue, separately, to see if the weights are proper. If they aren't, you may be able to get them right simply by moving some items around in the trailer.

Total Weight on Your Vehicle's Tires

Be sure your vehicle's tires are inflated to the limit for cold tires. You'll find these numbers on the Certification label at the rear edge of the driver's door (or see "Loading Your Vehicle" in the Index). Then be sure you don't go over the GVW limit for your vehicle.

Hitches

It's important to have the correct hitch equipment. Crosswinds, large trucks passing by, and rough roads are a few reasons why you'll need the right hitch. Here are some rules to follow:

- If your vehicle has a step bumper and you are going to use a ball-type hitch, remove the pad and cut holes in it to match the hitch and safety chain holes in the bumper.
- If you'll be pulling a trailer with a utility model that, when loaded, will weigh more than 3,000 pounds (1361 kg); or with a wagon model that when loaded, will weigh more than 4,000 pounds (1800 kg), be sure to use a properly mounted weight-distributing hitch and sway control of the proper size. This equipment is very important for proper vehicle loading and good handling when you're driving.

- Will you have to make any holes in the body of your vehicle when you install a trailer hitch? If you do, then be sure to seal the holes later when you remove the hitch. If you don't seal them, deadly carbon monoxide (CO) from your exhaust can get into your vehicle (see "Carbon Monoxide" in the Index). Dirt and water can, too.

Safety Chains

You should always attach chains between your vehicle and your trailer. Cross the safety chains under the tongue of the trailer so that the tongue will not drop to the road if it becomes separated from the hitch. Instructions about safety chains may be provided by the trailer manufacturer. Follow the manufacturer's recommendation for attaching safety chains. Always leave just enough slack so you can turn with your rig. And, never allow safety chains to drag on the ground.

Trailer Brakes

If your trailer weighs more than 1,000 pounds (450 kg) loaded, then it needs its own brakes—and they must be adequate. Be sure to read and follow the instructions for the trailer brakes so you'll be able to install, adjust and maintain them properly.

Don't tap into your vehicle's brake system if the trailer's brake system will use more than 0.02 cubic inch (0.3 cc) of fluid from your vehicles master cylinder. If it does, both braking systems won't work well. You could even lose your brakes.

- Will the trailer brake parts take 3,000 psi (20 650 kPa) of pressure? If not, the trailer brake system must not be used with your vehicle.
- If everything checks out this far, then make the brake fluid tap at the port on the master cylinder that sends fluid to the rear brakes. But don't use copper tubing for this. If you do, it will bend and finally break off. Use steel brake tubing.

Driving with a Trailer

Towing a trailer requires a certain amount of experience. Before setting out for the open road, you'll want to get to know your rig. Acquaint yourself with the feel of handling and braking with the added weight of the trailer. And always keep in mind that the vehicle you are driving is now a good deal longer and not nearly so responsive as your vehicle is by itself.

Before you start, check the trailer hitch and platform, safety chains, electrical connector, lights, tires and mirror adjustment. If the trailer has electric brakes start your vehicle and trailer moving and then apply the trailer brake controller by hand to be sure the brakes are working. This lets you check your electrical connection at the same time.

CAUTION

If you have a rear-most window open and you pull a trailer with your vehicle, carbon monoxide (CO) could come into your vehicle. You can't see or smell CO. It can cause unconsciousness or death (See "Engine Exhaust" in the Index). To maximize your safety when towing a trailer:

- Have the exhaust system inspected for leaks and make necessary repairs before starting on your trip.
- Keep the rear-most windows closed.
- If exhaust does come into your vehicle through a window in the rear or another opening, drive with your front, main heating or cooling system on and with the fan on any speed. This will bring fresh, outside air into your vehicle. Do not use **RECIR** because it only recirculates the air inside your vehicle. See "Comfort Controls" in the Index.

During your trip, check occasionally to be sure that the load is secure, and that the lights and any trailer brakes are still working.

Following Distance

Stay at least twice as far behind the vehicle ahead as you would when driving your vehicle without a trailer. This can help you avoid situations that require heavy braking and sudden turns.

Passing

You'll need more passing distance up ahead when you're towing a trailer. And, because you're a good deal longer, you'll need to go much farther beyond the passed vehicle before you can return to your lane.

Backing Up

Hold the bottom of the steering wheel with one hand. Then, to move the trailer left, just move your hand to the left. To move the trailer to the right, move your hand to the right. Always back up slowly and, if possible, have someone guide you.

Making Turns

When you're turning with a trailer, make wider turns than normal. Do this so your trailer wheels won't strike soft shoulders, curbs, road signs, trees, or other objects. Avoid jerky or sudden maneuvers. Signal well in advance.

Turn Signals When Towing a Trailer

When you tow a trailer, your vehicle has to have a different turn signal flasher and extra wiring. The green arrows on your instrument panel will flash wherever you signal a turn or lane change. Properly hooked up the trailer lights will also flash, telling other drivers you're about to turn, change lanes, or stop.

When towing a trailer, the green arrows on your instrument panel will flash for turns even if the bulbs on the trailer are burned out. Thus, you may think drivers behind you are seeing your signal when they are not. It's important to check occasionally to be sure the trailer bulbs are still working.

Driving on Grades

Reduce speed and shift to a lower gear **before** you start down a long or steep downgrade. If you don't shift down, you might have to use your brakes so much that they would get hot and no longer work well.

On a long uphill grade, shift down and reduce your speed to 45 mph (70 km/h) or less to reduce the possibility of engine and transmission overheating.

If you are towing a trailer that weighs more than 4,000 pounds (1800 kg), and you have an automatic transmission with Overdrive, you may prefer to drive in **D** instead of Overdrive (or as you need, a lower gear). Or, if you have a manual transmission with fifth gear and you are towing a trailer, it's better not to use fifth gear, just drive in fourth gear (or, as you need to, a lower gear).

Parking on Hills

You really should not park your rig on a hill. If something goes wrong, your rig could start to move. People can be injured and both your vehicle and the trailer can be damaged.

But if you ever have to park your rig on a hill, here's how to do it:

1. Apply your regular brakes, but don't shift into **P** (Park) yet, or into gear for a manual transmission.
2. Have someone place chocks under the trailer wheels.
3. When the wheel chocks are in place, release the regular brakes until the chocks absorb the load.
4. Reapply the regular brakes. Then apply your parking brake, and then shift to **P** (Park), or **R** (Reverse) for a manual transmission.
5. If you have a four-wheel-drive vehicle, be sure the transfer case is in a drive gear—not in **N** (Neutral).

6. Release the regular brakes.

CAUTION

It can be dangerous to get out of your vehicle if the shift lever is not fully in **P** (Park) with the parking brake firmly set. Your vehicle can roll.

If you have left the engine running, the vehicle can move suddenly. You or others could be injured. To be sure your vehicle won't move, when you're on fairly level ground, use the steps that follow.

If you have four-wheel drive and your transfer case is in **N** (Neutral), your vehicle will be free to roll, even if your shift lever is in **P** (Park). So, be sure the transfer case is in a drive gear—not in **N** (Neutral).

If you are parking on a hill, or if you're pulling a trailer, also see "Parking On Hills" in the Index.

When You Are Ready to Leave After Parking on a Hill

1. Apply your regular brakes and hold the pedal down while you:
   - Start your engine.
   - Shift into a gear; and
   - Release the parking brake.
2. Let up on the brake pedal.
3. Drive slowly until the trailer is clear of the chocks.
4. Stop and have someone pick up and stow the chocks.

Maintenance When Trailer Towing

Your vehicle will need service more often when you're pulling a trailer. See the Maintenance Schedule for more on this. Things that are especially important in trailer operation are automatic transmission fluid (don't overfill), engine oil, axle lubricant, belts, cooling system, and brake adjustment. Each of these is covered in this manual, and the Index will help you find them quickly. If you're trailering, it's a good idea to review these sections before you start your trip.

Check periodically to see that all hitch nuts and bolts are tight.

Trailer Wiring Harness

See "Trailer Wiring Harness" in the Index.

Power Winches

If you wish to use a power winch on your vehicle, only use it when your vehicle is stationary or anchored.

NOTICE

When operating a power winch on your vehicle always leave the transmission in the neutral position. Do not leave an automatic transmission in P (Park) or a manual transmission in gear or the transmission may be damaged.

Use the regular brakes, set the parking brake or block the wheels to keep your vehicle from rolling.

19 Owner's Manual

GMC

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4. [illegible] for take–off

   [illegible] to drive the vehicle, shift the transmission into the gear [illegible] shift the transfer case into the range you want, apply the regular brakes and release the parking brake.

5. Release the clutch (and the regular brakes) as you normally would. When you release the clutch, the power take–off will start.

Using a Transfer Case Mounted Power Take–Off (Automatic Transmission)

1. Set the parking brake.
2. Shift the transfer case into "N" (Neutral).
3. Shift the transmission into "N" (Neutral).
4. Engage the power take–off.

   If you are going to drive the vehicle, shift the transfer case into the range you want. Then apply the regular brakes and release the parking brake.

5. Shift the transmission to "D" (Drive) to start the power take–off.
6. Release the regular brakes to drive the vehicle.

Towing a Trailer

⚠ CAUTION:

If you don't use the correct equipment and drive properly, you can lose control when you pull a trailer. For example, if the trailer is too heavy, the brakes may not work well — or even at all. You and your passengers could be seriously injured. Pull a trailer only if you have followed all the steps in this section. Ask your GM dealer for advice and information about towing a trailer with your vehicle.

NOTICE:

Pulling a trailer improperly can damage your vehicle and result in costly repairs not covered by your warranty. To pull a trailer correctly, follow the advice in this section, and see your GM dealer for important information about towing a trailer with your vehicle.

Every vehicle is ready for some trailer towing. If it was built with trailering options, as many are, it's ready for heavier trailers. But trailering is different than just driving your vehicle by itself. Trailering means changes in handling, durability, and fuel economy. Successful, safe trailering takes correct equipment, and it has to be used properly.

That's the reason for this section. In it are many time-tested, important trailering tips and safety rules. Many of these are important for your safety and that of your passengers. So please read this section carefully before you pull a trailer.

If You Do Decide To Pull A Trailer

If you do, here are some important points.

- There are many different laws having to do with trailering. Make sure your rig will be legal, not only where you live but also where you'll be driving. A good source for this information can be state or provincial police.
- Consider using a sway control with a utility model if your trailer will weigh 3,000 pounds (1 361 kg) or less, or with a wagon model if your trailer will weigh 4,000 pounds (1 800 kg) or less. You should always use a sway control with a utility model if your trailer will weigh more than 3,000 pounds (1 361 kg), or with a wagon model if your trailer will weigh more than 4,000 pounds (1 800 kg).

You can ask a hitch dealer about sway controls.

- Don't tow a trailer at all during the first 500 miles (800 km) your new vehicle is driven. Your engine, axle or other parts could be damaged.
- Then, during the first 500 miles (800 km) that you tow a trailer, don't drive over 50 mph (80 km/h) and don't make starts at full throttle. This helps your engine and other parts of your vehicle wear in at the heavier loads.

Three important considerations have to do with weight:

Weight of the Trailer

How heavy can a trailer safely be?

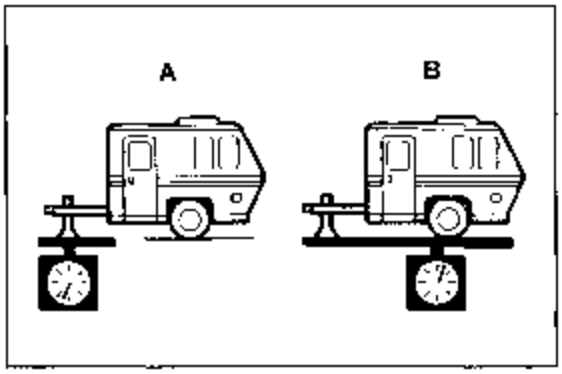
It depends on how you plan to use your rig. For example, speed, altitude, road grades, outside temperature and how much your vehicle is used to pull a trailer are all important. And, it can also depend on any special equipment that you have on your vehicle.

You can ask your dealer for our trailering information or advice, or you can write us at the address listed in your Warranty and Owner Assistance Information Booklet.

In Canada, write to General Motors of Canada Limited, Customer Assistance Center, 1908 Colonel Sam Drive, Oshawa, Ontario L1H 8P7.

Weight of the Trailer Tongue

The tongue load (A) of any trailer is an important weight to measure because it affects the total or gross weight of your vehicle. The gross vehicle weight (GVW) includes the curb weight of the vehicle, any cargo you may carry in it, and the people who will be riding in the vehicle. And if you will tow a trailer, you must add the tongue load to the GVW because your vehicle will be carrying that weight, too. See "Loading Your Vehicle" in the Index for more information about your vehicle's maximum load capacity.



If you're using a "dead–weight" hitch, the trailer tongue (A) should weigh 10% of the total loaded trailer weight (B). If you have a "weight–distributing" hitch, the trailer tongue (A) should weigh 12% of the total loaded trailer weight (B).

After you've loaded your trailer, weigh the trailer and then the tongue, separately, to see if the weights are proper. If they aren't, you may be able to get them right simply by moving some items around in the trailer.

Total Weight on Your Vehicle's Tires

Be sure your vehicle's tires are inflated to the limit for cold tires. You'll find these numbers on the Certification label at the rear edge of the driver's door or see "Tire Loading" in the Index. Then be sure you don't go over the GVW limit for your vehicle.

Hitches

It's important to have the correct hitch equipment. Crosswinds, large trucks going by, and rough roads are a few reasons why you'll need the right hitch. Here are some rules to follow:

- If you use a step bumper hitch, and your trailer tongue has a V-shaped foot, your bumper could be damaged in sharp turns. Check the distance from the front edge of the foot to the middle of the hitch ball socket. If the distance is less than 12 inches, take the foot off the trailer tongue.
- If you'll be pulling a trailer with a utility model that, when loaded, will weigh more than 3,000 pounds (1 361 kg); or with a wagon model that, when loaded, will weigh more than 4000 pounds (1 800 kg), be sure to use a properly mounted, weight-distributing hitch and sway control of the proper size. This equipment is very important for proper vehicle loading and good handling when you're driving.
- Will you have to make any holes in the body of your vehicle when you install a trailer hitch? If you do, then be sure to seal the holes later when you remove the hitch. If you don't seal them, deadly carbon monoxide (CO) from your exhaust can get into your vehicle (see "Carbon Monoxide" in the Index). Dirt and water can, too.

Safety Chains

You should always attach chains between your vehicle and your trailer. Cross the safety chains under the tongue of the trailer so that the tongue will not drop to the road if it becomes separated from the hitch. Instructions about safety chains may be provided by the hitch manufacturer or by the trailer manufacturer. Follow the manufacturer's recommendation for attaching safety chains. Always leave just enough slack so you can turn with your rig. And, never allow safety chains to drag on the ground.

Trailer Brakes

If your trailer weighs more than 1,000 pounds (450 kg) loaded, then it needs its own brakes — and they must be adequate. Be sure to read and follow the instructions for the trailer brakes so you'll be able to install, adjust and maintain them properly.

Your trailer brake system can tap into your vehicle's hydraulic brake system, but consider the following:

- Will the trailer brake system use more than 0.02 cubic inch (0.3 cc) of fluid from your vehicle's master cylinder? If it will, don't tap into your vehicle's brake system. Both braking systems won't work well, and you could even lose your brakes altogether.
- Will the trailer brake parts take 3,000 psi (20 650 kPa) of pressure? If not, the trailer brake system must not be used with your vehicle.

If everything checks out this far, make the brake tap at the port on the master cylinder that sends the fluid to the rear brakes. But don't use copper tubing for this. If you do, it will bend and finally break off. Use steel brake tubing.

Driving with a Trailer

Towing a trailer requires a certain amount of experience. Before setting out for the open road, you'll want to get to know your rig. Acquaint yourself with the feel of handling and braking with the added weight of the trailer. And always keep in mind that the vehicle you are driving is now a good deal longer and not nearly so responsive as your vehicle is by itself.

Before you start, check the trailer hitch and platform, safety chains, electrical connector, lights, tires and mirror adjustment. If the trailer has electric brakes, start your vehicle and trailer moving and then apply the trailer brake controller by hand to be sure the brakes are working. This lets you check your electrical connection at the same time.

⚠ CAUTION:

If you have a rear–most window open and you pull a trailer with your vehicle, carbon monoxide (CO) could come into your vehicle. You can't see or smell CO. It can cause unconsciousness or death. (See "Engine Exhaust" in the Index.) To maximize your safety when towing a trailer:

- **Have your exhaust system inspected for leaks, and make necessary repairs before starting on your trip.**
- **Keep the rear–most windows closed.**
- **If exhaust does come into your vehicle through a window in the rear or another opening, drive with your front, main heating or cooling system *on* and with the fan on any speed. This will bring fresh, outside air into your vehicle. Do not use *MAX* because it only recirculates the air inside your vehicle. (See " Comfort Controls" in the Index.)**

During your trip, check occasionally to be sure that the load is secure, and that the lights and any trailer brakes are still working.

Following Distance

Stay at least twice as far behind the vehicle ahead as you would when driving your vehicle without a trailer. This can help you avoid situations that require heavy braking and sudden turns.

Passing

You'll need more passing distance up ahead when you're towing a trailer. And, because you're a good deal longer, you'll need to go much further beyond the passed vehicle before you can return to your lane.

Backing Up

Hold the bottom of the steering wheel with one hand. Then, to move the trailer to the left, just move that hand to the left. To move the trailer to the right, move your hand to the right. Always back up slowly and, if possible, have someone guide you.

Making Turns

When you're turning with a trailer, make wider turns than normal. Do this so your trailer won't strike soft shoulders, curbs, road signs, trees, or other objects. Avoid jerky or sudden maneuvers. Signal well in advance.

Turn Signals When Towing a Trailer

When you tow a trailer, your vehicle has to have a different turn signal flasher and extra wiring. The green arrows on your instrument panel will flash whenever you signal a turn or lane change. Properly hooked up, the trailer lights will also flash, telling other drivers you're about to turn, change lanes or stop.

When towing a trailer, the green arrows on your instrument panel will flash for turns even if the bulbs on the trailer are burned out. Thus, you may think drivers behind you are seeing your signal when they are not. It's important to check occasionally to be sure the trailer bulbs are still working.

Driving On Grades

Reduce speed and shift to a lower gear **before** you start down a long or steep downgrade. If you don't shift down, you might have to use your brakes so much that they would get hot and no longer work well.

On a long uphill grade, shift down and reduce your speed to around 45 mph (70 km/h) to reduce the possibility of engine and transmission overheating.

If you have an automatic transmission, you should use "D" (or, as you need to, a lower gear) when towing a trailer. Operating your vehicle in "D" when towing a trailer will minimize heat buildup and extend the life of your transmission.

If you have a manual transmission and you are towing a trailer, it's better not to use fifth gear. Just drive in fourth gear (or, as you need to, a lower gear).

Parking on Hills

You really should not park your vehicle, with a trailer attached, on a hill. If something goes wrong, your rig could start to move. People can be injured, and both your vehicle and the trailer can be damaged.

But if you ever have to park your rig on a hill, here's how to do it:

1. Apply your regular brakes, but don't shift into "P" (Park) yet, or in gear for a manual transmission.
2. Have someone place chocks under the trailer wheels.
3. When the wheel chocks are in place, release the regular brakes until the chocks absorb the load.

4. Re–apply the regular brakes. Then apply your parking brake, and then shift to "P" (Park), or "R" (Reverse) for a manual transmission.

5. If you have a four–wheel–drive vehicle, be sure the transfer case is in a drive gear—not in "N" (Neutral).

6. Release the regular brakes.

> **⚠ CAUTION:**
>
> **It can be dangerous to get out of your vehicle if the shift lever is not fully in "P" (Park) with the parking brake firmly set. Your vehicle can roll.**
>
> **If you have left the engine running, the vehicle can move suddenly. You or others could be injured. To be sure your vehicle won't move, even when you're on fairly level ground, use the steps that follow.**
>
> **If you have four -wheel drive and your transfer case is in "N" (Neutral), your vehicle will be free to roll, even if your shift lever is in "P" (Park). So, be sure the transfer case is in a drive gear — not in "N" (Neutral).**
>
> **If you are parking on a hill, or if you're pulling a trailer, also see "Parking On Hills" in the Index.**

When You Are Ready to Leave After Parking on a Hill

1. Apply your regular brakes and hold the pedal down while you:
   - Start your engine;
   - Shift into a gear; and
   - Release the parking brake.
2. Let up on the brake pedal.
3. Drive slowly until the trailer is clear of the chocks.
4. Stop and have someone pick up and store the chocks.

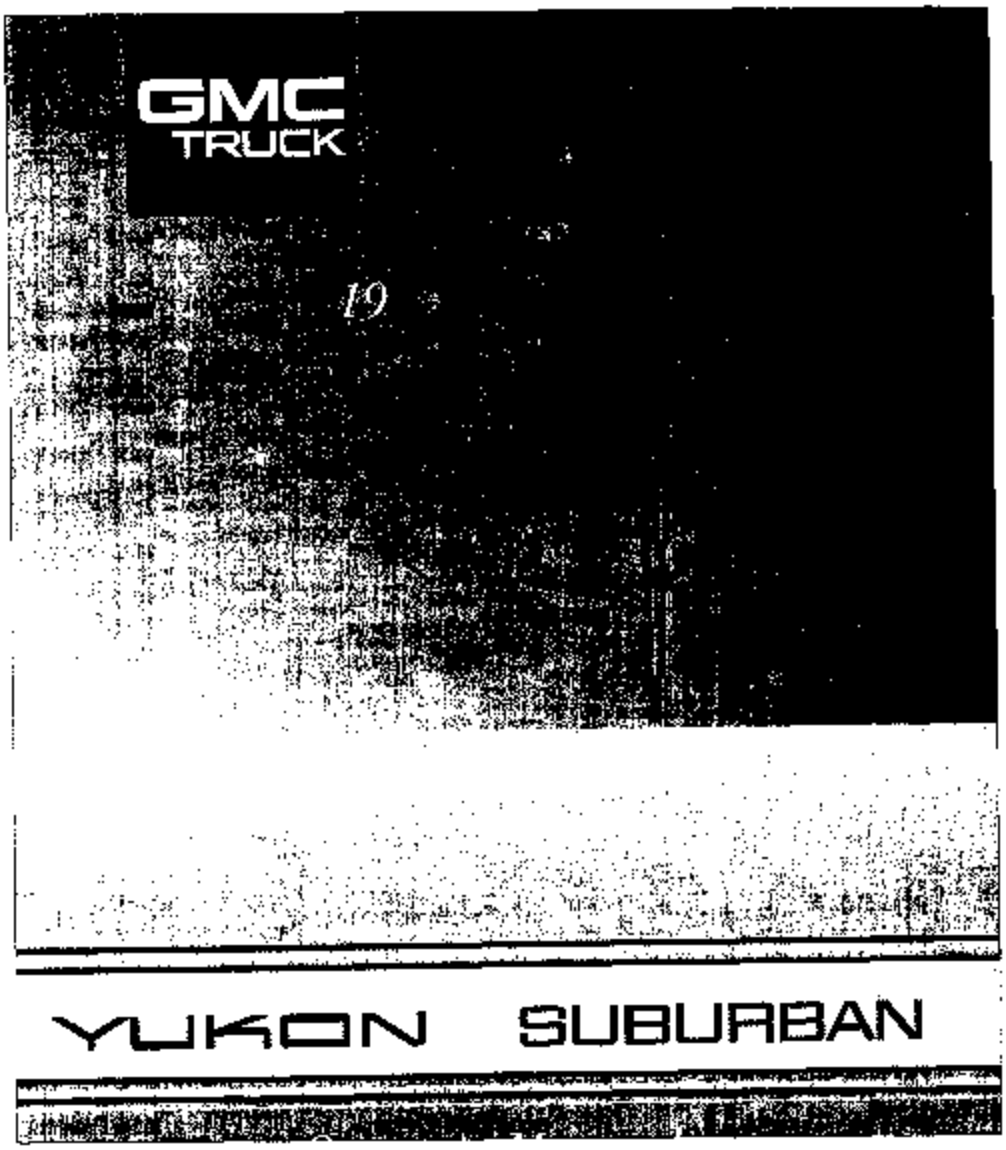
Maintenance When Trailer Towing

Your vehicle will need service more often when you're pulling a trailer. See the Maintenance Schedule for more on this. Things that are especially important in trailer operation are automatic transmission fluid (don't overfill), engine oil, axle lubricant, belt, cooling system, and brake adjustment. Each of these is covered in this manual, and the Index will help you find them quickly. If you're trailering, it's a good idea to review these sections before you start your trip.

Check periodically to see that all hitch nuts and bolts are tight.

Trailer Light Wiring

See "Trailer Wiring Harness" in the Index.



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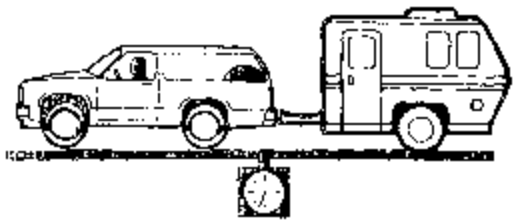


If your vehicle comes with the Trailering Package, there is also a load rating which includes the weight of the vehicle **and** the trailer it tows. This rating is called the Gross Combination Weight Rating (GCWR).

When you weigh your trailer, be sure to include the weight of everything you put in it. And, remember to figure the weight of the people inside as part of your load.

Your dealer can help you determine your GCWR.

Towing a Trailer

⚠ CAUTION:

If you don't use the correct equipment and drive properly, you can lose control when you pull a trailer. For example, if the trailer is too heavy, the brakes may not work well — or even at all. You and your passengers could be seriously injured. Pull a trailer only if you have followed all the steps in this section. Ask your GM dealer for advice and information about towing a trailer with your vehicle.

NOTICE:

Pulling a trailer improperly can damage your vehicle and result in costly repairs not covered by your warranty. To pull a trailer correctly, follow the advice in this part, and see your GM dealer for important information about towing a trailer with your vehicle.

Most vehicles are ready for some trailer towing. If yours was built with trailering options, as many are, it's ready for heavier trailers. But trailering is different than just driving your vehicle by itself. Trailering means changes in handling, durability, and fuel economy. Successful, safe trailering takes correct equipment, and it has to be used properly.

That's the reason for this part. In it are many time-tested, important trailering tips and safety rules. Many of these are important for your safety and that of your passengers. So please read this section carefully before you pull a trailer.

If You Do Decide To Pull A Trailer

If you do, here are some important points.

- There are many different laws, including speed limit restrictions, having to do with trailering. Make sure your rig will be legal, not only where you live but also where you'll be driving. A good source for this information can be state or provincial police.
- Consider using a sway control if your trailer will weigh 3,000 pounds (1 362 kg) or less for utility vehicle or, for wagon, 4,000 pounds (1 800 kg) or less. You should always use a sway control if your trailer will weigh more than 3,000 pounds (1 362 kg) for utility vehicle or 4,000 pounds (1 800 kg) for wagon. You can ask a hitch dealer about sway controls.
- Don't tow a trailer at all during the first 500 miles (800 km) your new vehicle is driven. Your engine, axle or other parts could be damaged.
- Then, during the first 500 miles (800 km) that you tow a trailer, don't drive over 50 mph (80 km/h) and don't make starts at full throttle. This helps your engine and other parts of your vehicle wear in at the heavier loads.
- If you have an automatic transmission, you should use DRIVE (3) (or, as you need to, a lower gear) when towing a trailer. Operating your vehicle in DRIVE (3) when towing a trailer will minimize heat build-up and extend the life of your transmission. If you have a manual transmission and you are towing a trailer, it's better not to use FIFTH (5) gear. Just drive in FOURTH (4) gear (or, as you need to, a lower gear).

Three important considerations have to do with weight:

Weight of the Trailer

How heavy can a trailer safely be?

It depends on how you plan to use your rig. For example, speed, altitude, road grades, outside temperature and how much your vehicle is used to pull a trailer are all important. And, it can also depend on any special equipment that you have on your vehicle.

You can ask your dealer for our trailering information or advice, or you can write us at the address listed in your Warranty and Owner Assistance Information Booklet.

In Canada, write to:

General Motors of Canada Limited

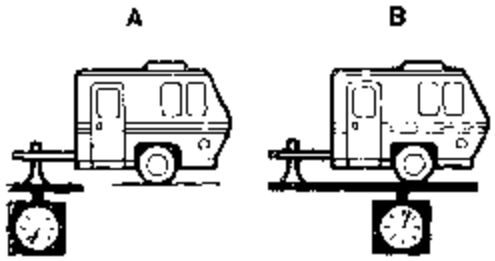
Customer Assistance Center

1908 Colonel Sam Drive

Oshawa, Ontario L1H 8P7

Weight of the Trailer Tongue

The tongue load (A) of any trailer is an important weight to measure because it affects the total or gross weight of your vehicle. The gross vehicle weight (GVW) includes the curb weight of the vehicle, any cargo you may carry in it, and the people who will be riding in the vehicle. And if you will tow a trailer, you must add the tongue load to the GVW because your vehicle will be carrying that weight, too. See "Loading Your Vehicle" in the Index for more information about your vehicle's maximum load capacity.



If you're using a "dead–weight" hitch, the trailer tongue (A) should weigh 10% of the total loaded trailer weight (B). If you have a "weight–distributing" hitch, the trailer tongue (A) should weigh 12% of the total loaded trailer weight (B).

After you've loaded your trailer, weigh the trailer and then the tongue, separately, to see if the weights are proper. If they aren't, you may be able to get them right simply by moving some items around in the trailer.

Total Weight on Your Vehicle's Tires

Be sure your vehicle's tires are inflated to the limit for cold tires. You'll find these numbers on the Certification label at the rear edge of the driver's door or see "Tire Loading" in the Index. Then be sure you don't go over the GVW limit for your vehicle, including the weight of the trailer tongue.

Hitches

It's important to have the correct hitch equipment. Crosswinds, large trucks going by, and rough roads are a few reasons why you'll need the right hitch. Here are some rules to follow:

- If you use a step bumper hitch, and your trailer tongue has a V-shaped foot, your bumper could be damaged in sharp turns. Check the distance from the front edge of the foot to the middle of the hitch ball socket. If the distance is less than 12 inches, take the foot off the trailer tongue.
- If you'll be pulling a trailer with a utility model that, when loaded, will weigh more than 3,000 pounds (2 250 kg) be sure to use a properly mounted, weight-distributing hitch and sway control of the proper size. This equipment is very important for proper vehicle loading and good handling when you're driving.

  If you'll be pulling a trailer with a Suburban that, when loaded, will weigh more than 4,000 pounds (1 814 kg) be sure to use a properly mounted, weight-distributing hitch and sway control of the proper size. This equipment is very important for proper vehicle loading and good handling when you're driving.
- Will you have to make any holes in the body of your vehicle when you install a trailer hitch? If you do, then be sure to seal the holes later when you remove the hitch. If you don't seal them, deadly carbon monoxide (CO) from your exhaust can get into your vehicle (see "Carbon Monoxide" in the Index). Dirt and water can, too.

Safety Chains

You should always attach chains between your vehicle and your trailer. Cross the safety chains under the tongue of the trailer so that the tongue will not drop to the road if it becomes separated from the hitch. Instructions about safety chains may be provided by the hitch manufacturer or by the trailer manufacturer. Follow the manufacturer's recommendation for attaching safety chains and do not attach them to the bumper. Always leave just enough slack so you can turn with your rig. And, never allow safety chains to drag on the ground.

Trailer Brakes

If your trailer weighs more than 1,000 pounds (450 kg) loaded, then it needs its own brakes — and they must be adequate. Be sure to read and follow the instructions for the trailer brakes so you'll be able to install, adjust and maintain them properly.

Your trailer brake system can tap into your vehicle's hydraulic brake system, but consider the following:

- Will the trailer brake system use more than 0.02 cubic inch (0.3 cc) of fluid from your vehicle's master cylinder? If it will, don't tap into your vehicle's brake system. Both braking systems won't work well, and you could even lose your brakes altogether.
- Will the trailer brake parts take 3,000 psi (20 650 kPa) of pressure? If not, the trailer brake system must not be used with your vehicle.

If everything checks out this far, make the brake tap at the port on the master cylinder that sends the fluid to the rear brakes. But don't use copper tubing for this. If you do, it will bend and finally break off. Use steel brake tubing.

Driving with a Trailer

⚠ CAUTION:

If you have a rear–most window open and you pull a trailer with your vehicle, carbon monoxide (CO) could come into your vehicle. You can't see or smell CO. It can cause unconsciousness or death. (See "Engine Exhaust" in the Index.) To maximize your safety when towing a trailer:

- **Have your exhaust system inspected for leaks, and make necessary repairs before starting on your trip.**
- **Keep the rear–most windows closed.**
- **If exhaust does come into your vehicle through a window in the rear or another opening, drive with your front, main heating or cooling system on and with the fan on any speed. This will bring fresh, outside air into your vehicle. Do not use MAX because it only recirculates the air inside your vehicle. (See "Comfort Controls" in the Index.)**

Towing a trailer requires a certain amount of experience. Before setting out for the open road, you'll want to get to know your rig. Acquaint yourself with the feel of handling and braking with the added weight of the trailer. And always keep in mind that the vehicle you are driving is now a good deal longer and not nearly as responsive as your vehicle is by itself.

Before you start, check the trailer hitch and platform (and attachments), safety chains, electrical connector, lamps, tires and mirror adjustment. If the trailer has electric brakes, start your vehicle and trailer moving and then apply the trailer brake controller by hand to be sure the brakes are working. This lets you check your electrical connection at the same time.

During your trip, check occasionally to be sure that the load is secure, and that the lamps and any trailer brakes are still working.

Following Distance

Stay at least twice as far behind the vehicle ahead as you would when driving your vehicle without a trailer. This can help you avoid situations that require heavy braking and sudden turns.

Passing

You'll need more passing distance up ahead when you're towing a trailer. And, because you're a good deal longer, you'll need to go much farther beyond the passed vehicle before you can return to your lane.

Backing Up

Hold the bottom of the steering wheel with one hand. Then, to move the trailer to the left, just move that hand to the left. To move the trailer to the right, move your hand to the right. Always back up slowly and, if possible, have someone guide you.

Making Turns

NOTICE:

Making very sharp turns while trailering could cause the trailer to come in contact with the vehicle. Your vehicle could be damaged. Avoid making very sharp turns while trailering.

When you're turning with a trailer, make wider turns than normal. Do this so your trailer won't strike soft shoulders, curbs, road signs, trees, or other objects. Avoid jerky or sudden maneuvers. Signal well in advance.

Turn Signals When Towing a Trailer

When you tow a trailer, your vehicle has to have extra wiring (included in the optional trailering package). The green arrows on your instrument panel will flash whenever you signal a turn or lane change. Properly hooked up, the trailer lamps will also flash, telling other drivers you're about to turn, change lanes or stop.

When towing a trailer, the green arrows on your instrument panel will flash for turns even if the bulbs on the trailer are burned out. Thus, you may think drivers behind you are seeing your signal when they are not. It's important to check occasionally to be sure the trailer bulbs are still working.

Driving On Grades

Reduce speed and shift to a lower gear *before* you start down a long or steep downgrade. If you don't shift down, you might have to use your brakes so much that they would get hot and no longer work well.

On a long uphill grade, shift down and reduce your speed to around 45 mph (70 km/h) to reduce the possibility of engine and transmission overheating.

If you have an automatic transmission you should use DRIVE (3) (or, as you need to, a lower gear) when towing a trailer. Operating your vehicle in DRIVE (3) when towing a trailer will minimize heat build-up and extend the life of your transmission.

If you have a manual transmission and you are towing a trailer, it's better not to use FIFTH (5) gear. Just drive in FOURTH (4) gear (or, as you need to, a lower gear).

When towing at high altitude on steep uphill grades, consider the following: Engine coolant will boil at a lower temperature than at normal altitudes. If you turn your engine off immediately after towing at high altitude on steep uphill grades, your vehicle may show signs similar to engine overheating. To avoid this, let the engine run while parked (preferably on level ground) with the automatic transmission in PARK (P) (or the manual transmission out of gear and the parking brake applied) for a few minutes before turning the engine off. If you do get the overheat warning, see "Engine Overheating" in the Index.

Parking on Hills

You really should not park your vehicle, with a trailer attached, on a hill. If something goes wrong, your rig could start to move. People can be injured, and both your vehicle and the trailer can be damaged.

But if you ever have to park your rig on a hill, here's how to do it:

1. Apply your regular brakes, but don't shift into PARK (P) yet, or in gear for a manual transmission.

2. Have someone place chocks under the trailer wheels.
3. When the wheel chocks are in place, release the regular brakes until the chocks absorb the load.
4. Re–apply the regular brakes. Then apply your parking brake, and then shift to PARK (P), or REVERSE (R) for a manual transmission.
5. If you have a four–wheel drive vehicle, be sure the transfer case is in a drive gear — not in NEUTRAL (N).
6. Release the regular brakes.

> **⚠ CAUTION:**
>
> **It can be dangerous to get out of your vehicle if the shift lever is not fully in PARK (P) with the parking brake firmly set. Your vehicle can roll.**
>
> **If you have left the engine running, the vehicle can move suddenly. You or others could be injured. To be sure your vehicle won't move, even when you're on fairly level ground, use the steps that follow.**
>
> **If you have four–wheel drive and your transfer case is in NEUTRAL (N), your vehicle will be free to roll, even if your shift lever is in PARK (P). So, be sure the transfer case is in a drive gear — not in NEUTRAL (N).**

When You Are Ready to Leave After Parking on a Hill

1. Apply your regular brakes and hold the pedal down while you:
   - Start your engine;
   - Shift into a gear; and
   - Release the parking brake.
2. Let up on the brake pedal.
3. Drive slowly until the trailer is clear of the chocks.
4. Stop and have someone pick up and store the chocks.

Maintenance When Trailer Towing

Your vehicle will need service more often when you're pulling a trailer. See the Maintenance Schedule for more information. Things that are especially important in trailer operation are automatic transmission fluid (don't overfill), engine oil, axle lubricant, belt, cooling system, and brake adjustment. Each of these is covered in this manual, and the Index will help you find them quickly. If you're trailering, it's a good idea to review these sections before you start your trip.

Check periodically to see that all hitch nuts and bolts are tight.

Trailer Lighting Systems Wiring

See "Trailer Wiring Harness" in the Index.

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GMC
TRUCK

Yukon/
Suburban

The Certification/Tire label also tells you the maximum weights for the front and rear axles, called Gross Axle Weight Rating (GAWR). To find out the actual loads on your front and rear axles, you need to go to a weigh station and weigh your vehicle. Your dealer can help you with this. Be sure to spread out your load equally on both sides of the centerline.

Never exceed the GVWR for your vehicle, or the GAWR for either the front or rear axle.

And, if you do have a heavy load, you should spread it out.

⚠ CAUTION:

Do not load your vehicle any heavier than the GVWR, or either the maximum front or rear GAWR. If you do, parts on your vehicle can break, or it can change the way your vehicle handles. These could cause you to lose control. Also, overloading can shorten the life of your vehicle.

Using heavier suspension components to get added durability might not change your weight ratings. Ask your dealer to help you load your vehicle the right way.

NOTICE:

Your warranty does not cover parts or components that fail because of overloading.

If you put things inside your vehicle -- like suitcases, tools, packages, or anything else -- they go as fast as the vehicle goes. If you have to stop or turn quickly, or if there is a crash, they'll keep going.

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⚠ CAUTION:

Things you put inside your vehicle can ... and injure people in a sudden stop or turn, or in a crash.

- Put things in the cargo area of your vehicle. Try to spread the weight evenly.
- Never stack heavier things, like suitcases, inside the vehicle so that some of them are above the tops of the seats.
- Don't leave an unsecured child restraint in your vehicle.
- When you carry something inside the vehicle, secure it whenever you can.
- Don't leave a seat folded down unless you need to.

There's also important loading information for off-road driving in this manual. See "Loading Your Vehicle" in the Index.

Towing a Trailer

⚠ CAUTION:

If you don't use the correct equipment and drive properly, you can lose control when you pull a trailer. For example, if the trailer is too heavy, the brakes may not work well -- or even at all. You and your passengers could be seriously injured. Pull a trailer only if you have followed all the steps in this section. Ask your GM dealer for advice and information about towing a trailer with your vehicle.

NOTICE:

Pulling a trailer improperly can damage your vehicle and result in costly repairs not covered by your warranty. To pull a trailer correctly, follow the advice in this part, and see your GM dealer for important information about towing a trailer with your vehicle.

Every vehicle is ready for some trailer towing. If yours was built with trailering options, as many are, it's ready for heavier trailers. But trailering is different than just driving your vehicle by itself. Trailering means changes in handling, durability and fuel economy. Successful, safe trailering takes correct equipment, and it has to be used properly.

That's the reason for this part. In it are many time-tested, important trailering tips and safety rules. Many of these are important for your safety and that of your passengers. So please read this section carefully before you pull a trailer.

If You Do Decide To Pull A Trailer

If you do, there are some important points.

- There are many different laws, including speed limit restrictions, having to do with trailering. Make sure your rig will be legal, not only where you live but also where you'll be driving. A good source for this information can be state or provincial police.
- Consider using a sway control if your trailer will weigh 4,000 lbs. (1 800 kg) or less. You should always use a sway control if your trailer will weigh more than 4,000 lbs. (1 800 kg). You can ask a hitch dealer about sway controls.
- Don't tow a trailer at all during the first 500 miles (800 km) your new vehicle is driven. Your engine, axle or other parts could be damaged.
- When, during the first 500 miles (800 km) that you tow a trailer, don't drive over 50 mph (80 km/h) and don't make starts at full throttle. This helps your engine and other parts of your vehicle wear in at the heavier loads.
- If you have an automatic transmission, you can tow in OVERDRIVE (OD). You may want to shift the transmission to DRIVE (D) or, if necessary, a lower gear selection if the transmission shifts too often (e.g., under heavy loads and/or hilly conditions).

Three important considerations have to do with weight:
the weight of the trailer,
the weight of the trailer tongue
and the weight on your vehicle's tires.

Weight of the Trailer

How heavy can a trailer safely be?

It depends on how you plan to use your rig. For example, speed, altitude, road grades, outside temperature and how much your vehicle is used to pull a trailer are all important. And, it can also depend on any special equipment that you have on your vehicle.

Use the following chart to determine how much your vehicle can weigh, based upon your vehicle model and options.

Maximum trailer weight is calculated assuming the driver and one passenger are in the tow vehicle and it has all the required trailering equipment. The weight of additional optional equipment, passengers and cargo in the tow vehicle must be subtracted from the maximum trailer weight.

Above the 2,000 lbs. (908 kg) trailer rating, the engine oil cooler is required on C/K-1500 models with 5.7L engine and C/K-2500 Suburban models with 5.7L engine and 3.73 axle ratio.

Vehicle	Axle Ratio	Max. Trailer Wt.
C-1500 (2WD)		
Utility	3.08	5,000 lbs. (2 270 kg)
	3.42	6,000 lbs. (2 724 kg)
	3.73	7,000 lbs. (3 178 kg)
K-1500 (4WD)		
Utility	3.42	5,500 lbs. (2 497 kg)
	3.73	6,500 lbs. (2 951 kg)
C-1500 (2WD)		
Suburban	3.42	5,500 lbs. (2 497 kg)
	3.73	6,500 lbs. (2 951 kg)
K-1500 (4WD)		
Suburban	3.73	5,000 lbs. (2 270 kg)
	4.10	6,000 lbs. (2 724 kg)
C-2500 (2WD)		
Suburban	3.73	6,000 lbs. (2 724 kg)
	4.10	7,500 lbs. (3 405 kg)
K-2500 (4WD)		
Suburban	4.10	7,000 lbs. (3 178 kg)

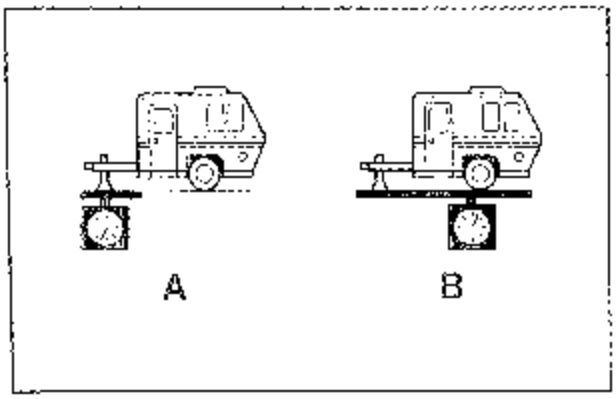
You can ask your dealer for our trailering information or advice, or you can write us at the address listed in your Warranty and Owner Assistance Information Booklet.

In Canada, write to:

General Motors of Canada Limited
Customer Assistance Center
1908 Colonel Sam Drive
Oshawa, Ontario L1H 8P7

Weight of the Trailer Tongue

The tongue load (A) of any trailer is an important weight to measure because it affects the total or gross weight of your vehicle. The Gross Vehicle Weight (GVW) includes the curb weight of the vehicle, any cargo you may carry in it, and the people who will be riding in the vehicle. And if you will tow a trailer, you must add the tongue load to the GVW because your vehicle will be carrying that weight, too. See "Loading Your Vehicle" in the Index for more information about your vehicle's maximum load capacity.



If you're using a weight-carrying hitch, the trailer tongue (A) should weigh 10 percent of the total loaded trailer weight (B). If you're using a weight-distributing hitch, the trailer tongue (A) should weigh 12 percent of the total loaded trailer weight (B).

After you've loaded your trailer, weigh the trailer and then the tongue, separately, to see if the weights are proper. If they aren't, you may be able to get them right simply by moving some items around in the trailer.

Total Weight on Your Vehicle's Tires

Be sure your vehicle's tires are inflated to the limit for cold tires. You'll find these numbers on the Certification label at the rear edge of the driver's door or see "Tire Loading" in the Index. Then be sure you don't go over the GVW limit for your vehicle, including the weight of the trailer tongue.

Hitches

It's important to have the correct hitch equipment. Crosswinds, large trucks going by and rough roads are a few reasons why you'll need the right hitch. Here are some rules to follow:

- If you use a step-bumper hitch, your bumper could be damaged in sharp turns. Make sure you have ample room when turning to avoid contact between the trailer and the bumper.
- If you'll be pulling a trailer that, when loaded, will weigh more than 2,000 lbs. (1 800 kg), be sure to use a properly mounted, weight-distributing hitch and sway control of the proper size. This equipment is very important for proper vehicle loading and good handling when you're driving.
- Will you have to make any holes in the body of your vehicle when you install a trailer hitch?

  If you do, then be sure to seal the holes later when you remove the hitch. If you don't seal them, deadly carbon monoxide (CO) from your exhaust can get into your vehicle (see "Carbon Monoxide" in the Index). Dirt and water can, too.

Safety Chains

You should always attach chains between your vehicle and your trailer. Cross the safety chains under the tongue of the trailer so that the tongue will not drop to the road if it becomes separated from the hitch. Instructions about safety chains may be provided by the hitch manufacturer or by the trailer manufacturer. Follow the manufacturer's recommendation for attaching safety chains and do not attach them to the bumper. Always leave just enough slack so you can turn with your rig. And, never allow safety chains to drag on the ground.

Trailer Brakes

If your trailer weighs more than 1,000 lbs. (450 kg) loaded, then it needs its own brakes -- and they must be adequate. Be sure to read and follow the instructions for the trailer brakes so you'll be able to install, adjust and maintain them properly.

Your trailer brake system can tap into the vehicle's hydraulic brake system only if:

- The trailer parts can withstand 3,000 psi (20,650 kPa) of pressure.
- The trailer's brake system will use less than 0.02 cubic inch (0,3 cc) of fluid from your vehicle's master cylinder. Otherwise, both braking systems won't work well. You could even lose your brakes.

If everything checks out this far, make the brake tap at the port on the master cylinder that sends the fluid to the rear brakes. But don't use copper tubing for this. If you do, it will bend and finally break off. Use steel brake tubing.

Driving with a Trailer

⚠ CAUTION:

If you have a rear-most window open and you pull a trailer with your vehicle, carbon monoxide (CO) could come into your vehicle. You can't see or smell CO. It can cause unconsciousness or death. (See "Engine Exhaust" in the Index.) To maximize your safety when towing a trailer:

- **Have your exhaust system inspected for leaks, and make necessary repairs before starting on your trip.**
- **Keep the rear-most windows closed.**
- **If exhaust does come into your vehicle through a window in the rear or another opening, drive with your front, main heating or cooling system on and with the fan on any speed. This will bring fresh, outside air into your vehicle. Do not use MAX because it only recirculates the air inside your vehicle. (See "Comfort Controls" in the Index.)**

Towing a trailer requires a certain amount of experience. Before setting out for the open road, you'll want to get to know your rig. Acquaint yourself with the feel of handling and braking with the added weight of the trailer. And always keep in mind that the vehicle you are driving is now a good deal longer and not nearly as responsive as your vehicle is by itself.

Before you start, check the trailer hitch and platform (and attachments), safety chains, electrical connector, lamps, tires and mirror adjustment. If the trailer has electric brakes, start your vehicle and trailer moving and then apply the trailer brake controller by hand to be sure the brakes are working. This lets you check your electrical connection at the same time.

During your trip, check occasionally to be sure that the load is secure, and that the lamps and any trailer brakes are still working.

Following Distance

Stay at least twice as far behind the vehicle ahead as you would when driving your vehicle without a trailer. This can help you avoid situations that require heavy braking and sudden turns.

Passing

You'll need more passing distance up ahead when you're towing a trailer. And, because you're a good deal longer, you'll need to go much farther beyond the passed vehicle before you can return to your lane.

Backing Up

Hold the bottom of the steering wheel with one hand. Then, to move the trailer to the left, just move that hand to the left. To move the trailer to the right, move your hand to the right. Always back up slowly and, if possible, have someone guide you.

NOTICE:

Making very sharp turns while trailering could cause the trailer to come in contact with the vehicle. Your vehicle could be damaged. Avoid making very sharp turns while trailering.

When you're towing with a trailer, make wider turns than normal. Do this so your trailer won't strike soft shoulders, curbs, road signs, trees or other objects. Avoid jerky or sudden maneuvers. Signal well in advance.

Turn Signals When Towing a Trailer

The green arrows on your instrument panel will flash whenever you signal a turn or lane change. Properly hooked up, the trailer lamps will also flash, telling other drivers you're about to turn, change lanes or stop.

When towing a trailer, the green arrows on your instrument panel will flash for turns even if the bulbs on the trailer are burned out. Thus, you may think drivers behind you are seeing your signal when they are not. It's important to check occasionally to be sure the trailer bulbs are still working.

Reduce speed and shift to a lower gear *before* you start down a long or steep downgrade. If you don't shift down, you might have to use your brakes so much that they would get hot and no longer work well.

On a long uphill grade, shift down and reduce your speed to around 45 mph (70 km/h) to reduce the possibility of engine and transmission overheating.

If you have an automatic transmission you should use THIRD (3) (or, as you need to, a lower gear) when towing a trailer. Operating your vehicle in THIRD (3) when towing a trailer will minimize heat buildup and extend the life of your transmission.

When towing at high altitude on steep uphill grades, consider the following: Engine coolant will boil at a lower temperature than at normal altitudes. If you turn your engine off immediately after towing at high altitude on steep uphill grades, your vehicle may show signs similar to engine overheating. To avoid this, let the engine run while parked (preferably on level ground) with the automatic transmission in PARK (P) for a few minutes before turning the engine off. If you do get the overheat warning, see "Engine Overheating" in the Index.

Parking on Hills

You really should not park your vehicle, with a trailer attached, on a hill. If something goes wrong, your rig could start to move. People can be injured, and both your vehicle and the trailer can be damaged.

But if you ever have to park your rig on a hill, here's how to do it:

1. Apply your regular brakes, but don't shift into PARK (P) yet.
2. Have someone place chocks under the trailer wheels.
3. When the wheel chocks are in place, release the regular brakes until the chocks absorb the load.
4. Reapply the regular brakes. Then apply your parking brake, and then shift to PARK (P).
5. If you have a four-wheel-drive vehicle, be sure the transfer case is in a drive gear -- not in NEUTRAL (N).
6. Release the regular brakes.

⚠ CAUTION:

It can be dangerous to get out of your vehicle if the shift lever is not fully in PARK (P) with the parking brake firmly set. Your vehicle can roll. If you have left the engine running, the vehicle can move suddenly. You or others could be injured. To be sure your vehicle won't move, even when you're on fairly level ground, use the steps that follow.

If you have four-wheel drive and your transfer case is in NEUTRAL (N), your vehicle will be free to roll, even if your shift lever is in PARK (P). So, be sure the transfer case is in a drive gear -- not in NEUTRAL (N).

When You Are Ready to Leave After Parking on a Hill

1. Apply your regular brakes and hold the pedal down while you:
   - Start your engine;
   - Shift into a gear; and
   - Release the parking brake.
2. Let up on the brake pedal.
3. Drive slowly until the trailer is clear of the chocks.
4. Stop and have someone pick up and store the chocks.

Maintenance When Trailer Towing

Your vehicle will need service more often when you're pulling a trailer. See the Maintenance Schedule for more on this. Things that are especially important in trailer operation are automatic transmission fluid (don't overfill), engine oil, axle lubricant, belt, cooling system and brake adjustment. Each of these is covered in this manual, and the Index will help you find them quickly. If you're trailering, it's a good idea to review these sections before you start your trip.

Check periodically to see that all hitch nuts and bolts are tight.

...ing Harness

... harness is stored under the rear of your ... on the frame rails. An electrical connector ... added at the trailer end of the harness, by ... electrical technician. For additional trailer wiring and towing information, please consult your dealer. Securely attach the harness to the trailer, then tape or strap it to your vehicle's frame rail. Be sure you leave it loose enough so the wiring won't bind or break when turning with the trailer, but not so loose that it drags on the ground. Store the harness in its original position. Wrap the harness together and tie it neatly so it won't be damaged. If you tow a trailer, your Center High-Mounted Stoplamp (CHMSL) may not be properly visible from behind. You should select a trailer with a CHMSL on it or, if one is not available, have one installed. See your GM dealer about how to connect your vehicle's wiring to a trailer CHMSL.

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CAUTION:

If you don't use the correct equipment and drive properly, you can lose control when you pull a trailer. For example, if the trailer is too heavy, the brakes may not work well -- or even at all. You and your passengers could be seriously injured. Pull a trailer only if you have followed all the steps in this section. Ask your GM dealer for advice and information about towing a trailer with your vehicle.

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If You Do Decide To Pull A Trailer

If you do, here are some important points:

- There are many different laws, including speed limit restrictions, having to do with trailering. Make sure your rig will be legal, not only where you live but also where you'll be driving. A good source for this information can be state or provincial police.
- Consider using a sway control if your trailer will weigh less than the capacity stamped on your step bumper. You should always use a sway control if your trailer will weigh more than the capacity stamped on your step bumper. You can ask a hitch dealer about sway controls.
- Don't tow a trailer at all during the first 500 miles (800 km) your new vehicle is driven. Your engine, axle or other parts could be damaged.
- Then, during the first 500 miles (800 km) that you tow a trailer, don't drive over 50 mph (80 km/h) and don't make starts at full throttle. This helps your engine and other parts of your vehicle wear in at the heavier loads.
- If you have an automatic transmission, you can tow in OVERDRIVE (OD). You may want to shift the transmission to THIRD (3) or, if necessary, a lower gear selection if the transmission shifts too often (e.g., under heavy loads and/or hilly conditions).

Three important considerations have to do with weight:

- the weight of the trailer,
- the weight of the trailer tongue
- and the weight on your vehicle's tires.

Weight of the Trailer

How heavy can a trailer safely be?

It depends on how you plan to use your rig. For example, speed, altitude, road grades, outside temperature and how much your vehicle is used to pull a trailer are all important. And, it can also depend on any special equipment that you have on your vehicle.

Use the following chart to determine how much your vehicle can weigh, based upon your vehicle model and options.

Maximum trailer weight is calculated assuming the driver and one passenger are in the tow vehicle and it has all the required trailering equipment. The weight of additional optional equipment, passengers and cargo in the tow vehicle must be subtracted from the maximum trailer weight.

Above the 2,000 lbs. (908 kg) trailer rating, the engine oil cooler is required on C/K-1500 and C/K-2500 models. Refer to the Trailering Guide for oil cooler recommendations.

Vehicle	Engine	Axle Ratio	Max. Trailer Wt.
C-1500 (2WD) Utility	5.7L	3.08	5,000 lbs. (2 270 kg)
		3.42	6,000 lbs. (2 724 kg)
		3.73	7,000 lbs. (3 178 kg)
K-1500 (4WD) Utility	5.7L	3.42	5,500 lbs. (2 497 kg)
		3.73	6,500 lbs. (2 951 kg)
	6.5L Diesel	3.42	6,000 lbs. (2 724 kg)
		3.73	7,000 lbs. (3 178 kg)
C-1500 (2WD) Suburban	5.3L	3.42	5,500 lbs. (2 497 kg)
		3.73	6,500 lbs. (2 951 kg)
	6.5L Diesel	3.42	5,500 lbs. (2 497 kg)
K-1500 (4WD) Suburban	5.7L	3.42	5,000 lbs. (2 270 kg)
		3.73	6,000 lbs. (2 724 kg)
	6.5L Diesel	3.42	5,000 lbs. (2 270 kg)

Vehicle	Engine	Axle Ratio	Max. Trailer Wt.
C-2500 (2WD) Suburban	5.7L	3.73	6,000 lbs. (2 724 kg)
		4.10	7,500 lbs. (3 405 kg)
	6.5L Diesel	3.73	6,500 lbs. (2 951 kg)
		4.10	8,000 lbs. (3 632 kg)
	7.4L	3.73	8,500 lbs. (3 859 kg)
		4.10	10,000 lbs. (4 540 kg)
K-2500 (4WD) Suburban	5.7L	4.10	7,000 lbs. (3 178 kg)
	6.5L Diesel	3.73	6,000 lbs. (2 724 kg)
		4.10	7,500 lbs. (3 405 kg)
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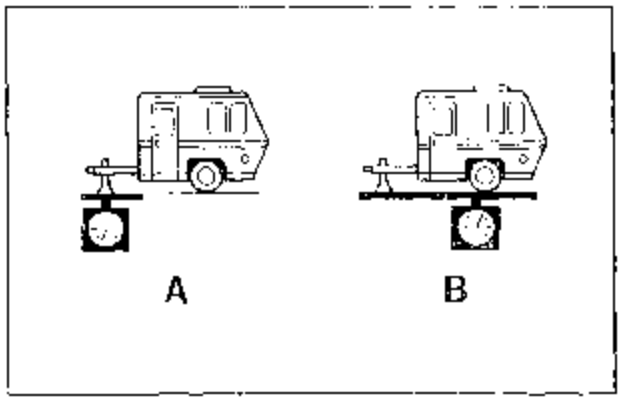
In Canada, write to:

General Motors of Canada Limited
Customer Communication Centre
1908 Colonel Sam Drive
Oshawa, Ontario L1H 8P7

Weight of the Trailer Tongue

The tongue load (A) of any trailer is an important weight to measure because it affects the total or gross weight of your vehicle. The Gross Vehicle Weight (GVW) includes the curb weight of the vehicle, any cargo you may carry in it, and the people who will be riding in the vehicle. And if you will tow a trailer, you must add the tongue load to the GVW because your vehicle will be carrying that weight, too. See "Loading Your Vehicle" in the Index for more information about your vehicle's maximum load capacity.



If you're using a weight-carrying hitch, the trailer tongue (A) should weigh 10 percent of the total loaded trailer weight (B). If you're using a weight-distributing hitch, the trailer tongue (A) should weigh 12 percent of the total loaded trailer weight (B).

After you've loaded your trailer, weigh the trailer and then the tongue, separately, to see if the weights are proper. If they aren't, you may be able to get them right simply by moving some items around in the trailer.

Total Weight on Your Vehicle's Tires

Be sure your vehicle's tires are inflated to the upper limit for cold tires. You'll find these numbers on the Certification label at the rear edge of the driver's door or see "Tire Loading" in the Index. Then be sure you don't go over the GVW limit for your vehicle, including the weight of the trailer tongue.

Hitches

It's important to have the correct hitch equipment. Crosswinds, large trucks going by and rough roads are a few reasons why you'll need the right hitch. Here are some rules to follow:

- If you use a step-bumper hitch, your bumper could be damaged in sharp turns. Make sure you have ample room when trailing to avoid contact between the trailer and the bumper.
- If you'll be pulling a trailer that, when loaded, will weigh more than the capacity stamped on your step bumper, be sure to use a properly mounted, weight-distributing hitch and sway control of the proper size. This equipment is very important for proper vehicle loading and good handling when you're driving.
- Will you have to make any holes in the body of your vehicle when you install a trailer hitch?

  If you do, then be sure to seal the holes later when you remove the hitch. If you don't seal them, deadly carbon monoxide (CO) from your exhaust can get into your vehicle (see "Carbon Monoxide" in the Index). Dirt and water can, too.

Safety Chains

You should always attach chains between your vehicle and your trailer. Cross the safety chains under the tongue of the trailer so that the tongue will not drop to the road if it becomes separated from the hitch. Instructions about safety chains may be provided by the hitch manufacturer or by the trailer manufacturer. Follow the manufacturer's recommendation for attaching safety chains and do not attach them to the bumper. Always leave just enough slack so you can turn with your rig. And, never allow safety chains to drag on the ground.

Trailer Brakes

If your trailer weighs more than 1,000 lbs. (450 kg) loaded, then it needs its own brakes — and they must be adequate. Be sure to read and follow the instructions for the trailer brakes so you'll be able to install, adjust and maintain them properly.

Your trailer brake system can tap into the vehicle's hydraulic brake system only if:

- The trailer parts can withstand 3,000 psi (20,650 kPa) of pressure.
- The trailer's brake system will use less than 0.03 cubic inch (0.5 cc) of fluid from your vehicle's master cylinder. Otherwise, both braking systems won't work well. You could even lose your brakes.

If everything checks out this far, make the brake tap at the port on the master cylinder that sends the fluid to the rear brakes. But don't use copper tubing for this. If you do, it will bend and finally break off. Use steel brake tubing.

Driving with a Trailer

⚠ CAUTION:

If you have a rear-most window open and you pull a trailer with your vehicle, carbon monoxide (CO) could come into your vehicle. You can't see or smell CO. It can cause unconsciousness or death. (See "Engine Exhaust" in the Index.) To maximize your safety when towing a trailer:

- **Have your exhaust system inspected for leaks, and make necessary repairs before starting on your trip.**
- **Keep the rear-most windows closed.**
- **If exhaust does come into your vehicle through a window in the rear or another opening, drive with your front, main heating or cooling system on and with the fan on any speed. This will bring fresh, outside air into your vehicle. Do not use the recirculation button or MAX because it only recirculates the air inside your vehicle. (See "Comfort Controls" in the Index.)**

Towing a trailer requires a certain amount of experience. Before setting out for the open road, you'll want to get to know your rig. Acquaint yourself with the feel of handling and braking with the added weight of the trailer. And always keep in mind that the vehicle you are driving is now a good deal longer and not nearly as responsive as your vehicle is by itself.

Before you start, check the trailer hitch and platform (and attachments), safety chains, electrical connector, lamps, tires and mirror adjustment. If the trailer has electric brakes, start your vehicle and trailer moving and then apply the trailer brake controller by hand to be sure the brakes are working. This lets you check your electrical connection at the same time.

During your trip, check occasionally to be sure that the load is secure, and that the lamps and any trailer brakes are still working.

Following Distance

Stay at least twice as far behind the vehicle ahead as you would when driving your vehicle without a trailer. This can help you avoid situations that require heavy braking and sudden turns.

Passing

You'll need more passing distance up ahead when you're towing a trailer. And, because you're a good deal longer, you'll need to go much farther beyond the passed vehicle before you can return to your lane.

Backing Up

Hold the bottom of the steering wheel with one hand. Then, to move the trailer to the left, just move that hand to the left. To move the trailer to the right, move your hand to the right. Always back up slowly and, if possible, have someone guide you.

NOTICE:

Making very sharp turns while trailering could cause the trailer to come in contact with the vehicle. Your vehicle could be damaged. Avoid making very sharp turns while trailering.

When you're turning with a trailer, make wider turns than normal. Do this so your trailer won't strike soft shoulders, curbs, road signs, trees or other objects. Avoid jerky or sudden maneuvers. Signal well in advance.

Turn Signals When Towing a Trailer

The green arrows on your instrument panel will flash whenever you signal a turn or lane change. Properly hooked up, the trailer lamps will also flash, telling other drivers you're about to turn, change lanes or stop.

When towing a trailer, the green arrows on your instrument panel will flash for turns even if the bulbs on the trailer are burned out. Thus, you may think drivers behind you are seeing your signal when they are not. It's important to check occasionally to be sure the trailer bulbs are still working.

Driving On Grades

Reduce speed and shift to a lower gear *before* you start down a long or steep downgrade. If you don't shift down, you might have to use your brakes so much that they would get hot and no longer work well.

On a long uphill grade, shift down and reduce your speed to around 45 mph (70 km/h) to reduce the possibility of engine and transmission overheating.

If you have an automatic transmission, you can tow in AUTOMATIC OVERDRIVE (D). You may want to shift the transmission to THIRD (3), or, if necessary, a lower gear selection if the transmission shifts too often (e.g., under heavy loads and/or hilly conditions).

When towing at high altitudes on steep uphill grades, consider the following: Engine coolant will boil at a lower temperature than at normal altitudes. If you turn your engine off immediately after towing at high altitude on steep uphill grades, your vehicle may show signs similar to engine overheating. To avoid this, let the engine run while parked (preferably on level ground) with the automatic transmission in PARK (P) for a few minutes before turning the engine off. If you do get the overheat warning, see "Engine Overheating" in the Index.

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Parking on Hills

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But if you ever have to park your rig on a hill, here's how to do it:

1. Apply your regular brakes, but don't shift into PARK (P) yet.
2. Have someone place chocks under the trailer wheels.
3. When the wheel chocks are in place, release the regular brakes until the chocks absorb the load.
4. Reapply the regular brakes. Then apply your parking brake, and then shift to PARK (P).
5. If you have a four-wheel-drive vehicle, be sure the transfer case is in a drive gear -- not in NEUTRAL (N).
6. Release the regular brakes.

⚠ CAUTION:

It can be dangerous to get out of your vehicle if the shift lever is not fully in PARK (P) with the parking brake firmly set. Your vehicle can roll.

If you have left the engine running, the vehicle can move suddenly. You or others could be injured. To be sure your vehicle won't move, even when you're on fairly level ground, use the steps that follow.

If you have four-wheel drive and your transfer case is in NEUTRAL (N), your vehicle will be free to roll, even if your shift lever is in PARK (P). So, be sure the transfer case is in a drive gear -- not in NEUTRAL (N).

When You Are Ready to Leave After Parking on a Hill

1. Apply your regular brakes and hold the pedal while you:
   - Start your engine,
   - Shift into a gear, and
   - Release the parking brake.
2. Let up on the brake pedal.
3. Drive slowly until the trailer is clear of the chocks.
4. Stop and have someone pick up and store the chocks.

Maintenance When Trailer Towing

Your vehicle will need service more often when you're pulling a trailer. See the Maintenance Schedule for more on this. Things that are especially important in trailer operation are automatic transmission fluid (don't overfill), engine oil, axle lubricant, belt, cooling system and brake adjustment. Each of these is covered in this manual, and the Index will help you find them quickly. If you're trailering, it's a good idea to review these sections before you start your trip.

Check periodically to see that all hitch nuts and bolts are tight.

Trailer Wiring Harness

Your vehicle's wire harness is stored under the rear of your vehicle, between the frame rails. An electrical connector will need to be added at the trailer end of the harness, by a qualified electrical technician. For additional trailer wiring and towing information, please consult your dealer. Securely attach the harness to the trailer, then tape or strap it to your vehicle's frame rail. Be sure you leave it loose enough so the wiring won't bind or break when turning with the trailer, but not so loose that it drags on the ground. Store the harness in its original position. Wrap the harness together and tie it neatly so it won't be damaged. If you tow a trailer, your Center High-Mounted Stoplamp (CHMSL) may not be properly visible from behind. You should select a trailer with a CHMSL on it or, if one is not available, have one installed. See your GM dealer about how to connect your vehicle's wiring to a trailer CHMSL.

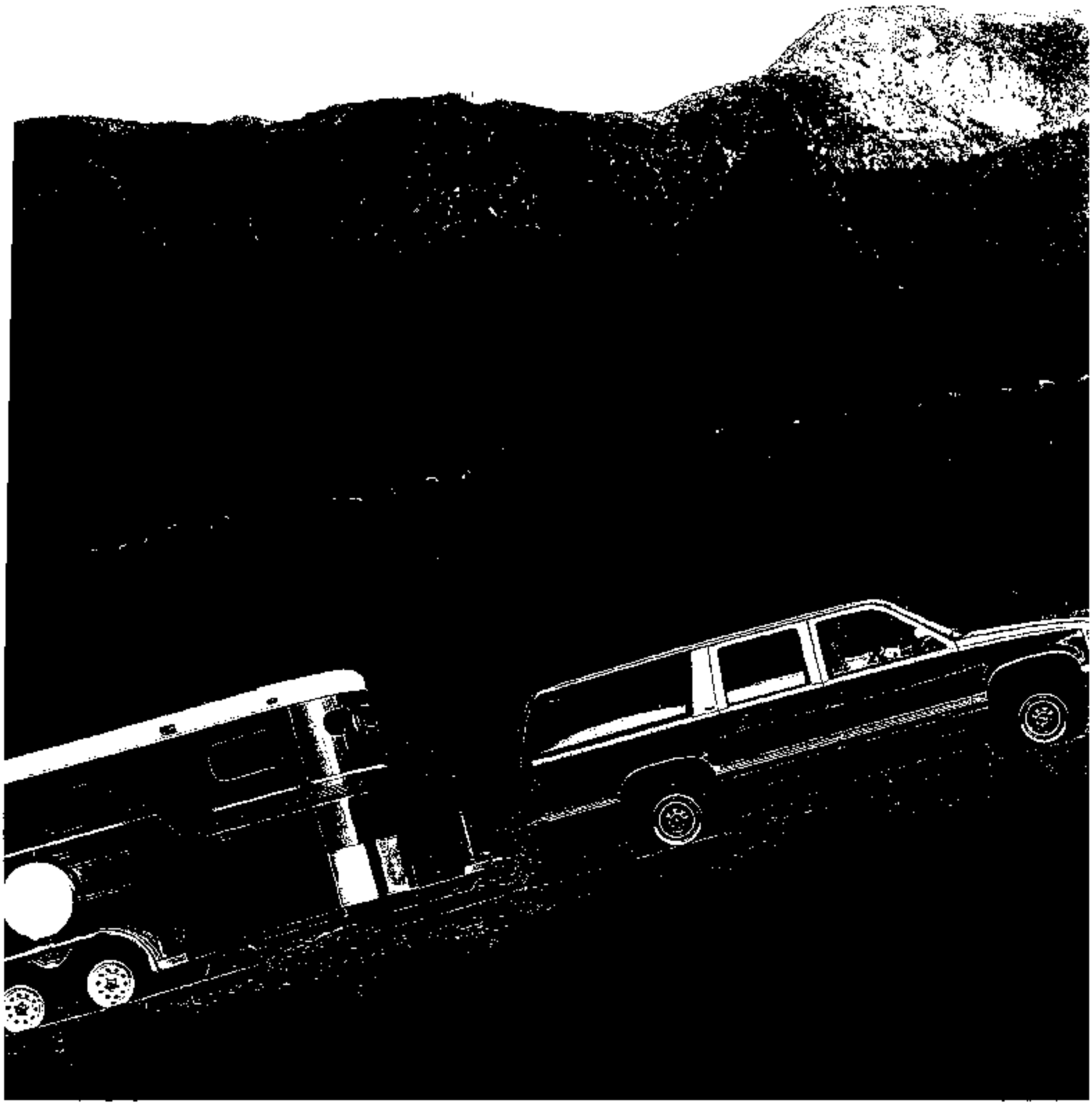
ATTACHMENT "L"

General Motors Corporation

DP00-001; GM583

Attachment L


©M583 Att L 12



TRAILERING WITH YOUR BLAZER OR SUBURBAN.

These trailering charts indicate the required and recommended options for towing with Blazers and Suburbans, and show the corresponding RPO (Regular Production Option) numbers. Chevrolet strongly recommends using the 4-speed automatic transmissions for towing. Refer to pages 58-59 for general trailering information.

NOTE: Maximum gross trailer weight includes all passengers, equipment and cargo in the vehicle, plus any cargo in the trailer.

Blazers With Ball Hitch	S-Blazer[1]				Blazer	
Trailer Classification	**Medium**		**Heavy**		**Medium**	**Heavy**
Maximum gross trailer weight (lbs.)	4000	4000	5500[2]	5250[2]	4000	7000
Maximum tongue load (lbs.)	500	500	700	650	500	8500
Truck Series	**2WD/4x4**	**2WD/4x4**	**2WD**	**4x4**	**4x4**	**4x4**
Required Axle Ratios/Maximum Trailer Weights						
4.3L Gas V6 w/TBI[3] and 5-speed manual transmission	3.42/4000[4]					
4.3L Gas V6 w/CPI[5] and 4-speed automatic transmission		3.08/4000[4]	3.08/4500[2] 3.42/5500[2]	3.08/4250[2] 3.42/5250[2]		
5.7L Gas V8					3.42/4000	3.42/6000 3.73/7000
Recommended (□) and Required (■) Options						
Automatic transmission *(MX0)*	–	■	■	■	■	■
Transmission oil cooler and engine oil cooler *(V08)*	■	–	–	–	–	–
Heavy-duty shock absorbers *(F51)*	□	□	■	■	–	–
Electronic speed control *(K34)*	□	□	□	□	–	–
Trailering Special Package[6] *(Z82)*	■	■	■	■	■	■
Locking rear axle *(G80)*	□	□	□	□	□	□
Convenience Group *(ZQ3) (includes Tilt-Wheel™ Adjustable Steering Column and speed control)*	–	–	–	–	□	□

Suburban With Ball Hitch						
Trailer Classification	**Medium**		**Heavy**			
Maximum gross trailer weight (lbs.)	4000	4000	7000	10,000	6500	10,000
Maximum tongue load (lbs.)	400	400	650	1000	800	1000
Truck Series	**C/K1500**	**C/K2500**	**C1500**	**C2500**	**K1500**	**K2500**
Required Axle Ratios/Maximum Trailer Weights						
5.7L Gas V8	3.42/4000	3.73/4000	3.42/6000 3.73/7000	3.73/8500 4.10/8000	3.42/6500 3.73/6500	3.73/6000 4.10/7500
7.4L Gas V8				3.73/9000 4.10/10,000		3.73/8500 4.10/10,000
Recommended (□) and Required (■) Options						
Automatic transmission *(MX0)*	■	■	■	■	■	■
Trailering Special Package[6] *(Z82)*	□	□	■	■	■	■
Locking rear axle *(G80)*	□	□	□	□	□	□
Convenience Group *(ZQ3) (includes Tilt-Wheel™ Adjustable Steering Column and speed control)*	□	□	□	□	□	□

1 In addition to the Trailering Special Package (RPO Z82) shown as option for S-Blazer, there is also a Trailering Special Package (RPO Z72) for S-Blazers towing trailers up to 2000 lbs. in gross weight, with maximum tongue loads of 200 lbs. The Z72 package includes a deadweight trailer hitch and a 5-wire wiring harness. 2 Add 250 lbs. for 2-door models. 3 Electronic Fuel Injection. 4 P205/75R-15 tires are required with 4x4 models. 5 Central-Port Fuel Injection. 6 Trailering Special Package (RPO Z82) includes weight-distributing hitch platform and 7-wire wiring harness. Transmission oil cooler (RPO V02) and engine oil cooler (RPO KC4) are included with Blazer and Suburban models.

***NOTE:** S-Blazer trailering-related standard equipment: power steering, power brakes, 20 gal. fuel tank, 100-amp generator and front stabilizer bar. Blazer and Suburban trailering-related standard equipment: power steering, power brakes, 30 gal. fuel tank (42-gal. fuel tank for Suburban), 100-amp generator, front stabilizer bar, heavy duty radiator, automatic transmission (Suburban only) and Below-Eyeline mirrors (Blazer only). The Blazer's standard 5-speed manual transmission (MM5) may be used for trailering and provides the vehicle with the same trailering ratings as the optional 4-speed automatic transmission (RPO MX0). The 5-speed manual transmission requires an optional engine oil cooler (RPO KC4), and is not available with the optional Trailering Special Package (RPO Z82).*

Gross Combination Weight Ratings (GCWR)

THE USE OF GCWRs TO DETERMINE ENGINE, TRANSMISSION AND REAR AXLE RATIOS Perhaps you prefer to use Gross Combination Weight Ratings (GCWRs) to determine the engine and rear axle ratio you will require to tow a specific trailer with your Chevy Blazer or Suburban. The chart below shows you the maximum allowable GCWR based on all the available truck engines and rear axle ratios with automatic or manual transmissions. The GCWR includes the total loaded weight of both the truck and the trailer. Any available engine may be used for trailering if the GCWR shown is not exceeded.

Automatic Transmissions

GCWR (lbs.)	8500	9500	11,000	12,000	13,500	14,500	17,000
Engine				**Rear Axle Ratio**			
4.3L Gas V6	3.08	3.42					
5.7L Gas V8			3.42	3.73	4.10[1]		
7.4L Gas V8[1]						3.73	4.10

Manual Transmissions[2]

GCWR (lbs.)	7500	8000	11,000	12,000
Engine		**Rear Axle Ratio**		
4.3L Gas V6	3.08[3]	3.42[3]		
5.7L Gas V8			3.42	3.73

1 Available in 2500 Series Suburban only. 2 Not available in Suburban. RPO V01 Heavy Duty Cooling is required with a manual transmission for towing trailers over 2000 lbs. In addition, any other equipment required for S-Blazers w/ automatic transmissions must also be ordered for S-Blazers with manual transmissions. 3 GCWRs for S-Blazers equipped with available P235/75R-15 tires must be reduced by 500 lbs.

***NOTE:** Model availability of the above drivetrain combinations must be verified by your Chevy dealer for correct emissions equipment.*

Caution

If you don't use the correct equipment and drive properly, you can lose control of your vehicle when you pull a trailer. For example, if the trailer is too heavy, your vehicle brakes may not work well — if at all. Your vehicle passengers and you could also be seriously injured. Pull a trailer only after you have taken all of the following steps.

Trailering Brakes

If your trailer weighs more than 1000 lbs. loaded, then it must have its own adequate brakes. Be sure to read and follow the instructions for the trailer brake controller so that it is installed, adjusted and maintained properly.

■ Don't tap into your vehicle's brake system if the trailer's brake system will use more than 0.02 cu. in. of fluid from your vehicle's master cylinder. If it does, neither braking system will work well. You could even lose your vehicle brakes.

■ The trailer brake parts must be able to take 3000 psi of pressure. If not, the trailer brake system must not be used with your vehicle. If everything checks out this far, then have a qualified individual make the brake fluid tap at the port on the master cylinder that sends fluid to the rear brakes. Don't use copper tubing, because it will bend and ultimately break. Use only steel brake tubing.

Hitches

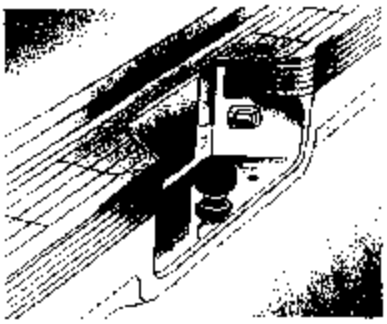
It's important to have the correct hitch equipment. Crosswinds, large trucks going by and rough roads are just a few of the reasons why you'll need the right hitch. Here are some rules to follow:

■ Be sure to use a frame-mounted, weight-distributing hitch and sway control of the proper size when towing a trailer with an S-Blazer if the loaded trailer will weigh more than 2000 lbs., or when towing a trailer with a Blazer or Suburban if the loaded trailer will weigh more than 4000 lbs. This equipment is very important for proper vehicle loading and good handling when you're driving.

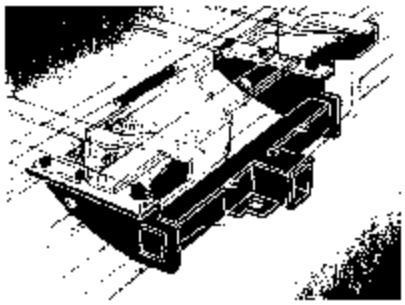
■ If you have to make any holes in the body of your vehicle to install a trailer hitch, be sure to seal the holes if you ever remove the hitch. If they're not sealed, dirt, water and deadly carbon monoxide from the exhaust can get into your vehicle.

***NOTE:** These are, by no means, the only precautions to be taken when trailering. See the Owner's Manual for the Chevy of your choice for additional guidelines and trailering tips.*

Chevrolet offers a wide selection of available options for trailering, but only a few of them are illustrated and described here. Check with your Chevrolet dealer for complete information on these and other items for your Chevy S-Blazer, Blazer or Suburban.

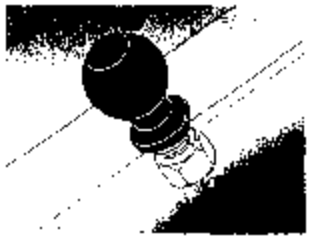


The standard step-bumper on Blazers and Suburbans can be used for towing trailers up to 4000 lbs. in gross weight, with tongue loads up to 400 lbs. A 1⅞" hitch ball is required for trailers up to 2000 lbs. in gross weight, and a 2" ball for trailers up to 4000 lbs. in gross weight. For S-Blazers, the light-duty deadweight hitch can be ordered for towing up to 2000 lbs. in gross weight, with a tongue load of up to 200 lbs.

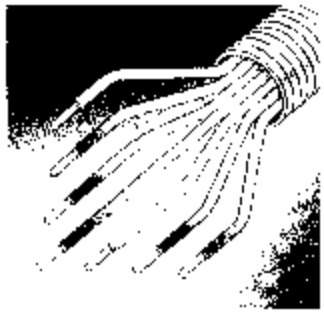


A weight-distributing hitch platform is a requirement for S-Blazers towing over 2000 lbs. in gross weight or with tongue loads over 200 lbs., and for Blazers and Suburbans towing over 4000 lbs. in gross weight or with tongue loads over 400 lbs. It's included with the Z82 Trailering Special Package and is also available as a dealer-installed accessory.

Chevy Blazers and Suburbans used as tow vehicles will require outside mirrors with extensions that exceed the width of the trailer to be towed. Optional mirrors with larger mounting brackets are available with all Chevy Blazers and Suburbans.



A 1⅞"-diameter hitch ball (Part No. 981148) is available as an accessory. A 2"-diameter ball (Part No. 980670) is also available.



A 5-wire wiring harness is required for trailers up to 2000 lbs. in gross weight, and may be purchased from an outside supplier. A 7-wire wiring harness is required for larger trailers, and is included in the Z82 Trailering Special Package. Both harnesses tie into the vehicle's electrical system to provide electricity for your trailer's lights, plus electric brakes or battery charging. The color code shown below should be used when installing trailer wiring harnesses.

WHITE. Ground.

- **RED.** Use for battery charging. Connects to starter solenoid (7-wire wiring harness only).
- **LIGHT GREEN.** Backup lights (7 wire wiring harness only).
- **BROWN.** Taillights and running lights.

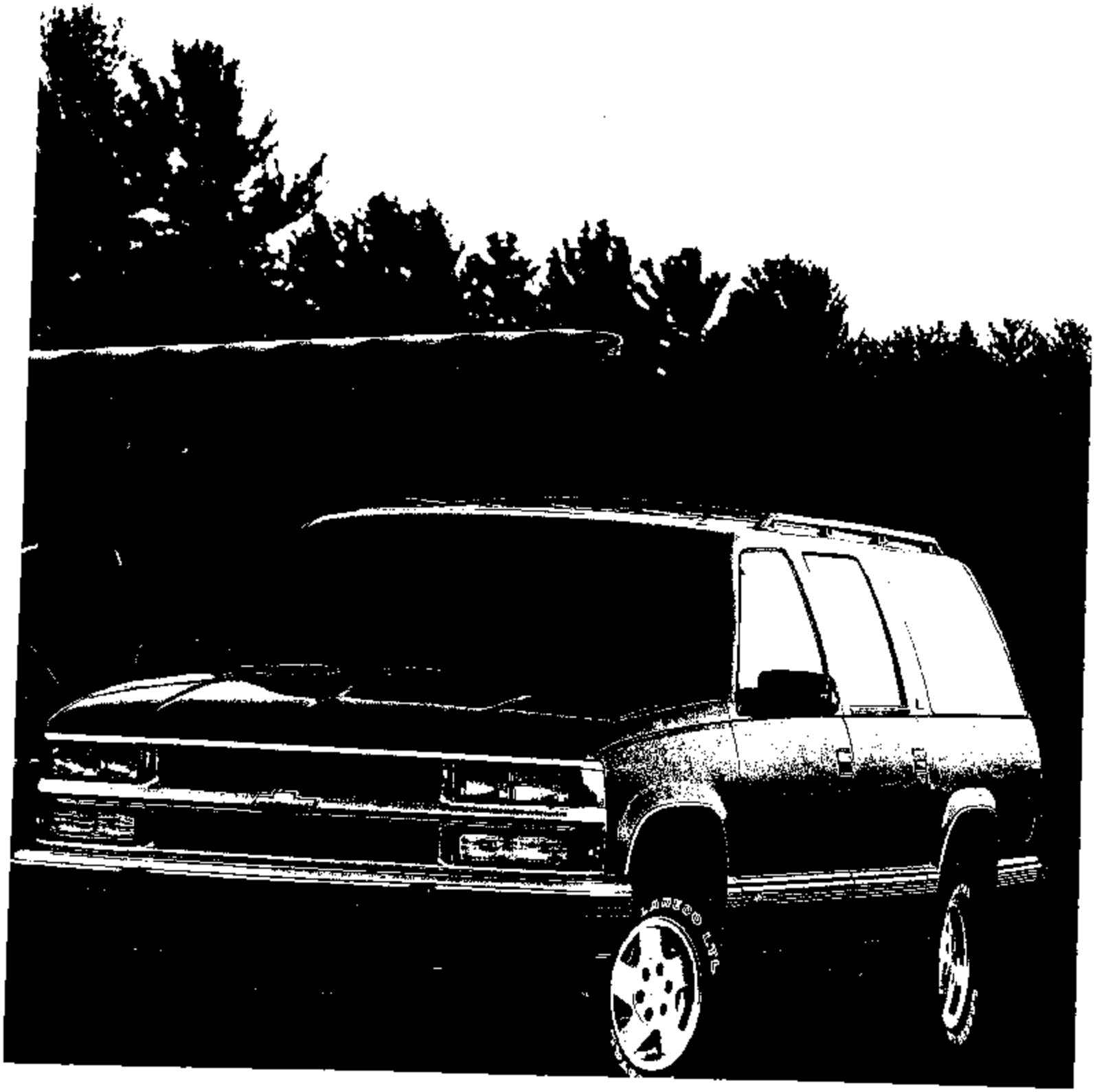
YELLOW. Left stop light and left turn signal.

- **DARK GREEN.** Right stop light and right turn signal.
- **BLUE.** Use for electric trailer brakes or auxiliary wiring.

Dealer-Installed Hitches

Trailer Classification	Heavy	Heavy	Heavy
Maximum gross trailer weight (lbs.)	6000	7000	[illegible]
Maximum tongue load (lbs.)	[illegible]	850	[illegible]
Type of hitch	Weight-distributing hitch platform	Weight-distributing hitch platform	Weight-distributing hitch platform
S-Blazer Part No.	996484	–	[illegible]
Blazer Part No.	[illegible]	996925	[illegible]
Suburban Part No.	[illegible]	–	[illegible]

CAUTION: *If your light-duty Chevy truck is equipped with a rear step-bumper, the V-shaped foot on your trailer tongue could dent the bumper in a sharp turn. Before towing a trailer with this foot in place, check the distance from the foot front edge to the center line of the coupler ball socket. If this dimension is less than 12 inches, remove the foot from the trailer, or possible damage to the rear step-bumper could occur.*



TRAILERING WITH SUBURBAN.

Trailering-related standard equipment found on all Suburbans includes power steering, power brakes, automatic transmission, a 42-gallon fuel tank, 100-amp generator, front stabilizer bar and heavy-duty radiator.

The trailering charts below will help you determine how to best equip your C/K Suburban for your towing requirements. NOTE: maximum gross trailer weight includes all passengers, equipment and cargo in the vehicle, plus any cargo in the trailer. Please read the "Trailering Caution" safety information on page 55 before trailering with your new vehicle.

BALL HITCH TRAILERING WITH SUBURBAN

ENGINE / TRANSMISSION	5.7 Liter Gas V8 Automatic			7.4 Liter Gas V8 Automatic			6.5 Liter V8 Turbo-Diesel Automatic		
MODEL	Max. Trailer Weight (lbs.)[1]	Max. Tongue Load (lbs.)	Required Axle Ratio	Max. Trailer Weight (lbs.)[1]	Max. Tongue Load (lbs.)	Required Axle Ratio	Max. Trailer Weight (lbs.)[1]	Max. Tongue Load (lbs.)	Required Axle Ratio
C1500 *(2WD)*	5500	700	3.42						
Suburban	6500	800	3.73						
K1500 *(4x4)*	5500	600	3.42						
Suburban	6500	750	3.73						
C2500 *(2WD)*	6500	750	3.73	8000	950	3.73	8500	800	3.73
Suburban	7500	900	4.10	10,000	1000	4.10	8000	950	4.10
K2500 *(4x4)*	5500	700	3.73	7500	900	3.73	8000	750	3.73
Suburban	7000	850	4.10	10,000	1000	4.10	7500	900	4.10

1 Maximum gross trailer weight is calculated assuming the driver and one passenger are in the tow vehicle and it has all required trailering equipment. The weight of additional optional equipment, passengers and cargo in the tow vehicle must be subtracted from the maximum trailer weight.

NOTE: *Any C/K Suburban can tow a 2000-lb. trailer without special equipment. • Suburbans towing trailers rated over 2000 lbs. require optional heavy-duty cooling (RPO V08). Heavy-duty cooling is included with Heavy-Duty Emissions engines (C/K 2500 models have Heavy-Duty Emissions engines). • Suburbans towing trailers rated over 4000 lbs. require optional special trailering equipment (RPO Z82), which includes a weight-distributing hitch platform, 7-wire trailer wiring harness and heavy-duty cooling. • Suburban's optional locking rear axle (RPO G80) and Convenience Group (RPO ZQ3—includes a Tilt-Wheel™ Adjustable Steering Column and electronic speed control) are also recommended by Chevrolet for trailering.*

GROSS COMBINATION WEIGHT RATINGS (GCWR)

THE USE OF GCWRs TO DETERMINE ENGINE AND REAR AXLE RATIOS. Perhaps you prefer to use Gross Combination Weight Ratings (GCWRs) to determine the engine and rear axle ratio you will require to tow a specific trailer with your Chevy Suburban. The ch below shows you the maximum allowable GCWR based on all the available Suburban engines and rear axle ratios. The GCWR includes the total loaded weight of both the Suburban and the trailer. Any available engine may be used for trailering if the GCWR shown not exceeded.

GCWR (lbs.)	11,000	12,000	13,000	14,500	17,000
ENGINE	Rear Axle Ratio				
5.7L Gas V8	3.42	3.73	4.10		
7.4L Gas V8				3.73	4.10
6.5l V8 Turbo-Diesel			3.73	4.10	

NOTE: *Model availability of the above driveline combinations must be verified by your Chevy dealer for correct emissions equipment. Caution: Refer to page 55 for important safety information before trailering with your new vehicle.*

ENGINE RATINGS AND AVAILABILITY

SERIES			C1500	C2500	K1500	K2500
ENGINE AVAILABILITY	HP (SAE Net @ RPM)	Torque (lb.-ft. @ RPM)				
5.7L (350 cu. in.) Gas V8 w/EFI[2]	200 @ 4000	310 @ 2400	S	–	S	–
5.7L (350 cu. in.) HD[1] Gas V8 w/EFI[2]	190 @ 4000	300 @ 2400	–	S	–	S
7.4L (454 cu. in.) HD[1] Gas V8 w/EFI[2]	230 @ 3600	385 @ 1500		O	–	O
6.5L (400 cu. in.) HD[1] V8 Turbo-Diesel	190 @ 3400	385 @ 1700	–	O	–	O

S – Standard O – Optional.

1 Heavy-Duty Emissions 2 Electronic Fuel Injection

TRAILERING WITH BLAZER.

Blazer trailering related standards will help you determine how to equip your K-Series Blazer for your towing requirements.

NOTE: maximum gross trailer weight includes all passengers, equipment and cargo in the vehicle, plus any cargo in the trailer. Please read the "Trailering Caution" safety information on page 55 before trailering with your new vehicle.

Blazer's optional equipment includes power steering, power brakes, a 30-gallon fuel tank, 100-amp generator, front stabilizer bar, heavy-duty radiator and below-eyeline mirrors. Chevrolet strongly recommends using Blazer's optional 4-speed automatic transmission for towing. The trailering charts below

BALL HITCH TRAILERING WITH K-SERIES BLAZER

ENGINE	5.7 Liter Gas V8			6.5 Liter V8 Turbo-Diesel		
TRANSMISSION	Automatic or Manual			Automatic		
MODEL	Max. Trailer Weight (lbs.)*	Max. Tongue Load (lbs.)	Required Axle Ratio	Max. Trailer Weight (lbs.)*	Max. Tongue Load (lbs.)	Required Axle Ratio
C1500 (4x4)	5500	700	3.42	6000	750	3.42
Blazer	6500	800	3.73	7000	850	3.73

Maximum gross trailer weight is calculated assuming the driver and one passenger are in the tow vehicle and it has all required trailering equipment. The weight of additional options, passengers and cargo in the tow vehicle must be subtracted from the maximum trailer weight.

NOTE: Any K-Series Blazer can tow a 2000-lb. trailer without special equipment. • Blazers towing trailers rated over 2000 lbs. require optional heavy-duty cooling (RPO V05) when equipped with an automatic transmission or optional engine oil cooler with manual transmission. • Blazers towing trailers rated over 3000 lbs. require optional special trailering equipment (RPO Z82), which includes a weight-distributing hitch platform, 7-wire trailer lamp harness and heavy-duty cooling. • Blazer's optional locking rear axle (RPO G80) and Convenience Group (RPO 7C3), which includes a Tilt-Wheel® Adjustable Steering Column and electronic speed control, are also recommended for trailering.

GROSS COMBINATION WEIGHT RATINGS (GCWR)

THE USE OF GCWRs TO DETERMINE ENGINE, TRANSMISSION AND REAR AXLE RATIOS: Perhaps you prefer to use Gross Combination Weight Ratings (GCWRs) to determine the engine and rear axle ratio you should have when towing a specific trailer with your Chevy Blazer. The chart below shows you the [illegible] established on all the available Blazer engines and rear axle ratios with standard manual or optional automatic transmissions. The GCWR shown is not exceeded [illegible] any available engine may be used for [illegible] the GCWR shown is not exceeded.

AUTOMATIC TRANSMISSION		
GCWR (lbs.)	11,000	12,000
ENGINE	Rear Axle Ratio	
5.7L Gas V8	3.42	
6.5L V8 Turbo-Diesel		

MANUAL TRANSMISSION		
GCWR (lbs.)	11,000	12,000
ENGINE	Rear Axle Ratio	
5.7L Gas V8	3.42	3.73

NOTE: Model availability of the above drivetrain recommendations may be limited by your Chevy dealer's current inventory. Caution: refer to page 55 for important safety information before trailering with your new vehicle.

ENGINE RATINGS AND AVAILABILITY

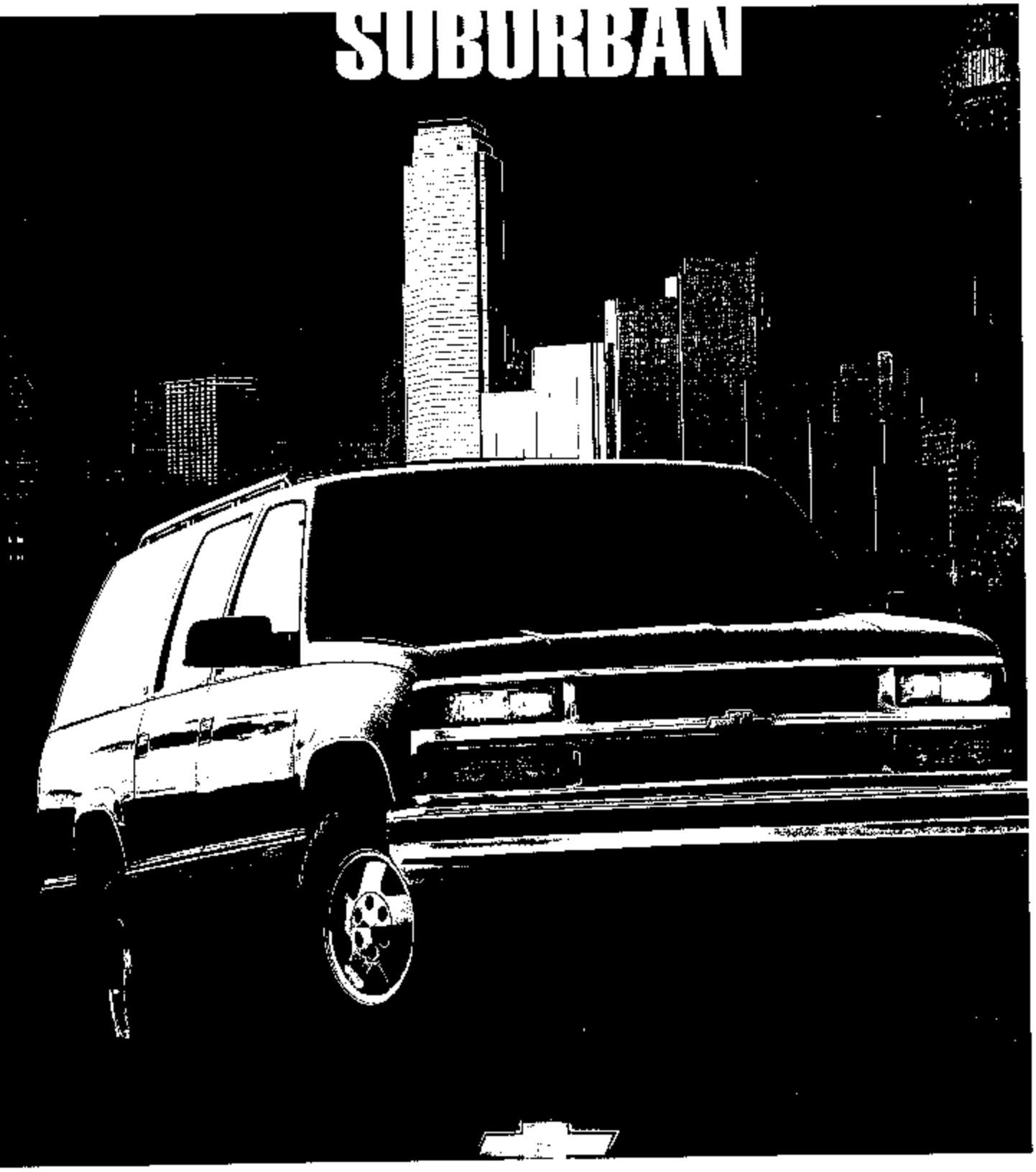
SERIES	C1500	
ENGINE AVAILABILITY	HP (SAE Net @ RPM)	Torque (SAE Net @ RPM)
5.7L (350 cu. in.) Gas V8 w/EFI	200 @ 4000	310 @ 2400
6.5L (400 cu. in.) V8 Turbo-Diesel	180 @ 3400	360 @ 1700

[illegible]

[illegible] 0000247

NHTSA IR: GM-583; DP00-01: 1993-1997 Chevrolet & GMC Suburbans
- Alleged Cracking of Trailer Hitch Receiver Platform

ATTACHMENT 7C-3



There Are Some Things We Can't Tell You.

Only driving new Suburban can adequately speak of the sense of control you'll discover behind the wheel, or the new securities you'll feel every mile of the way. You have to enjoy Suburban conveniences first-hand, and be pampered by its luxuries. You have to see for yourself what high-stance visibility does for the Suburban driver's confidence, and what its passenger room does for comfort. And yes, you have to be there in person to appreciate what it feels like to notice other drivers stealing a glance with that "Someday..." look in their eyes. In short, we hope this brochure has been helpful, but it can never replace your turn at the wheel. If you haven't had the pleasure already, we hope you'll see your dealer soon. The things we can't tell you are wonderful!

BALL HITCH TRAILERING WITH SUBURBAN

ENGINE	5.7 Liter Gas V8			6.5 Liter V8 Turbo-Diesel			7.4 Liter Gas V8		
TRANSMISSION	Automatic			Automatic			Automatic		
MODEL	Max. Trailer Weight (lbs.)[1]	Max. Tongue Load (lbs.)	Required Axle Ratio	Max. Trailer Weight (lbs.)[1]	Max. Tongue Load (lbs.)	Required Axle Ratio	Max. Trailer Weight (lbs.)[1]	Max. Tongue Load (lbs.)	Required Axle Ratio
C1500 (2WD)	5500	700	3.42	5500	700	3.42			
Suburban	6500	800	3.73						
K1500 (4x4)	5000	600	3.42	5000	600	3.42			
Suburban	6000	750	3.73						
C2500 (2WD)	6000	750	3.73	6500	800	3.73	8500	1000	3.73
Suburban	7500	900	4.10	8000	950	4.10	10,000	1000	4.10
K2500 (4x4)	7000	850	4.10	6000	750	3.73	8000	950	3.73
Suburban				7500	900	4.10	10,000	1000	4.10

[1] Maximum gross trailer weight is calculated assuming the driver and one passenger are in the tow vehicle and it has all required trailering equipment. The weight of additional optional equipment, passengers and cargo in the tow vehicle must be subtracted from the maximum trailer weight.

NOTE: *Suburban can tow a 2000-lb. trailer without special equipment. • An engine oil cooler (RPO KC4) is required on GK1500 models with 5.7L V8 and on C2500 with 5.7L V8 and 3.73 rear axle ratio for towing trailers rated over 2500 lbs. (The engine oil cooler is standard on all other models.) • A Suburban towing a trailer rated over 3500 lbs. requires optional special trailering equipment (RPO Z82), which includes a weight-distributing hitch platform and, where required, an engine oil cooler. • An optional locking rear axle (RPO G80) and the Tilt-Wheel™ Adjustable Steering Column and electronic sound system included with Suburban LS and LT trim levels are also recommended by Chevrolet for trailering.*

Trailering With Suburban.

Chevy Suburban towing capacity is something to marvel at, as the charts on this page reveal. Suburban trailering-related standard equipment includes power steering, power brakes, a 42 gallon fuel tank, 7-wire trailer wiring harness, 100 amp alternator, front stabilizer bar, heavy duty radiator and below-eyeline mirrors. The trailering charts will help you determine how to best equip Suburban for your towing requirements. ***NOTE:*** *Maximum gross trailer weight includes all passengers, equipment and cargo in the vehicle, plus any cargo in the trailer. Please read the "Trailering Caution" safety information before trailering.*

GROSS COMBINATION WEIGHT RATINGS (GCWRs)

THE USE OF GCWRs TO DETERMINE ENGINE, TRANSMISSION AND REAR AXLE RATIOS: Perhaps you prefer to use Gross Combination Weight Ratings (GCWRs) to determine the engine and rear axle ratio you will require to tow a specific trailer with your Chevy truck. The chart below shows you the maximum allowable GCWR based on all the available truck engine and rear axle ratios. The GCWR includes the total loaded weight of both the truck and the trailer. Any available engine may be used in trailering if the GCWR shown is not exceeded.

GCWR (lbs.)	Engine Availability	Axle Ratio
11,000	5.7L V8 – Gas	3.42
12,000	5.7L V8 – Gas	3.73
	6.5L V8 Turbo-Diesel	3.42
13,000	6.5L V8 – Turbo-Diesel	3.73
13,500	5.7L V8 – Gas	4.10
14,500	6.5L V8 Turbo-Diesel	4.10
15,000	7.4L V8 – Gas	3.73
17,000	7.4L V8 – Gas	4.10

NOTE: *Model availability of the above drivetrain combinations must be verified by your Chevrolet dealer for exact emissions equipment.*

TRAILERING CAUTION.

If you don't use the correct equipment and drive properly, you can lose control of your vehicle when you pull a trailer. For example, if the trailer is too heavy, your vehicle brakes may not work well—if at all. Your vehicle's passengers and you could also be seriously injured. Pull a trailer only after you have taken the following steps.

NOTE: *The safety steps described here are by no means the only precautions to be taken when trailering. See the Owner's Manual for the Chevy truck of your choice for additional guidelines and trailering tips.*

Optional 6.5 Liter V8 Turbo-Diesel power is available in C/K1500 and C/K2500 Series Suburbans.

TRAILER BRAKES.

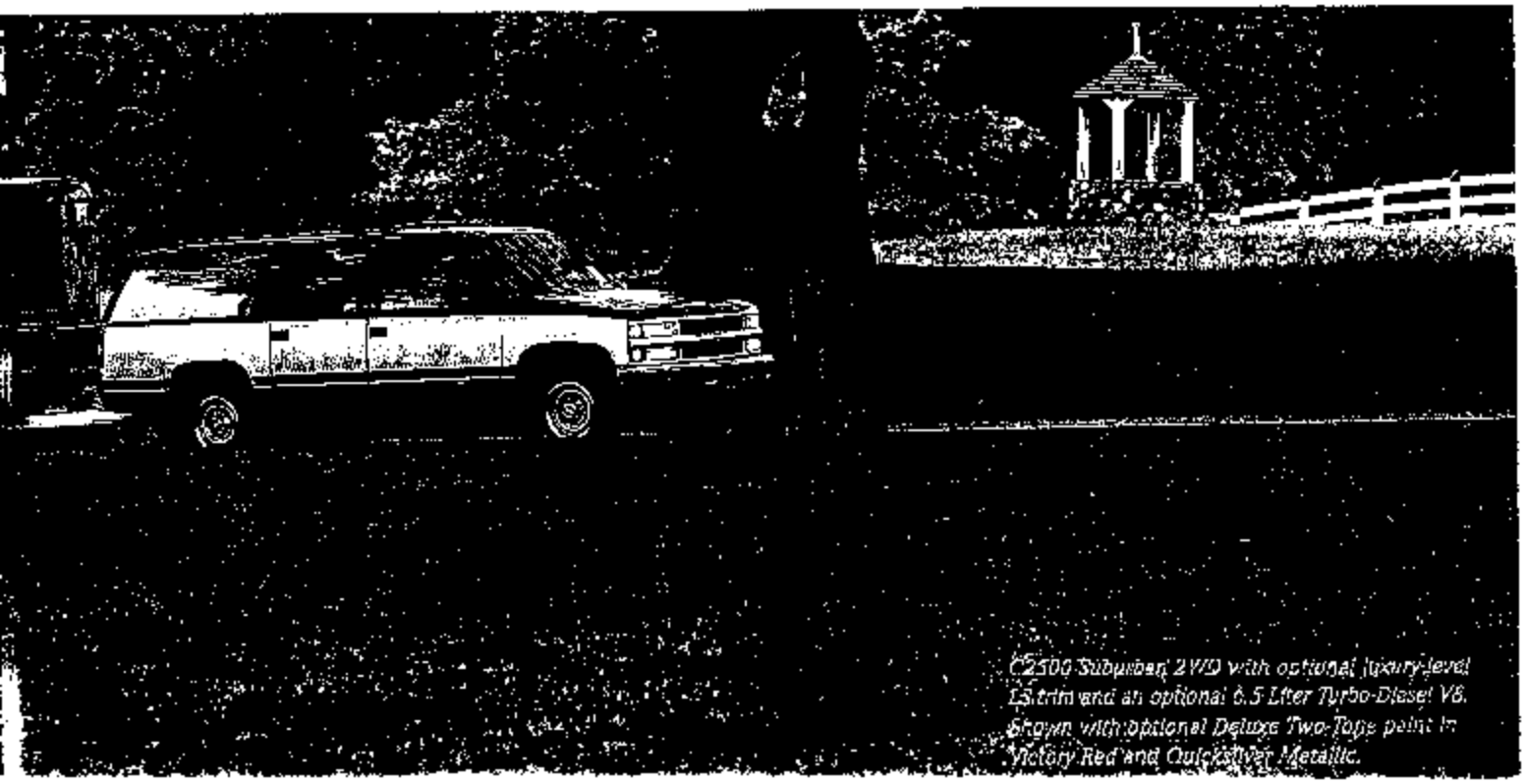
If your trailer weighs more than 1000 lbs. loaded, then it must have its own adequate brakes. Be sure to read and follow the instructions for the trailer brake controller so that it is installed, adjusted and maintained properly.

- *Don't tap into your vehicle's brake system if the trailer's brake system will use more than 0.02 cu. in. of fluid from your vehicle's master cylinder. If it does, neither braking system will work well. You could even lose your vehicle brakes.*
- *The trailer brake parts must be able to take 3000 psi of pressure. If not, the trailer brake system must not be used with your vehicle. If everything checks out this far, then have a qualified individual make the brake fluid tap at the port on the master cylinder that sends fluid to the rear brakes. Don't use copper tubing, because it will bend and ultimately break. Use only steel brake tubing.*

HITCHES.

It's important to have the correct hitch equipment. Crosswinds, large trucks going by and rough roads are just a few of the reasons why you'll need the right hitch. Here are some rules to follow:

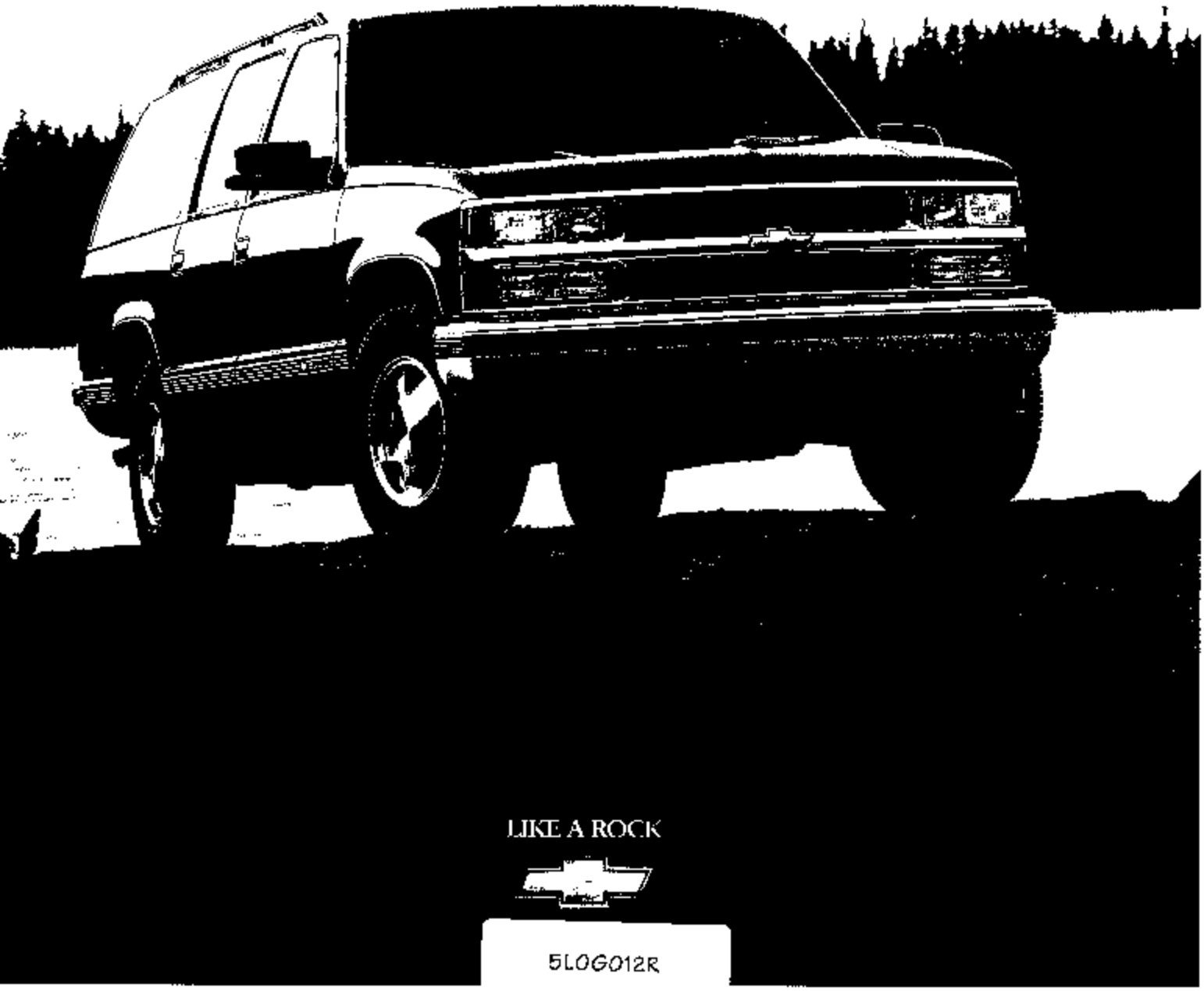
- *If you'll be towing a trailer that, when loaded, will weigh more than 2000 lbs., be sure to use a frame mounted, weight-distributing hitch and sway control of the proper size. This equipment is very important for proper vehicle loading and good handling when you're driving.*
- *If you have to make any holes in the body of your Suburban to install a trailer hitch, be sure to seal the holes if you ever remove the hitch. If they're not sealed, dirt, water and deadly carbon monoxide from the exhaust can get into your vehicle.*



C2500 Suburban 2WD with optional luxury-level LS trim and an optional 6.5 Liter Turbo-Diesel V8. Shown with optional Deluxe Two-Tone paint in Victory Red and Quicksilver Metallic.

1996 CHEVROLET
SUBURBAN

6SUB001



LIKE A ROCK

5LOGO12R

Trailering With Suburban.

Suburban trailering-related standard equipment includes power steering, power brakes, a 42-gallon fuel tank, transmission oil cooler, 7-wire trailer wiring harness, 100-amp alternator, front stabilizer bar and below-eyeline exterior mirrors.* The trailering charts will help you determine how to best equip your new Suburban for your towing requirements. **NOTE:** Please read the "Trailering Caution" safety information below before trailering with your new Suburban.

*Chevrolet recommends a Tilt-Wheel™ Adjustable Steering Column and electronic speed control (available with LS and LT trim levels; optional on Base models) as an optional feature easy to towing.

Gross Combination Weight Ratings (GCWRs)

THE USE OF GCWRs TO DETERMINE ENGINE, TRANSMISSION AND REAR AXLE RATIO. Perhaps you prefer to use Gross Combination Weight Ratings (GCWRs) to determine the engine and rear axle ratio you will require for a specific trailer with your Suburban. The chart below shows you the maximum allowable GCWR based on all the available truck engines and rear axle ratios. The GCWR includes the total loaded weight of both the truck and the trailer. Any available engine may be used for trailering if the GCWR shown is not exceeded.

GCWR (lbs.)	Engine Availability	Axle Ratio
11,000	Vortec 5700 V8	3.42
12,000	Vortec 5700 V8	3.73
	6.5 Liter Turbo-Diesel V8	3.42
13,000	6.5 Liter Turbo-Diesel V8	3.73
13,500	Vortec 5700 V8	4.10
	6.5 Liter Turbo-Diesel V8	4.10
15,000	Vortec 7400 V8	3.73
17,000	Vortec 7400 V8	4.10

NOTE: Model availability in the above drivetrain combinations must be verified by your Chevrolet dealer for current emissions equipment.

Ball Hitch Trailering With Suburban

Engine / Transmission	Vortec 5700 V8 Automatic			6.5 Liter Turbo-Diesel V8 Automatic			Vortec 7400 V8 Automatic		
Model	Max. Trailer Weight (lbs.)	Max. Tongue Load (lbs.)	Required Axle Ratio	Max. Trailer Weight (lbs.)*	Max. Tongue Load (lbs.)	Required Axle Ratio	Max. Trailer Weight (lbs.)*	Max. Tongue Load (lbs.)	Required Axle Ratio
C1500 (2WD)	5500	700	3.42	5500	700	3.42			
Suburban	6500	800	3.73						
K1500 (4x4)	5000	600	3.42	5000	600	3.42			
Suburban	6000	750	3.73						
C2500 (2WD)	6000	750	3.73	6500	800	3.73	8500	950	3.73
Suburban	7500	900	4.10	8000	950	4.10	10,000	1100	4.10
K2500 (4x4)	7000	850	4.10	6000	750	3.73	8000	900	3.73
Suburban				7500	900	4.10	10,000	1100	4.10

Maximum trailer weight is calculated assuming the driver and one passenger are in the vehicle and it has all required trailering equipment. The weight of additional optional equipment, passengers and cargo in the tow vehicle must be subtracted from the maximum trailer weight.

***NOTE:** The maximum weight-carrying trailer hitch load is a 4000-lb. trailer with a 600-lb. tongue weight. • With trailer ratings above 2000 lbs., an optional engine oil cooler (RPO K05) is required on C/K1500 Suburbans with the standard Vortec 5700 V8 engine. The engine oil cooler is included with optional trailering special equipment (RPO Z82) when ordered for a C/K1500 Suburban equipped with the standard Vortec 5700 V8. The engine oil cooler is included with all optional engines and models.*

Trailering Caution.

If you don't use the correct equipment and drive properly, you can lose control of your vehicle when you pull a trailer. For example, if the trailer is too heavy, your vehicle brakes may not work well — if at all. Your vehicle's passengers and you could also be seriously injured. Pull a trailer only after you have taken the following steps.

Trailer Brakes.

If your trailer weighs more than 1000 lbs. loaded, then it must have its own adequate brakes. Be sure to read and follow the instructions for the trailer brake controller so that it is installed, adjusted and maintained properly.

☐ Don't tap into your vehicle's brake system if the trailer's brake system will use more than 0.02 cu. in. of fluid from your vehicle's master cylinder. If it does, neither braking system will work well. You could even lose your vehicle brakes.

☐ The trailer brake parts must be able to take 3000 psi of pressure. If not, the trailer brake system must not be used with your vehicle. If everything checks out this far, then have a qualified individual make the brake fluid tap at the port on the master cylinder that sends fluid to the rear brakes. Don't use copper tubing, because it will bend and ultimately break. Use only steel brake tubing.

Hitches.

It's important to have the correct hitch equipment. Crosswinds, large trucks going by and rough roads are just a few of the reasons why you'll need the right hitch. Here are some rules to follow:

☐ If you'll be towing a trailer that, when loaded, will weigh more than 4000 lbs., be sure to use a frame-mounted, weight-distributing hitch and sway control of the proper size. This equipment is very important for proper vehicle loading and good handling when you're driving.

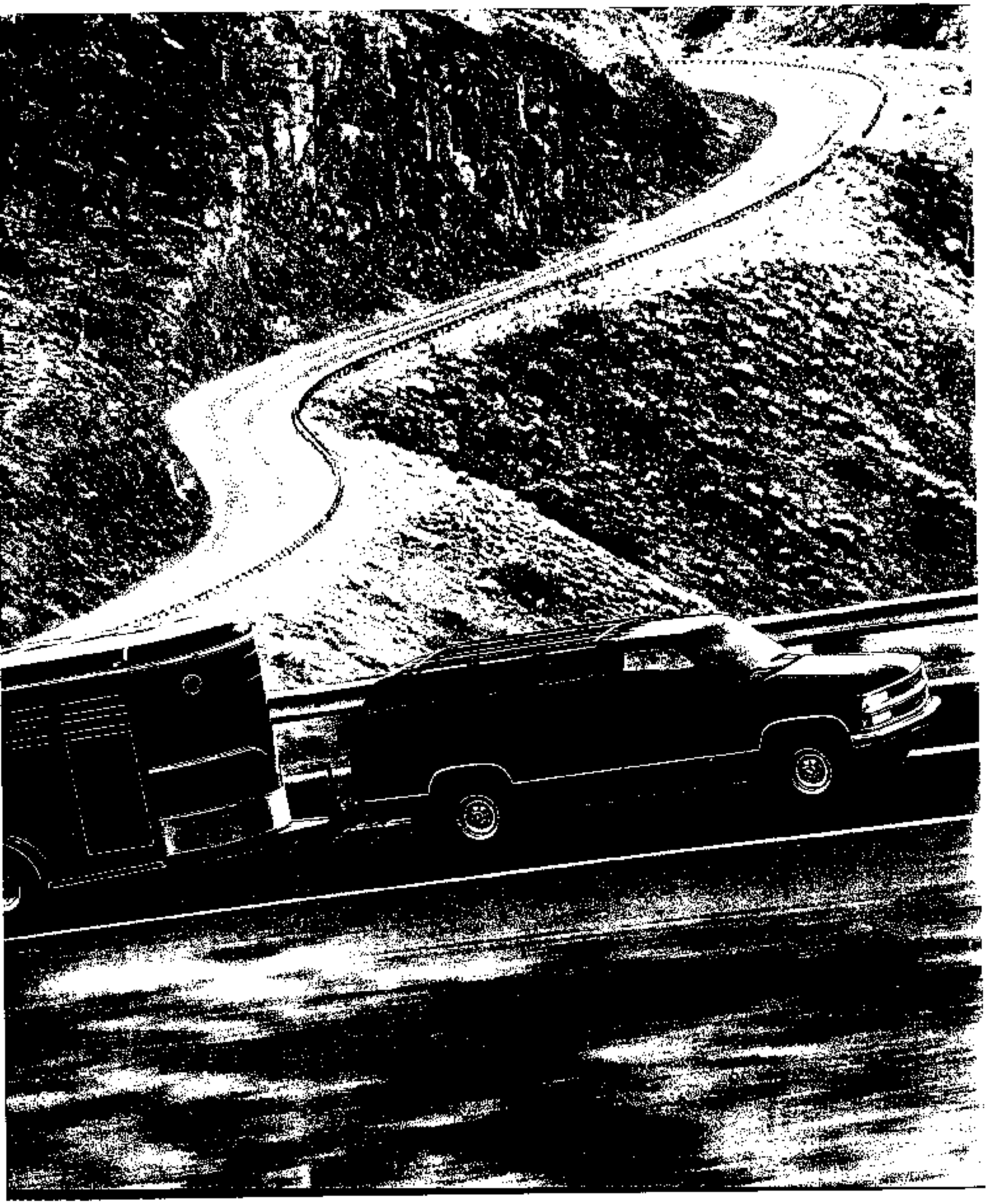
☐ If you have to make any holes in the body of your vehicle to install a trailer hitch, be sure to seal the holes if you ever remove the hitch. If they're not sealed, dirt, water and deadly carbon monoxide from the exhaust can get into your vehicle.

NOTE: The safety steps described here are by no means the only precautions to be taken when trailering. See the owner's manual for the Chevy truck of your choice for additional guidelines and trailering tips.

THE 1997 CHEVROLET

SUBURBAN

LIKE A ROCK



TRAILERING CAUTION.

If you don't use the correct equipment and drive properly, you can lose control of your vehicle when you pull a trailer. For example, if the trailer is too heavy, your vehicle brakes may not work well — if at all. You and your passengers could be seriously injured. Pull a trailer only after you have taken the following steps.

TRAILER BRAKES.

If your trailer weighs more than 1,000 lbs. loaded, then it must have its own adequate brakes. Be sure to read and follow the instructions for the trailer brake controller so that it is installed, adjusted and maintained properly.

- Don't tap into your vehicle's brake system if the trailer's brake system will use more than 0.02 cu. in. of fluid from your vehicle's master cylinder. If it does, neither braking system will work well. You could even lose your vehicle brakes.
- The trailer brake parts must be able to take 3,000 psi of pressure. If not, the trailer brake system must not be used with your vehicle. If everything checks out this far, have a qualified individual make the brake fluid tap at the port on the master cylinder that sends fluid to the rear brakes. Don't use copper tubing, because it will bend and ultimately break. Use only steel brake tubing.

HITCHES.

It's important to have the correct hitch equipment. Crosswinds, large trucks going by and rough roads are just a few of the reasons why you'll need the right hitch. Here are some rules to follow:

- If you'll be towing a trailer that, when loaded, will weigh more than 5,000 lbs., be sure to use a frame-mounted, weight-distributing hitch and sway control of the proper size. This equipment is very important for proper vehicle loading and good handling when you're driving.
- If you have to make any holes in the body of your vehicle to install a trailer hitch, be sure to seal the holes if you ever remove the hitch. If they're not sealed, dirt, water and deadly carbon monoxide from the exhaust can get into your vehicle.

NOTE: The safety steps described here are by no means the only precautions to be taken when trailering. See the owner's manual for the Chevy truck of your choice for additional guidelines and trailering tips.

SUBURBAN TRAILERING DATA

ENGINE/TRANSMISSION	VORTEC 5700 V8 AUTOMATIC			6.5 LITER TURBO-DIESEL V8 AUTOMATIC			VORTEC 7400 V8 AUTOMATIC		
MODEL	MAX. TRAILER WEIGHT (LBS.)*	MAX. TONGUE LOAD (LBS.)	REQUIRED AXLE RATIO	MAX. TRAILER WEIGHT (LBS.)*	MAX. TONGUE LOAD (LBS.)	REQUIRED AXLE RATIO	MAX. TRAILER WEIGHT (LBS.)*	MAX. TONGUE LOAD (LBS.)	REQUIRED AXLE RATIO
1500 – 2WD	5500 6500	700 800	3.42 3.73	5500	700	3.42			
1500 – 4x4	5000 6000	600 750	3.42 3.73	5000	600	3.42			
2500 – 2WD	6000 7500	750 900	3.73 4.10	6500 8000	800 950	3.73 4.10	8500 10,000	1000 1000	3.73 4.10
2500 – 4x4	7000	850	4.10	6000 7500	750 900	3.73 4.10	8000 10,000	950 1000	3.73 4.10

GROSS COMBINATION WEIGHT RATINGS (GCWRs)

THE USE OF GCWRs TO DETERMINE ENGINE, TRANSMISSION AND REAR AXLE RATIO. Perhaps you prefer to use Gross Combination Weight Ratings (GCWRs) to determine the powertrain you will require to tow a specific trailer with your Suburban. The chart shows you the maximum allowable GCWR based on all the available truck engines and rear axle ratios. The GCWR includes the total loaded weight of both the truck and the trailer. Any available engine may be used for trailering if the GCWR shown is not exceeded.

GCWR (LBS.)	GAS ENGINE AVAILABILITY	AXLE RATIO	GCWR (LBS.)	DIESEL ENGINE AVAILABILITY	AXLE RATIO
11,000	Vortec 5700 V8	3.42	12,000	6.5 Liter Turbo-Diesel V8	3.42
12,000	Vortec 5700 V8	3.73	13,000	6.5 Liter Turbo-Diesel V8	3.73
13,500	Vortec 5700 V8	4.10	14,500	6.5 Liter Turbo-Diesel V8	4.10
15,000	Vortec 7400 V8	3.73			
17,000	Vortec 7400 V8	4.10			

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ATTACHMENT "M"

General Motors Corporation

DP00-001; GM583

Attachment M

1993 GMC TRUCK

TRAILERING

THE STRENGTH OF EXPERIENCE

You already know you've come to the right place. GMC Truck has been the mark of towing strength of decades. Today you have the largest selection ever of strong towing trucks from GMC, trucks that are built, from their frames to their engines to their bumpers, to handle the stresses of pulling trailers. With the wide range of trailering options we offer, you and your dealer can put together a truck ideally suited to the specific demands you'll make on it.

Nearly every GMC Truck is ready for some trailer towing. (Typhoon is not a trailering vehicle.) If it was built as many GMC Trucks are, with available trailering options, it may be ready for heavy trailers.

But although your truck was probably built for trailering, trailering is still different from normal driving. A trailer changes a vehicle's handling, performance and fuel economy. Successful and efficient trailering takes special available equipment used correctly, and special driving skills.

To help you make the most of what your new GMC Truck has to offer, we've prepared this trailering guide. This guide will:

- Help you choose the best GMC Truck model, capacity and equipment for your needs.
- Explain the required or recommended equipment.
- Give you tips and cautions that can help you trailer smartly and safely.

There's a lot of valuable information here; please read it thoroughly and if your trailer manufacturer or installer has more information on the specific trailer you'll be pulling, read that, too.

Some Initial Precautions

- *Do not tow a trailer during your vehicle's first 500 miles/800 km.* Your engine, axle or other components could be damaged.
- After this break-in period, you must also break your vehicle in for trailer towing, again for 500 miles/800 km. Don't drive over 50 MPH/80 KPH during this period. Do not make full-throttle starts. With this care, your engine and other components will adjust much more easily to the heavier loads of trailer-pulling.
- Pulling a trailer improperly or with improper equipment can damage your vehicle and result in costly repairs that *will not be covered by the manufacturer's warranty.*
- Trailering laws differ from place to place. Be sure that your rig is legal, not only where you live but where you'll be driving. State police or provincial police can help you with local regulations.
- If you use a deadweight hitch, you should consider using a sway control. Sway control is required with a weight-distributing hitch; the charts beginning on p. 13 indicate where a weight-distributing hitch is required.
- Consult the GMC truck owners/operators manual for more details.

The Demands of Towing

Naturally, towing any trailer puts additional stresses on your truck's engine, transmission, rear axle and tires. The weight of the trailer, increased aerodynamic drag and the motion of the trailer itself all contribute to these greater demands. A couple examples:

- A large trailer's frontal area adds to air drag and, therefore, to pulling requirements. In fact, it takes about one horsepower per square foot of frontal area to move the vehicle and trailer at highway speeds. The shape of the trailer also affects air drag.
- For every additional 1000 feet of altitude, an engine loses 3 percent of its sea-level performance—so at 10,000 feet, the power loss amounts to 30 percent. Therefore, if much of your towing is to be at high altitudes, a larger engine should be considered.

To manage these demands, your truck will probably need some special available equipment or components, such as a higher axle ratio and heavy-duty cooling.

On cover: 1500 series 4WD Suburban has SLE trim and is shown in Deluxe 2-Tone with Onyx Black and Quicksilver Metallic, with available equipment.

4WD Sierra Crew Cab SL, shown in solid Onyx Black and available equipment.

Powertrain Considerations

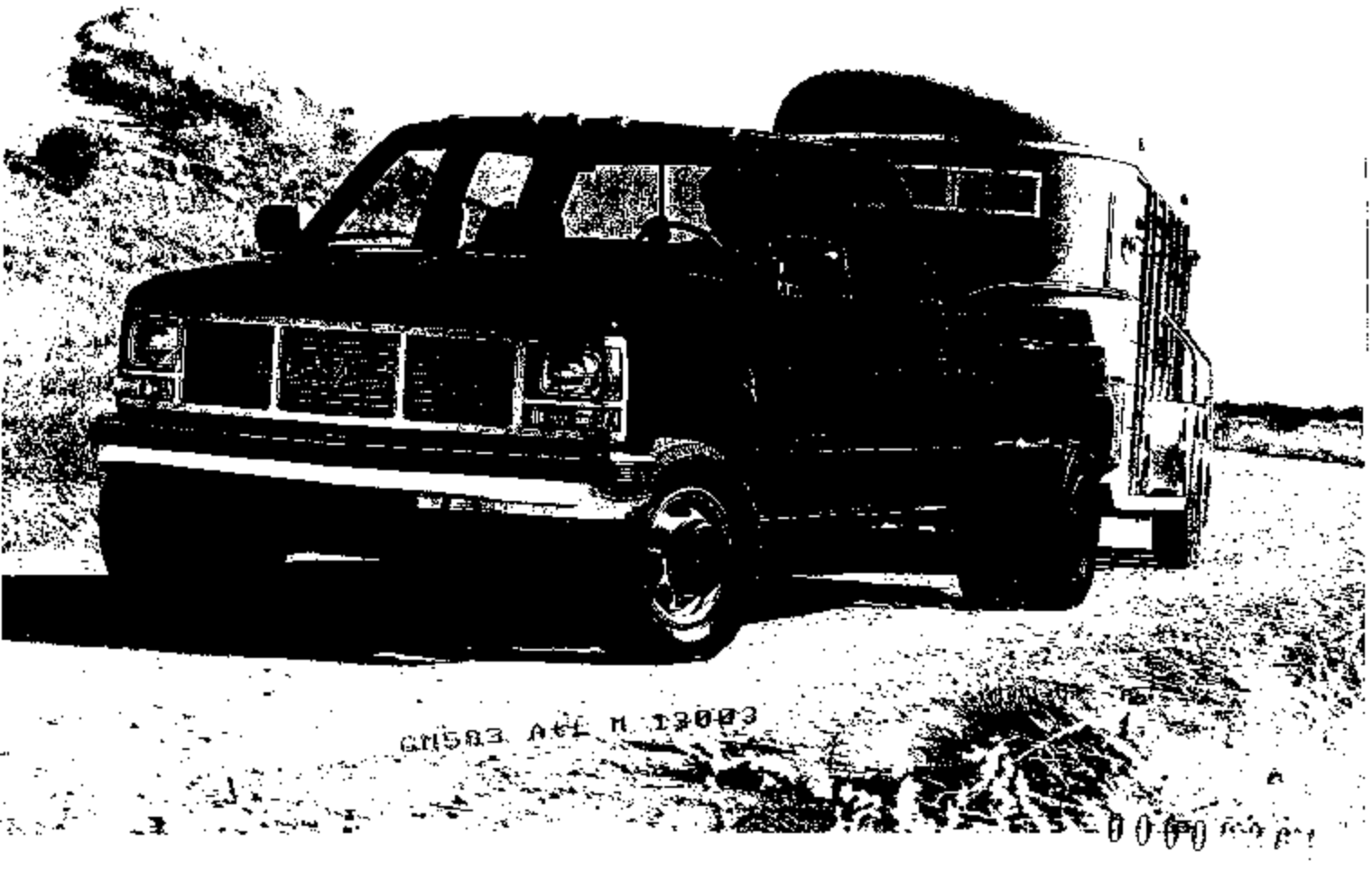
Trailer towing requires an engine with enough muscle to get the load rolling with ease, move it smoothly into traffic and enable it to blend with the flow at cruising speeds. The engine also must pull the load reliably over rough terrain and hills and in most climatic conditions. The charts beginning on page 19 show the minimum engine sizes needed to move the weight of specific vehicles and trailers. If you want improved performance, it's wise to choose an engine larger than the minimum recommended (if one is available).

Gearing Helps to Pull

Gearing multiplies the torque output of an engine. So proper gearing is important for trailering. This gearing involves the transmission, the rear axle and even the tires.

GMC Truck strongly endorses the use of automatic transmissions for trailering, because the torque converter multiplies the engine torque more smoothly and makes the first gear ratio about twice as effective as that of a manual transmission. The transmission's lower gears provide the power to get the load moving and up to road speed; direct drive reduces engine speed to efficient levels. When towing, the transmission should be in Drive. Operating in Drive will minimize heat build-up.

Rear axle ratio selection also incurs tradeoffs between performance and fuel economy. The axle ratio permanently gears engine speed and power for the work the drive wheels have to do. Recommended axle ratios are based on engine speeds required to produce adequate drive-wheel torque (pulling power) at cruising speed with the full rated load. The highest possible rear axle ratio would be the best choice for a vehicle that will be pulling heavy loads. However, a higher ratio requires the engine to run faster to maintain the same road speed, and may be less fuel-efficient.



The correct axle ratio, neither too high nor too low, based upon the gross combination weight (see page 23), will deliver the optimum combination of performance and fuel economy.

When selecting tires, it is important to know that larger tires actually reduce vehicle performance. To compensate for this loss of performance, you may want to order a higher axle ratio.

Vehicle Weight Ratings

Trailering recommendations are based on the load the vehicle will be required to *carry* as well as the load it will *pull*.

GVWR (Gross Vehicle Weight Rating)

This rating, displayed on the left-hand door or door-lock pillar label, is the most the tow vehicle may weigh when completely loaded and fueled and with all passengers aboard and equipment, including the weight of the hitch and tongue (or fifth-wheel kingpin) load of the trailer. Front and rear Gross Axle Weight Ratings (GAWR) are also printed on this label.

Many different components contribute to your vehicle's load-carrying capability. Tires, wheels, brakes, axle, steering, springs, shocks, frame and more affect the payload rating and GVWR. Increasing the capacity of one or more of these parts does not necessarily increase your vehicle's load rating.

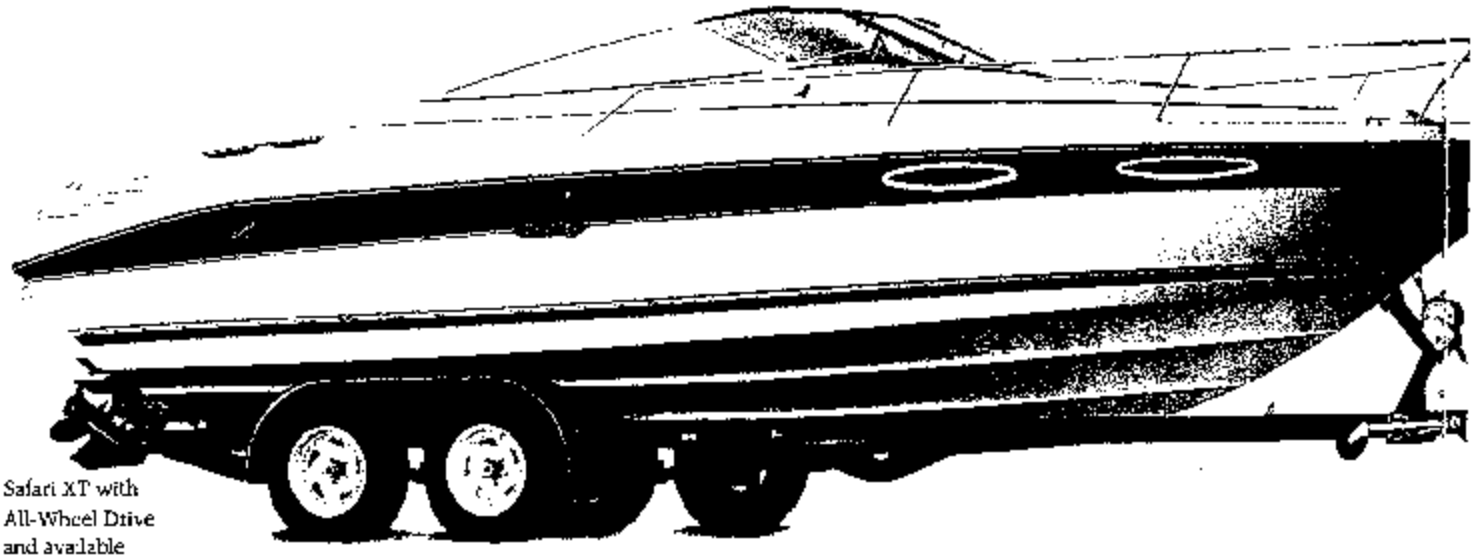
GCWR (Gross Combination Weight Rating)

This rating specifies how much the total trailering combination can weigh: the combined weight of the tow vehicle, trailer and passengers, plus all gear, equipment and supplies carried both in the vehicle and in the trailer. See page 23 for Gross Combination Weight Ratings by engine and axle ratio.

Trailer Tongue Load

Good trailering requires proper trailer tongue weight. The proper tongue weight is important because it allows the vehicle steering system to control the vehicle-trailer combination. If the tongue weight is too low, because, for example, the load is situated too far back in the trailer, away from the hitch, the trailer can cause a lifting effect on the tow vehicle's rear axle. This can lead to handling and control problems on rough roads or during heavy braking. If the tongue weight is too high, because, for example, the trailer is overloaded or the load is situated too far forward in the trailer, toward the hitch, the trailer can cause a lifting effect on the tow vehicle's front axle and reduce suspension travel range on the rear axle. Again, there is a danger of reduced handling and control.

Trailer tongue load should be 10 percent of the loaded trailer's weight for deadweight



Safari XT with All-Wheel Drive and available equipment shown in Light Teal Metallic and Sterling Silver Metallic.

hitches, and 12 percent for weight-distributing hitches. The tongue weight percentages for weight-distributing hitches are higher than those for deadweight hitches because both the trailer axle and the vehicle axle support the tongue load, reducing the chance of exceeding rear Gross Axle Weight Rating (GAWR), and, in turn unloading the front suspension to the point where there is not enough weight on the steering system to maintain vehicle/trailer control. Tongue loads may be adjusted by distributing the weight on or in the trailer, and can be verified by separately weighing the loaded trailer and then the tongue.

Hitch Types

There are three types of hitch: Deadweight hitches are available for light-duty trailering; weight-distributing and fifth-wheel hitches are available for heavier trailers.

Deadweight Hitch

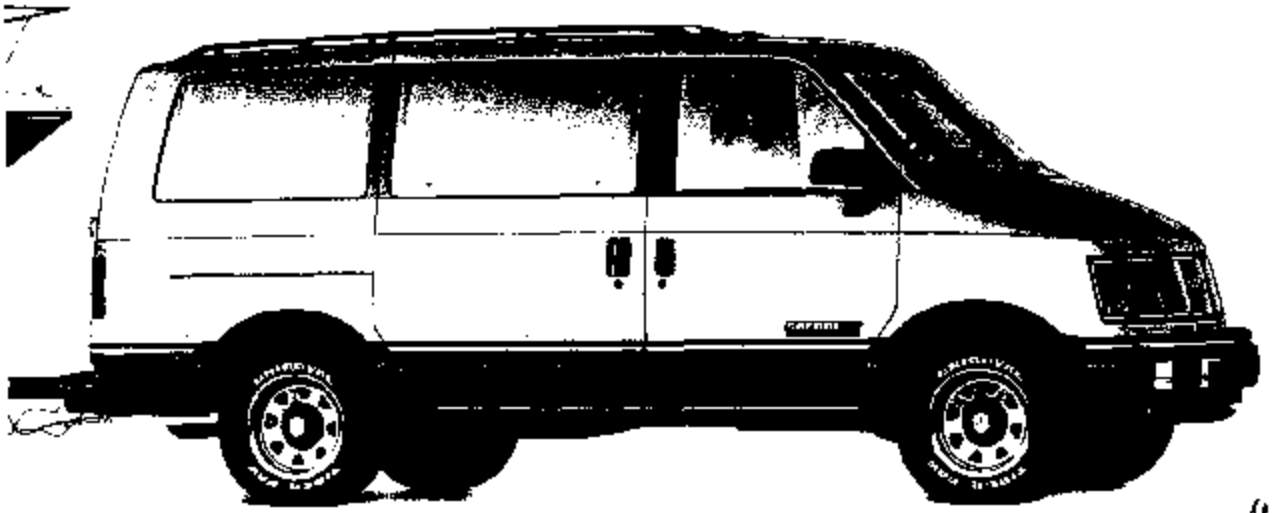
A deadweight hitch supports the trailer tongue load without distributing it. On vans and Jimmy models, the hitch is bolted to the undercarriage and/or rear bumper; it includes a 1 7/8"-diameter hitch ball and can be used to pull light trailers up to 2000 pounds with a maximum tongue weight capacity of 200 pounds.*

On Sonoma, Sierra, Yukon and Suburban models, the deadweight hitch is a step-type rear bumper equipped with a hitch ball. The ball is available from your GMC Truck dealer, and the bumper is prepunched at the factory to accept the hitch ball. With a 1 7/8"-diameter hitch ball, the hitch can be used to tow trailers up to 2000 pounds, with a maximum trailer tongue weight of 200 pounds. With a 2" diameter ball, this hitch is rated to tow 3000 pounds on Yukon with a maximum tongue weight of 300 pounds, or up to 4000 pounds on Suburban, Sierra and Crew Cab pickup models with a maximum tongue weight of 400 pounds.* See availability charts on pages 15-20.

Note: If your trailer tongue has a V-shaped foot, the foot could dent your step bumper in a sharp turn. Check the distance from the foot's front edge to the ball socket's centerline; if this distance is less than 12 inches, remove the foot or the trailer tongue.

If a 2000-pound trailer is attached to a deadweight hitch and set up properly, 10 percent of the trailer gross weight of 2000 pounds pushes down on the hitch ball resulting in a 200-pound tongue load. However, the combined wheelbase of the truck and trailer acts as a single lever with the rear suspension as the fulcrum. Because the hitch ball is located at the outermost

* When properly equipped, including trailer, passengers, cargo and equipment.



2500 series Rally van with 125" wheelbase has STX trim and is shown in Deluxe 2-Tone with Royal Blue Metallic and Summit White, with available equipment.

1500 series 2WD Suburban has SLE trim and is shown in Solid (ZY1) Dark Teal Metallic, with available equipment.

extremity of the rear overhang the hitch ball unloads the front suspension by as much as 100 pounds, depending on wheelbase-to-rear overhang ratio. This weight is transferred to the rear suspension and added to the 200-pound tongue load. Thus, in this example, about 300 pounds of weight is added to the tow vehicle's rear axle weight, wheels, tires and suspension. As noted above, exceeding the tow vehicle's maximum deadweight tongue load capacity can lead to poor handling. Use a weight-distributing hitch to support higher tongue loads.

*Weight-Distributing Hitch**

Weight-distributing hitches utilize a hitch platform that is bolted to the frame or underbody and acts as an extension of the frame (or frame equivalent on vehicles with body-frame construction). Through the geometry of the trailer tongue, the ball mount, the hitch ball, the equalizer bars and snap-up brackets, a variable proportion of the tongue load can be distributed to the tow vehicle's front and rear wheels, with some load also going back to the trailer wheels. Thus, a 5000-pound trailer, set up properly, would have a tongue load of 12 percent of the trailer weight, or 600 pounds. The front suspension should carry approximately 30 percent of the tongue load, or 180 pounds; the rear 40 percent or 240 pounds; and 30 percent or 180 pounds should go back to the trailer axle or axles. This distribution, obviously, can be varied, but care should be taken that recommended procedures are followed.

You can approximate proper weight distribution by measuring the height of your rear bumper before you couple the trailer to the hitch ball. After coupling, use your equalizer bars to bring your bumper height back to the starting point. You should always check your vehicle and trailer weights at a public scale before going on a trip. (See a local directory for public scale locations.)

*Fifth-Wheel Trailer Hitch**

Pickup and chassis-cab models can be equipped with a fifth-wheel hitch. (Fifth-wheel hitches are supplied and installed only by trailer manufacturers, not by GMC Truck.) Two main types of installations are in use on pickups.

- The fifth wheel is mounted on a bar, which, in turn, is mounted on brackets attached to the frame and the bed of the pickup box and supported by braces on the fender housings (diagonal bracing between the brackets is required). The kingpin is mounted on the trailer.
- The kingpin is mounted, with proper reinforcements, in the bed of the pickup box, and the fifth wheel is mounted on the trailer.

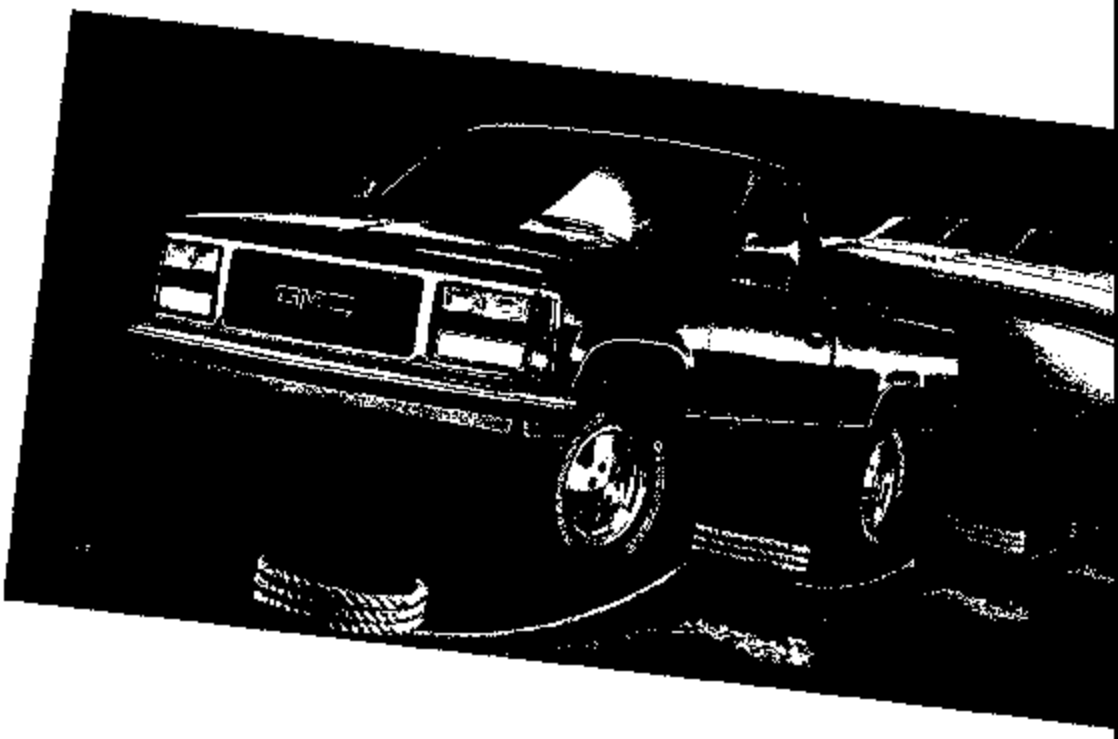
Trailers with fifth-wheel hitches put a greater percentage of their weight on the kingpin (tongue load) than do trailers with conventional hitches. Therefore, carefully observe the vehicle's payload capacity as well as the location of the hitch mounting in relation to the wheelbase. Your GM dealer can supply estimated payload data for a particular vehicle and its factory-installed equipment, but the weight of any additional equipment, all occupants and any other cargo must be subtracted from the estimated payload weight to determine the available tongue load weight. Trailer manufacturer representatives can supply the trailer weights and tongue load weights of their products.

Temperature Control

The additional work of pulling a trailer produces higher temperatures in engine coolant and engine oil and in transmission fluid. To help control these temperatures, GMC Truck offers a number of available options that should be considered when ordering and outfitting a vehicle for trailering. Larger radiators, with internal heat exchangers or external cooler lines for the transmission fluid and engine oil, provide increased cooling capacity. Some equipment is standard on models with specific engines or with other equipment. Conversely, some equipment is unavailable with other options. Your GMC Truck dealer can give you details on specific available equipment combinations; requirements and recommendations are also noted on the charts beginning on page 13.

* When properly equipped, including trailer, passengers, cargo and equipment.

TRAILERING PACKAGES



4WD Sierra SLE shown in solid Fire Red and available equipment.

Sonoma regular cab/short box is shown with SLE trim in Apple Red and available equipment.

Trailering Packages

The Heavy-Duty Trailering Special Package (RPO Z82) includes a hitch platform, a 7-wire trailer wiring harness and, in some cases, heavy-duty cooling. The Light-Duty Trailering Special Package (RPO Z72) includes a deadweight hitch and 5-wire trailer wiring harness. Availability of these packages is specified on page 22.

Trailer Wiring Harnesses

Two types of wiring harnesses are available for GMC Truck models: a 5-wire harness for light-duty applications, and a heavy-duty, 7-wire harness (recommended for all trailers with electric brakes). See availability chart on page 22.

Safety Chains

You should always attach chains between your vehicle and your trailer. Cross the chains under the tongue of the trailer, so that the tongue will not drop to the road if it separates from the hitch. Your hitch or trailer manufacturer should be able to supply specific instructions for chain installation with your hitch or trailer; follow these recommendations. Always leave just enough slack so that you can turn with your rig. Never allow the chains to drag the ground.

Trailer Brakes

If your trailer will weigh more than 1000 pounds/450 kg loaded, it must have its own brakes, and they must be rated adequately for the load. Be sure to read and follow the instructions for the trailer brakes, so that you'll be able to install, adjust and maintain them correctly. Even though all GMC Trucks are equipped with rear-wheel or all-wheel antilock brakes, trailer brake systems may be able to tap into your vehicle's hydraulic system, however these precautions must be observed:

- Do not tap into your vehicle's brake system if the trailer's system will use more than 0.02 cubic inches/0.3 cc of fluid from your vehicle's master cylinder. This could compromise both braking systems, and even cause a total loss of braking.
- Make sure that the trailer brake components will withstand 3000 psi/20 650 kPa of pressure. If they will not, do not use the trailer brake system with your vehicle.
- If you are certain that your chosen trailer brake system is within these guidelines, make the brake fluid tap at the port on the master cylinder that sends fluid to the rear brakes. Use steel brake tubing. Do not use copper tubing, it is subject to fatigue, and will eventually break off.

Sway Control

Adequate sway control is required when towing over 2000 pounds with Sonoma, Safari and Jimmy models, when towing over 3000 pounds with Yukon and when towing over 4000 pounds with Suburban, Sierra, Rally and Vandura models.*

TRAILERING DRIVING TIPS

Before You Start Your Trip

Before setting out for the open road, you should get to know your rig. Take the time to acquaint yourself with the feel of handling and braking with the added weight of the trailer. Always keep in mind that the vehicle combination you are driving is now much longer than your truck alone. Before starting a trip, check the trailer hitch and platform, safety chains, electrical connector, lights, tires and mirror adjustment. If the trailer is equipped with electric brakes, start the vehicle and trailer moving and apply the trailer brakes by hand, using the brake controller, to be sure they are working.

Check the trailer's load, and be sure that it is secure. Check the load's security occasionally throughout your trip.

* When properly equipped, including trailer, passengers, cargo and equipment.

Yukon SLE shown in Dark Garnet Metallic, with available equipment.

Jimmy SLT four-door shown in Frost White and Steel Gray Metallic, with available equipment.

Backing Up

To back up a trailer, start with your hand at the bottom of the steering wheel. To move the trailer left, move your hand to the left. To move the trailer right, move your hand to the right. Always back up slowly, and if possible have someone behind the trailer to guide you.

Following Distance and Passing

Stay at least twice as far behind the vehicle ahead as you would when driving your vehicle without a trailer. This can help you avoid situations that would require heavy braking or sudden maneuvers. And although passing is not recommended, be careful to pass only when you are certain to have adequate time and distance to pass safely. Allow extra distance for passing and returning to driving lanes. Signal well in advance. You'll need more distance to pass a vehicle when you're towing a trailer. And, because your vehicle-trailer combination is a good deal longer, you'll need to go much farther beyond the passed vehicle before you can return to your lane.

Turning Your Truck and Trailer

The turning radius is smaller for a trailer than it is for a truck. Thus the trailer and trailer wheels are closer than the truck's wheels to the edge of the pavement on the inside of curves. You must drive slightly beyond the normal turning point; this will help you avoid soft shoulders, curbs, road signs, trees and other objects. Avoid jerky or sudden steering maneuvers.

When you signal a turn, the turn indicators on your instrument panel will flash even if the bulbs on your trailer are not functioning. It is important that you check your trailer's turn signals occasionally to be certain that they are working properly.

Driving on Grades

Before starting long or steep down grades, reduce speed and shift the transmission to a lower gear to assist braking. On long uphill grades, downshift the transmission and reduce speed to 45 MPH or less to reduce the possibility of overheating.

Towing a trailer affects the way cruise control works. With the added weight and frontal area of the trailer, you may have to accelerate to maintain the set cruising speed in hilly terrain or when driving into the wind. When going downhill, you may have to brake or shift to a lower gear to keep your speed down. Of course, applying the brake disengages cruise control. Many drivers find the differences in driving requirements to be too much trouble, and simply don't use cruise control when towing in hilly terrain.

Parking on Hills and Grades

You should not park a vehicle with a trailer attached on a hill. If something goes wrong, your rig could move. People can be injured, and both your vehicle and the trailer can be damaged. But if you ever must park your rig on a hill, here's how to do it more safely:

1. Apply your regular brakes, but don't shift into Park (P) yet, or into gear for a manual transmission. CAUTION: Do not shift the automatic transmission into Park until the wheels are chocked and the parking brake is set; otherwise it may be difficult to shift out of Park.
2. Have someone place chocks under the trailer wheels.
3. When the wheel chocks are in place, release the regular brakes until the chocks absorb the load.
4. Reapply the regular brakes. Then apply your parking brake, and then shift to Park (P) with an automatic transmission, or Reverse (R) for a manual transmission. If you have a four-wheel-drive vehicle with a manual transfer case shift lever, be sure the transfer case is in a drive gear, not in Neutral (N).

When you are ready to leave after parking on a hill:

1. Apply your regular brakes and hold the pedal down.
2. With an automatic transmission, start your engine in Park; with a manual transmission start with the clutch pedal depressed.
3. Shift into gear and release the parking brake.
4. Release regular brakes and drive until the chocks are freed; apply regular brakes and have someone retrieve the chocks.

Engine Cooling While Trailering

When towing a trailer, you may encounter temporary cooling system overload, even if with proper cooling

equipment, especially if you have been climbing a long hill on a hot day or idling for long periods in heavy traffic or when slowing or stopping after high-speed driving.

You should refer to your vehicle's Owner's Manual in such situations; it contains specific instructions on what to do should overheating occur.

Maintenance Requirements

Your vehicle will need service more often when you use it to pull a trailer. See the Maintenance Schedule in your Owner's Manual for details on how to maintain your vehicle properly for trailering use. Especially important to maintenance: transmission fluid, engine oil, axle lubrication, adjustment of belts, the cooling system and the brakes (don't overfill). Review these sections before you start pulling a trailer, and follow the requirements. Check the hitch nuts and bolts to be sure they are tightly secured.

In addition, check your trailer's condition frequently. Check the turn signals and other electrical connections. Check wheel and tire conditions. When you drive with the trailer, make sure that chains are installed properly when you are using them.

Trailering Charts

The charts on the following pages give comprehensive details about required equipment and recommended available options for recreational or commercial towing with GMC Truck light-duty models. Although there are not specific charts covering the trailering requirements of GMC Truck series G-3500 and P-3500 recreational vehicle models, the maximum Gross Combination Weight Ratings shown in the chart on page 23 apply to the available engine and rear axle ratio combinations.

To determine required and recommended equipment, calculate your trailer's maximum loaded weight and tongue load. Then, using the chart for your GMC Truck model, look down the column that either matches or exceeds that weight. The equipment indicated in red is required. Larger components may be ordered, if available, for special needs and applications. NOTE: If available, a larger engine and numerically lower axle ratio for that engine may be substituted for the engine and axle ratio specified in the charts if the Gross Combination Weight Rating (GCWR) for that engine and axle ratio matches or exceeds the GCWR for the specified engine and axle ratio. If you want improved performance, buy increased capacity. See the GCWR chart on page 23. To facilitate ordering, each column lists the Regular Production Option (RPO) number for each item of available optional equipment, except for rear axle ratios where the ratio itself is shown.

SONOMA

2WD & 4WD SONOMA (BALL HITCH AND FIFTH WHEEL)

■ Required

GASOLINE ENGINE	Ball Hitch		Ball or 5th-Wheel Hitch		
Trailer Classification.	Medium		Heavy		
Vehicle Series.	2WD / 4WD	2WD / 4WD	2WD	2WD	4WD
Maximum Trailer Weight (lbs).†	4000(1)	4000	4500(1)	6000	5500(2)
Maximum Tongue Load (lbs).	500	500	550	750	700
Gross Vehicle Weight Rating (lbs).*	4600(3)	4600(3)	4600	4600	5150
Available Transmission: Automatic MX0/Manual MM5.	MM5	MX0	MM5	MX0	MX0
Maximum Payload (lbs).**			1684	1659	1876
Engine and Axle Ratio/ Maximum Trailer Weight.					
4.3L	3.08(4)	3.08	3.42/4500	3.08/5000	3.08/4500(5)
	3.42	3.42		3.42/6000	3.42/5500(5)
Trailering Special Package.	Z82	Z82	Z82	Z82	Z82
Trailer Hitch. Weight distributing platform (6)	Z82	Z82	Z82	Z82	Z82
Wiring Harness. 7-wire	Z82	Z82	Z82	Z82	Z82
Cooling. Transmission oil and engine oil (7)	V08	V08	V08	V08	V08
Power Steering.	N40(8)	N40(8)	N4C	N4C	STD
Cruise Control.	K34	K34	K34	K34	K34
Locking Rear Differential.	G80	G80	G80	G80	G80

(1) Manual transmission ratings. (2) Available P235 / 75R15 tires on 4WD models with standard LB4 engine reduce maximum trailer weight by 1000 lbs. (3) 5150 for 4WD models
(4) 3.42 axle and P205 / 75R15 tires required on 4WD models. (5) Add 250 lbs. for regular cab models. (6) Not applicable for 5th-wheel trailering.
(7) Transmission oil cooler not applicable with manual transmission. (8) Power steering standard on 4WD models and 2WD club coupe models.
NOTE: Although Sonoma Pickups can be purchased with manual transmissions, GMC Truck strongly recommends the available electronic automatic 4-speed overdrive transmission for towing.
* Gross Vehicle Weight includes vehicle, passengers, equipment and cargo.
** Payload includes passengers, cargo and equipment.
† More than two passengers and cargo in the tow vehicle will reduce the Maximum Trailer Capacity

Trailering-Related Standard Equipment.
Power brakes, 20-gallon fuel tank, 100-amp alternator, front stabilizer bar. L35 engine also includes automatic transmission, engine oil cooler, and transmission oil cooler.

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JIMMY
SAFARI

2WD & 4WD JIMMY (BALL HITCH)

■ Required

GASOLINE ENGINE	Medium		Heavy	
Trailer Classification.				
Vehicle Series.	2WD/4WD	2WD/4WD	2WD	4WD
Maximum Trailer Weight (lbs).†	4000(1)	4000	5500	5250
Maximum Tongue Load (lbs).	500	500	700	650
Available Transmissions: Automatic R8Y/Manual MM5.	MM5	R8Y	R8Y	R8Y
Engine and Axle Ratio/Maximum Trailer Weight.				
4.3L	3.42(2)	3.08	3.08/4500(3)	3.08/4250(3)
		3.42	3.42/5500(3)	3.42/5250(3)
Trailering Special Package.	Z82	Z82	Z82	Z82
Trailer Hitch. Weight distributing platform	Z82	Z82	Z82	Z82
Wiring Harness. 7-wire	Z82	Z82	Z82	Z82
Cooling. Transmission oil and engine oil(4)	VO8	STD	STD	STD
Heavy Duty Shock Absorbers.	F51	F51	F51	F51
Cruise Control	K34	K34	K34	K34
Locking Rear Differential.	G80	G80	G80	G80

(1) Standard L84 engine and manual transmission ratings. (2) P235/75R15 tires required on 4WD models. (3) Add 250 lbs. for 2Dr models.
(4) Transmission oil cooler not applicable with manual transmission.
† More than two passengers and cargo in the tow vehicle will reduce the Maximum Trailer Capacity.
NOTE: Although Jimmy Utilities can be purchased with manual transmissions, GMC Truck strongly recommends the available electronic automatic 4-speed overdrive transmission for towing.

Trailering-Related Standard Equipment.
Power steering, power brakes, 20-gallon fuel tank, 100-amp alternator, front stabilizer bar. R8Y enhanced powertrain also includes 200 HP engine, electronic automatic 4-speed overdrive transmission, engine oil cooler and transmission oil cooler.

2WD & AWD SAFARI (BALL HITCH)

■ Required

GASOLINE ENGINE	Medium	Heavy	
Trailer Classification.			
Vehicle Series.	2WD/AWD	2WD	AWD
Maximum Trailer Weight (lbs).†	4000	5500	5250
Maximum Tongue Load (lbs).	500	700	650
Engine and Axle Ratio/Maximum Trailer Weight.			
4.3L	3.42(1)	3.42/5000(2)	3.42/4750(2)
	3.73	3.73/5500(2)	3.73/5250(2)
Trailering Special Package.(3)	Z82	Z82	Z82
Trailer Hitch. Weight distributing platform	Z82	Z82	Z82
Wiring Harness. 7-wire	Z82	Z82	Z82
Cooling. Transmission oil and engine oil	Z82/VO8	Z82/VO8	Z82/VO8
Cruise Control and Tilt-Wheel.™	ZQ3	ZQ3	ZQ3
Locking Rear Differential.	G80	G80	G80

(1) 3.23 also available in 2WD models. (2) Add 250 lbs. for cargo models. (3) Z82 requires 3.42 or 3.73 axle (3.73 only in AWD models).
† More than two passengers and cargo in the tow vehicle will reduce the Maximum Trailer Capacity.

Trailering-Related Standard Equipment.
Power steering, power brakes, 27-gallon fuel tank, 100-amp alternator, heavy-duty shocks, front stabilizer bar, electronic automatic 4-speed overdrive transmission. L35 engine also includes engine oil cooler and transmission oil cooler.

SUBURBAN
YUKON

SUBURBAN (BALL HITCH)

■ Required

GASOLINE ENGINE							
Trailer Classification.		**Medium**			**Heavy**		
Vehicle Series.	C1500	K1500	C/K2500	C1500	K1500	C2500	K2500
Maximum Trailer Weight (lbs).†		4000		7000	6500	10,000	10,000
Maximum Tongue Load (lbs).		400		650	800	1000	1000
Engine and Axle Ratio/Maximum Trailer Weight.							
5.7L	3.42	3.42	3.73	3.42/6000	3.42/5500	3.73/6500	3.73/6000
	3.73	3.73	4.10	3.73/7000	3.73/6500	4.10/8000	4.10/7500
7.4L	NA	NA	3.73	NA	NA	3.73/9000	3.73/8500
			4.10			4.10/10,000	4.10/10,000
Trailering Special Package.	Z82	Z82	Z82	Z82	Z82	Z82	Z82
Trailer Hitch. Step bumper	STD	STD	STD	STD	STD	STD	STD
Weight distributing platform	Z82	Z82	Z82	Z82	Z82	Z82	Z82
Wiring Harness. 7-wire	Z82	Z82	Z82	Z82	Z82	Z82	Z82
Cooling. Transmission oil VO2	Z82/VO2	Z82/VO2	Z82/VO2	Z82/VO2	Z82/VO2	Z82/VO2	Z82/VO2
Engine oil KC4	Z82/KC4	Z82/KC4	Z82/KC4	Z82/KC4	Z82/KC4	Z82/KC4	Z82/KC4
Cruise Control and Tilt-Wheel.™	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3
Locking Rear Differential.	G80	G80	G80	G80	G80	G80	G80

† More than two passengers and cargo in the tow vehicle will reduce the Maximum Trailer Capacity.

Trailering-Related Standard Equipment.
Power steering, power brakes, 42-gallon fuel tank, 100 amp alternator, front stabilizer bar, and electronic automatic 4-speed overdrive transmission.

YUKON (BALL HITCH)

■ Required

GASOLINE ENGINE		
Trailer Classification.	**Medium**	**Heavy**
Vehicle Series.	K1500	K1500
Maximum Trailer Weight (lbs).†	4000	7000
Maximum Tongue Load (lbs).	500	850
Available Transmission: Automatic MX0/Manual MT8.	MX0	MX0
Engine and Axle Ratio/Maximum Trailer Weight.		
5.7L	3.42	3.42/6000
	3.73	3.73/7000
Trailering Special Package.	Z82	Z82
Trailer Hitch. Step bumper	STD	STD
Weight distributing platform	Z82	Z82
Wiring Harness. 7-wire	Z82	Z82
Cooling. Transmission oil	Z82/VO2	Z82/VO2
Engine oil	Z82/KC4	Z82/KC4
Cruise Control and Tilt-Wheel.™	ZQ3	ZQ3
Locking Rear Differential.	G80	G80

† More than two passengers and cargo in the tow vehicle will reduce the Maximum Trailer Capacity.

Trailering-Related Standard Equipment.
Power steering, power brakes, 30-gallon fuel tank, 100-amp generator and front stabilizer bar.

2WD / 4WD SIERRA CREW CAB (BALL HITCH AND FIFTH WHEEL)

■ Required

GASOLINE ENGINE	Ball Hitch				5th-Wheel Hitch	
Trailer Classification.	Medium		Heavy		Heavy	
Vehicle Series.	C3500	K3500	C3500	K3500	C3500	K3500
Maximum Trailer Weight (lbs).	4000		10,000	10,000	13,500	13,000
Maximum Tongue Load (lbs).	400		1000	1000	3200	3100
Available Transmission: Automatic MX0 / Manual MT8.	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8
Gross Vehicle Weight Rating (lbs).					9000/10,000	9200/10,000
Maximum Payload (lbs).					3285/4285	3120/3920
Engine and Axle Ratio/Maximum Trailer Weight.						
5.7L	4.10	4.10	4.10/8000	4.10/7500	4.10/8000	4.10/7500
	4.56	4.56	4.56/9500	4.56/9000	4.56/9500	4.56/9000
7.4L	4.10	4.10	4.10/10,000	4.10/10,000	4.10/11,500	4.10/11,000
	4.56	4.56	4.56/10,000	4.56/10,000	4.56/13,500	4.56/13,000
Trailering Special Package.	Z82	Z82	Z82	Z82	NA	NA
Trailer Hitch. Step bumper	V43/VB3	V43/VB3	V43/VB3	V43/VB3	NA	NA
Weight distributing platform	Z82	Z82	Z82	Z82	NA	NA
Wiring Harness. 7-wire	Z82	Z82	Z82	Z82	NA	NA
Cooling. Transmission oil(1)	Z82/VQ2	Z82/VQ2	Z82/VQ2	Z82/KC4	VQ2	VQ2
Engine oil(2)	Z82/KC4	Z82/KC4	Z82/VQ2	Z82/KC4	KC4	KC4
Cruise Control and Tilt-Wheel.†	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3
Locking Rear Differential.	G80	G80	G80	G80	G80	G80

(1) VQ2 not applicable with manual transmission. (2) KC4 included with 7.4L engine.
NOTE: Although Sierra Pickups can be purchased with manual transmissions, GMC Truck strongly recommends the available electronic automatic 4-speed overdrive transmission for towing.
† More than two passengers and cargo in the rear vehicle will reduce the Maximum Trailer Capacity.

Trailering-Related Standard Equipment.
Power steering, power brakes, 34-gallon fuel tank, 100-amp alternator, and front stabilizer bar.



2WD SIERRA REGULAR CAB & CLUB COUPE (BALL HITCH)*

■ Required

GASOLINE ENGINE							
Trailer Classification.		Medium			Heavy		
Vehicle Series.	C1500	C2500	C3500	C1500	C2500	C3500	C35HD;(1)
Maximum Trailer Weight (lbs).†		4000		7500	10,000	10,000	10,000
Maximum Tongue Load (lbs).		400		900	1000	1000	1000
Available Transmission: Automatic MX0/Manual MT8.	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8
Engine and Axle Ratio/Maximum Trailer Weight.(2)							
4.3L	3.08	3.42	NA	3.42/5000	3.42/5000	NA	NA
	3.42	3.73		3.73/5500	3.73/5500		
	3.73	4.10			4.10/6000		
		4.56			4.56/6500		
5.0L	3.08	3.42	NA	3.08/5000	3.42/6000	NA	NA
	3.42	3.73		3.42/6000	3.73/7000		
		4.10			4.10/8000		
5.7L	3.08	3.42	3.73	3.08/5500	3.42/6500	3.73/6500	4.63/9000(3)
	3.42	3.73	4.10	3.42/6500	3.73/7500	4.10/8000	5.13/10,000(3)
	3.73	4.10	4.56	3.73/7500	4.10/9000	4.56/9500	
		4.56			4.56/10,000		
7.4L	NA	3.73	3.73	NA	3.73/9500	3.73/9000	4.63/10,000
		4.10	4.10		4.10/10,000	4.10/10,000	5.13/10,000
			4.56			4.56/10,000	
Trailering Special Package.	Z82	Z82	Z82	Z82	Z82	Z82	NA
Trailer Hitch. (Dead Weight). Step bumper	V43/VB3	V43/VB3	V43/VB3	V43/VB3	V43/VB3	V43/VB3	NA
Weight distributing platform	Z82	Z82	Z82	Z82	Z82	Z82	NA
Wiring Harness. 7-wire	Z82	Z82	Z82	Z82	Z82	Z82	NA
Cooling. Transmission oil(4)	Z82/VO2	Z82/VO2	Z82/VO2	Z82/VO2	Z82/VO2	Z82/VO2	VO2
Engine oil(5)	Z82/KC4	Z82/KC4	Z82/KC4	Z82/KC4	Z82/KC4	Z82/KC4	KC4
Heavy-Duty Shock Absorbers.	Z82	STD	STD	Z82	STD	STD	NA
Cruise Control and Tilt-Wheel.™	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3
Locking Rear Differential.	G80	G80	G80	G80	G80	G80	NA

* Chassis Cab add 500 lbs. to maximum trailer weight shown (up to 10,000 lbs). (1) Chassis Cab only. (2) 4.3 and 5.0L engine tow ratings are lower with manual transmissions. See GCWR chart, page 23. (3) Manual transmission only. (4) VO2 transmission oil cooler is not applicable with manual transmission. (5) KC4 engine oil cooler is included with 7.4L engine.
† More than two passengers and cargo in the tow vehicle will reduce the Maximum Trailer Capacity.

Trailering-Related Standard Equipment.
Power steering, power brakes, 25 / 34-gallon fuel tank, 100-amp alternator and front stabilizer bar.



4WD SIERRA REGULAR CAB & CLUB COUPE (BALL HITCH)*

■ Required

GASOLINE ENGINE						
Trailer Classification.		Medium			Heavy	
Vehicle Series.	K1500	K2500	K3500	K1500	K2500	K3500
Maximum Trailer Weight (lbs).†		4000		8500	10,000	10,000
Maximum Tongue Load (lbs).		400		1000	1000	1000
Available Transmission: Automatic MX0/Manual MT8.	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8
Engine and Axle Ratio/Maximum Trailer Weight.(1)						
4.3L	3.42	3.42	NA	3.42/4500	3.73/5000	NA
	3.73	3.73		3.73/5000	4.10/5000	
		4.10			4.56/6000	
5.0L	3.42	3.42	NA	3.42/5500	3.42/5000	NA
	3.73	3.73		3.73/6500	3.73/6500	
	4.10	4.10		4.10/7500	4.10/7500	
5.7L	3.42	3.42	3.73	3.42/6000	3.42/6000	3.73/6000
	3.73	3.73	4.10	3.73/7000	3.73/7000	4.10/7500
	4.10	4.10	4.56	4.10/8500	4.10/8500	4.56/9000
					4.56/10,000	
7.4L	NA	3.42	3.73	NA	3.42/8500	3.73/8500
		3.73	4.10		3.73/9500	4.10/10,000
		4.10	4.56		4.10/10,000	4.56/10,000
Trailering Special Package.	Z82	Z82	Z82	Z82	Z82	Z82
Trailer Hitch (Dead Weight). Step bumper	V43/VB3	V43/VB3	V43/VB3	V43/VB3	V43/VB3	V43/VB3
Weight distributing platform	Z82	Z82	Z82	Z82	Z82	Z82
Wiring Harness. 7-wire	Z82	Z82	Z82	Z82	Z82	Z82
Cooling. Transmission oil (2)	Z82/VQ2	Z82/VQ2	Z82/VQ2	Z82/VQ2	Z82/VQ2	Z82/VQ2
Engine oil (3)	Z82/KC4	Z82/KC4	Z82/KC4	Z82/KC4	Z82/KC4	Z82/KC4
Cruise Control and Tilt-Wheel.**	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3
Locking Rear Differential.	G80	G80	G80	G80	G80	G80

* Chassis Cab add 500 lbs. to maximum trailer weight shown (up to 10,000 lbs). (1) 4.3 and 5.0L engine tow ratings are lower with manual transmissions. See GCWR chart, page 22.
(2) VQ2 transmission oil cooler is not applicable with manual transmission. (3) KC4 engine oil cooler is included with 7.4L engine.
** More than two passengers and cargo in the tow vehicle will reduce the Maximum Trailer Capacity.

Trailering-Related Standard Equipment.
Power steering, power brakes, 25 / 31 gallon fuel tank, 100-amp alternator and front stabilizer bar.

2WD / 4WD SIERRA REGULAR CAB & CLUB COUPE (BALL HITCH)*

DIESEL ENGINE ■ Required

Trailer Classification.	Medium						Heavy						
Vehicle Series.	C1500	K1500	C2500	K2500	C3500	K3500	C1500	K1500	C2500	K2500	C3500	K3500	C35/HD
Maximum Trailer Weight (lbs).†	4500						6000	5500	9500	9000	9000	8500	10 000
Maximum Tongue Load (lbs).	400						750	700	1000	1000	1000	1000	1000
Available Transmission:													
Automatic MX0/Manual MT8.	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8
Engine and Axle Ratio/Maximum Trailer Weight.(1)													
5.7L	3.08	3.42	3.42	3.42	3.73	3.73	3.42/5000	3.42/4500	3.42/4500	3.73/5500	4.10/6500	4.10/6000	NA
	3.42	3.73	3.73	3.73	4.10	4.10	3.73/6000	3.73/5500	3.73/5500	4.10/6500	4.56/8000	4.56/7500	
	3.73		4.10	4.10	4.56	4.56			4.10/6500	4.56/8000			
			4.56	4.56					4.56/8000				
6.5L	NA	NA	3.42	3.42	3.73	3.73	NA	NA	3.42/7000	3.42/6500	3.73/7500	3.73/7000	4.63/9000
			3.73	3.73	4.10	4.10			3.73/8000	3.73/7500	4.10/9000	4.10/8500	5.13/10,000
Trailering Special Package.	Z82	Z82	Z82	Z82	Z82	Z82	Z82	Z82	Z82	Z82	Z82	Z82	NA
Trailer Hitch (Dead Weight). Step bumper	V43/VB3	V43/VB3	V43/VB3	V43/VB3	V43/VB3	V43/VB3	V43/VB3	V43/VB3	V43/VB3	V43/VB3	V43/VB3	V43/VB3	NA
Weight distributing platform	Z82	Z82	Z82	Z82	Z82	Z82	Z82	Z82	Z82	Z82	Z82	Z82	NA
Wiring Harness. 7-wire	Z82	Z82	Z82	Z82	Z82	Z82	Z82	Z82	Z82	Z82	Z82	Z82	NA
Cooling. Transmission oil.(2)	Z82/VQ2	Z82/VQ2	Z82/VQ2	Z82/VQ2	Z82/VQ2	Z82/VQ2	Z82	Z82	Z82	Z82	Z82	Z82	VQ2
Locking Rear Differential.	G80	G80	G80	G80	G80	G80	G80	G80	G80	G80	G80	G80	NA
Cruise Control and Tilt-Wheel™	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3

* Add 500 lbs. to maximum trailer weight shown for Chassis Cab (up to 10,000 lbs). (1) Tow ratings are lower with manual transmission. See GCWR chart, page 23.
(2) Included with 6.5L engine and automatic transmission; not applicable with manual transmission.
† More than two passengers and cargo in the tow vehicle will reduce the Maximum Trailer Capacity.

Trailering-Related Standard Equipment.
Power steering, power brakes, 32-gallon fuel tank, 100-amp alternator, front stabilizer bar and engine oil cooler.

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2WD / 4WD SIERRA REGULAR CAB & CLUB COUPE (5TH-WHEEL HITCH)*

DIESEL ENGINE — ■ Required

Trailer Classification.	Medium						Heavy						
Vehicle Series.	C1500	K1500	C2500	K2500	C3500	K3500	C1500	K1500	C2500	K2500	C3500	K3500	C35/HD
Maximum Trailer Weight (lbs).†	4000						6000	5500	9000	9000	9000	8500	11,000
Maximum Tongue Load (lbs).							1500	1300	2300	2300	2750	2100	2750
Avail. Transmission: Auto. MX0/Man. MT8.	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8
Gross Vehicle Weight Rating (lbs).	5600	5600	7200	7200	9000	9200	6200	6600	8600	8600	11,000	12,000	15,000
Maximum Payload (lbs).	1878	1931	2858	2448	3824	3444	1975	1919	3835	3567	6178	6835	
Engine and Axle Ratio/Maximum Trailer Weight.(1)													
6.2L	3.08	3.42	3.42	3.42	3.73	3.73	3.42/5000	3.42/4500	3.42/4300	3.73/5500	4.10/6500	4.10/6000	NA
	3.42	3.73	3.73	3.73	4.10	4.10	3.73/6000	3.73/5500	3.73/5500	4.10/6500	4.56/8000	4.56/7500	
	3.73		4.10	4.10	4.56	4.56			4.10/6500	4.56/8500			
			4.56	4.56					4.56/8000				
6.5L	NA	NA	3.42	3.42	3.73	3.73	NA	NA	3.42/6500	3.42/6500	3.73/7500	3.73/7000	4.63/9000
			3.73	3.73	4.10	4.10			3.73/7500	3.73/7500	4.10/9000	4.10/8500	5.13/11,000
Cooling, Transmission oil(2)	VO2	VO2	VO2	VO2	VO2	VO2	VO2	VO2	VO2	VO2	VO2	VO2	VO2
Locking Rear Differential.	G80	G80	G80	G80	G80	G80	G80	G80	G80	G80	G80	G80	NA
Cruise Control and Tilt-Wheel.™	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3

* Add 500 lbs. to maximum trailer weight shown for Chassis Cab (up to 10,000 lbs). (1) Tow ratings are lower with manual transmission. See GCWR chart, page 75.
(2) Included with 6.5L engine and automatic transmission, not applicable with manual transmission.
† More than two passengers and cargo in the tow vehicle will reduce the Maximum Trailer Capacity.

Trailering-Related Standard Equipment
Power steering, power brakes, 32-gallon fuel tank, 100 amp alternator, front stabilizer bar and engine oil cooler.

2WD / 4WD SIERRA REGULAR CAB & CLUB COUPE (5TH-WHEEL HITCH)*

GASOLINE ENGINE — ■ Required

Trailer Classification.	Medium						Heavy						
Vehicle Series.	C1500	C2500	C3500	K1500	K2500	K3500	C1500	C2500	C3500	K1500	K2500	K3500	C35/HD(1)
Maximum Trailer Weight (lbs).†	4000						7500	12,000	13,500	8500	12,000	13,000	13,500
Maximum Tongue Load (lbs).	1000						1900	3000	3400	1900	3000	3400	3400
Avail. Transmission: Auto. MX0 / Man. MT8.	MX0	MX0	MX0/MT8	MX0	MX0	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8	MX0/MT8
Gross Vehicle Weight Rating (lbs).	5600	7200	9000	5600	7200	9200	6200	8500	11,000	6600	8600	12,000	15,000
Maximum Payload (lbs).	1878	2868	3824	1931	2448	3444	1975	3835	6178	1919	3567	6835	9480
Engine and Axle Ratio/Maximum Trailer Weight.(2)													
4.3L	3.08	3.42	NA	3.42	3.42	NA	3.42/5000	3.42/4500	NA	3.42/4500	3.73/5000	NA	NA
	3.42	3.42		3.73	3.73		3.73/5500	3.73/5000		3.73/5000	4.10/5500		
	3.73	4.10			4.10			4.10/5500			4.56/6000		
		4.56						4.56/6000					
5.0L	3.08	3.42	NA	3.42	3.42	NA	3.08/5000	3.42/5500	NA	3.42/5500	3.42/5500	NA	NA
	3.42	3.73		3.73	3.73		3.42/6000	3.73/6500		3.73/6500	3.73/6500		
		4.10		4.10	4.10			4.10/7500		4.10/7500	4.10/7500		
5.7L	3.08	3.42	3.73	3.42	3.42	3.73	3.08/5500	3.42/6000	3.73/6500	3.42/6000	3.42/6000	3.73/6000	4.63/9500(3)
	3.42	3.73	4.10	3.73	3.73	4.10	3.42/6500	3.73/7000	4.10/8000	3.73/7000	3.73/7000	4.10/7500	5.13/11,500(3)
	3.73	4.10	4.56	4.10	4.10	4.56	3.73/7500	4.10/8500	4.56/9500	4.10/8500	4.10/8500	4.56/9000	
		4.56						4.56/10,000					
7.4L	NA	3.73	3.73	NA	3.42	3.73	NA	3.73/9500	3.73/9000	NA	3.42/8500	3.73/8500	4.63/13,500
		4.10	4.10		3.73	4.10		4.10/12,000	4.10/11,500		3.73/9500	4.10/11,000	5.13/13,500
			4.56		4.10	4.56			4.56/13,500		4.10/12,000	4.56/13,000	
Trailer Hitch (Dead Weight). Step bumper	V43/VB3	V43/VB3	V43/VB3	V43/VB3	V43/VB3	V43/VB3	V43/VB3	V43/VB3	V43/VB3	V43/VB3	V43/VB3	V43/VB3	NA
Cooling, Transmission oil(4)	VO2	VO2	VO2	VO2	VO2	VO2	VO2	VO2	VO2	VO2	VO2	VO2	VO2
Engine oil(5)	KC4	KC4	KC4	KC4	KC4	KC4	KC4	KC4	KC4	KC4	KC4	KC4	KC4
Locking Rear Differential.	G80	G80	G80	G80	G80	G80	G80	G80	G80	G80	G80	G80	NA
Cruise Control and Tilt-Wheel.™	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3

* Chassis Cab add 500 lbs. to maximum trailer weight shown up to 10,000 lbs. (1) Chassis Cab only.
(2) 4.3 and 5.0L engine tow ratings are lower with manual transmissions. See GCWR chart, page 75. (3) Manual transmission only.
(4) VO2 transmission oil cooler is not applicable with manual transmission. (5) KC4 engine oil cooler is included with 7.4L engine.
† More than two passengers and cargo in the tow vehicle will reduce the Maximum Trailer Capacity.

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Trailering-Related Standard Equipment.
Power steering, power brakes, 25 / 34-gallon fuel tank, 100-amp alternator and front stabilizer bar.

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RALLY
VANDURA

RALLY & VANDURA VANS (BALL HITCH)

GASOLINE ENGINE ■ Required						
Trailer Classification.		**Medium**			**Heavy**	
Vehicle Series.	G1500	G2500	G3500	G1500	G2500	G3500
Maximum Trailer Weight (lbs).*		4000		6000	7000	10,000
Maximum Tongue Load (lbs).		500		750	850	1000
Engine and Axle Ratio/Maximum Trailer Weight.						
4.3L	3.42	3.42	3.73	3.42/7500	3.42/4500	4.10/5500
	3.73	3.73	4.10	3.73/5000	3.73/5000	4.56/6000
5.0L	3.08	3.42	NA	3.08/4500	3.42/5500	NA
	3.42	3.73		3.42/5500	3.73/6500	
5.7L	3.08	3.08	3.25(1)	3.08/5000	3.42/6000	3.73/6500
	3.42	3.42	3.73	3.42/6000	3.73/7000	4.10/8000
7.4L	NA	NA	3.73	NA	NA	3.73/9000
			4.10			4.10/10,000
Trailering Special Package.	Z82	Z82	Z82	Z82	Z82	Z82(2)
Trailer Hitch. Weight distributing platform.	Z82	Z82	Z82	Z82	Z82	Z82
Wiring Harness. 7-wire	Z82	Z82	Z82	Z82	Z82	Z82
Cooling. Transmission oil	Z82/V02	Z82/V02	Z82/V02	Z82	Z82	Z82
Engine oil	Z82/KC4	Z82/KC4	Z82/KC4	Z82	Z82	Z82
Cruise Control and Tilt-Wheel.**	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3	ZQ3
Locking Rear Differential.	G80	G80	G80	G80	G80	G80

(1) Standard in passenger models. (2) Not available in G3500 with 15-passenger seating.
* More than two passengers and cargo in the tow vehicle will reduce the Maximum Trailer Capacity.

Trailering-Related Standard Equipment.
Power steering, power brakes, 22-gallon fuel tank*, 100-amp alternator, heavy-duty shocks, front stabilizer bar, electronic automatic 4-speed overdrive transmission.

* 22 gallon-110" WB, 33 gallon-135" / 146" WB.

RALLY & VANDURA VANS (BALL HITCH)

DIESEL ENGINE ■ Required			
Trailer Classification.	**Medium**	**Heavy**	
Vehicle Series.	G2500/G3500	G2500	G3500
Maximum Trailer Weight (lbs).†	4000	6000	6500
Maximum Tongue Load (lbs).	400	750	800
Engine and Axle Ratio/Maximum Trailer Weight.			
6.2L Diesel	3.08/3.73	3.42/5000	3.73/5000
	3.42/4.10	3.73/6000	4.10/6000
Trailering Special Package.	Z82	Z82	Z82(1)
Trailer Hitch. Weight distributing platform	Z82	Z82	Z82
Wiring Harness. 7-wire	Z82	Z82	Z82
Cruise Control and Tilt-Wheel.**	ZQ3	ZQ3	ZQ3
Locking Rear Differential.	G80	G80	G80

(1) Not available in G3500 with 15-passenger seating.
* More than two passengers and cargo in the tow vehicle will reduce the Maximum Trailer Capacity.

Trailering-Related Standard Equipment.
Power steering, power brakes, 22-gallon fuel tank*, 100-amp alternator, heavy-duty shocks, front stabilizer bar, electronic automatic 4-speed overdrive transmission, transmission oil cooler, engine oil cooler.

* 22 gallon – 110" WB, 33 gallon – 135" / 146" WB.

HITCH / WIRING AVAILABILITY

LIGHT-DUTY TRAILERING — EQUIPMENT (RPO Z72)

Availability: Jimmy, Safari, Vandura, and Rally

This package is recommended when the trailer weight does not exceed 2000 pounds or when the tongue weight does not exceed 200 pounds. It includes a 5-wire wiring harness and a deadweight hitch with a 1 7/8" hitch ball.

HEAVY-DUTY TRAILERING — EQUIPMENT (RPO Z82)

Availability: Sonoma, Jimmy, Sierra Pickup, Yukon, Suburban, Safari, Vandura, and Rally

This package is required when the trailer weight exceeds 4000 pounds (over 3000 pounds for Yukon or over 2000 pounds for Safari, Sonoma, and Jimmy) or when the tongue weight exceeds 400 pounds (over 300 pounds for Yukon or 200 pounds for Safari, Sonoma, and Jimmy). It includes a 7-wire wiring harness and a weight-distributing hitch platform. Depending on the model, it includes other equipment necessary for heavy-duty trailering operation. The heavy-duty 7-wire harness is recommended for all trailers with electric brakes. It does not include a connector. A heavy-duty turn signal flasher is included for G-Vans, Safari, Sonoma, and Jimmy. All Sierra Pickup trucks include a heavy-duty turn signal flasher as standard equipment. The weight distributing hitch platform is bolted to the frame through pre-punched holes. Hitch ball, mounting head, and equalizing and anti-sway assemblies are also required and are available from outside sources.

Blue: Use for electric trailer brakes or auxiliary wiring

Red: Use for battery charging, connects to starter solenoid (7-wire harness only)

Light Green: Backup lights (7-wire harness only)

Brown: Taillight and running lights

Yellow: Left stop and turn signal

Dark Green: Right stop and turn signal

White: Ground wire

The above color codes should be followed when connecting a GM trailer wiring harness to your trailer.

COMBINATION WEIGHT RATINGS*

GROSS COMBINATION WEIGHT RATINGS FOR TRAILERING

GCWR (lb) by Engine and Axle Ratio

These charts show the maximum allowable gross combination weight ratings (GCWR) based on all of the available truck engines and rear axle ratios with automatic or manual transmissions. The GCWR includes the total loaded weight of both the truck and trailer. Any available engine may be used for trailering if the GCWR shown is not exceeded.
NOTE: The trailer weight can be increased by 25% if the vehicle speed will not exceed 25 mph. These charts reflect a generally acceptable performance level. If you prefer a higher performance level, we suggest you consider ordering an engine or axle combination that is rated for more trailer than you intend to tow.

Engine	Rear Axle Ratio with Automatic Transmission																
	6000	6500	8500	9000	9500	10,000	10,500	11,000	11,500	12,000	12,500	13,000	13,500	14,500	15,000	17,000	19,000
2.5L Gas	3.73	4.11															
4.3L V6 Gas			3.08	3.23	3.42(1)	3.73	4.10	4.56									
5.0L V8 Gas					3.08		3.42		3.73		4.10						
5.7L V8 Gas						3.08	3.73	5.42		3.73			4.10		4.56		
6.2L V8 Diesel				3.08		3.42		3.73		4.10			4.56				
6.5L V8 Diesel										3.42		3.73		4.10	4.63	5.13	
7.4L V8 Gas													3.42	3.73		4.10	4.56 4.63 5.13(2)

GROSS COMBINATION WEIGHT RATINGS FOR TRAILERING

GCWR (lb) by Engine and Axle Ratio(3)

Engine	Rear Axle Ratio with Manual Transmission																
	4500	5000	5500	6000	6500	7000	7500	8000	9000	10,000	11,000	12,000	13,500	14,500	15,000	17,000	19,000
2.5L Gas		3.73	4.11														
2.8L V6 Gas	3.42	3.73															
4.3L V6 Gas				2.73(4)	3.08(4)	3.42(4)	3.73	4.10	4.56								
5.0L V8 Gas						3.08	3.42		3.73								
5.7L V8 Gas										3.08	3.42	3.73	4.10		4.56		
6.2L V8 Diesel						3.08	3.42		3.73	4.10	4.56						
6.5L V8 Diesel										3.42	3.73	4.10	4.63		5.13		
7.4L V8 Gas													3.42	3.73		4.10	4.56 4.63 5.13(2)

(1) GCWR = 8500 lbs on Sonoma and Jimmy models equipped with L35 engine and P235 / 75R15 tires. (2) 4.88 axle ratio also available for motor home chassis.
(3) RPO KC4 engine oil cooler is required when towing a trailer over 2000 lbs with a manual transmission, except on 7.4L gas and all diesel engines where it is included.
(4) GCWR increased by 1000 lbs on all Sonoma and Jimmy models unless equipped with P235 / 75R15 tires in which case the increase is 500 lbs.
Model availability of the above driveline combinations must be verified by your GMC Truck dealer for correct emissions equipment.
* When properly equipped. Includes truck, trailer, passengers, cargo and equipment.

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THE STRENGTH OF EXPERIENCE

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OFFICIAL VEHICLE

THE MARK OF TOWING STRENGTH. YOU ALREADY KNOW YOU'VE COME TO THE RIGHT PLACE. GMC TRUCK HAS BEEN THE MARK OF TOWING STRENGTH FOR DECADES. TODAY

you have the largest selection ever of strong towing trucks from GMC Truck, trucks that are built, from the frames to their engines to their bumpers, to handle the stresses of pulling trailers. With the wide range of trailering options we offer, you and your dealer can put together a truck ideally suited to the specific demands you'll make on it.

Every GMC Truck is ready for some towing. But was built as many GMC Trucks are, with trailering options it may be ready for heavy towing.

Although your truck was built for trailering, towing is still different from normal driving. A trailer changes your vehicle's handling, braking, acceleration and fuel economy. Successful and efficient trailering takes some special know-how. The trailer must be used correctly and special driving skills.

To help you make the most of your new GMC Truck, we've prepared this trailering guide. This guide will: ■ Help you choose the best GMC Truck model, capacity and equipment for your needs. ■ Explain the required equipment. ■ Give you tips and cautions that can help you trailer smartly and safely.

There's a lot of valuable information here; please read it thoroughly, and if your trailer manufacturer or installer has more information on the specific trailer you'll be pulling, read that, too.

SOME INITIAL PRECAUTIONS. Do not tow a trailer during your vehicle's first 500 miles/800 km of operation. Side or other components could be damaged. ■ After this break-in period, your first stop should be for an oil change and lubrication. Next is at 5000 miles/8000 km. Don't drive over 50 MPH/80 km/h during break-in. Avoid full throttle starts. With this care, your engine will be ready to respond more easily to the heavier loads of trailer-pulling. ■ Excessive speed, improper hitch or improper equipment can damage your vehicle and result in costly repairs that are not covered by the manufacturer's warranty. ■ Trailering laws differ from place to place. Be sure that your rig is legal, not only where you live but where you'll be driving. State police or a local police can help you with local regulations. ■ If you use a dead-weight hitch, you should consider using a sway control. Sway control is not to be used with a weight-distributing hitch; the charts beginning on page 10 indicate when a weight-distributing hitch is required. ■ Consult the GMC Truck owner's manual for more details.

THE DEMANDS OF TOWING. Naturally, towing any trailer puts additional stresses on your truck's engine, transmission, rear axle and tires. The weight of the trailer increases aerodynamic drag, and the motion of the trailer itself adds to these greater demands. A couple examples: ■ A large trailer's frontal area adds to air drag and, therefore, to pulling requirements. In fact, it takes about one horsepower per square foot of frontal area to move the vehicle and trailer at highway speeds. The shape of the trailer also affects air drag; square corners increase drag. ■ For every additional 1000 feet of altitude, an engine loses 3 percent of its sea level performance – so at 10,000 feet, the power loss amounts to 30 percent. Therefore, if much of your towing is to be at high altitudes, a larger than recommended engine should be considered.

To manage these demands, your truck will need some special available equipment or components, such as a higher axle ratio and heavy duty cooling.

POWERTRAIN CONSIDERATIONS. TRAILER TOWING REQUIRES AN ENGINE WITH ENOUGH MUSCLE TO GET THE LOAD ROLLING WITH EASE, TO MOVE IT SMOOTHLY INTO TRAFFIC AND

to enable it to blend with the flow at cruising speeds. The engine also must pull the load reliably over hilly terrain and hills and in most climatic conditions. The charts beginning on page 10 show the minimum engine sizes needed to properly tow various trailers. If you want increased performance, you may want to choose an engine larger than the minimum required (if one is available) to get a performance boost.

GEARING HELPS TO PULL. Gearing multiplies the torque output of an engine. So proper gearing is important for trailering. This gearing involves the transmission, the rear axle and even the tires.

GMC Truck strongly recommends the use of automatic transmissions for trailering because

the torque converter multiplies the engine torque more smoothly and makes the first gear ratio about twice as effective as that of a manual transmission. The transmission's lower gears provide the power to get the load moving and up to road speed; direct drive can then reduce engine speed to efficient levels. When towing, the transmission should be in Drive (D). Operating in Drive will minimize heat build up.

Rear axle ratio selection also involves trade-offs between performance and fuel economy. The axle ratio determines gear engine speed and power for the work the drive wheels have to do. Recommended axle ratios are based on engine speeds required to produce adequate drive-wheel torque (pulling power) at cruising speeds with the trailer load. The highest possible rear axle ratio would be the best choice for a vehicle that will be towing heavy loads. However, a higher ratio requires the engine to run faster to maintain the same road speed, and may be less fuel-efficient.

The correct axle ratio, neither too high nor too low, combined with the gross combination weight (see pages 16-17), will deliver the optimum combination of performance and fuel economy.

When selecting gears, it is important to remember that numerically higher axle ratios usually reduce vehicle performance. To compensate for this, you may want to order a higher axle ratio.

VEHICLE WEIGHT RATINGS The following recommendations are based on the load the vehicle will be required to pull as well as the load it will *carry*.

GVWR (Gross Vehicle Weight Rating) This rating, which you'll see displayed on the left-hand door or door-lock pillar label, is the maximum amount the tow vehicle may weigh when completely loaded and fueled and with all passengers aboard, and equipment, including the weight of the hitch and tongue (or 5th-wheel & rear portion) load of the trailer. Front and rear Gross Axle Weight Ratings (GAWR) are also printed on this label.

Many components on trucks and vans [illegible] Tires, wheels, brakes, axle, steering, springs, shock absorbers, [illegible] and GVWR, increasing the capacity of your truck or van. [illegible] increase your vehicle's load rating.

GCWR (Gross Combination Weight Rating) This rating specifies how much the total trailering combination can weigh. It includes the [illegible] weight of the tow vehicle, trailer and passengers, plus all gear, equipment and accessories carried both in the vehicle and in the trailer. See pages 16-17 for Gross Combination Weight Ratings by engines and axle ratio.

Trailer Tongue Load Gross trailering requires proper distribution of trailer weight, as noted below. The proper tongue weight is important because it allows the vehicle steering system to control the vehicle-trailer combination. If the tongue weight is too low, because, for example, the load is situated too far back in the trailer, away from the hitch, the trailer can cause a lifting effect on the tow vehicle's rear axle. This can lead to handling and control problems on rough roads or during heavy braking. If the tongue weight is too high, because, for example, the trailer is overloaded or the load is situated too far forward in the trailer, toward the hitch, the trailer can cause a lifting effect on the tow vehicle's front axle and reduce suspension travel range on the rear axle. Again, there is a danger of reduced handling and control.

Trailer tongue load should be 10 percent of the loaded trailer's weight for deadweight hitches, and 12 percent for weight-distributing hitches. The tongue weight percentages for weight-distributing hitches are higher than those for deadweight hitches because both the trailer axle and the vehicle axles support the tongue load, reducing the chance of exceeding rear Gross Axle Weight Rating (GAWR), and, in turn, unloading the front suspension to the point where there is not enough weight on the steering system to maintain vehicle/trailer control. Tongue loads may be adjusted by distributing the weight further in the trailer, and can be verified by separately weighing the loaded trailer and then the tongue.

HITCHES AND OTHER TRAILERING EQUIPMENT.

THERE ARE THREE TYPES OF HITCH: DEADWEIGHT HITCHES ARE AVAILABLE FOR LIGHT-DUTY TRAILERING; WEIGHT-DISTRIBUTING and fifth-wheel hitches are available for heavier trailers.

Deadweight Hitch A deadweight hitch supports the trailer tongue load without distributing it. On vans and Jimmy models, the hitch is bolted to the undercarriage and/or rear bumper; it includes a 1-7/8"-diameter hitch ball, and can be used to pull light trailers, up to 2000 pounds with a maximum trailer tongue weight capacity of 200 pounds.

On Sonoma, Sierra, Yukon and Suburban models, the deadweight hitch is a step-type rear bumper equipped with a hitch ball. The ball is available from your GMC Truck dealer, and the bumper is prepunched at the factory to accept the hitch ball. With a 1-7/8"-diameter hitch ball, the hitch can be used to tow trailers up to 2000 pounds with a maximum trailer tongue weight

capacity of 200 pounds. With a 2" diameter ball, this hitch is rated to tow 3000 pounds* on Yukon with a maximum tongue weight of 300 pounds, or up to 4000 pounds* on Suburban, Sierra and Crew Cab pickup models, with a maximum tongue weight of 400 pounds. See availability charts on pages 16-17. Note: If your trailer tongue has a V-shaped front, the foot could dent your step bumper on a sharp turn. Check the distance from the foot's front edge to the ball socket's center ing. If this distance is less than 12 inches, remove the foot on the trailer tongue.

For 2000-pound trailers, attaches to a conventional hitch and set up properly, 10 percent of the trailer gross weight or 200 pounds pushes down on the hitch ball, resulting in a 200-pound tongue load. However, the combined wheelbase of the truck and trailer acts as a single lever, with the rear suspension as the fulcrum. Because the hitch ball is located at the outermost extremity of the rear overhang, the hitch ball unloads the front suspension by as much as 100 pounds, depending on wheelbase-to-rear overhang ratio. This weight is transferred to the rear suspension and added to the 200-pound tongue load. Thus, in this example, about 300 pounds of weight is added to the tow vehicle's rear axle weight. Where the rear suspension, As noted above, expanding the tow vehicle's load-carrying capacity can lead to poor handling. Use a weight-distributing hitch to support higher tongue loads.

Weight-Distributing Hitch Weight distributing hitches utilize a hitch platform that is bolted to the frame or unitbody and acts as an extension of the frame (or frame equivalent on vehicles with body-frame construction). Through the geometry of the trailer tongue, the ball mount, the hitch ball, the equalizer bars and snap up brackets, a variable proportion of the tongue load can be used to [illegible] front axle. A portion of the load also going back to the rear wheels. [illegible] properly, should have a tongue load of 12 percent of the trailer weight, or 240 pounds. The front suspension should carry approximately 30 percent of the tongue load, the rear 40 percent, and 30 percent should go back to the trailer axle or axles. This distribution obviously can be varied, but care should be taken that recommended procedures are followed.

You can approximate proper weight distribution by measuring the height of your rear bumper before you couple the trailer to the hitch ball. After coupling, use your equalizer bars to bring your bumper height back to the starting point. You should always check your vehicle and trailer

weights at a public scale before going on a trip. (See a local dealership for public scale locations.)

Fifth-Wheel Trailer Hitch* Sonoma pickup, Sierra Pickup and Classic 3 cab models can be equipped with a fifth-wheel, or "gooseneck" trailer hitch. Follow the hitch manufacturer's directions for installing the hitch, but note that the hitch must be attached to the truck frame. Do not use the pickup box for additional support. For proper kingpin (coupler) load distribution and control of the trailer, the hitch must be mounted so that the kingpin load is forward of the rear axle centerline. - ith wheel trailer kingpin loads are higher than conventional trailer tongue loads, so stay careful attention to the vehicle's payload capacity and rear axle weight ratings.

Mounting the hitch too far forward in the pickup box can prevent your truck and trailer from being able to turn to a 90° dogleg angle. Typically, the hitch centerline should be located at least one-half of the trailer's width behind the rear of the box rail.

TEMPERATURE CONTROL The additional work of pulling a trailer produces higher temperatures in engine coolant, engine oil and transmission fluid. To help control these temperatures, GMC Truck offers a number of available options that should be considered when ordering and outfitting a vehicle for trailering. Larger radiators with Sierra heat exchangers or external coolers for the transmission fluid and engine oil may provide increased cooling capacity. Some equipment is standard on models with specific engines or with other equipment. Conversely, some equipment is unavailable with other options. Your GMC Truck dealer can give you details on specific available equipment combinations, requirements and recommendations are also noted on the charts beginning on page 10.

TRAILERING PACKAGES The Heavy-Duty Trailering Special Package (RPO Z82) includes a frame platform, 7-wire trailer wiring harness and, in some cases, heavy-duty cooling. The Light-Duty Trailering Special Package (RPO Z72) includes a ceeweight hitch and 5-wire trailer wiring harness. Availability of these packages is specified in the notes on pages 16-17.

TRAILER WIRING HARNESSES Two types of wiring harnesses are available for GMC Truck models: a 5-wire harness for light-duty applications, and a heavy-duty 7-wire harness (recommended for all trailers with electric brakes). See availability charts on pages 16-17 in the notes.

SAFETY CHAINS You should always attach chains between your vehicle and your trailer. Cross the chains under the tongue of the trailer so that the tongue will not drop to the road if it sep-

[illegible] manufacturer should be able to supply special instructions for proper installation with your truck or trailer. Follow these recommendations. Always leave just enough slack so that you can turn with your rig. Never allow the chains to drag the ground.

TRAILER BRAKES If your trailer will weigh more than 1000 pounds/450 kg loaded, it must have its own brakes, and they must be rated adequately for the load. Be sure to read and follow the instructions for the trailer brakes so that you'll be able to install, adjust and maintain them correctly. [illegible] with rear-wheel or all-wheel anti-lock brakes [illegible] your vehicle's hydraulic brake system unless the trailer's brake system will use more than 0.02 cubic inches/0.3 cc of fluid from your vehicle's master cylinder. This [illegible] braking systems, and even cause a total loss of braking. Make sure that the trailer brake components will withstand 3000 psi/20 650 kPa of pressure. If they will not, [illegible] the trailer brake system with your vehicle. If you are certain that your chosen trailer brake system [illegible] the pad on the master cylinder [illegible] copper tubing. It is subject to [illegible] failure [illegible].

SWAY CONTROL Adequate sway control is required when towing over 2000 pounds with Sonoma, Safari and Jimmy models, when towing over 3000 pounds with Yukon and when towing over 4000 pounds with Suburban, Sierra, Rally and Vandura models.

TRAILERING DRIVING TIPS. BEFORE YOU START YOUR TRIP. BEFORE SETTING OUT FOR THE OPEN ROAD, YOU SHOULD GET TO KNOW YOUR RIG. TAKE THE TIME TO ACQUAINT

your [illegible] with the added weight of the trailer. Always keep in mind that the vehicle [illegible] is now much longer than your truck alone. Before starting a trip, check the trailer hitch and platform, safety chains, electrical connector, lights, tires and mirror adjustment. If the trailer is equipped with electric brakes, start the vehicle and trailer moving and apply the trailer brakes by hand, using the brake controller, to be sure they are working. Check the trailer's load, and be sure that it is secure. Check the load's security occasionally throughout your trip.

Backing Up To back up a trailer, start with your hand at the bottom of the steering wheel. To [illegible] the trailer [illegible] move your hand to the right. Always back up slowly and if possible, have someone behind the trailer to guide you.

Following Distance and Passing Stay at least twice as far behind the vehicle ahead of you as you would when driving your vehicle without a trailer. This can help you avoid situations that would require heavy braking or sudden maneuvers. [illegible] passing is not recommended [illegible]. If you must pass, do so only when you are certain to have adequate space and distance to pass safely. Signal well in advance. [illegible] when you're towing a trailer. And because your vehicle-trailer combination [illegible] you'll need to go much farther [illegible].

Turning Your Truck and Trailer [illegible] This will help you avoid [illegible] curbs, road signs, trees and other objects. Avoid jerky or sudden steering maneuvers.

When you signal a turn, the turn indicators on your instrument panel will flash even if the bulbs on your trailer are not functioning. It is imperative that you check your trailer's turn signals occasionally to be certain that they are working properly.

Driving on Grades Before starting long or steep downgrades, reduce speed and shift the transmission to a lower gear to assist braking. On long uphill grades, downshift the transmission and reduce speed to 45 MPH or less to reduce the possibility of overheating.

[illegible] cruise control works. With the added weight and frontal area of the trailer [illegible] cruising speed in hilly terrain or when [illegible] have to brake or shift to a lower gear to keep your speed [illegible] cruise control. Thus many drivers [illegible] too much trouble, and simply don't use cruise control when towing [illegible].

Parking on Hills and Grades [illegible] a vehicle *that has a trailer attached to it on a hill*. If something goes wrong, your rig [illegible]. People can be injured, and both your vehicle and the trailer can be damaged. In an emergency situation where you must park on a hill or grade,

[illegible] ■ Apply your regular brakes, but don't hold it. Park [illegible] ■ Have someone place chocks under the rear [illegible] ■ With the shift lever in the [illegible] position, release the regular brakes until the chocks absorb the load. ■ Reapply the regular brakes. Then apply your parking brake, and then shift to Park [illegible] ■ For vehicles with [illegible] transmission, if you have a hard time shifting out of Park, [illegible] ■ Shift to Park. ■ Release the parking brake. ■ Release the regular brakes.

To start forward after parking on a hill: ■ Apply your regular brakes and hold them [illegible] ■ Start the engine. ■ Shift to the proper gear. ■ Release the parking brake. ■ Release the regular brakes. To start backing after parking on a hill: Apply regular brakes and have someone chock the wheels. Then release the brakes.

Engine Cooling While Trailering When towing, your vehicle may encounter temporary conditions that cause the engine coolant to boil over, even though the engine cooling system is working properly. If you have been climbing a steep hill for a long distance, especially when the outside temperature is very hot, or when you are stopped for a long time in traffic, you may notice some of the following conditions. You should be aware of these conditions and know what to do if they occur.

The first indication may be a message in the Driver Information Center (DIC) telling you that the engine is too hot. If you see this message, pull off the road, park the vehicle, and let the engine idle in Park or Neutral until the message goes away. If the message does not go away after a few minutes, turn off the engine and let it cool. Do not open the hood until the engine has had time to cool. Then, check the coolant level in the coolant recovery tank. If it is low, add coolant. If you have to add coolant frequently, you should have your vehicle checked.

MAINTENANCE REQUIREMENTS. YOUR VEHICLE WILL NEED SERVICE MORE OFTEN WHEN YOU USE IT TO PULL A TRAILER. SEE THE MAINTENANCE SCHEDULE IN YOUR OWNER'S

manual for details on how to maintain your vehicle properly for trailering use. Especially important are the cooling system, the engine oil, the lubrication or adjustment of bolts, the coolant and other fluid levels, the tires, and the brakes. Have your vehicle serviced as you need before you start pulling a trailer, and follow the recommended schedule. Check your vehicle's tires and brakes to be sure they are tightly secured.

In addition, check your trailer's wheel bolts frequently. Check the turn signals and other electrical connections. Check wheel and tire inflations. When you drive with the trailer, make sure that you use the mirrors adjusted properly when you are using them.

TRAILERING CHARTS. THE CHARTS ON THE FOLLOWING PAGES GIVE COMPREHENSIVE DETAILS ABOUT REQUIRED EQUIPMENT AND RECOMMENDED AVAILABLE OPTIONS

for trailering with your vehicle. Although [illegible] trailers, the information on the charts may help you select the right trailer for your vehicle. To find out the GCW rating for your vehicle, see the label on the driver's door latch pillar. Then, add the weight of the trailer and everything you will be carrying in the trailer. The total must not exceed the GCW rating for your vehicle.

Before you buy any trailering equipment, be sure to read the instructions that come with it. They will tell you how to install the equipment correctly and safely. If you have any questions about how to install the equipment on your vehicle, see your dealer for assistance.

Remember that the load you place in a trailer adds to the total weight that your vehicle must support. Be sure to check the GCW rating for your vehicle and the GCW rating for the trailer you are considering. Your vehicle's GCW rating is the combined weight of the vehicle, all occupants, fuel, trailer, and trailer tongue load. Your vehicle's GCW rating is not the same as its GVW rating. The GVW rating is the weight of your vehicle, all occupants, fuel, and cargo, but not the trailer or trailer tongue load. You can find your vehicle's GVW rating on the certification label on the driver's door latch pillar. For more information on GCW ratings, see "Towing a Trailer" in the Index of your owner's manual.

SIERRA

BALL HITCH TRAILERING CHART FOR GAS ENGINES

1500 2WD								
1500 4WD								
2500 2WD								
2500 4WD								
3500 2WD								
3500 4WD								
3500 HD								
2WD CREW CAB								
4WD CREW CAB								

SIERRA

BALL HITCH TRAILERING CHART FOR GAS AND DIESEL ENGINES

1500 2WD								
1500 4WD								
2500 2WD								
2500 4WD								
3500 2WD								
3500 4WD								
3500 HD								
2WD CREW CAB								
4WD CREW CAB								

SIERRA

5TH WHEEL HITCH TRAILERING CHART FOR GAS ENGINES

1500 2WD								
1500 4WD								
2500 2WD								
2500 4WD								
3500 2WD								
3500 4WD								
3500 HD								
2WD CREW CAB								
4WD CREW CAB								

SIERRA

5TH WHEEL HITCH TRAILERING CHART FOR GAS AND DIESEL ENGINES

1500 2WD								
1500 4WD								
2500 2WD								
2500 4WD								
3500 2WD								
3500 4WD								
3500 HD								
2WD CREW CAB								
4WD CREW CAB								

SUBURBAN/YUKON

TRAILERING CHART FOR GAS AND DIESEL ENGINES

1500 2WD									
1500 4WD									
1500 4WD									
2500 2WD									
2500 4WD									

SONOMA

TRAILERING CHART FOR GAS ENGINES

2WD									
4WD									

RALLY/VANDURA

TRAILERING CHART FOR GAS AND DIESEL ENGINES

1500									
2500									
3500									

2500									
3500									

JIMMY

TRAILERING CHART FOR GAS ENGINES

2WD

4WD

SAFARI

TRAILERING CHART FOR GAS ENGINES

2WD

4WD

1994 GROSS COMBINATION WEIGHT RATINGS FOR TRAILERING

REAR AXLE RATIO WITH AUTOMATIC TRANSMISSION

REAR AXLE RATIO WITH MANUAL TRANSMISSION

GM1985 0003934

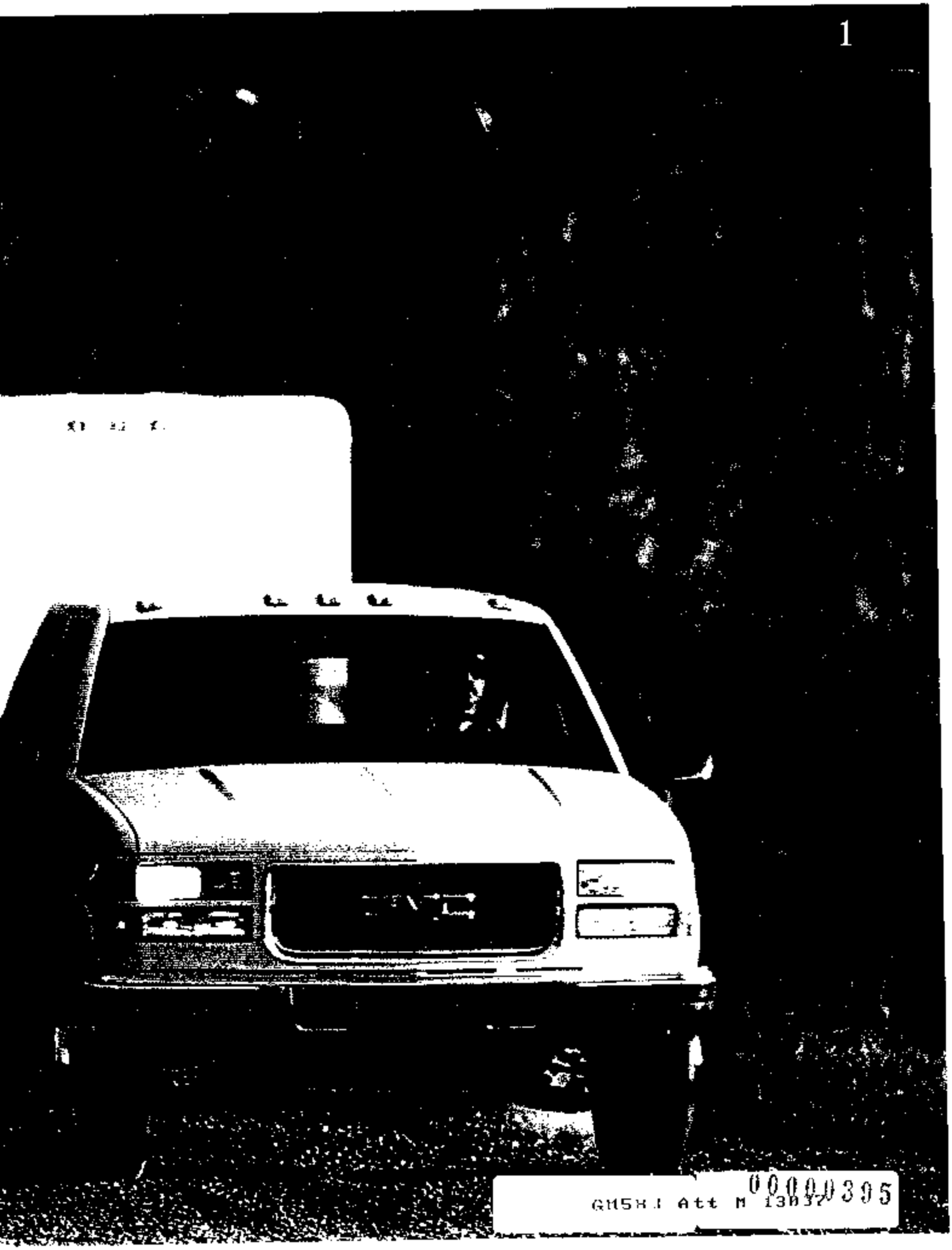
1995 GMC Truck Trailering Guide

GMC TRUCK

Trailering Guide

Sierra .....
Suburban .....
Yukon .....
Jimmy .....
Safari .....
Rally/Vandura .....
Precautions .....
Demands of Towing .....
Powertrain Considerations .....
Weight Ratings .....
Hitches and other Equipment .....
Temperature Control .....
Trailering Packages .....
Safety Chains .....
Sway Control .....
Trailer brakes .....
Trailering Driving Tips .....
Maintenance .....
Trailering Charts .....

This catalog presents the full line of GMC Truck trailering vehicles, from powertrains to safety chains, from hitches to harnesses. Read the guide in its entirety or select the information or trailering charts for the specific GMC truck that interests you. Then keep your GMC Truck Trailering Guide handy so you can refer to it whenever you have trailering questions.



GMC Trucks Are Really Pulling For You

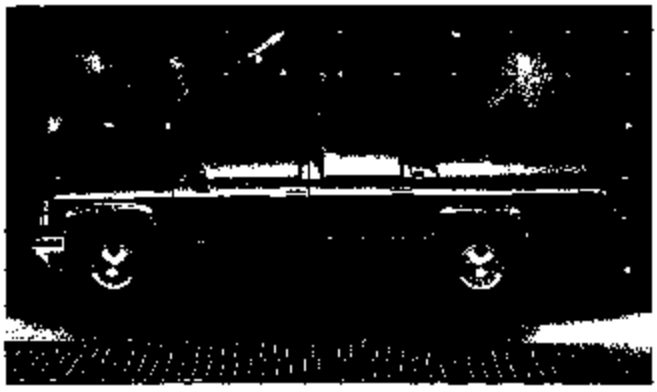
SIERRA Once you own a Sierra, it's hard to remember how you got along without one. Not only is it the consummate towing pickup, its independent front suspension and two-stage rear multileaf springs give it a

smooth ride as well. And you'll even find it's available in three different cab choices, including regular cab, Club Coupe and the extra-roomy 4-door Crew Cab. Sierra – the powerful truck that gets things done.

Sierra Towing Power

• Trailer towing capacities from 1 to 6½ tons – 2000 to an astounding 13,000 pounds*, and a maximum available GCWR of 19,000 pounds. • Engine torque range from 235 to 385 lb-ft to get big trailers moving with ease. • Horsepower range from 160 to 230, to keep the load moving and help out in the passing lane. • A 7-wire trailer wiring harness is standard equipment, as is an in-tank transmission oil cooler on automatic transmission models. Also available are a heavy-duty trailer hitch platform and heavy-duty front and rear shock absorbers with 1500 models.

SUBURBAN The GMC Suburban is a vehicle that does a lot of things. And does them very well. Its all-new interior can accommodate up to nine people, with available seating. With the available 7.4L V8, Suburban can tow up to



10,000 pounds*. And its long wheelbase and independent front suspension make sure it's smooth going all the way. Since it can handle the most demanding situations, you'll find your Suburban to be very much in demand itself.

Suburban Towing Power

Gasoline engine choices: 5.7L and 7.4L V8. Diesel: 6.5L turbo. All three engines adjust for barometric pressure, to deliver optimum performance at all altitudes. • From 5000 to 10,000* pounds of towing capacity, with a maximum available GCWR of 17,000 pounds. • Standard 4-wheel antilock brake system in both 2-wheel drive and 4-wheel drive. • 42-gallon fuel tank, standard for long-distance towing capacity. • For easy cargo access, you can choose from panel doors or the available tailgate/liftglass system, with the light, easy-to-lift tailgate.

*When properly equipped. Includes weight of trailer, passengers, cargo and equipment.

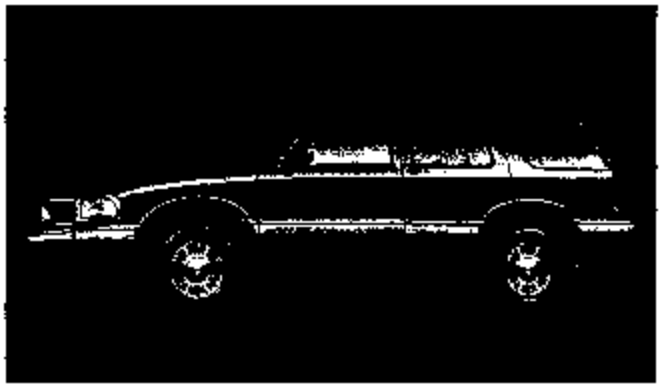
YUKON It's the kind of truck that can take you just about anywhere. It offers the kind of power you'll really appreciate—available 5.7L V8 and 6.5L turbo diesel V8 engines. Yukon lets you trailer with confidence—even when road

conditions are less then perfect. You can get in and out of 4-wheel drive with the simple shift of a lever for true on-the-fly 4WD. No backing up to get in or out, unlike some competitors who claim to have shift on-the-fly 4WD.

Yukon Towing Power

Engine choices—Gasoline: 5.7L V8. Diesel: 6.5L turbo. The 5.7L puts out 310 lb-ft torque, 200 HP, 360 lb-ft torque, 180 horsepower with the available 6.5L. • From 5500 to 7000* pounds of towing capacity, with a maximum available GCWR of 13,000 pounds. • Standard 4-wheel ABS. • Yukon can comfortably seat up to six adults with the available split-bench front seat. • The back seat folds flat for extra cargo capacity. • Electric rearview mirrors and rear window washer/wiper are available to keep the view behind you clear.

JIMMY One look tells you it's a truck. Built to do the things a truck does best. Upon closer inspection you'll notice all the little amenities that make the all-new Jimmy such a pleasure to own. Things like available



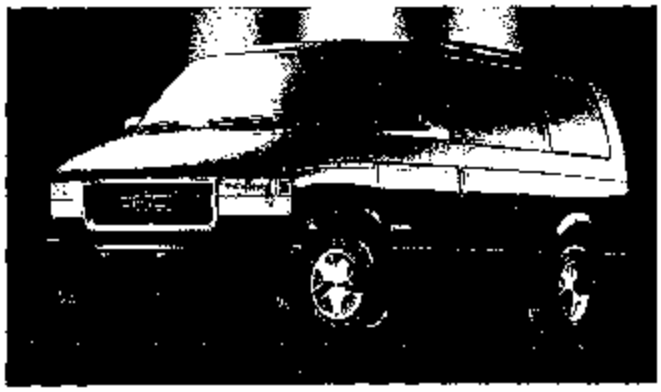
leather seating surfaces, plush carpeting, tinted Solar-Ray® glass, even an available AM/FM stereo with CD player. In other words, car things. All in all, it's the most stylish *and* comfortable Jimmy we've ever built.

Jimmy Towing Power

The standard Enhanced 4.3L V6 delivers 195 horsepower. • A 5-lead wire harness, for quick hookup, is standard on all Jimmys. • For higher towing capacity, the available heavy-duty trailering package (7.82) includes a weight-distributing hitch platform, to handle up to 5000 pounds on 4-wheel drive Jimmys, and up to 5500 pounds on 2-wheel drive Jimmys.† • Jimmy's standard towing equipment, like the heavy-duty radiator, engine oil cooler and transmission fluid cooler, help provide a long sevice life for all powertrain components.

READY WHENEVER YOU ARE

SAFARI We don't sell anything "mini." Safari is a family-sized van with abundant power for towing a boat or trailer. Power that comes from a standard six (not four, six) cylinder engine, the Enhanced 4.3L V6. An engine

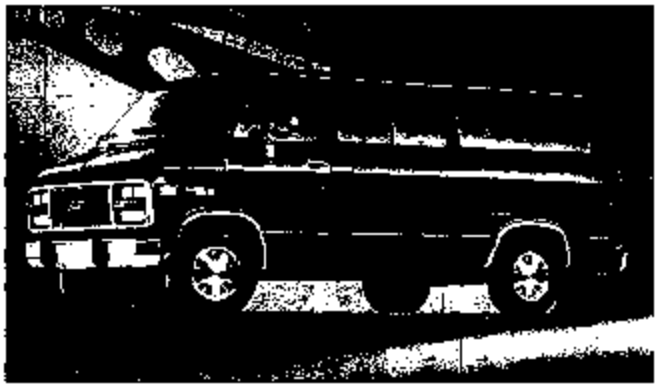


that's stronger than any minivan's offerings. And Safari's interior is both roomy and plush. You'll find available dutch rear doors for maximum convenience, even when your trailer's hitched.

Safari Towing Power

Safari's available heavy-duty trailering equipment package (Z82) includes a 7-lead wiring harness and a hitch platform. And heavy-duty cooling will help your Safari keep its cool in unforeseen situations. • Safari is available with all-wheel drive for superior traction and added safety in wet or snowy conditions. • Four-wheel ABS is standard, to improve steering control during hard braking, even with a trailer. • Four-speed automatic overdrive transmission is standard.

RALLY/VANDURA Rally and Vandura are, in a word, huge. You can tow up to five tons* with them. You can choose from several powerful gasoline and diesel engines. And you can seat up to 15 people in them. Or, if you

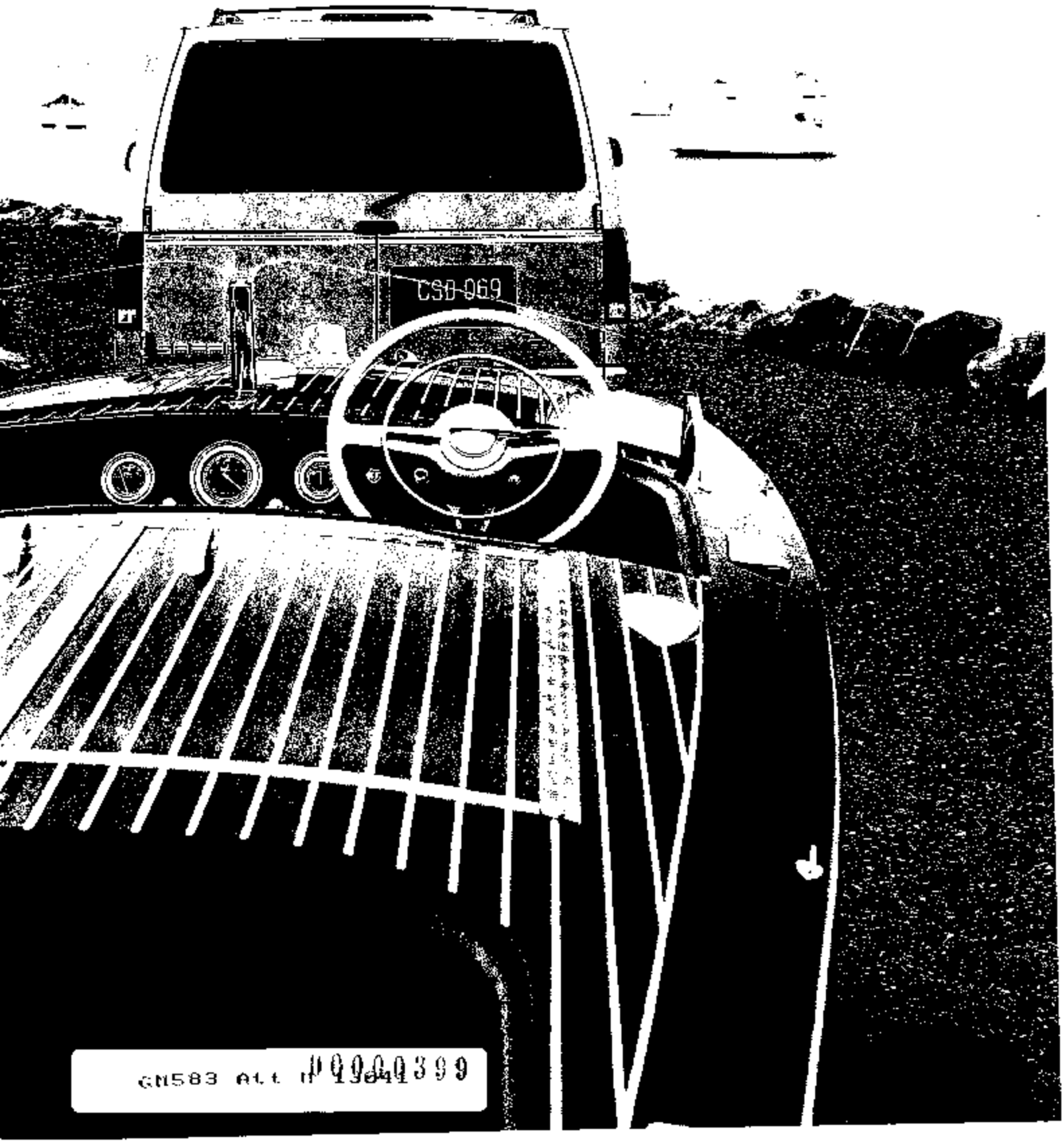


select one of the many sumptuous conversions available, you'll feel like you're in your living room. Whichever you choose, you will instantly gain a new perspective on driving. As a matter of fact, you do own the road.

Rally and Vandura Towing Power

Four available gasoline engine choices: a 4.3L V6, a 5.0L, 5.7L and a 7.4L V8. • An available 6.5L diesel. • Standard 4-wheel ABS. • Rally and Vandura are available in a broad range of seating configurations, from a one-seater on Vandura, to room for 15 with the 146" wheelbase Rally (with available equipment). • Up to 306 cubic feet of interior cargo capacity to complement Vandura and Rally's mammoth towing power.

*When properly equipped, and does not weight of trailer, passengers, cargo and equipment.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HERE'S EVERYTHING YOU NEED TO KNOW ABOUT TOWING

You already know you've come to the right place. GMC Truck has been the mark of towing strength for decades. Today you have the largest selection ever of strong towing vehicles from GMC Truck. Trucks that are built, from frames to engines to brakes, to handle the stresses of pulling trailers. With the wide range of trailering options we offer, you and your dealer can put together a truck ideally suited to the specific demands you'll make on it. So you will have complete confidence with your vehicle, no matter what you ask of it.

Every GMC Truck is ready for some trailer towing. If it was built with trailering options, as many GMC trucks are, it is ready for heavier trailers.

Although your truck was built for trailering, it is still different from normal driving. A trailer changes vehicle handling, performance and fuel economy. Successful and efficient trailering takes special available equipment, which must be used correctly, and special driving skills. To help you make the most of what your new GMC Truck has to offer, we've prepared this trailering guide. This guide will:

- Help you choose the best GMC Truck model, capacity and equipment for your needs.
- Give you tips and cautions to help you trailer smartly and safely.
- Explain the required equipment.

There's a lot of valuable information here; please read it thoroughly, and if your trailer manufacturer or installer has more information on the specific trailer you'll be pulling, we encourage you to read that too.

SOME INITIAL PRECAUTIONS

- *Do not tow a trailer during your vehicle's first 500 miles/800 km.* Your engine, axle or other components might be damaged.
- After completing the first 500 miles, your vehicle requires an additional 500 miles/800 km trailer-towing break-in period. Don't drive over 50 MPH/80 KPH during this period. Do not make full-throttle starts. With this care, your vehicle will adjust easier to heavier trailer-pulling loads.
- Pulling a trailer improperly or with improper equipment can damage your vehicle and result in costly repairs that *will not be covered by the manufacturer's warranty.* Consult the GMC Truck owner's manual for more details.
- Trailering laws differ from place to place. Be sure that your rig is legal, not only where you live but where you'll be driving. State police or provincial police can help you with local regulations.
- Be sure to consult the GMC Truck owner's/operator's manual for specific details on your GMC Truck.

THE DEMANDS OF TOWING

Towing a trailer puts additional stress on your truck's engine, transmission, rear axle and tires. The weight of the trailer, increased aerodynamic drag, and trailer motion all contribute to these greater demands. A couple of examples:

• A large trailer's frontal area adds to air drag and, therefore, to pulling requirements. In fact, it takes about one horsepower per square foot of additional frontal area to move the vehicle and trailer at highway speeds. The shape of the trailer also affects air drag.

• For every 1000 feet of altitude, an engine loses 3 percent of its sea-level performance – so at 10,000 feet, the power loss amounts to 30 percent. Therefore, if much of your towing is to be at high altitudes, a larger-than-recommended engine should be considered.

To manage these demands, your truck will probably need some special available equipment or components, such as a higher axle ratio and heavy-duty cooling.

POWERTRAIN CONSIDERATIONS

Trailer towing requires an engine with enough muscle to get the load rolling, move it smoothly into traffic and blend with the flow at cruising speeds. The engine also must pull the load reliably over rough terrain and hills and in most climatic conditions. The charts beginning on page 16 show the minimum engine sizes needed to move the weight of specific vehicles and trailers. If you want improved performance, choose an engine larger than the minimum recommended (if available).

Gearing helps to pull

Gearing is important for trailering because it multiplies the torque output of an engine. It involves the transmission, rear axle and even the tires.

GMC Truck strongly endorses the use of automatic transmissions for trailering, because the torque converter multiplies engine torque more smoothly and makes first gear about twice as effective as that of a manual transmission. The transmission's lower gears provide power to get the load moving and up to road speed; direct drive reduces engine speed to efficient levels. When towing, the transmission should be in Drive. Operating in Drive minimizes heat build-up.

Rear axle ratio selection also incurs tradeoffs between performance and fuel economy. The axle ratio permanently gears engine speed and power for the work the drive wheels have to do. Recommended axle ratios are based on engine speeds required to produce adequate drive-wheel torque (pulling power) at cruising speeds with the full rated load. The highest possible rear axle ratio would be the best choice for pulling heavy loads. However,

a higher ratio makes the engine run faster to maintain the same road speed, and may be less fuel-efficient.

The correct axle ratio, neither too high nor too low, based upon the gross combination weight rating (see page 21), will deliver the optimum combination of performance and fuel economy.

When selecting tires, know that larger diameter tires actually reduce your vehicle's pulling capability. To compensate for this loss of performance, you can order a higher axle ratio.

VEHICLE WEIGHT RATINGS

Trailering recommendations are based on the load the vehicle will *carry* as well as the load it will *pull*.

GVWR (Gross Vehicle Weight Rating)

This rating, displayed on the left-hand door or door-lock pillar label, is the maximum amount the tow vehicle may weigh when completely loaded, fueled and with all passengers and equipment aboard, including the weight of the hitch and tongue load of the trailer. Front and rear Gross Axle Weight Ratings (GAWR) are also printed on this label.

Many components contribute to load-carrying capability. Tires, wheels, brakes, axle, steering, springs, shocks, frame and more, affect the GVWR. Increasing the capacity of one or more of these parts won't necessarily increase your vehicle's load rating.

GCWR (Gross Combination Weight Rating)

This rating specifies how much the trailering combination can weigh: the combined weight of the tow vehicle, trailer, passengers, and all gear and supplies carried in the vehicle and in the trailer. See page 21 for Gross Combination Weight Ratings by engines and axle ratio.

Trailer Tongue Load

Proper tongue weight is important because it allows the vehicle steering system to control the vehicle-trailer combination. If the tongue weight is too low, because, for example, the load is situated too far back in the trailer, the trailer will not be adequately tied-in to the vehicle. It could tend to sway and not respond properly to vehicle steering inputs. This can lead to handling and control problems, particularly on rough roads, at highway speeds or during heavy braking. If the tongue weight is too high, because, for example, the trailer is overloaded or the load is situated too far forward in the trailer, the trailer can cause a lifting effect on the tow vehicle's front axle and reduce suspension travel range on the rear axle. Again, there is a danger of reduced handling and control.

Trailer tongue load should be 10 percent of loaded trailer weight for weight-carrying hitches, and 12 percent for weight-distributing hitches. Weight-distributing hitches allow a higher percentage because the trailer axles and

both vehicle axles support the tongue load, reducing the chance of exceeding rear Gross Axle Weight Rating (GAWR), and, in turn unloading the front suspension to the point where it is difficult to maintain vehicle/trailer control. Tongue loads may be adjusted by distributing the weight on or in the trailer, and can be verified by separately weighing the loaded trailer and then the tongue.

HITCH TYPES

There are three basic types of hitches: Weight-carrying hitches are available for light-duty trailering; weight-distributing and fifth-wheel hitches are available for heavier trailers.

Weight-Carrying Hitch

Weight-carrying hitches support trailer tongue load without distributing it. Your trailer hitch platform can be used as a weight-carrying hitch.

On Sonoma, Sierra, Yukon and Suburban models, the rear step bumper can be equipped with a hitch ball and used as a weight-carrying hitch. See charts on pages 16-20 for weight-carrying limits.

Note: Your trailer tongue could dent your step bumper in a sharp turn, especially when backing up. Use care and make sharp turns slowly.

If a 2000-pound trailer is attached to a weight-carrying hitch and set up properly, 10 percent of the trailer weight pushes down on the hitch ball, resulting in a 200-pound tongue load. Because the hitch ball is located well behind the rear axle, the hitch ball unloads the front suspension by as much as 50% of the tongue load, depending on wheelbase-to-rear overhang ratio. This weight is transferred to the rear suspension and added to the 200-pound tongue load. Thus, in this example, about 300 pounds are added to the tow vehicle's rear suspension. As noted above, exceeding the tow vehicle's maximum weight-carrying tongue load capacity can lead to poor handling. Use a weight-distributing hitch to support higher tongue loads.

Weight-Distributing Hitch

Weight distributing hitches utilize the hitch platform bolted to the frame or underbody and act as an extension of that unit. Through the geometry of the trailer tongue, ball mount, hitch ball, equalizer bars and snap-up brackets, a variable proportion of the tongue load can be distributed to the tow vehicle's front and rear wheels, with some load also going back to the trailer wheels. Thus, a 5000-pound trailer, set up properly, would have a tongue load of 12 percent of the trailer weight, or 600 pounds. As shown earlier, depending on wheelbase-to-rear overhang ratio, the rear suspension load could be 50% higher than the tongue load, or 900 lbs in this

example. The front suspension load would be decreased by 300 lbs. Proper weight distribution would return the additional weight transferred to the rear suspension back to the front.

You can approximate proper weight distribution by measuring the height of your front bumper before you couple the trailer to the hitch ball. After coupling, use your equalizer bars to bring your front bumper height back to the starting point. To be certain about proper weight distribution, you should always weigh your vehicle and trailer at a public scale (some trucking companies have public scales—check a local directory). Weigh your vehicle alone, loaded as if ready for a trip, including passengers and driver. Note front and rear axle weights separately. Weigh the trailer and its tongue load and make sure they are within the limits of the tow vehicle. Hitch the trailer to the vehicle and re-check front and rear axle weights, adjusting your equalizer bars until the front axle weight is as close to the original value as possible. Mark the proper link on the chain with tape or a paint dot for future reference. As long as the trailer weight and tongue weight are the same, the same chain link should provide proper distribution the next time.

Fifth-Wheel Trailer Hitch

Pickup and chassis cab models can be equipped with a fifth-wheel or gooseneck trailer hitches. Follow the hitch manufacturer's directions for installation, but note that the hitch must be attached to the truck frame. Do not use the pickup box for additional support. For proper kingpin tongue load distribution and control of the trailer, the hitch must be mounted so the kingpin load is forward of the rear axle centerline. Fifth-wheel trailer kingpin loads are higher than conventional trailer tongue loads, so pay careful attention to the vehicle's payload capacity and rear-axle weight ratings.

Mounting the hitch too far forward in the pickup box can prevent your truck and trailer from being able to turn to a 90-degree angle. Typically, the hitch center should be located at least one-half of the trailer's width behind the rear of the truck cab. Particularly when towing a fifth wheel trailer with a short box pickup, an extended pin box on the trailer will help. Fore/aft adjustable hitches are also available, and can be used for additional help in tight maneuvering situations.

TEMPERATURE CONTROL

Pulling a trailer produces higher temperatures in engine coolant, engine oil and transmission fluid. To help control these temperatures, GMC Truck offers a number of available options that should be considered when ordering and outfitting a vehicle for trailering. Larger

radiators, with internal heat exchangers or external cooler lines for the transmission fluid and engine oil, provide increased cooling capacity. Some equipment is standard on models with specific engines or with other equipment. Conversely, some equipment is unavailable with other options. Your GMC Truck dealer can give you details on specific available equipment combinations; requirements are also noted on the charts beginning on page 16.

TRAILERING PACKAGE

The Heavy-Duty Trailering Special Package (RPO Z82) includes a hitch platform, a 7-wire trailer wiring harness (if not standard equipment on your truck model) and, in some cases, heavy-duty cooling and heavy-duty shock absorbers. Z82 is available on all models except Sonoma pickups.

SAFETY CHAINS

You should always attach chains between your vehicle and your trailer. Cross the chains under the tongue of the trailer, so the tongue will not drop to the road if it separates from the hitch. Your hitch or trailer manufacturer should be able to supply specific instructions for chain installation with your hitch or trailer; follow these recommendations. Always leave just enough slack so you can turn with your rig. Never allow the chains to drag on the ground.

SWAY CONTROL

Even if your rig is set up properly, you may occasionally encounter trailer sway, especially when large trucks pass. Sway control will damp out minor trailer oscillations and help maintain stability of your rig. Adequate sway control is required when towing over 2000 pounds with Sonoma, Safari and Jimmy models and when towing over 4000 pounds with Yukon, Suburban, Sierra, Rally and Vandura models. The most common type of sway control is a sliding friction device, though some cam sway controls are also available. See a trailer or hitch dealer for sway controls.

TRAILER BRAKES

If your trailer will weigh more than 1000 pounds/450 kg loaded, it must have its own brakes, and they must be rated adequately for the load. Be sure to read and follow the instructions for the trailer brakes, so you'll be able to install, adjust and maintain them correctly. Even though all GMC Trucks are equipped with rear-wheel or all-wheel antilock brakes, trailer brake systems can tap into your vehicle's hydraulic system; however, these precautions must be observed:

• Do not tap into your vehicle's brake system if the trailer's system will use more than 0.02 cubic inches/0.3 cc of fluid from your vehicle's master cylinder. This could

compromise both of your braking systems and may even cause a total loss of braking.

• Make sure the trailer brake components will withstand 3000 psi/20 650 kPa of pressure. If they will not, do not use the trailer brake system for your vehicle.

• If you are certain your chosen trailer brake system is within these guidelines, make the brake fluid tap at the port on the master cylinder that sends fluid to the rear brakes. Use steel brake tubing. *Do not use copper tubing;* it is too subject to fatigue, wear and failure, and will eventually break off.

Electric Trailer Brake Controller Setup

If your trailer is equipped with electric brakes, use the following guidelines to install the brake controller in your vehicle.

• Disconnect the negative battery cable before installing an electric trailer brake controller.

• Mount the trailer brake controller to a solid area on the instrument panel within easy reach of the driver. Make sure the area behind the mounting location is clear so holes can be drilled without damaging other components or wiring. Drill holes according to the brake controller manufacturer's instructions.

• Determine the junction block location for your specific model in the Vehicle to Trailer Electrical System Setup chart. Drill a hole in the vehicle's front dash panel in a convenient location between the junction block and the brake controller mounting area. Install a properly sized grommet to protect wires running from the engine compartment to the brake controller.

• Install a 12 gauge wire with a ring terminal and a 20 Amp (or 30 Amp, if required by the trailer brake controller) self resetting circuit breaker to one of the junction block studs. Run this wire through the grommet in the dash panel and connect it to the controller wire identified as the power input line.

• Determine the location of the forward end of the blue trailer brake wire from the Vehicle to Trailer Electrical System Setup chart on page 16. If located in the engine compartment, route this wire through the same hole in the dash panel. Connect the blue wire to the controller wire identified as the controller brake output.

• Splice the controller wire identified as the stop light line to the brake pedal switch splice location shown in the Vehicle to Trailer Electrical System Setup chart.

• Use the wire gauge specified in the brake controller manufacturer's instructions.

• Install a 12 gauge wire with a ring terminal at the location specified in the Vehicle to Trailer Electrical System Setup chart to ground the brake controller. The junction

ground location specified can be substituted by running the ground wire through the grommet to the dash panel to an engine block or negative battery terminal ground location.

Use a sealant on the grommet to prevent fumes, dirt and water from entering your vehicle.

• Reconnect the negative battery cable and test the electric trailer brake controller per the brake controller manufacturer's instructions.

GENERAL: Use insulated, solderless crimp style connectors to install an electrical trailer brake controller.

TRAILERING DRIVING TIPS

Before setting out for the open road, get to know your rig. Take time to acquaint yourself with the feel of handling and braking with a trailer. Always keep in mind that the vehicle combination you are driving is now much longer than your truck alone. Before starting a trip, check the trailer hitch and platform, safety chains, electrical connector, lights, tires and mirror adjustment. If the trailer is equipped with electric brakes, start the vehicle and trailer moving and apply the trailer brakes by hand, using the brake controller, to be sure they are working.

Check the trailer's load to be sure it is secure, and recheck occasionally throughout your trip. The better you know your rig, the smoother your trip will be.

Backing Up

To back up a trailer, put one hand at the bottom of the steering wheel. To move the trailer left, move your hand to the left. To move the trailer right, move your hand to the right. Always back up slowly, and if possible, have someone behind the trailer to guide you.

Following Distance and Passing

Stay at least twice as far behind the vehicle ahead of you as you would when driving your vehicle without a trailer. This can help you avoid situations that would require heavy braking or sudden steering maneuvers. And although passing is not recommended, if you must pass be certain to have adequate time and distance to pass safely. Signal well in advance. You'll need more distance to pass a vehicle when you're towing a trailer. And, because your vehicle-trailer combination is a good deal longer than the vehicle alone, you'll need to go much further beyond the passed vehicle before you can return to your lane.

Turning Your Truck and Trailer

The turning radius is smaller for a trailer than it is for a truck, so the trailer and trailer wheels are closer than the truck's wheels to the edge of the pavement on the inside of curves. Drive slightly beyond the normal turning point to avoid soft shoulders, curbs, road signs, trees and other

objects. Avoid jerky or sudden steering maneuvers. When you signal a turn, the turn indicators on your instrument panel will flash even if the bulbs on your trailer are not functioning. Remember to check your trailer's turn signals occasionally to be sure they work.

Driving on Grades

Before starting long or steep downgrades, reduce your speed and shift the transmission to a lower gear to assist braking. On long uphill grades, downshift the transmission and reduce speed to 45 MPH/72KPH or less to reduce the possibility of overheating your engine.

Towing a trailer affects the way cruise control works. The added weight and frontal area of the trailer may make it difficult to maintain the set cruising speed in hilly terrain or when driving into the wind. When going downhill, you may have to brake or shift to a lower gear to keep your speed down. Of course, applying the brake disengages cruise control. You may find it too much trouble to use cruise control when towing in hilly terrain.

Parking on Hills and Grades

You should not park a vehicle with a trailer attached on a hill. If something goes wrong, your rig could move. People can be injured, and both your vehicle and the trailer can be damaged. But if you ever must park your rig on a hill, here's how to do it more safely:

• Apply your regular brakes, but don't shift into Park (P) yet, or into gear for a manual transmission.

• Have someone place chocks under the trailer wheels.

• When the wheel chocks are in place, release the regular brakes until the chocks absorb the load.

• Reapply the regular brakes. Then apply your parking brake, and then shift to Park (P) with an automatic transmission, or Reverse (R) for a manual transmission. If you have a four-wheel-drive vehicle with a manual transfer case shift lever, be sure the transfer case is in a drive gear, not in Neutral (N).

When you are ready to leave after parking on a hill:

• Apply your regular brakes and hold the brake pedal down. Leave the parking brake engaged.

• Start your engine.

• Shift into gear and release the parking brake.

• Release regular brakes and drive until the chocks are freed; apply regular brakes and have someone retrieve the chocks. Remember, even with these precautions, only park on hills and grades in an emergency situation.

Engine Cooling While Trailering

When towing a trailer, you may encounter temporary cooling system overload, even with proper cooling equipment, especially if you have been climbing a long hill on a hot day or idling for long periods in heavy

traffic, or when you are slowing or stopping after high-speed driving. If you get an overheat warning, you should refer to your vehicle's Owner's Manual in such situations; it contains specific instructions on what to do should overheating occur. When towing at high altitudes, note that coolant will boil at a lower temperature than at normal altitudes. If you turn your engine off immediately after towing up a steep grade at high altitude, your vehicle may show signs similar to overheating. To avoid this, let the engine run for a few minutes while parked (preferably on level ground) with automatic transmission in "Park" or with manual transmission out of gear and the park brake applied.

MAINTENANCE REQUIREMENTS

Your vehicle will need service more often when you use it to pull a trailer. See the Maintenance Schedule in your Owner's Manual for details on how to maintain your vehicle properly for trailering use. Especially important to maintenance: transmission fluid, engine oil, axle lubrication, adjustment of belts, the cooling system and the brakes. Review these sections before you start pulling a trailer, and follow the requirements. Check the hitch nuts and bolts to be sure they are tightly secured.

In addition, check your trailer's condition frequently. Check turn signals and electrical connections. Check wheel, wheel bearing and tire conditions. When you drive with the trailer, make sure that chains are installed properly when you are using them.

TRAILERING CHARTS

The charts on the following pages give details about required equipment for recreational or commercial towing with GMC Truck light-duty models. There are not specific charts covering the trailering requirements of GMC Truck series G-3500 and P-3500 recreational vehicle models, but the maximum Gross Combination Weight Ratings shown in the chart on page 21 apply to the available engine and rear axle ratio combinations. To determine required equipment, find your trailer's maximum loaded weight and tongue load in the chart for your GMC Truck model. The notes below the chart show the equipment required to attain that rating.

If you want improved performance, buy increased capacity. See the GCWR chart on page 21.

TRAILERING GUIDE

VEHICLE TO TRAILER ELECTRICAL SYSTEM SETUP INFORMATION

VEHICLE	BATTERY BLOCK LOCATION (BATTERY FEED)	BRAKE PEDAL SWITCH LOCATION	INTERIOR GROUND LOCATION	FORWARD TRAILER HARNESS LOCATION	REAR TRAILER HARNESS LOCATION
SIERRA SUBURBAN YUKON	UNDER DRIVER ELECTRICAL CENTER STUD. LEFT REAR CORNER BEHIND WASTE BOTTLE.	UNDER DASH AT BRAKE PEDAL SWITCH. (WHITE WIRED.	LEFT KICK OR GROUND POST ENGINE BLOCK OR NEGATIVE BATTERY TERMINAL	ENGINE COMPARTMENT, NEAR BRAKE BOOSTER. RED & BLUE WIRES STRAPPED TOGETHER.	BEHIND LICENSE PLATE AREA OF REAR BUMPER
C/K 1/2 YUKON JIMMY	FRONT OF DASH, LEFT SIDE OF GROVE BATTERY	UNDER DASH AT BRAKE PEDAL SWITCH. (WHITE WIRED)	UNDER DASH, LOOSE BLACK GROUND WIRE RIGHT OF FUSE PANEL.	ENGINE COMPARTMENT, NEAR STEERING COLUMN. ORANGE & BLUE WIRES STRAPPED TOGETHER.	INSIDE RIGHT FRAME RAIL
CAMRY	FRONT OF DASH, LEFT SIDE OF UNDER STEERING COLUMN (COMPACT)	UNDER DASH AT BRAKE PEDAL SWITCH. (WHITE WIRED.	UNDER LEFT SIDE TRIM PANEL. USE SCREW & RING TERMINAL ON ALUMINUM SIDE PANEL.	PASSENGER COMPARTMENT, UPPER DASH, CERAMIC & BLUE WIRES STRAPPED TOGETHER	INSIDE RIGHT SIDE, REAR CORNER SEAT MOUNT
MINI VAN ASTRO/APV	INSIDE LEFT FENDER (COMPACT)	UNDER DASH AT BRAKE PEDAL (WHITE TO BLUE WIRE)	ROTTEN ERROR GROUND TO ENGINE BLOCK OR NEGATIVE BATTERY TERMINAL	PASSENGER COMPARTMENT, NEAR JUNCTION BLOCK. RED & BLUE WIRES STRAPPED TOGETHER.	INSIDE LEFT FRAME RAIL

CAUTION: FOR ALL CHEVROLET TRUCKS, DO NOT CONNECT TRAILER GROUND WIRE TO BATTERY NEGATIVE POST. USE A GROUND WIRE FROM THE TRAILER TO BE CONNECTED TO A GOOD GROUND ON THE VEHICLE. FAILURE TO DO SO MAY RESULT IN DAMAGE TO THE VEHICLE'S ELECTRICAL SYSTEM.

- Brown: Ground to vehicle body (provides tail, clearance, marker)
- Red: Battery feed (provides power for auxiliary circuits)
- Light Green: Backup lights
- Yellow: Left turn/stop and hazard signal
- Dark Green: Right turn/stop and hazard signal
- White: Electrical case

The above color code should be followed when connecting a GMC trailering wiring harness to your vehicle.

SIERRA

BALL HITCH TRAILERING CHART FOR GAS ENGINES (Weight carrying rating for hitches is 10% of GCW. Trailer with 10% tongue weight.)

	4.3 LITER ENGINE AUTO OR MANUAL TRANSMISSION			5.0 LITER ENGINE AUTO OR MANUAL TRANSMISSION			5.7 LITER ENGINE AUTO OR MANUAL TRANSMISSION		
	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX TONGUE LOAD (LBS)	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX TONGUE LOAD (LBS)	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX TONGUE LOAD (LBS)
1500 2WD	3.08	4000	400	3.08	5000	600	3.08	5500	700
	3.42	5000	600	3.42	6000	750	3.42	6500	800
							3.73	7500	900
1500 4WD	3.73	5000	600	3.42	5500	700	3.42	6000	750
				3.73	6500	800	3.73	7000	850
2500 2WD	3.42	4500	450	3.42	5500	700	3.42	6000	740
	3.73	5000	500	3.73	6100	800	3.73	7000	850
							4.10	8000	950
2500 4WD	3.73	4500	450	3.42	5000	650	3.42	5500	700
				3.73	6000	750	3.73	6500	800
							4.10	7500	900
3500 2WD							4.10	8000	950
							4.56	9500	1100
3500 4WD							4.10	7500	900
3500 CREW CAB							4.10	7500	900
							4.56	9000	1100
4500 CREW CAB							4.10	7000	850
							4.56	8500	1000
3500 HD							4.56	8500	1000
							5.13	8500	1000

Axle Ratio: Weight carrying capacity for your vehicle is provided on the certification label on the driver's door edge.

The weight of all fluids, optional equipment, passengers and cargo in the vehicle must be subtracted from the Max Trailer Weight.

Transmission Cooler: Automatic transmissions with GCW over 8,500 lbs. require the heavy duty cooler.

Above 8500 lb. Trailer Rating: Engine Oil Cooler (RPO KC4) is required on Series 3500 models with engine axle ratio of 4.10 or 4.56 (except 7,400 lb. and 8,200 lb. GVW models). Engine Oil Cooler is standard on all other models.

Above 8500 lb. Trailer Rating: Heavy Duty Engine Cooling (RPO V01) is required on 1500 2WD models with Heavy Duty Shock Absorbers (RPO F55 or F57), is standard on 1500 4WD models with Trailering Mirrors, is standard on all Chevrolet cars.

350 Heavy Duty Trailering Equipment Package (RPO V23) is required with Manual Transmission.

Trailer Ratings are based on the SAE J 2807 (1995 to 2000) and SAE J 2807 (2001 and later) Trailer Towing Performance Requirements.

SIERRA

BALL HITCH TRAILERING CHART FOR GAS AND DIESEL ENGINES (Weight carrying capacity for 4000 lb rear axle with 10% tongue weight)

	4.3L 145 HP V6 DIESEL ENGINE AUTO OR MANUAL TRANSMISSION			6.5L 195 HP V8 TURBO DIESEL ENGINE AUTO OR MANUAL TRANSMISSION			7.4L 275 HP ENGINE AUTO OR MANUAL TRANSMISSION		
	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX TONGUE LOAD (LBS)	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX TONGUE LOAD (LBS)	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX TONGUE LOAD (LBS)
1500 2WD	3.08	5000	600	3.08	5000	750			
	3.42	6000	700	3.42	7000	850			
1500 4WD	3.42	5500	700	3.42	6500	800			
	3.73	6000	800	3.73	7500	900			
2500 2WD	3.42	5500	700	3.42	6500	800	3.73	9000	1000
	3.73	6000	800	3.73	7500	900	4.10	10,000	1000
				4.10	8500	1000			
2500 4WD	3.73	5500	750	3.73	6500	750	3.73	8500	1000
	4.10	6500	850	3.73	7500	850	4.10	10,000	1000
				4.10	8500	950			
3500 2WD				4.10	8500	1000	4.10	10,000	1000
							4.56	10,000	1000
3500 4WD				4.10	8000	950	4.10	10,000	1000
							4.56	10,000	1000
3500 CREW CAB				4.10	8000	950	4.10	10,000	1000
							4.56	10,000	1000
3500 CREW CAB				4.10	8000	950	4.10	10,000	1000
							4.56	10,000	1000
3500 HD				4.63	9000	1000	4.63	10,000	1000
				5.13	10,000	1000	5.13	10,000	1000

Max Trailer Weight is manufacturer maximum limit based on minimum engine and rear axle ratios and includes all required trailering equipment.

The weight of optional equipment, passengers and cargo in the tow vehicle must be subtracted from the Max Trailer Weight.

Transmission Oil Cooler is standard equipment on all Sierra models with 6.6L Duramax engine.

Above 2000 lb. maximum trailering capacity requires 8.1 Vortec (2004) is required on Sierra 1500 models with gas engines. Sierra 2500 models with gas engines (except 7.4L) and 8.1L Vortec (2004) require Engine Oil Cooler is standard on all other models.

Above 4000 lb. maximum trailering capacity requires Heavy Duty or Fleet Accessories (F57/F60), are required on 1500 2WD models and Heavy Duty Black Accessories or Off-Road Chassis Package (F57/Z71) is required on 1500 4WD models.

7-Wire Trailer Wiring Harness is standard on all Sierra models.

GVWR Upgrade Trailering Equipment Package includes 4-Wheel Disc Brakes, Hitch Platform and Engine Oil Cooler and Heavy Duty Black Accessories where required.

Trailer Ratings are Reduced on LD4 (4.3L), L61 (5.3L) and All Diesel Engines with Manual Transmission (See GVWR Chart)

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SIERRA

STEP-WHEEL TRAILERING CHART FOR GAS AND DIESEL ENGINES

	5.0L L03 ENGINE AUTOMATIC TRANSMISSION			5.3L L05 ENGINE AUTO OR MANUAL TRANSMISSION			6.0L L47 V8 ENGINE AUTOMATIC TRANSMISSION		
	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX KINGPIN LOAD (LBS)	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX KINGPIN LOAD (LBS)	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX KINGPIN LOAD (LBS)
2500 2WD 7700 LB GVW	3.42	5500	1300	3.42	6900	1500	3.42	5500	1300
	3.73	6000	1400	3.73	7000	1700	3.73	6500	1500
2500 2WD 8600 LB GVW				3.73	7000	1700			
				4.10	8000	2000			
2500 4WD 7700 LB GVW	3.42	5000	1200	3.42	5500	1300	3.42	5500	1300
	3.73	6000	1500	3.73	6500	1600	3.73	6500	1900
2500 4WD 8600 LB GVW				3.73	6500	1600			
				4.10	7500	1800			
3500 2WD				4.10	8000	2000			
				4.56	9000	2300			
3500 4WD				4.10	7500	1800			
2WD CREW CAB				4.10	7500	1800			
				4.56	9000	2200			
4WD CREW CAB				4.10	7000	1700			
				4.56	8500	2100			
3500 HD				4.63	8500	2100			
				5.13	8500	2100			

SIERRA

STEP-WHEEL TRAILERING CHART FOR GAS AND DIESEL ENGINES

	6.5L S65 V8 TURBO DIESEL ENGINE AUTO OR MANUAL TRANSMISSION			7.4L L19 ENGINE AUTO OR MANUAL TRANSMISSION		
	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX TONGUE LOAD (LBS)	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX KINGPIN LOAD (LBS)
2500 2WD 7200 LB GVW	3.42	6500	1600			
	3.73	7000	1800			
2500 2WD 8600 LB GVW	3.73	7500	1800	3.73	9000	2200
	4.10	8500	2100	4.10	11,000	2700
2500 4WD 7200 LB GVW	3.42	6000	1400			
	3.73	7000	1700			
2500 4WD 8600 LB GVW	3.73	7000	1700	3.73	8500	2100
	4.10	8000	2000	4.10	10,500	2600
3500 2WD	4.10	8500	2100	4.10	11,000	2700
				4.56	13,000	3400
3500 4WD	4.10	8000	2000	4.10	10,500	2900
				4.56	12,500	3100
2WD CREW CAB	4.10	8000	2000	4.10	10,500	2900
				4.56	12,500	3100
4WD CREW CAB	4.10	8000	2000	4.10	10,500	2900
				4.56	12,500	3100
3500 HD	4.63	9000	2200	4.63	12,500	3100
	5.13	10,500	2600	5.13	12,500	3100

Max Trailer Weight is established assuming 1 driver and no passengers in the vehicle, with the trailer equipped only as required.

The weight of additional optional equipment, passengers and cargo in the tow vehicle must be subtracted from the Max Trailer Weight.

Engine weight must be considered when calculating vehicle payload. Do not exceed vehicle weight ratings listed on certification label. GVW is maximum allowable gross vehicle weight.

Some 2500 models are not recommended for fifth-wheel trailering due to insufficient payload for engine weight.

Transmission GVW Capacity is optional equipment. Check with your dealer for more information.

Engine Cylinder Count is equal to or less than 5900 models with gasoline engines (4.3L and 5.7L gasoline) or diesel engines. Engine ID found on sticker on driver's door.

SUBURBAN/YUKON

TRAILERING CHART FOR GAS AND DIESEL ENGINES (Weight carrying hitch rear limit = 400 lb. for models with 420 lb. tongue weight.)

	5.3L V8 ENGINE 4L70-E TRANSMISSION			6.5L TURBO-DIESEL V8 ENGINE 4L80-E TRANSMISSION			7.4L V8 ENGINE 4L80-E TRANSMISSION		
	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX TONGUE LOAD (LBS)	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX TONGUE LOAD (LBS)	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX TONGUE LOAD (LBS)
1500 2WD SUBURBAN	3.42	7000	700	3.42	5500	700			
	3.73	7500	800						
1500 4WD SUBURBAN	3.42	7000	700	3.42	5000	500			
	3.73	8000	750						
2500 2WD SUBURBAN	3.73	8000	750	3.73	6500	650	3.73	8500	1000
	4.10	7300	930	4.10	8000	950	4.10	10,000	1000
2500 4WD SUBURBAN	4.10	7000	850	3.73	6000	750	3.73	8000	950
				4.10	7400	900	4.10	10,000	1000
2500 YUKON	3.08	5000	500						
	3.42	6000	750						
	3.73	7000	850						
4WD YUKON	3.42	5000	700	3.42	6000	750			
	3.73	6500	800	3.73	7000	850			

*4.3L V6 Turbo Diesel engine is not available on 4 Door models.

Max Trailer Weight is calculated assuming the driver and one passenger are in the vehicle and all standard equipment is in the vehicle. The weight of additional optional equipment, passengers, or cargo in the vehicle must be subtracted from the max trailer weight.

Transmission Oil Cooler is standard equipment on all Suburban and Yukon models with engine code.

Above 2000 lb. hitch rating, Engine Oil Cooler (KC4) is required on 1500 models with 5.7L engine, and 2500 4WD Suburban with 5.7L engine and 3.73 rear axle. Engine Oil Cooler is standard on all other models.

Above hitch rating shown is standard on all Suburban and Yukon.

4WD Heavy Duty Trailering Equipment Package includes Weight Distributing Hitch Provision and Engine Oil Cooler (where necessary).

Trailer Ratings are Reduced on 4WD 1500 Utility with Manual Transmission (See GCWR Chart).

RALLY/VANDURA

TRAILERING CHART FOR GAS ENGINES (Weight carrying hitch rear limit = 400 lb. for models with 400 lb. tongue weight.)

	4.3L V6 ENGINE AUTOMATIC TRANSMISSION			7.4L V8 TURBO DIESEL ENGINE AUTOMATIC TRANSMISSION			5.7L V8 ENGINE AUTOMATIC TRANSMISSION		
	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX TONGUE LOAD (LBS)	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX TONGUE LOAD (LBS)	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX TONGUE LOAD (LBS)
1500 VANDURA	3.42	4500	550	3.42	5500	700			
	3.73	5000	600						
2500 RALLY/VANDURA	3.42	4500	550	3.42	5500	700	3.42	5500	700
	3.73	5000	600	3.73	6500	800	3.73	6500	800
3500 RALLY/VANDURA	3.73	5000	600				3.23	5000	600
	4.10	5530	700				3.73	6500	900
							4.10	8000	950

RALLY/VANDURA

TRAILERING CHART FOR GAS AND DIESEL ENGINES (Weight carrying hitch rear limit = 400 lb. for models with 400 lb. tongue weight.)

	6.5L DIESEL ENGINE AUTOMATIC TRANSMISSION			7.4L V8 ENGINE AUTOMATIC TRANSMISSION		
	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX TONGUE LOAD (LBS)	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX TONGUE LOAD (LBS)
2500 RALLY/VANDURA	3.42	5000	600			
	3.73	6000	750			
3500 RALLY/VANDURA	3.73	5500	700	3.42	7000	850
	4.10	7000	850	3.73	8500	1000
				4.10	10,000	1000

Max Trailer Weight is calculated assuming the driver and one passenger are in the vehicle and all standard equipment is in the vehicle. The weight of additional optional equipment, passengers, or cargo in the vehicle must be subtracted from the Max Trailer Weight.

Above 2000 lb. hitch rating, Heavy Duty Cooling is required on all models with 4.3L, 5.0L or 5.7L gas engines and all gas Engine Oil Cooler is standard on 6.5L diesel and 7.4L engines.

(52) Heavy Duty Trailering Equipment Package includes Weight Distributing Hitch Provision, Heavy Duty Cooling (where necessary) and Heavy Duty Battery (where necessary).

TRAILERING GUIDE

SONOMA

TRAILERING CHART FOR GAS ENGINES (Weight carrying trailer hitch limit is 700 lb. trailer with 70C lb. tongue weight.)

	4.3L LV6 ENGINE 4L60 OR 4L60-E TRANSMISSION			4.3L LV8/L35 ENGINE 4L60 AUTOMATIC TRANSMISSION			4.3L LV8/L35 ENGINE MANUAL TRANSMISSION		
	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX TONGUE LOAD (LBS)	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX TONGUE LOAD (LBS)	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX TONGUE LOAD (LBS)
2WD	3.73	4000	700	3.08	5000	600	3.08	4000	500
	4.10	3000	700	3.42	6000	750			
4WD				3.08	4500	450	3.08	3500	450
				3.42	5500	650	3.42	4000	500
				3.73	5500	650	3.73	4500	550

*Trailer hitches, although not available as a factory installed option, are available from your dealer's parts department or from independent trailer hitch suppliers.

Max Trailer Weight is calculated assuming the driver and one passenger are in the tow vehicle and has all required towing equipment.

The weight of additional optional equipment, passengers and cargo in the tow vehicle must be subtracted from the Max Trailer Weight.

4WD models with 283 axles on a cab and chassis are rated at 5000 lb. trailer towing.

2WD models with 4.10 axle ratio are limited to 7000 lb. trailer towing.

Towing Trailer Along Borrego Mountain or other Steep Roads.

JIMMY

TRAILERING CHART FOR GAS ENGINES (Weight carrying trailer hitch limit is 2000 lb. trailer with 200 lb. tongue weight.)

	4.3L LV6 ENGINE AUTOMATIC TRANSMISSION			4.3L LV6 ENGINE MANUAL TRANSMISSION		
	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX TONGUE LOAD (LBS)	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX TONGUE LOAD (LBS)
2WD	3.08	4500	550			
	3.42	5500	750	3.42	4500	550
4WD	3.08	4000	500			
	3.42	5000	600	3.42	4000	500
	3.73	5000	600			

Max Trailer Weight is calculated assuming the driver and one passenger are in the tow vehicle and has all required towing equipment.

The weight of additional optional equipment, passengers and cargo in the tow vehicle must be subtracted from the Max Trailer Weight.

450 Heavy Duty Trailering Equipment Package includes weight distributing hitch platform and 7-wire round towing harness.

Transmission Oil Cooler is standard equipment on all Jimmy models with automatic transmission.

Engine Oil Cooler is standard on all Jimmy models.

SAFARI

TRAILERING CHART FOR GAS ENGINES (Weight carrying trailer hitch limit is 2000 lb. trailer with 200 lb. tongue weight.)

	4.3L LV6 ENGINE AUTOMATIC TRANSMISSION		
	AXLE RATIO	MAX TRAILER WEIGHT (LBS)	MAX TONGUE LOAD (LBS)
2WD	3.73	4500	550
	3.42	5000	600
	3.73	5500	650
AWD	3.42	4500	550
	3.73	5000	600

Max Trailer Weight is calculated assuming the driver and one passenger are in the tow vehicle and has all required towing equipment.

The weight of additional optional equipment, passengers and cargo in the tow vehicle must be subtracted from the Max Trailer Weight.

283 Heavy Duty Trailering Equipment Package includes weight distributing hitch platform and 7-wire round towing harness.

Transmission Oil Cooler and Engine Oil Cooler are standard equipment on all Safari models with automatic transmission.

1996 GROSS COMBINATION WEIGHT RATINGS FOR TRAILERING

REAR AXLE RATIO WITH AUTOMATIC TRANSMISSION

ENGINE	6,000	6,500	8,500	8000	9500	10,000	10,500	11,000	11,500	12,000	12,500	13,000	13,500	14,500	15,000	16,000	17,000	19,000
2.2L I4 GAS	3.73	4.10																
4.3L V6 GAS			3.08	3.23	3.42	3.73*	4.10	4.56										
5.0L V8 GAS					3.08		3.42		3.73		4.10							
5.7L V8 GAS						3.08	3.23	3.42		3.73			4.10		4.56			
															4.63			
															5.13			
6.5L V8 (N.A.) DIESEL						3.08		3.42		3.73			4.10					
6.5L V8 TURBO DIESEL								3.08		3.42		3.73		4.10		4.56*	5.13	
																4.63*		
7.4L V8 GAS													3.42		3.73		4.10	4.56
																		4.63
																		5.13

*GCWR reduced 500lb for all Tahoe and Sonoma models, reduced 1000 lb. for Sonoma models with ZP3 Suspension Package

**GCWR is 15,500 lb. for P 3500 commercial chassis.

***GCWR is 20,000 lb. for P 3500 commercial chassis.

In order GCWR, 209 Heavy Duty Cooling, required on Gasoline V-8 models and 104 Engine Oil Cooler required on Sierra, Suburban, and Yukon models unless equipped with HD radiator & A.T. cooling equipment.

REAR AXLE RATIO WITH MANUAL TRANSMISSION

ENGINE	5000	5.00	6500	7800	7500	8000	9200	10,000	11,000	12,000	13,500	15,000	17,000	19,000
2.2L I4 GAS	3.73	4.10												
4.3L V6 GAS			3.08	3.42	3.73*	4.10	4.56							
5.0L V8 GAS				3.08		3.42	3.73							
5.7L V8 GAS								3.08	3.42	3.73	4.10	4.56		
												4.63		
												5.13		
6.5L V8 (N.A.) DIESEL						3.08	3.42	3.73	4.10					
6.5L V8 TURBO DIESEL								3.08	3.42	3.73	4.10	4.63		
												5.13		
7.4L V8 GAS											3.42	3.73	4.10	4.56
														4.63
														5.13

GCWR increased by 1000 lbs. on all Tahoe and Sonoma models.

In combination GCWR on Sierra, Suburban and Yukon models, 104 Engine Oil Cooler required unless Engine RPO includes Engine Oil Cooler

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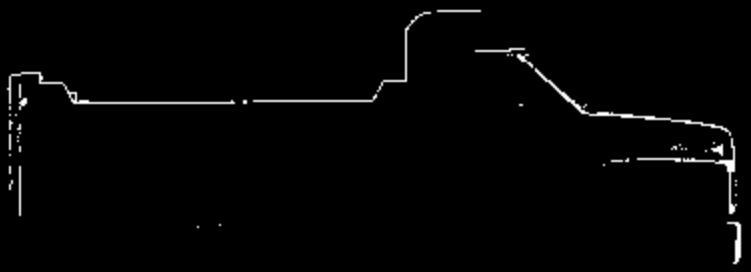
THE

STRENGTH



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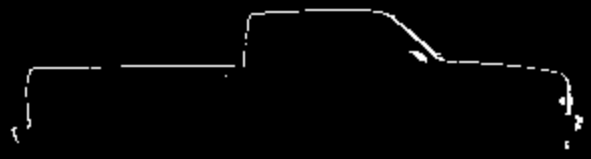
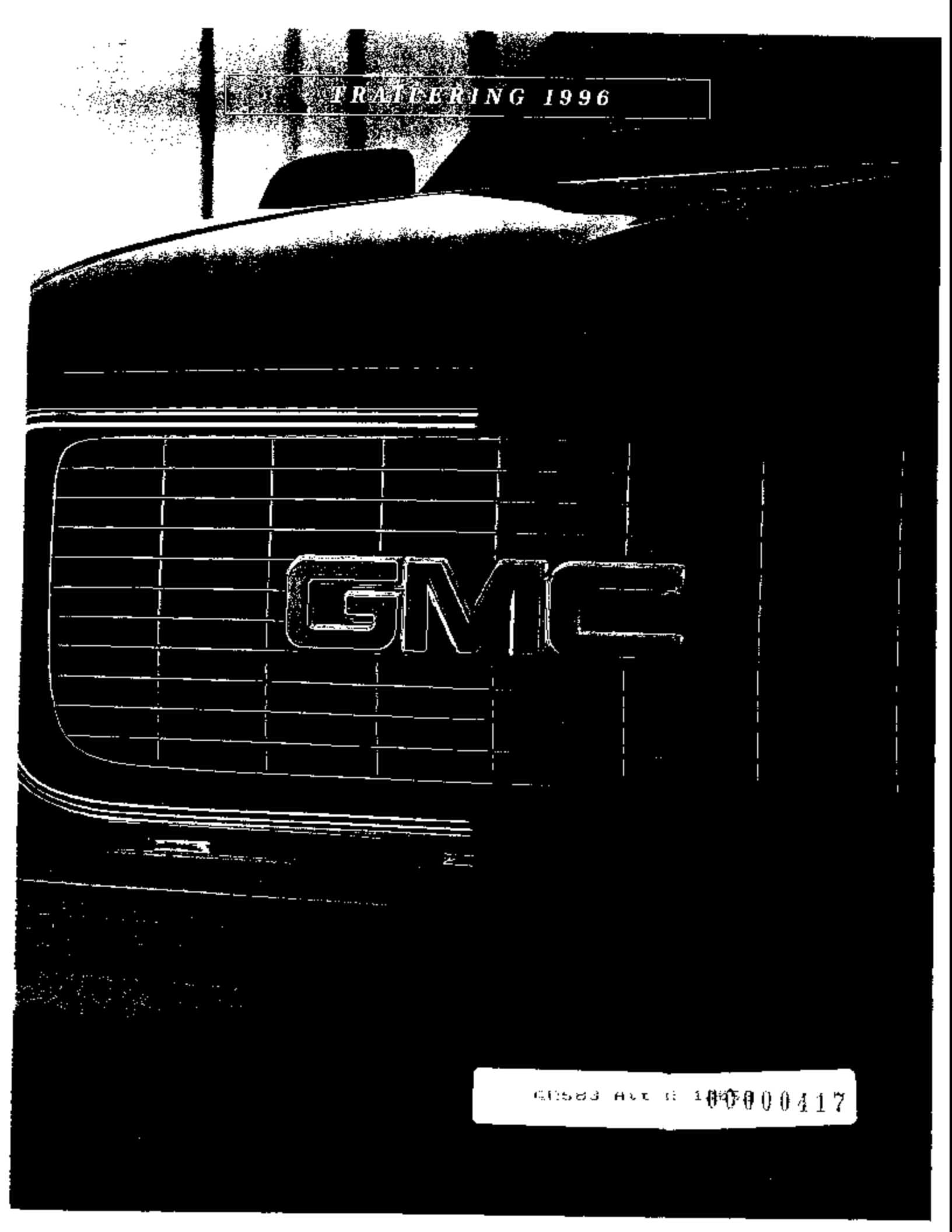


EXPERIENCE

GMC
TRUCK



OUR TRUCKS ARE AS STRONG AS OUR REPUTATION. *At GMC Truck, we've specialized in trucks, and comfortable and refined. But above all, GMC Trucks have earned a reputation for being strong, capable to well-appointed sport utilities to spacious vans, GMC Trucks are carefully designed* [illegible] *cut above*

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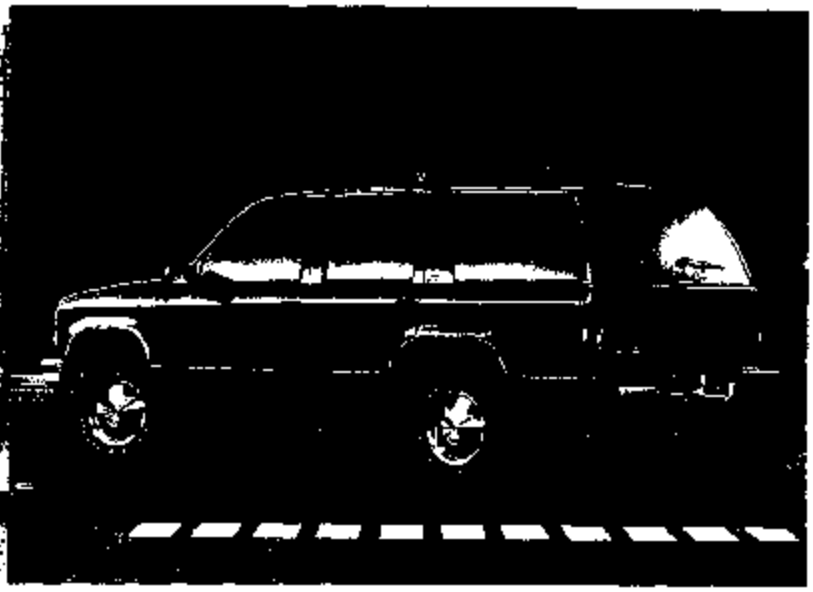
...ing but, since our founding in 1902. Over the years, our trucks have become renowned for being smooth,
...ling. And for their extraordinary capacity for carrying, hauling and towing. From versatile pickups
...ordinary. Perha... we concentrate on just one thing. Bringing you better trucks.

...ight Ratings/Hitch ... Driving Tips/Maintenance 10 Trailering Specifications 12



SIERRA. Over the years, the GMC Sierra has become renowned for its formidable strength and its extraordinary capabilities. Combined with its classic style and refinement, Sierra has earned a reputation for being everything a pickup should be. Designed to be versatile as well as strong, Sierra's choices are almost endless– Regular Cab, Club Coupe or Crew Cab; short bed or long bed; Wideside or Sportside; 2WD or 4WD; and five available powerful engines, from V6 to V8 to turbo diesel. Sierra is the very definition of the word pickup.

YUKON. While most sport utilities force you to choose between room for your passengers and room for your stuff, the GMC Yukon generously accommodates both. And it does so with poise, refinement and the strength of a GMC Truck. And with plenty of V8 power, whether you choose the Yukon 4-door or 2-door. From its four wheel antilock brakes to its strong steel safety cage structure, Yukon is engineered to make you feel secure. And with its luxurious accommodation and attention to detail, it is also designed to make you feel very comfortable.

SIERRA TOWING POWER

MAXIMUM TOWING CAPACITY	
MAXIMUM GVWR	
MAXIMUM GCWR	

ENGINE CHOICES	HORSEPOWER @ RPM	TORQUE (LB-FT) @ RPM

YUKON TOWING POWER

MAXIMUM TOWING CAPACITY	
MAXIMUM GVWR	
MAXIMUM GCWR	

ENGINE CHOICES	HORSEPOWER @ RPM	TORQUE (LB-FT) @ RPM

SUBURBAN *For those who believe bigger is better, and who believe in owning the road as opposed to merely traversing it, the GMC Suburban is the ultimate statement. And it is a class unto itself- highly sophisticated and thoroughly capable. With its boxed steel frame, two-stage multileaf rear springs and choice of three powerful V8 engines, Suburban is every bit as strong as it looks. With its generous room for up to nine passengers and its seemingly endless list of comfort and convenience features, Suburban is truly an incomparable vehicle.*

SUBURBAN TOWING POWER

MAXIMUM TOWING CAPACITY [illegible]	[illegible]
MAXIMUM GVWR [illegible]	[illegible]
MAXIMUM GCWR [illegible]	[illegible]

ENGINE CHOICES	HORSEPOWER @ RPM	TORQUE (LB-FT) @ RPM
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

[illegible]

[illegible]

JIMMY *The true achievement of the GMC Jimmy is not so much in combining the ride and comfort of a luxury sedan with the strength and capability of a GMC Truck, but in combining them so gracefully and intelligently in a vehicle that is uncommonly well suited to the way you really drive. Jimmy is unquestionably sedan-like in its ride, its comfort and its amenities. But it is also strong, versatile and functional. With a choice of 2-door or 4-door, 2WD, 4WD or AWD. In other words, Jimmy is everything you would expect a GMC Truck to be. And then some.*

JIMMY TOWING POWER

MAXIMUM TOWING CAPACITY [illegible]	[illegible]
MAXIMUM GVWR [illegible]	[illegible]
MAXIMUM GCWR [illegible]	[illegible]

ENGINE CHOICES	HORSEPOWER @ RPM	TORQUE (LB-FT) @ RPM
[illegible]	[illegible]	[illegible]

[illegible]

[illegible]

[illegible]

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SAFARI | *Though trim, stylish and eminently maneuverable, the GMC Safari is a genuine van, with effortless power, welcome breathing space and luxurious accommodation. Safari is not a competitor of the minivans: it is a step up from them. Designed primarily to be practical and versatile, Safari offers room for five, seven or eight passengers—with plenty of usable space left over. But Safari also offers a thoroughly redesigned interior, relaxing comfort and a long list of conveniences and amenities. If there's such a thing as sensible luxury, this is it.*

SAFARI TOWING POWER

MAXIMUM TOWING CAPACITY [illegible]		5[illegible]0
MAXIMUM GVWR [illegible]		[illegible]
MAXIMUM GCWR [illegible]		[illegible]
ENGINE CHOICES	HORSEPOWER @ RPM	TORQUE (LB-FT) @ RPM
[illegible]	[illegible]	[illegible]

[illegible]

[illegible]

[illegible] 1984

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GMC

WHAT YOU NEED TO KNOW BEFORE YOU TOW.

This brochure is designed to help you choose the right GMC Truck model and equipment for your towing needs, give you tips to help you trailer safely, and explain trailering terms and required equipment. If you have questions that are not answered in this brochure, please feel free to ask your GMC Truck dealer.

FROM INITIAL PURCHASE TO INITIAL PRECAUTIONS *If you haven't already purchased your GMC Truck, here are a few tips to help you choose the right vehicle and equipment for your towing needs.*

You can best provide a stable towing platform by having a truck with a long, wide "footprint" and a low center of gravity. The footprint of a vehicle describes its wheelbase length combined with the distance between the outer edges of the tires. The longer and wider the footprint of the vehicle, the easier it will be to use that vehicle to tow. This becomes more important as the trailer becomes bigger and heavier.

If you don't need the extra capabilities provided by four-wheel drive, a two-wheel-drive truck with its lower center of gravity would be better than a four-wheel drive truck. An eight-foot bed extended cab pickup with its long wheelbase will be better than a short bed standard pickup. When towing a heavy trailer, the soft, car-like ride of a half-ton 1500 chassis will not provide the solid feel that the three-quarter 2500 or one-ton 3500 will. Additionally, dual rear wheels will provide the greatest stability with their wide stance.

There are some initial precautions you should take before you even hitch a trailer to your GMC Truck. And when you do join the two, there are some additional things to consider.

Your GMC Truck was built to tow. But remember, driving your truck is a lot different from towing. A trailer changes the vehicle handling, performance and fuel economy. Successful and efficient trailering takes practiced driving skill and may require special available equipment.

We want you to see the world safely and legally. Trailering laws differ from state to state. Be sure your trailer setup is legal both where you live and where you plan to travel. State and provincial police can assist you in obtaining these regulations.

BREAKING IT IN *Do not tow a trailer during your truck's first 500 miles on the road. After the initial 500 miles, your truck requires an additional 500 miles of a trailer "break-in" period during which you should not drive over 50 mph and should not accelerate at full throttle.*

Pulling a trailer improperly or without proper equipment can damage your vehicle, resulting in costly repairs not covered by the manufacturer's warranty. Consult your GMC Truck owner's manual or your dealer for more specific details.

DEMANDS OF TOWING *Towing a trailer puts stress on your truck's engine, transmission, tires and rear axle. Because you're towing, you are demanding more from your engine due to increased aerodynamic drag, the weight of the trailer and trailer motion.*

The trailer's frontal area will create excess drag, and the larger the frontal area of the trailer, the more power you'll need.

Altitude is one other factor that may require some pre-planned power compensation. For every 1000 feet of altitude, an engine loses 3 percent of its sea-level performance. So at 10,000 feet, the power loss amounts to 30 percent. Therefore, if you plan to tow in high altitudes frequently, a larger engine is probably appropriate.

Controlling your engine temperature also requires extra care when towing a trailer. Even with proper cooling equipment, you may encounter temporary cooling system overload—especially when climbing a long hill on a hot day, idling for long periods in heavy traffic or slowing down or stopping after high-speed driving. If you get an overheat warning, refer to your owner's manual.

TAKING A LOAD ALONG *Most of GMC Truck's engines now offer more power and torque than ever, and they'll help you take a load wherever you want to go. To see which engine suits the load you'll want to haul, please see the charts at the end of this brochure.*

GEARING UP OR DOWN *"Gearing," or changing your gears to match the engine's pulling power to the terrain, involves the transmission, rear axle and tires. GMC Truck strongly recommends using an automatic transmission for trailering because the torque converter makes first gear about twice as effective as on a manual transmission.*

The rear axle also plays a big part in the amount of towing capacity and the frequency of refueling. Because engine speed and power going to the wheels are dictated by the rear axle gear ratio, the recommended axle ratios are based on engine speed pulling power (see the charts at the end of this brochure).

The highest possible rear axle ratio would be the best choice for pulling heavy loads. However, higher ratios may be less fuel efficient when you're not towing. A correct axle ratio will deliver both performance and fuel economy.

Tires are the last part of the gearing equation. Larger diameter tires reduce your vehicle's pulling capability. Compensate for this loss by opting for a higher rear axle ratio.

OUR NAME CARRIES A LOT OF WEIGHT.

Weight is the most important consideration when towing with your GMC Truck. Improper distribution of weight or overloading can cause reduced drivability, reduced control and serious accidents and/or injury. Please familiarize yourself with your trailer setup and know how much weight you can pull safely. Also remember that trailering recommendations are based on the payload the vehicle will carry as well as what it will tow.

Below are basic explanations of some of the commonly used terms you will encounter in towing and trailering.

GROSS VEHICLE WEIGHT RATING *Gross Vehicle Weight Rating (GVWR) is the maximum amount a tow vehicle can weigh including all the following: truck, driver and all passengers, fuel, payload, tongue load of trailer, weight of hitch and all optional equipment. This weight is displayed on the driver's door or door lock pillar label of your GMC Truck.*

GROSS COMBINATION WEIGHT RATING *Gross Combination Weight Rating (GCWR) specifies how much the trailering combination can weigh: the combined weight of the driver and all passengers, fuel, truck, trailer, optional equipment, and all gear and supplies carried in the vehicle and trailer.*

GROSS AXLE WEIGHT RATING *Gross Axle Weight Rating (GAWR) is the total weight each axle (front or rear) is capable of carrying. The total load on each axle must never exceed its GAWR.*

TONGUE LOADS AND CARRYING WEIGHT *Tongue load is the amount of trailer weight that creates a downward force on the truck's hitch. It is important because it allows the truck's steering system to control the whole vehicle/trailer setup. Therefore, the way you load your trailer can affect the overall driveability.*

Loads that sit too far back on the trailer bed and have lower tongue weights can cause the trailer to sway and not respond well to steering inputs. This type of handling difficulty will be particularly unsafe on rough roads, at highway speeds and during heavy braking.

Loads that sit too far forward on the trailer bed and have higher tongue weights can cause a lift on the truck's front axle, reducing suspension, handling and control.

To avoid overloading, make sure the tongue weight is 10 percent of the total trailer weight with a weight-carrying hitch (12 percent with a weight-distributing hitch). When loading, 55-60 percent of your cargo weight should be distributed over the front half of your trailer. Weight distribution from side to side should be as even as possible.

Tongue loads may be adjusted by distributing the weight in the trailer. Verify the adjustment by weighing the loaded trailer and the tongue separately.

SWAY CONTROL *Even if your vehicle and trailer are set up properly, you may occasionally encounter trailer sway. A common way to dampen minor trailer oscillations and help maintain stability is a sliding friction device developed for this purpose.*

Sway control devices are required when towing over 2000 pounds with Sonoma, Safari and Jimmy models and when towing over 4000 pounds with Yukon, Suburban and Sierra models.

HITCH TYPES *There are three basic types of hitches. Weight-carrying hitches are available for light and medium trailering while weight-distributing hitches and fifth-wheel hitches are available for heavy duty trailering.*

• *WEIGHT-CARRYING HITCH Weight-carrying hitches support trailer tongue load without distributing it. Your trailer hitch platform can be used as a weight-carrying hitch.*

On Sonoma, Sierra, Yukon and Suburban models, the rear step bumper can be equipped with a hitch ball and used as a weight-carrying hitch. Charts at the back of this brochure detail specific weight limits.

• *WEIGHT-DISTRIBUTING HITCH Weight-distributing hitches use the hitch platform bolted to the frame or underbody and act as extensions of that unit. Through the geometry of the trailer tongue, ball mount, hitch ball, equalizer bars and snap-up brackets, a variable proportion of the tongue load can be distributed to your truck's front and rear wheels.*

• *FIFTH-WHEEL TRAILER HITCH Pickup and chassis cab models can be equipped with a fifth-wheel or gooseneck trailer hitch. Follow the hitch manufacturer's directions for installation, but note that the hitch must be attached to the truck frame. Do not use the pickup bed for additional support. For proper kingpin tongue load distribution and control of the trailer, the hitch must be mounted so the kingpin load is placed ahead of the rear axle centerline. Fifth-wheel trailer kingpin loads are higher than conventional trailer tongue loads, so pay careful attention to the truck's payload capacity and rear-axle weight ratings.*

HEAVY DUTY TRAILERING PACKAGE *The Heavy Duty Trailering Package includes a hitch platform, a 7-wire harness (if it is not already standard on your truck model) and, in some cases, heavy duty cooling and heavy duty shock absorbers. This package is available on all GMC Truck models except Sonoma.*

BEFORE YOU HIT THE ROAD, DO YOUR HOMEWORK.

Before setting out for the open road, get to know your truck and trailer. The handling, braking and actual length of the truck and trailer combination will be different from the GMC Truck you've grown accustomed to. The better you know your equipment, the smoother your trip will be.

Before starting each trip, double-check the trailer hitch and platform, hitch nuts and bolts, safety chains, electrical connections, all lights, vehicle and trailer tires, and mirror adjustments. If the trailer is equipped with electric brakes, test the trailer's brakes by manually engaging the brake controller while the vehicle is moving at a low speed. Also, check your trailer's load to be sure it is secure. Recheck the load occasionally throughout your trip.

SAFETY CHAINS *You should always attach chains between your truck and your trailer. Your hitch or trailer manufacturer should specify instructions for chain installation with your particular hitch and trailer. Be sure to follow the recommendations of this manufacturer or see your hitch dealer. In addition, remember the following basic guidelines:*

- *Cross the chains under the trailer tongue, so the tongue will not drop to the pavement if it separates from the hitch.*
- *Do not allow chains to drag on the ground.*
- *Leave enough slack so you can turn your vehicle and trailer.*

BACKING UP *To back up a trailer, put one hand at the bottom of the steering wheel. To move the trailer to the left, move your hand to the left. To move the trailer to the right, move your hand to the right. Back up slowly, and if possible, have someone behind you to guide you.*

TURNING *The turning radius for the trailer is much smaller than that of the truck; therefore, the trailer is apt to hit the soft shoulders, curbs, road signs, trees and other objects on a sharp curve. Avoid this by driving your truck slightly past the normal turning point and allowing a wider turn.*

Remember, the instrument panel signal lights will flash even if trailer lights are not functioning properly. Check your trailer's turn signals occasionally throughout your trip for this reason.

PASSING *Although passing is not recommended, if you must pass, be certain you have enough time and distance to do so. (You'll need more distance to pass a vehicle when you're towing a trailer.) Signal well in advance and make sure your trailer will more than clear the vehicle you have passed before re entering your lane.*

FOLLOWING DISTANCE *When you tow, double the following distance between you and the vehicle ahead of you. Extending your following distance will help you avoid situations requiring heavy braking or sudden steering maneuvers.*

DRIVING ON GRADES *Before starting to drive down a long or steep hill, reduce your speed and shift the transmission into a lower gear to assist braking. On long uphill grades, downshift the transmission and reduce speed to 45 mph or less to reduce the chances of overheating your engine.*

PARKING ON HILLS AND GRADES *Parking your vehicle and a trailer on a hill is not recommended. However, if you must park on a hill, do so as safely as possible:*

- *Apply your brakes and shift into Neutral.*
- *Have someone place blocks (wheel chocks) behind the trailer wheels on the downgrade side.*
- *Release the brakes until the chocks absorb the load.*
- *Then apply the parking brake and shift into Park (or Reverse for a manual transmission).*

When you are ready to resume your trip, do the following:

- *Apply your brake and hold the pedal down while starting your engine.*
- *Shift into gear and release the parking brake.*
- *Release the brake pedal and drive uphill until the chocks are freed.*
- *Apply the brake and have someone retrieve the chocks.*

Remember, even with these precautions, only park on hills or grades in an emergency situation.

GENERAL MAINTENANCE *Your vehicle will need service more often when you use it to pull a trailer. The "Maintenance Schedule" found in your owner's manual will outline details on optimally maintaining your truck. Overall, though, it is important to remember to check the following items frequently between scheduled maintenance visits:*

- *Transmission fluid*
- *Engine oil*
- *Belt condition and tension*
- *Cooling system fluid levels*
- *Axle lubrication*
- *Brakes*
- *Hitch nuts and bolts*

Remember to frequently check your trailer's condition. It is important to check the following:

- *Turn signals and lights*
- *Electrical connections for brakes, turn signals and lights*
- *Wheels*
- *Wheel bearings*
- *Tire condition and air pressure*

TRAILERING SPECIFICATIONS

SIERRA (Weight-distributing hitch trailering chart for gas and diesel engines; weight-carrying trailer hitch limit is 4000 lb trailer with 400 lb tongue weight)

	VORTEC 4300 (L35)			VORTEC 5000 (L30)			VORTEC 5700 (L31)			6.5L V8 TURBO DIESEL (L56/L65)			VORTEC 7400 (L29)		
	Axle Ratio	Max. Trailer Weight (lbs.)	Max. Tongue Load (lbs.)	Axle Ratio	Max. Trailer Weight (lbs.)	Max. Tongue Load (lbs.)	Axle Ratio	Max. Trailer Weight (lbs.)	Max. Tongue Load (lbs.)	Axle Ratio	Max. Trailer Weight (lbs.)	Max. Tongue Load (lbs.)	Axle Ratio	Max. Trailer Weight (lbs.)	Max. Tongue Load (lbs.)
1500 2WD	3.08	5000	500	3.08	5000	500	3.08	5500	700	3.08	6000	750			
	3.42	5000	500	3.42	6000	750	3.42	7000	850	3.42	7000	850			
							3.73	7500	900						
1500 4WD	3.73	5000	500	3.42	5500	700	3.42	6000	750	3.42	6000	800			
				3.73	6500	800	3.73	7000	850	3.73	7000	850			
2500 2WD				3.42	5500	700	3.42	6000	750	3.42	6500	800			
				3.73	6500	800	3.73	7000	850	3.73	7000	900			
							4.10	8000	950	4.10	8500	1000			
2500 4WD				3.42	5500	700	3.42	6500	800	3.42	7000	850			
				3.73	6500	750	3.73	6500	800	3.73	7000	850			
							4.10	7500	900	4.10	8000	950			
3500 2WD							4.10	8000	950	4.10	8500	1000	4.10	10,000	1500
							4.56	9000	1000				4.56	10,000	1500
3500 4WD							4.10	7500	900	4.10	8000	950	4.10	10,000	1500
													4.56	10,000	1500
3500 2WD CREW CAB							4.10	7500	900	4.10	8000	950	4.10	10,000	1500
							4.56	8000	1000				4.56	10,000	1500
3500 4WD CREW CAB							4.10	7000	850	4.10	8000	950	4.10	10,000	1500
							4.56	8500	1000				4.56	10,000	1500
3500 HD CHASSIS CAB							4.63	9000	1000	4.63	9000	1000	4.63	10,000	1500
							5.13	10,000	1000	5.13	10,000	1000	5.13	10,000	1500

SIERRA (Fifth-wheel hitch trailering chart for gas and diesel engines)

	VORTEC 5000 (L30)			VORTEC 5700 (L31)			6.5L V8 TURBO DIESEL (L56/L65)			VORTEC 7400 (L29)		
	Axle Ratio	Max. Trailer Weight (lbs.)	Max. Tongue Load (lbs.)	Axle Ratio	Max. Trailer Weight (lbs.)	Max. Tongue Load (lbs.)	Axle Ratio	Max. Trailer Weight (lbs.)	Max. Tongue Load (lbs.)	Axle Ratio	Max. Trailer Weight (lbs.)	Max. Tongue Load (lbs.)
1500 2WD	3.42	5500	1500	3.08	6500	1500						
				3.73	7500	1500						
1500 4WD	3.42	5500	1200	3.42	6000	1200						
	3.73	5500	1200	3.73	6500	1200						
2500 2WD 7200 LB GVWR	3.42	5500	2000	3.42	6000	2000	3.42	7500	1600			
	3.73	5500	2000	3.73	7000	2000	3.73	7500	1600			
2500 2WD 8600 LB GVWR				3.73	7500	3000	3.73	7500	2500			
				4.10	8000	3000	4.10	8500	2500			
2500 4WD 7200 LB GVWR	3.42	6000	1400	3.42	6500	1400	3.42	6000	1300			
	3.73	6000	1400	3.73	6500	1400	3.73	6500	1300			
2500 4WD 8600 LB GVWR				3.73	6500	2500	3.73	7000	2000			
				4.10	7000	2500	4.10	8000	2000			
3500 2WD				4.10	8000	3000	4.10	8500	3000	4.10	11,000	3000
				4.56	9000	3000				4.56	13,000	3000
3500 4WD				4.10	7500	3000	4.10	8000	3000	4.10	10,500	3000
										4.56	12,500	3000
3500 2WD CREW CAB				4.10	7500	3000	4.10	8000	3000	4.10	10,500	3000
				4.56	9000	3000				4.56	12,500	3000
3500 4WD CREW CAB				4.10	7000	3000	4.10	8000	3000	4.10	10,500	3000
				4.56	8500	3000				4.56	12,500	3000
3500 HD CHASSIS CAB							4.63	9000	4000	4.63	12,500	4000
							5.13	10,500	4000	5.13	12,500	4000

SONOMA (Weight-distributing and fifth-wheel hitch trailering chart for gas engines; weight-carrying trailer hitch limit is 2000 lb trailer with 200 lb tongue weight)

	2.2L I-4 (LN2)			VORTEC 4300 (L35/LF6) AUTOMATIC TRANSMISSION			VORTEC 4300 (L35/LF6) MANUAL TRANSMISSION		
	Axle Ratio	Max. Trailer Weight (lbs.)	Max. Tongue Load (lbs.)	Axle Ratio	Max. Trailer Weight (lbs.)	Max. Tongue Load (lbs.)	Axle Ratio	Max. Trailer Weight (lbs.)	Max. Tongue Load (lbs.)
2WD	3.73	2000	200	3.08	5000	650	3.08	4000	500
	4.10	2000	200	3.42	6000	750			
4WD				3.08	4500	550	3.08	3500	450
				3.42	5500	650	3.42	4000	500
				3.73	5500	650	3.73	4500	550

YUKON[3] (Weight-distributing hitch trailering chart for gas and diesel engines; weight-carrying trailer hitch limit is 4000 lb trailer with 400 lb tongue weight)

	VORTEC 5700 (L31)			6.5L V8 TURBO DIESEL (L56)		
	Axle Ratio	Max. Trailer Weight (lbs)	Max. Tongue Load (lbs)	Axle Ratio	Max. Trailer Weight (lbs)	Max. Tongue Load (lbs)
YUKON 2WD	3.08	5000	600			
	3.42	6000	750			
	4.10	7000	850			
YUKON 4WD	3.42	5500	700	3.42	6000	750
	3.73	6500	800	3.73	7000	850

SUBURBAN[4] (Weight-distributing hitch trailering chart for gas and diesel engines; weight-carrying trailer hitch limit is 4000 lb trailer with 400 lb tongue weight)

	VORTEC 5700 (L31)			6.5L V8 TURBO DIESEL (L65)			VORTEC 7400 (L29)		
	Axle Ratio	Max. Trailer Weight (lbs)	Max. Tongue Load (lbs)	Axle Ratio	Max. Trailer Weight (lbs)	Max. Tongue Load (lbs)	Axle Ratio	Max. Trailer Weight (lbs)	Max. Tongue Load (lbs)
SUBURBAN 1500 2WD	3.42	5500	700	3.42	7000	850			
	3.73	6500	800						
SUBURBAN 1500 4WD	3.42	5000	600	3.42	6000	700			
	3.73	6000	750						
SUBURBAN 2500 2WD	3.73	6000	750	3.73	8000	900	3.73	8500	950
	4.10	7000	900	4.10	8800	950	4.10	10,000	1000
SUBURBAN 2500 4WD	4.10	7000	850	3.73	6000	750	3.73	8000	900
				4.10	7000	900	4.10	10,000	1000

JIMMY[5] (Weight-distributing hitch trailering chart for gas engines; weight-carrying trailer hitch limit is 2000 lb trailer with 200 lb tongue weight)

	VORTEC 4300 (L35) AUTOMATIC TRANSMISSION			VORTEC 4300 (L35) MANUAL TRANSMISSION		
	Axle Ratio	Max. Trailer Weight (lbs)	Max. Tongue Load (lbs)	Axle Ratio	Max. Trailer Weight (lbs)	Max. Tongue Load (lbs)
2WD	3.08	4500	550	3.42	4500	550
	3.42	5000	650			
4WD/AWD	3.08	4000	500	3.42	4000	500
	3.42	5000	600			
	3.73	5000	600			

SAFARI[6] (Weight-distributing hitch trailering chart for gas engines; weight-carrying trailer hitch limit is 2000 lb trailer with 200 lb tongue weight)

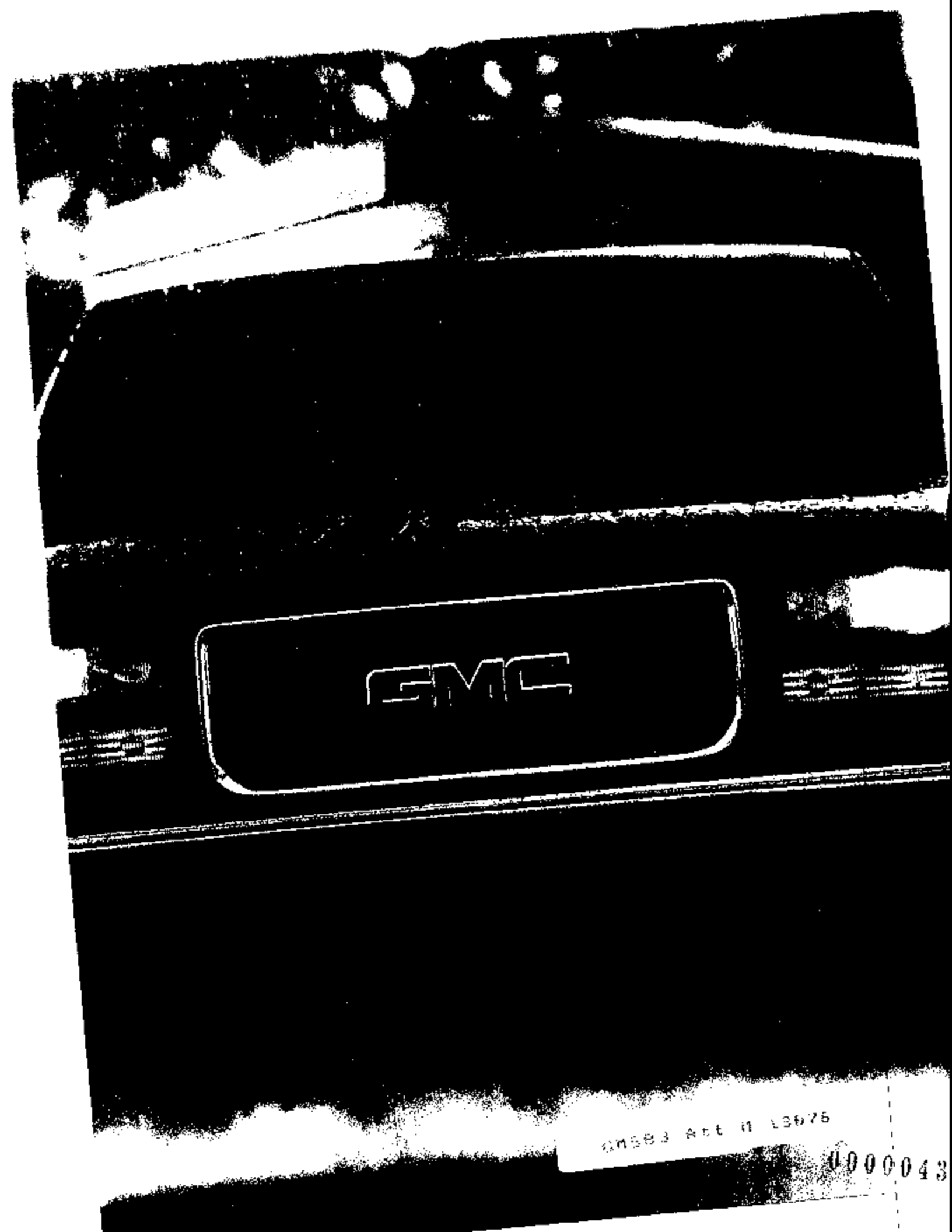
	VORTEC 4300 (L35)		
	Axle Ratio	Max. Trailer Weight (lbs)	Max. Tongue Load (lbs)
2WD	3.23	4500	550
	3.42	5000	600
	3.73	5500	650
AWD	3.42	4500	550
	3.73	5000	600

Maximum trailer weight is calculated assuming the driver and one passenger are in the tow vehicle and it has all required towing equipment. The weight of additional passengers, cargo and optional equipment in the tow vehicle must be subtracted from the maximum trailer weight. Transmission oil cooler is standard equipment on all Sierra, Suburban, Yukon, Sonoma and Jimmy models with an automatic transmission. For Envoy and Yukon trailering specifications, please refer to the 1995 GMC Truck Sporting Side Trailering specifications. For Sonoma, GMC Truck's new full-size van, will be available spring 1995. Please see your GMC Truck dealer for complete details.

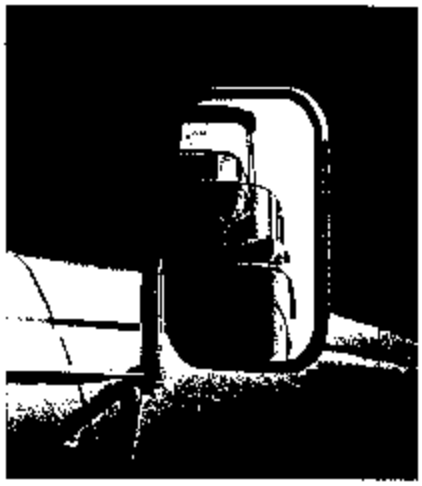
[1]Above 2000 lbs trailer rating, engine oil cooler (K04) is required on 1500 gas engine models, and 2WD 2500 gas engine models (except Vortec 7400) with a 3.73 or lower axle ratio. Engine oil cooler is standard on all other models. Above 4000 lbs trailer rating, heavy duty (y51) or gas (H45) shock absorbers are required on 2WD 1500 models and heavy duty shock absorbers (H51) or off road chassis package (Z71) is required on 4WD 1500 models. Step-in weight cannot exceed available payload (unloaded vehicle weight and the weight of passengers and cargo) for the GVWR to determine available payload. [2]Trailer hitches, although not available as a factory installed option, are available from your GMC Truck dealer or most aftermarket trailer suppliers. 4WD models with the Highrider suspension package and 2WD Regular Cab short bed models are limited to 2000 lbs trailer rating. [3]Above 2000 lbs trailer rating, engine oil cooler (K04) is required on gas engine models. Engine oil cooler is standard on all other models. 6.5L turbo diesel engine is not available on four door models. [4]Above 2000 lbs trailer rating, engine oil cooler (K04) is required on 1500 models with a Vortex 5700 engine, and 2WD 2500 models with Vortec 5700 engine and 3.73 axle ratio. Engine oil cooler is standard on all other models. [5]Engine oil cooler is standard on all models. [6]Engine oil cooler is standard on all models.

About This Catalog

We have made this catalog as comprehensive and factual as possible. We reserve the right to make changes in prices, colors, materials, equipment, specifications, models and availability at any time and without notice. Because some information may have been updated since the time of printing, please check with your GMC Truck dealer for complete up-to-the-minute details. GMC Truck models are equipped with engines produced by the GM Powertrain Division and are assembled by operating units of General Motors, its subsidiaries or suppliers to General Motors worldwide. It is sometimes necessary to produce models with components that are different or differently sourced than originally scheduled. All such components have been approved for use in GMC Truck models and will provide the same quality of performance associated with the GMC Truck name. Since some options may be unavailable when your vehicle is assembled, we suggest you verify that your vehicle includes the equipment you ordered, or, if there are changes, that they are acceptable to you. GMC Truck regularly sends its dealers useful service bulletins about GMC Truck products. To obtain these bulletins, ask your dealer or call 1-800-551-4123.



GMC is known for both capability and refinement, but we always lead with our basic strength — 90 years of specializing in trucks. GMC has the expertise to make towing a trailer easier on you. We offer a wide range of strong and versatile pickups, sport utilities and vans. And our range of engines offers you the choices and power to keep you comfortably in



WITH GMC, YOU'LL HAVE A LOT OF PULL

command of the road. This guide will help you choose the best GMC for your trailering needs, explain the required trailering equipment and provide tips to help you trailer confidently and comfortably.

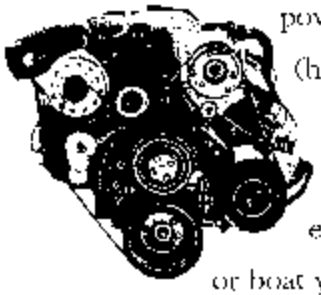
GR580 Rec'd 11877

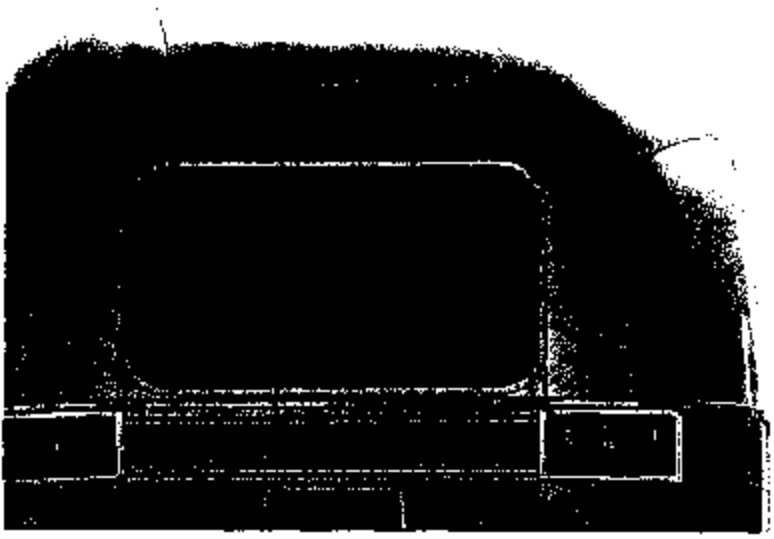
CONTENTS CAPABILITY **4** SELECTION **6** HITCHES **8** TIPS **10** DETAILS **12**

OUR REPUTATION FOR STRENGTH

At GMC, we know one of the most important considerations in towing is a vehicle's engine. That's why we offer a wide range of powerful yet sophisticated engines. Over the years, our engines have been continually enhanced and refined to make them smoother, more powerful, more efficient-running and requiring less maintenance than ever before.

Basically, an engine's strength is measured in two ways: the power to get you going (torque) and the power to keep you going (horsepower). Our engines offer you the high torque ratings that allow you to easily tow the type of trailer or boat you want to tow and the horsepower to keep you confidently in control throughout your travels. The chart on the opposite page summarizes these impressive ratings while the charts on pages 12-15 provide the towing capability of each engine.





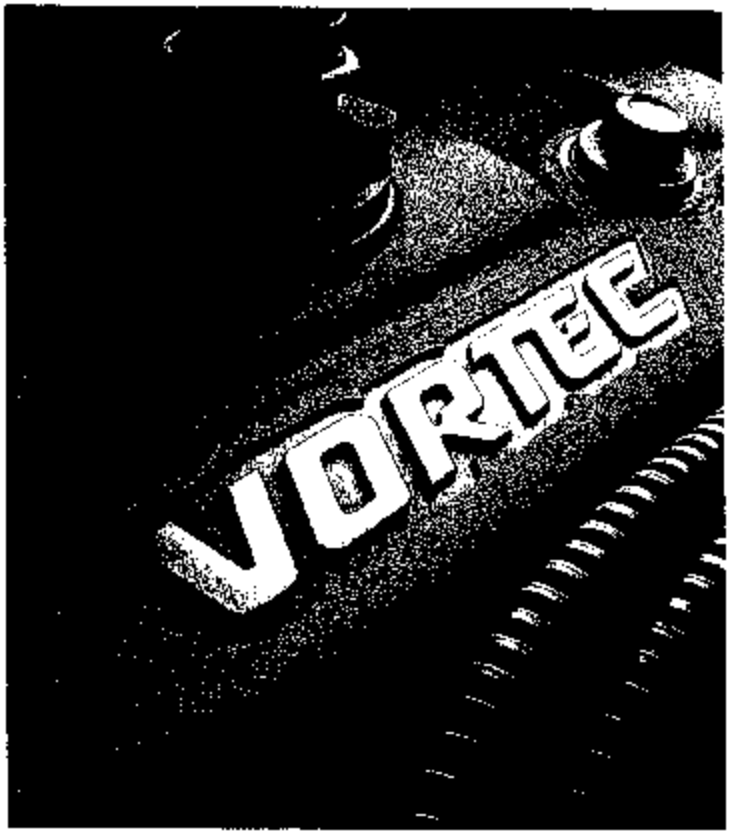
Vortec: A Powerful Name in Engines. Over the years, Vortec gas engines have been refined to provide more power. For example, the Vortec 5000 and 5700 V8 will deliver roughly 30 percent more horsepower and between 7 and 12 percent more torque than similar engines made just two years ago. A number of other advanced features make our Vortec engines even more impressive. Sequential fuel injection, an advanced fuel delivery system that helps you achieve maximum horsepower and torque without sacrificing fuel economy, is engineered into all of our gas engines. A mass air flow meter accurately measures the weight of the air entering the engine and monitors fluctuations in altitude and air temperature to give you smooth acceleration. Additionally, a crankshaft position sensor monitors the timing of the engine's combustion, helping your engine perform at its optimum efficiency.

Our Vortec engines are designed to go 100,000 miles before your first scheduled tune-up thanks to an array of long-life components! Platinum-tipped spark plugs and low-resistance spark plug wires increase conductivity helping them last longer. The one-piece serpentine drive belt requires no adjustment, so it's hassle-free for you. And the extended-life coolant even inhibits corrosion. All these features mean that even if you drive 20,000 miles a year, your next scheduled tune-up won't be until the year 2002!

There's Diesel, too. On many of our vehicles, you can choose a powerful V8 turbo diesel. Our Sierra, for instance, is the only fullsize pickup below 8600 lbs GVWR to even offer a diesel! For heavy duty

trailering (above 8600 lbs GVWR), our diesel features increased torque (a new rating of 430 lb-ft at 1800 rpm) and a strong horsepower rating (195 hp at 3400 rpm).[3] Our diesels also provide an increased flow cooling system utilizing dual thermostats, increased flow water pump and a new water crossover system. Other improvements include increased diameter oil cooler lines for better oil flow[4] and piston spray cooling for increased engine life.

Strength You'll Feel A solid foundation is also important when towing. That's why GMC uses a boxed front semiperimeter frame in most of its vehicles. These formidable frames are built with hot-rolled steel, which is shaped into C-channels and then "boxed" for strength and durability. The frames are reinforced by crossmembers for extra rigidity, assuring you a solid foundation — which is something we know you will appreciate when you want to tow.



[1]Actual mileage may vary depending on driving habits and environmental conditions. See owner's manual for details.
[2]Excludes other GM vehicles.
[3]Sierra and Suburban models only, beginning January 1997

HORSEPOWER AND TORQUE RATINGS

ENGINE	SIERRA HP @ RPM	SIERRA TQ LB-FT @ RPM	SAVANA HP @ RPM	SAVANA TQ LB-FT @ RPM	SUBURBAN HP @ RPM	SUBURBAN TQ LB-FT @ RPM	YUKON HP @ RPM	YUKON TQ LB-FT @ RPM	JIMMY HP @ RPM	JIMMY TQ LB-FT @ RPM	SAFARI HP @ RPM	SAFARI TQ LB-FT @ RPM	SONOMA HP @ RPM	SONOMA TQ LB-FT @ RPM
VORTEC 7400 V8 (L29)	290 @ 4000	410 @ 3200	290 @ 4000	410 @ 3200	290 @ 4200	410 @ 3200								
VORTEC 5700 V8 (L31)	255 @ 4400a 290 @ 4400a	330 @ 2800 330 @ 2800	245 @ 4600a 250 @ 4600d 245 @ 4200e	325 @ 2800 330 @ 2800 330 @ 2800	255 @ 4600	330 @ 2800	255 @ 4600	330 @ 2800						
VORTEC 5000 V8 (L30)	210 @ 4600	285 @ 2600	220 @ 4600	280 @ 2800										
VORTEC 4300 V6 (L35)	200 @ 4400	260 @ 2800	200 @ 4400	250 @ 2800					155 @ 4400	255 @ 2800	190 @ 4400	250 @ 2800	180 @ 4400a 190 @ 4400f	245 @ 2200 250 @ 2200
VORTEC 4300 V6 (LF6)													175 @ 4400a 190 @ 4400f	240 @ 2800 240 @ 2800
2.2L 4 CYLINDER (LN2)													115 @ 5200	130 @ 3000
6.5L TURBO DIESEL (L56/L65)	180 @ 3100b 195 @ 3400g	350 @ 1800 430 @ 1800	155 @ 3400	365 @ 1800	155 @ 3400	430 @ 1800	155 @ 3400	360 @ 1800						

a. <8500 lbs GVWR
b. <8600 lbs GVWR
c. >10,000 lbs GVWR
d. 8500-10,000 lbs GVWR
e. 2WD Models
f. 4WD Models
g. ≥8500 lbs GVWR

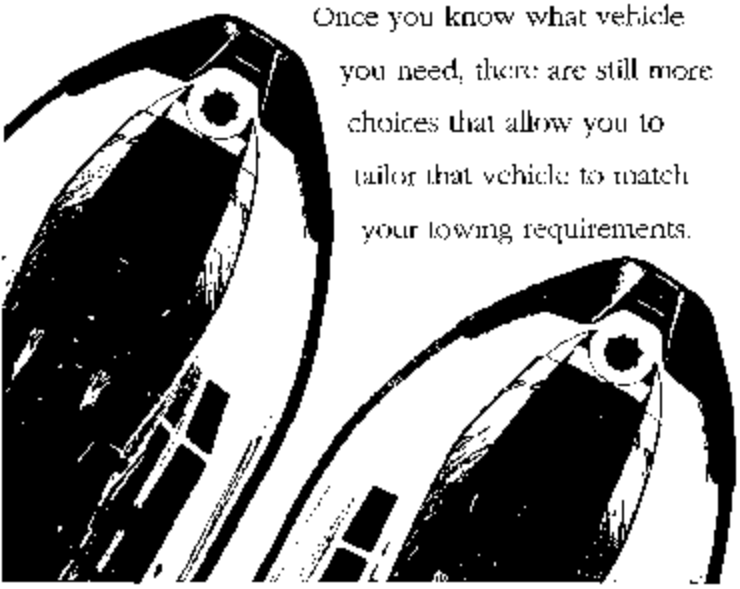
Selection

OUR NAME CARRIES A LOT OF WEIGHT

If you haven't already selected your GMC, these pages outline some towing considerations you may want to think about as you decide on a vehicle. The fold-out worksheet on the back cover is designed to complement these pages. It lists some key points which will help you select the right GMC for your towing needs.

Vehicle Selection. Selecting the right GMC starts with figuring out how much weight you plan to tow and matching that weight to the capability of a specific model. The chart at the bottom of the opposite page illustrates the total amount of weight you can tow with each vehicle. When calculating the total weight you plan to tow, remember to include the total weight of your cargo and any additional passengers you plan to take along (driver and one passenger are already included in the ratings).

As you are considering a specific vehicle, one basic principle to remember is that the longer and wider the wheelbase, the better suited it will be for towing. For example, our fullsize Savana van would be a better choice for larger loads than the midsize Safari van.



Once you know what vehicle you need, there are still more choices that allow you to tailor that vehicle to match your towing requirements.

Series and Suspension. Suburban, Savana and Sierra are classified by series. Higher series numbers designate a higher capability for towing heavy loads. A 2500 series designation on a Suburban means the vehicle has more towing power than a 1500. Moving up to a 2500 series model also gives you a choice of larger engines, a heavier frame, a stiffer suspension and a larger-capacity front axle.

Many GMC vehicles offer heavy duty Bilstein* shocks, heavy duty springs or uniquely tuned suspension systems to make [redacted] you comfortable while you tow. Please consult with your GMC salesperson to determine the right suspension for your needs.

Drive Type. Four wheel drive gives you extra traction for use on rugged, unfinished roads or on slippery boat ramps. If you won't need that extra traction and control, two-wheel drive models, which have a lighter chassis weight and a lower center of gravity than four-wheel drive models, allow you to tow more weight.

Transmission. When towing, an automatic transmission is more effective than a manual transmission and is easier to drive — especially on steep grades. So GMC recommends an automatic transmission and provides it as standard equipment on most vehicles.

GMC also offers a range of light and heavy duty transmissions to suit your needs.

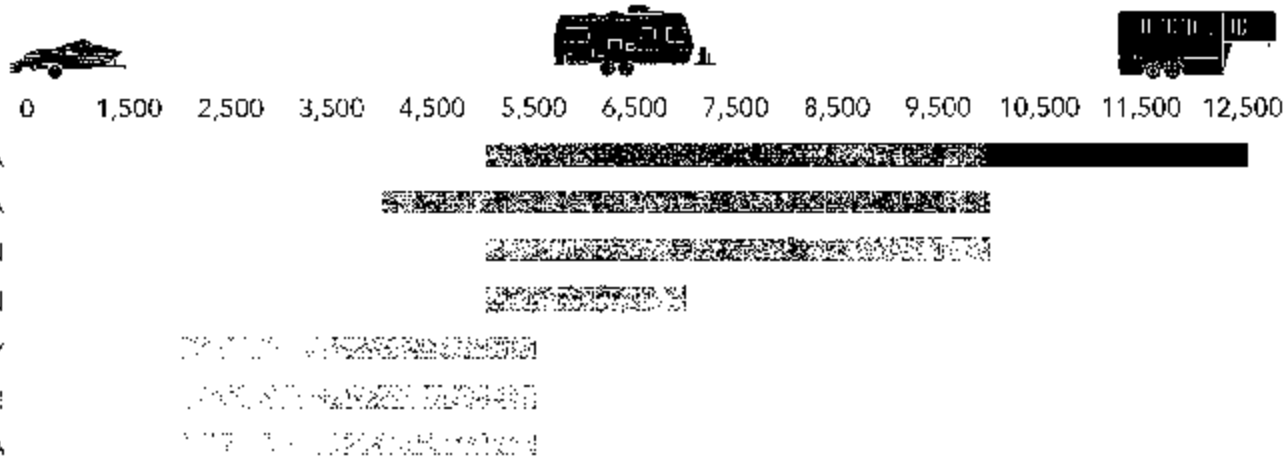
Engine. From our Vortec engines to our V8 turbo diesel, GMC offers a wide range of engine choices. While most gas engines offer more horsepower, diesel engines have better fuel economy (especially noticeable when towing heavy loads). Diesel engines also give you more peak torque at a lower rpm — which means you'll have more power when you are starting to put a load into motion. This power can make a big difference for heavy hauling on hills or grades.

When selecting your engine, an important consideration is whether you'll be towing a trailer with a large front face, which increases aerodynamic drag. If so, you'll want to opt for a larger engine. You may also prefer a larger engine if you plan to tow at high altitudes frequently. Your engine loses three percent of its sea-level performance with every increase of 1000 feet in altitude. For example, at 10,000 feet, you can expect a power loss of 30 percent.

Rear Axle Ratios. Another consideration in choosing a GMC vehicle is the rear axle ratio, which allows you to match your vehicle to your towing requirements. Numerically higher ratios (4.10 for example) increase engine rpms relative to your driving speed. Higher engine speeds (rpms) generally produce more torque at the driving wheels. The result is greater towing power but with a reduction in road speed and fuel economy. Numerically lower ratios (3.08 for example) operate just the opposite. Engine rpms are low, torque at the drive wheels is less, but driving speed is increased and theoretically so is fuel economy.

An axle ratio of 4.10 will give you more pulling power on hills, driving in traffic, or pulling your boat out of the water, but you will experience lower fuel economy than with a ratio of 3.08. For varied terrain and moderate towing, you might want to select the midrange axle ratio of 3.73. Please see pages 12-15 for more information.

MAXIMUM TRAILERING WEIGHT RATING IN POUNDS*



** Maximum trailer weight includes driver, one passenger and all required trailering equipment*

Hitches

PUTTING ON THE FINISHING TOUCHES

Once you have selected your vehicle, the next step is making sure you have the necessary equipment to help you trailer more safely and confidently. GMC offers you the option of a heavy duty trailering package on every model except Sonoma. In most cases, the package includes a hitch platform and other equipment to make your trailering experience safer. Please ask your GMC dealer about your vehicle's towing package or refer to the GMC brochure which provides specific information for each vehicle.

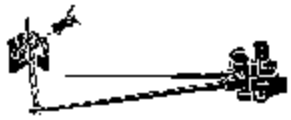
There are three categories of trailer hitches: weight-carrying, weight-distributing and fifth-wheel. Each is designed for specific types of trailering.

Weight-Carrying Hitch is the most basic and most common hitch for light and medium weights (find details on specific weights on pages 12-15). A weight-carrying hitch uses a hitch ball mounted to a draw bar or a step-bumper (on Sierra, Suburban, Yukon and Sonoma Wideside).

Draw Bar Type Weight-Carrying Hitch

Step Bumper Type Weight-Carrying Hitch

Weight-Distributing Hitch is used for heavy trailering (see ratings on pages 12-15). This hitch, with its equalizing bars and snap-up brackets, helps distribute your trailer's tongue weight evenly to your vehicle and trailer instead of "carrying" the load mostly on the rear of the vehicle. The brackets and spring bars raise the hitch point parallel to the ground, equalizing the load onto all axles.



Weight-Distributing Hitch

Fifth-Wheel Hitch or gooseneck hitch is used for heavy trailering with a fullsize pickup, and it must be attached to the truck frame. Make sure to follow the manufacturer's installation instructions, paying careful attention to the truck's payload capacity and rear axle weight ratings. These kingpin (trailer tongue) loads are higher than conventional trailer tongue loads.

Fifth-Wheel Hitch

Making a Safe Connection. Once you've determined the appropriate hitch, you'll want to make sure you set up your rig properly. The following terms, along with the information on the Tips page, define things you'll need to keep in mind as you connect your trailer.

Safety Chains. Use safety chains as a precaution each time you tow. Connect the chains as the hitch or trailer manufacturer suggests with these ideas in mind:

- Cross the chains under the trailer tongue, so the tongue won't drop on the pavement if it separates from the hitch.
- Leave enough slack in the chains, so you can turn, yet don't let the chains drag on the ground.

Sway Control. Even if your rig is set up properly, you may occasionally encounter trailer sway. To help maintain stability, you can equip your trailer with sliding friction devices to help dampen trailer sway. They are required for towing over 2000 pounds with Sonoma, Safari or Jimmy, and for towing over 4000 pounds with Savana, Yukon, Suburban or Sierra.

Wiring Harness. An important part of your trailering package is your wiring harness, which allows you

to connect the electrical components of your trailer (signal and brake lights, etc.) to the tow vehicle's power supply. This harness contains six wires on Sonoma, Jimmy and Safari, and eight wires on Sierra, Suburban and Yukon. An eight-wire harness is also available on Sonoma, Jimmy, Safari and Savana. Please check with your dealer to determine the appropriate wiring harness for your trailer.

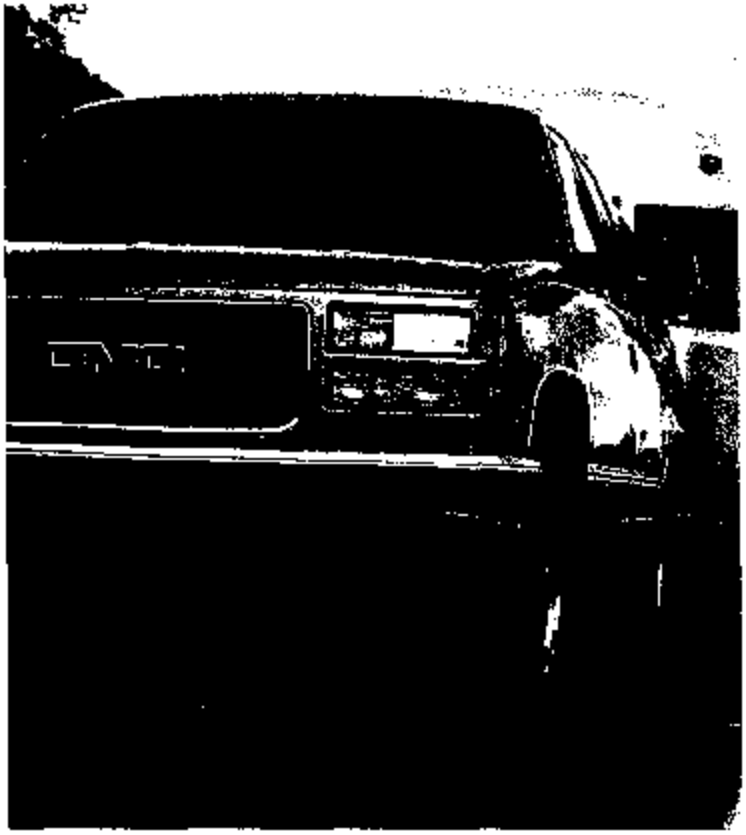
Tongue Weight is the amount of weight that creates a downward force on the trailer's hitch. The way you load your trailer affects the overall tongue weight, which in turn affects the handling of your vehicle while towing. (For more information, refer to Loading Your Trailer on page 10.)

Hitch Ball. The ball that the trailer tongue sits on is a hitch ball. They are generally solid steel and are available in a variety of sizes and finishes. Make sure the diameter of the ball matches the ball mount on your trailer coupling and meets or exceeds the gross trailer weight rating. A hitch ball's shank diameter affects the amount it should be tightened, so be sure to follow the manufacturer's instructions when installing your hitch ball.

Ball Mount, also called a draw bar when using a weight-carrying hitch, is the part that holds the hitch ball and is inserted into the receiver hitch platform.

Receiver Hitch Platform is the part mounted to the frame of your vehicle. It also "receives" the ball mount.

Gross Vehicle Weight Rating (GVWR). This number, measured in pounds, is the maximum amount a tow vehicle can weigh. It includes the vehicle, driver and all passengers, fuel, payload, tongue load of trailer, weight of hitch and all optional equipment.



The GVWR is displayed on the driver's door or door lock pillar label of your GMC.

Gross Combination Weight Rating (GCWR). This number, also in pounds, specifies the maximum possible weight of the vehicle and trailer combination (including driver, passengers, fuel, optional equipment, and gear/supplies carried in vehicle).

Gross Axle Weight Rating (GAWR). This number, in pounds, is the total weight each axle is capable of carrying. The main point to remember is the total load on each axle must never exceed its GAWR. This rating is also displayed on the driver's door or door lock pillar label of your GMC.

Tips

IT'S DIFFERENT WITH A TRAILER

Remember that having a trailer attached to your vehicle will change the handling, fuel efficiency and performance of your vehicle, and even the most basic trailering may require special equipment. Also note that trailering laws differ from state to state. Make sure you are in compliance with the regulations of each state where you plan to travel.

Breaking in Your Vehicle. It is important to ensure your engine, axles and brakes wear evenly during the vehicle's "break-in" period. When you buy your GMC, do not tow a trailer during the first 500 miles. After your first 500 miles, your vehicle requires an additional 500 miles of a trailering "break-in" period during which you should not drive over 50 mph and should not accelerate at full throttle. Please refer to your owner's manual for more information.

500 miles

Loading Your Trailer. Positioning weight on your trailer is crucial to how your vehicle handles while towing. A good guideline is to distribute 55-60% of the load over the front half of the trailer (with weight distributed evenly from side to side). Loads sitting too far forward, with higher tongue weights, can cause the tow vehicle's front axle to lift slightly — reducing handling and overworking the rear axle. Loads sitting too far back, with lower tongue weights, may cause the trailer to sway — particularly on rough roads, at highway speeds, and during heavy braking.

Things to Check. Before each trip, double check your hitch and platform, the hitch nuts and bolts, tire condition and pressure on both your vehicle and trailer, mirror adjustments, safety chains, electrical components and trailer lights. If your trailer has electric brakes, test the trailer's brakes by manually engaging the brake controller while the vehicle is moving slowly. Finally, check the load on the trailer to be sure it is secure. Throughout your trip, recheck the trailer's brake and turn signal lights, all tires and the cargo in your trailer to make sure it hasn't shifted.

Backing Up will be different with a trailer. To back up a trailer, put one hand on the bottom of your steering wheel. To move the trailer to the left, move your hand to the left. To move the trailer to the right, move your hand to the right. Back up slowly, and it might be helpful to have someone behind you to guide you. Be sure you can see them in your side mirror.

Turning. The turning radius of the trailer is much smaller than that of the vehicle; therefore, the trailer is more likely to hit soft shoulders, curbs, trees and other objects on tight turns. To avoid this, drive your vehicle slightly past the normal turning point, then turn the wheels quickly allowing the rig to make a wider turn.

Passing. Although passing is not recommended in a towing situation, if you must pass, be certain you have enough time and distance to do so. You will need more distance to pass a vehicle when you are towing a trailer. Make sure to signal well in advance and when re-entering the lane, check to make sure the trailer will clear the vehicle you have passed.

Following Distance. When you tow, double your following distance so you have time to react in cases requiring heavy braking or sudden steering maneuvers.

Lugging refers to the sluggish stuttering of the tow vehicle's engine when it needs to be in a lower gear. In other words, if your vehicle does this, downshift.

Driving on Grades. Before going down a long or steep hill, reduce your speed and shift the transmission into a lower gear to assist braking and avoid lugging. To go up a long or steep hill, reduce your speed to avoid overheating your engine.

Parking on Hills. Avoid parking your rig on an incline, but if it cannot be avoided, park as safely as possible using these guidelines after you have pulled into your parking spot:

- Apply your brakes and shift into Neutral.
- Have someone place wheel blocks behind the trailer wheels on the downgrade side.
- Release the brakes until the blocks absorb the load.
- Apply the parking brake and shift into Park (or Reverse with a manual transmission).

To leave your parking spot, do the following:

- Hold brake pedal down and start your engine.
- Shift into gear and release the parking brake.
- Release brake pedal and drive uphill slightly until blocks are freed.
- Apply brake and have someone retrieve blocks.

General Maintenance. Because your vehicle is working harder when you pull a trailer, your GMC will need service more often. Your owner's manual will outline details on optimally maintaining your vehicle. Overall, though, it is important to check the following items frequently between scheduled maintenance visits:

- Transmission fluid
- Engine oil
- Belt condition and tension
- Cooling system
- Axle lubrication
- Brakes
- Hitch nuts and bolts

Tires. Checking your tire pressure is important to your ride, stopping ability and fuel efficiency. Because temperature changes through the year will affect your tire pressure, check both your vehicle's tires and trailer's tires periodically. Tires perform best during braking if they are filled to their prescribed rating. You'll see the benefits on your gas gauge.

Details

TOWING DETAILS FOR YOUR GMC

These four pages detail information you need to know to tow within recommended guidelines. These charts specify the maximum trailer weight for your vehicle assuming you are using a weight-distributing hitch and receiver. The maximum rating for a weight carrying hitch can be found below each model name. These charts not only give you maximum weight limits for your vehicle, they show you the different capacities for each rear axle ratio. If, for instance, you have a Sierra 1500 2WD with an automatic transmission and Vortec 4300 gas engine, you can tow up to 4000 pounds if you have a rear axle ratio of 3.08. With that same vehicle, if you opt for a rear axle ratio of 3.73, however, you can then tow up to 5500 pounds (making sure your tongue weight does not exceed 700 pounds). For more information, please see your dealer or call 1-800-GMC-8782.

Sierra[1] with Automatic Transmission

The following chart is for use with a weight-distributing hitch. When using a weight-carrying hitch, the maximum trailer weight is 5000 lbs with a 500 lb tongue weight.

	VORTEC 4300 (L35)			VORTEC 5000 (L20)			VORTEC 5700 (L31)			6.5L V8 TURBO DIESEL (LS6/L65)			VORTEC 7400 (L79)		
	Axle Ratio	Max. Trailer Weight (lbs.)	Max. Tongue Load (lbs.)	Axle Ratio	Max. Trailer Weight (lbs.)	Max. Tongue Load (lbs.)	Axle Ratio	Max. Trailer Weight (lbs.)	Max. Tongue Load (lbs.)	Axle Ratio	Max. Trailer Weight (lbs.)	Max. Tongue Load (lbs.)	Axle Ratio	Max. Trailer Weight (lbs.)	Max. Tongue Load (lbs.)
1500 2WD	3.08 3.42 3.73	4000 4000 5500	600 600 700	3.08 3.42 3.73	4800 5500 6500	550 750 900	3.08 3.42 3.73	5000 6000 7000	600 750 850						
1500 4WD	3.73	5000	600	3.42 3.73	5000 6000	600 750	3.42 3.73	6000 6500	700 800	3.42 3.73	6000 7000	750 850			
2500 2WD				3.42 3.73	5500 6500	700 800	3.42 3.73 4.10	6000 7000 8000	750 850 950	3.42 3.73 4.10	6500 7500 8500	800 900 1000	3.73 4.10	9000 10,000	1000 1000
2500 4WD							3.73 4.10	6000 7000	750 900	3.73 4.10	6500 8000	800 950	3.73 4.10	8500 10,000	1000 1000
3500 2WD							4.10 4.56	7500 9000	900 1000	4.10	8000	950	4.10 4.56	10,000 10,000	1000 1000
3500 4WD							4.10	7000	850	4.10	7500	900	4.10 4.56	10,000 10,000	1000 1000
3500 2WD CREW CAB							4.10 4.56	7000 8500	850 1000	4.10	8000	950	4.10 4.56	10,000 10,000	1000 1000
3500 4WD CREW CAB							4.10 4.56	6500 8000	800 950	4.10	7500	900	4.10 4.56	10,000 10,000	1000 1000
3500 HD CHASSIS CAB										4.63 5.13	9000 10,000	1000 1000	4.63 5.13	10,000 10,000	1000 1000

Maximum trailer weight is calculated assuming the driver and one passenger are in the tow vehicle and it has all required trailering equipment. The weight of additional passengers, cargo and optional equipment in the tow vehicle must be subtracted from the maximum trailer weight. Transmission oil cooler is standard equipment on all Sierra, Suburban, Yukon, Safari, Savana and Jimmy models with an automatic transmission. Please see your GMC dealer for complete details.

[1] Above 2000 lbs trailer rating, engine oil cooler (KC4) is required on 1500 gas engine models, and 3.08 or 3.42 axle ratios. Engine oil cooler is standard on all other models. Above 5000 lbs trailering rating, heavy duty (F51) or gas (F55) shock absorbers are required on 2WD 1500 models, and Heavy duty shock absorbers (F51) or off road chassis package (Z71) is required on 4WD 1500 models. Regular weight cannot access available payload (subtract curb weight and the weight of passengers and cargo from the GVWR to determine available payload).

Sierra[1] with Manual Transmission

The following chart is for use with a weight-distributing hitch. When using a weight-carrying hitch, the maximum trailer weight is 5000 lbs with a 500 lb tongue weight.

	VORTEC 4300 (L35)			VORTEC 5000 (L30)			VORTEC 5700 (L31)			6.5L V8 TURBO DIESEL (L56/L65)			VORTEC 7400 (L29)		
	Axle Ratio	Max Trailer Weight (lbs)	Max. Tongue Load (lbs)	Axle Ratio	Max Trailer Weight (lbs)	Max. Tongue Load (lbs)	Axle Ratio	Max Trailer Weight (lbs)	Max Tongue Load (lbs)	Axle Ratio	Max Trailer Weight (lbs)	Max Tongue Load (lbs)	Axle Ratio	Max Trailer Weight (lbs)	Max Tongue Load (lbs)
1500 2WD	3.08 3.42 3.73	7000 8500 9650	700 850 1000	3.08 3.42 3.73	7000 8000 9000	700 800 900	3.08 3.42 3.73	7000 8000 9000	700 800 900						
1500 4WD	3.42 3.73	7500	750	3.42 3.73	7500 8500	750 850	3.42 3.73	7500 8500	750 850	3.42 3.73	8000 9000	750 850			
2500 2WD				3.42 3.73	8000 8000	800 800	3.42 3.73 4.10	8000 8000 8000	750 850 950	3.42 3.73 4.10	8500 9500 9500	800 900 1000	3.73 4.10	9000 10,000	1000 1000
2500 4WD							3.73 4.10	8000 8000	750 900	3.73 4.10	8500 9000	800 950	3.73 4.10	9000 10,000	1000 1000
3500 2WD							4.10 4.56	8000 9000	900 1000	4.10	9000	950	4.10 4.56	10,000 10,000	1000 1000
3500 4WD							4.10	8000	850	4.10	9500	900	4.10 4.56	10,000 10,000	1000 1000
3500 2WD CREW CAB							4.10 4.56	8000 9000	850 1000	4.10	9000	950	4.10 4.56	10,000 10,000	1000 1000
3500 4WD CREW CAB							4.10 4.56	8500 9000	900 950	4.10	9500	900	4.10 4.56	10,000 10,000	1000 1000
3500 HD CHASSIS CAB										4.63 5.13	9000 10,000	1000 1000	4.63 5.13	10,000 10,000	1000 1000

Sierra[1] with Fifth-Wheel Hitch

	VORTEC 5000 (L30) AUTOMATIC TRANSMISSION			VORTEC 5700 (L31) AUTOMATIC OR MANUAL TRANSMISSION			6.5L V8 TURBO DIESEL (L56/L65) AUTOMATIC OR MANUAL TRANSMISSION			VORTEC 7400 (L29) AUTOMATIC OR MANUAL TRANSMISSION		
	Axle Ratio	Max Trailer Weight (lbs)	Max. Kingpin Load (lbs)	Axle Ratio	Max Trailer Weight (lbs)	Max Kingpin Load (lbs)	Axle Ratio	Max Trailer Weight (lbs)	Max. Kingpin Load (lbs)	Axle Ratio	Max Trailer Weight (lbs)	Max Kingpin Load (lbs)
1500 2WD	3.42 3.73	5500 6500	1200 1200	3.42 3.73	6000 7000	1200 1200						
1500 4WD	3.42 3.73	5000 6000	1000 1000	3.42 3.73	5500 6500	1000 1000						
2500 2WD 7200 LB GVWR	3.42 3.73	5500 6500	2000 2000	3.42 3.73	6300 7300	2000 2000	3.42 3.73	6500 7500	1600 1600			
2500 2WD 8600 LB GVWR				3.73 4.10	6500 8000	3000 3000	3.73 4.10	7000 8500	2500 2500	3.73 4.10	9000 11,000	2500 2500
2500 4WD 8600 LB GVWR				3.73 4.10	6000 7500	2500 2500	3.73 4.10	6500 8000	2000 2000	3.73 4.10	8500 10,500	2000 2000
3500 2WD				4.10 4.56	7500 9000	3000 3000	4.10	8000	3000	4.10 4.56	10,500 12,500	3000 3000
3500 4WD				4.10	7000	3000	4.10	7500	3000	4.10 4.56	10,000 12,000	3000 3000
3500 2WD CREW CAB				4.10 4.56	7000 8500	3000 3000	4.10	8000	3000	4.10 4.56	10,500 12,500	3000 3000
3500 4WD CREW CAB				4.10 4.56	6500 8000	3000 3000	4.10	7500	3000	4.10 4.56	10,000 12,000	3000 3000
3500 HD CHASSIS CAB							4.63 5.13	9000 10,000	4000 4000	4.63 5.13	12,000 12,000	4000 4000

Sonoma

The following chart is for use with a weight distributing hitch. When using a weight carrying hitch, the maximum trailer weight is 2000 lbs with a 200 lb tongue weight.

	2.2L I4 (LN2) AUTOMATIC OR MANUAL TRANSMISSION			VORTEC 4300 (L35) AUTOMATIC TRANSMISSION			VORTEC 4300 (L35) MANUAL TRANSMISSION		
	Axle Ratio	Max Trailer Weight (lbs)	Max Tongue Load (lbs)	Axle Ratio	Max Trailer Weight (lbs)	Max Tongue Load (lbs)	Axle Ratio	Max Trailer Weight (lbs)	Max Tongue Load (lbs)
2WD	3.73 4.10	2000 2000	220 220	3.08 3.42	4500 5500	550 650	3.08	3500	450
4WD				3.08 3.42 3.73	4500 5500 5500	550 650 650	3.08 3.42 3.73	3500 4000 4500	450 500 550

Yukon

The following chart is for use with a weight-distributing hitch. When using a weight-carrying hitch, the maximum trailer weight is 5000 lbs with a 500 lb tongue weight.

	VORTEC 5700 (L31) AUTOMATIC TRANSMISSION			6.5L V8 TURBO DIESEL (L56) AUTOMATIC TRANSMISSION		
	Axle Ratio	Max Trailer Weight (lbs)	Max Tongue Load (lbs)	Axle Ratio	Max Trailer Weight (lbs)	Max Tongue Load (lbs)
2 DOOR 2WD	3.08 3.42	5000 6000	600 750			
2 DOOR 4WD	3.42 3.73	5500 6500	700 800	3.42 3.73	6000 7000	750 850
4 DOOR 2WD	3.42 3.73	6000 7000	750 850			
4 DOOR 4WD	3.42 3.73	5500 6500	700 800			

Suburban

The following chart is for use with a weight-distributing hitch. When using a weight-carrying hitch, the maximum trailer weight is 5000 lbs with a 500 lb tongue weight.

	VORTEC 5700 (L31) AUTOMATIC TRANSMISSION			6.5L V8 TURBO DIESEL (L65) AUTOMATIC TRANSMISSION			VORTEC 7400 (L29) AUTOMATIC TRANSMISSION		
	Axle Ratio	Max Trailer Weight (lbs)	Max Tongue Load (lbs)	Axle Ratio	Max Trailer Weight (lbs)	Max Tongue Load (lbs)	Axle Ratio	Max Trailer Weight (lbs)	Max Tongue Load (lbs)
1500 2WD	3.42 3.73	5500 6500	700 800	3.42	5500	700			
1500 4WD	3.42 3.73	5000 6000	600 750	3.42	5000	600			
2500 2WD	3.73 4.10	6000 7500	750 900	3.73 4.10	6500 8000	800 950	3.73 4.10	8500 10,000	1000 1000
2500 4WD	4.10	7000	650	3.73 4.10	6000 7500	750 700	3.73 4.10	8000 10,000	950 1000

Jimmy[5]

The following chart is for use with a weight-distributing hitch. When using a weight-carrying hitch, the maximum trailer weight is 2000 lbs with a 200 lb tongue weight.

	VORTEC 4300 (L35) AUTOMATIC TRANSMISSION			VORTEC 4300 (L35) MANUAL TRANSMISSION		
	Axle Ratio	Max Trailer Weight (lbs)	Max Tongue Load (lbs)	Axle Ratio	Max Trailer Weight (lbs)	Max Tongue Load (lbs)
2WD	3.08 3.42	4500 5500	550 650	3.42	4000	500
4WD/AWD	3.08 3.42 3.73	4000 5000 5000	500 600 600	3.42 3.73	3500 4000	450 500

Savana[6]

The following chart is for use with a weight-distributing hitch. When using a weight-carrying hitch, the maximum trailer weight is 4000 lbs with a 400 lb tongue weight.

	VORTEC 4300 (L35) AUTOMATIC TRANSMISSION			VORTEC 5000 (L30) AUTOMATIC TRANSMISSION			VORTEC 5700 (L31) AUTOMATIC TRANSMISSION			6.5L TURBO DIESEL (L65) AUTOMATIC TRANSMISSION			VORTEC 7400 (L29) AUTOMATIC TRANSMISSION		
	Axle Ratio	Max Trailer Weight (lbs)	Max Tongue Load (lbs)	Axle Ratio	Max Trailer Weight (lbs)	Max Tongue Load (lbs)	Axle Ratio	Max Trailer Weight (lbs)	Max Tongue Load (lbs)	Axle Ratio	Max Trailer Weight (lbs)	Max Tongue Load (lbs)	Axle Ratio	Max Trailer Weight (lbs)	Max Tongue Load (lbs)
1500	3.42 3.73	4000 4000	500 500	3.42	5000	600	3.42 3.73	5500 6000	700 800						
2500	3.42 4.10	4000 4000	500 500	3.42	5000	600	3.42 3.73 4.10	5500 5500 7000	700 700 850	3.73 4.10	6500 8000	850 950			
3500							3.73 4.10	5500 7000	700 850	3.73 4.10	6000 7500	750 900	3.42 3.73 4.10	9600 8000 10,000	800 950 1000

Safari[5]

The following chart is for use with a weight-distributing hitch. When using a weight-carrying hitch, the maximum trailer weight is 2000 lbs with a 200 lb tongue weight.

	VORTEC 4300 (L35) AUTOMATIC TRANSMISSION		
	Axle Ratio	Max Trailer Weight (lbs)	Max Tongue Load (lbs)
2WD	3.23 3.42 3.73	4500 5000 5500	550 600 650
AWD	3.42 3.73	4500 5000	550 600

Maximum trailer weight is calculated assuming the driver and one passenger are in the tow vehicle and it has all required trailering equipment. The weight of additional passengers, cargo and optional equipment in the tow vehicle must be subtracted from the maximum trailer weight. Transmission oil cooler is standard equipment on all Sierra, Suburban, Yukon, Safari, Savana and Jimmy models with an automatic transmission. Please see your GMC dealer for complete details.

[1] Trailer hitches, although not available as a factory-installed option, are available from your GMC dealer or most aftermarket trailer suppliers. Maximum trailer weight rating reduces 500 lbs on four-wheel drive models with extended cab.

[2] Above 4,600 lbs trailer rating, engine oil cooler (KC4) is required on gas engines models with 3.08 or 3.42 axle ratios. Engine oil cooler is standard on all other models. 6.5L turbo diesel engine is not available on four door models.

[4] Above 7000 lbs trailer rating, engine oil cooler (KC4) is required on 1500 models with a Vortec 5700 engine. Engine oil cooler is standard on all other models.

[5] Engine oil cooler is standard on all models.

[6] Base Cooling System for each powertrain includes all content required to attain maximum trailer rating. No optional cooling equipment available.

Worksheet

The answers to these questions will provide you with information necessary for selecting the GMC to meet all your needs. Fill out this worksheet and review it with your GMC salesperson as you spec your new vehicle.

1. What is the weight of your boat or trailer (including all cargo)? _____ _ _

2. Maximum towing ratings include driver and one passenger. How many additional passengers will be in the vehicle when you are towing? _____

3. How much of the vehicle's driving time will be spent towing? ☐0-25% ☐25-50% ☐50-75% ☐75-100%

4. What special conditions requiring added traction will you encounter while towing? ☐Off-road ☐Unfinished roads ☐Snow-covered roads ☐Boat ramps

5. What are the height and width of your boat or trailer? _____

6. Will you be towing over short or long distances? ☐Short ☐Long

7. When trailering which of the following special conditions will you encounter? ☐Steep grades ☐Mountains ☐High altitudes ☐Extreme temperatures

8. What type of hitch does your trailer require? ☐Weight-carrying ☐Weight-distributing ☐Fifth-wheel

9. Is your trailer equipped with trailer brakes? ☐Yes ☐No

10. What type of electrical connection does your trailer require (6- or 8 wire)? ___ _____

11. Will your towing needs increase in the future? ☐Yes ☐No

Worksheet

The worksheet included on the other side of this page can be used to write down key information which will help identify your towing requirements. Answer the questions before you visit your dealer and refer to them as you specify your vehicle with your GMC salesperson.

About this guide. We have made this Trailering Guide as comprehensive and factual as possible. We reserve the right to make changes in prices, colors, materials, equipment, specifications, models and availability at any time and without notice. Because some information may have been updated since the time of printing, please check with your GMC dealer for complete up-to-the-minute details. GMC models are equipped with engines produced by the GM Powertrain Division and are assembled by operating units of General Motors, its subsidiaries or suppliers to General Motors worldwide. It is sometimes necessary to produce models that are different or differently sourced than originally scheduled. All such components have been approved for use in GMC models and will provide the same quality performance associated with the GMC name. Since some options may be unavailable when your vehicle is assembled, we suggest you verify that your vehicle includes the equipment you ordered, or, if there are changes, that they are acceptable to you. GMC regularly sends its dealers useful GMC product bulletins. To obtain these bulletins, ask your dealer or call 1-800-GMC-8782. GMC models are designed and built to resist corrosion. All body sheet metal components are covered by a General Motors limited warranty; see your GMC dealer for terms. Application of additional rust-inhibiting materials is not required or encouraged. For additional information about standard occupant protection, crash avoidance and theft deterrent equipment, please refer to individual product catalogs.

For another way of looking at GMC, visit our website at www.gmc.com

ATTACHMENT "N"

00004451

General Motors Corporation

DP00-001; GM583

Attachment N

PD2PG31
DIST: 8002
GPDS PRODUCTION SYSTEM

PRODUCT DESCRIPTION SYSTEM
EWD LONG REPORT
EWO: W6654

DATE: 01-MR-00
TIME: 15:53:10
PAGE: 1

EWO W6654 DIVISION T SUBJECT PLATFORM ASM-YSLR WT DISTR CURRENT STATUS CLOZ LOCK Y

TYPE PART		PRIORITY	EPP	CPN	PROP	
RCD:	ECD:	DSGN	ENGR		IMPL	APPR
	ACD: 24-MY-95	DSGN 24-MY-95	ENGR		IMPL	APPR 24-JA-95

RESPONSIBLE ENGINEER KROUSE , ROBERT J PHONE 8-248 1059

INITIATOR LELLI , PAUL PHONE 8-238 0747

CODE YDO2

CODE	STATUS	LOCK	DATE	DAYS IN STATUS
	OPEN	N	24-JA-95	0
CODE	EXEC	Y	24-JA-95	120
	CLOZ	Y	24-MY-95	

REASON CODE 02 REASON DESC PRODUCT IMPROVEMENT
REASON TO AID CUSTOMER IN DETERMINING SPECIFIC TOW VEHICLE RATING.

MODEL YEAR	PROD	ADT DRD/FMLY	EFFECTIVE POINT	WFUC MODIFIER	ECS	CONTRACT	FINISH DATE	MODEL DESIGNATOR(S)	OPTION
96	1		SOP		S	36001	12-MY-95		
96	9		SOP		S	36001	24-MY-95		

NAME / NOTE DATE	ENTERED BY		NBR	ROLE TYPE	RESPONSIBLE FOR / NOTE TEXT	ITEM	ESTM BY DATE	STAT DATE	STAT
BILDSON ,	JAMES			SPEC	1996 9			24-MY-95	COMPLETED
KATCHKA ,	MICHAEL			SPEC	1996 1			12-MY-95	COMPLETED
LANE ,	KENNETH	S		DSGN	19COMPLETE			20-AP-95	COMPLETED
20-AP-95	FRALEY		01	S	STAT DATE SIGNED OFF BY FRALEY				
LANE ,	KENNETH	S		DSGN	19LAYOUT			20-AP-95	COMPLETED
20 AP 95	FRALEY		01	S	STAT DATE SIGNED OFF BY FRALEY				
DAVIDSON ,	DWAYNE	F		DSGN	12CHECKING			24 MY 95	COMPLETED
24-MY-95	BILD		01	S	STAT DATE SIGNED OFF BY BILD				
DAVIDSON ,	DWAYNE	F		DSGN	12COMPLETE			24-MY-95	COMPLETED
24-MY-95	BILD		01	S	STAT DATE SIGNED OFF BY BILD				
NOWICKI ,	REGINALD	J		DSGN	24COMPLETE			12 MY 95	COMPLETED
12-MY-95	KATCHKA		01	S	STAT DATE SIGNED OFF BY KATCHKA				
NOWICKI ,	REGINALD	J		DSGN	24LAYOUT			12-MY-95	COMPLETED
12 MY 95	KATCHKA		01	S	STAT DATE SIGNED OFF BY KATCHKA				
KROLEI ,	ROBERT	J		APPR	AUTHOR			24-JA-95	COMPLETED
08-NO-97	PD2PZ67		01	S	STAT DATE SIGNED OFF BY LELLI				

AFFECTS: ITM ITM ITM

IMPERATIVES:

EDPTS TABLES:

VALIDATION PLAN:
ANALYSIS

PLANT:

CROSS REFERENCE:	TYPE	NUMBER	TYPE	NUMBER	TYPE	NUMBER
	NCA	J1Z	PRJ	36800'	T4S	..4802-02

COORDINATED CHANGE: EWO
VIN BREAKPOINT REQUEST

TEAM IDENTIFIER:	VSMT	PDIT	VSMT	PDIT	VSMT	PDIT	VSMT	PDIT

LINE ITEM	SEQ	PART	DESCRIPTION
1			'99E CK, G 100200300 (00)
2			1). CANCEL AND REPLACE THE FOLLOWING PLATFORM ASSEMBLIES TO CHANGES A). & B). BELOW.
3		15953178	FOR BOOK 01 CANCEL P/N — REPLACE MPN — USAGE
4			15957333 — 15724872 — CK 109209(0353 &VB3/V43&VR4. CK 300 (00) &VB3/V43&VR4. (SOURCE - VALLEY INDUSTRIES)
5			15957334 — 15724873 — CK 107 (0353) CK 207 (53) &VR4. (SOURCE = VALLEY INDUSTRIES)
6			15643953 — 15724874 — CK 100200 (0516)&VR4. (SOURCE = PRODUCTION STAMPING)
7			FOR BOOK 09 2). REVISE P/N 15953178, PLATFORM ASM-TRLR WT DISTR HITCH TO CHANGES A). & B). BELOW. (SOURCE = PRODUCTION STAMPING) NOTE. PART NO CHANGED TO 15727651,PER W6194. ENGINEER TO REVISE EWO.
8			A). REVISE LABEL PLACEMENT ZONE SO AS TO BE IDENTIFIED AS AN AREA SUCH THAT THE LEFT EDGE OF THE ZONE IS 10.0MM FROM THE INNER EDGE OF THE LEFT SIDE PLATE. ALSO, THE LOWER EDGE OF THE ZONE IS TO BE 10.0MM FROM THE LOWER EDGE OF THE CROSS TUBE. OVERALL DIMENSIONS OF THE ZONE ARE 58.0MM HIGH BY 283.0MM LONG. LABEL MUST BE ORIENTED SO THAT IT IS PARALLEL
9			TO THE LOWER EDGE OF THE CROSS TUBE WITH 3.0MM FOR ITS ENTIRE LENGTH.
10			B). REVISE THE FINISH SPECIFICATION TO ADD "APPEARANCE PER GM4348M, ZONE B AS DESIGNATED. ALL OTHER SURFACES TO BE ZONE D". DESIGNATED ZONE B AREAS ARE TO BE ENTIRE REAR FACE OF EACH PART, PLUS ENTIRE OUTER SURFACES OF SIDE PLATES.
11			3). REVISE HITCH PLATFORM LABEL AS SHOWN PER ATTACHMENT PAGE 4). LABEL WILL ALSO INCLUDE V-5 SYMBOL, SUPPLIER IDENTIFICATION & GM PART NUMBERS. OVERALL LABEL DIMENSIONS MUST BE 38.0MM MINIMUM HEIGHT, BY 130.0MM MINIMUM

LINE ITEM	SEQ	PART	DESCRIPTION
			LENGTH. CORNERS MAY BE ROUNDED WITH A MAXIMUM RADIUS OF 6.0 MINIMUM PRINT SIZE ON LABEL MUST BE AT LEAST 6 PT.
12			REFERENCE AND ADDITIONAL INFORMATION ANALYSIS STATEMENT - PER ENGINEER ANALYSIS, REVISIONS DO
13			NOT AFFECT THE VALIDATION OR TEST OF PARTS AS COMPLETED.
14			PURCHASING AGREEMENTS: BOOK 01 PURCHASING IS IN AGREEMENT WITH 1996 SOP EFFECTIVE POINT PROVIDED ENGINEERING RELEASES &/OR DRAWINGS ARE REC'D BY 05/15/95.PER W. KONCZALSKI,AUTH#96-TKR-022,DTD 02/10/95. REVISED 04/04/95 PPAP APPROVAL PARTS ARE REQUIRED FOR PILOT #3 06/17/95. BOOK 03 PURCHASING IS IN AGREEMENT WITH 1996 SOP EFFECTIVE POINT PROVIDED ENGINEERING RELEASES &/OR DRAWINGS ARE REC'D BY 05/22/95.PER K. MURPHY,AUTH#96-TKR-303,DATED 06/21/95. PPAP APPROVAL PARTS ARE REQUIRED BY 06/21/95.
1000		15724872	PLATFORM ASM-TRLR WT DISTR HITCH
		15724873	PLATFORM ASM-TRLR WT DISTR HITCH
		15724874	PLATFORM ASM-TRLR WT DISTR HITCH

END OF REPORT

GM509 Rec'd 11-MAR-00

00000457

ATTACHMENT "O"

General Motors Corporation

DP00-001; GM583

"GM CONFIDENTIAL" MATERIAL HAS BEEN REMOVED FROM THIS ATTACHMENT AND SUPPLIED TO THE OFFICE OF THE CHIEF COUNSEL.

Attachment O

ATTACHMENT "P"

General Motors Corporation

DP00-001; GM583

"GM CONFIDENTIAL" MATERIAL HAS BEEN REMOVED FROM THIS ATTACHMENT AND SUPPLIED TO THE OFFICE OF THE CHIEF COUNSEL.

Attachment P

ATTACHMENT "Q"

00004462

General Motors Corporation

DP00-001; GM583

Attachment Q

GM Truck Group

September 15,1995

Subject: GMT410/430 Hitch Platform Investigation Meeting Minutes

To: J. Clement
J. Hingst
B. Hughes
J. Jang
V. Schmidt
B. Suresh
D. Wachtel

From: R. Krouse

J. Hingst, B. Hughes, J. Jang, B. Suresh and R. Krouse attended the subject meeting. Discussion focused on the following items:

R. Krouse stated that NHTSA issued an Information Request (IR) to GM due to cracks reported on the GMT410/430 hitch platform. The subject meeting was called:

-to review analysis results that indicated the hitch platform may be subject to yield under historical hitch design loads.
-to formulate a plan to measure hitch platform strain levels on R-15-31 trailer tow durability and MPG road system for comparison/correlation to finite element analysis results.

J. Jang showed initial hitch platform analysis results from the 1992 model year, including longitudinal, transverse, vertical and weight distributing hitch moment load values used in the analysis. All load cases may subject the hitch platform to yield.

B. Suresh identified a vehicle for the strain measurement activity (KS6681, a K20 Suburban with L29 engine, automatic transmission and 4.10 axle). This vehicle has a GCWR of 17,000 lbs. and a trailer rating of 10,000 lbs.

J. Hingst reviewed hitch load data gathered recently for GMT800 design. The analysis loads may be excessive for longitudinal, transverse and moment cases, but may be too low in the vertical case. He recommended running the entire R-15-31 schedule because some of the highest hitch loads occurred in isolated areas on relatively smooth roads (most likely due to undulations or dips in the road surface taken at highway speed).

B. Hughes outlined the strain measurement plan. The group agreed to instrument two or three hitches in case peak strains exceed strain gauge capacity. To simplify set up, R. Krouse agreed that strain measurement only (no hitch loads) would be required. Because of resource constraints at MPG, B. Hughes proposed gathering R-15-31 strain measurements before those on the MPG road system. He expects to complete strain gauging the week of September 18, and R-15-31 strain measurement by the end of the month. MPG work will be done in early October.

R. Krouse will provide various hitch ball locations for strain measurement and additional analysis work. Strain measurement results are required for correlation to finite element analysis, but high stress locations identified in analysis match crack locations in NHTSA photos. Therefore, potential fix analysis can progress simultaneously with strain measurement activity. R. Krouse will provide potential fixes to J. Jang.

Additional meetings will be scheduled as needed based upon strain measurement and analysis results. Please contact the writer if additional information is required.

R. J. Krouse
Chassis Components

September 22, 1995

Jae Jang
Brendan Hughes

I've done some research on hitch drawbar shank lengths, and it appears there is less variation available in the aftermarket than I first thought. The three primary aftermarket sources (Reese Products, Valley Industries and Draw-Tite) each offer only three different lengths--10", 12" & 14". I found a 16" shank length in an Eaz-Lift catalog, and an 8" in a Pulliam Enterprises catalog, but they are much less likely to be used. Therefore, from this point on, I want to look only at 10" (best case) & 14" (worst case) shanks. Use some caution here--the following page shows shank length dimension, and explains its relation to receiver end-to-hitch ball centerline distance.

As for ball height--I want Analysis to use hitch ball center (load application point) at vertical centerline of the receiver. Run "Table 1" loads provided earlier using 10" & 14" shank lengths. I want Measurement Engineering to use an 18" ball height--BUT--that means the trailer chosen for this activity should have an 18" coupler height. The trailer must be 10,000# gross weight & 1000# tongue weight WHILE THE TRAILER IS LEVEL. For instance, I don't want a 21" coupler height tilted downward to match up with an 18" ball height. Please let me know if you can get a 10,000# GVW trailer with an 18" coupler height. For weight distribution--check FRONT bumper height BEFORE the trailer is attached. Couple the trailer to the hitch, then use the bars to raise the rear and drop the front until front bumper height is back to its starting point (rear will be a little lower than its starting point).

Call me if you have any questions.

Rob

R. Krouse
8+353-5517

cc: J. Frank
J. Hingst
V. Schmidt
B. Suresh
D. Wachtel

NHTSA IR: GM-583; DP00-01: 1993-1997 Chevrolet & GMC Suburbans
- Alleged Cracking of Trailer Hitch Receiver Platform

ATTACHMENT 10C

Valley INDUSTRIES

Weight Distributing Ball Mount Shanks Feature:

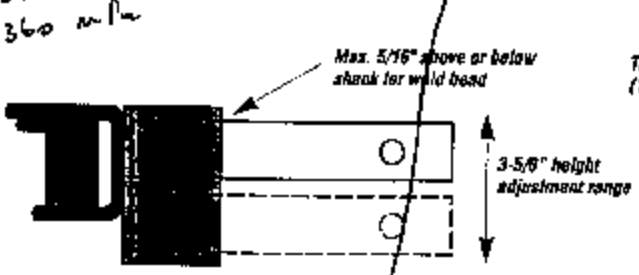
- 2" x 2" solid steel for Valley and other weight distributing hitches
- Hitch pin hole accepts 5/8" hitch pin or hitch lock
- Black polyester painted finish
- Choose for bolt-on or weld-on installation
- Models feature various rise and drop positions for use on vehicles with high or low ground clearance

7582 Ball Mount Shank

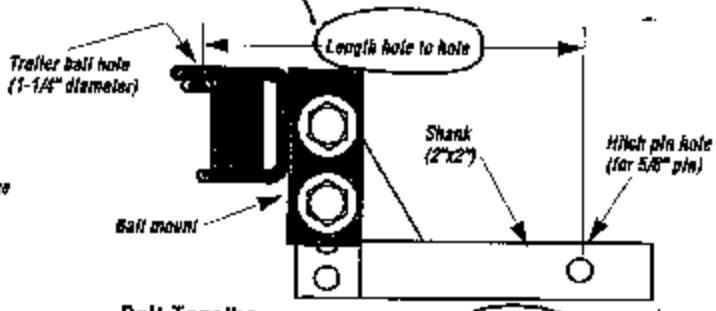
- 12" for weld-on installation. Included with weld-on weight distributing hitches

Yield: 245 mPa
Ultimate 360 mPa

How To Measure Shank:



Weld-Together



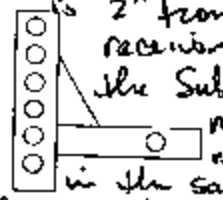
Bolt-Together

Weight Distributing Shank Selection Chart

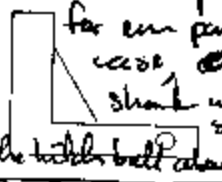
Part No.	Shank Length	Length Ball Hole to Pin Hole Round	Length Ball Hole to Pin Hole Trunnion	Rise Round	Rise Trunnion	Drop Round	Drop Trunnion
Bolt-Together							
7660*	10"	12-3/4"	12"	5-1/2"	6-3/8"	2-1/2"	1-5/8"
7661	12"	14-5/8"	13-7/8"	5-1/2"	6-3/8"	2-1/2"	1-5/8"
7662	14"	16-3/4"	16"	5-1/2"	6-3/8"	2-1/2"	1-5/8"
7663	10"	12-5/8"	11-7/8"	8-3/4"	9-5/8"	5-3/4"	4-7/8"
7520	12"	14-3/4"	14"	8-3/4"	9-5/8"	5-3/4"	4-7/8"
7664	14"	16-5/8"	15-7/8"	8-3/4"	9-5/8"	5-3/4"	4-7/8"
Weld-Together							
7665	8"	10"	9-1/4"	6-1/16"	6-3/16"	2-9/16"	2-7/16"
7666	10"	11-7/8"	11-1/8"	6-1/16"	6-3/16"	2-9/16"	2-7/16"
7579	10"	11-7/8"	11-1/8"	9-5/16"	9-7/16"	5-13/16"	5-11/16"
7582**	12"	11-7/8"	11-1/8"	3-9/16"	3-11/16"	0"	0"

*Included with bolt on Weight Distributing Hitch
**Included with weld on Weight Distributing Hitch

Note that the pin hole has to align with the hole in the hitch receiver tube that is 2" from the receiver end. On the Suburban, the receiver end is almost in the same vertical plane as the rear bumper edge. So, for our particular case a 10" shank w/ trunnion style bars will locate the hitch ball about 10" rear of the bumper



Bolt Together



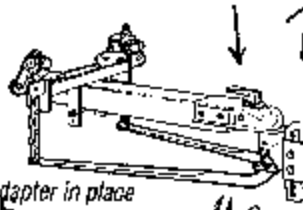
Weld Together

I believe all equipment we have at DTS or MPG is trunnion style. This is the round bar style. The trunnion style is square bar.

7521 Pole Tongue Adapter

Used as a mounting platform for the lift brackets of any weight distributing hitch when used on a trailer with a straight/pole tongue.

- Fits all lift brackets regardless of manufacturer
- Fits tongue widths from 1-5/8" to 5"
- Fits tongue heights from 3" to 6"



Pole tongue adapter in place

GM583 Att Q 17005

168

- Models feature various rise and drop positions for use on vehicles with high or low ground clearance

7582 Ball Mount Shank

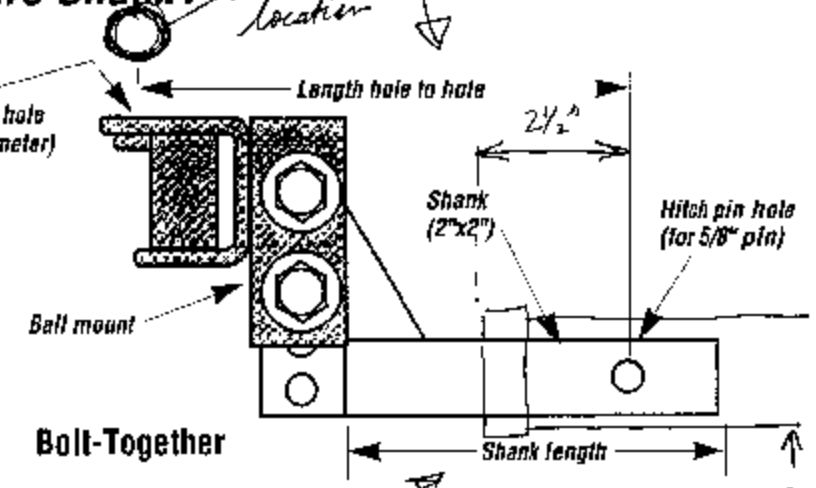
- 12" for weld-on installation. Included with weld-on weight distributing hitches

Mine, the 10" shank length is the "short" extension and the 14" is the "long" one. Note that it is the aftermarket parts that differ, not the Suburban's hitch platform.

Weld-Together

Hope this helps. Call if any questions.
Roz K 753-2931

How To Measure Shank:



Bolt-Together

Truck hitch platform

Weight Distributing Shank Selection Chart

Part No. Bolt-Together	Shank Length	Length Ball Hole to Pin Hole Round	Length Ball Hole to Pin Hole Trunnion	Rise Round	Rise Trunnion	Drop Round	Drop Trunnion
7660*	10"	12-3/4"	12"	5-1/2"	6-3/8"	2-1/2"	1-5/8"
7661	12"	14-5/8"	13-7/8"	5-1/2"	6-3/8"	2-1/2"	1-5/8"
7662	14"	16-3/4"	16"	5-1/2"	6-3/8"	2-1/2"	1-5/8"
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Weld-Together							
7665	8"	10"	9-1/4"	6-1/16"	6-3/16"	2-9/16"	2-7/16"
7666	10"	11-7/8"	11-1/8"	6-1/16"	6-3/16"	2-9/16"	2-7/16"
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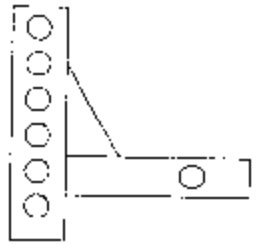
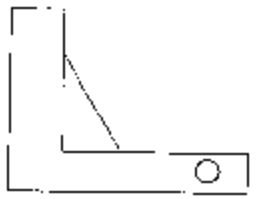
*Included with bolt on Weight Distributing Hitch
**Included with weld on Weight Distributing Hitch

Bolt Together



Weld Together



GM533 Alt 0 1/96

69000

DISTRIBUTION LIST

GMT 410/430 HITCH PLATFORM ANALYSIS

R. J. Krouse	483-512-0H1
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V. D. Schmidt	483-517-8A6
R. K. Seriguchi	2101-12
E.A. Microfiche	483-517-8A6

NOTE: If there are any additions, corrections, or deletions, please contact Gwen Dooley, TPC 483-517-8A6, (8-238) 753-2076.

GM Truck Group

12DEC95

SUBJECT: GMT 410/430 HITCH PLATFORM ANALYSIS

FROM: JAE H. JANG 483-517-8A6

TO: ROBERT J. KROUSE 483-512-0H1

MODEL LINE CK **MODEL YEAR** 92 **UPC** 14L **NO. OF PAGES** 6
ANALYSIS DATE FROM 15SEP95 **TO** 15NOV95 **EPN** 41001 **ESDW TASK** N/A

1.0 OBJECTIVES

To determine the structural integrity of the GMT 410/430 trailer hitch when subjected to a set of loads as specified in the GMUTS L-14L-1.

To investigate potential reasons for alleged suburban trailer hitch platform cracks in the area of the side plates as documented in NHTSA IR GM-496; PE95-036.

2.0 FOREWORD

PROP JAB08 has been issued to conduct an investigation on the GMT 410/430 hitch platform due to a NHTSA information request. The original analysis, which was done for the GMT 410/430 program in 1989, was modified to check hitch platform side plates. Additional load cases were provided by the DRE based on the recent revisions to the GMUTS L-14L-1. Various hitch ball locations were also provided by the DRE.

3.0 CONCLUSIONS

All load cases, except for the longitudinal loads, may subject the hitch platform to yield (Fig. 1).

Permanent sets at the ball attachment area of the shank were predicted, i.e., 14.3 mm for 10 in. shank and 16.5 mm for 14 in. shank (Fig. 2).

4.0 PERFORMANCE OBJECTIVES

To have the maximum hitch stress below ultimate stress for all the load cases. Stresses above yield strength (plastic deformation area) were considered acceptable.

5.0 RESULTS

GMT410/430 HITCH PLATFORM NONLINEAR ANALYSIS

TABLE 1: LOADS DESCRIPTION

SUBCASE	LOADS	DIRECTION	HITCH LOAD TYPE
1	2830 LB	DOWNWARD	WEIGHT CARRYING HITCH LOAD
2	2830 LB	COMPRESSIVE	WEIGHT CARRYING HITCH LOAD
3	2100 LB	DOWNWARD	WEIGHT DISTRIBUTING HITCH LOAD
4	51000 LB-IN	MOMENT	WEIGHT DISTRIBUTING HITCH LOAD
5	2740 LB	TENSILE	WEIGHT DISTRIBUTING HITCH LOAD
6	1500 LB	DOWNWARD	WEIGHT DISTRIBUTING HITCH LOAD
7	2740 LB	COMPRESSIVE	WEIGHT DISTRIBUTING HITCH LOAD
8	1500 LB	DOWNWARD	WEIGHT DISTRIBUTING HITCH LOAD
9	2500 LB	LEFTWARD	WEIGHT DISTRIBUTING HITCH LOAD
10	2500 LB	RIGHTWARD	WEIGHT DISTRIBUTING HITCH LOAD
11	114200 LB-IN	MOMENT	WEIGHT DISTRIBUTING HITCH LOAD
12	1500 LB	DOWNWARD	WEIGHT DISTRIBUTING HITCH LOAD

TABLE 2: 10 IN. SHANK LENGTH

SUBCASE	MAX. STRESS (MPa)	MAX. DISP. @ BALL (MM)	PERM. SET @ BALL (MM)	REMARKS
1	264	5.16	0.18	
2	61.7	0.36	0	
3	263	3.73	0.04	
4	262 / 282	1.23	0.70	SIDE PLATE / BALL
5	59.7	0.35	0	
6	262	2.64	0	
7	59.7	0.35	0	
8	262	2.64	0	
9	262	2.61	0	
10	262	2.61	0	
11	356 / 436	15.5	14.3	SIDE PLATE / BALL
12	262	2.64	0	

TABLE 3: 14 IN. SHANK LENGTH

SUBCASE	MAX. STRESS (MPa)	MAX. DISP. @ BALL (MM)	PERM. SET @ BALL (MM)	REMARKS
1	267	9.79	0.81	
2	-	-	-	
3	264	6.81	0.17	
4	263 / 285	1.71	0.9	SIDE PLATE / BALL
5	-	-	-	
6	262	4.78	0.03	
7	-	-	-	
8	-	-	-	
9	262	5.09	0.06	
10	-	-	-	
11	359 / 438	18.4	16.5	SIDE PLATE / BALL
12	-	-	-	

-: skipped due to duplication and insignificance.

6.0 DISCUSSION

6.1 Material Properties

The material properties of SAE 1008 HR sheet metal were utilized. The yield value was taken from Table 1 of SAE J1099 "Monotonic stress-strain properties of selected metals".

6.2 Assumptions

Static analyses were performed, assuming small, linear, elastic deflection. Material nonlinearity and large displacement effect were included in the nonlinear analyses.

6.3 Procedure

An existing GMT 410/430 hitch model, retrieved from EAMODEL, was refined in the area of side plates and a rivet-access hole was added to each side plate to better predict possible cracks in the area. Two different models based on 10 in. and 14 in. shank lengths were generated to examine best and worst cases. Linear analyses were first conducted to inform the DRE and test engineer of the strain measurement locations in the structure. Nonlinear analyses were then performed with nonlinear material and geometry options to extract permanent sets, in terms of ball position because of the high loads in the test plan.

6.4 Loads/Constraints

All weight distribution hitch load cases plus step "A" of the weight carrying hitch were considered from Table 2 in GMUTS L-14L-1. The matrix for the loads was rearranged as shown in Table 1. Loads are applied through a ball hitch located at the center position. The model is constrained in all 6 DOFs at 6 bolt positions located in the flanges of side plates.

7.0 MODEL LOCATION

Input decks for ABAQUS and MSC/NASTRAN are stored in EAMODEL:

'EEA.ADM.V5192.U14L.GMT410.HITCH.SUBURBAN'

8.0 LIST OF ATTACHMENTS

Figure 1- Stress plot for 2830 lb downward (14 in. shank)
Figure 2- Permanent set for 114200 lb-in moment (14 in. shank)

Jae H. Jang
Engineering Analysis

Attachments

c01046bgd/ce/ea

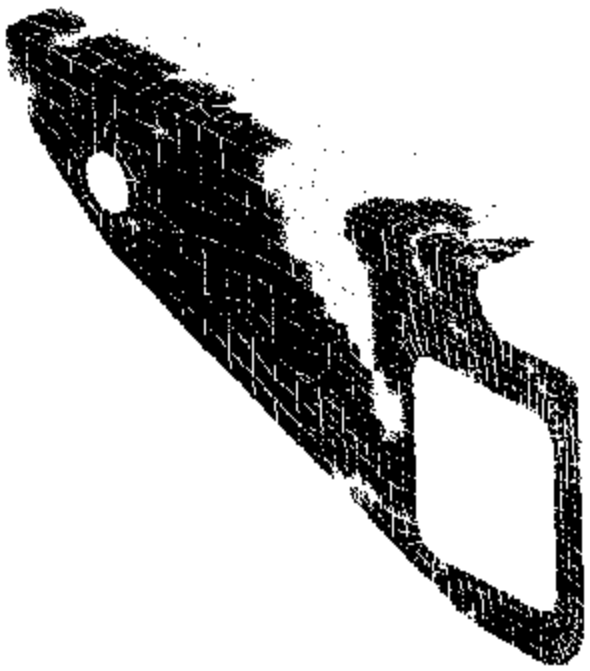

Figure 1- Stress plot for 2830 lb downward (14 in. shank)

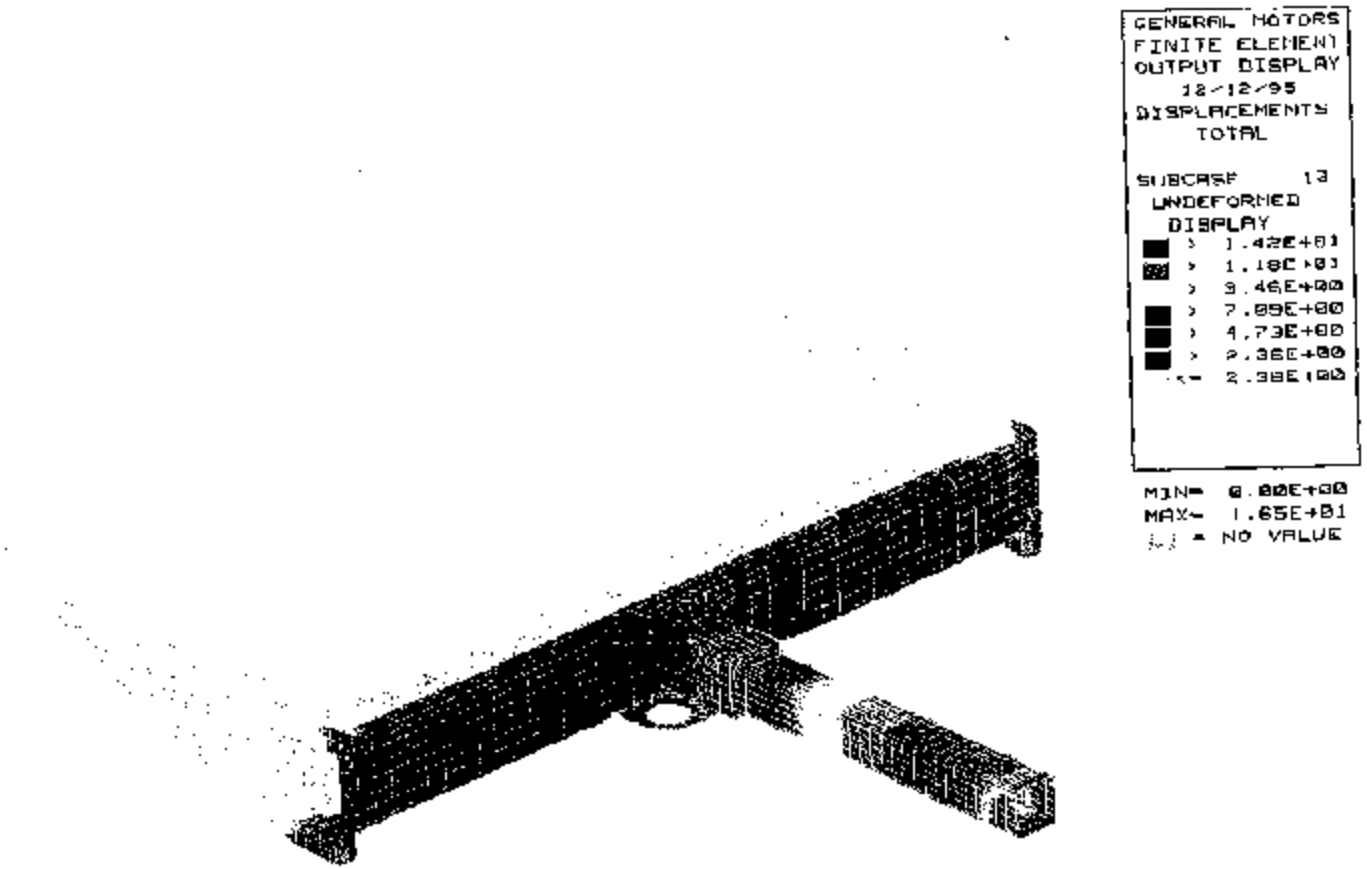

Figure 2- Permanent set for 114200 lb-in moment (14 in. shank)

GMT410/430 HITCH PLATFORM ANALYSIS

LOADS DESCRIPTION

SUBCASE	LOADS	DIRECTION	HITCH LOAD TYPE
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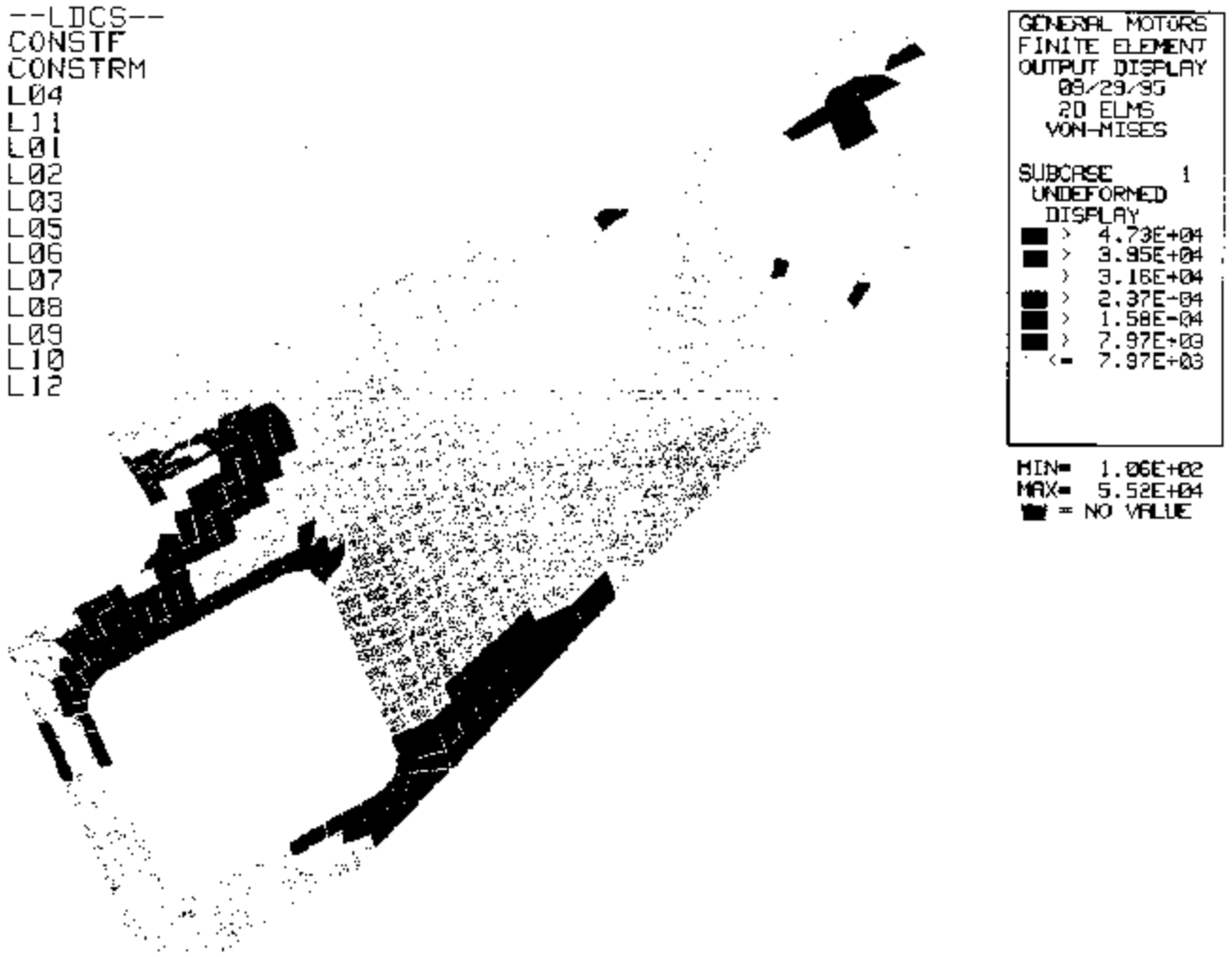
10	2500 LB	RIGHTWARD	WEIGHT DISTRIBUTING HITCH LOAD
11	114200 LB-IN	MOMENT	WEIGHT DISTRIBUTING HITCH LOAD
12	1500 LB	DOWNWARD	WEIGHT DISTRIBUTING HITCH LOAD

10 IN. SHANK LENGTH

SUBCASE	SIDE SUPPPORT (MPa)	REMARKS
1	552	
2	62.4	
3	410	
4	243	428 MPa at ball attachment area of shank
5	60.4	
6	293	
7	60.4	
8	293	
9	335	
10	335	
11	545	958 MPa at ball attachment area of shank
12	293	

14 IN. SHANK LENGTH

SUBCASE	SIDE SUPPORT (MPa)	REMARKS
1	672	
2	62.4	
3	499	
4	273	430 MPa at ball attachment area of shank
5	60.4	
6	356	
7	60.4	
8	356	
9	344	
10	344	
11	611	962 MPa at ball attachment area of shank
12	356	



PROCEED

OUT

RESTART

VIEW ROTATE
DISPLAYS
SCALE P M SH F D A
DOMAIN
M1 M2
M3 BUTTONS
RECORD UTILITY

CL
EG
MM
AI
CR

-> BUILD ANALYSIS RESULTS FRINGES -> UPDATE MIN=DEF
-> INP DSN= <S/new.r10.rssmug MAX=DEF
-> REVIEW INP DSN (>) ELM FRINGES
SUBCASE=1 ELM DATA (>)PART(S)=SIDE1 (+)
DATA SCALE= 1.0 VIEW= 1 -> RESET @ OFF
DEF SCALE = (>)UNDEF @ REPLACE VIEW (>) PRT PLOT (>) 7 COLORS
(<1>)2-D ELMS @ STRESS * LEGEND
@ MAX FIBER @ PLATE * CONTOUR LABELS

* VONMISES XNORMAL * PLOT MISSING DATA (VALUES=0)
MAJPRIN YNORMAL (>) TITLE=(CH)
MINPRIN XYSHEAR (CH)
SHEARANGLE NLCSTRAIN (CH)

:

--PART--	--LIDCS--
APPL	CONSTF
APPL1	CONSTRM
BAR	L04
BAR1	L11
FLANGE	L01
FLANGE1	L02
HITCH	L03
HITCH1	L05
PLATE	L06
PLATE1	L07
SIDE1	L08
SIDE1A	L09
COLLAR	L10
COLLAR1	L12
RIGID	
PIN	
RIGID1	
PIN1	
TRANS	

GENERAL MOTORS
FINITE ELEMENT
OUTPUT DISPLAY
09/29/95
2D ELMS
VON-MISES

SUBCASE 2
UNDEFORMED
DISPLAY
> 5.35E+03
> 4.46E+03
> 3.57E+03
> 2.68E+03
> 1.79E+03
> 9.05E+02
<= 9.05E+02

MIN= 1.62E+01
MAX= 6.24E+03
= NO VALUE

PROCEED
OUT
RESTART
VIEW ROTATE
DISPLAYS
SCALE P M SH F D A
DOMAIN
M1 M2
M3 BUTTONS
RECORD UTILITY

CL
EG
MM
AI
CR

-> BUILD ANALYSIS RESULTS FRINGES -> UPDATE MIN=DEF
-> INP DSN= <5/new.r10.nasmug MAX=DEF
-> REVIEW INP DSN (>) ELM FRINGES
SUBCASE=2 ELM DATA (>)PART(S)=SIDE1 (+)
DATA SCALE= 1.0 VIEW= 1 -> RESET @ OFF
DEF SCALE = (>)UNDEF @ REPLACE VIEW (>) PRT PLOT (>) ? COLORS
(<0>)2-D ELMS @ STRESS * LEGEND
@ MAX FIBER @ PLATE * CONTOUR LABELS

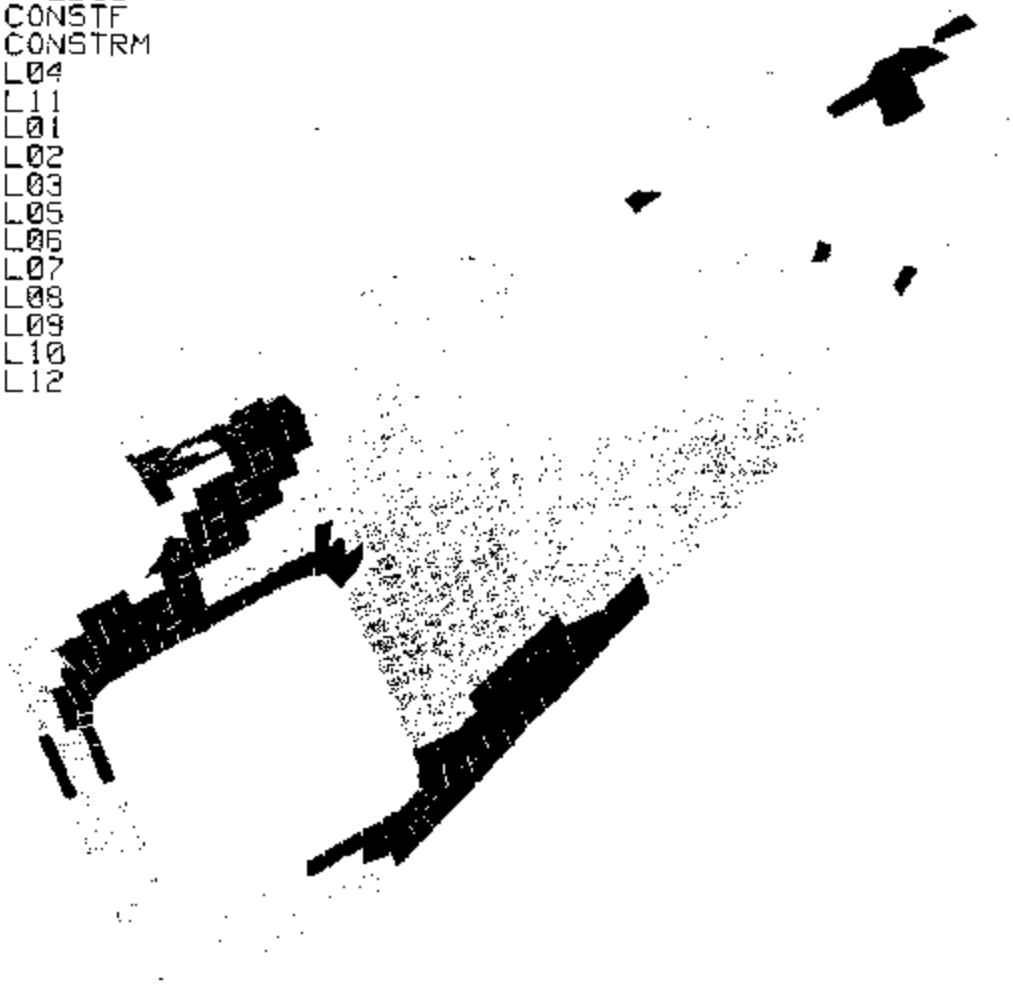
* VONMISES XNORMAL * PLOT MISSING DATA (VALUES=0)
MAJPRIN YNORMAL (>) TITLE=(CH)
MINPRIN XYSHEAR (CH)
SHEARANGLE NLSTRAIN (CH)

GM5B3 Rte 6 1015

87000078

:

--PART--	--LOCS--
APPL	CONSTF
APPL1	CONSTRM
BAR	L04
BAR1	L11
FLANGE	L01
FLANGE1	L02
HITCH	L03
HITCH1	L05
PLATE	L06
PLATE1	L07
SIDE1	L08
SIDE1A	L09
COLLAR	L10
COLLAR1	L12
RIGID	
PIN	
RIGID1	
PIN1	
TRANS	



GENERAL MOTORS
FINITE ELEMENT
OUTPUT DISPLAY
09/29/95
2D ELMS
VON-MISES

SUBCASE 3
UNDEFORMED
DISPLAY

>	3.51E+04
>	2.93E+04
>	2.34E+04
>	1.76E+04
>	1.18E+04
>	5.92E+03
<=	5.92E+03

MIN= 7.85E+01
MAX= 4.10E+04
* = NO VALUE

PROCEED
OUT
RESTART
VIEW ROTATE
DISPLAYS
SCALE P M SH F D A
DOMAIN
M1 M2
M3 BUTTONS
RECORD UTILITY

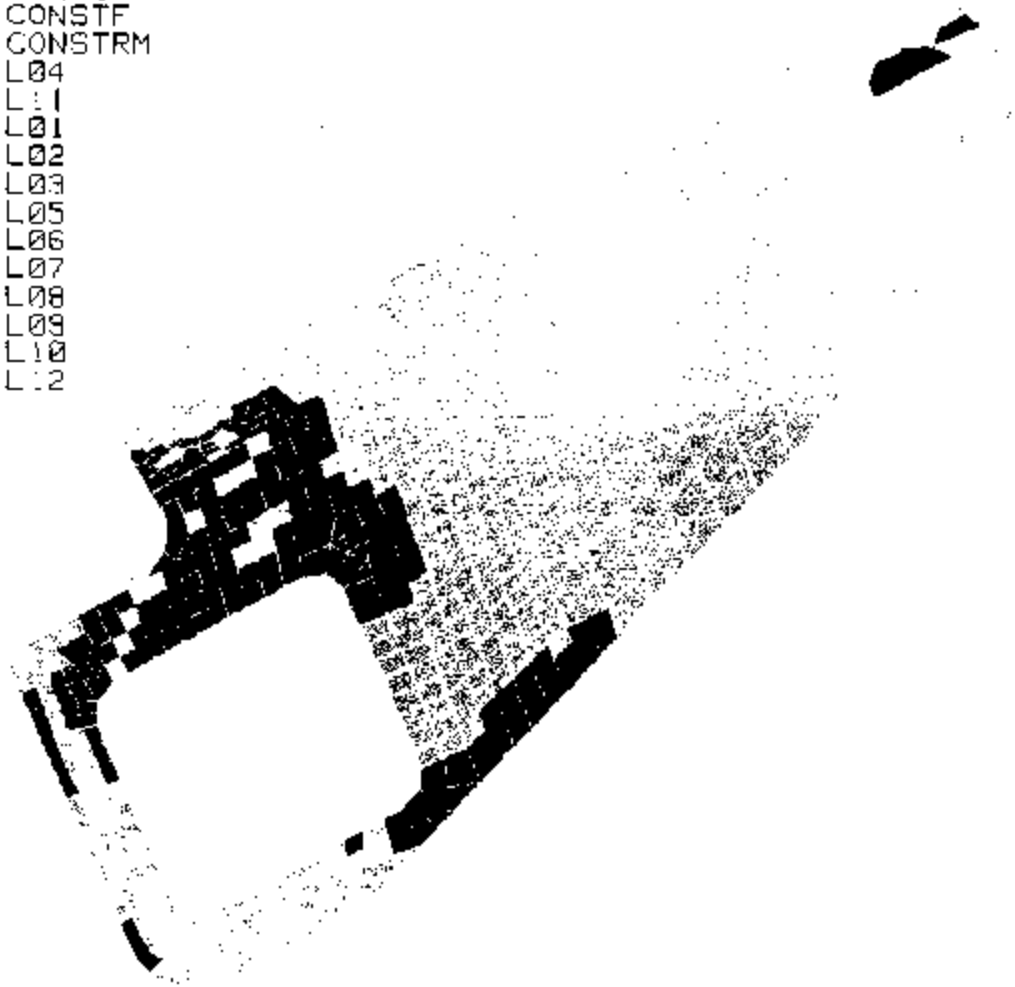
CL EG MM AI CR

-> BUILD ANALYSIS RESULTS FRINGES -> UPDATE MIN= DEF
-> INP DSN= <5/new,r10.nastmg MAX= DEF
-> REVIEW INP DSN (>) ELM FRINGES
SUBCASE=3 ELM DATA (>)PART(S)=SIDE1 (+)
DATA SCALE= 1.0 VIEW= 1 -> RESET @ OFF
DEF SCALE = (>)UNDEF @ REPLACE VIEW (>) PRT PLOT (>) 7 COLORS
((0))2-D ELMS @ STRESS * LEGEND
@ MAX FIBER @ PLATE * CONTOUR LABELS

* VONMISES XNORMA_ * PLOT MISSING DATA (VALUES=0)
MAJPRIN YNORMA_ (>) TITLE=(CH)
MINPRIN XYSHEAR (CH)
SHEARANGLE NLCSTRAIN (CH)

:

--PART--	--LDCS--
APPL	CONSTF
APPL1	CONSTRM
BAR	L04
BAR1	L11
FLANGE	L01
FLANGE1	L02
HITCH	L03
HITCH1	L05
PLATE	L06
PLATE1	L07
SIDE1	L08
SIDE1A	L09
COLLAR	L10
COLLAR1	L12
RIGID	
PIN	
RIGID1	
PIN1	
TRANS	



GENERAL MOTORS
FINITE ELEMENT
OUTPUT DISPLAY
09/29/95
2D ELMS
VON-MISES

SUBCASE 4
UNDEFORMED
DISPLAY
> 2.09E+04
> 1.74E+04
> 1.39E+04
> 1.05E+04
> 6.98E+03
> 3.52E+03
<= 3.52E+03

MIN= 5.10E+01
MAX= 2.43E+04
= NO VALUE

PROCEED
OUT
RESTART
VIEW ROTATE
DISPLAYS
SCALE P M SH F D A
DOMAIN
M1 M2
M3 BUTTONS
RECORD UTILITY

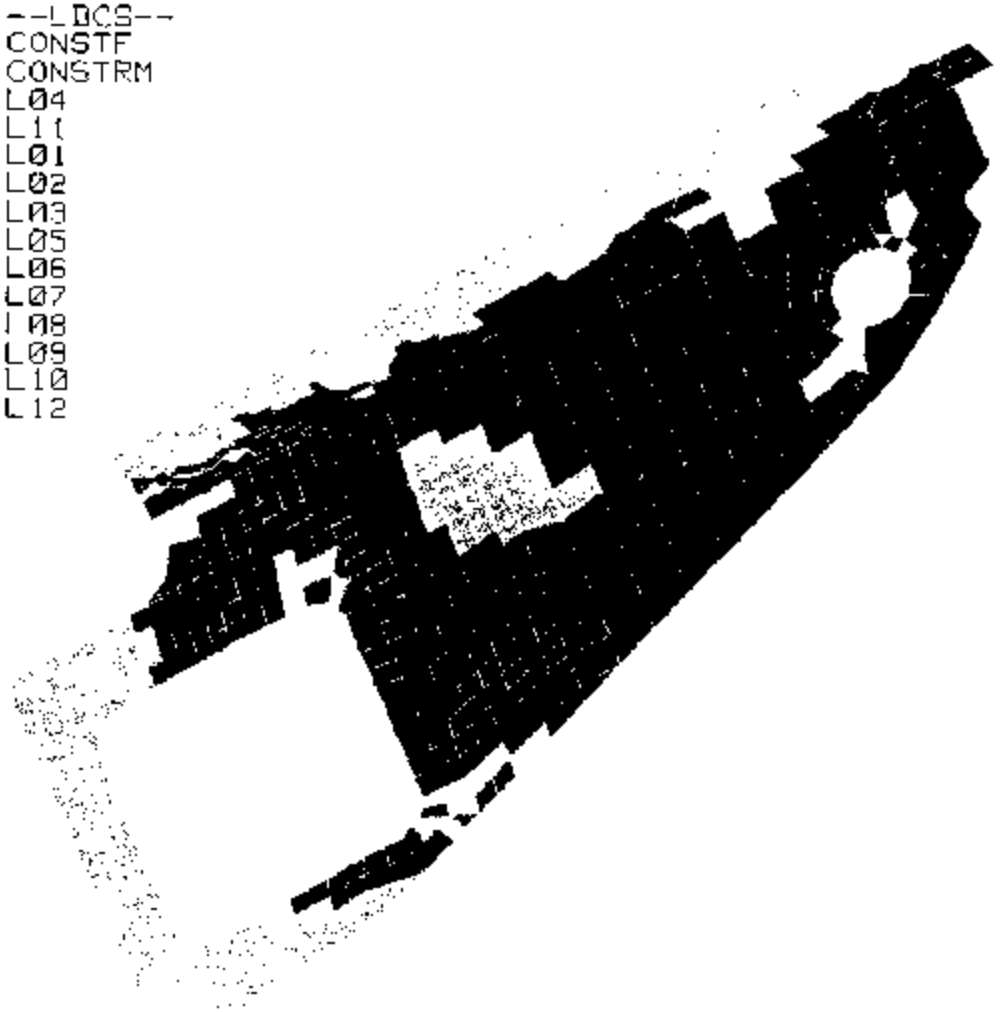
CL EG MM RI CR

-> BUILD ANALYSIS RESULTS FRINGES -> UPDATE MIN=DEF
INP DSN= <5/new.r10.nasrug MAX=DEF
-> REVIEW INP DSN (>) ELM FRINGES
SUBCASE=4 ELM DATA (>)PART(S)=SIDE1 (+)
DATA SCALE= 1.0 VIEW= 1 -> RESET @ OFF
DEF SCALE = (>)UNDEF @ REPLACE VIEW (>) PRT PLOT (>) 7 COLORS
(<(>)2-D ELMS @ STRESS * LEGEND
@ MAX FIBER @ PLATE * CONTOUR LABELS

* VONMISES XNORMAL * PLOT MISSING DATA (VALUES=0)
MAJPRIN YNORMAL (>) TITLE=(CH)
MINPRIN XYSHEAR (CH)
SHEARANGLE NLCSTRAIN (CH)

:

--PART--	--LDCS--
APPL	CONSTF
APPL1	CONSTRM
BAR	L04
BAR1	L11
FLANGE	L01
FLANGE1	L02
HITCH	L03
HITCH1	L05
PLATE	L06
PLATE1	L07
SIDE1	L08
SIDE1A	L09
COLLAR	L10
COLLAR1	L12
RIGID	
PIN	
RIGID1	
PIN1	
TRANS	



GENERAL MOTORS
FINITE ELEMENT
OUTPUT DISPLAY
09/29/95
2D ELMS
VON-MISES

SUBCASE 5
UNDEFORMED
DISPLAY

■	>	5.18E+03
■	>	4.32E+03
	>	3.46E+03
■	>	2.60E+03
■	>	1.74E+03
■	>	8.76E+02
	<=	8.79E+02

MIN= 1.57E+01
MAX= 6.04E+03
■ = NO VALUE

PROCEED

OUT

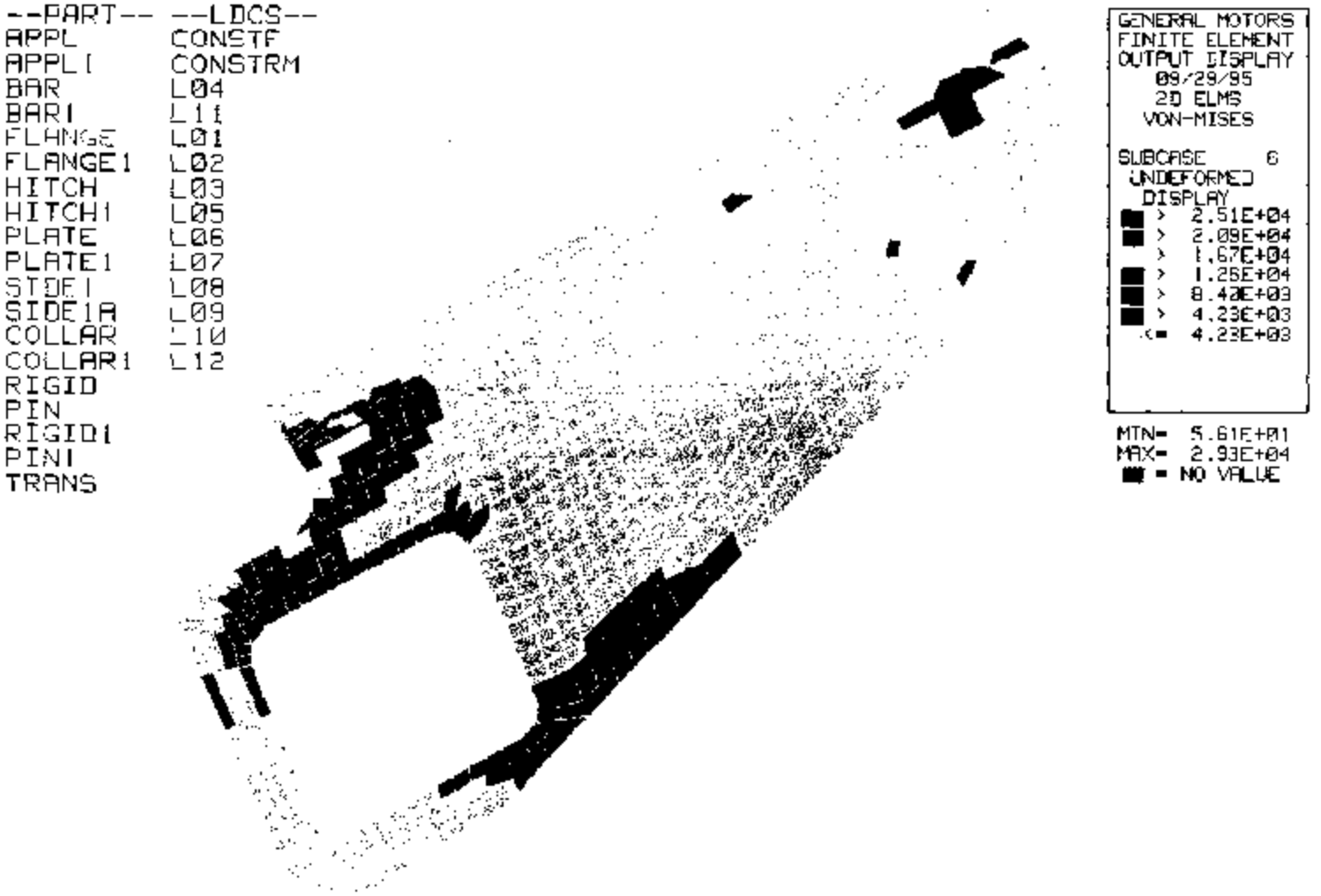
RESTART

VIEW ROTATE
DISPLAYS
SCALE P M SH F D A
DOMAIN
M1 M2
M3 BUTTONS
RECORD UTILITY

CL
EG
MM
AI
CR

-> BUILD ANALYSIS RESULTS FRINGES -> UPDATE MIN=DEF
-> INP DSN= <5/new.r10.nasmug MAX=DEF
-> REVIEW INP DSN (>) ELM FRINGES
SUBCASE=5 ELM DATA (>)PART(S)=SIDE1 (+)
DATA SCALE= 1.0 VIEW= 1 -> RESET @ OFF
DEF SCALE = (>)UNDEF @ REPLACE VIEW (>) PRT PLOT (>) ? COLORS
((<)(>)2-D ELMS @ STRESS * LEGEND
@ MAX FIBER @ PLATE * CONTOUR LABELS

* VONMISES XNORMAL * PLOT MISSING DATA (VALUES=0)
MAJPRIN YNORMAL (>) TITLE=(CH)
MINPRIN XYSHEAR (CH)
SHEARANGLE NLCSTRAIN (CH)



PROCEED

OUT

RESTART

VIEW ROTATE

DISPLAYS

SCALE P M SH F D A

DOMAIN

M1 M2

M3 BUTTONS

RECORD UTILITY

CL EG MM AI CR

-> BUILD ANALYSIS RESULTS FRINGES -> UPDATE MIN= DEF

-> INP DSN= (5/new.r10.nasmug MAX= DEF

-> REVIEW INP DSN (>) ELM FRINGES

SUBCASE=6 ELM DATA (>)PART(S)=SIDE: (+)

DATA SCALE= 1.0 VIEW= 1 -> RESET @ OFF

DEF SCALE = (>)UNDEF @ REPLACE VIEW (>) PRT PLOT (>) 7 COLORS

(<(>)2-D ELMS @ STRESS * LEGEND

@ MAX FIBER @ PLATE * CONTOUR LABELS

* VONMISES XNORMAL * PLOT MISSING DATA (VALUES=0)

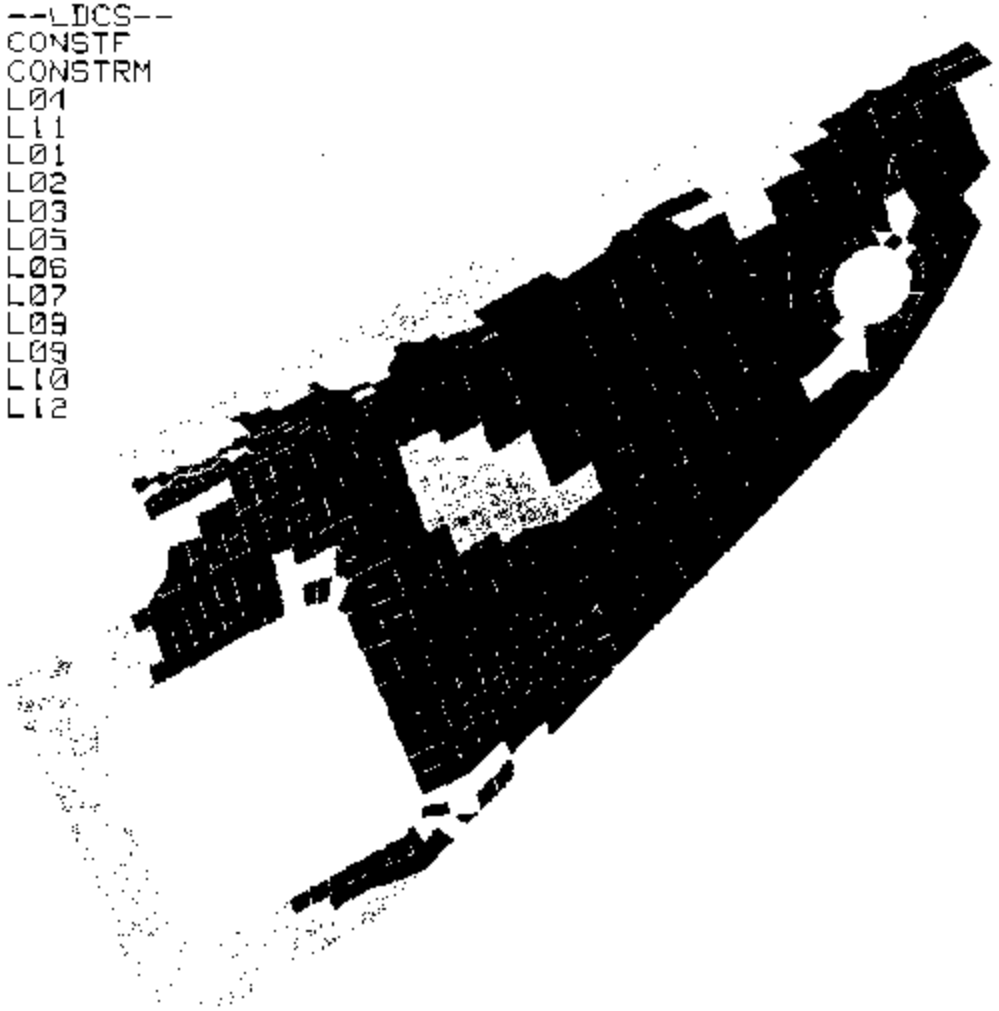
MAJPRIN YNORMAL (>) TITLE=(CH)

MINPRIN XYSHEAR (CH)

SHEARANGLE NLCSTRAIN (CH)

:

--PART--	--LDCS--
APPL	CONSTF
APPL1	CONSTRM
BAR	L01
BAR1	L11
FLANGE	L01
FLANGE1	L02
HITCH	L03
HITCH1	L05
PLATE	L06
PLATE1	L07
SIDE1	L09
SIDE1A	L09
COLLAR	L10
COLLAR1	L12
RIGID	
PIN	
RIGID1	
PIN1	
TRANS	



GENERAL MOTORS
FINITE ELEMENT
OUTPUT DISPLAY
09/29/95
2D ELMS
VON-MISES

SUBCASE 7
UNDEFORMED
DISPLAY

■	>	5.18E+02
■	>	4.32E+03
	>	3.46E+03
■	>	2.60E+03
■	>	1.74E+03
■	>	8.76E+02
	<=	8.76E+02

MIN= 1.57E+01
MAX= 6.04E+03
■ = NO VALUE

PROCEED
OUT
RESTART
VIEW ROTATE
DISPLAYS
SCALE P M SH F D A
DOMAIN
M1 M2
M3 BUTTONS
RECORD UTILITY

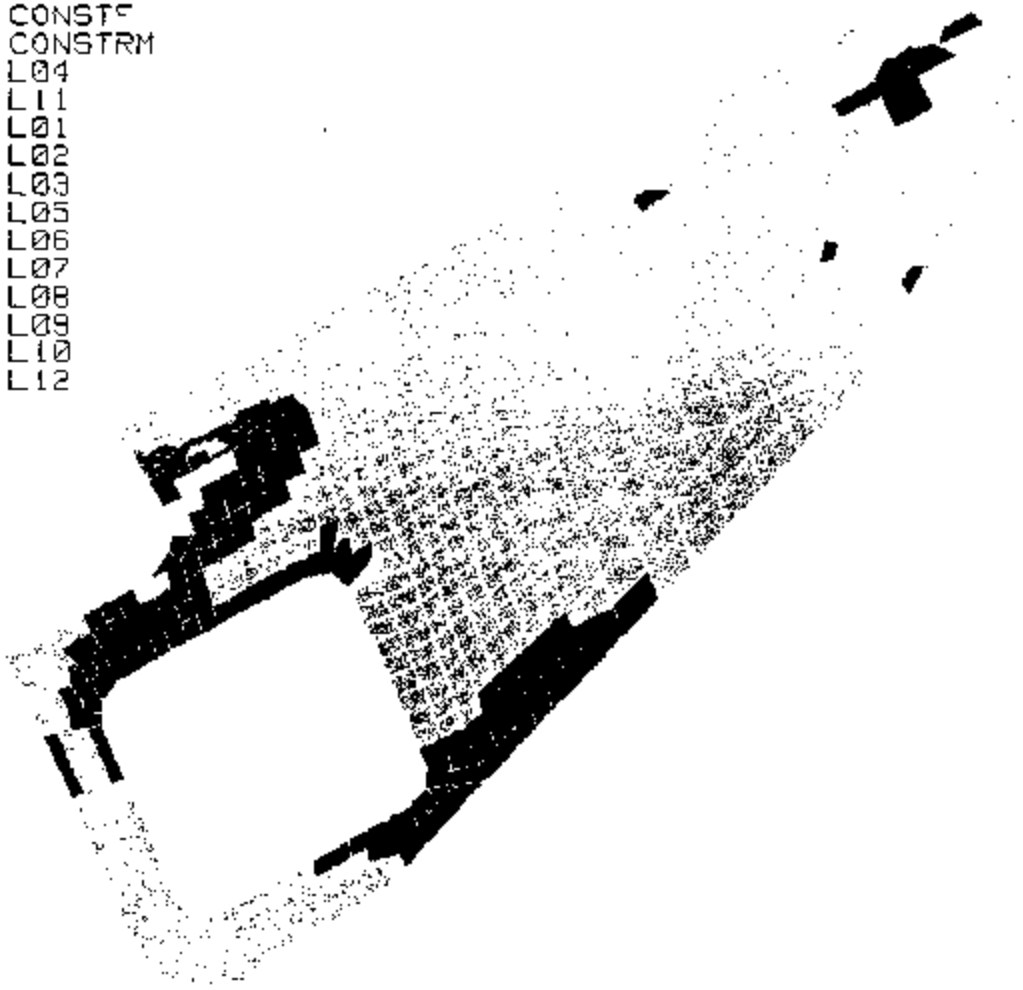
CL EG MM AI CR

-> BUILD ANALYSIS RESULTS FRINGES -> UPDATE MIN= DEF
> INP DSN= <5/new.r10.nasmug MAX= DEF
-> REVIEW INP DSN (>) ELM FRINGES
SUBCASE=7 ELM DATA (>) PART(S)=SIDE1 (+)
DATA SCALE= 1.0 VIEW= 1 -> RESET @ OFF
DEF SCALE = (>)UNDEF @ REPLACE VIEW (>) PRT PLOT (>) 7 COLORS
(<1>)2-D ELMS @ STRESS * LEGEND
@ MAX FIBER @ PLATE * CONTOUR LABELS

* VONMISES	XNORMAL	* PLOT MISSING DATA (VALUES=0)
MAJPRIN	YNORMAL	(>) TITLE=(CH)
MINPRIN	XYSHEAR	(CH)
SHEARANGLE	NLCSTRAIN	(CH)

:

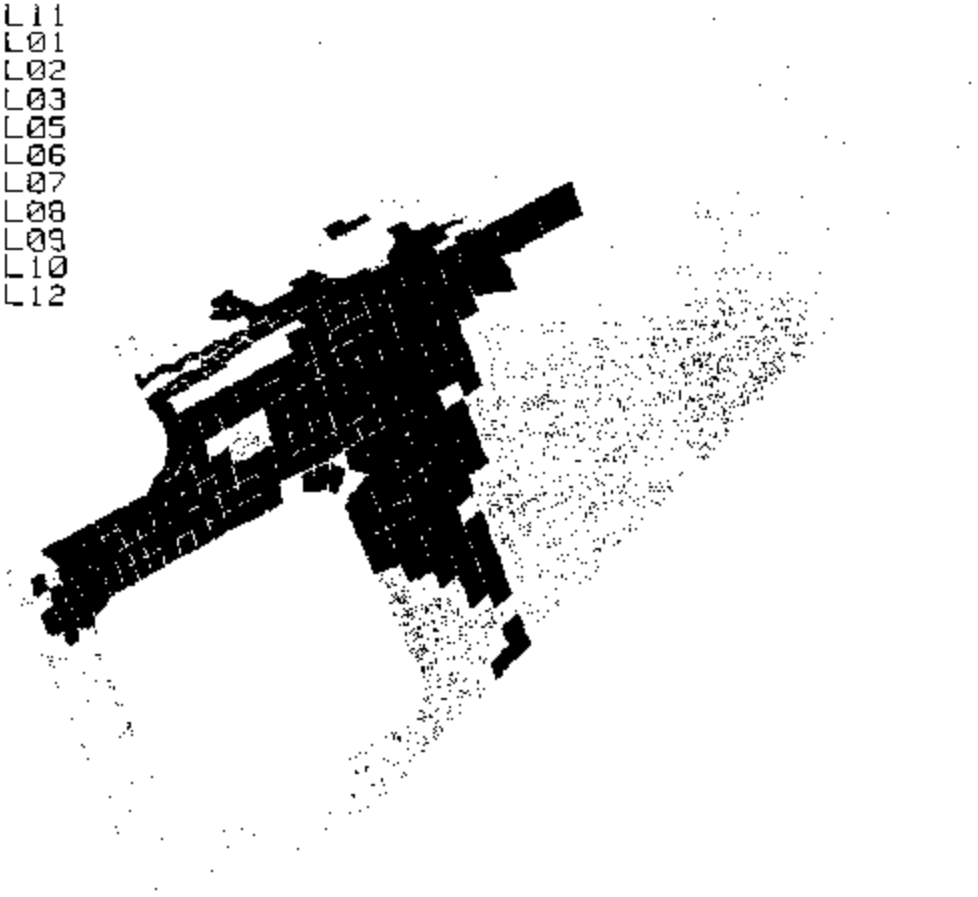
```
--PART--  --LBCS--
APPL      CONSTS
APPL1     CONSTRM
BAR       L04
BAR1      L11
FLANGE    L01
FLANGE1   L02
HITCH     L03
HITCH1    L05
PLATE     L06
PLATE1    L07
SIDE1     L08
SIDE1A    L09
COLLAR    L10
COLLAR1   L12
RIGID
PIN
RIGID1
PIN1
TRANS
```



```
GENERAL MOTORS
FINITE ELEMENT
OUTPUT DISPLAY
   09/29/95
   2D ELMS
  VON-MISES

SUBCASE      8
 UNDEFORMED
  DISPLAY
   >   2.51E+04
   >   2.09E+04
   >   1.67E+04
   >   1.26E+04
   >   8.40E+03
   >   4.23E+03
  <=   4.23E+03


MIN=  5.61E+01
MAX=  2.93E+04
   = NO VALUE
```

```
PROCEED                  -> BUILD  ANALYSIS RESULTS FRINGES -> UPDATE MIN= DEF
                         -> INP DSN= <5/new.r10.nasmug                MAX= DEF
OUT                      -> REVIEW INP DSN    (>) ELM FRINGES
                         SUBCASE=8              ELM DATA      ( )PART(S)=SIDE1   (+)
RESTART                  DATA SCALE= 1.0        VIEW= 1       -> RESET  @ OFF
                         DEF SCALE = (>)UNDEF   @ REPLACE VIEW (>) PRT PLOT      (>) 7 COLORS
VIEW        ROTATE       (<(>)2-D ELMS  @ STRESS               * LEGEND
DISPLAYS                    @ MAX FIBER  @ PLATE               * CONTOUR LABELS
SCALE P M SH F D A
DOMAIN                   * VONMISES     XNORMAL               * PLOT MISSING DATA (VALUES=0)
M1          M2             MAJPRIN     YNORMAL          (>) TITLE=(CH)
M3          BUTTONS        MINPRIN     XYSHEAR                  (CH)
RECORD      UTILITY        SHEARANGLE  NLCSTRAIN                (CH)
```

CL EG MM AI CR



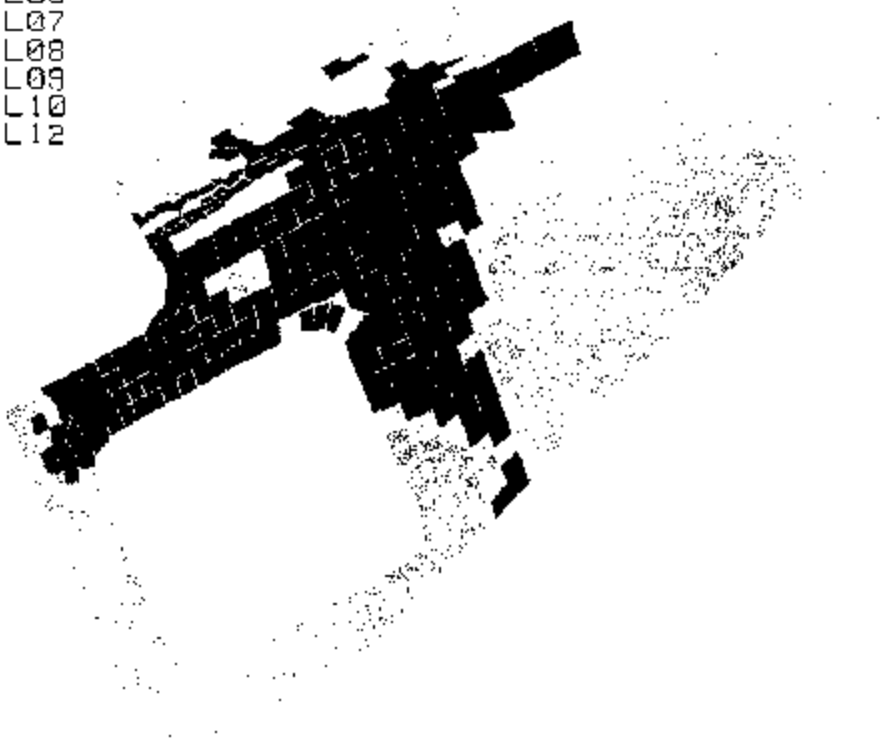
```
--PART--   --LDCS--
APPL       CONSTF
APPLI      CONSTRM
BAR        I04
BARI       L11
FLANGE     L01
FLANGEI    L02
HITCH      L03
HITCHI     L05
PLATE      L06
PLATEI     L07
SIDEi      L08
SIDEIA     L09
COLLAR     L10
COLLARI    L12
RIGID
PIN
RIGIDI
PINI
TRANS
```

```
GENERAL MOTORS
FINITE ELEMENT
OUTPUT DISPLAY
   09/29/95
    2D ELMS
   VON-MISES

SUBCASE      9
 UNDEFORMED
  DISPLAY
■  >  2.67E+04
■  >  2.39E+04
   >  1.92E+04
■  >  1.44E+04
■  >  9.59E+03
■  >  4.81F+03
  <=  4.81E+03

MIN=  2.59E+01
MAX=  3.35E+04
■ = NO VALUE
```

```
PROCEED                     └> BUILD  ANALYSIS RESULTS FRINGES -> UPDATE MIN= DEF
                           -> INP DSN= <5/new.r10.nasmug                  MAX= DEF
OUT                      CL └> REVIEW INP DSN    (>) ELM FRINGES
                         EG SUBCASE=9             ELM DATA     ( ) PART(S)=SIDEI   (+)
RESTART                  MM DATA SCALE= 1.0       VIEW= 1      ->  RESET   @ OFF
                            DEF SCALE = ( )UNDEF  ● REPLACE VIEW  (>) PRT PLOT     (>) 7 COLORS
VIEW            ROTATE   AT ((@>)2-D ELMS     @ STRESS       *  LEGEND
DISPLAYS                 CR    @ MAX  FIBER    @ PLATE        *  CONTOUR LABELS
SCALE P  M  SH F  D  A
DOMAIN                      * VONMISES        XNORMAL           * PLOT MISSING DATA (VALUES=0)
M1             M2             MAJPRIN         YNORMAL         (>) TITLE=(CH)
M3             BUTTONS        MINPRIN         XYSHEAR                  (CH)
RECORD         UTILITY        SHEARANGLE      NLCSTRAIN                (CH)
```

:

--PART--	--LDCS--
APPL	CONSTF
APPL1	CONSTRM
BAR	L04
BAR1	L11
FLANGE	L01
FLANGE1	L02
HITCH	L03
HITCH1	L05
PLATE	L06
PLATE1	L07
SIDE1	L08
SIDE1A	L09
COLLAR	L10
COLLAR1	L12
RIGID	
PIN	
RIGID1	
PIN1	
TRANS	



GENERAL MOTORS
FINITE ELEMENT
OUTPUT DISPLAY
09/29/95
2D ELMS
VON-MISES

SUBCASE 10
UNDEFORMED
DISPLAY
> 2.87E+04
> 2.39E+04
> 1.92E+04
> 1.44E+04
> 9.58E+03
> 4.81E+03
<= 4.81E+03

MIN= 2.59E+01
MAX= 3.35E+04
■ = NO VALUE

PROCEED

OUT

RESTART

VIEW ROTATE
DISPLAYS
SCALE P M SH F D A
DOMAIN
M1 M2
M3 BUTTONS
RECORD UTILITY

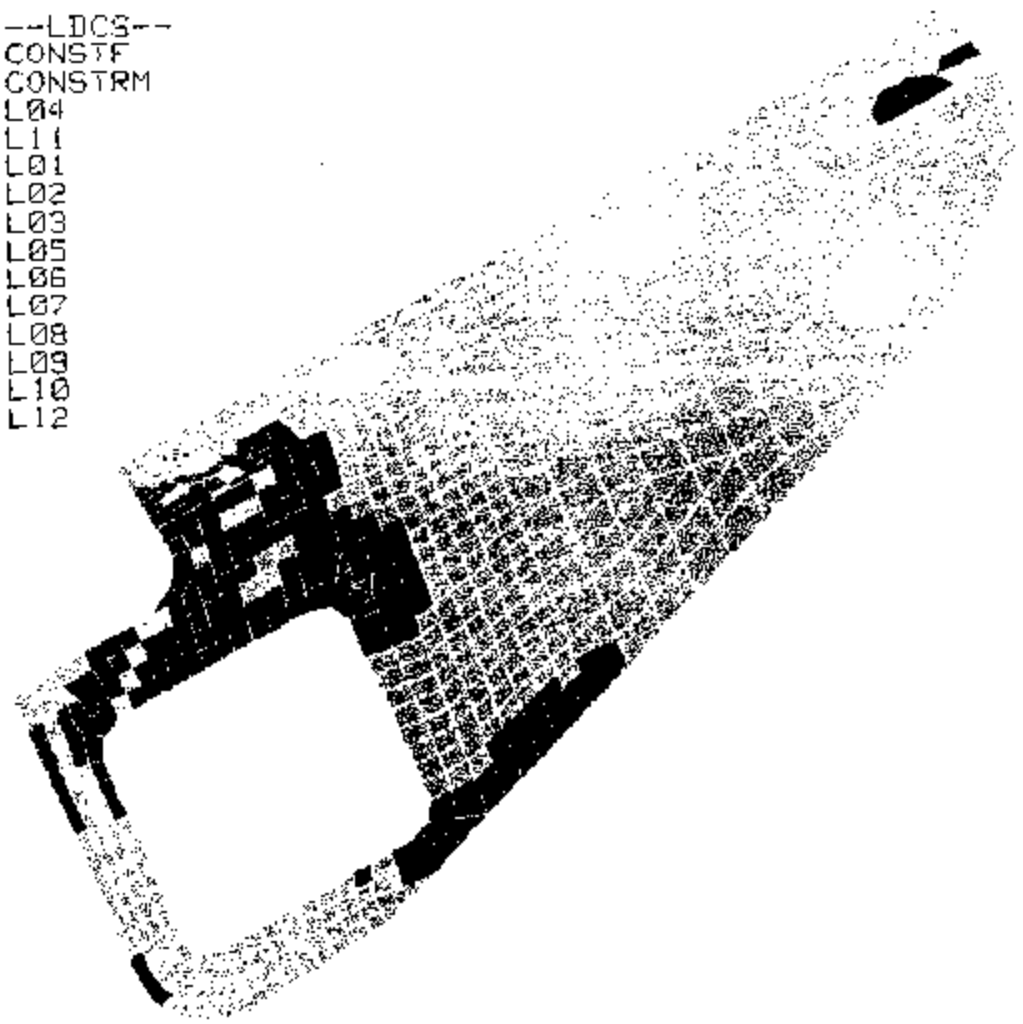
CL
EG
MM
AI
CR

-> BUILD ANALYSIS RESULTS FRINGES -> UPDATE MIN= DEF
-> INP DSN= <5/new.r10.nasmug MAX= DEF
-> REVIEW INP DSN (>) ELM FRINGES
SUBCASE=10 ELM DATA (>)PART(S)=SIDE1 (+)
DATA SCALE= 1.0 VIEW= 1 -> RESET @ OFF
DEF SCALE = (>)UNDEF @ REPLACE VIEW (>) PRT PLOT (>) ? COLORS
((*))2-D ELMS @ STRESS * LEGEND
@ MAX FIBER @ PLATE * CONTOUR LABELS

* VONMISES XNORMAL # PLOT MISSING DATA (VALUES=0)
MAJPRIN YNORMAL (>) TITLE=(CH)
MINPRIN XYSHEAR (CH)
SHEARANGLE NLCSTRAIN (CH)

:

```
--PART--  --LDCS--
APPL      CONSTF
APPL1     CONSTRM
BAR       L04
BAR1      L11
FLANGE    L01
FLANGE1   L02
HITCH     L03
HITCH1    L05
PLATE     L06
PLATE1    L07
SIDE1     L08
SIDE1A    L09
COLLAR    L10
COLLAR1   L12
RIGID
PIN
RIGID1
PIN1
TRANS
```



```
GENERAL MOTORS
FINITE ELEMENT
OUTPUT DISPLAY
   09/29/95
   2D ELMS
  VON-MISES

SUBCASE     11
 UNDEFORMED
  DISPLAY
   >  4.67E+04
   >  3.90E+04
   >  3.12E+04
   >  2.34E+04
   >  1.57E+04
   >  7.89E+03
  <=  7.89E+03

MIN=  1.14E+02
MAX=  5.45E+04
   = NO VALUE
```

```
PROCEED                                  -> BUILD  ANALYSIS RESULTS FRINGES -> UPDATE MIN=DEF
OUT                                      -> INP DSN= <5/new.r10.nasmug                MAX=DEF
                                         -> REVIEW INP DSN    (>) ELM FRINGES
RESTART                                  SUBCASE=11           ELM DATA      (>)PART(S)=SIDE1   (+)
                                         DATA SCALE= 1.0      VIEW= 1       -> RESET  @ OFF
VIEW          ROTATE                     DEF SCALE = (>)UNDEF  @ REPLACE VIEW  (>) PRT PLOT      (>) 7 COLORS
DISPLAYS                                 (<0>)2-D ELMS  @ STRESS      * LEGEND
SCALE P M SH F D A                          @ MAX FIBER  @ PLATE       * CONTOUR LABELS
DOMAIN
                                         * VONMISES        XNORMAL          * PLOT MISSING DATA (VALUES=0)
                                           MAJPRIN        YNORMAL       (>) TITLE=(CH)
```

CL EG MM AI CR

PROCEED

OUT

RESTART

VIEW ROTATE
DISPLAYS
SCALE P M SH F D A
DOMAIN
M1 M2
M3 BUTTONS
RECORD UTILITY

CL
EG
MM
AI
CR

-> BUILD ANALYSIS RESULTS FRINGES -> UPDATE MIN= DEF
-> INP DSN= <S/new.r10.nasmug MAX= DEF
-> REVIEW INP DSN (>) ELM FRINGES
SUBCASE=2 ELM DATA ( )PART(S)=SIDE1 (+)
DATA SCALE= 1.0 VIEW= 1 -> RESET @ OFF
DEF SCALE = ( )UNDEF @ REPLACE VIEW (>) PRT PLOT (>) 7 COLORS
(<1>)2-D ELMS @ STRESS * LEGEND
@ MAX FIBER @ PLATE * CONTOUR LABELS

* VONMISES XNORMAL * PLOT MISSING DATA (VALUES=0)
MAJPRIN YNORMAL ( ) TITLE=(CH)
MINPRIN XYSHEAR (CH)
SHEARANGLE NLCSTRAIN (CH)

PROCEED
OUT
RESTART
VIEW ROTATE
DISPLAYS
SCALE P M SH F D A
DOMAIN
M1 M2
M3 BUTTONS
RECORD UTILITY

CL FG MM AI CR

-> BUILD ANALYSIS RESULTS FRINGES -> UPDATE MIN= DEF
-> INP DSN= <3/new.r14.nasmug MAX= DEF
-> REVIEW INP DSN (>) ELM FRINGES
SUBCASE=1 ELM DATA (>) PART(S)=SIDE1 (+)
DATA SCALE= 1.0 VIEW= 1 -> RESET @ OFF
DEF SCALE = (>)UNDEF @ REPLACE VIEW (>) PRT PLOT (>) 7 COLORS
(<0>)2-D ELMS @ STRESS * LEGEND
@ MAX FIBER @ PLATE * CONTOUR LABELS

* VONMISES XNORMAL * PLOT MISSING DATA (VALUES=0)
MAJPRIN YNORMAL (>) TITLE=(CH)
MINPRIN XYSHEAR (CH)
SHEARANGLE NLCSTRAIN (CH)

:

--PART--	--LDCS--
APPL	CONSTF
APPL1	CONSTRM
BAR	L04
BAR1	L11
FLANGE	L01
FLANGE1	L02
HITCH	L03
HITCH1	L05
PLATE	L06
PLATE1	L07
SIDE1	L08
SIDE1A	L09
COLLAR	L10
COLLAR1	L12
RIGID	
PIN	
RIGID1	
PIN1	
TRANS	

GENERAL MOTORS
FINITE ELEMENT
OUTPUT DISPLAY
09/29/95
2D ELMS
VON-MISES

SUBCASE 2
UNDEFORMED
DISPLAY
> 5.35E+03
> 4.46E+03
> 3.57E+03
> 2.68E+03
> 1.79E+03
> 9.05E+02
<= 9.05E+02

MIN= 1.62E+01
MAX= 6.24E+03
= NO VALUE

PROCEED
OUT
RESTART
VIEW ROTATE
DISPLAYS
SCALE P M SH F D A
DOMAIN
M1 M2
M3 BUTTONS
RECORD UTILITY

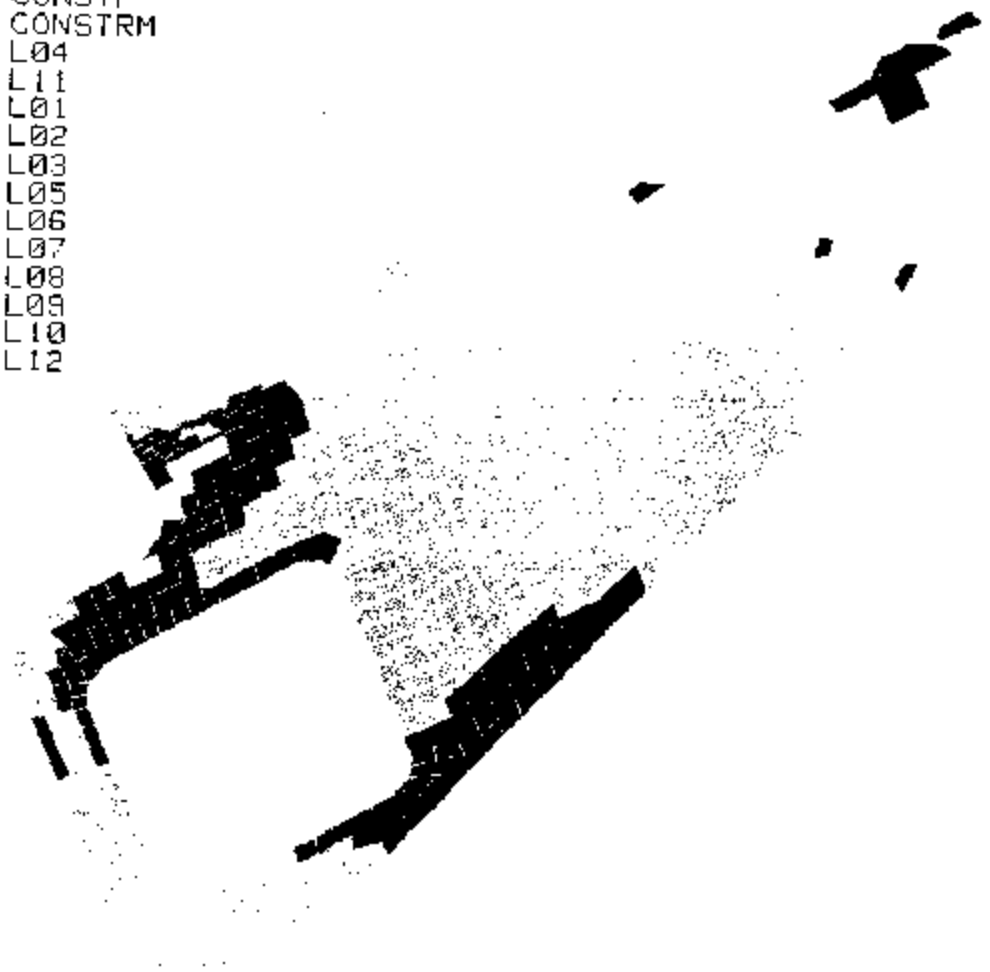
CL
EG
MM
AI
CR

-> BUILD ANALYSIS RESULTS FRINGES -> UPDATE MIN= DEF
-> INP DSN= <3/new.r14.nasmug MAX= DEF
-> REVIEW INP DSN (>) ELM FRINGES
SUBCASE=2 ELM DATA (>) PART(S)=SIDE1 (+)
DATA SCALE= 1.0 VIEW= 1 -> RESET @ OFF
DEF SCALE = (>)UNDEF @ REPLACE VIEW (>) PRT PLOT (>) ? COLORS
(<0>)2-D ELMS @ STRESS * LEGEND
@ MAX FIBER @ PLATE * CONTOUR LABELS

* VONMISES XNORMAL * PLOT MISSING DATA (VALUES=0)
MAJPRIN YNORMAL (>) TITLE=(CH)
MINPRIN XYSHEAR (CH)
SHEARANGLE NLCSTRAIN (CH)

:

--PART--	--LDCS--
APPL	CONSTF
APPL1	CONSTRM
BAR	L04
BAR1	L11
FLANGE	L01
FLANGE1	L02
HITCH	L03
HITCH1	L05
PLATE	L06
PLATE1	L07
SIDE1	L08
SIDE1A	L09
COLLAR	L10
COLLAR1	L12
RIGID	
PIN	
RIGID1	
PIN1	
TRANS	



GENERAL MOTORS
FINITE ELEMENT
OUTPUT DISPLAY
08/29/95
2D ELMS
VON-MISES

SUBCASE 3
UNDEFORMED
DISPLAY

	>	4.28E+04
	>	3.57E+04
	>	2.85E+04
	>	2.14E+04
	>	1.43E+04
	>	7.21E+03
	<=	7.21E+03

MIN= 9.25E+01
MAX= 4.99E+04
= NO VALUE

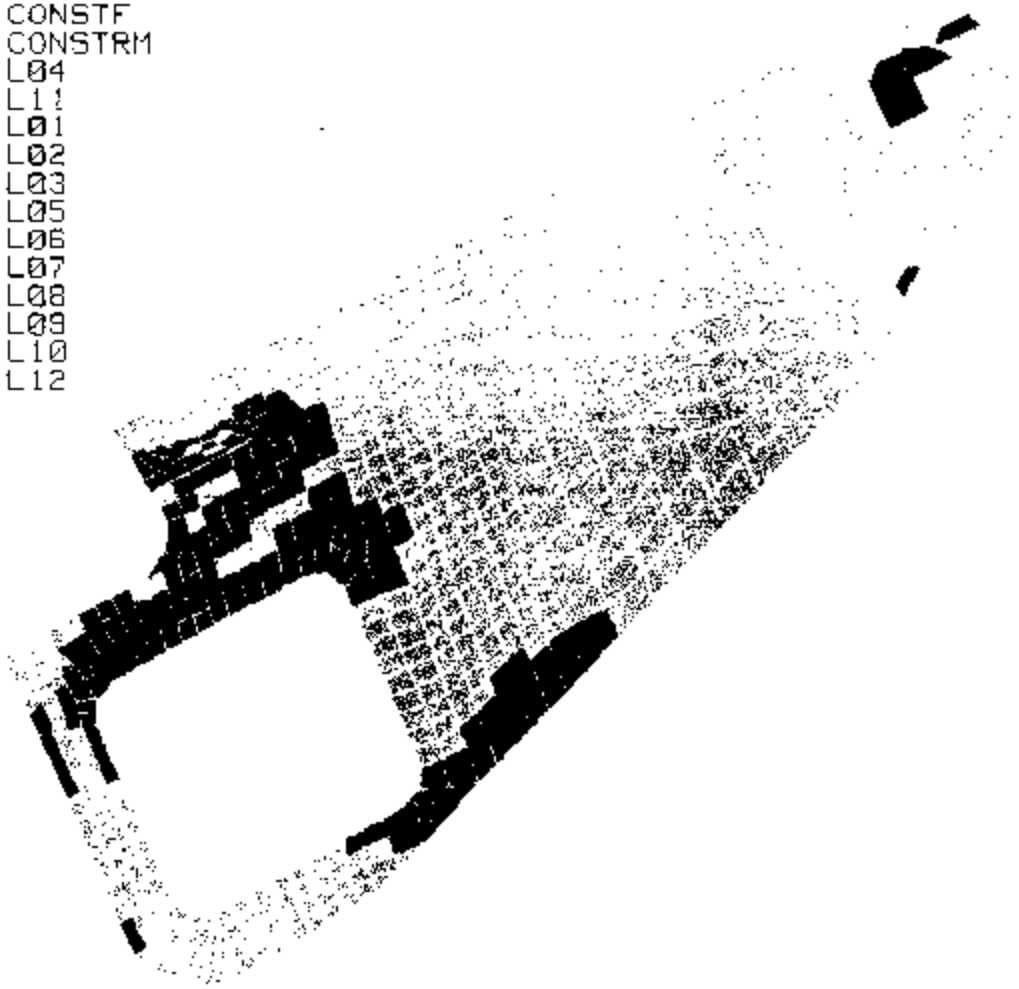
PROCEED		CL
OUT		EG
RESTART		MM
VIEW	ROTATE	AI
DISPLAYS		CR
SCALE P M SH F D A		
DOMAIN		
M1	M2	
M3	BUTTONS	
RECORD	UTILITY	

-> BUILD ANALYSIS RESULTS FRINGES -> UPDATE MIN= DEF
-> INP DSN= <3/new.r14.nastrug MAX= DEF
-> REVIEW INP DSN (>) ELM FRINGES
SUBCASE=3 ELM DATA (>)PART(S)=SIDE1 (+)
DATA SCALE= 1.0 VIEW= 1 -> RESET @ OFF
DEF SCALE = (>)UNDEF @ REPLACE VIEW (>) PRT PLOT (>) 7 COLORS
((*)>)2-D ELMS @ STRESS * LEGEND
@ MAX FIBER @ PLATE * CONTOUR LABELS

* VONMISES	XNORMAL	* PLOT MISSING DATA (VALUES=0)
MAJPRIN	YNORMAL	(>) TITLE=(CH)
MINPRIN	XYSHEAR	(CH)
SHEARANGLE	NLCSTRAIN	(CH)

:

--PART--	--LDCS--
APPL	CONSTF
APPL1	CONSTRM
BAR	L04
BAR1	L11
FLANGE	L01
FLANGE1	L02
HITCH	L03
HITCH1	L05
PLATE	L06
PLATE1	L07
SIDE1	L08
SIDE1A	L09
COLLAR	L10
COLLAR1	L12
RIGID	
PIN	
RIGID1	
PIN1	
TRANS	



GENERAL MOTORS
FINITE ELEMENT
OUTPUT DISPLAY
09/29/95
2D ELMS
VON-MISES

SUBCASE 4
UNDEFORMED
DISPLAY

>	2.34E+04
>	1.95E+04
>	1.56E+04
>	1.17E+04
>	7.84E+03
>	3.95E+03
<=	3.95E+03

MIN= 6.13E+01
MAX= 2.73E+04
= NO VALUE

PROCEED
OUT
RESTART
VIEW ROTATE
DISPLAYS
SCALE P M SH F D A
DOMAIN
M1 M2
M3 BUTTONS
RECORD UTILITY

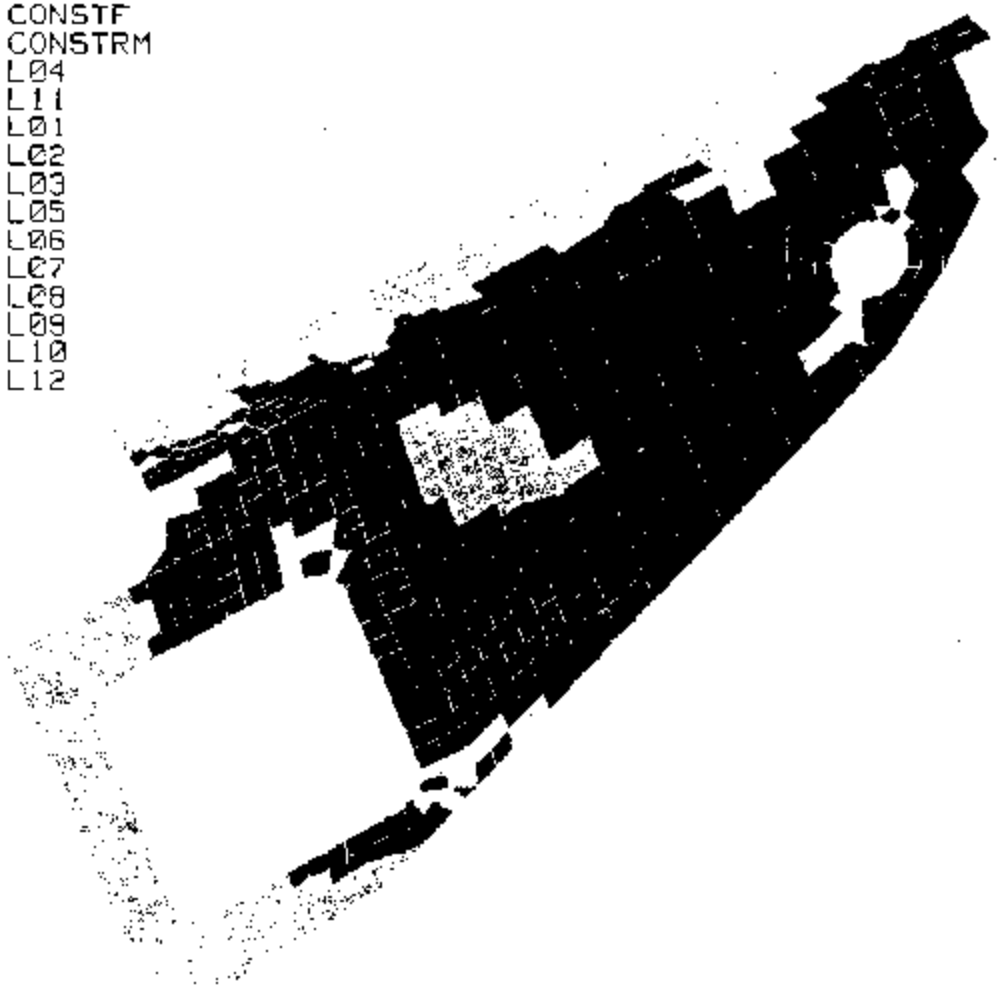
CL EG MM AI CR

-> BUILD ANALYSIS RESULTS FRINGES -> UPDATE MIN=DEF
-> INP DSN= <3/new,r14.nasmug MAX=DEF
-> REVIEW INP DSN (>) ELM FRINGES
SUBCASE=4 ELM DATA ( )PART(S)=SIDE1 (+)
DATA SCALE= 1.0 VIEW= 1 -> RESET @ OFF
DEF SCALE = (>)UNDEF @ REPLACE VIEW ( ) PRT PLOT (>) 7 COLORS
(( ))2-D ELMS @ STRESS * LEGEND
@ MAX FIBER @ PLATE * CONTOUR LABELS

* VONMISES XNORMAL * PLOT MISSING DATA (VALUES=0)
MAJPRIN YNORMAL ( ) TITLE=(CH)
MINPRIN XYSHEAR (CH)
SHEARANGLE NLCSTRAIN (CH)

:

--PART--	--LDCS--
APPL	CONSTF
APPL1	CONSTRM
BAR	L04
BAR1	L11
FLANGE	L01
FLANGE1	L02
HITCH	L03
HITCH1	L05
PLATE	L06
PLATE1	L07
SIDE1	L08
SIDE1A	L09
COLLAR	L10
COLLAR1	L12
RIGID	
PIN	
RIGID1	
PIN1	
TRANS	



GENERAL MOTORS
FINITE ELEMENT
OUTPUT DISPLAY
08/29/85
2D ELMS
VON-MISES

SUBCASE 5
UNDEFORMED
DISPLAY
> 5.18E+03
> 4.32E+03
> 3.46E+03
> 2.60E+03
> 1.74E+03
> 8.76E+02
<= 8.76E+02

MIN= 1.57E+01
MAX= 6.04E+03
= NO VALUE

PROCEED
OUT
RESTART
VIEW ROTATE
DISPLAYS
SCALE P M SH F D R
DOMAIN
M1 M2
M3 BUTTONS
RECORD UTILITY

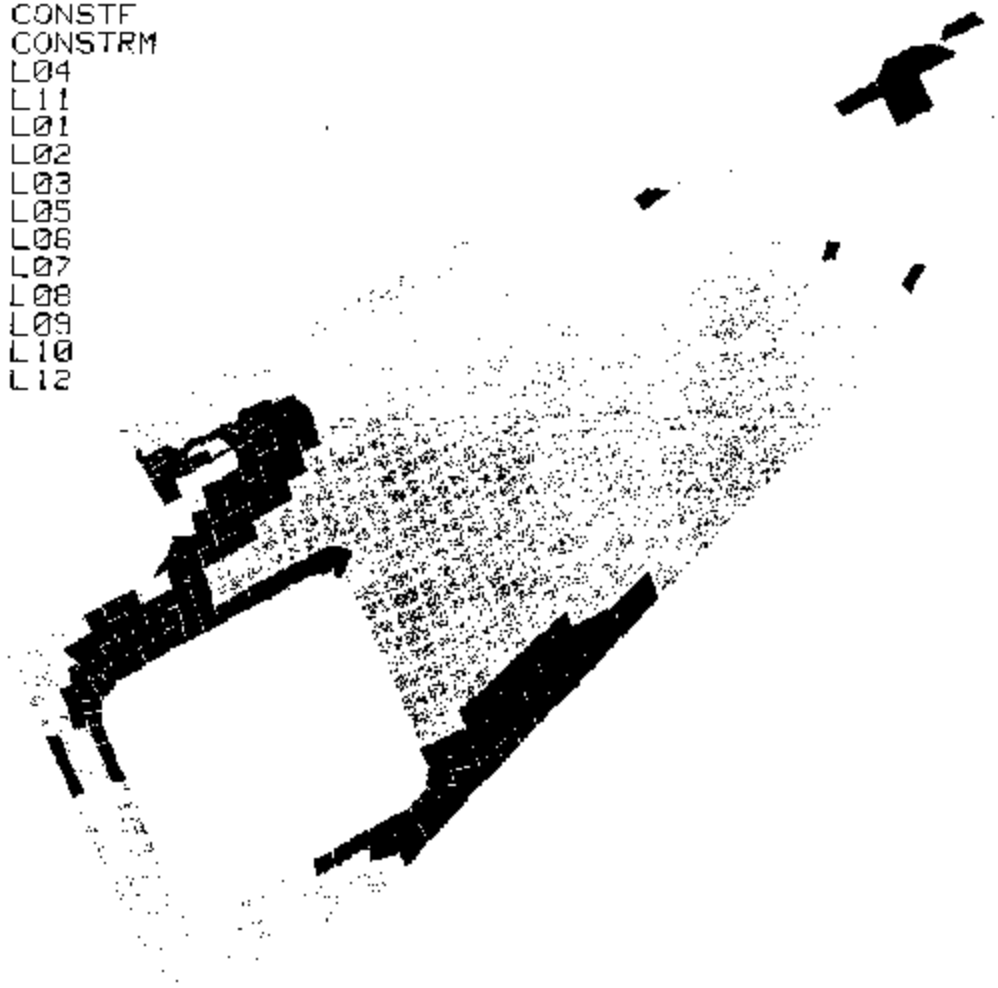
CL EG MM AI CR

-> BUILD ANALYSIS RESULTS FRINGES -> UPDATE MIN= DEF
-> INP DSN= <3/neu.r14.nasmug MAX= DEF
-> REVIEW INP DSN (>) ELM FRINGES
SUBCASE=5 ELM DATA ( )PART(S)=SIDE1 (+)
DATA SCALE= 1.0 VIEW= 1 -> RESET @ OFF
DEF SCALE = (>)UNDEF @ REPLACE VIEW (>) PRT PLOT (>) 7 COLORS
(<1>)2-D ELMS @ STRESS * LEGEND
@ MAX FIBER @ PLATE * CONTOUR LABELS

*	VONMISES	XNORMAL	* PLOT MISSING DATA (VALUES=0)
	MAJPRIN	YNORMAL	(>) TITLE=(CH)
	MINPRIN	XYSHEAR	(CH)
	SHEARANGLE	NLCSTRAIN	(CH)

:

```
--PART--  --LDCS--
APPL      CONSTF
APPL1     CONSTRM
BAR       L04
BAR1      L11
FLANGE    L01
FLANGE1   L02
HITCH     L03
HITCH1    L05
PLATE     L06
PLATE1    L07
SIDE1     L08
SIDE1A    L09
COLLAR    L10
COLLAR1   L12
RIGID
PIN
RIGID1
PIN1
TRANS
```



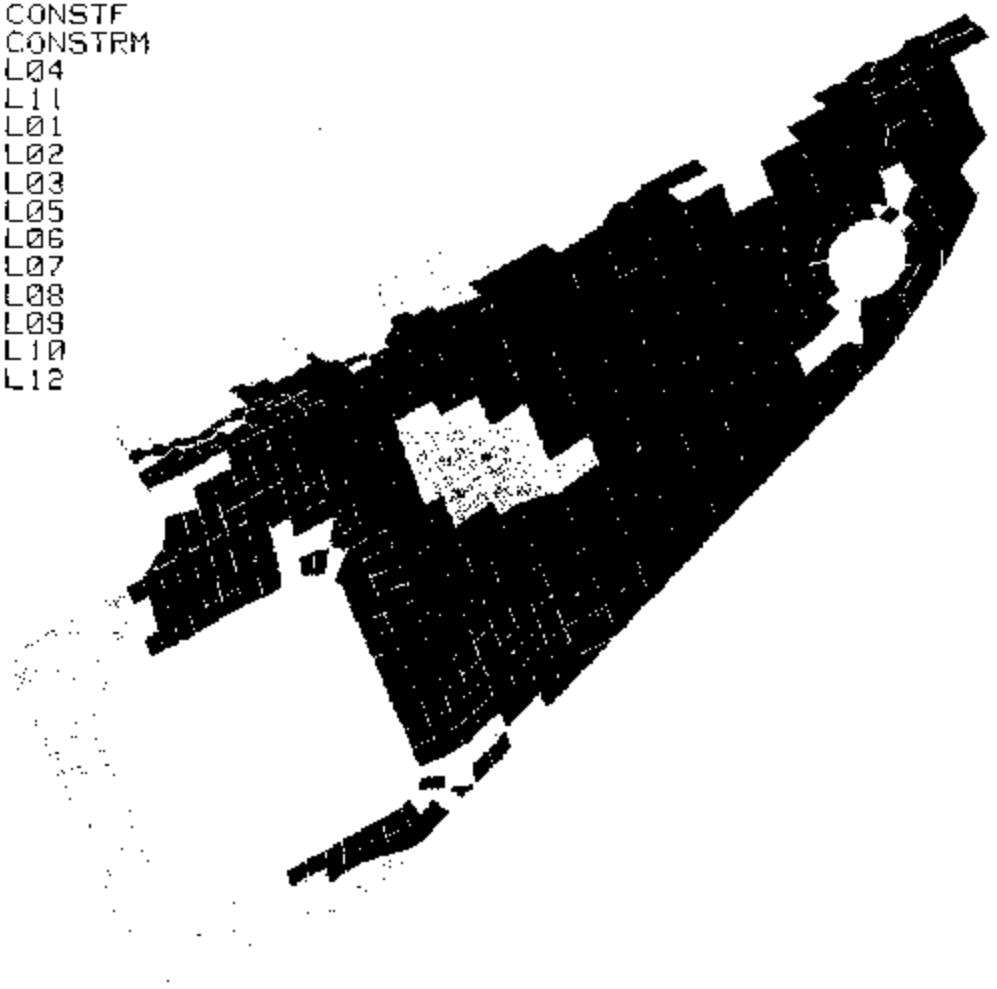
```
GENERAL MOTORS
FINITE ELEMENT
OUTPUT DISPLAY
    05/23/95
    2D ELMS
  VON-MISES

SUBCASE      6
 UNDEFORMED
  DISPLAY
   >  3.05E+04
   >  2.55E+04
   >  2.04E+04
   >  1.53E+04
   >  1.02E+04
   >  5.15E+03
  <=  5.15E+03

MIN=  6.60E+01
MAX=  3.56E+04
   = NO VALUE
```

```
PROCEED                  <- BUILD  ANALYSIS RESULTS FRINGES -> UPDATE MIN=DEF
OUT                      -> INP DSN= <3/new.r14.nasmug                MAX=DEF
                         -> REVIEW INP DSN    (>) ELM FRINGES
RESTART                  SUBCASE=6              ELM DATA      (>)PART(S)=SIDE1   (+)
                         DATA SCALE= 1.0        VIEW= 1       -> RESET  @ OFF
VIEW        ROTATE       DEF SCALE = (>)UNDEF   @ REPLACE VIEW (>) PRT PLOT      (>) 7 COLORS
DISPLAYS                 ((*))2-D ELMS  @ STRESS    * LEGEND
SCALE P M SH F D A          @ MAX FIBER @ PLATE     * CONTOUR LABELS
DOMAIN                   * VONMISES     XNORMAL      * PLOT MISSING DATA (VALUES=0)
M1          M2             MAJPRIN     YNORMAL    (>) TITLE=(CH)
M3          BUTTONS        MINPRIN     XYSHEAR           (CH)
RECORD      UTILITY        SHEARANGLE  NLCSTRAIN        (CH)
```

CL EG MM AI CR

:

--PART--	--LDCS--
APPL	CONSTF
APPL1	CONSTRM
BAR	L04
BAR1	L11
FLANGE	L01
FLANGE1	L02
HITCH	L03
HITCH1	L05
PLATE	L06
PLATE1	L07
SIDE1	L08
SIDE1A	L09
COLLAR	L10
COLLAR1	L12
RIGID	
PIN	
RIGID1	
PIN1	
TRANS	



GENERAL MOTORS
FINITE ELEMENT
OUTPUT DISPLAY
09/29/95
2D ELMS
VON-MISES

SUBCASE 7
UNDEFORMED
DISPLAY
> 5.10E+03
> 4.32E+03
> 3.46E+03
> 2.60E+03
> 1.74E+03
> 8.76E+02
<= 3.76E+02

MIN= 1.57E+01
MAX= 6.04E+03
= NO VALUE

PROCEED

OUT

RESTART

VIEW ROTATE
DISPLAYS
SCALE P M SH F D A
DOMAIN
M1 M2
M3 BUTTONS
RECORD UTILITY

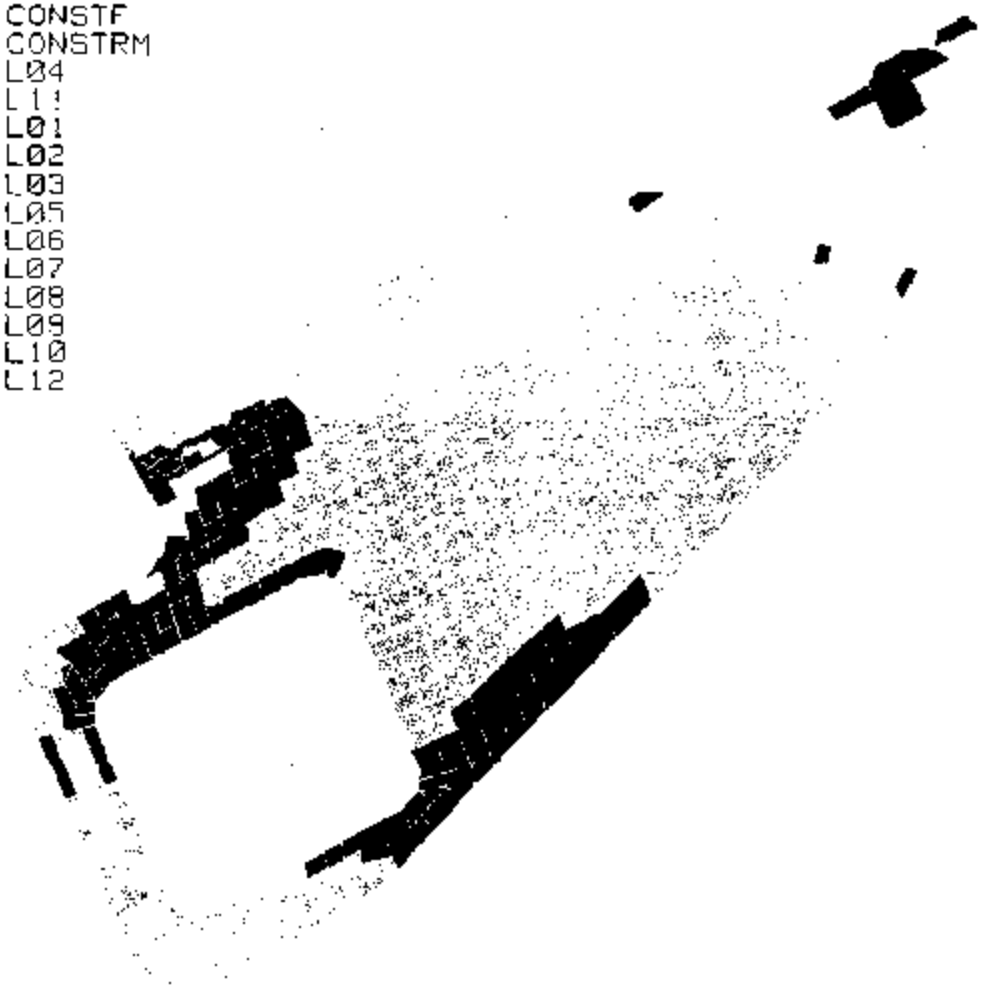
CL
EG
MM
AI
CR

-> BUILD ANALYSIS RESULTS FRINGES -> UPDATE MIN= DEF
-> INP DSN= (3/new.r14.nasmug MAX= DEF
-> REVIEW INP DSN (>) ELM FRINGES
SUBCASE=7 ELM DATA ( )PART(S)=SIDE1 (+)
DATA SCALE= 1.0 VIEW= 1 -> RESET @ OFF
DEF SCALE = ( )UNDEF @ REPLACE VIEW ( ) PRT PLOT ( ) ? COLORS
(<0>)2-D ELMS @ STRESS * LEGEND
@ MAX FIBER @ PLATE * CONTOUR LABELS

* VONMISES XNORMAL * PLOT MISSING DATA (VALUES=0)
MAJPRIN YNORMAL ( ) TITLE=(CH)
MINPRIN XYSHEAR (CH)
SHEARANGLE NLCSTRAIN (CH)

:

--PART--	--LTCS--
APPL	CONSTF
APPL1	CONSTRM
BAR	L04
BAR1	L11
FLANGE	L01
FLANGE1	L02
HITCH	L03
HITCH1	L05
PLATE	L06
PLATE1	L07
SIDE1	L08
SINF1A	L09
COLLAR	L10
COLLAR1	L12
RIGID	
PIN	
RIGID1	
PIN1	
TRANS	



GENERAL MOTORS
FINITE ELEMENT
OUTPUT DISPLAY
09/29/95
2D ELMS
VON-MISES

SUBCASE 8
UNDEFORMED
DISPLAY
> 3.05E+04
> 2.55E+04
> 2.04E+04
> 1.53E+04
> 1.02E+04
> 5.15E+03
<= 5.15E+03

MIN= 6.60E+01
MAX= 3.56E+04
= NO VALUE

PROCEED
OUT
RESTART
VIEW ROTATE
DISPLAYS
SCALE P M SH F D A
DOMAIN
M1 M2
M3 BUTTONS
RECORD UTILITY

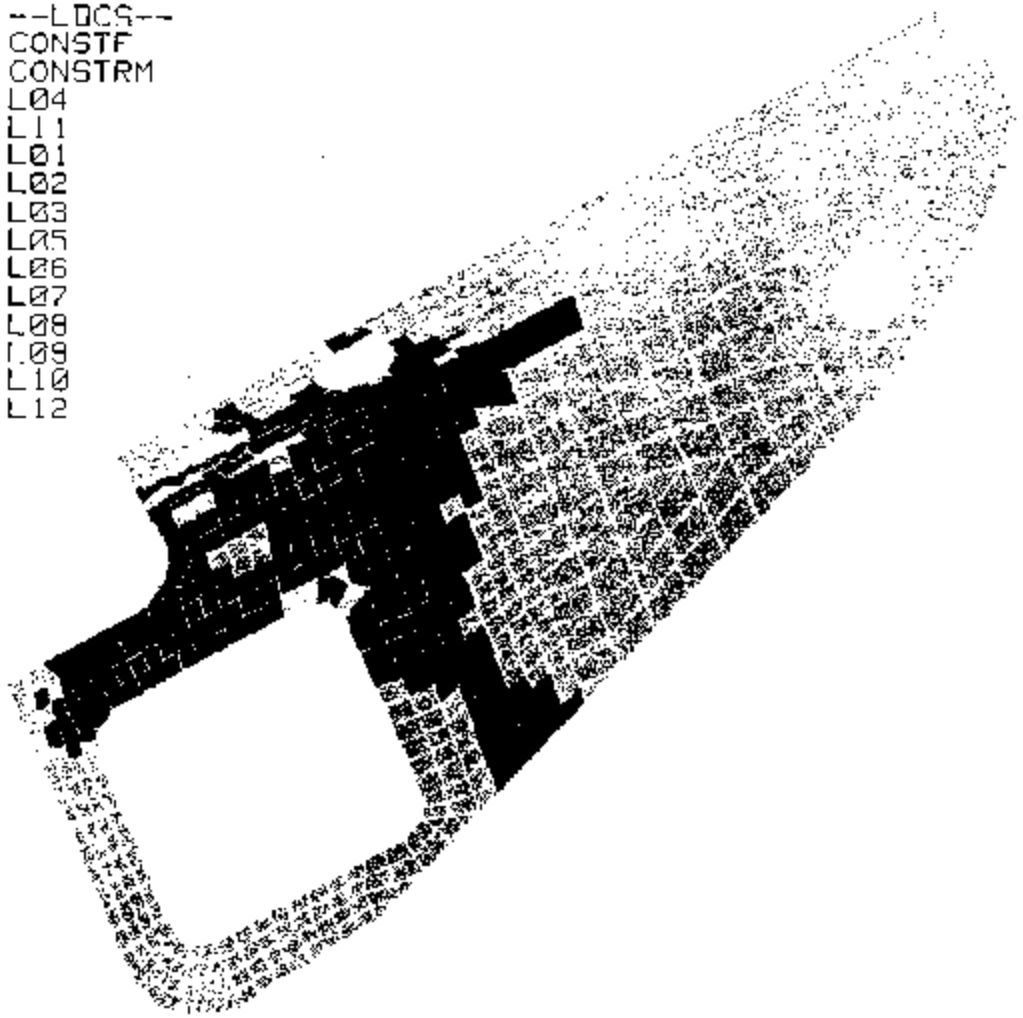
CL EG MM AI CR

-> BUILD ANALYSIS RESULTS FRINGES -> UPDATE MIN= DEF
> INP DSN= <3/new.r14.nasmug MAX= DEF
-> REVIEW INP DSN (>) ELM FRINGES
SUBCASE=8 ELM DATA ( )PART(S)-SIDE1 (+)
DATA SCALE= 1.0 VIEW= 1 -> RESET @ OFF
DEF SCALE = (>)UNDEF @ REPLACE VIEW (>) PRT PLOT ( ) 7 COLORS
(<0>)2-D ELMS @ STRESS * LEGEND
@ MAX FIBER @ PLATE * CONTOUR LABELS

* VONMISES XNORMAL * PLOT MISSING DATA (VALUES=0)
MAJPRIN YNORMAL (>) TITLE=(CH)
MINPRIN XYSHEAR (CH)
SHEARANGLE NLCSTRAIN (CH)

:

--PART--	--LOCS--
APPL	CONSTF
APPL1	CONSTRM
BAR	L04
BAR1	L11
FLANGE	L01
FLANGE1	L02
HITCH	L03
HITCH1	L05
PLATE	L06
PLATE1	L07
SIDE1	L08
SIDE1A	L09
COLLAR	L10
COLLAR1	L12
RIGID	
PIN	
RIGID1	
PIN1	
TRANS	



GENERAL MOTORS
FINITE ELEMENT
OUTPUT DISPLPY
09/29/95
2D ELMS
VON-MISES

SUBCASE 9
UNDEFORMED
DISPLAY
> 2.95E+04
> 2.46E+04
> 1.97E+04
> 1.47E+04
> 9.84E+03
> 4.93E+03
<= 4.93E+03

MIN= 2.27E+01
MAX= 3.44E+04
= NO VALUE

PROCEED
OUT
RESTART
VIEW ROTATE
DISPLAYS
SCPLE P M SH F D A
DOMAIN
M1 M2
M3 BUTTONS
RECORD UTILITY

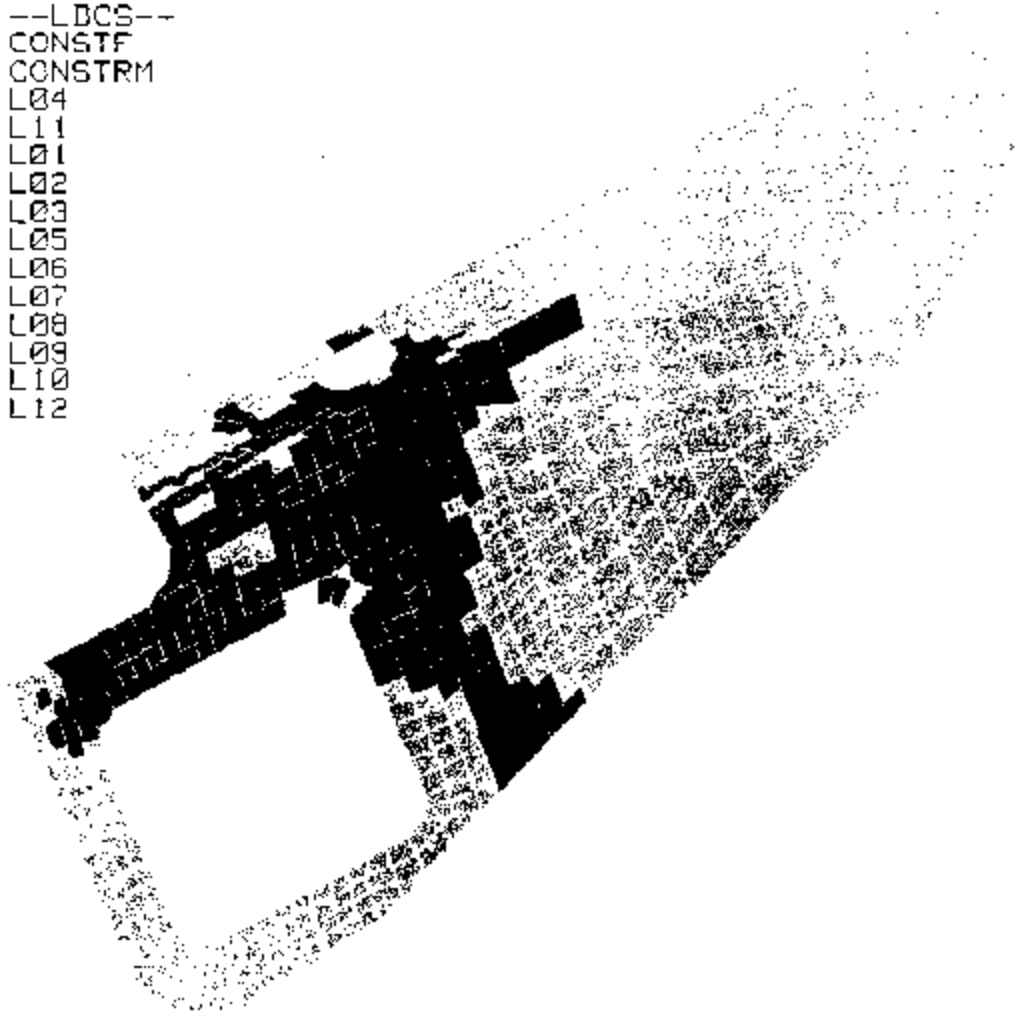
CL EG MM AI CR

-> BUILD ANALYSIS RESULTS FRINGES -> UPDATE MIN= DEF
-> INP DSN= <3/new.r14.nasmtg MAX= DEF
-> REVIEW INP DSN (>) ELM FRINGES
SUBCASE=9 ELM DATA (>)PART(S)=SIDE1 (+)
DATA SCALE= 1.0 VIEW= 1 -> RESET @ OFF
DEF SCALE = (>)UNDEF @ REPLACE VIEW (>) PRT PLOT (>) ? COLORS
(<(>)2-D ELMS @ STRESS * LEGEND
@ MAX FIBER @ PLATE * CONTOUR LABELS

* VONMISES XNORMAL * PLOT MISSING DATP (VALUES=0)
MAJPRIN YNORMAL (>) TITLE=(CH)
MINPRIN XYSHEAR (CH)
SHEARANGLE NLCSTRAIN (CH)

:

```
--PART--  --LDCS--
APPL      CONSTF
APPL1     CONSTRM
BAR       L04
BAR1      L11
FLANGE    L01
FLANGE1   L02
HITCH     L03
HITCH1    L05
PLATE     L06
PLATE1    L07
SIDE1     L08
SIDE1A    L09
COLLAR    L10
COLLAR1   L12
RIGID
PIN
RIGID1
PIN1
TRANS
```

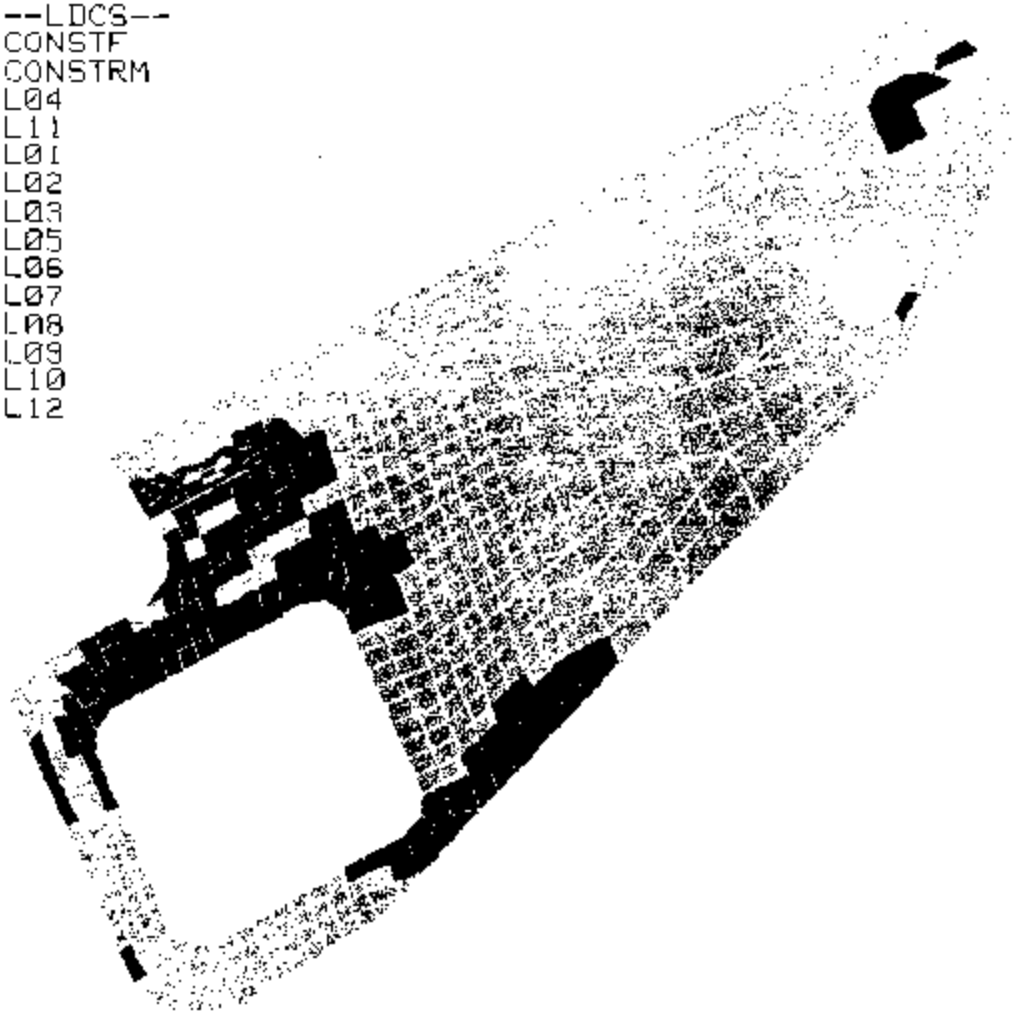


```
GENERAL MOTORS
FINITE ELEMENT
OUTPUT DISPLAY
   09/29/95
   2D ELMS
  VON-MISES

SUBCASE    10
 UNDEFORMED
  DISPLAY
   >  2.95E+04
   >  2.46E+04
   >  1.97E+04
   >  1.47E+04
   >  9.84E+03
   >  4.93E+03
  <=  4.93E+03

MIN=  2.27E+01
MAX=  3.44E+04
   = NO VALUE
```

```
PROCEED                                  -> BUILD  ANALYSIS RESULTS FRINGES -> UPDATE MIN=DEF
                                         -> INP DSN= (3/new.c14.nastmug                MAX=DEF
OUT                                      -> REVIEW INP DSN    (>) ELM FRINGES
                                         SUBCASE=10           ELM DATA      (>)PART(S)=SIDE1   (+)
RESTART                                  DATA SCALE= 1.0      VIEW= 1       -> RESET  @ OFF
                                         DEF SCALE = (>)UNDEF  @ REPLACE VIEW (>) PRT PLOT      (>) 7 COLORS
VIEW          ROTATE                     (<@>)2-D ELMS  @ STRESS      * LEGEND
DISPLAYS                                    @ MAX FIBER  @ PLATE       * CONTOUR LABELS
SCALE P M SH F D A
DOMAIN                                   * VONMISES      XNORMAL       * PLOT MISSING DATA (VALUES=0)
M1            M2                           MAJPRIN      YNORMAL       (>) TITLE=(CH)
M3            BUTTONS                      MINPRIN      XYSHEAR             (CH)
RECORD        UTILITY                      SHEARANGLE   NLCSTRAIN           (CH)
```

:

```
--PART--  --LDCS--
APPL      CONSTF
APPL1     CONSTRM
BAR       L04
BAR1      L11
FLANGE    L01
FLANGE1   L02
HITCH     L03
HITCH1    L05
PLATE     L06
PLATE1    L07
SIDE1     L08
SIDE1A    L09
COLLAR    L10
COLLAR1   L12
RIGID
PIN
RIGID1
PIN1
TRANS
```



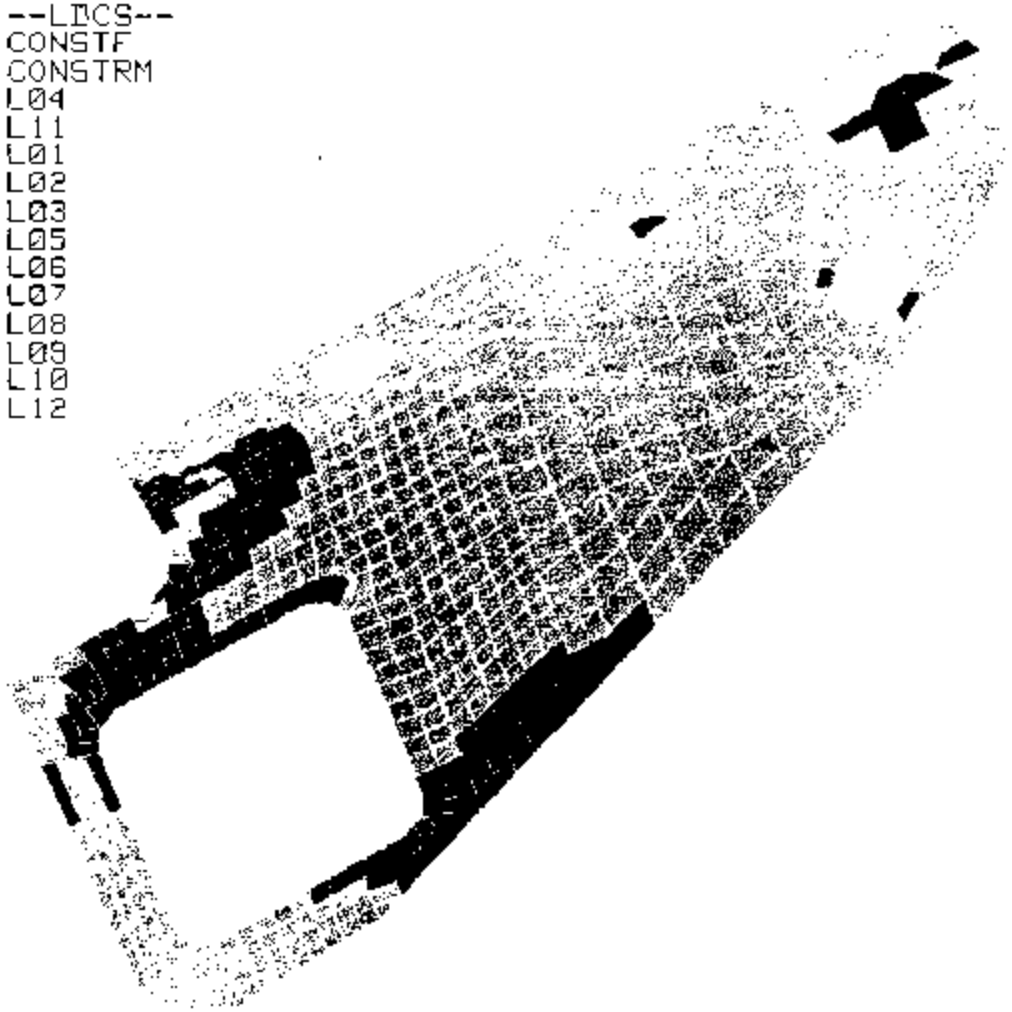
```
GENERAL MOTORS
FINITE ELEMENT
OUTPUT DISPLAY
   09/29/95
   2D ELMS
  VON-MISES

SUBCASE     11
 UNDEFORMED
  DISPLAY
   > 5.24E+04
   > 4.37E+04
   > 3.50E+04
   > 2.63E+04
   > 1.75E+04
   > 8.85E+03
  <= 8.85E+03

MIN=  1.37E+02
MAX=  6.11E+04
   = NO VALUE
```

```
PROCEED                  -> BUILD  ANALYSIS RESULTS FRINGES -> UPDATE MIN=DEF
                         -> INP DSN= <3/new.r14.nasmug                MAX=DEF
OUT                      -> REVIEW INP DSN   (>) ELM FRINGES
                         SUBCASE=11              ELM DATA     (>)PART(S)=SIDE1   (+)
RESTART                  DATA SCALE= 1.0         VIEW= 1      -> RESET  @ OFF
                         DEF SCALE = (>)UNDEF    @ REPLACE VIEW (>) PRT PLOT     (>) 7 COLORS
VIEW        ROTATE       (<(>)2-D ELMS           @ STRESS      * LEGEND
DISPLAYS                    @ MAX FIBER          @ PLATE       * CONTOUR LABELS
SCALE P M SH F D A
DOMAIN                   * VONMISES              XNORMAL       * PLOT MISSING DATA (VALUES=0)
M1          M2             MAJPRIN               YNORMAL      (>) TITLE=(CH)
M3          BUTTONS        MINPRIN               XYSHEAR           (CH)
RECORD      UTILITY        SHEARANGLE            NLCSTRAIN         (CH)
```

CL EG MM AI CR

:

--PART--	--LBCS--
APPL	CONSTF
APPL1	CONSTRM
BAR	L04
BAR1	L11
FLANGE	L01
FLANGE1	L02
HITCH	L03
HITCH1	L05
PLATE	L06
PLATE1	L07
SIDE1	L08
SIDE1A	L09
COLLAR	L10
COLLAR1	L12
RIGID	
PIN	
RIGID1	
PIN1	
TRANS	



GENERAL MOTORS
FINITE ELEMENT
OUTPUT DISPLAY
09/29/95
2D ELMS
VON-MISES

SUBCASE 12
UNDEFORMED
DISPLAY
> 3.06E+04
> 2.55E+04
> 2.04E+04
> 1.53E+04
> 1.02E+04
> 5.15E+03
<= 5.15E+03

MIN= 6.68E+01
MAX= 3.58E+04
= NO VALUE

PROCEED		-> BUILD ANALYSIS RESULTS FRINGES -> UPDATE MIN=DEF
		-> INP DSN= <3/new.r14.nasmug MAX=DEF
OUT	CL	-> REVIEW INP DSN (>) ELM FRINGES
	EG	SUBCASE=12 ELM DATA (>)PART(S)=SIDE1 (+)
RESTART	MM	DATA SCALE= 1.0 VIEW= 1 -> RESET @ OFF
	AI	DEF SCALE = (>)UNDEF @ REPLACE VIEW (>) PRT PLOT (>) 7 COLORS
VIEW ROTATE	CR	(<(>)2-D ELMS @ STRESS * LEGEND
DISPLAYS		@ MAX FIBER @ PLATE * CONTOUR LABELS
SCALE P M SH F D A		
DOMAIN		* VONMISES XNORMAL * PLOT MISSING DATA (VALUES=0)
M1 M2		MAJPRIN YNORMAL (>) TITLE=(CH)
M3 BUTTONS		MINPRIN XYSHEAR (CH)
RECORD UTILITY		SHEARANGLE NLCSTRAIN (CH)

10 in. Shank Length

CORPORATE FATIGUE SYSTEM (VERSION 2.0) 08:45:04 Mon Oct 02

DAMAGE CALCULATION, CONSTANT AMPLITUDE

MATERIAL NAME : 1008KR
MATERIAL PROPERTY SOURCE : MASTER FILE
MATERIAL FILE NAME: ...pl_hp/prod/ascent/AV2R0/prod/cfs/HP-UX/cfs_mater.dat

MATERIAL PROPERTIES

E	- YOUNG'S ELASTICITY MODULUS	203397.0
SF	- FATIGUE STRENGTH COEFFICIENT	610.2
EF	- FATIGUE DUCTILITY COEFFICIENT	.12000
B	- FATIGUE STRENGTH EXPONENT	-.09900
C	- FATIGUE DUCTILITY EXPONENT	-.40000
K	- CYCLIC STRENGTH COEFFICIENT	475.7
N	- CYCLIC STRAIN HARDENING EXP	.12000

PEAK VALUE: 552.0 VALLEY VALUE: .000DE+00
NUMBER OF CYCLES IN HISTORY: 1.000

LINEAR SCALE FACTOR : 1.00
POSITIVE LOADS IMPLY : TENSION
NOMINAL STRESS-STRAIN RELATION : LINEAR
NOMINAL LOAD TYPE IS : STRESS

MEAN STRESS CORRECTION METHOD : SMITH-WATSON-TOPPER

RESULTS:

KF VALUE(S)	DAMAGE (FOR ONE HISTORY)	FATIGUE LIFE (REPEATS OF HISTORY)	FATIGUE LIFE (NUMBER OF CYCLES)
1.00	.255E-04	.392E+05	.392E+05

08:45:04 Mon Oct 02

/usrea21/xzl65j/cfs.rpt

14 in. Shank Length

CORPORATE FATIGUE SYSTEM (VERSION 2.0) 08:46:06 Mon Oct 02

DAMAGE CALCULATION, CONSTANT AMPLITUDE

MATERIAL NAME : 1000HR
MATERIAL PROPERTY SOURCE : MASTER FILE
MATERIAL FILE NAME: ...pl_hp/prod/ascent/AV2R0/prod/cfs/HP-UX/cfs_mater.dat

MATERIAL PROPERTIES

E	- YOUNG'S ELASTICITY MODULUS	: 203397.0
SF	- FATIGUE STRENGTH COEFFICIENT	: 610.2
EF	- FATIGUE DUCTILITY COEFFICIENT	: .12000
B	- FATIGUE STRENGTH EXPONENT	: -.09900
C	- FATIGUE DUCTILITY EXPONENT	: -.40000
K	- CYCLIC STRENGTH COEFFICIENT	: 475.7
N	- CYCLIC STRAIN HARDENING EXP	: .12000

PEAK VALUE: 672.0 VALLEY VALUE: .0000E+00
NUMBER OF CYCLES IN HISTORY: 1.000

LINEAR SCALE FACTOR : 1.00
POSITIVE LOADS IMPLY : TENSION
NOMINAL STRESS-STRAIN RELATION : LINEAR
NOMINAL LOAD TYPE IS : STRESS

MEAN STRESS CORRECTION METHOD : SMITH-WATSON-TOPPER

RESULTS:

KF VALUE(S)	DAMAGE (FOR ONE HISTORY)	FATIGUE LIFE (REPEATS OF HISTORY)	FATIGUE LIFE (NUMBER OF CYCLES)
1.00	.6816-04	.147E+05	.147E+05

08:46:06 Mon Oct 02

Filename: /usrea21/xzt65j/cfs.rpt

GM583 Att 9 17039

00000502

NHTSA IR: GM-583; DP00-01: 1993-1997 Chevrolet & GMC Suburbans
- Alleged Cracking of Trailer Hitch Receiver Platform

ATTACHMENT 10F

ENGINEERING REPORT

DISTRIBUTION

T.W.O. NO.: JAB08-10B SEQUENCE NO.: 010

SUBJECT: GMT410/430 TRAILER HITCH PLATFORM FATIGUE ANALYSIS

DISTRIBUTION		**CIRCULATION**	
CENTRAL TEST RECORDS	483-510-5H1	N. V. NIEMIEC	483-378-201
ROBERT J. KROUSE	483-512-0H1	B. A. HUGHES	483-378-201
MINE TASCI	483-378-201	TEST RESOURCE	483-378-111(LAST)
TECHNOLOGY SERVICES	483-326-151		

NOTE - MAIL ORIGINAL REPORT TO: CENTRAL TEST RECORDS
JILLIAN GREGG, 483-510-5H1

GM Truck Group

ENGINEERING OPERATIONS
MILFORD PROVING GROUND
ENGINEERING REPORT

SUBJECT: GMT410/430 TRAILER HITCH PLATFORM FATIGUE ANALYSIS

TO: ROBERT J. KROUSE

FROM: MINE TASCI

********** DEVELOPMENT TEST **********

T.W.O. NO.: JAB08-10B **SEQ. NO.:** 010 **MODEL LINE:** K20906 **MODEL YEAR:** 1996

PROCEDURE/FMVSS: N/A **UPC:** 14L **VEH. NO.:** KS6681 **ENGINE:** L29

DATE EVALUATED FROM: 25MR96 **TO:** 30AU96 **DATE PUBLISHED:** 04FE97

FINAL REPORT ( ) **PROGRESS REPORT (X)** **REISSUE ( )** **REISSUE DATE:**

REASON FOR REISSUE:

OBJECTIVE

To calculate fatigue life estimates of GMT410/430 trailer hitch platform during R-15-31 Trailer Tow durability test.

FOREWORD

GMT410/430 trailer hitch platform strain levels road load data acquisition (T.W.O. JAB08-10B SEQ. 005) was conducted by Technology Services Engineer Jim Frank at the Desert Proving Grounds, Mesa, AZ. The vehicle used for the acquisition was KS6681, a K20 Suburban with L29 engine, MT1 transmission and 4.10 axle. This vehicle has Gross Combination Weight Rating (GCWR) of 17,000 Lbs. and a trailer rating of 10,000 Lbs.

Strain levels on hitch platform (P/N 15643953) with two (2) different ball mount shanks were collected at GCWR ballast condition. The test schedules from R-15-31 Trailer Towing Durability test excluding the Broken Concrete/Rough Pavement schedule were used to measure strain data. Two (2) rosette gages (three gages per rosette, total of six strain gages) were installed, one on the hitch LH side support and one on the hitch RH side support. Please refer to the end of test report issued on T.W.O. JAB08-10B SEQ. 005 for the specific gage locations. The two different configurations used were:

Config I - Short extension hitch
Ball mount shank of 10" length was installed to the hitch platform (P/N 15643953) receiver

Config II - Long Extension hitch
Ball mount shank of 14" length was installed to the hitch platform (P/N 15643953) receiver

RESULTS

Using the collected strain data, fatigue life comparisons for short and long extension trailer hitches were calculated using the Corporate Fatigue System (CFS) fatigue code. The following is the list of all the variables involved in the calculations:

material : known, SAE 1008HR
load : known, measured strain data multiplied with *number of repetitions* **
fatigue notch factor (Kf) : unknown
life (or damage) : known, life=1

The assumption of life=1 (at least) was made for the hitch platform with short extension because this configuration had completed at least one cycle of R-15-31 Trailer Towing Durability test without crack initiation.

Initial observation of the strain data showed that among the six gages (gage1, gage 2, gage3 located on hitch LH side support and Gage 4, Gage 5 and Gage 6 located on hitch RH side support) Gage 1 and Gage 4 (located directly on the opposite side of Gage 1) consistently indicated considerably higher strain levels compared to the rest of the gages. Hence, only these two gages were included in the fatigue calculations to reduce the analysis time.

First step of the analysis was to back calculate the fatigue notch factor (Kf) of the two (2) selected gage locations for the hitch with short extension (Config I). These Kf values were then used to calculate the fatigue lives of the selected gage locations on the hitch with long extension (Config II). This allowed us to compare the fatigue lives of the two (2) hitch configurations. The following table shows the results of this step.

	Kf calculated	Life Config I-short extension	Life Config II-long extension
Gage 1	3.22	1	6.13
Gage 4	3.25	1	11.10

** The number of repetitions for various schedules in one cycle of R-15-31 Trailer Towing Durability test are as follows:

Schedule	Repetitions
Sutton Summit	24
Tortilla Flat	24
Hunt Highway	48
Salt River Canyon	6

RESULTS(continued)

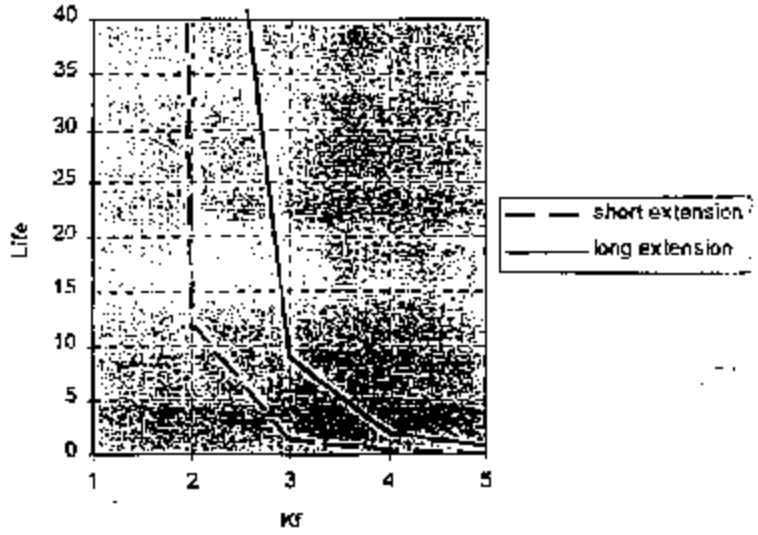
The following table lists the fatigue life values of Gage 1 for both short and long extension hitch configurations for various Kf values, ranging from 1 to 5.

Lives for different Kf values for Gage 1
for both hitch configurations

	Kf=1	Kf=2	Kf=3	Kf=4	Kf=5
Hitch with short extension	523	11.60	1.42	0.34	0.12
Hitch with long extension	5920	80.80	8.87	2.03	0.67

The values from the table above are presented graphically below:

LIFE VS. FATIGUE NOTCH FACTOR FOR GAGE 1



Mine Tasci — Date
Measurement Engineer
Milford Proving Ground
8-341-3509

Brendan A. Hughes — Date
Measurement Supervisor
Milford Proving Ground
8-341-4102

MT/sar

GM583 Att 9 17844

00000507

GM GENERAL MOTORS NORTH AMERICA
Safety Center

To: PETER ONG

From: KIRK ULMAN

Group: PRODUCT INVESTIGATIONS

Phone: (810) 986-6116 (8-226)

Fax: (810) 947-2318 (8-227)

Date: MAY 19, 2000

Pages including cover: 4

Comments:

Peter,

This is the warranty information on the trailer hitch platform for 1992 MY vehicles provided in response to request #5 of IR DP00-001; GM 583. I have also asked the four sources of information we need to respond to request #3 to make another search for 1992 MY vehicles.

At this time I am unable to provide a time estimate for the submission of the incident data.

Kirk

Product Investigations
Mail Code: 480-106-304 • 30500 Mound Road • Warren, MI 48090-9055
A:\EA81\FAX_PI.DOC

GM583 WARRANTY 1992 SUBURBANS
LABOR OPERATION - B1160 - HITCH,TRAILER-R&R

10:57 Friday, May 19, 2000

QUESTION #5

PARTNUN	PARTNME	Frequency	Percent	Cumulative Frequency	Cumulative Percent
15643953	PLATFORM	14	100.0	14	100.0

TCODE	TCDEF	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1K	CRACKED	3	21.4	3	21.4
6C	COMPONENT-INOPERATIVE	3	21.4	6	42.9
4S	WELD OMITTED OR POOR WELD	2	14.3	8	57.1
2H	IMPROPERLY INSTALLED	1	7.1	9	64.3
2W	LOOSE	1	7.1	10	71.4
3H	POOR MACHINING	1	7.1	11	78.6
3R	POROSITY	1	7.1	12	85.7
4X	WORN	1	7.1	13	92.9
5W	RUSTED OR CORRODED	1	7.1	14	100.0

CUSCDE	CUSDICT	Frequency	Percent	Cumulative Frequency	Cumulative Percent
		3	21.4	3	21.4
VC	VISUAL/CRACKED	5	35.7	8	57.1
OH	OPER/LOOSE	2	14.3	10	71.4
VH	VISUAL/HAZY(MISALIGNED)	2	14.3	12	85.7
OZ	OPER/SPONGY(INOPERATIVE)	1	7.1	13	92.9
VJ	VISUAL/EXPOSED(FIT)	1	7.1	14	100.0

00000511

GM GENERAL MOTORS NORTH AMERICA
Safety Center

To: PETER ONG

From: KIRK ULMAN

Group: PRODUCT INVESTIGATIONS

Phone: (810) 986- 6116 (8-226)

Fax: (810) 947-2318 (8-227)

Date: JUNE 14, 2000

Pages including cover: 4

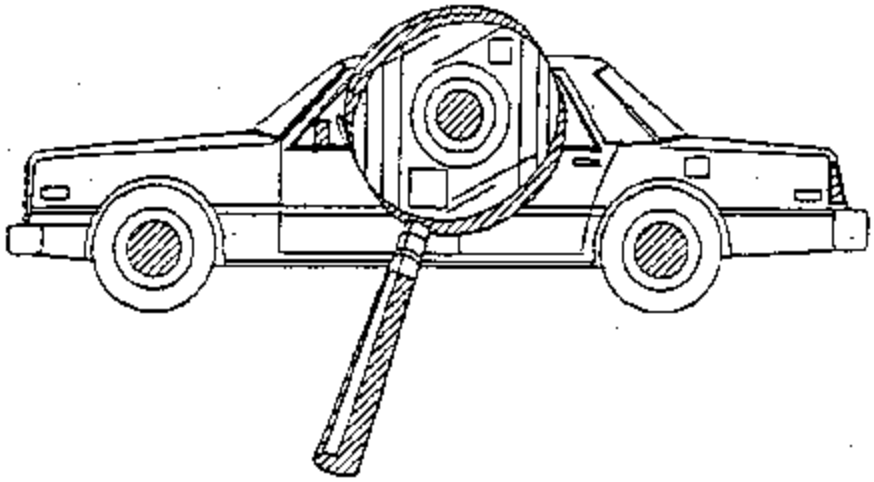
Comments: 1992 VEHICLE ADDITION TO DP00-001 GM 583

Peter,

I have yet to receive a report from our CAC source. The three replies I have received so far indicate no 1992 incidents - copies attached.

Kirk

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION



OFFICE OF DEFECTS INVESTIGATION

FACSIMILE TRANSMITTAL SHEET

FAX NO. (202) 366- 1767

DATE: 7/14/00 7/17/00

FROM: Peter Ong

TELEPHONE NO.: (202) 366- 0583

TO: Peter Bjke

COMPANY: DaimlerChrysler

OFFICE: pjb12@chrysler.com

PHONE NO.: _____ **: FAX NO.:** 248-576 7321

MESSAGE: _____

00000517

PAGE COUNT: 2
(Including This Page)

Report Safety Defects
Call the Auto Safety Hotline
800-424-9393

00000517

GM Legal Staff

Inter-Organization

Date: May 22, 2000

To: F.C. Sonye, Jr.
Product Investigations

From: K. M. Nothnagel
Product Regulation

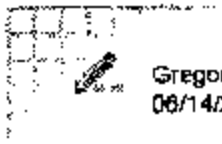
Subject: NHTSA IR: GM-583; DP00-001: 1993-1997 Chevrolet & GMC Suburbans – Alleged Cracking of Trailer Hitch Receiver Platform

Per your request, today I searched our product liability files for accident reports, claims, subrogation claims and lawsuits for any allegations involving trailer hitches in 1992 Chevrolet and GMC Suburbans. My searches did not reveal any responsive matters.

/kmn

c: Kirk Ulman, Product Investigations (via hand-delivery)
Steve Selander, Product Regulation (via hand-delivery)

Mail Code 480-106-304
Research Engineering Building, 30500 Mound Road, Warren, Michigan 48090-9055



Gregory J. O'Sickey
06/14/2000 09:40 AM

To: Kirk Ulman/US/GM/GMC@GM
cc:
Subject: 1992 surburbans IR GM-583

Kirk,

There were no documents found in the Central File for defective trailer hitches for 1992 suburbans. The codes searched for this request are C00 body general and R00 accessories general with the remarks hitch. These codes and remarks were searched for the previous 583 search.

Greg O'Sickey

Tim Dunning 05/23/2000 07:35 AM

To: Kirk Ulman/US/GM/GMC@GM, Elizabeth A. Bardowell/US/GM/GMC@GM
cc: Robert Krouse/US/GM/GMC@GM, Martin Povirk/US/GM/GMC@GM, Michael Kinloch/US/GM/GMC@GM
Subject: Re: GM-583, Suburban Trailer Hitches; NHTSA expansion of Model Years to include 1992

Kirk, Elizabeth,
Attached is Robrt Krouse's response to NHTSA follow-up question adding the 1992 model year to the trailer hitch investigation.

Tim

---------- Forwarded by Tim Dunning/US/GM/GMC on 05/23/2000 07:31 AM ----------

Robert Krouse
05/19/2000 02:28 PM

To: Tim Dunning/US/GM/GMC@GM
cc:
Subject: Re: GM-583, Suburban Trailer Hitches; NHTSA expansion of Model Years to include 1992

Tim,

My response is unaffected by the addition of 1992 model year to the original IR. Specifically,

"The ORE is unaware of the existence of any of the above items pertaining to the alleged defect other than reports provided by NHTSA".

Let me know if you need any additional info.

RobK

Tim Dunning

Tim Dunning 05/19/2000 11:30 AM

To: Michael Kinloch/US/GM/GMC@GM, Robert Krouse/US/GM/GMC@GM
cc: Martin Povirk/US/GM/GMC@GM, Michael Bailey/US/GM/GMC@GM, Jim Federico/US/GM/GMC@GM
Subject: GM-583, Suburban Trailer Hitches; NHTSA expansion of Model Years to include 1992

Rob, Mike,
NHTSA has expanded this IR to include 1992 Model Year Suburbans. Original IR was for 1993 through 1997 Suburbans.

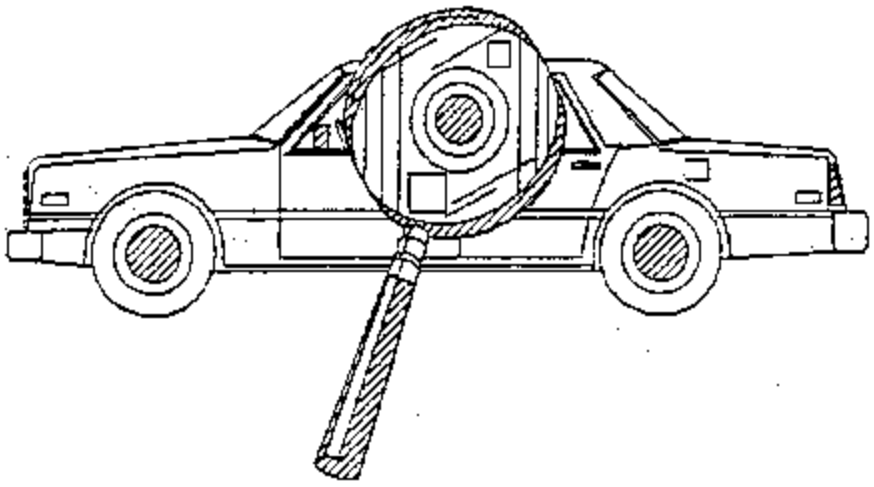
Specifically they are asking us to answer question #3 of the original IR for the 1992 Model Year also. Question #3 is as follows;

State the number and provide copies of all documents containing the following, from all sources, of which GM is aware and which relate, or could relate to the alleged defect in the subject vehicles;

1. owner/fleet complaints;
2. field reports;

00000516

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION



OFFICE OF DEFECTS INVESTIGATION

FACSIMILE TRANSMITTAL SHEET

FAX NO. (202) 366- 1767

DATE: 7/14/00 7/17/00

FROM: Peter Ong

TELEPHONE NO.: (202) 366- 0583

TO: Peter Bjk

COMPANY: DaimlerChrysler

OFFICE: psbiz@chrysler.com

PHONE NO.: _____ ; **FAX NO.:** 248-576 7321

MESSAGE:

000000517

PAGE COUNT: 2
(Including This Page)

Report Safety Defects
Call the Auto Safety Hotline
800-424-9393

000000518

Peter,
In my efforts preparing a petition analysis,
Request your assistance to obtain
the following info.

MY 92-97 D/B series "1500" - "3500" PUs
populations w/ OEM trailer towing
receiver installed by each MY.

This will help me to finish the analysis
with a peer comparison. Need ASAP or
early next week if possible.

Q's please call @ 202/366-0583

Peter Ong
ODI
NHTSA

518

DAIMLER CHRYSLER PICKUP TRUCK VOLUMES

MY	MODEL	US VOLUME	US VOLUME with TRAILER TOW	% EQUIPPED
1992	AD	74,944	3,714	5.0
1993	AD	76,241	3,826	5.0
1994	BR	188,097	44,967	23.9
1995	BR	267,241	108,517	40.6
1996	BR	362,880	154,907	42.7
1997	BR	375,061	179,129	47.8

To: Peter Org

From: Peter Byk

00000519

AUG 2000

Mr. Raymond A Mosley
Director of the Federal Register
Office of the Federal Register
National Archives and Records
Administration
Washington, D.C. 20408

Dear Mr. Mosley:

This is to certify that the diskette furnished with the document, Denial of Motor Vehicle Defect Petition, is a true copy of the original signed document and should be used by GPO in preparing the document for publication

Sincerely,

J. Edward Glancy
Senior Attorney

Enclosure

NHTSA:NSA:ODI
?

00000520

DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

Denial of Motor Vehicle Defect Petition, DP00-001

AGENCY: National Highway Traffic Safety Administration (NHTSA), Department of Transportation.

ACTION: Denial of petition for a defect investigation.

SUMMARY: This notice sets forth the reasons for the denial of a petition submitted to NHTSA under 49 U.S.C. § 30162, requesting that the agency commence a proceeding to determine the existence of a defect related to motor vehicle safety. The petition is hereinafter identified as DP00-001.

FOR FURTHER INFORMATION CONTACT: Dr. George Chiang, Office of Defects Investigation, NHTSA, 400 Seventh Street, SW, Washington, D.C. 20590. Telephone: (202) 366-5206.

SUPPLEMENTARY INFORMATION: Mr. Dave Blum (petitioner), 5329 Eagles Nest Road, Fruitland Park, Florida 34731, submitted a petition to NHTSA by letter dated February 1, 2000, requesting that an investigation be initiated on trailer towing hitch platforms (receivers) and related hitch equipment for "compatibility with National Highway Safety Standards for materials and construction specifications."

Mr. Blum is a safety committee member of the Region 3 Wally Byam Caravan Club International Airstream travel club. He provided pictures and descriptions of four club members' tow vehicles with cracked Original Equipment Manufacturer hitch receivers. The tow vehicles were model years (MY) 1993, 1994, and 1997 General Motor Corporation Suburban Sport Utility Vehicles and a MY 1995 Dodge 2500 pickup truck.

NHTSA has reviewed and analyzed all available information. The result of this review and analysis is set forth in a Petition Analysis Report for DP00-001 and is published in its entirety as an appendix to this notice.

For the reasons presented in the petition analysis report, it is unlikely that NHTSA would issue an order concerning the notification and remedy of a safety-related defect at the conclusion of an investigation. Therefore, in view of the need to allocate and prioritize NHTSA's limited resources to best accomplish the agency's safety mission, the petition is denied.

Authority: 49 U.S.C. 30162(d); delegations of authority at CFR 1.50 and 501.8.

Issued on:

Kenneth N. Weinstein
Associate Administrator
for Safety Assurance

Billing Code *4910-59-P*

APPENDIX

PETITION ANALYSIS - DP00-001

1.0 INTRODUCTION

Mr. Dave Blum (petitioner), Fruitland Park, Florida, submitted a petition to NHTSA by letter requesting that an investigation be initiated on trailer towing hitch receivers (platforms) and related hitching equipment "to assess their compatibility with National Highway Safety Standards for materials and construction specifications." The petitioner, who is a member of the Wally Byam Caravan Club International (WBCCI) Airstream travel club safety committee stated that NHTSA's Office of Defects Investigation (ODI) should open an investigation concerning hitch receiver failure because the WBCCI Airstream travel club members allegedly inspected and found cracks in their hitch receivers.

2.0 VEHICLE INFORMATION

2.1 Subject Vehicle

In his petition, Mr. Blum did not specify the make, model, or year of vehicles he wanted ODI to investigate. However, between December 1999 and January 2000, he supplied information concerning cracked hitch receivers on a 1993, 1994, and 1997 model year (MY) General Motor Corporation (GM) Suburban vehicle and on a 1995 MY Dodge 2500 pickup (PU) truck. ODI selected MY 1992 - 1997 GM Suburban vehicles as the subject vehicles for the following reasons: (1) the petitioner identified three Suburban vehicles with cracked Original Equipment Manufacturer (OEM) hitch receivers; (2) the ODI consumer complaint database contained a relatively high number of complaints on the subject vehicles; (3) the Suburban has one of the largest towing capacities among the peer vehicles and is commonly used to tow large travel trailers; and (4) ODI had conducted a previous investigation (PE95-036) on certain GM Sport Utility Vehicles (SUVs), including MY 1992-1995 Suburbans to investigate a similar OEM hitch receiver crack problem.

2.2 Vehicles Involved

GM produces the Suburban for both the Chevrolet and GMC Divisions. The combined number of subject vehicles produced in the United States was 738K vehicles[1]. The Chevrolet Division accounted for 512K vehicles and the GMC Division accounted for 226K vehicles According to GM, among the 738K vehicles, 494K vehicles were equipped with factory installed OEM hitch receivers.

3.0 PREVIOUS RECALLS AND INVESTIGATIONS OF HITCH RECEIVERS

ODI is aware of one recall and one previous investigation concerning hitch receiver cracking. DaimlerChrysler recalled certain MY 1998-2000 Dodge 2500 Ram pickup trucks (Recall 00V-107) because the steel had insufficient strength due to poor quality control. ODI opened a Preliminary Evaluation, PE95-036, in June of 1995 into an alleged defect in MY 1992-1993 Suburban vehicles after receiving four (4) complaints, one MY 1992 and three (3) MY 1993, concerning cracked hitch receivers. During this investigation, ODI expanded the scope to include other MY 1992-1995 GM SUVs. By the conclusion of the investigation in late 1995, ODI had received another complaint (MY 1992) and GM reported three (3) additional complaints (one MY 1992 and two MY 1993) bringing the complaints to a combined total of eight (8). The investigation revealed no injuries or crashes related to the alleged defect on the subject vehicles. ODI closed the investigation without any further actions and concluded the following:

> ...it appears that the cracks are readily obvious and slow to propagate. The problem may not be a catastrophic failure of the hitch platform. The high number of warranty claims coupled with the corresponding low number of failures is not indicative of a safety trend at this time.[2]

---

[1]Ward's Automotive Yearbook, 1992 - 1998 Editions for MY 1992 - 1997 Suburbans.

[2]NHTSA ODI PE95-036 (J. Abbott) of 31 October, 1995 (closing resume).

4.0 HITCH RECEIVER/EQUIPMENT AND TOWING LIMITS

Currently, there are no Federal Motor Vehicle Safety Standards (FMVSS) applicable to trailer towing hitch equipment. However, many hitch equipment manufacturers use the Society of Automotive Engineers Standard, SAE J684,[3] for hitch classification and test limits. According to SAE J684 (Table 1), there are four classes of towing capacities or tow ratings for applications less than 10,000 lb. When used with a weight distributing hitch system, the Suburban has a 10,000 lb. maximum towing capacity with the driver and one passenger onboard and no cargo in the tow vehicle. The additional weight of other occupants and cargo in the tow vehicle will reduce the towing capacity accordingly.

Table 1 Various Types of Hitch Receivers

Class Rating Per SAE J684	Towing Duty	Max. Towing Weight	Hitch System Attachment Type	Common Payloads
Class I	Light	2,000 lb.	Weight Carrying (WC)	Monocycle & Jet Ski trailers
Class II	Medium	3,500 lb.	WC	Small Boat & utility trailers
Class III	Heavy	5,000 lb.	WC	Med. travel & utility trailers Large boat trailers
Class IV	Heavy	10,000 lb.	Weight Distributing	Large travel & utility trailers Automotive trailers

4.1 Hitch Receiver

Figure 1 shows a diagram of a typical frame mounted Class III/IV type hitch receiver. There are three basic sections that make up a hitch receiver: (1) the hitch bar and ball assembly that connects the trailer to the tow vehicle, (2) the horizontal box transfer beam and (3) the vertical mounting flanges for attachment to the vehicle frame. Note that the diagram also shows the typical crack patterns found as reported by the petitioner.

[3] "Trailering Couplings, Hitches, and Safety Chains - Automotive Type" - SAE J684 (6/98).

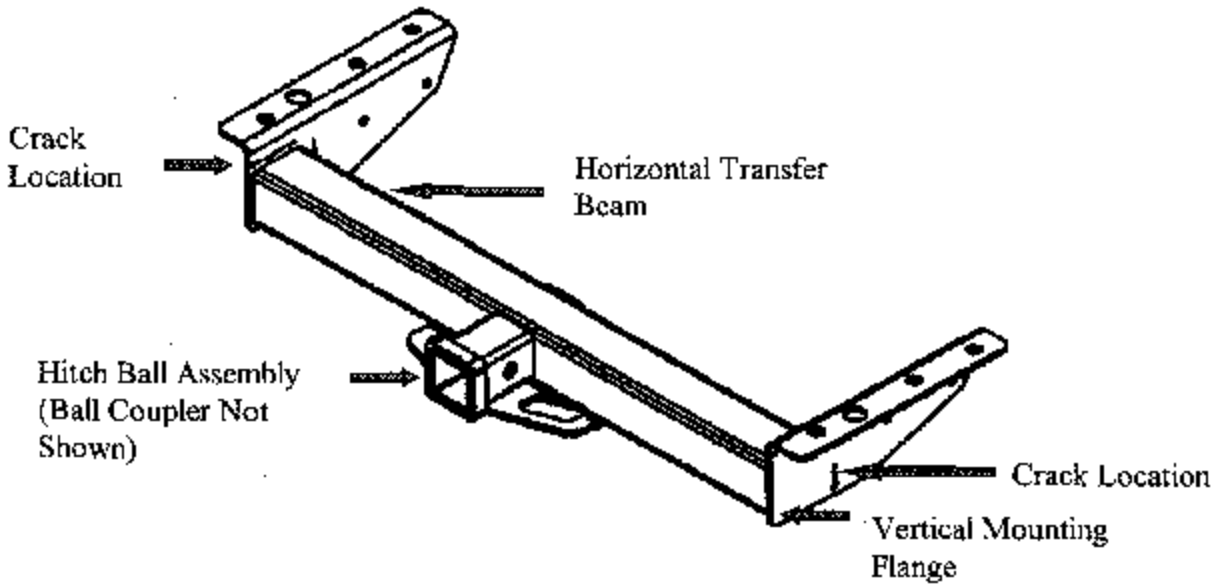


Figure 1. Typical Class III/IV towing Hitch Receiver

4.2 Weight Distribution (WD) Hitch System

Normally, on the lighter duty Class I/II/III applications, the trailer's tongue weight directly pushes down on the hitch receiver's coupling ball causing the rear of the tow vehicle to drop and the front of the vehicle to rise slightly. With larger and heavier trailers, this can severely affect vehicle handling and stopping distances and further add stresses to the tow vehicle and hitch receiver structures. To reduce these undesirable effects, an 'aftermarket' or 'third party' Weight Distribution (WD) hitch system must be used when towing large trailers. For Class IV applications with the WD system as shown in the set up of Figure 2, the two spring bars are bent upward to apply a counter moment torque to the WD hitch ball mount assembly and redirect or redistribute the point load tongue weight further forward in the tow vehicle. The subject vehicles' hitch receiver has a decal specifying 10,000 lb. towing and 1,000 lb. maximum tongue weight limits when used with the WD hitch system.

4.3 Proper Installation of the WD Hitch System

Based on the information obtained from various trailering sources,[4] a properly installed WD hitch system evenly distributes the loads to the entire tow vehicle. The WD hitch system's spring bars force both the front and rear wheel fenders equally downward. This aligns the tow vehicle so that it is approximately the same 'attitude' or 'level' as it was before the trailer was hooked up. A poorly installed WD hitch system can cause the tow vehicle's front end to 'lift up' resulting in more weight to the hitch receiver and rear axle. In addition, the ball mount height, spring bar angles, spring bar engagement level, and ball mount receiver bar length can also affect the proper installation and effectiveness of the WD hitch system.

---

[4]Various Trailering Guides. Ford 2000 RV & Trailer Towing Guide (8/99); Reese 'Hitching-Up Procedure' distributed during Airstream RV rally in Sarasota, Florida (2/00); 1997 Airstream 34' Excella Travel Trailer Owners Guide, Sections E and I on Hitching Up and Trailer Specifications; GM Suburban Owners Manuals, Section 4 - 'Towing a Trailer', MY 1993-1997; GM Suburban Sales Brochures, Section on Trailering, MY 1993-1997; and GMC Trailering Guides, MY 1993-1997.

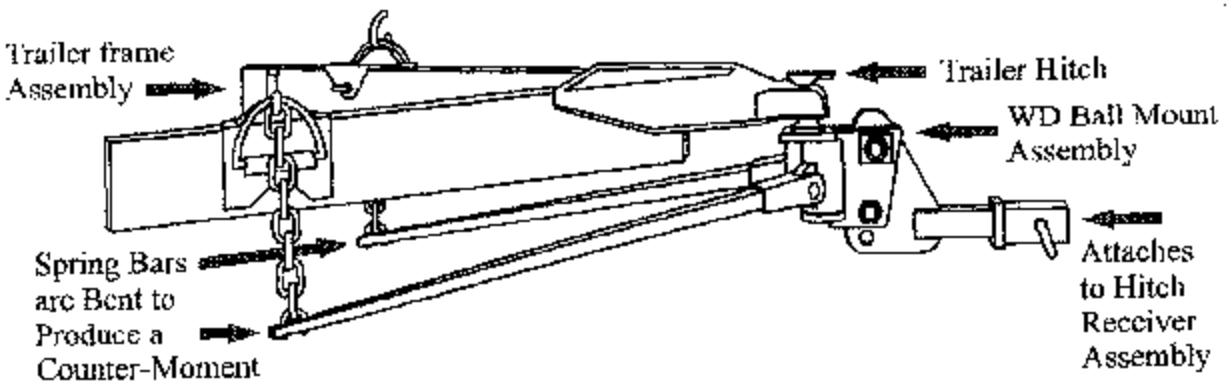


Figure 2. Typical Weight Distributing Hitch System Setup

4.4 Hitch Receiver Performance

For Class IV hitch receivers, SAE recommends a series of static test loads applied to the hitch ball mount and receiver to verify their towing limits. The static test loads include longitudinal, transverse, vertical and moment loads. According to SAE,[5] these static test loads are higher than the loads encountered during actual on-road towing. For example, the 2,100 lb. SAE specified vertical load is more than twice that of the typical trailer tongue weight limit of 1,000 lb. Tests conducted by SAE in the mid-1990s verified that the actual measured dynamic loads under normal towing conditions, such as turns, hills, dips and stops, are well within the higher SAE specified static loads. However, SAE also cautioned that abuse or mishaps such as backing into an object or one side of the trailer falling off the pavement can create loads that exceed the SAE specified loads. Remote and unimproved roadways and certain stretches of highways, with short concrete slabs causing the trailer to "porpoise" or oscillate up and down severely, can also create higher than normal loads at the hitch receiver.

5.0 COMPLAINTS

5.1 Complaints Submitted to ODI on the Subject Vehicles

ODI searched and analyzed all complaints involving the subject vehicles in its consumer database pertaining to an alleged cracked hitch receiver. As of August 1, 2000, the ODI database had recorded 15 cracked hitch receiver complaints on the subject vehicles. As shown in Table 2, the complaint dates, by calender year, were as follow: five in 1995, one in 1996, two in 1998, one in 1999 and six in 2000. There are high concentrations of complaints submitted in years 1995 and 2000. The first complaint concentration in 1995 was due to an effort of a Northeast region WBCCI Airstream travel club who surveyed its members and submitted all five of the complaints to ODI. The second complaint concentration in year 2000 was due to the efforts of the petitioner's Southeast region Airstream travel club safety committee in conjunction with ODI

[5]Discussions with SAE J684 Group Chairman, Mr. Jim Fait, during April and May of 2000.

personnel during the February 2000 RV Rally in Sarasota, Florida. The inspections and field survey during the rally resulted in the submission of five of the six CY 2000 complaints in the ODI database. Otherwise, ODI has received only one or two complaints per year on the subject vehicles.

Table 2 ODI Complaints by Calendar Year

Calendar Year	CY95	CY96	CY97	CY98	CY99	CY00	Total
Suburban Total	5	1	0	2	1	6	15

Table 3 shows the complaint counts by model year for the subject vehicles equipped with the OEM installed hitch receivers. Among the fifteen Suburban complaints, eleven complainants were contacted during this petition analysis and they all reported towing 29' and longer Airstream trailers having a listed Gross Vehicle Weight Rating (GVWR) ranging from 7,000 to 9,800 lb. Most of the complainants never weighed their trailer and do not know the actual gross trailer towing weight (trailer plus cargo in both the tow vehicle and trailer). One recent (CY 2000) complainant reported that prior to towing his current 31' trailer, he was towing a 30' long trailer when the trailer's wheels hit a large pothole on the road. The impact was severe enough to damage the trailer's frame and totally destroyed the trailer structure. After receiving the Airstream RV club's newsletter which asked members to inspect their hitch receivers, he found

Table 3 ODI Complaints and Complaint Rates on the Subject Vehicles and Peer Vehicles

Model Year	MY92	MY93	MY94	MY95	MY96	MY97	Total	Pop. with Hitch	Rate
Suburban Total	2	6	4	0	2	1	15	494K	3.0
Dodge PUs	1	0	0	3	0	0	4	495K	0.8

cracks in the hitch receiver. It is unclear whether the cracks were caused by the impact with the pothole or inappropriate loading, or initiated from incorrect installation and usage of the WD hitch system. ODI was unable to contact the other four complainants despite attempting to reach them at the addresses and telephone numbers they provided.

5.2 Complaints Submitted to ODI on Peer Vehicles

ODI has also searched for cracked hitch receiver complaints in its database on other MY 1992-1997 trucks and vans having similar towing capacities. Except for the Dodge D-150/250/350 and B-1500/2500/3500 series pickup trucks (see Table 3), ODI has received no more than one hitch receiver complaint on any other vehicle. The complaint rate for cracked hitch receivers on the Dodge truck with OEM hitch receivers is 0.8 per 100,000 vehicles[6] as compared with the subject vehicles' rate of 3.0 per 100,000 vehicles.

6.0 INSPECTION AND SURVEY AT THE RECREATIONAL VEHICLE (RV) RALLY

6.1 Airstream RV Rally in Sarasota, Florida

ODI personnel, at the invitation of the petitioner and the Airstream Region 3 RV Safety Committee, attended a RV rally held in Sarasota, Florida during the period of February 15 - 21, 2000. Of the 600 RV participants towing a travel trailer at the RV rally, approximately 150 use the subject vehicle to tow a large 31' - 34' length Airstream travel trailer. Therefore, the percentage of large travel trailers among the 600 travel trailers at the Airstream RV rally was approximately 25%.

6.2 Physical Inspection of the Tow Vehicle Hitch Receivers

During the course of the RV rally, ODI and Airstream RV Safety Committee personnel made several announcements requesting each RV rally participant to inspect his/her hitch receiver for cracks. For those that responded, ODI and safety committee personnel visited them to further

[6]Dodge light duty pickup truck population equipped with OEM hitch receivers supplied by DCX on 6/20/00.

inspect their tow vehicles and trailers and to interview the owners. The Suburban was used as the tow vehicle in 21 of the 27 units inspected. Among these 21 units, 10 had cracked OEM hitch receivers, four had previously experienced cracked OEM hitch receivers and since had them replaced, and the remaining seven did not have any problems while using either the OEM or the non-OEM hitch receiver. The older MY 1993-1994 Suburbans accounted for six of the ten cracked receivers. Eight of the these 10 Suburban vehicles towed or previously towed the large 31' - 34' length Airstream travel trailer with GVWR near the 10,000 lb. limit.

Among the remaining six owners who didn't have the Suburban as their tow vehicle, there were two reports of cracked hitch receivers. Specifically, a MY 1995 and a MY 1996 Dodge pickup truck towing Airstream 30' and 34' travel trailers respectively.

6.3 Overloading in the RV Community

Present at this rally was the A'Weigh We Go (AWWG) weighing service. AWWG travels across North America to large rallies to provide an on-site weighing service and to give seminars on safe towing practices. RV manufacturers and tire companies partially sponsor AWWG to provide the weighing service at a nominal cost to the participants. AWWG[7] has weighed more than 10,000 vehicles and trailers in the past 10 years including motorhomes, tow vehicles, 5th wheel trailers, and travel trailers (TTs). The majority of the data collected were from motorhomes (5,462 units) and the least amount of data collected were from travel trailers (462 units). They found that overloading or improper matching of equipment and loading is a common problem in the RV communities. Among the 462 travel trailers they have weighed over this period, 54 percent of the tow vehicles and 51 percent of the TTs exceeded load limits in one or more of the loading limits such as the Gross Combination Weight Rating (GCWR), the Gross Vehicle Weight Rating (GVWR), Gross Axle Weight Rating (GAWR), Tire Load Rating (TLR) or net vertical hitch loading. AWWG noted the following concern in their handbook:

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[7] A'Weigh We Go Recreation Vehicle Weight & Tier Safety Handbook, Textbook Edition, Section I, Rev. 1/00.

Of particular concern is that 57% (percent) were over GCWR, indicating that too many folks are trying to pull too much trailer with too little truck.

6.4 Weighing of Units at the Florida RV Rally

ODI contracted with AWWG to use their weighing services during the Florida RV rally. ODI then requested all of the Suburban owners with cracked hitch receivers and randomly selected a few of the owners without cracked hitch receivers to have their units weighed by the AWWG (at ODI's expense) at the conclusion of the RV rally. ODI instructed each owner to prepare the tow vehicle and trailer as they normally would for road travel. Prior to the day of departure, AWWG weighed each tow vehicle without the trailer attached. Then, on departure day, AWWG weighed the entire tow vehicle and trailer assembly at each wheel and axle. By measuring the loads at each wheel, AWWG can determine if the loads exceed any of the GCWR, GVWR, GAWR limits for both the tow vehicle and the trailer. AWWG also measured and calculated the total trailer towing weight and the net vertical loading on the tow vehicle. According to AWWG, the net vertical loading on the tow vehicle rear axis is roughly equal to the trailer tongue weight within an error of 50 lb.[8] By comparing the measured vehicle loads with the manufacturer's load limits, AWWG can calculate the amount of 'weight margins' or 'weight overloading' in each of these areas.

During the RV rally, AWWG used calibrated commercial/industrial grade weighing scales that measure up to 20,000 lb. each with an accuracy to +/- 50 lb.[9] Many law enforcement agencies use the same type of scale during their highway truck inspections. Throughout the weighing process, ODI personnel observed that AWWG was careful to keep the vehicle and/or trailer level during weighing in order to obtain the most accurate and consistent readings.

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[8]Discussions With AWWG president, Mr. J. Anderson, during March-April 2000. Data taken from AWWG's weighing of both tongue and vertical weights on travel trailers in early 1990's.

[9]AWWG Weighing Devices - Model WL 101, Range 0-20,000 lb., Class III Accuracy, Load-O-Meter Corporation, Baltimore, MD.

6.5 AWWG Data Review

AWWG weighed nine of the 10 Suburban vehicles with cracked OEM hitch receivers. One owner did not make his vehicle and trailer available for weighing. Eight of the nine weighed units showed overloading in at least one category. Note that these recorded load conditions represent only the load conditions while attending the week-long RV rally. Table 4 shows the various load conditions for each of the nine weighed units. The percentage of the rated load limit, shown as a "+" value, represents the margin within which the vehicle/trailer is below the maximum weight rating, and the percentage over the rated load limit, shown as a "-" value, represents overloading. Many owners exceeded weight limits in more than one rating. One owner (ID #1) exceeded six of the nine weight limits. Based on the weight data, overloading appeared to be a major contributing factor in cracked hitch receivers. The two vehicles listed at the bottom of the table (ID #8 & #9) that recorded the least amount of overloading and no overloading, respectively, had previously towed a larger and heavier 34' travel trailer, and that may have been the cause of the cracked hitch receivers.

The remaining seven Suburban vehicles with cracked hitch receivers that were weighed had from one to six failed rating areas out of the possible nine areas. Additionally, six of these seven units exceeded either the 10,000 lb. trailer towing or 1,000 lb. tongue weight limits as specified on the OEM hitch receiver.

6.6 Weights of Large Travel Trailers

Many modern RV trailers have comforts and amenities that help make mobile traveling more like a home on wheels. Full size bedroom, kitchen, bath, recliner and sofa are standard on many 28' or larger trailers. Many RV manufacturers can equip these trailers with additional options such as ceramic tile floors, stone counter tops, microwave oven, entertainment center, satellite/computer systems and room slide-outs. All these items add additional weight to the basic trailer. The more the trailer weight is above the empty Dry Weight condition, the less 'cargo'

capacity is available to the consumer before reaching the trailer GVWR and the hitch receiver's towing limit. For example, Airstream rates their MY 2000 34' length Limited travel trailers at 8,290 lb. Dry Weight and a GVWR of 9,800 lb. maximum[10] resulting in a Net Carrying Capacity (NCC) of only 1,510 lb. This NCC would include any additional dealer or owner-installed options, fluids, LP gas, personal items such as food, clothing, television, furniture, kitchen wares, books, and repair tools. In addition, relocating some loads from the trailer to the tow vehicle may help keep from exceeding the trailer's GVWR, but still diminishes the towing capacity of the hitch receiver from the 10,000 lb. maximum rating. Note that in a "remote" camping environment where there are no utilities, the camper may have the 54-gallon fresh water tank and the twin 20-gallon LP tanks filled to full capacities. These two items alone account for a combined weight of more than 600 lb. of the available NCC. In the Airstream web site[11], the following disclaimer appears at the bottom of every page:

> Vehicle Loading: Every effort has been made to provide the greatest number of options for the recreation vehicle owner. Along with these choices comes the responsibility to manage the loads that are imposed by the choices so that they remain within the manufacturer's specified chassis weight limits. Do not overload the recreation vehicle.
>
> Dry weights based on standard features; optional equipment not included. Net carrying capacity (NCC) determined by subtracting unloaded vehicle weight (UVW) from gross vehicle weight (GVWR) and includes fluids, options and cargo. Liquid capacities and weights are approximations only.

Besides a safety seminar given by the RV club's safety committee at the Florida rally, AWWG also presented a safety seminar there. During the seminar, AWWG reported that "the average couple carries about 2,000 lb. of stuff and the average full-timer, about 3,000 lb." which

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[10]Thor Industries, Inc. Airstream, An American Legend 2000 Sales Brochure.

[11]Thor Industries Inc. Airstream Travel Trailer Internet web site at http://www.airstream-rv.com 5/00.

was documented in its handbook.[12] Many of the participants at the RV rally were retired "full-timers," including all of the Suburban owners with cracked hitch receivers.

Although not included in Table 4, because the owners did not report any hitch receiver problems, seven other Suburban vehicles towing large trailers with OEM and non-OEM hitch receivers, including the one belonging to the petitioner, were also weighed by AWWG. The results showed that overloading is also common among these owners, but to a lesser extent.

While the WBCCI RV safety committee provides guidance to RV owners in the proper usage of towing a trailer and the need to regularly inspect the towing equipment, there are no Federal or state laws that require weighing of RV trailers while traveling the nation's interstates as there are for commercial trucks

7.0 GM DATA REVIEW

At the request of ODI, GM supplied the following information[13] concerning the alleged defect. GM stated that the same hitch receiver design has been used during the entire production period of the subject vehicles (MY 1992-1997).

7.1 GM Owner Reports

Among the 494K MY 1992-1997 Suburban vehicles sold with OEM hitch receivers, GM has received 15 owner complaints, one accident claim, and has been named in two lawsuits related to the alleged defect in the subject vehicles. Excluding non-crack-related problems, duplicates of RV rally field survey reports and ODI complaints, Table 5 lists the nine cracked hitch receiver complaints from GM. The first reported litigation case involved a MY 1993 Suburban towing a 34' Airstream RV travel trailer. Prior to the case going to trial, the owner filed a 'notice of nonsuit' and the court dismissed the case in 1/99. ODI reviewed this same report in 1995 during its investigation (PE95-036). The other litigation report involved a MY 1995 Suburban that lost

[12] A'Weigh We Go Recreation Vehicle Weight & Tire Safety Handbook, Textbook Edition, Section VI, Rev. 1/00.

[13] General Motor response to ODI Information Request (IR), GM 583 of 3/00 and FAX of 5/00.

Table 4 Weight Data/Analysis on the Nine Suburban Hitch Receiver Crack Failures

			Tow Vehicle Overload?				Trailer Overload?			Hitch Receiver Overload?		
ID	Tow Vehicle	Trailer	Tow Veh. GCWR	Tow Veh. GVWR	Tow Veh. GAWR)	Tire Load Limit	Trailer GVWR	Trailer GAWR	Tire Load Limit	Trailer Tow Wt. 10,000 lb.	Vert. Wt 1,000 lb.	Remarks
1	1994 Sub	34' A/S	-4%	99%	82%	-1%	-16%	-12%	68%	-23%	-12%	6 failed areas
2	1996 Sub	34' A/S	99%	-3%	-12%	94%	-5%	98%	82%	-15%	-18%	5 failed areas
3	1999 Sub	34' A/S	-1%	92%	77%	78%	-3%	-13%	84%	-17%	1%	4 failed areas
4	1993 Sub	31' A/S	80%	96%	93%	80%	-7%	0%	88%	82%	-8%	3 failed areas
5	1993 Sub	34' A/S	92%	-6%	-10%	90%	99%	98%	63%	-3%	84%	3 failed areas
6	1993 Sub	34' A/S	91%	88%	-4%	90%	91%	97%	79%	-1%	88%	2 failed areas
7	1995 Sub	30' A/S	86%	96%	-1%	86%	95%	93%	99%	91%	65%	1 failed area
8	1994 Sub	31' A/S	86%	80%	80%	67%	-1%	100%	96%	92%	53%	1 failed area
9	1996 Sub	30' A/S	86%	97%	79%	97%	96%	91%	84%	91%	100%	0 failed area

Notes:

GCWR The Gross Combination Weight Rating (GCWR) is the maximum allowable combined weights from the tow vehicle and the trailer as specified by the vehicle manufacturer.

GVWR The Gross Vehicle Weight Rating (GVWR) is the maximum allowable gross vehicle weight of the tow vehicle or trailer as specified by the manufacturer.

GAWR The Gross Axle Weight Rating (GAWR) is the maximum allowable weight on each axle as specified by the manufacturer.

Tire Load Limit The tire load limit is the maximum allowable load on each tire as specified by the manufacturer.

Trailer Tow Wt. The trailer towing weight is the maximum allowable towing weight by the hitch receiver. It includes the trailer weight, as well as any additional occupant and cargo weights in the tow vehicle.

Vert. Wt. The hitch vertical weight is the maximum net vertical loads on the rear axis after trailer hookup. According to AWWG, the vertical weight is approximately the same as the hitch tongue weight.

Table 5. GM Complaints and Reports on Hitch Receiver Cracking

ID	DOI	Tow Vehicle	Trailer Mileage	Trailer & Weight	Nature of Failure	Est. Damage Cost	GM/Dealer Action
99-6701	6/99	'96 Sub	6K vehicle miles	32' Jayco Est. 9K#	1" crack both sides	Not Aailable (N/A)	100% Goodwill (G/W)
99-7801	8/99	'94 Sub	100K vehicle miles	Car Trailer Est. 6,5K#	Side plate broke off	$0.9K on trailer	Denied
99-6101	9/99	'94 Sub	Est. 120K tow miles	27 Jayco RV Est. 8K#	Broken & cracked	N/A	Denied
99-7001	11/99	'95 Sub	45Kvehicle miles	A/S trailer N/A	Broken & cracked	N/A	Under warranty
99-0994	8/99	'96 Sub	43K vehicle miles	RV trailer N/A	Broken-trailer separation	N/A	75% G/W
99-4148	12/99	'94 Sub	57K vehicle miles	A/S trailer N/A	Cracked on both sides	N/A	Denied
99-1001	3/00	'93 Sub	Est. 60K tow miles	A/S 32' trailer 6.5K+	Broken & crack	N/A	Denied
95-3291	4/95	'92 Sub	41K vehicle miles	A/S trailer N/A	Cracked on both sides	N/A	Denied
95-6101	10/94	'93 Sub	160K vehicles miles	A/S trailer N/A	Broken & crack	N/A	Denied

its trailer while hauling a load of pumpkins. The owner replaced the hitch receiver before a GM representative was able to verify the failure or determine the cause. The report claimed approximately $1800 in damages. The one accident claim was from the same owner as the first litigation report. GM also reported 154 warranty claims on the subject vehicles' hitch receiver. Based on the GM failure codes, ODI estimates that approximately 15 to 20 percent of the claims may involve cracks in the vertical mounting flange, but further detail is not available. None of the complaints or warranty reports indicate bodily injuries or vehicle crashes as a result of the cracked hitch receivers.

7.2 GM Hitch Receiver Design, Test and Performance Limits

During the development phase, GM conducted both nondestructive analysis and destructive testing on their hitch receiver design. This included Finite Element Analysis (FEA), static load testing and on-road durability tests. GM's FEA, as well as the static load testing, support GM's opinion that the hitch receiver will perform as designed. Both GM and other hitch receiver manufacturers use the same static load limits found in the SAE standard. In addition, GM successfully conducted a 6,500 mile on-road durability test with a Suburban towing a 10,000 lb. trailer having 1,000 lb. tongue weight over various road conditions without cracks or hitch receiver failure. According to GM, due to the course's hilly terrain, this test is equivalent to 20,000 normal towing miles. It should be noted that GM does not identify the "towing rating with no cargo" limitation anywhere on the hitch receiver, on the vehicle, or in any of the pre-1996 owners' manuals. However, this limitation is specified in their trailering guides.

7.3 GM's Assessment of the Crack Hitch Receiver Problems

GM concluded that based on its data:

> All test and analysis documents within GM's possession indicate that the subject component will perform without failure in the field if load limitations are met. GM believes that loaded trailer weights in the field may exceed 10,000 lb. and that loaded trailer tongue weights in the field may exceed 1000 lb. It is GM's belief that if the hitch platform is used within the confines as described by GM in various, readily

available trailering usage documents, the subject component will perform without failure.

8.0 CONCLUSIONS

1. There are no Federal Motor Vehicle Safety Standards (FMVSS) or "National Highway Safety Standards for materials and construction specifications," as indicated in the petition, relating to trailer hitch design. The SAE J684 trailering standard covers classification and testing of towing equipment. For Class IV hitch receivers, according to SAE J684, the static test loads take into account the dynamic loads experienced during normal towing operations.

2. An analysis of hitch receiver crack/failure complaints in the ODI consumer complaint database and those submitted by GM reveals a low number and rate of complaints and a lack of a complaint trend for the subject vehicles, as well as their peer vehicles.

3. A recent field survey and weighing of the tow vehicles and trailers conducted by ODI indicate that a combination of overloading, improper hitch setup, and adverse road conditions appears to be a major factor in hitch receiver failures. Eight of nine surveyed Suburban owners at the Florida RV rally had overloaded their vehicle/trailer in one or more areas that can affect the structural integrity of the hitch receiver platform.

4. GM information indicates that the hitch receiver design passes the same static loading levels as specified in SAE J684 and also passes their on-road durability test while towing of a 10,000 lb. trailer with 1,000 lb. tongue load. GM believes that overloading is the cause of the reported failures in the field.

5. ODI initiated an investigation on the same hitch receiver cracking problem in 1995, but closed it in October the same year because the total complaint rates were low and ODI could not identify a defect trend. Since then, ODI has found no new significant information on MY 1992-1997 Suburban vehicles to support reopening this investigation.

6. RV owners should be educated as to the seriousness of overloading their RVs and tow vehicles. This could be accomplished by initiating an extensive campaign by vehicle, RV manufacturers, RV club safety committees, and national RV associations to further define loading limits and industry-wide terminologies, to advise owners to avoid conditions leading to overloading of both the towing vehicle and trailer, to inspect their towing equipment periodically, and to install weight distributing hitch systems correctly.

7. Based on the information presented above, it is unlikely that NHTSA would issue an order for the notification and remedy of a safety-related defect in the subject vehicles at the conclusion of the investigation requested in the petition. Therefore, in view of the need to allocate and prioritize NHTSA's limited resources to best accomplish the agency's safety mission, the petition is denied.

AUG 31 2000

Mr. Dave Blum
WBCCI RV Safety Committee
5329 Eagles Nest Road
Fruitland Park, FL 34731

NSA-14pco
DP00-001

Dear Mr. Blum:

This is in response to your petition dated January 7, 2000, requesting that the National Highway Traffic Safety Administration (NHTSA) initiate an investigation to determine whether to issue an order concerning the notification and remedy of a defect in model year 1992 through 1997 Suburban sport utility vehicles (subject vehicles) manufactured by General Motors Corporation.

You requested that an investigation be initiated on trailer towing hitch platforms (receivers) and related hitch equipment for "compatibility with National Highway Safety Standards for materials and construction specifications."

We have analyzed your petition and a summary of the analysis is presented in the enclosed notice, which is to be published in the Federal Register.

Based on our analysis, it is unlikely that NHTSA would issue an order for the notification and remedy of a safety-related defect in the subject vehicles at the conclusion of the investigation requested in the petition. Therefore, in view of the need to allocate and prioritize NHTSA's limited resources to best accomplish the agency's safety mission, your petition is denied.

Thank you for bringing this matter to our attention.

Sincerely,

Kenneth N. Weinstein
Associate Administrator
for Safety Assurance

Enclosure:
Federal Register Notice

00000542

DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

Denial of Motor Vehicle Defect Petition, DP00-001

AGENCY: National Highway Traffic Safety Administration (NHTSA), Department of Transportation.

ACTION: Denial of petition for a defect investigation.

SUMMARY: This notice sets forth the reasons for the denial of a petition submitted to NHTSA under 49 U.S.C. § 30162, requesting that the agency commence a proceeding to determine the existence of a defect related to motor vehicle safety. The petition is hereinafter identified as DP00-001.

FOR FURTHER INFORMATION CONTACT: Dr. George Chiang, Office of Defects Investigation, NHTSA, 400 Seventh Street, SW, Washington, D.C. 20590. Telephone: (202) 366-5206.

SUPPLEMENTARY INFORMATION: Mr. Dave Blum (petitioner), 5329 Eagles Nest Road, Fruitland Park, Florida 34731, submitted a petition to NHTSA by letter dated February 1, 2000, requesting that an investigation be initiated on trailer towing hitch platforms (receivers) and related hitch equipment for "compatibility with National Highway Safety Standards for materials and construction specifications."

Mr. Blum is a safety committee member of the Region 3 Wally Byam Caravan Club International Airstream travel club. He provided pictures and descriptions of four club members' tow vehicles with cracked Original Equipment Manufacturer hitch receivers. The tow vehicles were model years (MY) 1993, 1994, and 1997 General Motor Corporation Suburban Sport Utility Vehicles and a MY 1995 Dodge 2500 pickup truck.

NHTSA has reviewed and analyzed all available information. The result of this review and analysis is set forth in a Petition Analysis Report for DP00-001 and is published in its entirety as an appendix to this notice.

For the reasons presented in the petition analysis report, it is unlikely that NHTSA would issue an order concerning the notification and remedy of a safety-related defect at the conclusion of an investigation. Therefore, in view of the need to allocate and prioritize NHTSA's limited resources to best accomplish the agency's safety mission, the petition is denied.

Authority: 49 U.S.C. 30162(d); delegations of authority at CFR 1.50 and 501.8.

Issued on:

Kenneth N. Weinstein
Associate Administrator
for Safety Assurance

Billing Code *4910-59-P*

Federal Register

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Vol. 65 No. 186

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CFR Part

On August 28, 2000, the FAA determined that the application to impose and use the revenue from a PFC submitted by the Luzerne and Lackawanna Counties By-County Board of Commissioners was substantially complete within the requirements of section 158.25 of Part 158. The FAA will approve or disapprove the application, in while or in part, no later than Nov. 23, 2000. The following is a brief overview of the application.

PFC Application No.: 00–03–C–00–AVP.

Level of the proposed PFC: $4.50.

Proposed charge effective date: January 1, 2001.

Proposed charge expiration date: July 31, 2010.

Total estimated PFC revenue: $10,794,855.

Brief description of proposed project(s):

- Construct New Passenger Terminal Facility
- Construction Access Roadways and Non-Revenue Surface Parking
- Construction Terminal Aircraft Parking Apron
- Architect/Engineering Inspection and Contingency Fees
- Construct Snow Removal Equipment Storage/Maintenance Building
- Airport Master Plan Update
- Design/Construct Perimeter Fence
- Design/Runway Safety Areas
- Design/Reconstruct General Aviation ramp
- Purchase Snow Removal Equipment (Three plows/spreaders)

Class or classes of air carriers which the public agency has requested not be required to collect PFCs: Non-Scheduled/On-Demand Air Carriers, with seating capacity of less than 20 seats, filing DOT Form 1800–31.

Any person may inspect the application in person at the FAA office listed above under FOR FURTHER INFORMATION CONTACT and at the FAA regional airports office located at: 1 Aviation Plaza, Jamaica, New York 11434–4809

In addition, any person may, upon request, inspect the application, notice and other documents germane to the application in person at the Luzerne and Lackawanna Counties By-County Board Commissioners.

Issued in New York City, New York on August 28, 2000.

Thomas Felix,

Manager, *Planning and Programming Branch, Eastern Region*

[FR Doc. 00–24492 Filed 9–22–00; 8:45 am]

BILLING CODE 4910–13–M

DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

Denial of Motor Vehicle Defect Petition, DP00–001

AGENCY: National Highway Traffic Safety Administration (NHTSA), Department of Transportation

ACTION: Denial of petition for a defect investigation.

SUMMARY: This notice sets forth the reasons for the denial of a petition submitted to NHTSA under 49 U.S.C. § 30162, requesting that the agency commence a proceeding to determine the existence of a defect related to motor vehicle safety. The petition is hereinafter identified as DP00–001.

FOR FURTHER INFORMATION CONTACT: Dr. George Chiang, Office of Defects Investigation, NHTSA, 400 Seventh Street, SW, Washington, D.C. 20590. Telephone: (202) 366–5206.

SUPPLEMENTARY INFORMATION: Mr. Dave Blum (petitioner), 5329 Eagles Nest Road, Fruitland Park, Florida 34731, submitted a petition to NHTSA by letter dated February 1, 2000, requesting that an investigation be initiated on trailer towing hitch platforms (receivers) and related hitch equipment for "compatibility with National Highway Safety Standards for materials and construction specifications."

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NHTSA has reviewed and analyzed all available information. The result of this review and analysis is set forth in a Petition Analysis Report for DP00–001 and is published in its entirety as an appendix to this notice.

For the reasons presented in the petition analysis report, it is unlikely that NHTSA would issue an order concerning the notification and remedy of a safety-related defect at the conclusion of an investigation. Therefore, in view of the need to allocate and prioritize NHTSA's limited resources to best accomplish the agency's safety mission, the petition is denied.

Authority: 49 U.S.C. 30162(d); delegations of authority at CFR 1.50 and 501.8.

Kenneth N. Weinstein,

Associate Administrator for Safety Assurance.

Appendix—Petition Analysis—DP00–001

1.0 Introduction

Mr. Dave Blum (petitioner), Fruitland Park, Florida, submitted a petition to NHTSA by letter requesting that an investigation be initiated on trailer towing hitch receivers (platforms) and related hitching equipment "to assess their compatibility with National Highway Safety Standards for materials and construction specifications." The petitioner, who is a member of the Wally Byam Caravan Club International (WBCCI) Airstream travel club safety committee stated that NHTSA's Office of Defects Investigation (ODI) should open an investigation concerning hitch receiver failure because the WBCCI Airstream travel club members allegedly inspected and found cracks in their hitch receivers.

2.0 Vehicle Information

2.1 Subject Vehicle

In his petition, Mr. Blum did not specify the make, model, or year of vehicles he wanted ODI to investigate. However, between December 1999 and January 2000, he supplied information concerning cracked hitch receivers on a 1993, 1994, and 1997 model year (MY) General Motor Corporation (GM) Suburban vehicle and on a 1995 MY Dodge 2500 pickup (PU) truck. ODI selected MY 1992—1997 GM Suburban vehicles as the subject vehicles for the following reasons: (1) the petitioner identified three Suburban vehicles with cracked Original Equipment Manufacturer (OEM) hitch receivers; (2) the ODI consumer complaint database contained a relatively high number of complaints on the subject vehicles; (3) the Suburban has one of the largest towing capacities among the peer vehicles and is commonly used to tow large travel trailers; and (4) ODI had conducted a previous investigation (PE95–036) on certain GM Sport Utility Vehicles (SUVs), including MY 1992–1995 Suburbans to investigate a similar OEM hitch receiver crack problem.

2.2 Vehicles Involved

GM produces the Suburban for both the Chevrolet and GMC Divisions. The combined number of subject vehicles produced in the United States was 738K vehicles.[1] The Chevrolet Division accounted for 512K

[1] Ward's Automotive Yearbook, 1992—1998 Editions for MY 1992—1997 Suburbans

vehicles and the GMC Division accounted for 220K vehicles. According to GM, among the 738K vehicles, 494K vehicles were equipped with factory installed OEM hitch receivers.

3.0 Previous Recalls and Investigations of Hitch Receivers

ODI is aware of one recall and one previous investigation concerning hitch receiver cracking. DaimlerChrysler recalled certain MY 1998–2000 Dodge 2500 Ram pickup trucks [Recall 00V–107] because the steel had insufficient strength due to poor quality control. ODI opened a Preliminary Evaluation, PE95–036, in June of 1995 into an alleged defect in MY 1992–1993 Suburban vehicles after receiving four (4) complaints, one MY 1992 and three (3) MY 1993, concerning cracked hitch receivers. During this investigation, ODI expanded the scope to include other MY 1992–1995 GM SUVs. By the conclusion of the investigation in late 1995, ODI had received another complaint (MY 1992) and GM reported three (3) additional complaints (one MY 1992 and two MY 1993) bringing the complaints to a combined total of eight (8). The investigation revealed no injuries or crashes related to the alleged defect on the subject vehicles. ODI closed the investigation without any further actions and concluded the following:

* * * it appears that the cracks are readily obvious and slow to propagate. The problem may not be a catastrophic failure of the hitch platform. The high number of warranty claims coupled with the corresponding low number of failures is not indicative of a safety trend at this time.[2]

4.0 Hitch Receiver/Equipment and Towing Limits

Currently, there are no Federal Motor Vehicle Safety Standards (FMVSS) applicable to trailer towing hitch equipment. However, many hitch equipment manufacturers use the Society of Automotive Engineers Standard, SAE J684,[3] for hitch classification and test limits. According to SAE J684 (Table 1), there are four classes of towing capacities or tow ratings for applications less than 10,000 lb. When used with a weight distributing hitch system, the Suburban has a 10,000 lb. maximum towing capacity with the driver and one passenger onboard and no cargo in the tow vehicle. The additional weight of other occupants and cargo in the tow vehicle will reduce the towing capacity accordingly.

TABLE 1.—VARIOUS TYPES OF HITCH RECEIVERS

Class rating per SAE J684	Towing duty	Max. towing weight (in pounds)	Hitch system attachment type	Common payloads
Class I	Light	2,000	Weight Carrying (WC)	Motorcycle & Jet Ski trailers.
Class II	Medium	3,500	WC	Small Boat & utility trailers.
Class III	Heavy	5,000	WC	Med. travel & utility trailers, Large boat trailers.
Class IV	Heavy	10,000	Weight Distributing	Large travel & utility trailers Automotive trailers.

4.1 Hitch Receiver

Figure 1 shows a diagram of a typical frame mounted Class III/IV type hitch receiver. There are three basic sections that make up a hitch receiver: (1) the hitch bar and ball assembly that connects the trailer to the tow vehicle, (2) the horizontal box transfer beam and (3) the vertical mounting flanges for attachment to the vehicle frame. Note that the diagram also shows the typical crack patterns found as reported by the petitioner.

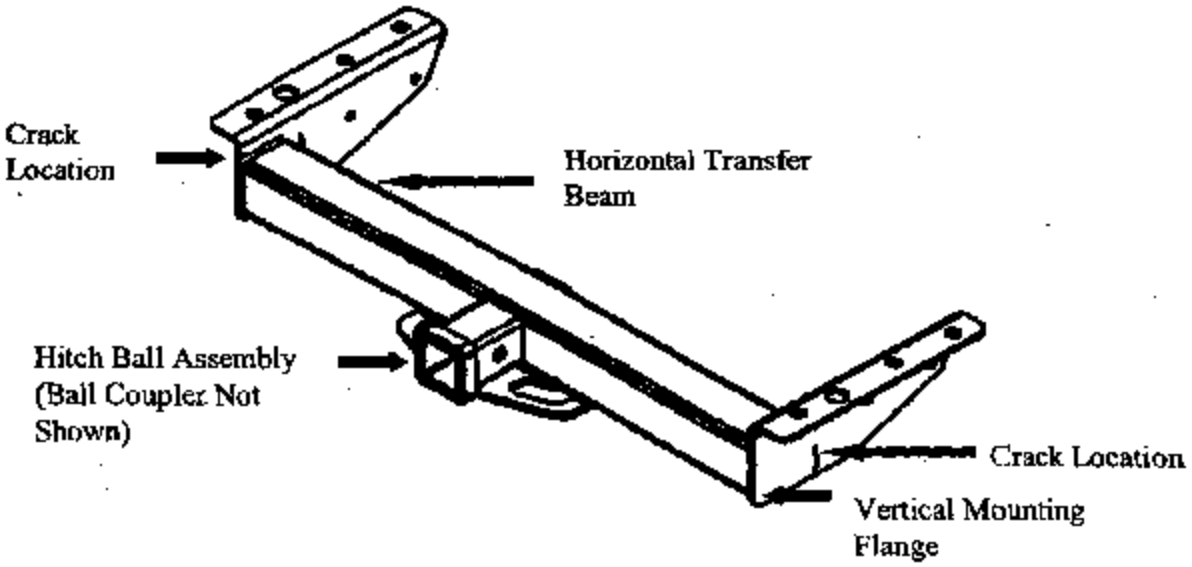

Figure 1. Typical Class III/IV towing Hitch Receiver

[2] NHTSA ODI PE95–036 (J. Abbott) of 31 October, 1995 (closing resume).

[3] "Trailering Couplings, Hitches, and Safety Chains—Automotive Type"—SAE J684 [6/98].

4.2 Weight Distribution (WD) Hitch System

Normally, on the lighter duty Class I/II/III applications, the trailer's tongue weight directly pushes down on the hitch receiver's coupling ball causing the rear of the tow vehicle to drop and the front of the vehicle to rise slightly. With larger and heavier trailers, this can severely affect vehicle handling and stopping distances and further add stresses to the tow vehicle and hitch receiver structures. To reduce these undesirable effects, an 'aftermarket' or 'third party' Weight Distribution (WD) hitch system must be used when towing large trailers. For Class IV applications with the WD system as shown in the set up of Figure 2, the two spring bars are bent upward to apply a counter moment torque to the WD hitch ball mount assembly and redirect or redistribute the point load tongue weight further forward in the tow vehicle. The subject vehicles' hitch receiver has a decal specifying 10,000 lb. towing and 1,000 lb. maximum tongue weight limits when used with the WD hitch system.

4.3 Proper Installation of the WD Hitch System

Based on the information obtained from various trailering sources,[4] a properly installed WD hitch system evenly distributes the loads to the entire tow vehicle. The WD hitch system's spring bars force both the front and rear wheel fenders equally downward. This aligns the tow vehicle so that it is approximately the same 'attitude' or 'level' as it was before the trailer was hooked up. A poorly installed WD hitch system can cause the tow vehicle's front end to 'lift up' resulting in more weight to the hitch receiver and rear axle. In addition, the ball mount height, spring bar angles, spring bar engagement level, and ball mount receiver bar length can also affect the proper installation and effectiveness of the WD hitch system.

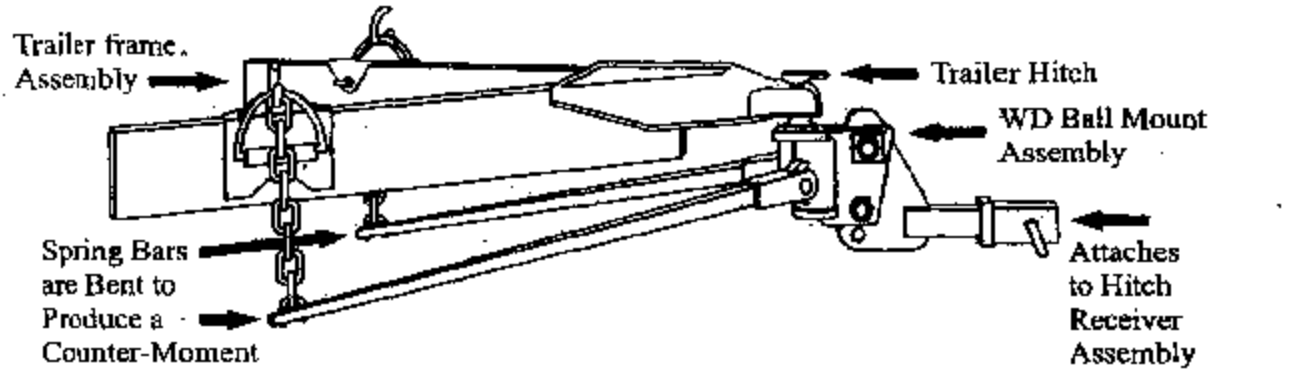

Figure 2. Typical Weight Distributing Hitch System Setup

4.4 Hitch Receiver Performance

For Class IV hitch receivers, SAE recommends a series of static test loads applied to the hitch ball mount and receiver to verify their towing limits. The static test loads include longitudinal, transverse, vertical and moment loads. According to SAE,[5] these static test loads are higher than the loads encountered during actual on-road towing. For example, the 2,100 lb. SAE specified vertical load is more than twice that of the typical trailer tongue weight limit of 1,000 lb. Tests conducted by SAE in the mid-1990s verified that the actual measured dynamic loads under normal towing conditions, such as turns, hills, dips and stops, are well within the higher SAE specified static loads. However, SAE also cautioned that abuse or mishaps such as backing into an object or one side of the trailer falling off the pavement can create loads that exceed the SAE specified loads. Remote and unimproved roadways and certain stretches of highways, with short concrete slabs causing the trailer to "porpoise" or oscillate up and down severely, can also create higher than normal loads at the hitch receiver.

5.0 Complaints

5.1 Complaints Submitted to ODI on the Subject Vehicles

ODI searched and analyzed all complaints involving the subject vehicles in its consumer database pertaining to an alleged cracked hitch receiver. As of August 1, 2000, the ODI database had recorded 15 cracked hitch receiver complaints on the subject vehicles. As shown in Table 2, the complaint dates, by calender year, were as follow: five in 1995, one in 1996, two in 1998, one in 1999 and six in 2000. There are high concentrations of complaints submitted in years 1995 and 2000. The first complaint concentration in 1995 was due to an effort of a Northeast region WBCCI Airstream travel club who surveyed its members and submitted all five of the complaints to ODI. The second complaint concentration in year 2000 was due to the efforts of the petitioner's Southeast region Airstream travel club safety committee in conjunction with ODI personnel during the February 2000 RV Rally in Sarasota, Florida. The inspections and field survey during the rally resulted in the submission of five of the six CY 2000 complaints in the ODI database. Otherwise, ODI has received only one or two complaints per year on the subject vehicles.

[4] Various Trailering Guides: Ford 2000 RV & Trailer Towing Guide (8/99), Reese 'Hitching Up Procedure' distributed during Airstream RV rally in Sarasota, Florida (2/00), 1997 Airstream 34' Excella Travel Trailer Owners Guide, Sections B and I on Hitching Up and Trailer Specifications; GM Suburban Owners Manuals, Section 4—'Towing a Trailer', MY 1993–1997, GM Suburban Sales Brochures, Section on Trailering, MY 1993–1997 and GMC Trailering Guides, MY 1993–1997.

[5] Discussions with SAE Jb84 Group Chairman, Mr. Jim Fait, during April and May of 2000.

TABLE 2.—ODI COMPLAINTS BY CALENDAR YEAR

Calendar year	CY95	CY96	CY97	CY98	CY99	CY00	Total
Suburban Total	5	1	0	2	1	6	15

Table 3 shows the complaint counts by model year for the subject vehicles equipped with the OEM installed hitch receivers. Among the fifteen Suburban complaints, eleven complainants were contacted during this petition analysis and they all reported towing 29' and longer Airstream trailers having a listed Gross Vehicle Weight Rating (GVWR) ranging from 7,000 to 9,600 lb. Most of the complainants never weighed their trailer and do not know the actual gross trailer towing weight (trailer plus cargo in both the tow vehicle and trailer). One recent (CY 2000) complainant reported that prior to towing his current 31' trailer, he was towing a 30' long trailer when the trailer's wheels hit a large pothole on the road. The impact was severe enough to damage the trailer's frame and totally destroyed the trailer structure. After receiving the Airstream RV club's newsletter which asked members to inspect their hitch receivers, he found cracks in the hitch receiver. It is unclear whether the cracks were caused by the impact with the pothole or inappropriate loading, or initiated from incorrect installation and usage of the WD hitch system. ODI was unable to contact the other four complainants despite attempting to reach them at the addresses and telephone numbers they provided.

TABLE 3.—ODI COMPLAINTS AND COMPLAINT RATES ON THE SUBJECT VEHICLES AND PEER VEHICLES

Model year	MY92	MY93	MY94	MY95	MY96	MY97	Total	Pop. with hitch	Rate
Suburban Total	2	6	4	0	2	1	15	494K	3.0
Dodge PUs	1	0	0	3	0	0	4	485K	0.8

5.2 Complaints Submitted to ODI on Peer Vehicles

ODI has also searched for cracked hitch receiver complaints in its database on other MY 1992–1997 trucks and vans having similar towing capacities. Except for the Dodge D–150/250/350 and B–1500/2500/3500 series pickup trucks (see Table 3), ODI has received no more than one hitch receiver complaint on any other vehicle. The complaint rate for cracked hitch receivers on the Dodge truck with OEM hitch receivers is 0.8 per 100,000 vehicles [6] as compared with the subject vehicles' rate of 3.0 per 100,000 vehicles.

6.0 Inspection and Survey at the Recreational Vehicle (RV) Rally

6.1 Airstream RV Rally in Sarasota, Florida

ODI personnel, at the invitation of the petitioner and the Airstream Region 3 RV Safety Committee, attended a RV rally held in Sarasota, Florida during the period of February 15–21, 2000. Of the 600 RV participants towing a travel trailer at the RV rally, approximately 150 use the subject vehicle to tow a large 31'–34' length Airstream travel trailer. Therefore, the percentage of large travel trailers among the 600 travel trailers at the Airstream RV rally was approximately 25%.

6.2 Physical Inspection of the Tow Vehicle Hitch Receivers

During the course of the RV rally, ODI and Airstream RV Safety Committee personnel made several announcements requesting each RV rally participant to inspect his/her hitch receiver for cracks. For those that responded, ODI and safety committee personnel visited them to further inspect their tow vehicles and trailers and to interview the owners. The Suburban was used as the tow vehicle in 21 of the 27 units inspected. Among these 21 units, 10 had cracked OEM hitch receivers, four had previously experienced cracked OEM hitch receivers and since had them replaced, and the remaining seven did not have any problems while using either the OEM or the non-OEM hitch receiver. The older MY 1993–1994 Suburbans accounted for six of the ten cracked receivers. Eight of the these 10 Suburban vehicles towed or previously towed the large 31'–34' length Airstream travel trailer with GVWR near the 10,000 lb. limit.

Among the remaining six owners who didn't have the Suburban as their tow vehicle, there were two reports of cracked hitch receivers. Specifically, a MY 1995 and a MY 1996 Dodge pickup truck towing Airstream 30' and 34' travel trailers respectively.

6.3 Overloading in the RV Community

Present at this rally was the A'Weigh We Go (AWWG) weighing service. AWWG travels across North America to large rallies to provide an on-site weighing service and to give seminars on safe towing practices. RV manufacturers and tire companies partially sponsor AWWG to provide the weighing service at a nominal cost to the participants. AWWG [7] has weighed more than 10,000 vehicles and trailers in the past 10 years including motorhomes, tow vehicles, 5th wheel trailers, and travel trailers (TTs). The majority of the data collected were from motorhomes (5,462 units) and the least amount of data collected were from travel trailers (462 units). They found that overloading or improper matching of equipment and loading is a common problem in the RV communities. Among the 462 travel trailers they have weighed over this period, 54 percent of the tow vehicles and 51 percent of the TTs exceeded load limits in one or more of the loading limits such as the Gross Combination Weight Rating (GCWR), the Gross Vehicle Weight Rating (GVWR), Gross Axle Weight Rating (GAWR), Tire Load Rating (TLR) or net vertical hitch loading. AWWG noted the following concern in their handbook:

Of particular concern is that 57% (percent) were over GCWR, indicating that too many folks are trying to pull too much trailer with too little truck.

6.4 Weighing of Units at the Florida RV Rally

ODI contracted with AWWG to use their weighing services during the Florida RV rally. ODI then requested all of the Suburban owners with cracked hitch receivers and randomly selected a few of the owners without cracked hitch receivers to have their units weighed by the AWWG (at ODI's expense) at the conclusion of the RV rally. ODI instructed each owner to prepare the tow vehicle and trailer as they normally would for road travel. Prior to the day of departure, AWWG weighed each tow vehicle without the trailer attached. Then, on departure day, AWWG weighed the entire tow vehicle and trailer assembly at each wheel and axle. By measuring the loads at each wheel, AWWG can determine if the loads exceed any of the GCWR, GVWR, GAWR limits for both the tow vehicle and the trailer. AWWG also measured and calculated the total trailer towing weight and the net vertical loading on the tow vehicle. According to AWWG, the net vertical loading on the tow vehicle rear axis is roughly equal to the trailer tongue weight within an error of 50 lb.[8] By comparing the measured vehicle loads with the manufacturer's load limits, AWWG can

[6] Dodge light duty pickup truck population equipped with OEM hitch receivers supplied by DCX on 6/20/00.

[7] A'Weigh We Go Recreation Vehicle Weight & Tire Safety Handbook, Textbook Edition, Section I, Rev. 1/00.

[8] Discussions with AWWG president, Mr. J. Anderson, during March–April 2000. Data taken from AWWG's weighing of both tongue and vertical weighing of both tongue and vertical weights on travel trailers in early 1990's.

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calculate the amount of 'weight margins' or 'weight overloading' in each of these areas.

During the RV rally, AWWC used calibrated commercial/industrial grade weighing scales that measure up to 20,000 lb. each with an accuracy to +/- 10 lb.[9] Many law enforcement agencies use the same type of scale during their highway truck inspections. Throughout the weighing process, ODI personnel observed that AWWC was careful to keep the vehicle and/or trailer level during weighing in order to obtain the most accurate and consistent readings.

5.5 AWWC Data Review

AWWC weighed nine of the 10 Suburban vehicles with cracked OEM hitch receivers. One owner did not make his vehicle and trailer available for weighing. Eight of the nine weighed units showed overloading in at least one category. Note that these recorded load conditions represent only the load conditions while attending the week long RV rally. Table 4 shows the various load conditions for each of the nine weighed units. The percentage of the rated load limit, shown as a "+" value, represents the margin within which the vehicle/trailer is below the maximum weight rating and the percentage over the rated load limit shown as a "–" value, represents overloading. Many owners exceeded weight limits in more than one rating. One owner (ID #1) exceeded six of the nine weight limits. Based on the weight data, overloading appeared to be a major contributing factor in cracked hitch receivers. The two vehicles listed at the bottom of the table (ID #8 & #9) that recorded the least amount of overloading and no overloading, respectively, had previously towed a larger and heavier 34' travel trailer, and that may have been the cause of the cracked hitch receivers.

The remaining seven Suburban vehicles with cracked hitch receivers that were weighed had from one to six failed rating areas out of the possible nine areas. Additionally, six of these seven units exceeded either the 10,000 lb trailer towing or 1,000 lb tongue weight limits as specified on the OEM hitch receiver.

5.6 Weights of Large Travel Trailers

Many modern RV trailers have comforts and amenities that help make mobile traveling more like a home on wheels. Full size bedroom, kitchen, bath, recliner and sofa are standard on many 28' or larger trailers. Many RV manufacturers can equip these trailers with additional options such as ceramic tile floors, stone counter tops, microwave oven, entertainment center satellite/computer systems and room slide-outs. All those items add additional weight to the basic trailer. The more the trailer weight is above the empty Dry Weight condition, the less "cargo" capacity is available to the consumer before reaching the trailer GVWR and the hitch receiver's towing limit. For example, Airstream rates their MY 2000 34' length Limited travel trailers at 8,290 lb. Dry Weight and a GVWR of 9,800 lb. maximum[10] resulting in a Net Carrying Capacity (NCC) of only 1,510 lb. This NCC would include any additional dealer or owner-installed options, fluids, LP gas, personal items such as food, clothing, television, furniture, kitchen wares, books, and repair tools. In addition, relocating some loads from the trailer to the tow vehicle may help keep from exceeding the trailer's GVWR, but still diminishes the towing capacity of the hitch receiver from the 10,000 lb maximum rating. Note that in a "remote" camping environment where there are no utilities, the camper may have the 54-gallon fresh water tank and the twin 20-gallon LP tanks filled to full capacities. These two items alone account for a combined weight of more than 600 lb. of the available NCC. In the Airstream web site,[11] the following disclaimer appears at the bottom of every page:

Vehicle Loading: Every effort has been made to provide the greatest number of options for the recreation vehicle owner. Along with these choices comes the responsibility to manage the loads that are imposed by the choices so that they remain within the manufacturer's specified chassis weight limits. Do not overload the recreation vehicle.

Dry weights based on standard features; optional equipment not included. Net carrying capacity (NCC) determined by subtracting unloaded vehicle weight (UVW) from gross vehicle weight (GVWR) and includes fluids, options and cargo. Liquid capacities and weights are approximations only.

Besides a safety seminar given by the RV Club's safety committee at the Florida rally, AWWC also presented a safety seminar there. During the seminar, AWWC reported that "the average couple carries about 2,000 lb. of stuff and the average full-timer, about 3 000 lb." which was documented in its handbook.[12] Many of the participants at the RV rally were retired "full-timers," including all of the Suburban owners with cracked hitch receivers.

Although not included in Table 4 because the owners did not report any hitch receiver problems, seven other Suburban vehicles towing large trailers with OEM and non-OEM hitch receivers, including the one belonging to the petitioner, were also weighed by AWWC. The results showed that overloading is also common among these owners, but to a lesser extent.

While the WBCCI RV safety committee provides guidance to RV owners in the proper usage of towing a trailer and the need to regularly inspect the towing equipment, there are no Federal or state laws that require weighing of RV trailers while traveling the nation's interstates as there are for commercial trucks.

7.0 GM Data Review

At the request of ODI, GM supplied the following information[13] concerning the alleged defect. GM stated that the same hitch receiver design has been used during the entire production period of the subject vehicles (MY 1992–1997).

7.1 GM Owner Reports

Among the 494K MY 1992–1997 Suburban vehicles sold with OEM hitch receivers, GM has received 15 owner complaints, one accident claim, and has been named in two lawsuits related to the alleged defect in the subject vehicles. Excluding non-crack related problems, duplicates of RV rally field survey reports and ODI complaints, Table 5 lists the nine cracked hitch receiver complaints from GM. The first reported litigation case involved a MY 1993 Suburban towing a 34' Airstream RV travel trailer. Prior to the case going to trial, the owner filed a "notice of nonsuit" and the court dismissed the case in 1/99. ODI reviewed this same report in 1995 during its investigation (PE95–036). The other litigation report involved a MY 1995 Suburban that lost its trailer while hauling a load of pumpkins. The owner replaced the hitch receiver before a GM representative was able to verify the failure or determine the cause. The report claimed approximately $1800 in damages. The one accident claim was from the same owner as the first litigation report. GM also reported 154 warranty claims on the subject vehicles' hitch receiver. Based on the GM failure codes, ODI estimates that approximately 15 to 20 percent of the claims may involve cracks in the vertical mounting flange, but further detail is not available. None of the complaints or warranty reports indicate bodily injuries or vehicle crashes as a result of the cracked hitch receivers.

TABLE 4.—WEIGHT DATA/ANALYSIS ON THE NINE SUBURBAN HITCH RECEIVER CRACK FAILURES

ID	Tow vehicle	Trailer	Tow vehicle overload? (percent)				Trailer overload? (percent)			Hitch receiver overload? (percent)		
			Tow veh GCWR	Tow veh GVWR	Tow veh GAWR	Tire load limit	Trailer GVWR	Trailer GAWR	Tire load limit	Trailer tng Wt 10,000 lb	Vert. Wt 1,000 lb.	Remarks
1	1994 Sub	34' A/S	+ 4	95	92	+ 1	– 16	12	93	– 93	– 12	6 failed areas
2	1995 Sub	34' A/S	99	3	12	94	+ 5	88	87	13	– 13	5 failed areas
3	1993 Sub	34' A/S	– 1	82	77	78	+ 3	– 13	64	– 17	1	4 failed areas

[9] AWWC Weighing Devices: Model WL 10K Range = 1-20,000 lb. Class III Accuracy, Load Onto Meter Corporation, Baltimore, MD.

[10] The Airstream, Inc. Airstream Travel Trailer web site, <http://www.airstream.com> on 5/00.

[11] Airstream Inc. Safety Tow Vehicle Weight & Tire Safety Handbook, First Edition, pages VI, B-1 – 1 01.

[12] General Motors response to ODI Information Request (IR), GN 58 of 3/00 and FAX of 5/02.

TABLE 4.—WEIGHT DATA/ANALYSIS ON THE NINE SUBURBAN HITCH RECEIVER CRACK FAILURES—Continued

ID	Tow vehicle	Trailer	Tow vehicle overload? (percent)				Trailer overload? (percent)			Hitch receiver overload? (percent)		
			Tow veh. GCWR	Tow veh. GVWR	Tow veh. GAWR	Tire load limit	Trailer GVWR	Trailer GAWR	Tire load limit	Trailer tow Wt. 10,000 lb.	Vert. Wt. 1,000 lb.	Remarks
4	1999 Sub	31' A/S	80	96	93	90	−7	0	88	82	−8	3 failed areas.
5	1993 Sub	34' A/S	92	−5	−10	90	99	84	83	−3	84	3 failed areas.
6	1993 Sub	34' A/S	91	86	−4	90	91	97	79	−1	86	2 failed areas.
7	1996 Sub	30' A/S	95	96	−1	85	95	93	89	91	85	1 failed area.
8	1994 Sub	31' A/S	66	80	60	87	−1	100	95	92	63	1 failed area.
9	1996 Sub	30' A/S	86	87	79	97	96	91	84	91	100	0 failed area.

Notes:
GCWR—The Gross Combination Weight Rating (GCWR) is the maximum allowable combined weights from the tow vehicle and the trailer as specified by the vehicle manufacturer.
GVWR—The Gross Vehicle Weight Rating (GVWR) is the maximum allowable gross vehicle weight of the tow vehicle or trailer as specified by the manufacturer.
GAWR—The Gross Axle Weight Rating (GAWR) is the maximum allowable weight on each axle as specified by the manufacturer.
Tire Load Limit—The tire load limit is the maximum allowable load on each tire as specified by the manufacturer.
Trailer Tow Wt.—The trailer towing weight is the maximum allowable towing weight by the hitch receiver. It includes the trailer weight, as well as any additional occupant and cargo weights in the tow vehicle.
Vert. Wt.—The hitch vertical weight is the maximum net vertical loads on the rear axle after trailer hookup. According to AAVVG, the vertical weight is approximately the same as the hitch tongue weight.

TABLE 5.—GM COMPLAINTS AND REPORTS ON HITCH RECEIVER CRACKING

ID	DOI	Tow vehicle	Trailer mileage	Trailer weight	Nature of failure	Est. damage cost	GM/dealer action
99–6701	6/99	'96 Sub	6K vehicle miles	32' Jayco Est. 9Kt	1" crack both sides	Not Available (n/a).	100% Goodwill (G/W).
99–7801	8/99	'94 Sub	100K vehicle miles	Car Trailer Est. 6.5Kt.	Side plate broke off	$0.9K on trailer.	Denied.
99–6101	9/99	'94 Sub	Est. 120K tow miles	27 Jayco RV Est. 8Kt.	Broken & cracked	N/A	Denied.
99–7001	11/99	'96 Sub	45K vehicle miles	A/S trailer N/A	Broken & cracked	N/A	Under warranty.
99–0994	8/99	'96 Sub	43K vehicle miles	RV trailer N/A	Broken-trailer separation.	N/A	75% G/W.
99–4148	12/99	'94 Sub	57K vehicle miles	A/S trailer N/A	Cracked on both sides.	N/A	Denied.
99–1001	3/00	'93 Sub	Est. 60K tow miles	A/S 32' trailer 6.5K+	Broken & cracked on both sides.	N/A	Denied.
99–6101	10/94	'93 Sub	160K vehicle miles	A/S trailer N/A	Broken & crack	N/A	Denied.

7.2 GM Hitch Receiver Design, Test and Performance Limits

During the development phase, GM conducted both nondestructive analysis and destructive testing on their hitch receiver design. This included Finite Element Analysis (FEA), static load testing and on-road durability tests. GM's FEA, as well as the static load testing, support GM's opinion that the hitch receiver will perform as designed. Both GM and other hitch receiver manufacturers use the same static load limits found in the SAE standard. In addition, GM successfully conducted a 6,500 mile on-road durability test with a Suburban towing a 10,000 lb. trailer having 1,000 lb. tongue weight over various road conditions without cracks or hitch receiver failure. According to GM, due to the course's hilly terrain, this test is equivalent to 20,000 normal towing miles. It should be noted that GM does not identify the "towing rating with no cargo" limitation anywhere on the hitch receiver, on the vehicle, or in any of the pre-1996 owners' manuals. However, this limitation is specified in their trailering guides.

7.3 GM's Assessment of the Crack Hitch Receiver Problems

GM concluded that based on its data:

All test and analysis documents within GM's possession indicate that the subject component will perform without failure in the field if load limitations are met. GM believes that loaded trailer weights in the field may exceed 10,000 lb. and that loaded trailer tongue weights in the field may exceed 1000 lb. It is GM's belief that if the hitch platform is used within the confines as described by GM in various, readily available trailering usage documents, the subject component will perform without failure.

8.0 Conclusions

1. There are no Federal Motor Vehicle Safety Standards (FMVSS) or "National Highway Safety Standards for materials and construction specifications," as indicated in the petition, relating to trailer hitch design. The SAE J684 trailering standard covers classification and testing of towing equipment. For Class IV hitch receivers, according to SAE J684, the static test loads take into account the dynamic loads experienced during normal towing operations.

2. An analysis of hitch receiver crack/failure complaints in the ODI consumer complaint database and those submitted by GM reveals a low number and rate of complaints and a lack of a complaint trend for the subject vehicles, as well as their peer vehicles.

3. A recent field survey and weighing of the tow vehicles and trailers conducted by ODI indicate that a combination of overloading, improper hitch setup, and adverse road conditions appears to be a major factor in hitch receiver failures. Eight of nine surveyed Suburban owners at the Florida RV rally had overloaded their vehicle/trailer in one or more areas that can affect the structural integrity of the hitch receiver platform.

4. GM information indicates that the hitch receiver design passes the same static loading levels as specified in SAE J684 and also passes their on-road durability test while towing of a 10,000 lb. trailer with 1,000 lb. tongue load. GM believes that overloading is the cause of the reported failures in the field.

5. ODI initiated an investigation on the same hitch receiver cracking problem in 1995, but closed it in October the same year because the total complaint rates were low and ODI could not identify a defect trend. Since then, ODI has found no new significant information on MY 1992–1997 Suburban vehicles to support reopening this investigation.

6. RV owners should be educated as to the seriousness of overloading their RVs and tow vehicles. This could be accomplished by initiating an extensive campaign by vehicle, RV manufacturers, RV club safety committees, and national RV associations to further define loading limits and industry-wide terminologies, to advise owners to avoid conditions leading to overloading of both the towing vehicle and trailer, to inspect their towing equipment periodically, and to install weight distributing hitch systems correctly.

7. Based on the information presented above, it is unlikely that NHTSA would issue an order for the notification and remedy of a safety-related defect in the subject vehicles at the conclusion of the investigation.

requested in the petition. Therefore, in view of the need to allocate and prioritize NHTSA's limited resources to best accomplish the agency's safety mission, the petition is denied.

(FR Doc. 00-24584 Filed 9-22-00; 8:45 am)

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DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

[Docket No. NHTSA-2000-7154; Notice 2]

Suzuki Motor Corporation; Denial of Application for Decision of Inconsequential Noncompliance

Suzuki Motor Corporation of Hamamatsu, Japan, has determined that it manufactured 1,595 vehicles that fail to comply with Federal Motor Vehicle Safety Standard (FMVSS) No. 225, "Child Restraint Anchorage Systems," and has filed an appropriate report pursuant to 49 CFR part 573, "Defect and Noncompliance Reports." Suzuki has also applied to be exempted from the notification and remedy requirements of 49 U.S.C. Chapter 301—"Motor Vehicle Safety" on the basis that the noncompliance is inconsequential to motor vehicle safety.

Notice of receipt of the application was published on April 25, 2000 in the **Federal Register** (65 FR 24253), with a 30-day comment period. We received no comments.

FMVSS No. 225, S4.1, requires that:

Each tether anchorage and each child restraint anchorage system installed, either voluntarily or pursuant to this standard, in any new vehicle manufactured on or after September 1, 1999, shall comply with the configuration, location, marking and strength requirements of this standard. The vehicle shall be delivered with written information, in English, on how to appropriately use those anchorages and systems.

FMVSS No. 225, S12, requires that:

The vehicle must provide written instructions, in English, for using the tether anchorages and the child restraint anchorage system in the vehicle. If the vehicle has an owner's manual, the instructions must be in that manual. The instructions shall:

(a) Indicate which seating positions in the vehicle are equipped with tether anchorages and child restraint anchorage systems;

(b) In the case of vehicles required to be marked as specified in paragraphs S4.5(j), S9.5(j), or S11.4, explain the meaning of markings provided to locate the lower anchorages of child restraint anchorage systems; and

(c) Include instructions that provide a step-by-step procedure, including diagrams, for properly attaching a child restraint system's tether strap to the tether anchorages.

At the start of production for the 2000 model year, Suzuki began installing user-ready tether anchorages as standard equipment in Suzuki Swift vehicles. Due to an oversight, however, Suzuki neglected to update the Suzuki Swift owner's manual in conjunction with this production change. As a result, the owner's manuals for 1,595 Suzuki Swift vehicles manufactured between August 1999 and February 2000, and shipped prior to March 2000, do not comply with the information requirements in FMVSS No. 225.

Suzuki supports its application for inconsequential noncompliance with the following:

"The vehicle owner's manual for the subject Suzuki Swift vehicles contains the following text relating to the use of child restraint systems that require use of a top tether.

Some child restraint systems require the use of a top strap. If you use such a restraint system and your vehicle is not equipped with the top tether strap anchor bracket, have your dealer install the top strap anchor bracket, or contact your dealer for instructions on how to install the anchor bracket.

In addition to the text message, the owner's manual contains two illustrations (one for the hatchback model and one for the sedan model) showing a child restraint system positioned at one of the rear seating positions, with its tether strap attached to the tether anchorage.

Although the Swift owner's manual does not mention that user-ready tether anchorages are provided as standard equipment and does not show all of the seating positions that are equipped with a tether anchorage, the illustrations in the manual do show the tether anchorage location for one of the rear seating positions. Suzuki believes that vehicle owners will assume, based on the illustrations, that anchorages are provided for both rear seating positions. In addition, when you look at the actual vehicle, it is obvious that user-ready anchorages are provided as standard equipment for both rear seating positions. Since the tether anchorages are easily recognizable in the vehicle, Suzuki believes that failure to fully illustrate the location of each tether anchorage in the vehicle owner's manual is inconsequential.

The Swift owner's manual also does not fully comply with the requirement to "* * * provide a step-by-step procedure, including diagrams, for properly attaching a child restraint system to the tether anchorages." * * * Typically, because there are differences in child restraint system design, the vehicle owner's manual can only provide general instructions to hook the tether strap hook into the anchor bracket and tighten the tether strap. These steps are somewhat obvious, and should be intuitively understood by vehicle owners.

Also, each child restraint system is required to be accompanied with its own installation instructions. Section 5 of FMVSS No. 213, Child Restraint Systems, requires that each child restraint system * * * must be accompanied by printed installation instructions in the English language that provide a step-by-step procedure, including diagrams, for installing the system in motor vehicles * * *". Suzuki believes that vehicle owners rely on the installation instructions provided with the child restraint system, rather than those provided in the vehicle owner's manual, for information about how to install the child restraint system in their vehicle. As a result, Suzuki believes that failure to provide a step-by-step procedure, in the vehicle owner's manual, for attaching a child restraint system to the vehicle's tether anchorages is inconsequential to safety."

We are denying Suzuki's application for the following reasons:

Suzuki failed to adhere to S4.1 of FMVSS No. 225, which requires that manufacturers shall specify tether anchorage configurations and locations in their vehicles along with written information on how to use those anchorages and systems appropriately. Suzuki also failed to meet the requirements of S12(a) and (c) of FMVSS No. 225, which specify that the information provided in the vehicle owner's manual must (a) indicate which seating positions in the vehicle are equipped with tether anchorages and (b) include instructions that provide step-by-step procedures, and diagrams for properly attaching a child restraint system's tether strap to the tether anchorages. Suzuki provides no excuse for its oversight in neglecting to update the 2000 model year Suzuki Swift owner's manual with the required information.

The agency does not agree with Suzuki that illustrating one child restraint system positioned at only one of the two rear seating positions, with its tether strap attached to the tether anchorage sufficiently demonstrates to the owner that in fact two rear seating positions are available for child restraints with tether installations. The agency further disagrees with Suzuki's assumption that the steps necessary for hooking the tether strap to the anchor bracket in the vehicle will be "intuitively" understood by vehicle owners. Child restraint systems with a top tether strap have only recently been introduced for use in this country, and requirements for tether anchorages have only applied to vehicles manufactured after September 1, 1999. Therefore, it is not likely that vehicle owners will be familiar with this new child restraint system feature on the child seat itself or its proper connection to the vehicle. The use of a top tether decreases the motion of a child restraint in a forward crash and therefore reduces the likelihood that the occupant child's head will impact hard interior surfaces of the

GENERAL MOTORS NORTH AMERICA
Safety Center

September 11, 2000

Peter Ong
Trend and Analysis Division
Office of Defects Investigation
NHTSA Safety Assurance
400 Seventh Street, S.W.
Washington, D.C. 20590

GM-583

NSA-14pco
DP00-001

Dear Mr. Ong:

Enclosed are two copies of examination documents furnished to Product Investigations concerning GM Truck's analysis of the trailer hitch, you furnished for examination.

Do you wish to have the hitch returned to you?

Sincerely

Kirk Ulman
Product Investigations

enclosures

00000553

Product Investigations
Mail Code: 480-106-304 • 30500 Mound Road • Warren, MI 48090-9055
Phone (810) 986-6116 • Fax: (810) 947-2318 kirk.ulman@gm.com

August 24, 2000

Tim Dunning,

The attached document is the Metallurgical Lab evaluation of the Suburban trailer hitch platform sent by NHTSA. The report contains several observations, including the following:

1) Both side plate fractures were unidirectional bending fatigue.
2) Corrosion was apparent on fracture surfaces
3) Safety chain plate was deformed
4) Abrasive wear was noted on side plate bottom edges.
5) Witness marks around mounting holes indicate hitch platform had shifted position relative to frame

It is impossible to determine if the hitch platform was overloaded during use, however the following considerations with respect to the above points, may be relevant.

1) Unidirectional bending fatigue indicates that single axis forces, rather than multi-axis forces such as a combined longitudinal and vertical loading, caused the fracture. Furthermore, reverse bending, where a part is alternately loaded in opposite directions along a single axis, did not occur. This tends to point to excessive vertical loading as longitudinal loading would not exercise the radius in this manner and excessive lateral loads would tend to lead to reverse bending fatigue.
2) The fractures appear to have progressed slowly enough to allow surface corrosion to develop and provide the owner opportunity to observe part condition.
3) The hitch platform experienced some abnormal loading as the only way the safety chain plate can deform while trailering is through trailer separation, where hitch ball, ball mount and receiver are no longer carrying load. If not trailering, this kind of damage could conceivably occur if chains or tow straps are attached to hitch platform safety chain holes during activities such as vehicle recovery from a ditch or stump pulling.
4) The hitch platform experienced ground contact. While ground contact alone may or may not affect hitch platform performance, ground contact most often occurs while negotiating steep inclines (i.e., driveways) and/or while the vehicle rear axle is overloaded. Rear axle overloading could occur if the vehicle carries more passengers and/or cargo than it should or if excessive trailer tongue weight is applied.
5) The hitch platform apparently experienced sufficiently high fore/aft loading to dislodge it from its original position. That can compromise attachment integrity and reduce ability of the part to adequately carry load.

It is impossible to accurately determine causes and subsequent effects of safety chain plate deformation, side plate ground contact, and hitch platform-to-frame slip on the fatigue cracks. However, it should be noted that none of these situations were documented during vehicle trailering validation with a properly set up 10000 lb trailer at 1000 lb tongue weight.

Robert J Krouse
GM Truck Trailering Engineer

Attachment:
Cc: M.Bailey
J. Federico
C. Krajewski
M. Povirk

0000554

CG190 (Rev June/00)

GM Evaluation Report

Platform	Project/EWO No.	Requirement No.	Procedure No.	VPP/VIA/UPC	Model Year	Model No.	PER/Report No.
C/K Annual and Current Product Support	n/a	n/a	n/a	n/a	1995		Materials Test - 01879

Reference Issue Report (IR) No. na

Category: MAT
Function x Development Validation
Method: Math Based x Hardware Based

Date: 7/11/2000

Title: Materials Test - 01879

☒ Final
☐ Interim No.
☐ Reissue Date of Reissue:

To: (Requestor) Frank D Risko

From: Gary L. Haviland

Date of Request: 06/19/2000

Dates of Evaluation: 6/19/2000 –7/12/2000

- The results published within this report relate only to the items tested.
- This report shall not be reproduced except in full, without the written approval of the laboratory manager or his/her cesignate.
- Tests identified with an asterisk are not included in the laboratory's current A2LA scope of accreditation.

Objective:

Determine trailer hitch side plate fracture cause and parts conformance to material specifications.

Conclusions:

The two side plate fractures were both unidirectional bending fatigue initiating on the inner radius surface of the formed bend which creates the frame mounting flange. The side plates conform to material specifications. The cause of the safety chain plate deformation could not be accurately determined.

Design Evaluated: **GMUTS Rating:** n/a **Veh. Mileage:**

Part/Test Object Name(s)	Veh/Buck/PT/Part No./RPO	Revision Date/Level
Miscellaneous	15643953	n/a
Material		
1008-1020		

Distribution:

Name: Frank D Risko Loc:
Name: Loc
Name: Loc
Name: Loc:
Name: Loc:

cc:

Author Gary L. Haviland Date: 7/11/2000
(Title/Phone) Lead Analyst/
(Location) GMNA Materials Lab -

Approver: Date:
(Title) Final Report Approver
(Location) GMNA Materials Lab -

Approver: Date:
(Title)
(Location)

8049552

CG190 (Rev June/99)

GM Evaluation Report

Platform	Project/EWO No.	Requirement No.	Procedure No.	VPP/VIA/UPC	Model Year	Model No.	PER/Report No.
C/K Annual and Current Product Support	n/a	n/a	n/a	n/a	1995		Materials Test - 01879

Reference Issue Report (IR) No. na

Category: MAT
Function x Development: Validation
Method: Math Based x Hardware Based

Recommendations:

None made.

Requirements:

None Provided.

Background:

Sample Condition as received:

"on pallet"

Sample History:

Field Return. This piece came directly from NHTSA. It is identified with a white address label. We will need to provide a report to NHTSA on this specific part. Also, until we hear from NHTSA, please do not dispose of this part or any sectioned pieces. For all parts please ensure that the parts meet the material specifications of print 15643953. This part number is indicated on the black label on the part.

Equipment:

Instrument Name	Used for:
Baird "One Spark" Optical Emission Spectrometer	Chemistry
Wilson Rockwell Hardness Tester Model 3JR tester #10589	Hardness
Mitutoyo Micrometer #112-237 internal I.D. #TCO 748	Material Thickness
Nikon Epiphot TME Metallograph	Microstructural analysis
Olympus SZH Microscope	Macro examination
Canon/Kodak EOS-DCS 1c Camera	Photography
Magnaflux Model CSQG-5A Magnetic Particle inspection Equipment	Crack Detection

Procedure/Method:

Failure Analysis – Scanning Electron Microscopy (ADEM II/JEOL 840F/JEOL 5800) was tested by Gary L. Haviland
Photography (Digital Imaging) of Materials* was tested by Gary L. Haviland
Report Preparation (Failure Analysis)* was tested by Gary L. Haviland
Microstructural Analysis of Metals and Alloys including Etching (ASTM E407-93) was tested by Gary L. Haviland
Photomicrography of Metals and Materials (ASTM E883-94) was tested by Gary L. Haviland
Preparation of Metallographic Samples (ASTM E3-95) was tested by Gary L. Haviland
Magnetic Partical Examination (Magnaglo) (ASTM E1444-94a)* was tested by Gary L. Haviland
Analysis of Low Alloy Steels by OES (ASTM E415) was tested by Randy Kandow

NOTE: The specific procedure followed for each test is that described in the relevant GMNA Materials Laboratory

CG190 (Rev. June/99)

GM Evaluation Report

Platform	Project/EWO No.	Requirement No.	Procedure No.	VPP/VIA/UPC	Model Year	Model No.	PER/Report No.
C/K Annual and Current Product Support	n/a	n/a	n/a	n/a	1995		Materials Test - 01879

Reference Issue Report (R) No. na

Category: MAT
Function x Development Validation
Method: Math Based x Hardware Based

test instruction. When standard test methods have been modified, the specific nature of such modifications is stated in the test instructions.

Results:

Macro and fracture analysis:

The submitted trailer hitch exhibited two fractures, one in each of its side plates (see photograph 1). Both fractures were located in the rear edge of their respective frame mounting flange radii. The right hand plate fracture was approximately 43 mm in length (measured from the rear plate edge to the crack end). The left hand plate fracture was approximately 54 mm in length. Both fracture surfaces evidenced heavy corrosion products, typical for the part that had fractured and subsequently been in service for an extended period of time (see photographs 2 & 3).

An attempt to clean the fracture surfaces was made (in a heated solution of 5% Cole-Palmer Micro cleaning solution, alternately heated and ultrasonically cleaned). The partially cleaned surfaces revealed, in both cases, unidirectional bending fatigue fractures initiating on the inner surface of the aforementioned frame mounting flange radius. The fractures were identified as fatigue on a macro scale because of the characteristic arrest lines (beachmarks) originating from a single point and ratchet marks along the inner radius surface. No attempt was made to characterize the fracture on a micro scale by scanning electron microscope because of the lack of surface detail (the surface was heavily pitted from the severe corrosion).

The right hand fracture initiation site was located approximately 7.5 mm from the rear sheared edge of the plate (see photograph 4); the left hand fracture initiated approximately 6.5 mm from its respective rear sheared edge (see photograph 5). The last portion of the left plate fracture (the last 33 mm) had propagated along a linear tool mark. This shallow tool mark was not in the area of nor did it appear to influence the left plate fracture initiation. No other detrimental material or processing defects (inclusions, tool marks or mechanical damage) were observed at the other fracture initiation sites.

As submitted, the edges of the safety chain plate were bent downward (7 mm from the original position on the left side and 20 mm on the right; see photograph 6). The rear edges of the holes and the rear outer edges of the plate exhibited considerable mechanical damage (upset metal, gouging, etc.). It, however, could not be determined whether this damage (which might logically be determined to have resulted from an interaction with the safety chains) was related to the bent condition of the plate and or whether either was related to the side plate fracturing.

Each of the right and left side plates also evidenced heavy directional (fore-aft) abrasive wear on their bottom most edges, typical of being dragged on a rough surface (such as pavement). The frame mounting surfaces did exhibit some degree of looseness, particularly around the forward mounting holes, in the form of polish (paint worn off) and fretting corrosion (typical of minute relative movement). The significance of these observations in regard to the side plate fractures could not be determined (with the limited information supplied).

Magnetic particle inspection:

No other crack indications (other than the two major right and left side plate fractures) were observed.

00000557

CG190 (Rev June/92)

GM Evaluation Report

Platform	Project/EWO No.	Requirement No.	Procedure No.	VPP/VIA/UPC	Model Year	Model No.	PER/Report No.
C/K Annual and Current Product Support	n/a	n/a	n/a	n/a	1995		Materials Test - 01879

Reference Issue Report (IR) No. na

Category: MAT
Function x Development Validation
Method: Math Based x Hardware Based

Chemistry:

All units are % by weight

Sample	C	Mn	P	S	Al	Cr	Cu	Mo	Ni
Right Side	0.05	0.18	0.008	0.014	0.08	0.01	0.02	0.03	<.01
Left Side	0.04	0.18	0.008	0.014	0.08	0.01	0.02	0.03	<.01

(Side plates conform to the blueprint materials specification of SAE 1008-1020).

Metallography:

Both side plates evidenced typical low carbon sheet steel microstructures. They had primarily equi-axed ferritic grain structures, ASTM grain size 7-8, with some partially spheroidized pearlite at the grain boundaries. Additional small spheroidized carbides, evenly distributed within the microstructure, were observed (see photograph 7).

Hardness:

Right side plate: 70 Rockwell 'B' (average of three tests: 69, 70, 71 Rb).
Left side plate: 70 Rockwell 'B' (average of three tests: 70, 69, 71 Rb).

Material thickness:

Right side plate: 6.07 mm
Left side plate: 6.07 mm
Safety chain plate: 6.05 mm
Specification: 6.0 min + 0.6 mm

References/File Storage:

All raw data files are stored in the laboratory and can be made available upon request.

Calibration Report Information:

All relevant calibration records are available in the laboratory and can be provided upon request. For specific information please contact the Laboratory Quality Manager.

00000558

CG190 (Rev. June/99)

GM Evaluation Report

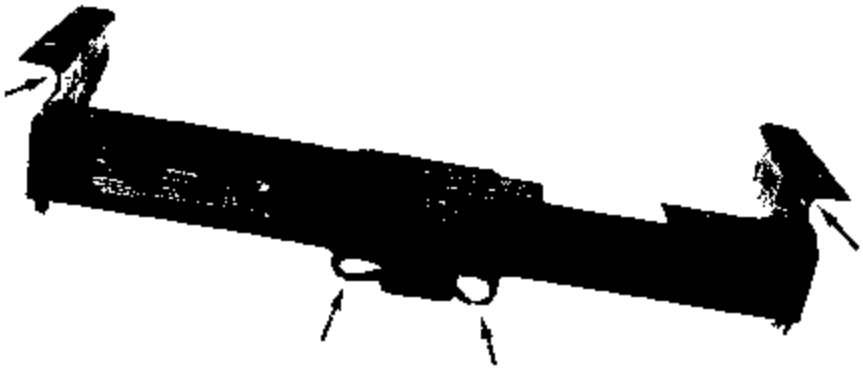
Platform	Project/EWO No.	Requirement No.	Procedure No.	VPP/VIA/UPC	Model Year	Mocel No.	PER/Report No.
C/K Annual and Current Product Support	n/a	n/a	n/a	n/a	1995		Materials Test - 01879

Reference Issue Report (IR) No. na

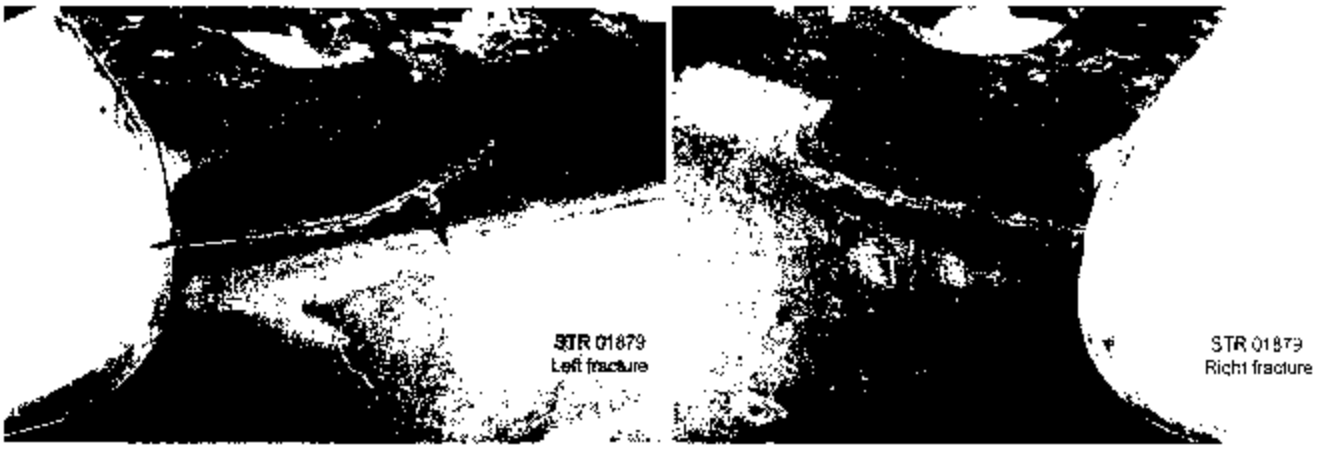
Category: MAT
Function x Development Validation
Method: Math Based x Hardware Based

Appendix:

STR 01879



Photograph 1. The submitted trailer hitch. The black arrows indicate the fracture locations. The red arrows denote the safety chain plate deformation.



Photographs 2 & 3. The right and left frame flange radius fractures.

00000559

CG196 (Rev. June/99)

GM Evaluation Report

Platform	Project/EWO No.	Requirement No.	Procedure No.	VPP/VIA/UPC	Model Year	Model No.	PER/Report No.
C/K Annual and Current Product Support	n/a	n/a	n/a	n/a	1995		Materials Test - 01879

Reference Issue Report (IR) No. na

Category: MAT
Function x Development Validation
Method: Math Based x Hardware Based

STR 01879
Right side fracture

Photograph 4. The right plate fracture surface showing the fatigue progression and the initiation site.

STR 01879
Left side fracture

Photograph 5. The left plate fracture surface showing the fatigue progression and the initiation site.

00000560

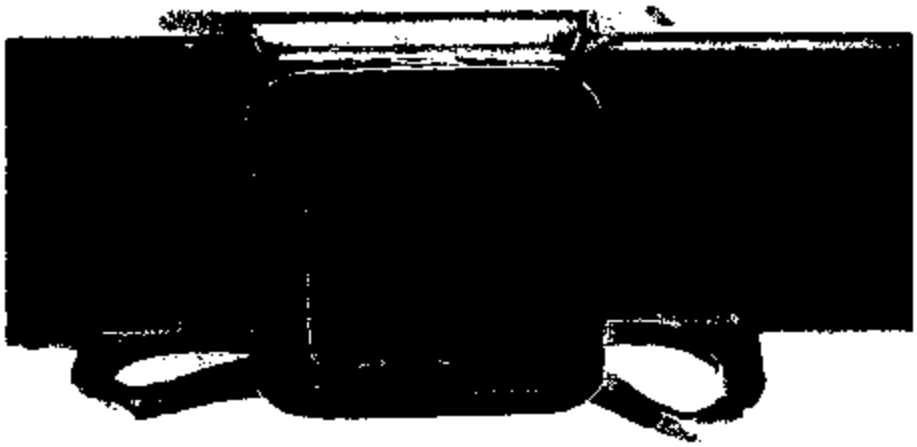
CG190 (Rev June/98)

GM Evaluation Report

Platform	Project/EWO No.	Requirement No.	Procedure No.	VPP/VIA/UPC	Model Year	Model No.	PER/Report No.
C/K Annual and Current Product Support	n/a	n/a	n/a	n/a	1995		Materials Test - 01879

Reference Issue Report (IR) No. na

Category: MAT
Function x Development Validation
Method: Math Based x Hardware Based



STR 01879

Photograph 6. A close up of the safety chain plate showing the downward deformation.

Photograph 7. Typical side plate material microstructure.

00000561

August 24 2000

Tim Dunning,

The attached document is the Metallurgical Lab evaluation of the Suburban trailer hitch platform sent by NHTSA. The report contains several observations, including the following:

1) Both side plate fractures were unidirectional bending fatigue.
2) Corrosion was apparent on fracture surfaces.
3) Safety chain plate was deformed.
4) Abrasive wear was noted on side plate bottom edges
5) Witness marks around mounting holes indicate hitch platform had shifted position relative to frame

It is impossible to determine if the hitch platform was overloaded during use, however, the following considerations with respect to the above points may be relevant.

1) Unidirectional bending fatigue indicates that single axis forces, rather than multi axis forces such as a combined longitudinal and vertical loading, caused the fracture. Furthermore, reverse bending, where a part is alternately loaded in opposite directions along a single axis, did not occur. This tends to point to excessive vertical loading as longitudinal loading would not exercise the radius in this manner and excessive lateral loads would tend to lead to reverse bending fatigue.
2) The fractures appear to have progressed slowly enough to allow surface corrosion to develop and provide the owner opportunity to observe part condition.
3) The hitch platform experienced some abnormal loading as the only way the safety chain plate can deform while trailering is through trailer separation, where hitch ball, ball mount and receiver are no longer carrying load. If not trailering, this kind of damage could conceivably occur if chains or tow straps are attached to hitch platform safety chain holes during activities such as vehicle recovery from a ditch or stump pulling
4) The hitch platform experienced ground contact. While ground contact alone may or may not affect hitch platform performance, ground contact most often occurs while negotiating steep inclines (i.e. driveways) and/or while the vehicle rear axle is overloaded. Rear axle overloading could occur if the vehicle carries more passengers and/or cargo than it should or if excessive trailer tongue weight is applied.
5) The hitch platform apparently experienced sufficiently high fore/aft loading to dislodge it from its original position. That can compromise attachment integrity and reduce ability of the part to adequately carry load

It is impossible to accurately determine causes and subsequent effects of safety chain plate deformation, side plate ground contact, and hitch platform-to-frame slip on the fatigue cracks. However, it should be noted that none of these situations were documented during vehicle trailering validation with a properly set up 10000 lb trailer at 1000 lb tongue weight.

Robert J Krouse
GM Truck Trailering Engineer

Attachment
Cc: M.Bailey
J. Federico
G. Krajewski
M. Povirk

CG190 (Rev. June/99)

GM Evaluation Report

Platform	Project/EWO No.	Requirement No.	Procedure No.	VPP/VIA/UPC	Model Year	Model No.	PER/Report No.
C/K Annual and Current Produc: Support	n/a	n/a	n/a	n/a	1995		Materials Tes: - 01879

Reference Issue Report (IR) No. na

Category: MAT
Function x Development Validation
Method: Math Based x Hardware Based

Date: 7/11/2000

Title: Materials Test - 01879

To: (Requestor) Frank D Risko

From: Gary L. Haviland

☒ Final

☐ Interim No.

☐ Reissue Date of Reissue:

Date of Request: 06/19/2000

Dates of Evaluation: 6/19/2000 -7/12/2000

- The results published within this report relate only to the items testec.
- This report shall not be reproduced except in full, without the written approval of the laboratory manager or his/her designate.
- Tests identified with an asterisk are not included in the laboratory's current A2LA scope of accreditation.

Objective:

Determine trailer hitch side plate fracture cause and parts conformance to material specifications.

Conclusions:

The two side plate fractures were both unidirectional bending fatigue initiating on the inner radius surface of the formed bend which creates the frame mounting flange. The side plates conform to material specifications. The cause of the safety chain plate deformation could not be accurately determined.

Design Evaluated: **GMUTS Rating:** n/a **Veh. Mileage:**

Part/Test Object Name(s)	Veh/Buck/PT/Part No./RPO	Revision Date/Level
Miscellaneous	15643953	n/a
Material		
1008-1020		

Distribution:

Name: Frank D Risko Loc:
Name: Loc:
Name: Loc:
Name: Loc:
Name: Loc:

cc:

Author: Gary L. Haviland Date: 7/11/2000
(Title/Phone) Lead Analyst/
(Location) GMNA Materials Lab -

Approver: Date:
(Title) Final Report Approver
(Location) GMNA Materials Lab -

Approver: Date:
(Title)
(Location)

0000563

GMNA Materials Laboratory -

CG150 (Rev ...ne/99)

GM Evaluation Report

Platform	Project/EWO No.	Requirement No.	Procedure No.	VPP/VIA/UPC	Model Year	Model No.	PER/Report No.
C/K Annual and Current Product Support	n/a	n/a	n/a	n/a	1995		Materials Test - 01879

Reference Issue Report (IR) No. na

Category: MAT
Function x Development Validation
Method: Math Based x Hardware Based

Recommendations:

None made.

Requirements:

None Provided.

Background:

Sample Condition as received:

"on pallet"

Sample History:

Field Return. This piece came direcly from NHTSA. It is icentified with a write address label. We will need to provide a report to NHTSA on this specific part. Also, unt.l we hear from NHTSA. please do not dispose of this part or any sectioned pieces. For all parts please ensure that the parts meet the material specifications of print 15643953. This part number is indicated on the black label on the part.

Equipment:

Instrument Name	Used for:
Baird "One Spark" Optical Emission Spectrometer	Chemistry
Wilson Rockwell Hardness Tester Model 3JR tester #10589	Hardness
Mitutoyo Micrometer #1? 2-237 internal I.D. #TCO 748	Material Th.ckness
Nikon Epiphot TME Metallograph	Microstructural analysis
Olympus SZH Microscope	Macro examination
Canon/Kodak EOS-DCS 1c Camera	Photography
Magnaflux Model CSQG-5A Magnetic Particle Inspection Equipment	Crack Detection

Procedure/Method:

Failure Analysis – Scanning Electron Microscopy (ADEM I./JEOL 840F/JEOL 5800) was tested by Gary L. Haviland
Photography (Digita Imaging) of Materials* was tested by Gary L. Haviland
Report Preparation (Failure Analysis)* was tested by Gary L. Haviland
Microstructural Analysis of Metals and Alloys Including Etching (ASTM E407-93) was tested by Gary L. Haviland
Photomicrography of Metals and Materials (ASTM E883-94) was tested by Gary L. Haviland
Preparation of Metallographic Samples (ASTM E3-95) was tested by Gary L. Haviland
Magnetic Partical Examination (Magnaglo) (ASTM E1444-94a)* was tested by Gary L. Haviland
Analysis of Low Alloy Steels by OES (ASTM E415) was tested by Randy Kandow
NOTE: The specific procedure followed for each test is that described in the relevant GMNA Materials Laboratory

CG100 (Rev. June/99)

GM Evaluation Report

Platform	Project/EWC No.	Requirement No.	Procedure No.	VPP/VIA/UPC	Model Year	Model No.	PER/Report No.
C/K Annual and Current Product Support	n/a	n/a	n/a	n/a	1995		Materials Test - 01879

Reference Issue Report (IR) No. n/a

Category: MAT
Function x Development Validation
Method: Math Based x Hardware Based

test instruction. When standard test methods have been modified, the specific nature of such modifications is stated in the test instructions.

Results:

Macro and fracture analysis:

The submitted trailer hitch exhibited two fractures, one in each of its side plates (see photograph 1). Both fractures were located in the rear edge of their respective frame mounting flange radii. The right hand plate fracture was approximately 43 mm in length (measured from the rear plate edge to the crack end). The left hand plate fracture was approximately 54 mm in length. Both fracture surfaces evidenced heavy corrosion products, typical for the part that had fractured and subsequently been in service for an extended period of time (see photographs 2 & 3).

An attempt to clean the fracture surfaces was made (in a heated solution of 5% Cole-Palmer Micro cleaning solution, alternately heated and ultrasonically cleaned). The partially cleaned surfaces revealed, in both cases, unidirectional bending fatigue fractures initiating on the inner surface of the aforementioned frame mounting flange radius. The fractures were identified as fatigue on a macro scale because of the characteristic arrest lines (beachmarks) originating from a single point and ratchet marks along the inner radius surface. No attempt was made to characterize the fracture on a micro scale by scanning electron microscope because of the lack of surface detail (the surface was heavily pitted from the severe corrosion).

The right hand fracture initiation site was located approximately 7.5 mm from the rear sheared edge of the plate (see photograph 4); the left hand fracture initiated approximately 6.5 mm from its respective rear sheared edge (see photograph 5). The last portion of the left plate fracture (the last 33 mm) had propagated along a linear tool mark. This shallow tool mark was not in the area of nor did it appear to influence the left plate fracture initiation. No other detrimental material or processing defects (inclusions, tool marks or mechanical damage) were observed at the other fracture initiation sites.

As submitted, the edges of the safety chain plate were bent downward (7 mm from the original position on the left side and 20 mm on the right; see photograph 6). The rear edges of the holes and the rear outer edges of the plate exhibited considerable mechanical damage (upset metal, gouging, etc.). It, however, could not be determined whether this damage (which might logically be determined to have resulted from an interaction with the safety chains) was related to the bent condition of the plate and or whether either was related to the side plate fracturing.

Each of the right and left side plates also evidenced heavy directional (fore-aft) abrasive wear on their bottom most edges, typical of being dragged on a rough surface (such as pavement). The frame mounting surfaces did exhibit some degree of looseness, particularly around the forward mounting holes, in the form of polish (paint worn off) and fretting corrosion (typical of minute relative movement). The significance of these observations in regard to the side plate fractures could not be determined (with the limited information supplied).

Magnetic particle inspection:

No other crack indications (other than the two major right and left side plate fractures) were observed.

00000565

CG198 (Rev. June/99)

GM Evaluation Report

Platform	Project/EWO No.	Requirement No.	Procedure No.	VPP/VIA/UPC	Model Year	Model No.	PER/Report No.
C/K Annual and Current Product Support	n/a	n/a	n/a	n/a	1995		Materials Test - 01879

Reference Issue Report (IR) No. n/a

Category: MAT
Function x Development Validation
Method: Math Based x Hardware Based

Chemistry:

All units are % by weight

Sample	C	Mn	P	S	Al	Cr	Cu	Mo	Ni
Right Side	0.05	0.18	0.008	0.014	0.08	0.01	0.02	0.03	<.01
Left Side	0.04	0.18	0.008	0.014	0.08	0.01	0.02	0.03	<.01

(Side plates conform to the blueprint materials specification of SAE 1008-1020).

Metallography:

Both side plates evidenced typical low carbon sheet steel microstructures. They had primarily equi-axed ferritic grain structures, ASTM grain size 7-8, with some partially spheroidized pearlite at the grain boundaries. Additional small spheroidized carbides, evenly distributed within the microstructure, were observed (see photograph 7).

Hardness:

Right side plate: 70 Rockwell 'B' (average of three tests; 69, 70, 71 Rb).
Left side plate: 70 Rockwell 'B' (average of three tests: 70, 69, 71 Rb).

Material thickness:

Right side plate: 6.07 mm
Left side plate: 6.07 mm
Safety chain plate: 6.05 mm
Specification: 6.0 min - 0.6 mm

References/File Storage:

All raw data files are stored in the laboratory and can be made available upon request.

Calibration Report Information:

All relevant calibration records are available in the laboratory and can be provided upon request. For specific information please contact the Laboratory Quality Manager.

00000566

CG193 (Rev. June99)

GM Evaluation Report

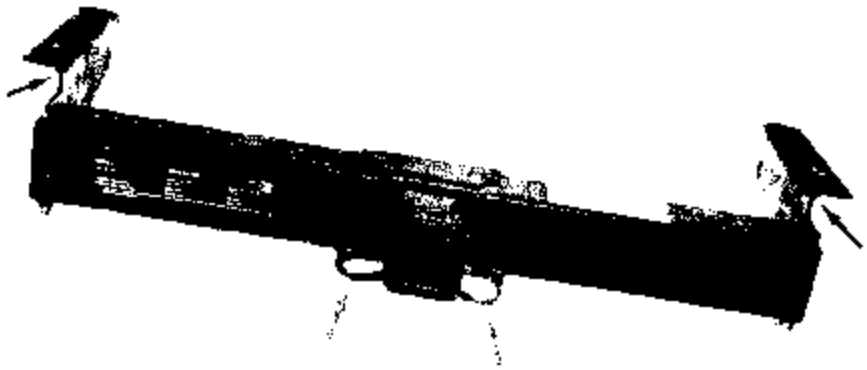
Platform	Project/EWO No.	Requirement No.	Procedure No.	VPP/VIA/UPC	Model Year	Model No.	PER/Report No.
C/K Annual and Current Product Support	n/a	n/a	n/a	n/a	1995		Materials Test - 01879

Reference Issue Report (IR) No. n/a

Category: MAT
Function: x Development Validation
Method: Math. Based x Hardware Based

Appendix:

STR 01879



Photograph 1. The submitted trailer hitch. The black arrows indicate the fracture locations. The red arrows denote the safety chain plate deformation.

Photographs 2 & 3. The right and left frame flange radius fractures.

00000567

CG197 Rev. June/99:

GM Evaluation Report

Platform	Project/EWO No.	Requirement No.	Procedure No.	VPP/MA/UPC	Model Year	Model No.	PER/Report No.
C/K Annual and Current Product Support	n/a	n/a	n/a	n/a	1995		Materials Test - 01679

Reference Issue Report (IR) No. na

Category: MAT
Function: x Development ___ Validation
Method: ___ Math Based x Hardware Based

STR 01679
Right side fracture

Photograph 4. The right plate fracture surface showing the fatigue progression and the initiation site.

STR 01679
Left side fracture

Photograph 5. The left plate fracture surface showing the fatigue progression and the initiation site.

00000568

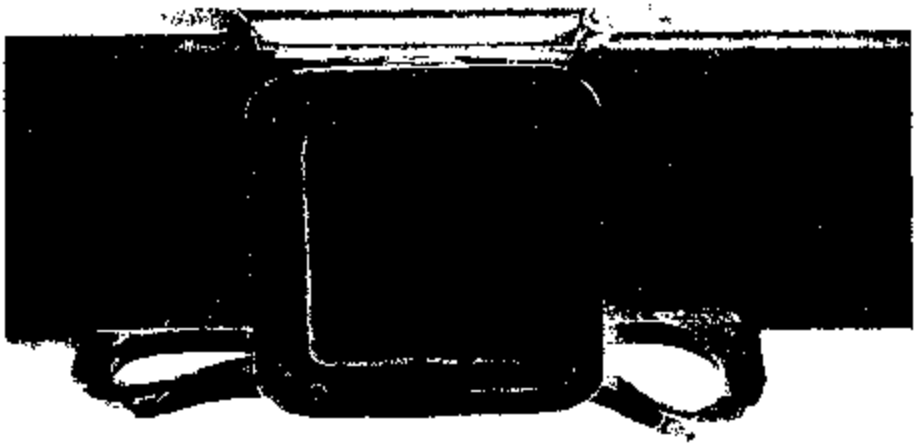
CG190 (Rev. June/99)

GM Evaluation Report

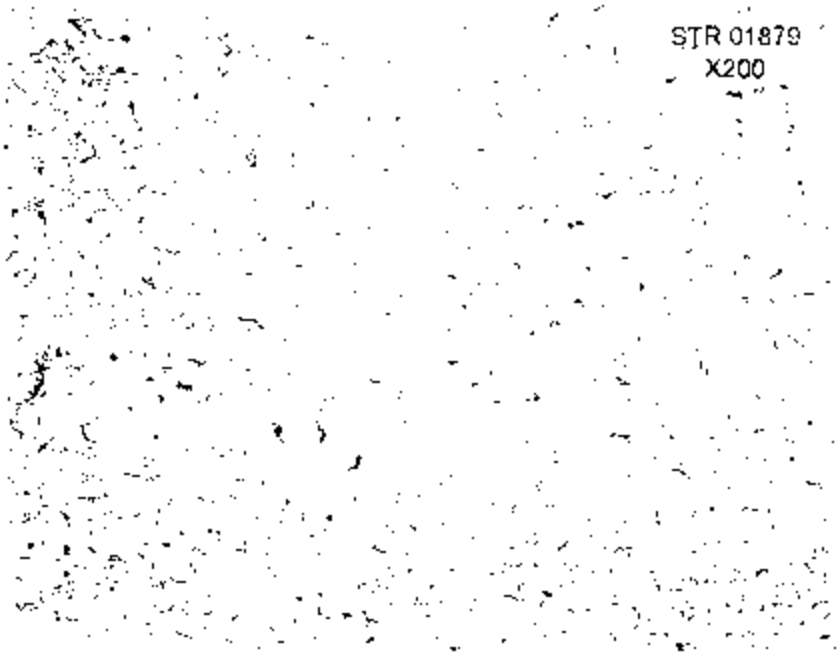
Platform	Project/EWO No.	Requirement No.	Procedure No.	VPP/VIA/UPC	Model Year	Model No.	PER/Report No.
C/K Annual and Current Product Support	n/a	n/a	n/a	n/a	1995		Materials Test - 01879

Reference Issue Report (IR) No: na

Category: MAT
Function: x Development Validation
Method: Math Based x Hardware Based



Photograph 6. A close up of the safety chain plate showing the downward deformation.



Photograph 7. Typical side plate material microstructure.

00000569

U.S. Department of Transportation
National Highway Traffic Safety Administration

ODI PETITION RESUME

IDENTIFICATION: DP00-001 DATE CLOSED: 07-Nov-00
SUBJECT: Alleged OEM Hitch Receiver Platform Cracking
PROMPTED BY: Consumer
INVESTIGATORS: Peter C. Ong

MANUFACTURER: General Motors Corp. MODEL: Chevrolet & GMC Suburbans
MODEL YEAR(S): 1992-1997
VEHICLE POPULATION: 494K factory installed trailer towing hitch receiver platforms

PROBLEM DESCRIPTION: The petition alleges that cracks in the hitch receiver platform may lead to separation of the trailer and loss of steering control.

FAILURE REPORT SUMMARY

	ODI	MANUFACTURER	TOTAL
COMPLAINTS:	15*	9**	24
CRASHES:	0	1 lawsuit w/ crash	1
INJ CRASHES:	0	0	0
# INJURIES:	0	0	0
FAT CRASHES:	0	0	0
# FATAL:	0	0	0
OTHERS:	10***	0	10

* Complainants alleged cracks in either or both side/vertical mounting flanges of hitch receiver.
** Complainants alleged cracks in the hitch receiver. Excludes duplicates and non-crack related reports.
*** ODI surveyed over 600 owners at a recreation vehicle rally and found 10 vehicles with cracks in either or both side/vertical mounting flanges of hitch receiver

ACTION: The petition was denied. The analysis of the petition is presented in the attached notice which is published in the Federal Register.

ENGINEER: _____ DATE: 11/7/00
DIV CHIEF: _____ DATE: 11/8/00
OFC DIR: _____ DATE: 11-8-00

SUMMARY: The National Highway Traffic Safety Administration was petitioned to commence a defect investigation by a recreation vehicle (RV) club safety committee member. The petition alleges that some of the hitch platform and related towing equipment may not meet National Highway Safety Standards for material and construction specification. Specifically, cracks were found in the Class IV type hitch receiver platforms on some of the club members' vehicles when towing an Airstream travel trailer. The denial of the petition is presented in the attached notice which is published in the Federal Register.

U.S. Department
of Transportation

National Highway
Traffic Safety
Administration

Memorandum

DP00-001

Subject: WBCCI 44th International Rally - ODI Survey **Date:** July 5, 2001

From: Bob Young

To: Public File, DP00-001

On June 27, 2001, while attending the Wally Byam Caravan Club International Inc.'s 44th International Rally in Sioux Falls, SD, ODI interviewed owners of 1982-1999 GM Suburbans which were being used to tow 34' Airstream travel trailers (the longest produced by the company). During the interview, the tow vehicle's hitch receiver was inspected for cracks, particularly in the area where the rearmost fastener joins it to the vehicle frame.

The 1992-1999 Chevrolet/GMC Suburban is rated to tow trailers weighing no more than 10,000 lbs. and are designed by GM to tow trailers with tongues weighing no more than 1,000 lbs. These vehicles have a Gross Combination Weight Rating (GCWR) of no more than 17,000 lbs. when properly equipped (7.4L engine with 4.10 rear gear ratio). Some of the Suburbans we inspected were not equipped to tow the maximum GCW specified by GM and may have been overloaded as a result.

ODI found 4 Suburbans with cracked receivers—both OEM and aftermarket—at the Rally. These findings are documented in the attached listing. All had identical weight ratings (maximum of 10,000 lbs. with 1,000 lb. tongue weight).

None of the owners surveyed had weighed their current rig and none knew the trailer's gross and/or tongue weight nor the tow vehicle's weight while traveling. In conversation with WBCCI members, ODI found many did not realize the importance of each and every vehicle weight rating.

Of those owners with cracked receivers, interviewed by ODI at the rally, none had ever inspected it to assess its condition before towing. The cracks we observed were consistent with an overload condition resulting in a slow propagating fatigue fracture, which would be readily noticeable during routine, pre-trip, inspections. A complete separation of the tow bar from the vehicle was not imminent in any of the receivers we inspected.

Suburban w/Cracked Receiver Platforms
WBCCI Sioux Falls Rally, June 27, 2001

NO	Vehicle	VIN	Last Inspected	Last weighed	Complaint
1	96 Sub	1GNGC26JXTJ376115	Never	Never	OEM D/S stress crack
2	92 Sub	1GNGC26N6NJ338886	Never	Never	Aftermarket (EAZ-LIFT) both sides stress crack
3	92 Sub	1GNEC16K6NJ358482	Never	Never	OEM both sides stress crack
4	94 Sub	1GNGC26N6RJ316439	June '98	Never	Reinforcement welded in June '98 after cracking
5	97 Sub	1GKEC16R2VJ727624	June '99	Never	OEM replaced w/OEM when cracked 2 years ago
6	92 Sub	1GKGC26N0RJ770456	Never	Never	OEM both sides stress crack

Memorandum

U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

DP00-001

Subject: Presentation materials **Date:** July 5, 2001

From: *Bob Young*

To: Public File. DP00-001

On June 28, 2001 @ 10:30AM, I delivered a seminar/presentation at the Wally Byam Caravan Club International, Inc. (WBCCI) 44th International Rally in Sioux Falls, South Dakota concerning receiver platform cracking. About 45 persons attended, all voluntarily.

Attached to this memo are original copies of the receiver-related material presented, in a slide-show format, during the seminar.

Petition

"We are petitioning [for] an investigation of hitch platforms and related hitching equipment to assess their compatibility with National Highway Safety Standards for materials and construction specifications."

[redacted]

[redacted]

CHECK FOR CRACKS

RECEIVERS

DP00-001

00000576

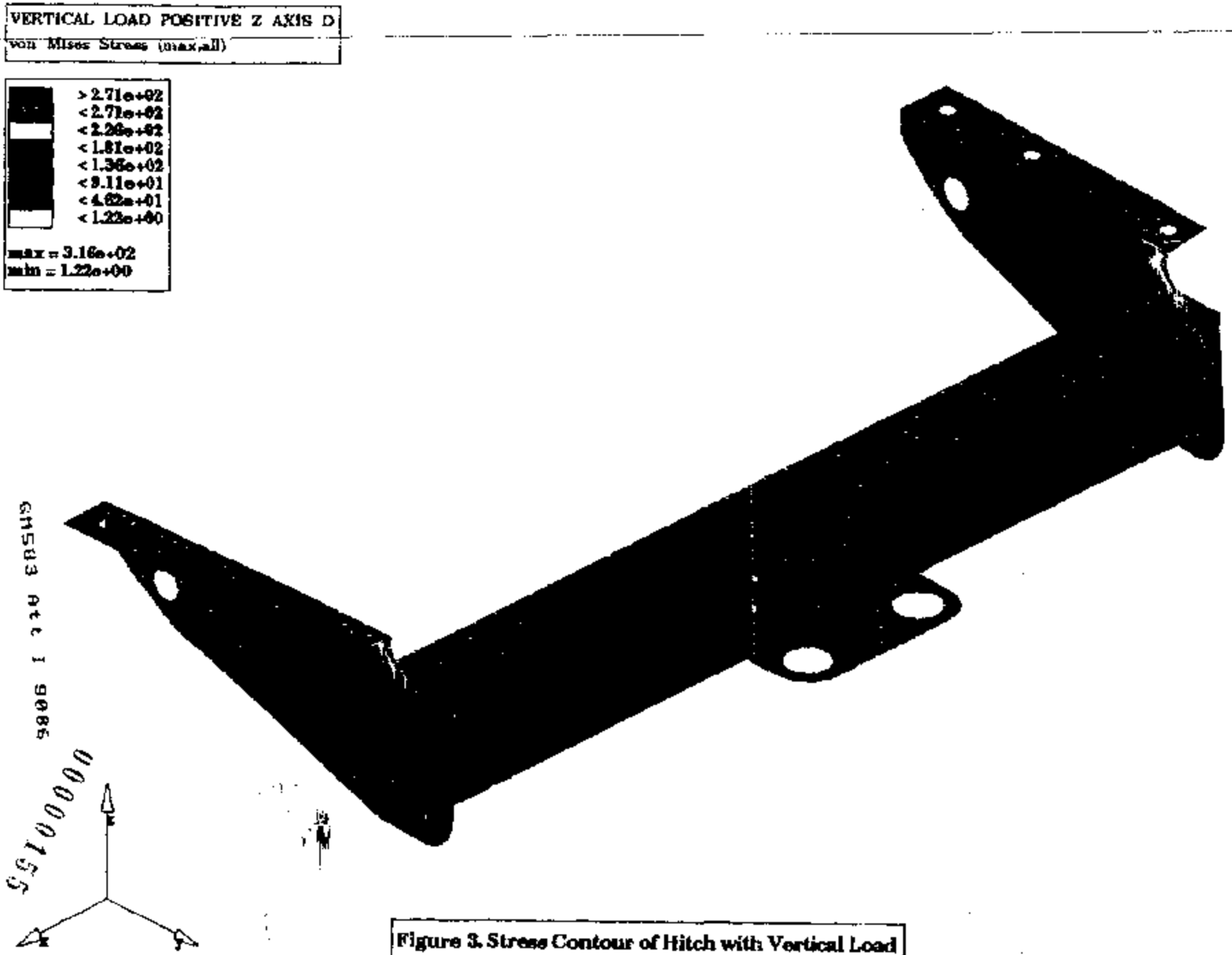


Figure 3. Stress Contour of Hitch with Vertical Load

BE 583 Rev 4/94

VALIDATION TEST AND VEHICLE REVIEW

TEST WORK ORDER: 16501-43B P.A. NO.:

TEST OBJECTIVE: Perform an R-15-31 Trailer Tow Test using vehicle K34606.

The vehicle model number is K20906 and is equipped with the Z82 trailering package.

TEST PROCEDURE FMVSS NO.: R-15-31 OTHER:

SPECIAL CONDITIONS OF TEST AND EXPLANATION: No ballast will be placed in the vehicle. An Airstream trailer will be ballasted to 10,000 lbs with a tongue weight of 1,000 lbs.

No ballast changes will done during the test.

MATERIAL UNDER TEST: Trailer hitch mounting fasteners.

The undersigned agree that the test set-up, and when applicable, the test vehicle, data acquisition vehicle, test buck, and test material have been inspected and found to be representative of the released design and are appropriate for use in the test described above.

Brian Kurth	/Brian A. Kurth/	11MAY95		
Test Engineer	Signature	Date		
Robert Krause	/R Krause/	12-MAY-95	14L	Hitch Fasteners
Design Responsible Engineer	Signature	Date	UPC	Content Description
	/	/		
Design Responsible Engineer	Signature	Date	UPC	Content Description
	/	/		
Design Responsible Engineer	Signature	Date	UPC	Content Description
	/	/		
Design Responsible Engineer	Signature	Date	UPC	Content Description

NOTE: If additional space is required, please attach a second sheet.

GM583 Att 1 9118

** TOTAL PAGE.00 **

Suburban Weights - Source: GM Truck Technical Guides

MYR	Model	Engine/Rear Gear	Curb Wt.	Trailer Wt.	GVWR	Payload	GAWRF	GAWRR	Receiver: Dead Wt. - WD Trailer Wt. / Tongue Wt.
2002	C-15	All	4914	8700	7000	2086	3150	4000	5,000/600 - 12,000/1,500
2002	C-15	All	5447	12000	8600	3153	3800	6000	5,000/600 - 12,000/1,500
2002	K-15	All	5123	8500	7200	2077	3600	4000	5,000/600 - 12,000/1,500
2002	K-25	All	5760	12000	8600	2840	4180	6000	5,000/600 - 12,000/1,500
1999	C-15	All	4825	6500/800 tongue	6800	1980	2950	3600	5,000/500 - 10,000/1,000
1999	C-25	All	5249	10000/1000 tongue	8600	3314	3600	6084	5,000/500 - 10,000/1,000
1999	K-15	All	5293	6000/750 tongue	7300	2003	3600	4000	5,000/500 - 10,000/1,000
1999	K-25	All	5693	10000/1000 tongue	8600	2850	4250	6000	5,000/500 - 10,000/1,000
1997	C-15	5.7L V8 / 3.73	4825	6500/800 tongue	6800	1975	2950	3968	5,000/500 - 10,000/1,000
1997	C-15	6.5L Turbo Diesel	5725	5500/700 tongue	7700	1975	3600	6084	5,000/500 - 10,000/1,000
1997	C-25	5.7L V8 / 4.10	5249	7500/900 tongue	8600	3351	3600	6084	5,000/500 - 10,000/1,000
1997	C-25	7.4L V8 / 4.10	5249	10000/1000 tongue	8600	3351	3600	6084	5,000/500 - 10,000/1,000
1997	C-25	6.5L Turbo Diesel	5249	8000/950 tongue	8600	3351	3600	6084	5,000/500 - 10,000/1,000
1997	K-15	5.7L V8 / 3.73	5293	6000/750 tongue	7300	2007	3600	4000	5,000/500 - 10,000/1,000
1997	K-15	6.5L Turbo Diesel	6043	5000/600 tongue	8050	2007	3925	4800	5,000/500 - 10,000/1,000
1997	K-25	5.7L V8 / 4.10	5693	7000/850 tongue	8600	2907	4250	6000	5,000/500 - 10,000/1,000
1997	K-25	7.4L V8 / 4.10	5693	10000/1000 tongue	8600	2907	4250	6000	5,000/500 - 10,000/1,000
1997	K-25	6.5L Turbo Diesel	5693	7500/900 tongue	8600	2907	4250	6000	5,000/500 - 10,000/1,000
1996	C-15	5.7L V8 w/3.73	4825	6500/800 tongue	6800	1975	2950	3968	4,000/400 - 10,000/1,000
1996	K-15	5.7L V8 w/3.73	5293	6000/750 tongue	7300	2007	3600	4000	4,000/400 - 10,000/1,000
1996	C-25	7.4L V8 w/4.10	5249	10000/1000 tongue	8600	3351	3600	6084	4,000/400 - 10,000/1,000
1996	K-25	7.4L V8 w/4.10	5693	10000/1000 tongue	8600	2907	4250	6000	4,000/400 - 10,000/1,000

At the Rally

Results of the Physical Inspection:

- 10 Suburbans w/ cracked OEM receiver platforms (9/10 from MY '93-'97)
- 3 Suburbans w/ previously cracked OEM receivers
- 1 Suburban w/ previously cracked OEM receiver from petition letter (1997 Sub - Mr. D. Kenney)
- *2 Dodge PUs w/ cracked OEM receivers*
- *1 Ford F250 PU w/ slight cracked 3rd party receiver*
- *1 Ford Expedition w/ loose bolts (PE 99-060 - Abbott)*

Units were weighted by "A'Weight We Go"

- Weighted a total of 21 units (units w/ cracks & w/o cracks)

A'Weigh We Go

100 ▲ 100,000

Recreation Vehicle Weight & Tire Safety Handbook

SPECIAL

LIFE ON WHEELS

Textbook Edition

DP00-001
00000581

$19.95

Rev. 1/00

A'Weigh We Go

211 Mae McKee Road
Chuckey, TN 37641
(423)257-7985

WEIGHING RECORD

NOTE. ALL RATINGS AND WEIGHTS IN POUNDS

Record DATE: 2/27/00

MOTORHOME/TRUCK: 1996 GMC Suburban TOWED CAR/TRAILER: 1997 Airstream Legend

RATINGS

RIGHT FRONT	0	0	HITCH	0	0	0	OUTER TIRES
2,623	0	2,623		2,020	2,020	2,020	INNER TIRES
FRONT			TOW				
3,400	0	4,410	10,000	3,200	3,200	3,200	AXLES
65	0	65	VERTICAL	45	45	45	TIRE PRESSURE
2,623	0	2,623	1,300	2,020	2,020	2,020	INNER TIRES
LEFT FRONT	0	0		0	0	0	OUTER TIRES

GVWR: 7,500 GCWR: 0 TOW BAR: 0 GVWR: 9,800

LOAD MEASUREMENTS

1,420	0	1,780					
1,325	0	2,450	TOW	1,650	1,550	1,400	RIGHT TIRES
2,805	0	4,920	10,315	3,150	3,130	2,860	AXLES
			VERTICAL				
1,480	0	2,470	1,175	1,500	1,580	1,460	LEFT TIRES
[illegible]	0	1,300					

MOTORHOME/TRUCK WEIGHT: 7,725 TOWED CAR/TRAILER WEIGHT: 10,315 COMBINED WEIGHT: 16,865

[illegible] 6,550

MARGINS

[illegible] (-RED NEGATIVE NUMBERS) =OVERLOAD!

[illegible]	N/A	[illegible]					
[illegible]	N/A	[illegible]	TOW	370	470	630	RIGHT TIRES
			(315)				
[illegible]	N/A	[illegible]	VERTICAL	50	70	[illegible]	AXLES
[illegible]	N/A	[illegible]	125	830	440	560	LEFT TIRES

GVWR: (-225) GCWR: N/A TOW BAR: N/A GVWR: (-515)

INVOICE

WEIGHING: 3 AXLES $0.00 OR $30 PLUS $0

SUB TOTAL	$30.00
MINUS DISC.	$0.00
PLUS TAX	$0.00
TOTAL	$30.00

PAID

THANKS FOR HAVING YOUR "WEIGH" WITH US!

DP00-001
00000582

A'Weigh We Go

211 Mae McKee Road
Chuckey, TN 37641
(423)257-7985

WEIGHING RECORD

NOTE: ALL RATINGS AND WEIGHTS IN POUNDS

Record DATE: 2/27/00

MOTORHOME/TRUCK: 1996 Chevrolet Suburbar TOWED CAR/TRAILER: 1988 Airstream Excella 1000 34'

RATINGS

RIGHT FRONT	2,030	0	0	HITCH	0	0	0	OUTER TIRES
		0	2,900		2,540	2,540	2,540	INNER TIRES
FRONT	3,800	0	6,084	TOW 14,000	2,800	2,800	2,800	AXLES
	45	0	75	VERTICAL	65	65	65	TIRE PRESSURE
	2,030	0	2,900	1,700	2,540	2,540	2,540	INNER TIRES
LEFT FRONT		0	0		0	0	0	OUTER TIRES

GVWR: 8,600 GCWR: 0 TOW BAR: 0 GVWR: 8,900

LOAD MEASUREMENTS

1,520	0	1,780	TOW	1,450	1,500	1,275	RIGHT TIRES
1,500	0	2,350	9,465				
3,170	0	4,700	VERTICAL	2,810	2,930	2,595	AXLES
1,670	0	2,350	1,130	1,360	1,430	1,320	LEFT TIRES
[illegible]	0	1,220					

MOTORHOME/TRUCK WEIGHT: 7,870 TOWED CAR/TRAILER WEIGHT: 9,465 COMBINED WEIGHT: 16,205

[illegible] 6,740

MARGINS

(GREEN NUMBERS=SAFETY MARGIN) (-RED NEGATIVE NUMBERS) =OVERLOAD!

331	N/A	550	TOW	1,090	1,040	1,265	RIGHT TIRES
66	N/A	1,384	4,535				
			VERTICAL	(-10)	(-130)	205	AXLES
330	N/A	550	570	1,150	1,110	1,220	LEFT TIRES

GVWR: 730 GCWR: N/A TOW BAR: N/A GVWR: (-565)

INVOICE

WEIGHING: 3 AXLES $0.00 OR $30 PLUS $0

SUB TOTAL	$30.00
MINUS DISC.	$0.00
PLUS TAX	$0.00
TOTAL	$30.00

PAID

DP00-001
00000583

THANKS FOR HAVING YOUR "WEIGH" WITH US!

Note: "If your vehicle is rated to pull 3,500 lbs., adding a 10,000 lb. hitch is a waste of money. It adds nothing to the towing capacity of your vehicle."

—www.trailersource.com

And the Result Is?

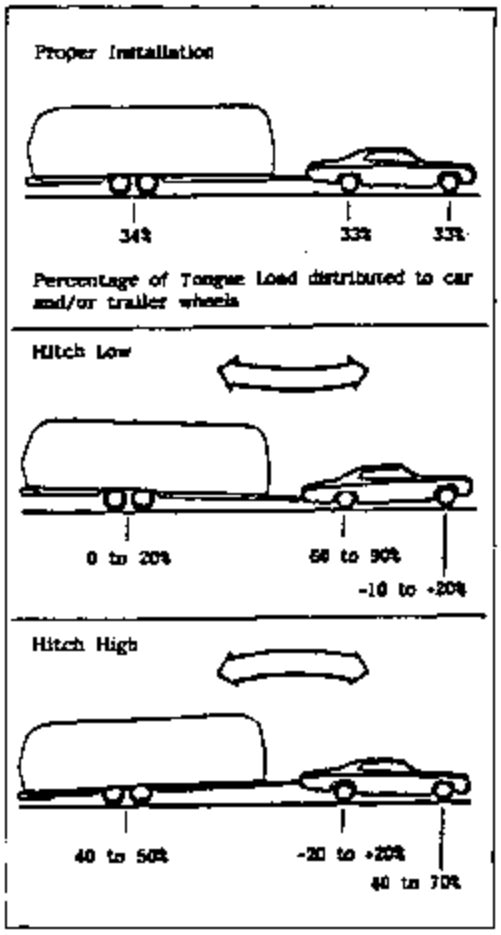
ID	Tow Vehicle Info			Net Vertical Weights on Tow Vehicle			Results (setup/ vert. overload?)		Cracked Reciever?	
Last Name	Tow Vehicle Year	Tow Vehicle	OEM Receiver?	Delta FA	Delta RA	Net Vert. Wt.	Wrong Setup?	OverLoad?	Cracks Found?	Remarks
DP00-001 00000585	1999	Suburban	Yes	-240	1150	910			Yes	
	1996	Suburban	Yes	-165	1340	1175			Yes	
	1996	Suburban	Yes	-245	1240	995			Yes	Previously Towed a 34 until 6/99
	1994	Suburban	Yes	-30	1145	1115			Yes	
	1994	Suburban	Yes	-25	650	625		No	Yes	Previously Towed Other Trailers
	1993	Suburban	Yes	-235	1110	875			Yes	
	1993	Suburban	Yes	350	725	1075	No		Yes	
	1993	Suburban	Yes	-150	1090	940			Yes	
	1994	Suburban	Yes	0	0	0	N/A	N/A	Yes	Didn't weight unit
	1995	Suburban	Yes	30	620	650	No	No	Yes	Replaced w/ New Receiver Platform
	1994	Suburban	Yes-Previous	0	0	0	N/A	N/A	Past	Past Failure of OEM Platform-Not weighted
	1994	Suburban	Yes-Previous	0	0	0	N/A	N/A	Past	Past Failure of OEM Platform-Not weighted
	1993	Suburban	Yes-Previous	0	0	0	N/A	N/A	Past	Past Failure of OEM Platform-Not weighted
	1997	Suburban	Yes-Previous	-75	700	625		No	Past	Past Failure - Now w/ New Receiver Platform
	1999	Suburban	Yes	-260	1190	910			No	
	1999	Suburban	Yes	30	875	905	No	No	No	
	1996	Suburban	No-ReeseV	255	810	1065	No	No	No	3rd Party Class V Receiver 1400# Max.
	1995	Suburban	?	160	870	1030	No		No	Reported a Past Failure a Reese Dist. Hitch
	1992	Suburban	Yes	-50	980	930		No	No	
	1991	Suburban	No-ReeseV	395	620	1015	No		No	3rd Party Receiver Platform (P)
	1989	Suburban	Yes	-110	990	880		No	No	
	1996	Suburban	Yes	30	1100	1130			No	

Note:

- Wrong Setup is conservatively defined as when the front axis get lighter when the trailer is hooked up with the distribution hitch
- Overload is conservatively defined as when the net vetical weight of the towing vehicle (hitch weight) exceeds the manufacturer's limit (Class IV limited to 1000#) after hood up (threshold could be as low as 667 lbs. Max. if the '33% rule' applies)

HITCHING UP

Hitching up your trailer is something that will become almost second nature with practice. The following section includes proper hitch load distribution and a procedure for hitching up.



Equalizing Hitch Load Distribution

When a trailer is hitched up properly to a tow vehicle with a load equalizing hitch, approximately 1/3 of the trailer's tongue weight will be on the trailer's axles and 2/3 will be transferred to the tow vehicle, 1/3 of this weight transfer will be carried by the front wheels and 1/3 by the rear wheels of the tow vehicle (See diagram). Thus, the tire load of each wheel on the tow vehicle will be increased by 1/6 of the trailer's tongue weight. The tire air pressure of the tow vehicle should be increased to compensate for this additional weight. Refer to the vehicle's owners manual for this information.

CAUTION: The tongue weight should be approximately 10% of the trailer's total weight, but MUST NOT EXCEED 1,000 lbs. And, under no condition should it exceed the hitch rating. Your hitch rating information should be provided to you by your hitch installer.

Sway Control Device

Although Airstream has not intruded into the hitch manufacturers field of expertise and preformed formal testing, we find the vast majority of Airstream owners purchase sway control devices.

When passed by large trucks or when exposed to sudden crosswinds the trailer will be "pushed" and this action will be felt in the tow vehicle. It's our understanding the sway control devices will reduce the amount of movement and make towing more comfortable and add some safety.

Follow the directions of the sway control manufacturer when having installed and using.

Steps for Hitching Up

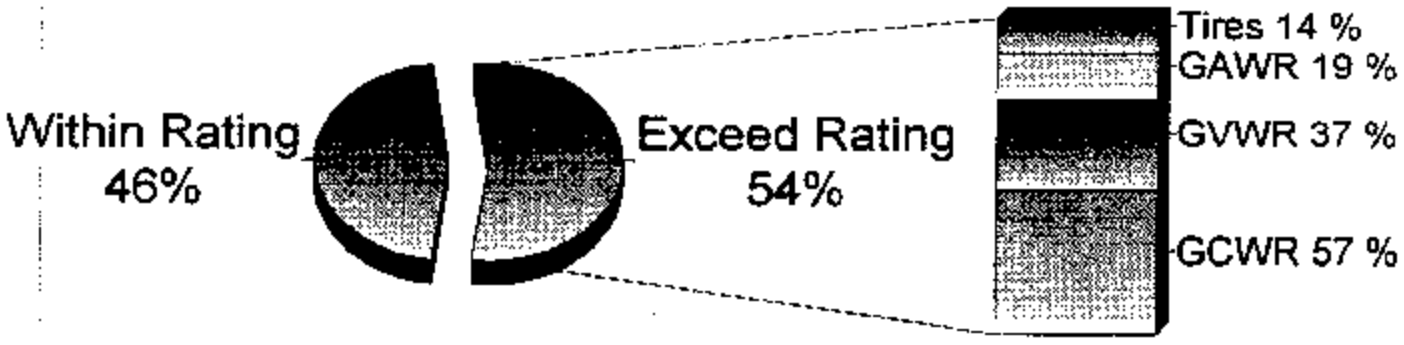
Jack up the trailer hitch until there is clearance for the HITCH BALL to slide under. Remove safety pin, slide the locking lever forward and raise. Back the tow vehicle straight back to the hitch. (See Fig. 2) This can best be accomplished through the use of prearranged hand signals with the help of another person; but, if you are hitching up by yourself we recommend the use of a HOOK-UP VIEW MIRROR.

Lower the trailer hitch onto the hitch ball. Then close the locking lever and insert safety pin. (See Fig. 3)

Now raise the trailer and tow vehicle to the full height of the hitch jack (See Fig. 7) and then attach the LEVELING BARS. (See Fig. 4, 5 & 6). Lower the tow vehicle and trailer (See Fig. 7).

OVERWEIGHT TOW VEHICLES

Percent Exceeding Ratings



Example:54% Exceeded 1 or more ratings. Of these, 57% exceeded GCWR.

A'Weigh We Go, 1 January, 2000

DP00-001
00000587

00000030

Petition Findings and Conclusions

There are no hitch-related FMVSS'

•

Low number of failures in subject vehicles

•

Survey found a number of setup anomalies (including overload) contributing to receiver failures

•

Subject receiver complies w/SAE J684 and GM's on-road durability tests

•

Since closing an earlier investigation of the same receiver in 1995, no new defect trend has been noted

•

The trailering industry should undertake a training program for RV owners with emphasis on loads and ratings

•

Based on the information found to date, it is unlikely NHTSA would issue a recall order. The petition is denied

U.S. Department of Transportation
National Highway Traffic Safety Administration

ODI PETITION RESUME

IDENTIFICATION: DP00-001 DATE CLOSED: 07-Nov-00
SUBJECT: Alleged OEM Hitch Receiver Platform Cracking
PROMPTED BY: Consumer
INVESTIGATORS: Peter C. Ong

MANUFACTURER: General Motors Corp. MODEL: Chevrolet & GMC Suburbans
MODEL YEAR(S): 1992-1997
VEHICLE POPULATION: 494K factory installed trailer towing hitch receiver platforms

PROBLEM DESCRIPTION: The petition alleges that cracks in the hitch receiver platform may lead to separation of the trailer and loss of steering control.

FAILURE REPORT SUMMARY

	ODI	MANUFACTURER	TOTAL
COMPLAINTS:	15*	9**	24
CRASHES:	0	1 lawsuit w/ crash	1
INJ CRASHES:	0	0	0
# INJURIES:	0	0	0
FAT CRASHES:	0	0	0
# FATAL:	0	0	0
OTHERS:	10***	0	10

* Complainants alleged cracks in either or both side/vertical mounting flanges of hitch receiver.
** Complainants alleged cracks in the hitch receiver. Excludes duplicates and non-crack related reports.
*** ODI surveyed over 600 owners at a recreation vehicle rally and found 10 vehicles with cracks in either or both side/vertical mounting flanges of hitch receiver.

ACTION: The petition was denied. The analysis of the petition is presented in the attached notice which is published in the Federal Register.

ENGINEER [signature] DATE: 11/7/00
DIV CHIEF [signature] DATE: 11/8/00
OFC DIR: [signature] DATE: 11-8-00

SUMMARY The National Highway Traffic Safety Administration was petitioned to commence a defect investigation by a recreation vehicle (RV) club safety committee member. The petition alleges that some of the hitch platform and related towing equipment may not meet National Highway Safety Standards for material and construction specification. Specifically, cracks were found in the Class IV type hitch receiver platforms on some of the club members' vehicles when towing an Airstream travel trailer The denial of the petition is presented in the attached notice which is published in the Federal Register

What we've done while preparing for this discussion:

- Reviewed the petition
- Reviewed material related to NHTSA's trailer hitch performance standard efforts in the 60's, 70's, & 80's
- Discussed status of NHTSA's "Trailer Towing Information" publication w/NPS
- Discussed the VESCompact w/its author
- Discussed the VESCommission with the counsel to the THMA
- Discussed V5 with its author
- Discussed Automotive Manufacturers Equipment Compliance Agency, Inc's. (AMECA) V5 certification program with it's staff
- Discussed state hitch requirements with the AAMVA
- Reviewed state regulations related to hitches
- Discussed Canadian trailer towing regulations with the CMOT
- Surveyed OEM and Aftermarket hitches for V5 labeling
- Discussed V5 and J684 with current and former members of the SAE Trailer Committee
- Discussed TT labeling requirements with the RVIA
- Surveyed TT's for compliance with the RVIA labeling requirement
- Conducted RV dealer surveys, comparing and contrasting Airstream trailers with their peers
- Discussed Airstream hitch recommendations with AS dealers
- Discussed Suburban hitch recommendations with GM
- Discussed hitch recommendations, in general, with independent hitch installers
- Discussed the alleged defect in the subject vehicles with 5 local dealer service and parts departments
- Met with 5 local fleets, all utilizing the subject vehicle and component, for their perspective
- Reviewed over 100 publications dealing with the subject of safe trailer towing
  Discussed safe trailer-towing practices with the editors of two major trailer-related magazines
- Discussed tow vehicle/trailer weight ratings with the technical editor of Trailer Life magazine
- Reviewed GM's 2002 Suburban retail brochure and its towing guide
- Reviewed Reese, Draw-Tite, and Valley retail publications
- Discussed theory, application, and results of the Aweigh-We-Go program with its President
- Reviewed and discussed the Recreational Vehicle Safety Education Foundation mission with its President
- Discussed GVWR, GCWR, TWA, CCC, etc. with engineering departments of 2 major vehicle mfrs, 2 trailer mfrs, and 2 hitch mfrs.
- Requested and reviewed the GVWR, GCWR, and TWA specifications for each Suburban involved in an alleged receiver-cracking incident.
- Obtained and reviewed the owner's guide for a Draw-Tite model 7801 weight-distributing (WD) hitch
- Reviewed 3-body diagrams and calculations related to tongue weight supplied by a major hitch manufacturer
- Reviewed other hitch-related ODI investigations
- Reviewed other hitch-related safety recalls
- Searched the Fatal Accident Reporting System (FARS) for in-scope crashes
- Searched the ODI complaint database for new complaints since denying the petition
- Reviewed the survey material gathered during the February, 2000 WBCCI rally in Sarasota
- Reviewed the entire file for DP00-001
- Purchased a new receiver from a local parts department for a 1997 Suburban, part number 12343221
- Conducted another survey on June 27, 2001 at the WBCCI rally in Sioux Falls, SD
- Prepared a slide presentation outlining our findings

Suburban OEM Receiver - Sarasota In-scope Rpts - w/o A'WWG - (Cracks Only)

NO	Source	ReptDte	Vehicle	VIN	Trailer	AWWG?	Complaint
1	WBC/Fla/VOQ	2-25-00	94 Sub	1GNGC26N1RJ315828	31' AS	N	OEM stress cracks - would not allow trailer to be weighed
2	WBC/Fla	2-25-00	94 Sub	No longer have vehicle	34' AS	N	OEM replaced 2x w/stress cracks
3	WBC/Fla	2-25-00	93 Sub	1GNGC26N2PJ394651	25' AS	N	OEM replaced with Reese after weld cracks in '96
4	WBC/Fla	2-25-00	94 Sub	Vehicle sold	32' AS	N	OEM stress cracks - replaced with Reese
5	WBC/Fla	2-25-00	92 Sub	1GNGC26NJ338688	31' AS	N	OEM flange stress crack - welded
6	WBC/Fla	2-25-00	94 Sub	??	??	N	OEM stress cracks on wings - replaced w/aftermarket
7	WBC/Fla/VOQ	5-23-00	93 Sub	1GNGC26N6PJ324683	29' AS	N	OEM stress crack - "bad roads." New OEM and no more bad roads.

These reports were not included in the petition analysis.

Suburban OEM Receivers - In Scope Complaints (All Myrs - Cracks only)

NO	Source	ReptDte	Vehicle	VIN	Trailer	AWWG?	Complaint
1	VOQ	6-14-95	93 Sub	1GNGK26N7PJ701926	NG	N	OEM Flange stress cracks - both sides
2	VOQ	11-2-95	93 Sub	1GNGC26N2PJ356305	NG	N	?? Receiver w/weld cracks
3	VOQ	9-11-95	93 Sub	1GNGC26N8PJ377451	NG	N	?? "Trailer Hitch Cracked"
4	VOQ	11-25-97	93 Sub	1GNGC26N5PJ359926	NG	N	OEM flange stress cracks
5	VOQ	9-22-98	94 Sub	1GNGC26N8RJ412251	AS	N	OEM flange stress cracks - AS rally w/5 found crkd
6	VOQ	6-15-95	93 Sub	1GNCG26N8P.....	NG	N	OEM flange stress cracks - both sides
7	VOQ	11-26-99	97 Sub	1GKGC26J5VJ733362	NG	N	OEM stress cracks - both sides
8	VOQ	6-21-00	95 Sub	1GKGK26N4SJ708129	?	N	OEM crack w/9K trailer 3-4" stress crack
9	VOQ	5-9-95	92 Sub	1GNGK26N5NJ326389	32' AS	N	"Problem w/cracks in Suburban hitch" Bad Roads No Weight
10	VOQ/GM	4-7-00	96 Sub	3GKGK26J2TG514103	32' HR	N	OEM wing broke off - 32' HR – Never weighed. Using Class V w/Hensley now.
11	Ltr/WBC/ GM-C	4-28-00	94 Sub	1GNGC26F6RJ339924	AS	N	OEM stress cracks - Has weight ticket but no tongue
12	VOQ/Pet/W BC/Fla	1-7-00	97 Sub	1GKGC26J5VJ7733362	34' AS	Y	*Aftermarket hitch installed after OEM Stress crack in both wings. Never weighed. Claims it has a 1,700 lb. tongue rating*
13	Petition	1-7-00	93 Sub	1GNGK26N7PJ324212	AS	N	OEM hitch partial sep
14	Petition	1-7-00	94 Sub	1GNGC26NXRJ399034	34' AS	N	OEM Stress crack above box - re-welded-failed again
15	WBC/Fla/ VOQ	2-25-00	94 Sub	1GNGC26N1RJ315828	31' AS	N	OEM stress cracks - would not allow trailer to be weighed
16	WBC/Fla	2-25-00	94 Sub	No longer have vehicle	34' AS	N	OEM replaced 2x w/stress cracks
17	WBC/Fla	2-25-00	93 Sub	1GNGC26N2PJ394651	25' AS	N	OEM replaced with Reese after weld cracks in '96
18	WBC/Fla	2-25-00	94 Sub	Vehicle sold	32' AS	N	OEM stress cracks - replaced with Reese
19	WBC/Fla	2-25-00	92 Sub	1GNGC26NJ338688	31' AS	N	OEM flange stress crack - welded
20	WBC/Fla	2-25-00	94 Sub	??	??	N	OEM stress cracks on wings - replaced w/aftermarket
21	WBC/Fla/ VOQ	5-23-00	93 Sub	1GNGC26N6PJ324683	29' AS	N	OEM stress crack - "bad roads"

NO	Source	ReptDte	Vehicle	VIN	Trailer	AWWG?	Complaint
22	WBC/Fla	2-25-00	93 Sub	1GNGC26N1PJ352763	31' AS	Y	OEM flange stress crack
23	WBC/Fla	2-25-00	93 Sub	1GNGC26N6PJ346294	34' AS	Y	OEM flange stress cracks
24	WBC/Fla/ VOQ	2-27-00	95 Sub	1GKGC26N3SJ706580	30' AS	Y	OEM flange stress cracks
25	WBC/Fla/ VOQ	2-27-00	94 Sub	1GNGC26K9RJ378147	31' AS	Y	*OEM flange stress cracks Small motor yet owner says will tow 10K*
26	WBC/Fla/ VOQ	2-27-00	96 Sub	1GNGC26J2TJ377565	30' AS	Y	OEM flange stress cracks
27	WBC/Fla/ VOQ	2-27-00	99 Sub	1GKGC26J2TJ733445	34' AS	Y	OEM flange stress cracks - 1,175 lb. tongue!
28	WBC/Fla	2-27-00	94 Sub	1GKGC26FXRJ715764	34' AS	Y	OEM flange stress cracks - 1,115 lb. tongue
29	WBC/Fla/ VOQ	2-27-00	99 Sub	3GNGKZ659XG107033	34' AS	Y	OEM Flange stress cracks-both sides. Now has Reese Class IV receiver
30	WBC/Fla/ VOQ/GM	2-27-00	93 Sub	1GNGC26N3PJ336449	30' AS	Y	OEM Flange stress cracks-both sides
31	GM-C	6-23-99	96 Sub	3GKGC26JXTG502455	NG	N	"Hitch is cracked - 100% goodwill"
32	GM-C	8-5-99	94 Sub	1GKGC26NXRJ730899	NG	N	"Trailer hitch tore off"
33	GM-C	9-13-99	94 Sub	1GKGC26N2RJ725258	NG	N	"W/towing, receiver broke completely off right side"
34	GM-C	9-13-99	94 Sub	1GKGC26N0SJ705709	AS	N	"Hitch completely broke away on one side and ½ on the other.
35	GM-C	8-2-99	96 Sub	1GNEC16R4TJ348267	NG	N	"Hitch broke off while towing TT"
36	GM-C	12-17-99	94 Sub	1GNGC26NXRJ349203	AS	N	"Discovered cracks during inspection"
37	GM-C	3-3-00	93 Sub	1GKGC26K9PJ727463	NG	N	"Hitch cracked"
38	GM-C	10-25-94	93 Sub	1GKFK16K6PJ709768	NG	N	"Hitch pulled away from welding"

NO	Source	RcptDte	Vehicle	VIN	Trailer	AWWG?	Complaint
39	GM-E	4-3-96	93 Sub	1GNFK16K7PJ362843	34' AS	N	Lawsuit - "hitch separated while towing and trailer rolled down hill. Sub had Z82 equipment. Allstate's expert found small amounts of fatigue cracking from the multiple sharp weld toes, porosity, and lack of fusion discontinuities. Also inadequate fusion and poor control of crown contour promoted rapid fatigue cracking from the onset of use and that poor weld fusion also elevated the local stresses at the connections and dramatically shortened the time to complete failure.
40	GM-E	11-18-96	95 Sub	1GKGK26F8SJ716033	Stake	N 8k est	Lawsuit - "carrying load of pumpkins at 55mph. Fatigue failure of hitch while towing 8,000 lb. trailer with weight-carrying mode. Receiver rated 4,000/400. Partial separation of trailer occured.

Suburban OEM Receiver Complaints - NIS (for any reason)

NO	All Num	Source	Rept Dte	Vehicle	VIN	Trailer	AWWG?	Complaint
1	4	VOQ	1-8-97	96 Sub	1GNSK16KXFJ42045??	NG	N	?? "Trailer hitch bolts came loose"
2	14	Pet	1-7-00	95 Dodge PU		34' AS	N	OEM cracked "on both sides"
3	18	WBC/Fla	2-25-00	96 Dodge		34' AS	N	12K lb. Reese hitch w/stress cracks
4	20	WBC/Fla	2-25-00	95 F250 PU	Ford Pickup	31' AS	N	Shelton platform stress crack
5	22	WBC/Fla	2-25-00	GM Dualie	??	??	N	Aftermarket hitch w/stress cracks
6	23	WBC/Fla	2-25-00	99 Sub	Vehicle totaled	??	N	Edmonston form - no info
7	24	WBC/Fla	2-25-00	76 Olds 4dr	Oldsmobile passcar	??	N	No information
8	27	WBC/Fla	2-25-00	87 Sub	1GNGR26N4HF147750	??	N	Reese welded to frame in 1994 - No Cracks
9	28	WBC/Fla	2-25-00	96 Sub	3GNGC26J3TG109321	31' AS	N	NO CRACKS IN OEM
10	29	WBC/Fla	2-25-00	84 Sub	1G5EC1629EF526269	???	N	No information
11	30	WBC/Fla	2-25-00	No Info	No Info	No Info	N	"Checked OK"
12	31	WBC/Fla	2-25-00	No Info	No Info	No Info	N	"Cracks - None known"
13	32	WBC/Fla	2-25-00	99 Ford E350	1FMNE31S5XHB99854	No Info	N	"I could not detect cracks"
14	33	WBC/Fla	2-25-00	98 Expedition	1FMRU17L4WLC32735	No Info	N	No information
15	34	WBC/Fla	2-25-00	No Info	No Info	No Info	N	No information
16	35	WBC/Fla	2-25-00	95 Sub	1GKGC26K9SJ735507	25' AS	N	NO CRACKS
17	36	WBC/Fla	2-25-00	99 Dodge	1B7KC23ZDXJ580781	???	N	NO CRACKS
18	37	WBC/Fla	2-25-00	97 F250	1FTHX25F1VEB28765	34'	N	NO CRACKS IN AFTERMARKET RECEIVER
19	38	WBC/Fla	2-25-00	88 Sub	1GKGR26K5JF533473	???	N	NO CRACKS
20	39	WBC/Fla	2-25-00	98 Sierra	2GTEC19R1W1519835	???	N	NO CRACKS
21	40	WBC/Fla	2-25-00	89 Sub	1GNGR26N2KF117699	???	N	NO CRACKS IN OEM
22	44	WBC/Fla	2-27-00	91 Sub	Not Given	34' AS	Y	*Reese V - no cracks - He has the tongue capacity wrong*
23	45	WBC/Fla	2-27-00	99 Sub	Not Given	28' AS	Y	No Crack
24	47	WBC/Fla	2-27-00	96 Sub	Not Given	34' AS	Y	*No Crack - Aftermarket receiver - Grimes claims it has a 1,700 lb tongue rating.*

NO	All Num	Source	ReptDte	Vehicle	VIN	Trailer	AWWG?	Complaint
25	49	WBC/Fla	2-27-00	89 Sub	Not Given	34' AS	Y	No Cracks
26	52	WBC/Fla/ VOQ	2-27-00	99 Expedition	1FMRN17L4XLA25764	31' AS	Y	Loose bolt
27	53	WBC/Fla	2-27-00	99 Sub	Not Given	32' AS	Y	No cracks
28	54	WBC/Fla	2-27-00	95 C20 Van	Not Given	31' AS	Y	No cracks
29	56	WBC/Fla/ VOQ	2-27-00	95 Ram PU	3B7KC23W2SM173627	30' AS	Y	Dodge - OEM receiver r&r'd 2x
30	58	WBC/Fla	2-27-00	01 F350	Not Given	34' AS	Y	No cracks
31	59	WBC/Fla	2-27-00	95 C P/U	Not Given	34' AS	Y	No cracks
32	62	WBC/Fla	2-27-00	99 Sub	Not Given	34' AS	Y	No cracks
33	67	GM-C*	2-10-00	94 Sub	1GNGC26F6RJ339924*	AS	N	"Found platform cracked after RV club advisory"
34	68	GM-C*	3-15-00	93 Sub	1GNGC26N3PJ336449*	NG	N	"Cust states cracked trailer hitch - NHTSA taking pictures of them."
35	70	GM-C*	12-17-99	94 Sub	1GNGC26NXRJ349203*	AS	N	"Discovered cracks during inspection"
36	76	GM-F*						Duplicate of VIN 6033 report, above

* = Duplicates report from another source

What's Missing?

1GNGC26F6RJ339924

1994 C2500 Suburban - 6.5L turbo diesel - 4.10 axle

CurbWt	5249
Payload:	3351
GVWR:	8600 lb.
TrlWt:	8,000/950 tongue
GCWR	14,500 lbs. Is the GCVW - Powertrain performance and we validate and its chosen range of performance

The trailer rating is derived from subtracting the weight of the tow vehicle (EPA with 2 people in the vehicle) from the GCWR - the Gross combined is in the trailering guides and is based on GM's proprietary testing to meet certain performance criteria while towing..

Actual (from weigh ticket): 6,520 (Truck)
1,271 (Cargo in Suburban)
7,440 (Trailer)
13,960 (Truck & Trailer) < 14,500 lb. GCWR

Model	Engine/Rear Gear	Curb Wt.	Trailer Wt.	GVWR	Payload	GCWR	TrlWt Difference	Receiver: Dead Wt. - WD Trailer Wt. / Tongue Wt.
C-15	6.5L/TD / 4.10	5249	8000/950 tongue	8600	3351	14,500	(2300)	5,000/500 - 10,000/1,000

What was the tongue weight?

Failure Rates - Suburban OEM Receivers

All in-scope w/cracks (Myr 1992-1999):	40/732,276 = 5.5/100K
Same, w/o the 7 Sarasota reports (1992-1999):	33/732,276 = 4.5/100K
DP scope rate (1993-1997 w/cracks):	36/440,438 = 8.2/100K
Dodge recall rate (00R-107)	54/357,000 = 15.1/100K

DAIMLERCHRYSLER

April 2000

Dealer Service Instructions for:

Safety Recall No. 872
Trailer Hitch Reinforcement Brackets

Models

1998-2000 (BR/BE) Dodge Ram Truck

*NOTE: This recall applies only to the above trucks equipped with a trailer tow package (sales code AHC) built from January 1, 1998 through September 29, 1999 **(MDH 0101XX through 092919)**.*

IMPORTANT: Some of the involved vehicles may be in dealer new vehicle inventory. **Federal law requires you to stop sale and complete this recall service on these vehicles before retail delivery.** Dealers should also consider this requirement to apply to used vehicle inventory and should perform this recall on vehicles in for service. Involved vehicles can be determined by using the DIAL VIP System.

Subject

The trailer hitch assembly on about 357,000 of the above vehicles may fatigue and crack. This can allow a trailer to separate from the truck and cause an accident without warning.

MOPAR Accessory Trailer Hitches

DP00-001
00000599

The following Mopar accessory trailer hitch part numbers purchased from Mopar between January 1998 and March 2000 are also affected by this recall. DaimlerChrysler does NOT have a record of the vehicles that have had these Mopar hitches installed. Every effort should be made by dealers to review their records and contact owners who have purchased these Mopar trailer hitches or have had these hitches installed by your dealer. Use this recall service procedure and parts information to inspect and repair Mopar accessory trailer hitches.

Model	Hitch Part No. (Qty 1)	Hitch Part No. (Qty 12)
1999-2000 BR/BE	82204656	82204657 (12 of P/N 82204656)
1994-1998 BR/BE	82401014	82204069 (12 of P/N 82401014)

NOTE: Mopar accessory trailer hitch P/N 82202017 & 82205979 are <u>not</u> affected by this recall.

Service Procedure

A: Inspect the Trailer Hitch Assembly for Cracks

1. Raise the vehicle on an appropriate hoist.
2. Clean the side plate area by the trailer hitch mounting nuts (Figure 1).
3. Inspect the right and left trailer hitch side plates for cracks as shown in Figure 1.

   - **Trucks with <u>NO cracks</u> on either side of the trailer hitch assembly** must have reinforcement brackets installed. Continue with Section "B - Install Trailer Hitch Reinforcement Brackets."

   - **Trucks <u>with cracks</u> on either side of the trailer hitch assembly** must have the trailer hitch assembly replaced. Continue with Section "C – Replace the Trailer Hitch Assembly (P/N CBCB8722)." If P/N CBCB8722 is not available, continue with Section "D - Replace the Trailer Hitch Assembly (Mopar 82205979)."

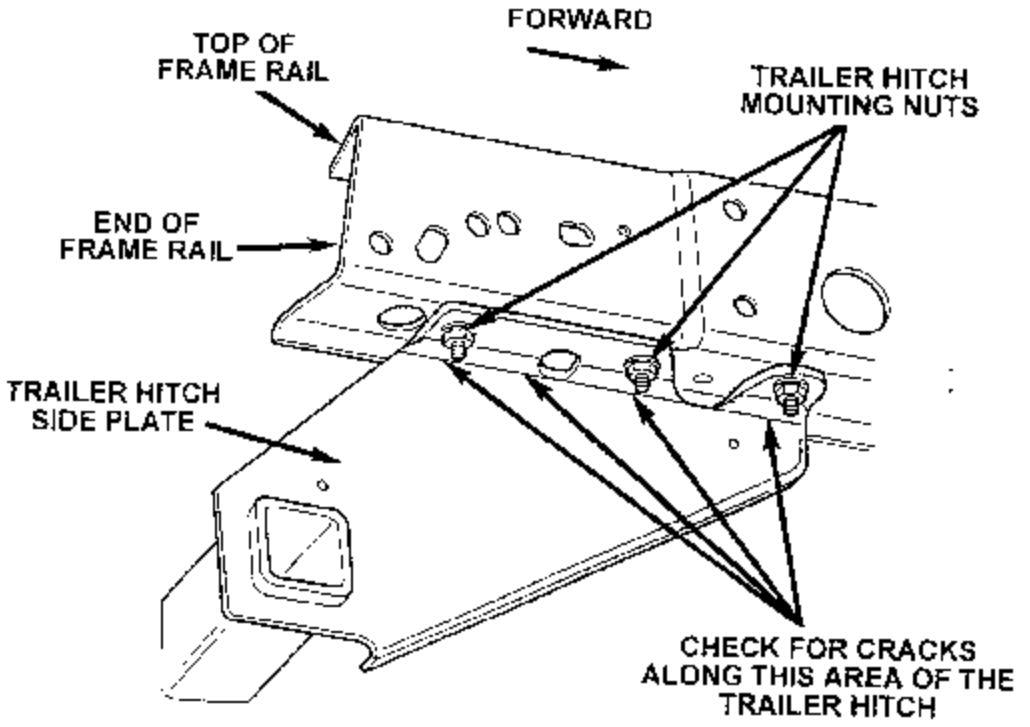


Figure 1 – Right Side of a 1999-2000 Model Year Hitch Shown

00V-107 - Dodge Receiver Recall

Scope: Valley-built receivers between 1-98 and 9-99

Number of Reports: 54

Population: Approx. 357,000

Rate: 15.1

Failures were occurring w/i first 12 months

DP00-001 - Suburban Receiver

Scope: PSI-built receivers between 9-91 and 6-99

Number of Reports: 40

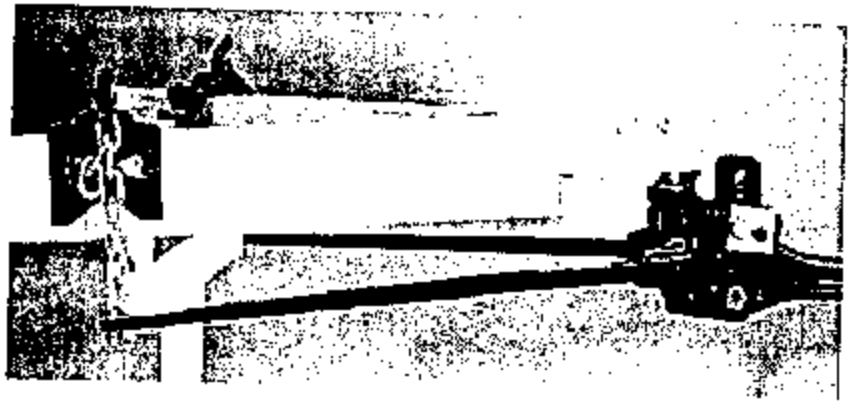
Population: 732,276

Rate: 5.5/100K

Most failures occur after 4-7 years

Dist. Hitch System

Dist. Hitch System



00000603
DP00-001

Total Weight on Your Vehicle's Tires

Be sure your vehicle's tires are inflated to the upper limit for cold tires. You'll find these numbers on the Certification label at the rear edge of the driver's door or see "Tire Loading" in the Index. Then be sure you don't go over the GVW limit for your vehicle, including the weight of the trailer tongue.

Hitches

It's important to have the correct hitch equipment. Crosswinds, large trucks going by and rough roads are a few reasons why you'll need the right hitch. Here are some rules to follow:

- If you use a step-bumper hitch, your bumper could be damaged or sharp turns. Make sure you have ample room when turning to avoid contact between the trailer and the bumper.
- If you'll be pulling a trailer that, when loaded, will weigh more than the capacity stamped on your step bumper, be sure to use a properly mounted, weight-distributing hitch and sway control of the proper size. This equipment is very important for proper vehicle loading and good handling when you're driving.
- Will you have to make any holes in the body of your vehicle when you install a trailer hitch?

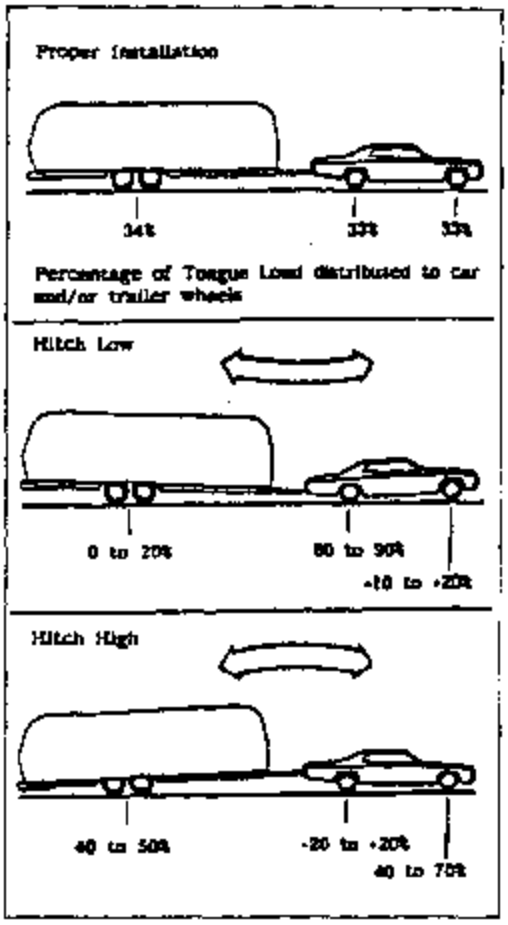
  If you do, then be sure to seal the holes later when you remove the hitch. If you don't seal them, deadly carbon monoxide (CO) from your exhaust can get into your vehicle (see "Carbon Monoxide" in the Index). Dirt and water can, too.

Safety Chains

You should always attach chains between your vehicle and your trailer. Cross the safety chains under the tongue of the trailer so that the tongue will not drop to the road if it becomes separated from the hitch. Instructions about safety chains may be provided by the hitch manufacturer or by the trailer manufacturer. Follow the manufacturer's recommendation for attaching safety chains and do not attach them to the bumper. Always leave just enough slack so you can turn with your rig. And, never allow safety chains to drag on the ground.

HITCHING UP

Hitching up your trailer is something that will become almost second nature with practice. The following section includes proper hitch load distribution and a procedure for hitching up.



Equalizing Hitch Load Distribution

When a trailer is hitched up properly to a tow vehicle with a load equalizing hitch, approximately 1/3 of the trailer's tongue weight will be on the trailer's axles and 2/3 will be transferred to the tow vehicle, 1/3 of this weight transfer will be carried by the front wheels and 1/3 by the rear wheels of the tow vehicle (See diagram). Thus, the tire load of each wheel on the tow vehicle will be increased by 1/6 of the trailer's tongue weight. The tire air pressure of the tow vehicle should be increased to compensate for this additional weight. Refer to the vehicle's owners manual for this information.

CAUTION: The tongue weight should be approximately 10% of the trailer's total weight, but MUST NOT EXCEED 1,000 lbs. And, under no condition should it exceed the hitch rating. Your hitch rating information should be provided to you by your hitch installer.

Sway Control Device

Although Airstream has not intruded into the hitch manufacturers field of expertise and preformed formal testing, we find the vast majority of Airstream owners purchase sway control devices.

When passed by large trucks or when exposed to sudden crosswinds the trailer will be "pushed" and this action will be felt in the tow vehicle. It's our understanding the sway control devices will reduce the amount of movement and make towing more comfortable and add some safety.

Follow the directions of the sway control manufacturer when having installed and using.

Steps for Hitching Up

Jack up the trailer hitch until there is clearance for the HITCH BALL to slide under. Remove safety pin, slide the locking lever forward and raise. Back the tow vehicle straight back to the hitch. (See Fig. 2). This can best be accomplished through the use of prearranged hand signals with the help of another person; but, if you are hitching up by yourself we recommend the use of a HOOK-UP VIEW MIRROR.

Lower the trailer hitch onto the hitch ball. Then close the locking lever and insert safety pin. (See Fig. 3)

Now raise the trailer and tow vehicle to the full height of the hitch jack (See Fig. 7) and then attach the LEVELING BARS. (See Fig. 4, 5 & 6). Lower the tow vehicle and trailer (See Fig. 7).

How Weight-Distributing Hitches Work

by
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Vice President, Engineering
Draw-Tite, Inc.
February 1, 2000

Weight distributing hitches (sometimes call "equalizing" hitches) apply leverage between the tow vehicle and trailer to redistribute the trailer's tongue weight among all the axles of both vehicles. The tow vehicle rides more level, and carries less than the trailer's tongue weight.

Weight-Carrying Hitches

To understand weight-distributing hitches, it is useful to review weight-carrying hitches. Weight-carrying hitches simply support the trailer tongue weight at the rear of the tow vehicle as though it were luggage in the trunk, except located farther to the rear. The additional load supported by the tow vehicle's rear axle is greater than the tongue weight itself. The load on the tow vehicle's front axle is reduced by the same amount that the load on the rear axle is increased. For many vehicles, the rear overhang is about half as long as the wheelbase. For this situation, the load on the rear axle is increased by 1.5 x the tongue weight, and the load on the front axle is decreased by 0.5 x the tongue weight. The total increase in axle loads is exactly equal to the tongue weight.

With weight-carrying hitches, the tongue weight tends to cause the tow vehicle to squat at the rear and rise at the front.

Fifth wheel and gooseneck hitches are weight-carrying hitches, but in these applications the connection between tow vehicle and trailer is generally forward of the tow vehicle's rear axle. The rear axle carries most of the tongue weight, and the front axle carries a small percentage.

Weight-Distributing (WD) Hitches

Most WD hitches use a pair of spring bars to introduce leverage between the tow vehicle and trailer. The front ends of the spring bars are attached to the tow vehicle through the hitch. Other than the fact that the spring bars can usually pivot about a vertical axis, they may be thought of as a pair of wheelbarrow handles attached to the tow vehicle. The rear ends of the spring bars are attached to the trailer tongue by a pair of brackets and/or chains. When the trailer attachments pull up on the ends of the spring bars, leverage is introduced between the trailer and the tow vehicle. This changes the weight distribution between the two vehicles.

Upward forces on the rear ends of the spring bars tend to lift the rear and lower the front of the tow vehicle. These same forces react on the trailer frame, and result in an increase in the reaction between the trailer's coupler and the ball, and also in an increase in the trailer's axle load. The tow vehicle's rear axle load is reduced, which the front axle's load is increased. The effect of this leverage tends to level the tow vehicle.

Note that the tow vehicle carries *less* than the trailer's tongue weight. However, the trailer axle load is increased compared to the weight-carrying case.

The changes in axle loads and the total amount of tongue weight carried by the tow vehicle depend on the following:

- the trailer's tongue weight
- the amount of leverage introduced by the spring bars
- the tow vehicle's wheelbase and overhang
- the distance from the hitch ball to the center of the trailer's axle(s)

An Example

Consider the following tow vehicle and trailer:
Tow vehicle wheelbase = 130"
Tow vehicle rear overhang = 65"
Ball to centerline of trailer axle = 180" (Typical for a trailer with overall length of 24-25 feet)
Tongue weight = 1000 lb.

Weight-carrying:

The tow vehicle's rear axle load increases by 1500 lb.
The front axle load is reduced by 500 lb.

Weight-distributing; with 60,000 inch/pound of moment (leverage) applied by the spring bars:

The tow vehicle rear axle load increases by 538.46 lb.
The tow vehicle front axle load increases by 128.21 lb.
The total tongue weight carried by the tow vehicle is 666.67 lb.
The trailer axle load increases by 333.33 lb.

DP00-001
00000606

This example is not a recommendation for setting up a tow vehicle and trailer with the given characteristics.

Insert Wheel Barrow Slide

INSTALLATION / OPERATION INSTRUCTIONS
WEIGHT DISTRIBUTING HITCH SYSTEMS
7801, 7802, 7803 AND 7879 (SINGLE SWAY CONTROL ATTACHMENT)
7979 (DUAL SWAY CONTROL ATTACHMENT)

NOTE: When selecting a shank, select the shortest unit that provides clearance with all the accessories on the tow vehicle and the trailer. This will maximize weight distributing and handling characteristics.

	PART NUMBER	MAX. TONGUE WEIGHT	MAX. GROSS TRAILER WEIGHT
RATING WHEN USED AS A WEIGHT DISTRIBUTING HITCH WITH SPRING BARS:	7801	600	12,000
	7802	800	12,000
	7803	1200	12,000
	7879 / 7979	RATING OF SPRING BARS	12,000
RATING WHEN USED AS A WEIGHT CARRYING BALL MOUNT WITHOUT SPRING BARS:	ALL	800	6,000

DO NOT EXCEED TOWING VEHICLE MANUFACTURER'S LOAD RATINGS

INTRODUCTION

When a trailer is hitched to a tow vehicle, the tongue weight typically causes the rear of the tow vehicle to lower and the front to raise. See Figure 1.

Figure 1

The purpose of a weight distributing hitch is to remove excessive weight from the tow vehicle's rear axle and distribute it to the front wheels and the trailer wheels. See Figure 2.

Figure 2

SETUP DIMENSIONS

1. Line up tow vehicle and trailer on level pavement, in a straight-ahead position, uncoupled.
2. For vehicles with air springs, air shocks or automatic leveling systems, check vehicle owner's manual. Unless otherwise specified, level the vehicle with the vehicle loaded as it will be when towing. Deactivate load leveling system before coupling trailer and adjusting spring bars.

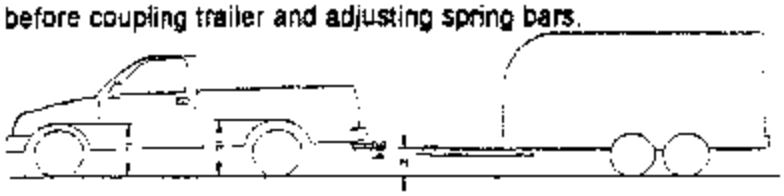

Figure 3

3. Measure and record uncoupled height on front and rear wheel openings to pavement and level trailer coupler height [See figure 3].

F = _____ R = _____ H = _____

DRAW-TITE, INC
CANTON, MI 48188
10/25/99

Slide - Bicycle towing an Airstream

DP00-001
00000609

Suburban Weights - Source: GM Truck Technical Guides

MYR	Model	Engine/Rear Gear	Curb Wt.	Trailer Wt.	GVWR	Payload	GAWRF	GAWRR	Receiver: Dead Wt. - WD Trailer Wt. / Tongue Wt.
2002	C-15	All	4914	8700	7000	2086	3150	4000	5,000/600 - 12,000/1,500
2002	C-15	All	5447	12000	8600	3153	3800	6000	5,000/600 - 12,000/1,500
2002	K-15	All	5123	8500	7200	2077	3600	4000	5,000/600 - 12,000/1,500
2002	K-25	All	5760	12000	8600	2840	4180	6000	5,000/600 - 12,000/1,500
1999	C-15	All	4825	6500/800 tongue	6800	1980	2950	3600	5,000/500 - 10,000/1,000
1999	C-25	All	5249	10000/1000 tongue	8600	3314	3600	6084	5,000/500 - 10,000/1,000
1999	K-15	All	5293	6000/750 tongue	7300	2003	3600	4000	5,000/500 - 10,000/1,000
1999	K-25	All	5693	10000/1000 tongue	8600	2850	4250	6000	5,000/500 - 10,000/1,000
1997	C-15	5.7L V8 / 3.73	4825	6500/800 tongue	6800	1975	2950	3968	5,000/500 - 10,000/1,000
1997	C-15	6.5L Turbo Diesel	5725	5500/700 tongue	7700	1975	3600	6084	5,000/500 - 10,000/1,000
1997	C-25	5.7L V8 / 4.10	5249	7500/900 tongue	8600	3351	3600	6084	5,000/500 - 10,000/1,000
1997	C-25	7.4L V8 / 4.10	5249	10000/1000 tongue	8600	3351	3600	6084	5,000/500 - 10,000/1,000
1997	C-25	6.5L Turbo Diesel	5249	8000/950 tongue	8600	3351	3600	6084	5,000/500 - 10,000/1,000
1997	K-15	5.7L V8 / 3.73	5293	6000/750 tongue	7300	2007	3600	4000	5,000/500 - 10,000/1,000
1997	K-15	6.5L Turbo Diesel	6043	5000/600 tongue	8050	2007	3925	4800	5,000/500 - 10,000/1,000
1997	K-25	5.7L V8 / 4.10	5693	7000/850 tongue	8600	2907	4250	6000	5,000/500 - 10,000/1,000
1997	K-25	7.4L V8 / 4.10	5693	10000/1000 tongue	8600	2907	4250	6000	5,000/500 - 10,000/1,000
1997	K-25	6.5L Turbo Diesel	5693	7500/900 tongue	8600	2907	4250	6000	5,000/500 - 10,000/1,000
1996	C-15	5.7L V8 w/3.73	4825	6500/800 tongue	6800	1975	2950	3968	4,000/400 - 10,000/1,000
1996	K-15	5.7L V8 w/3.73	5293	6000/750 tongue	7300	2007	3600	4000	4,000/400 - 10,000/1,000
1996	C-25	7.4L V8 w/4.10	5249	10000/1000 tongue	8600	3351	3600	6084	4,000/400 - 10,000/1,000
1996	K-25	7.4L V8 w/4.10	5693	10000/1000 tongue	8600	2907	4250	6000	4,000/400 - 10,000/1,000

Trailer Life

2001 TOWING GUIDE

This year's Towing Guide is the biggest ever, surpassing last year's listing by nearly two-fold. It's hard to believe, but manufacturers have yet to run out of ideas for new models and technology to stuff into these rugged vehicles, and there doesn't appear to be an end in sight. To keep the 2001 Tow Ratings from growing larger than the national debt, we've excluded any vehicles that can tow less than 2000 pounds. And while every effort has been made to ensure the accuracy of all ratings, keep in mind that much of the information we receive is preliminary, and may have changed slightly by the time you visit your dealer's showroom. When in doubt, consult the manufacturer's towing guide, available at your dealership -- it's the final word.

Compiled by Chris Hemer

RVING AT ITS BEST

TDP00-001
00000611

ACURA

Vehicle	Engine	Tow Limit (lbs)
Acura MDX	3.5 V-6	4,500a,b
Acura RL	3.5 V-6	2,000

a = Requires automatic transmission and power steering coolers when towing more than 2,000 pounds.
b = Maximum rated capacity of 4,500 pounds is for towing boats; 3,500 for towing other trailers.

AM GENERAL

Vehicle	Engine	Tow Limit (lbs)
Hummer 2-dr Hardtop	6.5 V-8 TD	8,300
Hummer 4-dr Open Top	6.5 V-8 TD	8,050
Hummer 4-dr Hardtop	6.5 V-8 TD	7,900
Hummer Station Wagon	6.5 V-8 TD	7,770

TD = Turbodiesel

BMW

Vehicle	Engine	Tow Limit (lbs)
BMW X5	4.4 V-8	6,000a,b
BMW X5	3.0 I-6	5,000a,b,c
BMW X5	3.0 I-6	5,000a,b,d

a = Maximum towing weight for trailers without brakes is 1,650 pounds.
b = Maximum towing weight for trailers with brakes off road, 3,300 pounds.
c = With manual transmission.
d = With automatic transmission.

BUICK

Vehicle	Engine	Tow Limit (lbs)
Rendezvous	3.4 V-6	3,500a

a = Requires towing package.

CADILLAC

Vehicle	Engine	Tow Limit (lbs)
DeVille	4.6 Northstar V-8	2,000a
Escalade AWD	6000 V-8	8,500
Escalade 2WD	5300 V-8	7,700
Seville SLS	4.6 Northstar V-8	2,000a
Seville STS	4.6 Northstar V-8	2,000a

a = Requires trailer-towing package.

CHEVROLET/GMC

Vehicle	Engine	Tow Limit (lbs)
Astro/Safari Mini-Van		
RWD CV	4300 V-6	5,400a
RWD CV	4300 V-6	5,900b
RWD PV	4300 V-6	5,000a
RWD PV	4300 V-6	5,500b
AWD CV	4300 V-6	5,100a
AWD CV	4300 V-6	5,600b
AWD PV	4300 V-6	4,700a
AWD PV	4300 V-6	5,200b
Avalanche		
1500 CC ULV	5300 V-8	7,300b
1500 CC ULV	5300 V-8	8,300c
1500 CC ULV 4WD	5300 V-8	7,100b
1500 CC ULV 4WD	5300 V-8	8,100c
Express/Savana Van		
G1500 CV	4300 V-6	4,600a
G1500 CV	4300 V-8	5,100b
G1500 CV	5000 V-8	5,600a
G1500 CV	5700 V-8	6,100a
G1500 PV	4300 V-6	4,200a
G1500 PV	4300 V-8	4,700a
G1500 PV	5000 V-8	5,100a
G1500 PV	5700 V-8	5,600a
G1500 PV	5700 V-8	6,600b
G2500 CV	4300 V-8	4,500a
G2500 CV	5000 V-8	5,400a
G2500 CV	5700 V-8	5,900a
G2500 CV HD	4300 V-6	5,200c
G2500 CV HD	5700 V-8	6,600b
G2500 CV HD	5700 V-8	8,100c
G2500 CV HD	6.5 V-8 TD	8,700b,c
G2500 LWB CV	4300 V-6	4,300a
G2500 LWB CV	5000 V-8	5,200a
G2500 LWB CV	5700 V-8	5,700a
G2500 LWB CV HD	4300 V-6	5,000c
G2500 LWB CV HD	5700 V-8	6,400b
G2500 LWB CV HD	5700 V-8	7,900c
G2500 LWB CV HD	6.5 V-8 TD	8,500b,c
G2500 PV	5700 V-8	6,000a
G2500 PV	5700 V-8	7,500c
G2500 PV	6.5 V-8 TD	8,100b,c
G2500 LWB PV	5700 V-8	5,800b
G2500 LWB PV	5700 V-8	7,300c
G3500 CV	5700 V-8	6,400b
G3500 CV	5700 V-8	7,900c
G3500 CV	8100 V-8	7,600a
G3500 CV	8100 V-8	9,100b
G3500 CV	8100 V-8	10,000c
G3500 CV	6.5 V-8 TD	8,600b,c
G3500 LWB CV	5700 V-8	6,300b
G3500 LWB CV	5700 V-8	7,800c
G3500 LWB CV	8100 V-8	7,500a
G3500 LWB CV	8100 V-8	9,000b
G3500 LWB CV	8100 V-8	10,000c
G3500 LWB CV	6.5 V-8 TD	8,400b,c
G3500 PV	5700 V-8	5,900b
G3500 PV	5700 V-8	7,400c
G3500 PV	8100 V-8	7,100a
G3500 PV	8100 V-8	8,600b
G3500 PV	8100 V-8	10,000c
G3500 PV	6.5 V-8 TD	8,000b,c
G3500 LWB PV	5700 V-8	5,600b
G3500 LWB PV	5700 V-8	7,100c
G3500 LWB PV	8100 V-8	6,800a
G3500 LWB PV	8100 V-8	8,300b
G3500 LWB PV	8100 V-8	10,000c
G3500 LWB PV	6.5 V-8 TD	7,800b,c

LWB = Long Wheelbase PV = Passenger Van
CV = Cargo Van TD = Turbodiesel
a = 3.42:1 axle ratio
b = 3.73:1 axle ratio
c = 4.10:1 axle ratio

Blazer/Jimmy		
2-dr 2WD	4300 V-6	4,700a,c
2-dr 2WD	4300 V-6	5,700a,d
2-dr 2WD	4300 V-6	4,200b,d
4-dr 2WD	4300 V-6	4,500a,c
4-dr 2WD	4300 V-6	5,500a,d
2-dr 4WD	4300 V-6	4,400a,c
2-dr 4WD	4300 V-6	5,400a,d/e
2-dr 4WD	4300 V-6	3,900b,d
ZR2	4300 V-6	4,800a,e
ZR2	4300 V-6	4,300b,e
4-dr 4WD	4300 V-6	4,200a,c
4-dr 4WD	4300 V-6	5,200a,d/e
4-dr 4WD	4300 V-6	3,700b,d
S-10/Sonoma		
Regular cab	2200 I-4	3,200a,f
Regular cab	4300 V-6	4,900a,c
Regular cab	4300 V-6	5,900a,c
Regular cab	4300 V-6	6,800a,d
Extended cab	2200 I-4	2,100b,f
Extended cab	2200 I-4	3,000a,f
Extended cab	4300 V-6	3,900b,c
Extended cab	4300 V-6	4,800a,c
Extended cab	4300 V-6	5,800a,d
Lengthed	2200 I-4	2,200b,f
Lengthed	2200 I-4	3,100a,f
Lengthed	4300 V-6	3,900b,c
Longbed	4300 V-6	4,900a,c
Longbed	4300 V-6	5,900a,d
Regular cab 4WD	4300 V-6	4,200b,d
Regular cab 4WD	4300 V-6	5,700a,d/e
Extended cab 4WD	4300 V-6	4,900b,d
Extended cab 4WD	4300 V-6	5,500a,d/e
ZR2	4300 V-6	4,400b,e
ZR2	4300 V-6	4,900a,e
Crew Cab 4WD	4300 V-6	5,200a,d/e

4WD = Four-wheel drive
a = Automatic transmission
b = Manual transmission
c = 3.08:1 rear axle ratio
d = 3.42:1 rear axle ratio
e = 3.73:1 rear axle ratio
f = 4.10:1 rear axle ratio

Sierra/Silverado, Light-Duty,
Automatic Transmission, Conventional Towing

1500	4300 V-6	4,700a
1500	4300 V-6	5,200c
1500	4800 V-8	6,600c
1500	4800 V-8	7,600d
1500	5300 V-8	7,600c
1500	5300 V-8	8,600d
1500 EC	4300 V-6	4,900c
1500 EC	4300 V-8	5,900d
1500 EC	4800 V-8	6,300c
1500 EC	4800 V-8	7,300d
1500 EC	5300 V-8	7,300c
1500 EC	5300 V-8	8,300d
CC	6000 V-8	8,300d
CC	6000 V-8	10,300e
1500 LS	4300 V-6	4,600a
1500 LH	4300 V-6	5,100c
1500 LS	4800 V-8	6,500c
1500 LS	4800 V-8	7,500d
1500 LS	5300 V-8	7,500c
1500 LS	5300 V-8	8,500d
1500 LS EC	4800 V-8	6,100c
1500 LS EC	4800 V-8	7,100d
1500 LS EC	5300 V-8	7,100c
1500 LS EC	5300 V-8	8,100d
2500 LS	6000 V-8	8,800d
2500 LS	6000 V-8	10,800e
1500 4WD	4300 V-6	4,900c
1500 4WD	4300 V-6	5,400d
1500 4WD	4800 V-8	7,300d
1500 4WD	4800 V-8	8,300e
1500 4WD	5300 V-8	8,300d
1500 4WD	5300 V-8	9,300e
1500 4WD EC	4800 V-8	7,000c
1500 4WD EC	4800 V-8	8,000e
1500 4WD EC	5300 V-8	8,000d
1500 4WD EC	5300 V-8	9,000e
1500 4WD EC	6000 V-8	8,700d
1500 4WD EC	6000 V-8	9,000d
1500 4WD CC	6000 V-8	10,400e
1500 4WD LS	4300 V-6	4,800c
1500 4WD LS	4300 V-6	5,300d
1500 4WD LS	4800 V-8	7,200e
1500 4WD LS	4800 V-8	8,200e
1500 4WD LS	5300 V-8	8,200d
1500 4WD LS	5300 V-8	9,200e
1500 4WD LS EC	4800 V-8	6,800d
1500 4WD LS EC	4800 V-8	7,800e
1500 4WD LS EC	5300 V-8	7,800d
1500 4WD LS EC	5300 V-8	8,800e
2500 4WD EC	6000 V-8	8,300d
2500 4WD EC	6000 V-8	10,300e

Sierra/Silverado, Light-Duty,
Manual Transmission, Conventional Towing

1500	4300 V-6	3,700a
1500	4300 V-6	4,200c
1500	4800 V-8	4,600c
1500	4800 V-8	5,600c
1500 EC	4300 V-6	3,900c
1500 EC	4800 V-8	4,300c
1500 EC	4800 V-8	5,300d
1500 LH	4300 V-6	3,500a
1500 LS	4300 V-8	4,100c
1500 LS	4800 V-8	4,500c
1500 LS	4800 V-8	5,500d
1500 LS EC	4800 V-8	4,100c
1500 LS EC	4800 V-8	5,100d
2500 LS	6000 V-8	8,000d
2500 LS	6000 V-8	10,000e
1500 4WD	4300 V-6	3,900c
1500 4WD	4300 V-6	4,400d
1500 4WD	4800 V-8	5,300d
1500 4WD	4800 V-8	6,300e
1500 4WD EC	4800 V-8	5,000d
1500 4WD EC	4800 V-8	6,000e
1500 4WD LH	4300 V-6	3,800c
1500 4WD LS	4300 V-6	4,300d
1500 4WD LS	4800 V-8	5,200d
1500 4WD LH	4800 V-8	5,200e
1500 4WD LS EC	4800 V-8	4,900d
1500 4WD LS EC	4800 V-8	5,800e
2500 4WD EC	6000 V-8	8,300d
2500 4WD EC	6000 V-8	10,300e

Sierra/Silverado, Light-Duty,
Automatic Transmission, Fifth-Wheel Towing
(Automatic or Manual with 6000 V-8)

1500	4800 V-8	6,600c
1500	4800 V-8	7,600d

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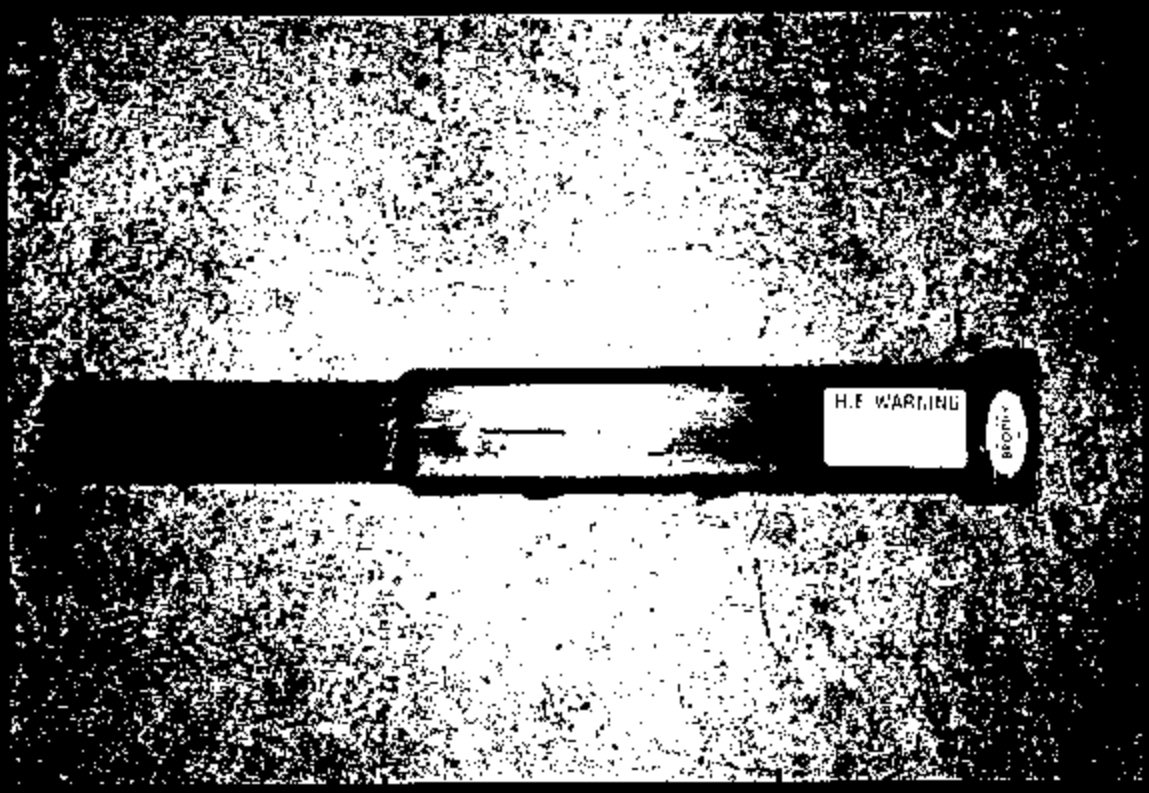
Vehicle	Engine	Axle Ratio	Max. Trailer Wt.
C-2500 (2WD) Suburban	5.7L	3.73	6,000 lbs. (2 724 kg)
		4.10	7,500 lbs. (3 405 kg)
	6.5L Diesel	3.73	6,500 lbs. (2 951 kg)
		4.10	8,000 lbs. (3 632 kg)
	7.4L	3.73	8,500 lbs. (3 859 kg)
		4.10	10,000 lbs. (4 540 kg)
K-2500 (4WD) Suburban	5.7L	4.10	7,000 lbs. (3 178 kg)
	6.5L Diesel	3.73	6,000 lbs. (2 724 kg)
		4.10	7,500 lbs. (3 405 kg)
	7.4L	3.73	8,000 lbs. (3 632 kg)
		4.10	10,000 lbs. (4 540 kg)



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Slide - WD Ball Mount

DP00-001
00000615

Worksheet

The answers to these questions will provide you with information necessary for selecting the GMC to meet all your needs. Fill out this worksheet and review it with your GMC salesperson as you spec your new vehicle.

1. What it the weight of your boat or trailer (including all cargo)? _____

2. Maximum towing ratings include driver and one passenger. How many additional passengers will be in the vehicle when you are towing? _____

3. How much of the vehicle's driving time will be spent towing? ☐0-25% ☐25-50% ☐50-75% ☐75-100%

4. What special conditions requiring added traction will you encounter while towing? ☐Off-road ☐Unfinished roads ☐Snow-covered roads ☐Boat ramps

5. What are the height and width of your boat or trailer? _____

6. Will you be towing over short or long distances? ☐Short ☐Long

7. When trailering which of the following special conditions will you encounter? ☐Steep grades ☐Mountains ☐High Altitudes ☐Extreme temperatures

8. What type of hitch does your trailer require? ☐Weight-carrying ☐Weight-distributing ☐Fifth-wheel

9. Is your trailer equipped with trailer brakes? ☐Yes ☐No

10. What type of electrical connection does your trailer require (6- or 8-wire)? _____

11. Will your towing needs increase in the future? ☐Yes ☐No

- Three important considerations have to do with weight:

Weight of the Trailer

How heavy can a trailer safely be?

- For utility vehicles, a trailer should never weigh more than 7,000 pounds (3175.2 kg).
- For wagon models, a trailer should never weigh more than 10,000 pounds (6125.6 kg).

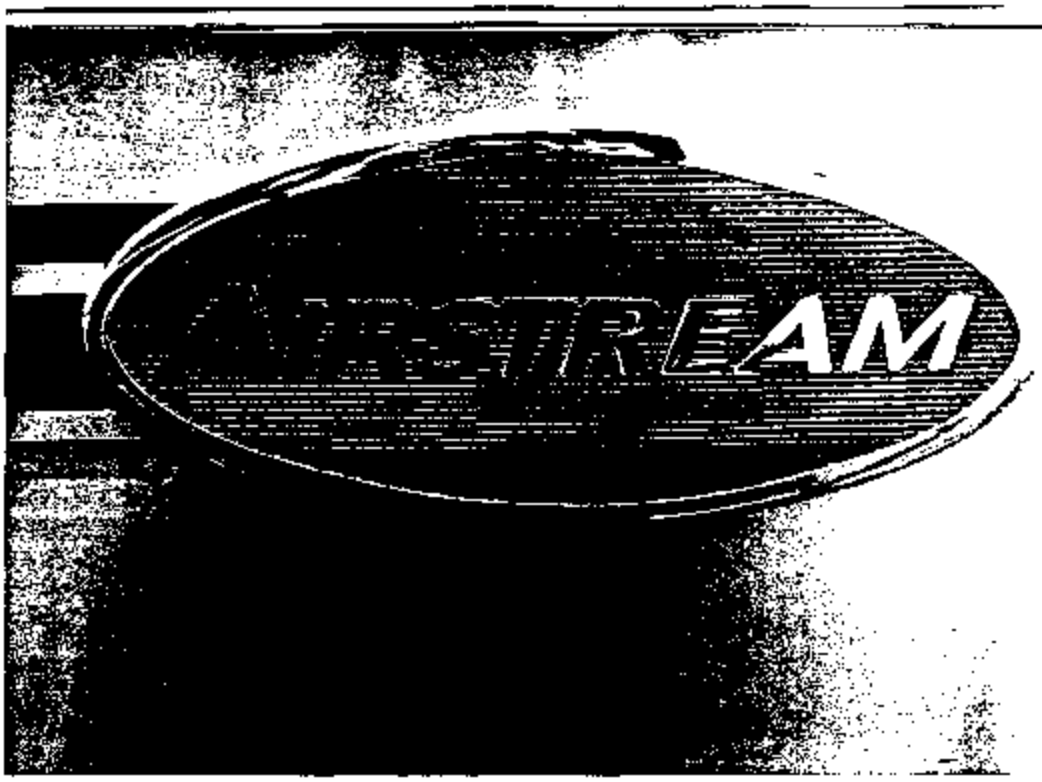
But even that can be too heavy. It depends on how you plan to use your rig. For example, speed, altitude, road grades, outside temperature, and how much your vehicle is used to pull a trailer all are important. And, it can also depend on any special equipment that you have on your vehicle. You can ask your dealer for our trailering information or advice, or you can write us at the address listed in your Warranty and Owner Assistance Information Booklet.

In Canada, write to:

General Motors of Canada Limited
Customer Assistance Center
1908 Colonel Sam Drive
Oshawa, Ontario L1H 8P7

Weight of the Trailer Tongue

The tongue load (A) of any trailer is an important weight to measure because it affects the total, gross weight of your vehicle. The gross vehicle weight (GVW) includes the curb weight of the vehicle, any cargo you may carry in it, and the people who will be riding in the vehicle. And if you will tow a trailer, you must add the tongue load to the GVW because your vehicle will be carrying that weight, too. See "Loading Your Vehicle" in the Index for more information about your vehicle's maximum load capacity.



DP00-001
00000618

MFD BY
8300 LBS.
4000 LBS.
225/75R15 15X6
65
7/17/00

CONSULT OWNER'S MANUAL FOR SPECIFIC WEIGHING INSTRUCTIONS AND TOWING GUIDELINES

[illegible]20LJ513720 1131W WB	GVWR @ 8,300
[illegible] APPROX 1,171 APPROX	

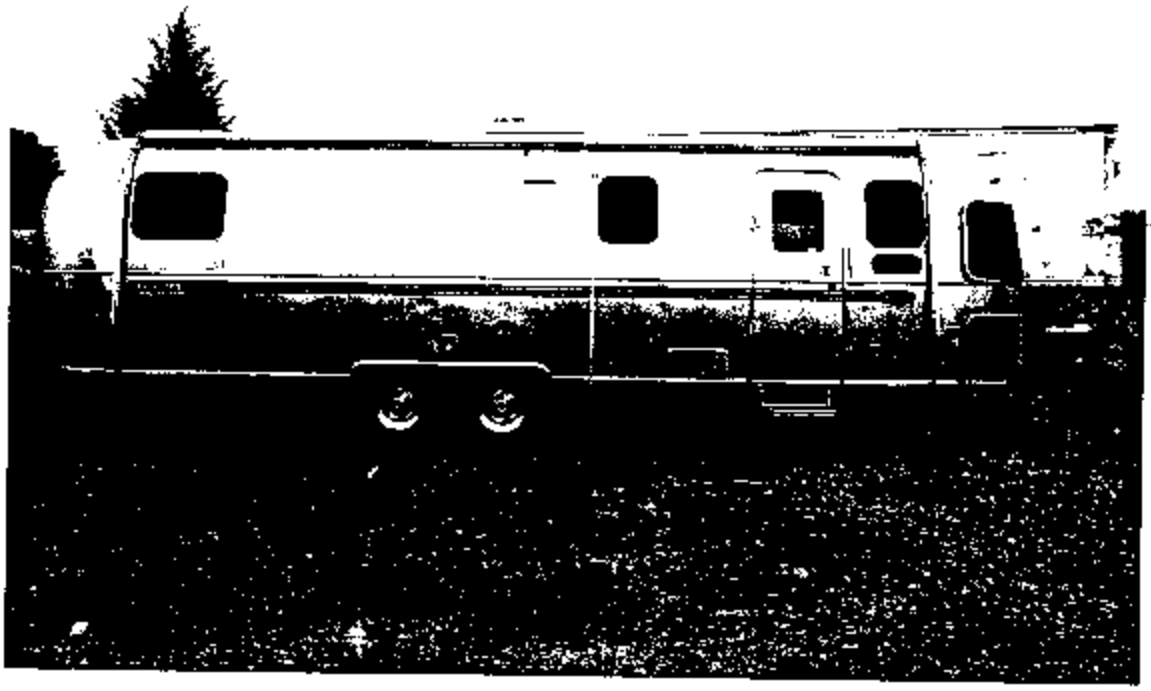
THIS TRAILER IS CAPABLE OF CARRYING UP TO 60 GAL.
OF FRESH WATER (INCLUDING WATER HEATER) FOR A TOTAL OF 504 LBS.
REFERENCE: *WEIGHT OF FRESH WATER IS 8.33 LBS/GAL.*

GVWR: ***GROSS VEHICLE WEIGHT RATING*** MEANS THE MAXIMUM PERMISSIBLE WEIGHT OF THIS TRAILER. THE GVWR IS EQUAL TO OR GREATER THAN THE SUM OF THE UNLOADED VEHICLE WEIGHT PLUS THE NET CARRYING CAPACITY.

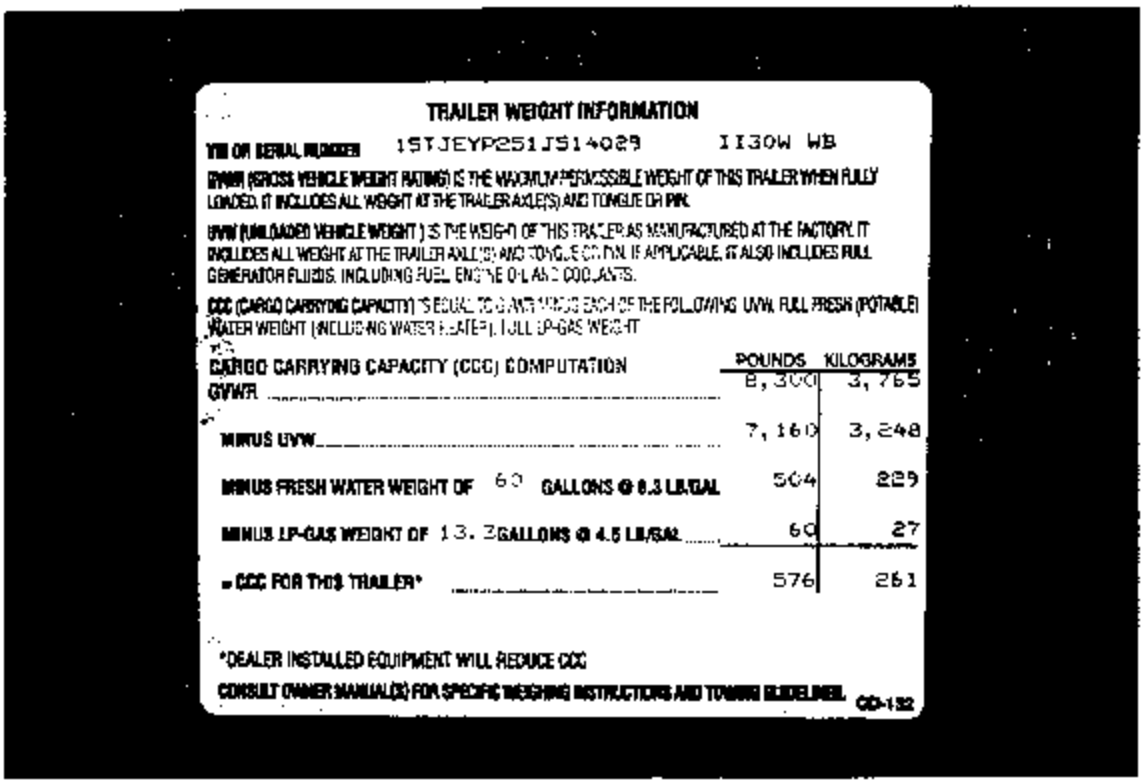
UVW: ***UNLOADED VEHICLE WEIGHT*** MEANS THE WEIGHT OF THIS TRAILER AS BUILT AT THE FACTORY, IF APPLICABLE. IT INCLUDES FULL GENERATOR FUEL, ENGINE OIL AND COOLANTS. THE UVW DOES NOT INCLUDE CARGO, FRESH WATER, LP GAS, OR DEALER INSTALLED ACCESSORIES.

NCC: ***NET CARRYING CAPACITY*** MEANS THE MAXIMUM WEIGHT OF ALL PERSONAL BELONGINGS, FOOD, FRESH WATER, LP GAS, TOOLS, DEALER INSTALLED ACCESSORIES, ETC., THAT CAN BE CARRIED BY THIS TRAILER. NCC IS EQUAL TO OR LESS THAN GVWR MINUS UVW.

CO-127



2/2/03
330 LBS.
4000 LBS.
225/75R15E 35/6
35
MEMBER RVIA
PLUMBING • HEATING • FIRE SAFETY
ELECTRICAL
MANUFACTURER CERTIFIES COMPLIANCE WITH STANDARD FOR RECREATIONAL VEHICLES ANSI NO. A119.2 AND NATIONAL ELECTRICAL CODE ANSI/NFPA NO.70
711589
RECREATION VEHICLE INDUSTRY ASSOCIATION
RVIA



TRAILER WEIGHT INFORMATION

VIN OR SERIAL NUMBER 1STJEYP251JS14029 1130W WB

GVWR (GROSS VEHICLE WEIGHT RATING) IS THE MAXIMUM PERMISSIBLE WEIGHT OF THIS TRAILER WHEN FULLY LOADED. IT INCLUDES ALL WEIGHT AT THE TRAILER AXLE(S) AND TONGUE OR PIN.

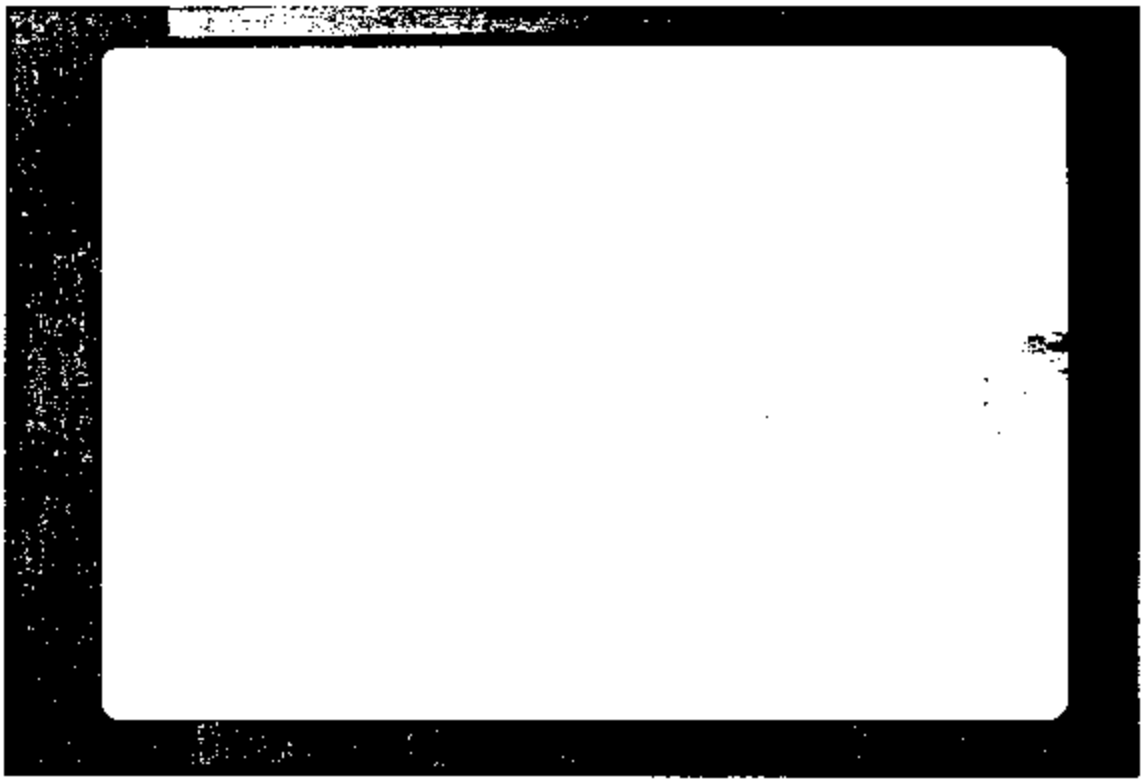
UVW (UNLOADED VEHICLE WEIGHT) IS THE WEIGHT OF THIS TRAILER AS MANUFACTURED AT THE FACTORY. IT INCLUDES ALL WEIGHT AT THE TRAILER AXLE(S) AND TONGUE OR PIN, IF APPLICABLE. IT ALSO INCLUDES FULL GENERATOR FLUIDS, INCLUDING FUEL, ENGINE OIL AND COOLANTS.

CCC (CARGO CARRYING CAPACITY) IS EQUAL TO GVWR MINUS EACH OF THE FOLLOWING: UVW, FULL FRESH (POTABLE) WATER WEIGHT (INCLUDING WATER HEATER), FULL LP-GAS WEIGHT

CARGO CARRYING CAPACITY (CCC) COMPUTATION	POUNDS	KILOGRAMS
GVWR	8,300	3,765
MINUS UVW	7,160	3,248
MINUS FRESH WATER WEIGHT OF 60 GALLONS @ 8.3 LB/GAL	504	229
MINUS LP-GAS WEIGHT OF 13.3 GALLONS @ 4.5 LB/GAL	60	27
= CCC FOR THIS TRAILER*	576	261

*DEALER INSTALLED EQUIPMENT WILL REDUCE CCC

CONSULT OWNER MANUAL(S) FOR SPECIFIC WEIGHING INSTRUCTIONS AND TOWING GUIDELINES. CD-132



MODEL: '31' EXCELLA TT 2001 VEHICLE IDENTIFICATION NUMBER: 1STSEYR201J513720
C.B. DOUBLE "W" II31W WB
GOLDEN OAK

DEALER TO WHOM DELIVERED:
SAFFORD DODGE, INC.

FINAL ASSEMBLY POINT:
JACKSON CENTER, OHIO

THE FOLLOWING ITEMS ARE STANDARD ON THIS MODEL AT NO EXTRA CHARGE UNLESS REPLACED BY OPTIONAL EQUIPMENT:

7,000 LB GVWR
ALUMINUM WHEELS (4)
RADIAL BLACK WALL TIRES LOAD RANGE D
12" ELECTRIC DRUM BRAKES
ELECTRIC HITCH JACK;EXTERIOR LIGHT
RETRACTABLE STABILIZER JACK W/PADS
ALUMINUM STEP W/EXTENSION
MOLDED REAR BUMPER W/ROLL-OUT STORAGE
AUTOMOTIVE STYLED MAIN DOOR LOCK
LPG BOTTLE COVER; PREWIRE FOR TV DISH
S.P. SOLAR GREY FRONT PANORAMIC WINDOW
OAK INTERIOR W/RAISED PANELS
CEILING FLOURESCENT LIGHTS
SPARE TIRE BRACKET; 3 PC. STONE GUARD
FULL AWNING 2XG; PREWIRE SOLAR PANEL
SONY AM/FM STEREO/CASSETTE/4 SPEAKERS
QUILTED BEDSPREADS
INNERSPRING MATTRESS
WRAP PROTECTOR;ENTRANCE GRAB HANDLE
MIRRORED SLIDING WARDROBE DOORS
BULLET READING LIGHTS IN END LOCKERS
SPICE RACK; RANGE COVER
DAY/NIGHT SHADES LOUNGE; NIGHT BEDROOM
GALLEY SINKS W/MOEN PULLOUT FAUCET
13,500 A/C W/HEAT PUMP & WALL CONTROLS
3-BURNER RANGE TOP W/DELUXE DOOR
REGULAR MICROWAVE OVEN
6.0 CU.FT. 2-WAY REFRIG W/RAISED PANEL
TANK MONITORING SYSTEM IN RANGE HOOD
GAS/ELEC. 6 GALLON WATER HEATER W/DSI
CORIAN GALLEY AND LAVATORY TOP
WRITING TABLE W/CHAIR STORAGE
LAMINATE LIFT-UP TABLE (R.S.)
76" FRONT LOUNGE/DRAWER STORAGE
BATH UPGRADE/HARD SURFACE FLOORING
FIBERGLASS SHOWER STALL
7-WAY TRAILER PLUG
50 AMP CONVERTER PREWIRE FOR TV DISH
EXTERIOR LIGHTING PACKAGE
TV JACK W/12V OUTLETS (2)
EXTERIOR HEIGHT W/AC 9'7.5"
EXTERIOR WIDTH 8'5.5"
INTERIOR HEIGHT 6'3.5"
2 ZIP DEE CHAIRS;2 FANTASTIC FANS
FROSTED GLASS IN MAIN DOOR
54 GALLON FRESH WATER TANK W/DRAIN
39 GALLON BLACK TANK W/FLUSH
37 GALLON GREY TANK
30 LBS ALUMINUM BOTTLES
STAINLESS STEEL A-FRAME PROTECTORS
PRICES AND SPECS SUBJECT TO CHANGE
CANADIAN SPECS MAY DIFFER FROM U.S.

MANUFACTURER'S SUGGESTED RETAIL PRICE OF THIS MODEL 55,781.00

MANUFACTURER'S SUGGESTED RETAIL DELIVERED PRICE FOR OPTIONAL EQUIPMENT INSTALLED ON THIS VEHICLE BY MANUFACTURER

SKYLIGHT, GALLEY, W/SHADE	343.00
SKYLIGHT, BATH WITH SHADE	170.00

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OPTIONS SUBTOTAL	513.00
CUSTOMIZING CHARGE	
DESTINATION CHARGE	90.00
TOTAL AMOUNT	56,364.00

Slide - RVIA Member

STANDARDS NEWS

August 31, 2000
Standards News Bulletin RV-24/00

TO: RV Manufacturers, Suppliers and Other Interested Parties

FROM: Harley Holt, Director, Automotive Standards

SUBJECT: RVIA Weight Label Program

As a condition of RVIA membership, all motorhomes and trailers built on or after September 1, 2000 are required to have affixed the newly revised weight labels. These labels are to be conspicuously located. In addition, towing and weighing information is required to be included with owner's manuals. Either the original weight labels or the revised weight labels can be used until September 1, 2000.

This bulletin is a reminder that use of the revised RVIA weight labels becomes mandatory on September 1, 2000. When the RVIA inspectors make their regular inspections, they will be checking to assure that the revised labels are properly affixed.

Please refer to the attached RVIA Weight Label Requirement. Also attached are the Motorhome Weight Information and the Trailer Weight Information labels.

Please call me at 800-336-0154 ext. 313 or Bruce Hopkins at ext. 323 if you have any questions.

Attachments

ST00230

For a copy of this bulletin or any other bulletins, please visit RVIA's web site at www.rvia.org/members/new/RVstandards.

RECREATION VEHICLE INDUSTRY ASSOCIATION STANDARDS DEPARTMENT
8896 Preston White Dr. P.O. Box 2999 Reston, VA 20195-0999 Tel: 703/620-6003 Fax: 703/620-5071 www.rvia.org

TRAILER
WEIGHT INFORMATION

Model _____
GVWR _____
UVW _____
NCC _____

GVWR (Gross Vehicle Weight Rating) means the maximum permissible weight of this trailer. The GVWR is equal to or greater than the sum of the Unloaded Vehicle Weight plus the Net Carrying Capacity.

UVW (Unloaded Vehicle Weight) means the weight of this trailer as built at the factory. If applicable, it includes full generator fuel, engine oil, and coolants. The UVW does not include cargo, fresh water, LP gas, or dealer installed accessories.

NCC (Net Carrying Capacity) means the maximum weight of all personal belongings, food, fresh water, LP gas, tools, dealer installed accessories, etc., that can be carried by this trailer.
(NCC is equal to or less than GVWR minus UVW).

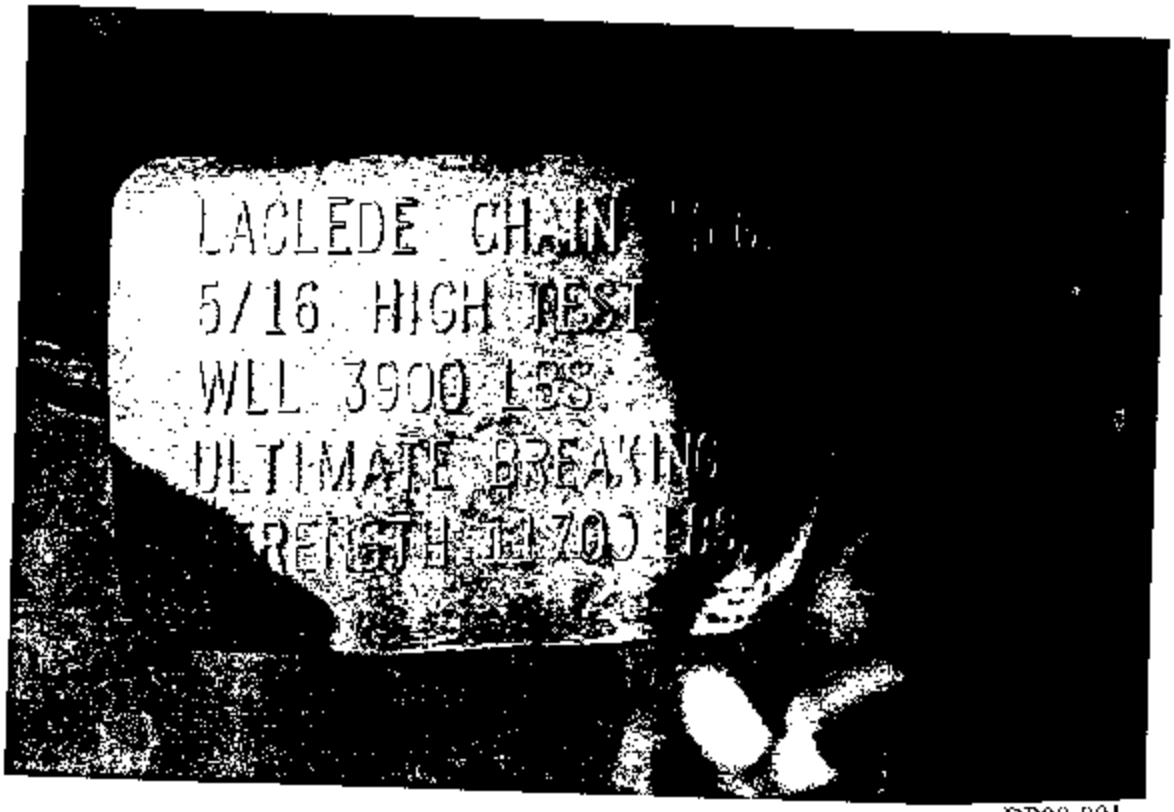
This trailer is capable of carrying up to _____ gallons of fresh water (including water heater) for a total of _____ _____pounds.
Reference: Weight of fresh water is 8.33 lbs/gal; Weight of LP gas is 4.5 lbs/gal (average).

CONSULT OWNER'S MANUAL FOR SPECIFIC WEIGHING INSTRUCTIONS AND TOWING GUIDELINES.

How Much Do They Weigh?

Airstream Excella 1000 - 30' = 7180 lbs.

Thor Citation 30G - 30' = 4679 lbs.


LACLEDE CHAIN
5/16 HIGH TEST
WLL 3900 LBS.
ULTIMATE BREAKING

Gross Combined Weight (GCW)

Base Curb Weight
+ Cargo Weight
+ Passenger Weight
= Gross Vehicle Weight (GVW)

Then, add:

GVW
+ Loaded Trailer Weight
= Gross Combination Weight (GCW)

Gross Combination Weight Ratings (GCWR)

USE OF GCWRs TO DETERMINE ENGINE, TRANSMISSION AND REAR AXLE RATIOS. Perhaps you prefer to use Gross Combination Weight Ratings (GCWRs) to determine the engine and rear axle ratio you will require to tow a specific trailer with your Chevy Blazer or Suburban. The chart below shows you the maximum allowable GCWR based on all the available truck engines and rear axle ratios with automatic or manual transmissions. The GCWR includes the total loaded weight of both the truck and the trailer. Any available engine may be used for trailering if the GCWR shown is not exceeded.

Automatic Transmissions

GCWR (lbs.)	8500	9500	11,000	12,000	13,500	14,500	17,000
Engine				**Rear Axle Ratio**			
4.3L Gas V6	3.08	3.42					
5.7L Gas V8			3.42	3.73	4.10[1]		
7.4L Gas V8[2]						3.73	4.10

Manual Transmissions[3]

GCWR (lbs.)	7500	8000	11,000	12,000
Engine		**Rear Axle Ratio**		
4.3L Gas V6	3.08[4]	3.42[4]		
5.7L Gas V8			3.42	3.73

[1] Available in 2500 Series Suburban only. [2] Not available in Suburban. RPO Y01 Heavy-Duty Cooling is required with a manual transmission for towing trailers over 2000 lbs. In addition, any other equipment required for S-Blazers with automatic transmissions must also be ordered for S-Blazers with manual transmissions. [3] GCWRs for S-Blazers equipped with available P235/75R-15 tires must be reduced by 500 lbs.

NOTE: Model availability of the above drivetrain combinations must be verified by your Chevy dealer for correct emissions equipment.

Caution

If you don't use the correct equipment and drive properly, you can lose control of your vehicle when you pull a trailer. For example, if the trailer is too heavy, your vehicle brakes may not work well — if at all. Your vehicle passengers and you could also be seriously injured. Pull a trailer only after you have taken all of the following steps.

Trailering Brakes

If your trailer weighs more than 1000 lbs. loaded, then it must have its own adequate brakes. Be sure to read and follow the instructions for the trailer brake controller so that it is installed, adjusted and maintained properly.

■ Don't tap into your vehicle's brake system. If the trailer's brake system will use more than 0.02 cu. in. of fluid from your vehicle's master cylinder, it does, neither braking system will work well. You could even lose your vehicle brakes.

■ The trailer brake parts must be able to take 3000 psi of pressure. If not, the trailer brake system must not be used with your vehicle. If everything checks out this far, then have a qualified individual make the brake fluid tap at the port on the master cylinder that sends fluid to the rear brakes. Don't use copper tubing, because it will bend and ultimately break. Use only steel brake tubing.

Hitches

It's important to have the correct hitch equipment. Crosswinds, large trucks going by and rough roads are just a few of the reasons why you'll need the right hitch. Here are some rules to follow:

■ Be sure to use a frame-mounted, weight-distributing hitch and sway control of the proper size when towing a trailer with an S-Blazer if the loaded trailer will weigh more than 2000 lbs., or when towing a trailer with a Blazer or Suburban if the loaded trailer will weigh more than 4000 lbs. This equipment is very important for proper vehicle loading and good handling when you're driving.

■ If you have to make any holes in the body of your vehicle to install a trailer hitch, be sure to seal the holes if you ever remove the hitch. If they're not sealed, dirt, water and deadly carbon monoxide from the exhaust can get into your vehicle.

NOTE: These are, by no means, the only precautions to be taken when trailering. See the Owner's Manual for the Chevy of your choice for additional guidelines and trailering tips.

1997 Suburban Weights w/GCWR

Model	Engine/Rear Gear	Curb Wt.	Payload	GVWR	TWA	GCWR	GCWR - (GVWR + TWA)	GCWR - (Curb Wt. + TWA)	Receiver: Dead Wt. - WD Trailer Wt. / Tongue Wt.
C-15	5.7L V8 / 3.42	4825	1975	6800	6500	11000	(2300)	(325)	5,000/500 - 10,000/1,000
C-15	5.7L V8 / 3.73	4825	1975	6800	6500	12000	(1300)	675	5,000/500 - 10,000/1,000
C-15	5.7L V8 / 4.10	4825	1975	6800	6500	13500	***200***	2175	5,000/500 - 10,000/1,000
C-25	5.7L V8 / 3.42	5249	3351	8600	7500	11000	(5100)	(1,749)	5,000/500 - 10,000/1,000
C-25	5.7L V8 / 3.73	5249	3351	8600	7500	12000	(4100)	(749)	5,000/500 - 10,000/1,000
C-25	5.7L V8 / 4.10	5249	3351	8600	7500	13500	(2600)	751	5,000/500 - 10,000/1,000
C-25	7.4L V8 / 3.73	5399	3201	8600	8000	15000	(1600)	1601	5,000/500 - 10,000/1,000
C-25	7.4L V8 / 4.10	5399	3201	8600	10000	17000	***1600***	1601	5,000/500 - 10,000/1,000
K-25	5.7L V8 / 3.42	5693	2907	8600	7000	11000	(4600)	(1693)	5,000/500 - 10,000/1,000
K-25	5.7L V8 / 3.73	5693	2907	8600	7000	12000	(3600)	(693)	5,000/500 - 10,000/1,000
K-25	5.7L V8 / 4.10	5693	2907	8600	7000	13500	(2100)	807	5,000/500 - 10,000/1,000
K-25	7.4L V8 / 3.73	5843	2757	8600	8000	15000	(1600)	1157	5,000/500 - 10,000/1,000
K-25	7.4L V8 / 4.10	5843	2757	8600	10000	17000	***1600***	1157	5,000/500 - 10,000/1,000

Gross Combined Weight (GCW)

Base Curb Weight
+ Cargo Weight
+ Passenger Weight
= Gross Vehicle Weight (GVW)

Then, add:

GVW
+ Loaded Trailer Weight
= Gross Combination Weight (GCW)

pounds, or slightly more, to allow for extra cargo and passengers and to leave a bit of extra performance and safety margin. This also allows you to have enough truck to move up to a larger trailer if you decide to change RVs at a later date.

You may be shopping for both a truck and trailer for the first time, in which case you need to rely on the RV manufacturers' trailer weight estimates when making the matchup between vehicles. In this case, you may be starting with the RV manufacturers' net carrying capacity (ncc) figure, to which you need to add the estimated weight of water, propane and cargo to arrive at an estimated trailer weight. If the RV manufacturer has a cargo carrying capacity (ccc) figure posted, it's supposed to already include the weight of water and propane, but you'll need to add your estimated personal cargo to calculate the approximate trailer weight.

Remember that you also need to include the weight of any passengers and cargo in the truck, because all of that weight applies toward the truck's gcwr.

That's why a truck, such as a 2WD Silverado extended-cab with the Duramax diesel engine that's rated to tow 12,000 pounds, may actually be best matched to a trailer with a 10,500- to 10,800-pound manufacturer's weight figure, for example. By the time you add the weight of water, at 8.5 pounds per gallon, and propane, at 4.5 pounds per gallon, plus food, truck passengers and personal equipment, it's easy to add a lot of assorted weight to that of the basic trailer. That's why Chevy offers a truck to handle every towing job.

Chevrolet's new heavy-duty Silverado 2500- and 3500-series truck offerings have moved to the head of the pack in towing power and capability. The broad variety of engine, transmission and chassis options available means there's a Silverado to suit most towing needs.

By Jeff Johnston

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Variables*

Gross Vehicle Weight Rating (GVWR)

Tow vehicle Trailer Weight Allowance (TWA)

Gross combined weight rating (GCWR)

Ball Mounts and Spring Bars

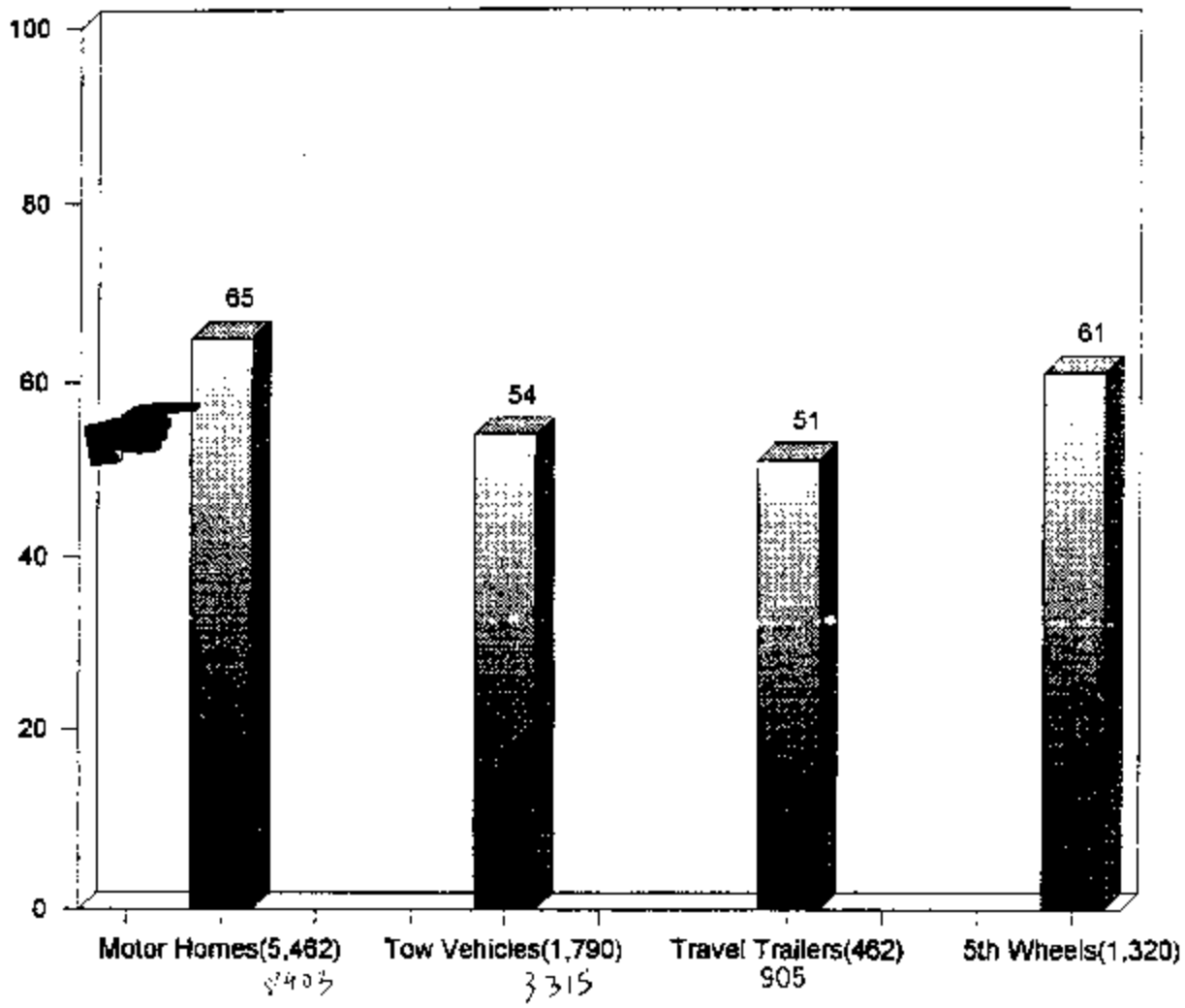
Receiver weight rating (dependant upon type of hitch - WC or WD)

The lowest weight rating is determinative

**Tow vehicle only and not a complete list*

OVERWEIGHT RVs

Percent over by Type



Example:65% of 5,462 Motorhomes exceed one or more ratings

A'Weigh We Go, 1 Jar

DP00-001

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00000022

A'Weigh We Go

100 100,000

211 Mae McKee Road
Chuckey, TN 37641
(423)257-7985

WEIGHING RECORD

NOTE: ALL RATINGS AND WEIGHTS IN POUNDS

Record # DATE: 2/27/00

MOTORHOME/TRUCK: 1991 GMC Suburban TOWED CAR/TRAILER: 1991 Airstream Limited

RATINGS

RIGHT FRONT	0	0	HITCH	0	0	0	OUTER TIRES
3,042	0	3,042		2,380	2,380	2,380	INNER TIRES
FRONT			TOW 14,000				
3,800	0	6,000		2,800	2,800	2,800	AXLES
80	0	80	VERTICAL 1,700	60	60	60	TIRE PRESSURE
3,042	0	3,042		2,380	2,380	2,380	INNER TIRES
LEFT FRONT	0	0		0	0	0	OUTER TIRES

GVWR: 8,600 GCWR: 0 TOW BAR: 0 GVWR: 8,900

LOAD MEASUREMENTS

1,480	0	1,900		1,700	1,400	1,475	RIGHT TIRES
1,600	0	2,200	TOW 9,980				
3,475	0	4,550		3,200	2,950	2,815	AXLES
1,875	0	2,350	VERTICAL 1,015	1,500	1,550	1,340	LEFT TIRES
1,600	0	2,030					

MOTORHOME/TRUCK WEIGHT: 8,025 TOWED CAR/TRAILER WEIGHT: 9,980 COMBINED WEIGHT: 16,990

Uncoupled Tow Truck 7,010

MARGINS

(GREEN NUMBERS =SAFETY MARGIN (-RED NEGATIVE NUMBERS) =OVERLOAD!

1,442	N/A	842		680	980	905	RIGHT TIRES
			TOW 4,020				
325	N/A	1,450		(-400)	(-150)	(-15)	AXLES
1,167	N/A	692	VERTICAL 685	880	830	1,040	LEFT TIRES

GVWR: 575 GCWR: N/A TOW BAR: N/A GVWR: (-1,080)

INVOICE

WEIGHING: 3 AXLES: $0.00 OR $30 PLUS $0

SUB TOTAL	$30.00
MINUS DISC.	$0.00
PLUS TAX	$0.00
TOTAL	$30.00

PAID

THANKS FOR HAVING YOUR "WEIGH" WITH US!

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1991 Suburban 2500 w/ "Class V" Reese

Weights Taken @ WBCCI - Sarasota - February 27, 2000

Tow Vehicle Specs (No VIN):

Assume: C Series
4.56 Rear
6.2L Turbo Diesel

Ratings: 8,600 GVWR
8,000 TWA
950 Tongue
13,500 GCWR

Observations: 8,025 GVW (575 lbs. under)
9,980 Trailer Weight (1,980 lbs. over)
1,015 Tongue (65 lbs. over)
16,900 GCW (*3,400 lbs. over*)

GVW (Rating/Observation/ + or -)	TWA (Rating/Observation/Overage)	GCW (Rating/Observation/Overage)	Tongue (Rating/Observation/Overage)
8,600 / 8,025 / 575	8,000 / 9,980 / *1,980*	13,500 / 16,900 / *3,400*	950 / 1,015 / *65*

Public Law 85-683

AN ACT

August 19, 1958
[H. R. 13266]

Authorizing Commodity Credit Corporation to purchase flour and cornmeal and donating same for certain domestic and foreign purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That at any time Commodity Credit Corporation has wheat or corn available for donation pursuant to clauses (3) or (4) of section 416 of the Agricultural Act of 1949, as amended, section 210 of the Agricultural Act of 1956, or title II of the Agricultural Trade Development and Assistance Act, as amended, the Corporation, in lieu of processing all or any part of such wheat or corn into flour or meal, may purchase flour or meal in quantities not to exceed the equivalent of such wheat or corn so available on the date of purchase and donate such flour and meal pursuant to clauses (3) or (4) of said section 416 and to said section 210 and make such flour or meal available to the President, pursuant to said title II and may sell, without regard to the provisions of section 407 of the Agricultural Act of 1949, as amended, a quantity of wheat and corn not to exceed that which is equivalent to the quantity of flour and meal so purchased.

Agriculture.
Flour and cornmeal donations.
63 Stat. 457, 458, 70 Stat. 202.
7 USC 1431, 1859, 1727.

Approved August 19, 1958.

Public Law 85-684

JOINT RESOLUTION

August 20, 1958
[H. J. Res. 227]

Granting the consent of Congress to the several States to negotiate and enter into compacts for the purpose of promoting highway traffic safety.

Whereas from year to year there has been an increase in the number of accidents and deaths on the streets and highways of the United States; and

Whereas this increase in highway traffic deaths and accidents presents a serious national problem; and

Whereas to aid in meeting this problem there is need for the development of nationwide highway traffic safety programs, including, but not limited to, establishment of uniform traffic laws, improvement in driver education and training, and coordination of traffic enforcement; and

Whereas cooperative effort and mutual assistance on the part of the States offers the greatest hope of satisfactorily dealing with this national problem: Therefore be it

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby given to any two or more of the several States to enter into agreements or compacts—

Interstate compacts.
Highway safety.

(1) for cooperative effort and mutual assistance in the establishment and carrying out of traffic safety programs, including, but not limited to, the enactment of uniform traffic laws, driver education and training, coordination of traffic law enforcement, research into safe automobile and highway design, and research programs of the human factors affecting traffic safety, and

(2) for the establishment of such agencies, joint or otherwise, as they deem desirable for the establishment and carrying out of such traffic safety programs.

Approved August 20, 1958.

CHAPTER 286A
VEHICLE EQUIPMENT SAFETY COMPACT

SECTION 286A-1 ENACTMENT OF COMPACT.

The *Vehicle Equipment Safety Compact* is enacted into law and entered into with all other jurisdictions legally joining herein in the form substantially as follows:

VEHICLE EQUIPMENT SAFETY COMPACT

ARTICLE I.
FINDINGS AND PURPOSES

(a) The party states find that:

(1) Accidents and death on their streets and highways present a very serious human and economic problem with a major deleterious effect on the public welfare.

(2) There is a vital need for the development of greater inter-jurisdictional cooperation to achieve the necessary uniformity in the laws, rules, regulations and codes relating to vehicle equipment, and to accomplish this by such means as will minimize the time between the development of demonstrably and scientifically sound safety features and their incorporation into vehicles.

(b) The purposes of this compact are to:

(1) Promote uniformity in regulation of and standards for equipment.

(2) Secure uniformity of law and administrative practice in vehicular regulation and related safety standard to permit incorporation of desirable equipment changes in vehicles in the interest of greater traffic safety

(3) Provide means for the encouragement and utilization of research which will facilitate the achievement of the foregoing purposes, with due regard for the findings set forth in subdivision (a) of this article.

(c) It is the intent of this compact to emphasize performance requirements and not to determine the specific detail of engineering in the manufacture of vehicles or equipment except to the extent necessary for the meeting of such performance requirements

ARTICLE II.
DEFINITIONS

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VE
SC

VEHICLE EQUIPMENT SAFETY COMMISSION

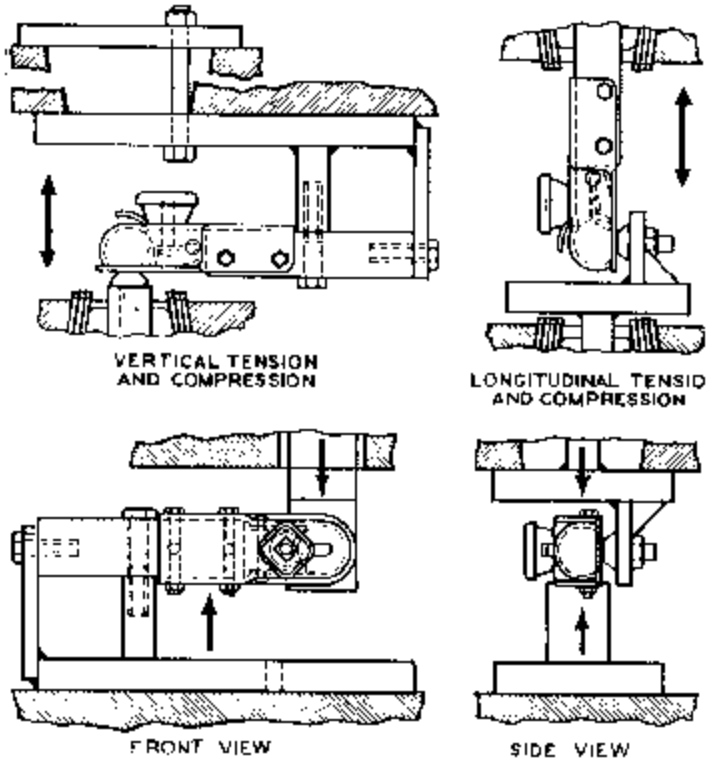
Regulation V-5

MINIMUM REQUIREMENTS FOR MOTOR VEHICLE CONNECTING DEVICES AND TOWING METHODS

Adopted July 1968
Revised March 1973
Revised July 1977

Suite 908
1030 15th Street, N.W.
Washington, D.C. 20005

10.1 FIGURE 1



NOTE: TEST FIXTURE BARS TO BE SOLID AND FIT SNUGLY INSIDE OF HOUSING CHANNELS

TYPICAL COUPLER AND BALL TEST FIXTURE ARRANGEMENT

10.2

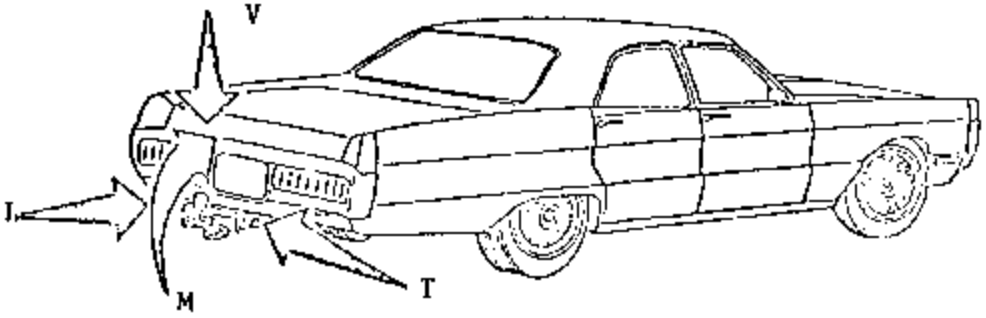
Table 2

HITCH TEST FORCES*

STEP	WEIGHT CARRYING HITCH		WEIGHT DISTRIBUTING HITCH	
	Force	Direction	Force	Direction
a	V=.47R1480 L=.47R1480	Downward Compressive	V=.045R+1650 M=51,000	Downward See Figure 2
b	L=.23R1530 V=.15R	Tensile Downward	L=.067R+2070 V=.15R	Tensile Downward
c	L=.23R1530 V=.15R	Compressive Downward	L=.067R+2070 V=.15R	Compressive Downward
d	T=.20R1500	Leftward	T=.20R+500	Leftward
e	T=.20R1500	Rightward	T=.20R+500	Rightward
f	Not Applicable	Not Applicable	M=93.2X+21000 V=.15R	See Figure 2 Downward

V = Vertical Force (lbs.)
L = Longitudinal Force (lbs.)
T = Transverse Force (lbs.)
M = Spring Bar Moment (inch-lbs.)
R = Hitch Rating in terms of MGTW (lbs.) (Maximum Gross Trailer Weight)
X = Hitch Rating for Maximum Vertical Load on Hitch (lbs.) (Tongue Weight)
** = Leveling Force Couple

10.2 FIGURE 2



A.M.E.C.A.

Automotive Manufacturers Equipment Compliance Agency, Inc.

The Automotive Manufacturers Equipment Compliance Agency, Inc. (AMECA) was incorporated in late 1994 to continue providing the same safety equipment services of the states that the American Association of Motor Vehicle Administrators, (AAMVA) had provided since 1967.

As with AAMVA, AMECA has individual signed agreements with various states for providing equipment compliance services as their agent. This is the same arrangement that AAMVA had until the discontinuation of their Safety Equipment Services (SES) on 31 December 1994.

The AMECA program is a centralized one-stop program that notifies government, industry and the general public about items of motor vehicle safety equipment that have been tested by an AMECA-accredited laboratory and found to be in compliance with applicable United States standards. Our clients and market are the national and international automotive industry, the standards-setting community, the federal government's General Services Administration (GSA), numerous state governments, as well as some foreign governments.

AMECA maintains a listing of items that have been tested and currently comply with the applicable standards. This listing is updated quarterly and sold by annual subscription to industry and the public.

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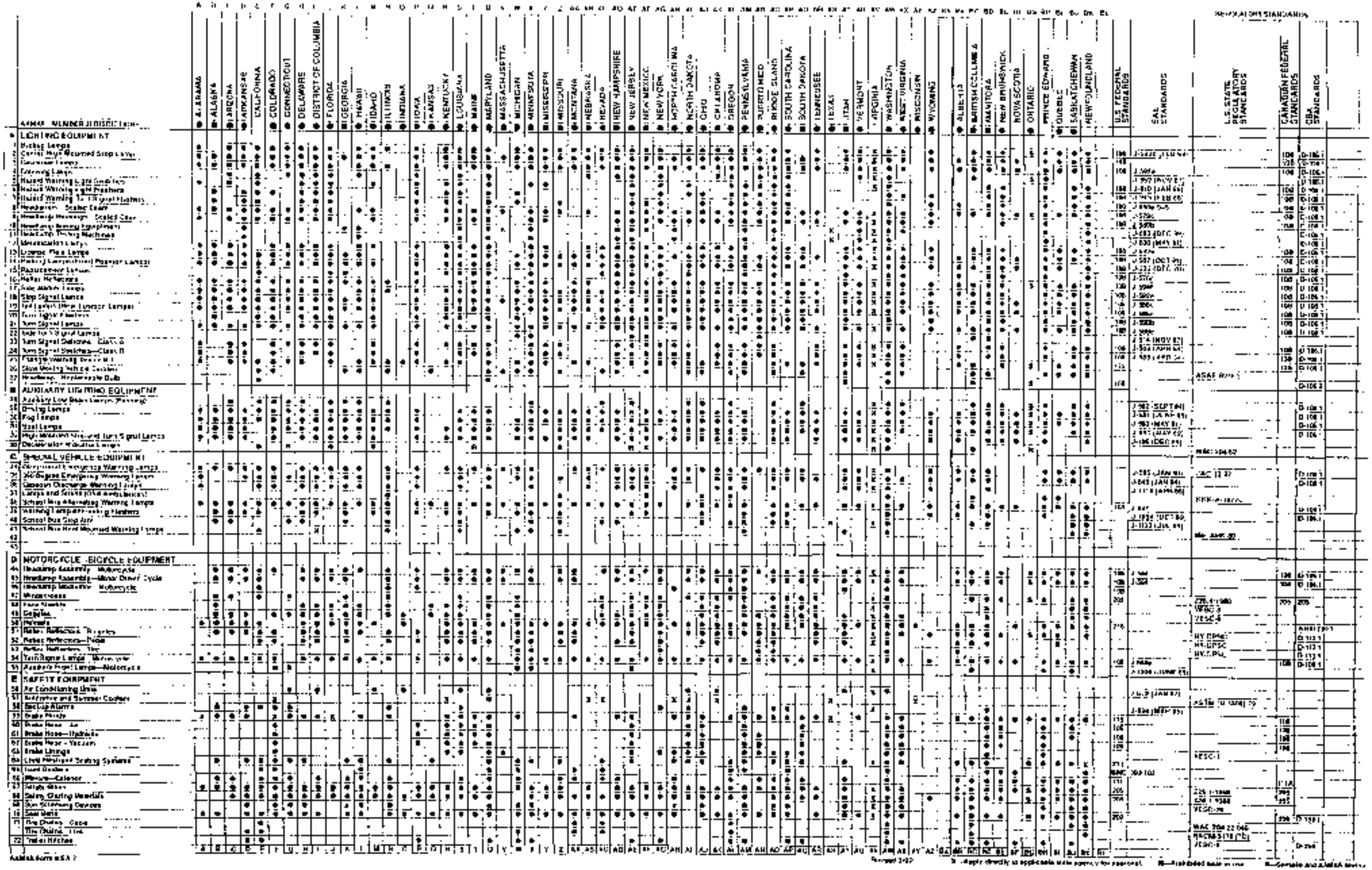
EQUIPMENT COMPLIANCE LISTING BY JURISDICTION



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9 of 17 DOCUMENTS

WASHINGTON ADMINISTRATIVE CODE

*** THIS SECTION IS CURRENT THROUGH JANUARY 24, 2001 ***

TITLE 204. STATE PATROL (COMMISSION ON EQUIPMENT)

CHAPTER 70. STANDARDS FOR VEHICLE CONNECTING DEVICES AND TOWING METHODS

WAC § 204-70-080 (2000)

WAC 204-70-080. Identification.

(1) Device and component marking. Each coupling and each hitch shall be legibly and permanently marked (so as to be visible to consumers and any regulatory authority viewing the coupling and hitch as installed on a vehicle) on at least one hitch component or related component marketed with the hitch, as shown below. When hitch components (except hitch balls and their hardware) are marketed separately, the following markings must also appear on at least one of the components in the package or marketing unit.

(a) Manufacturer's or distributor's name, initials, trademark, trade name, or code symbol. (Code symbol shall mean one assigned and approved by appropriate regulatory authority.)

(b) Model number, part number, or style; and, for couplings only, the class.

(c) Maximum gross trailer weight (MGTW) to be drawn.

(d) Maximum vertical load on hitch (tongue weight) to be imposed on the ball or other points of connection.

(e) The symbol V-5. Note: Placement of the symbol V-5 on any coupling or any hitch indicates certification of compliance of the product on which the symbol is placed with all requirements contained in VESC Regulation V-5.

(2) Hitch ball marking. Each hitch ball sold for use in primary connecting system shall be permanently and legibly marked to show both the spherical diameter of the ball; e.g., 1- 7/8", 2", etc., and the maximum gross trailer weight (MGTW) which it is designed to draw.

(3) Labelling. Each crate, box, or other container in which a coupling or hitch is packed shall be imprinted or labelled to display at least the same information required in WAC 204-70-080(1) for marking, except that the maximum gross trailer weight (MGTW) to be drawn must be shown for each coupling regardless of class. Further, the year, make, and model of each vehicle on which a hitch may be installed and meet the requirements of this regulation shall be shown but may be shown on an enclosed sheet, or sheets, separate from the imprintation, or labelling, or on hitch manufacturer's application tables which are kept available at the location where the device or system is sold, either for resale or for use. However, the provision contained in the preceding sentence

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(4) Brake fluids shall comply with all applicable standards and requirements of FMVSS 116 and SAE standards J1702e and J1703e.

Source: SL 1975, ch 16, § 1; 8 SDR 87, 8 SDR 134, effective July 1, 1982.
General Authority: SDCL 32-15A-3.
Law Implemented: SDCL 32-18-29.

61:05:03:06. Specifications for safety glass and safety glazing material. The following specifications apply to safety glass and safety glazing material:

(1) Safety glass shall comply with all applicable standards and requirements of FMVSS 205 and ANSI standard Z26.1-1973;

(2) Safety glazing materials shall comply with all applicable standards and requirements of FMVSS 2-5 and ANSI standard Z26.1-1973.

Source: SL 1975, ch 16, § 1; 8 SDR 87, 8 SDR 134, effective July 1, 1982.
General Authority: SDCL 32-15A-3.
Law Implemented: SDCL 32-15-1.

61:05:03:07. Specifications for other vehicle safety equipment. The following specifications apply to other vehicle safety equipment:

(1) Child seating and restraint systems shall comply with all applicable standards and requirements of FMVSS 213;

(2) Seat belt systems, including assemblies, safety harnesses, hardware and other attachments, shall comply with all applicable standards and requirements of FMVSS 209 and SAE standard J4c;

(3) Mirrors, rearview, shall comply with all applicable standards and requirements of FMVSS 111 and SAE standard J964;

(4) Trailer hitches, vehicle connecting devices, shall comply with all applicable standards and requirements of VESC standard V-5.

Source: SL 1975, ch 16, § 1; 8 SDR 87, 8 SDR 134, effective July 1, 1982.
General Authority: SDCL 32-15A-3.
Law Implemented: SDCL 32-15-8.

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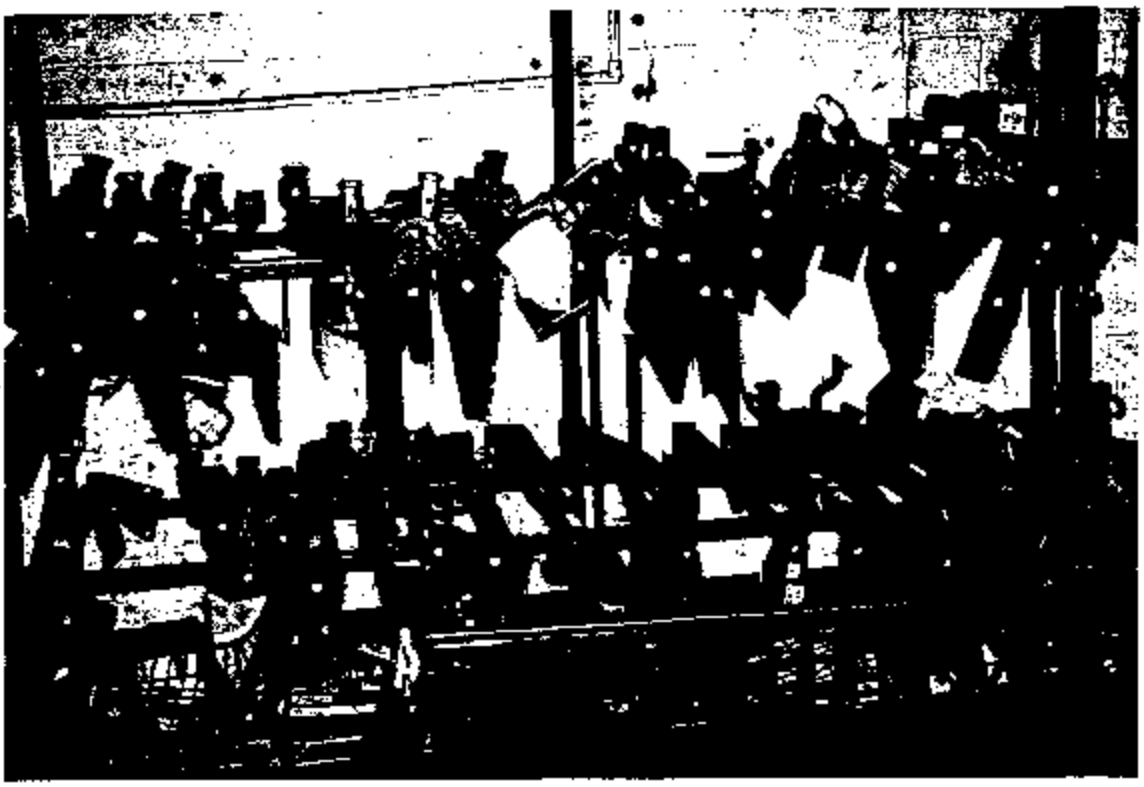

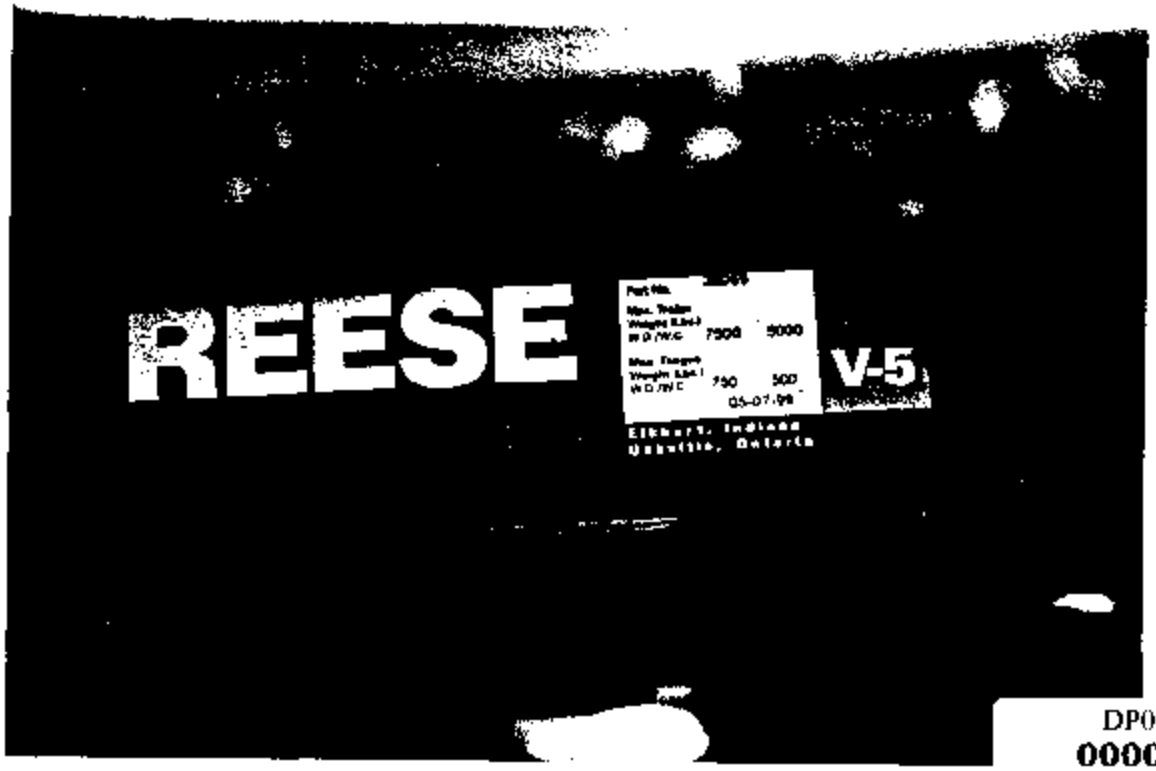

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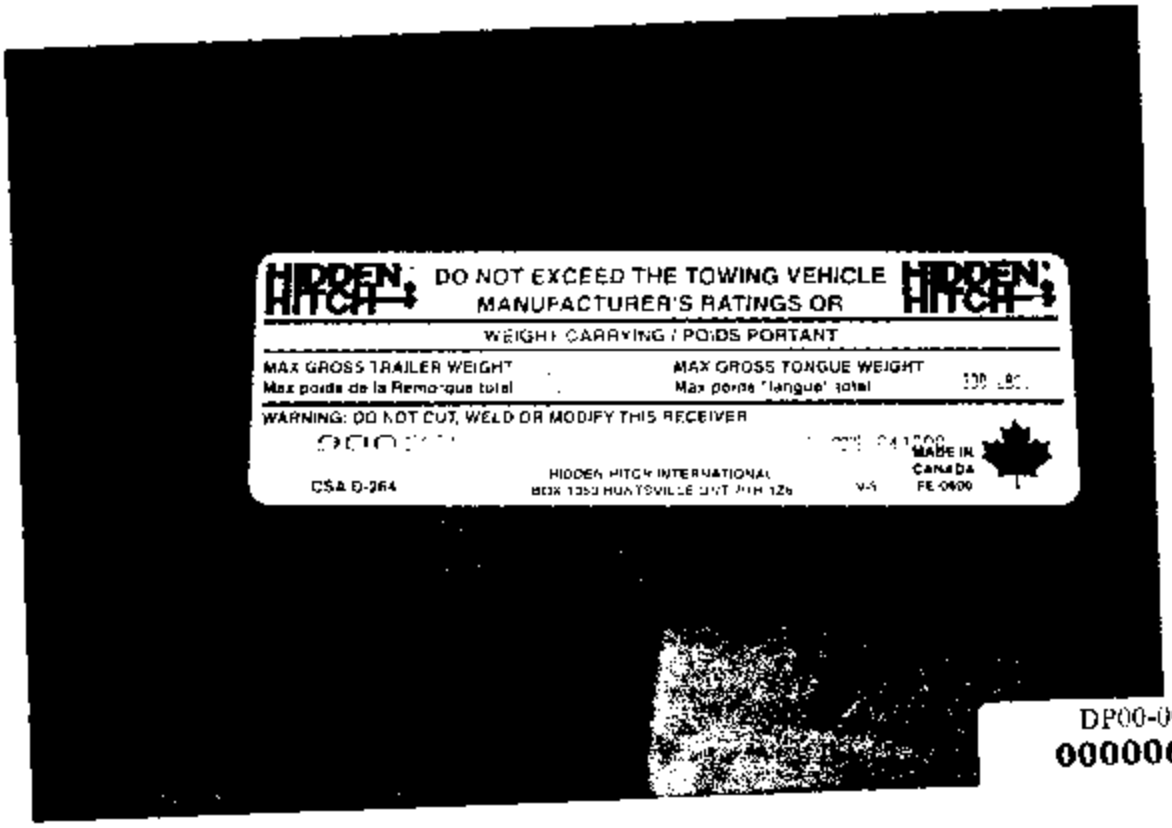

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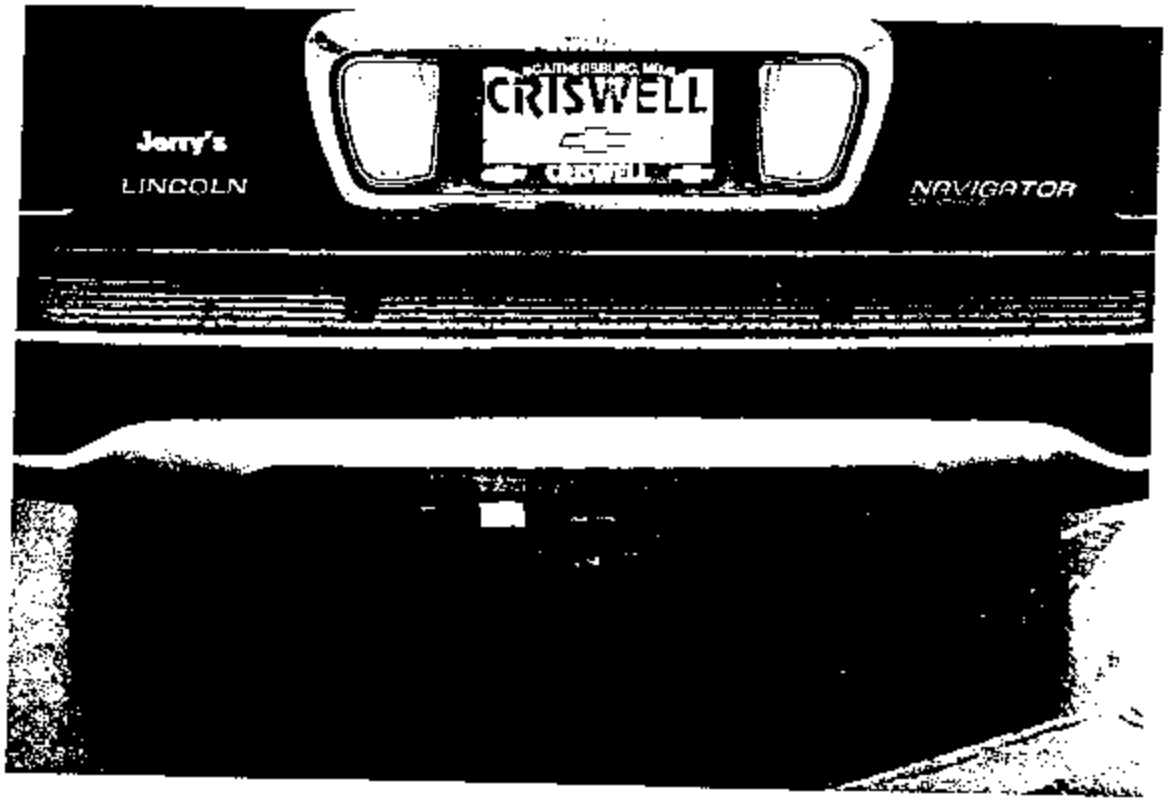
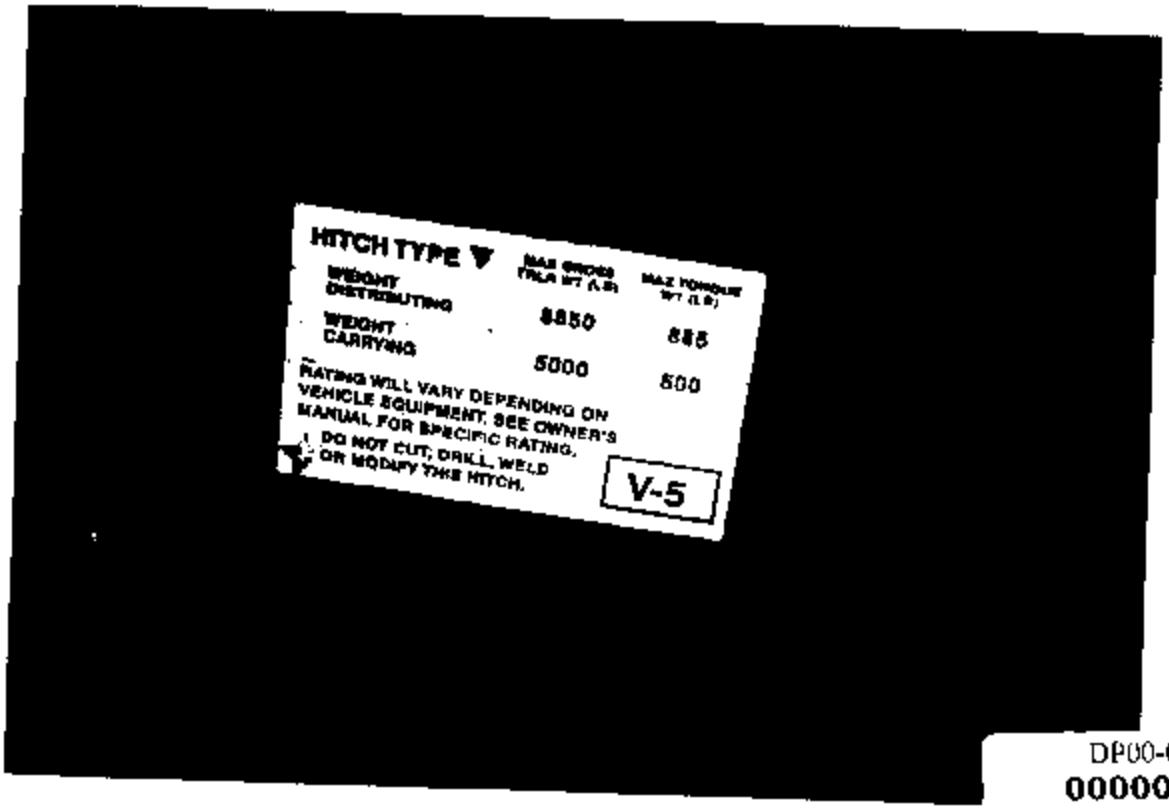
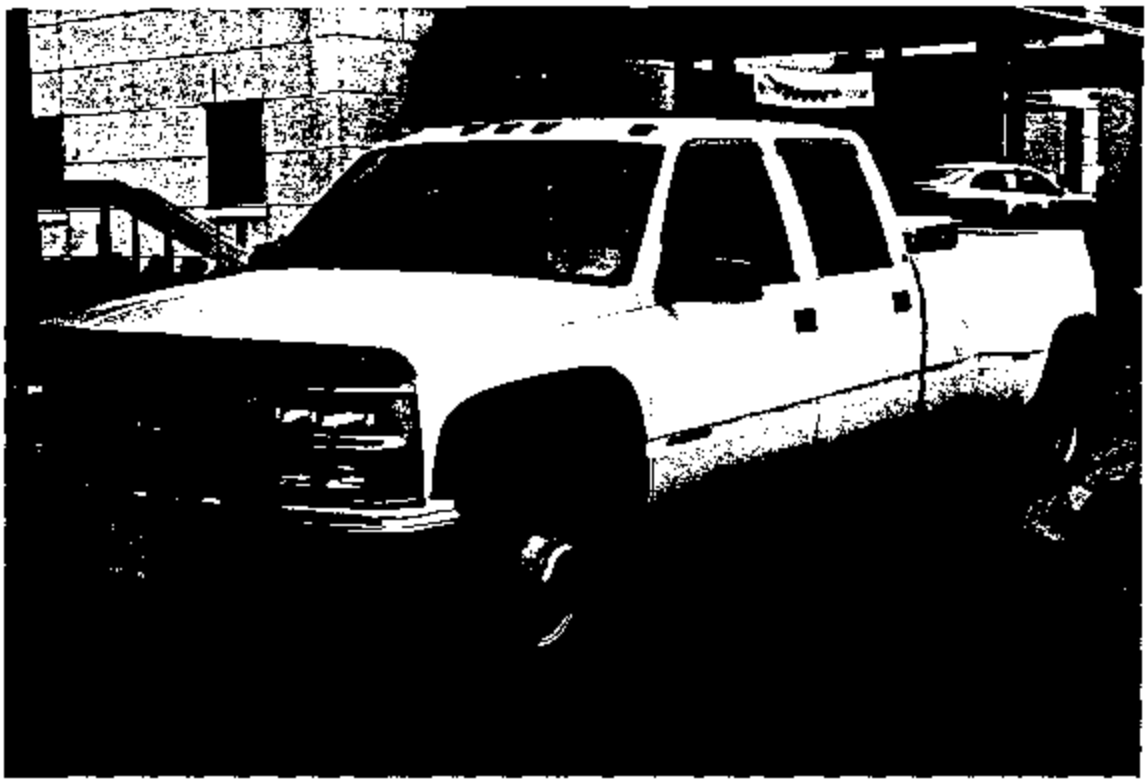

Jerry's
LINCOLN
CRISWELL
NAVIGATOR


HITCH TYPE
WEIGHT DISTRIBUTING
WEIGHT CARRYING
5000
500
RATING WILL VARY DEPENDING ON VEHICLE EQUIPMENT. SEE OWNER'S MANUAL FOR SPECIFIC RATING.
DO NOT CUT, DRILL, WELD OR MODIFY THIS HITCH.
V-5



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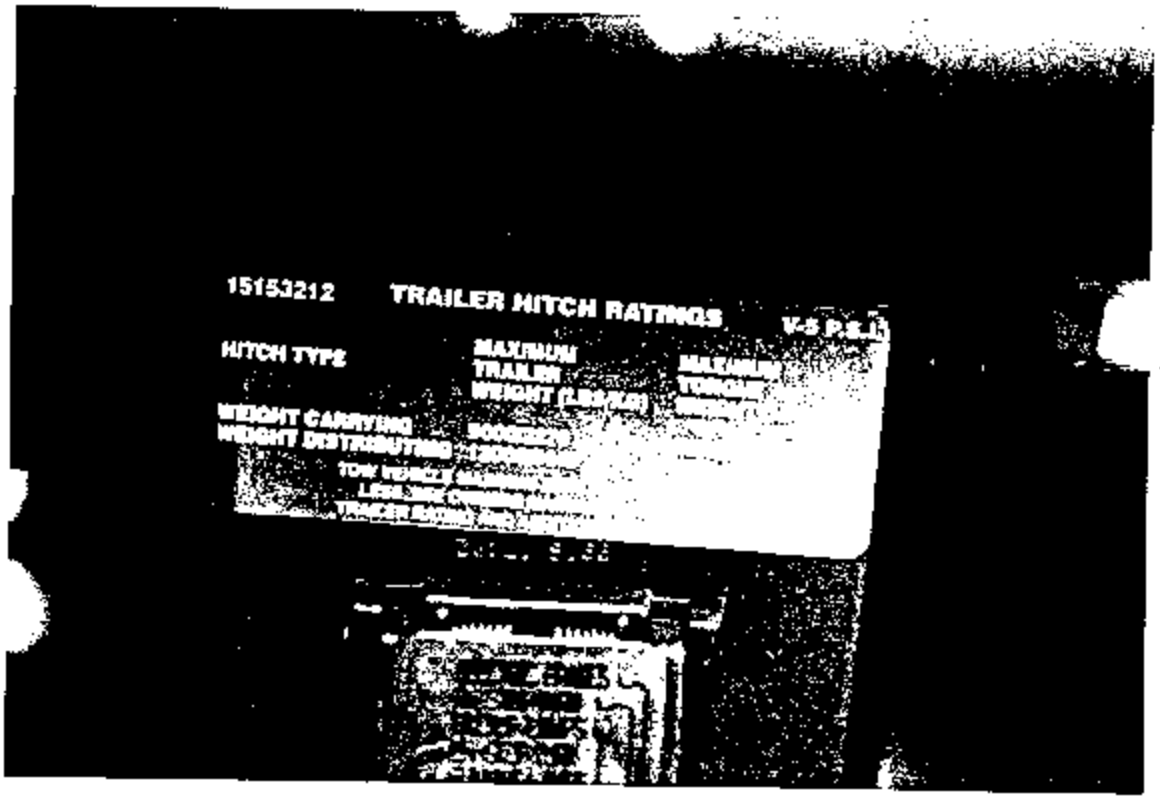
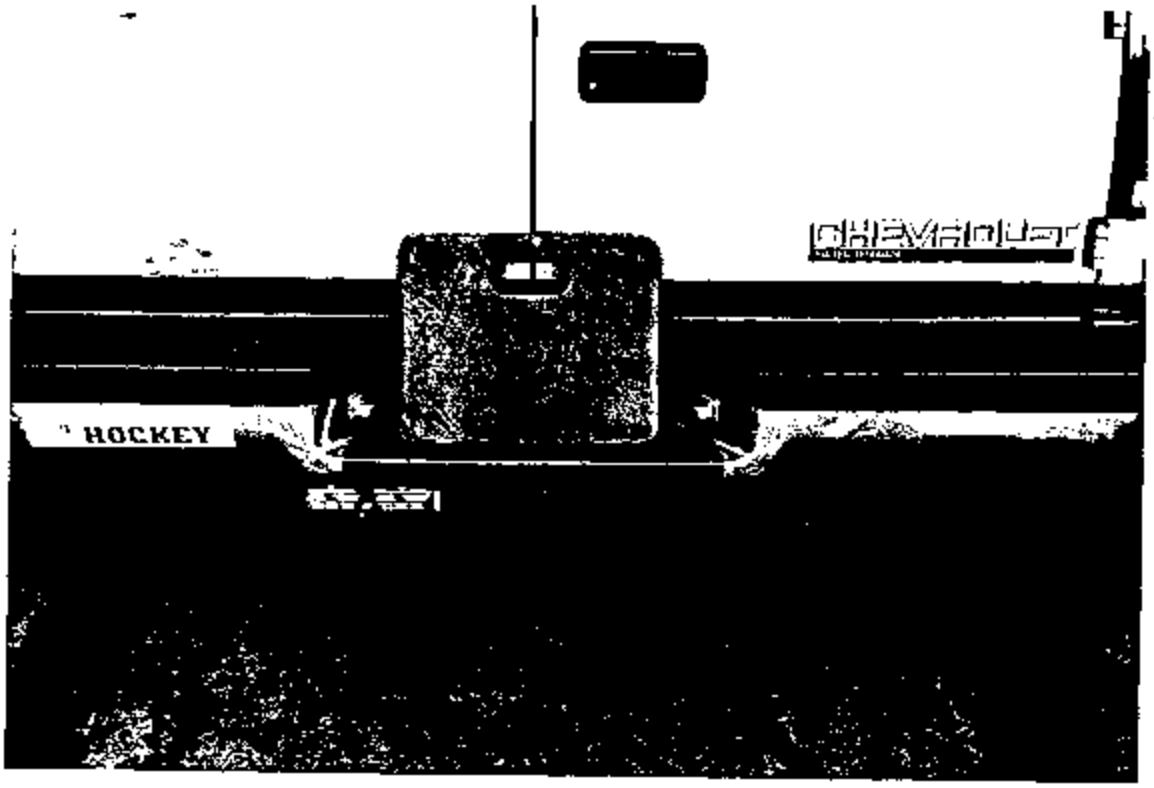
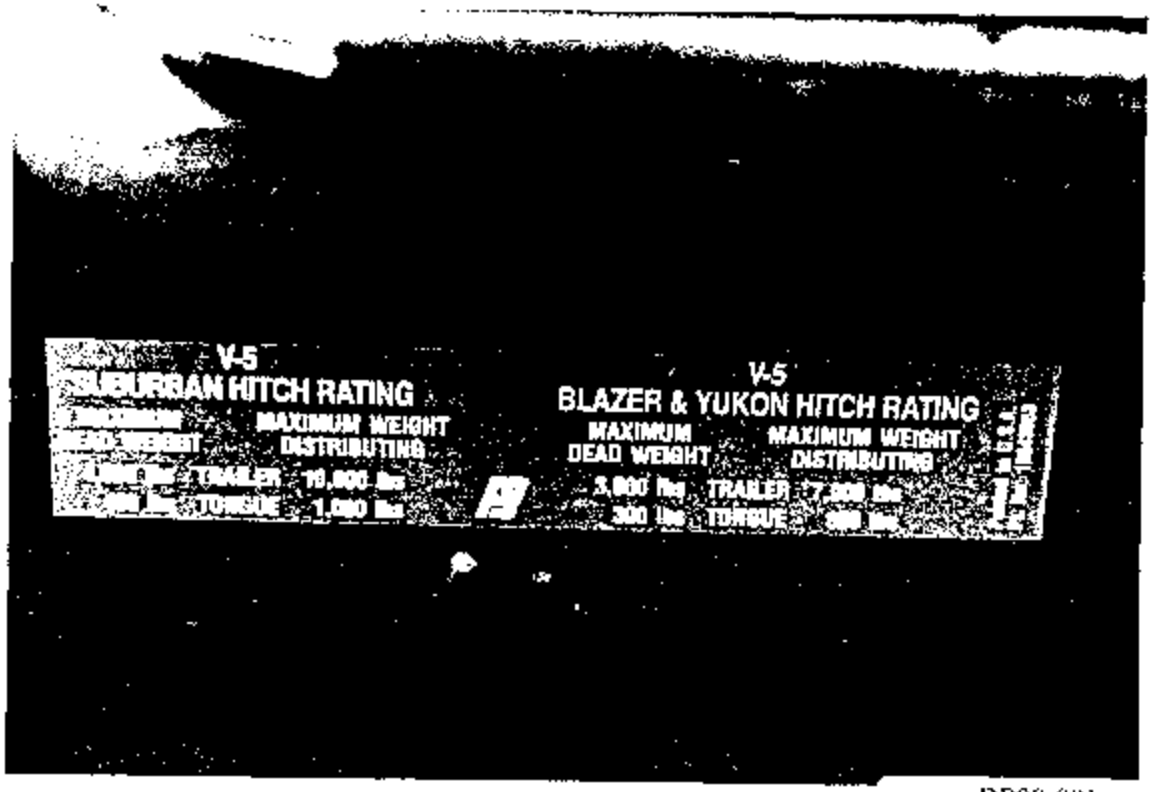
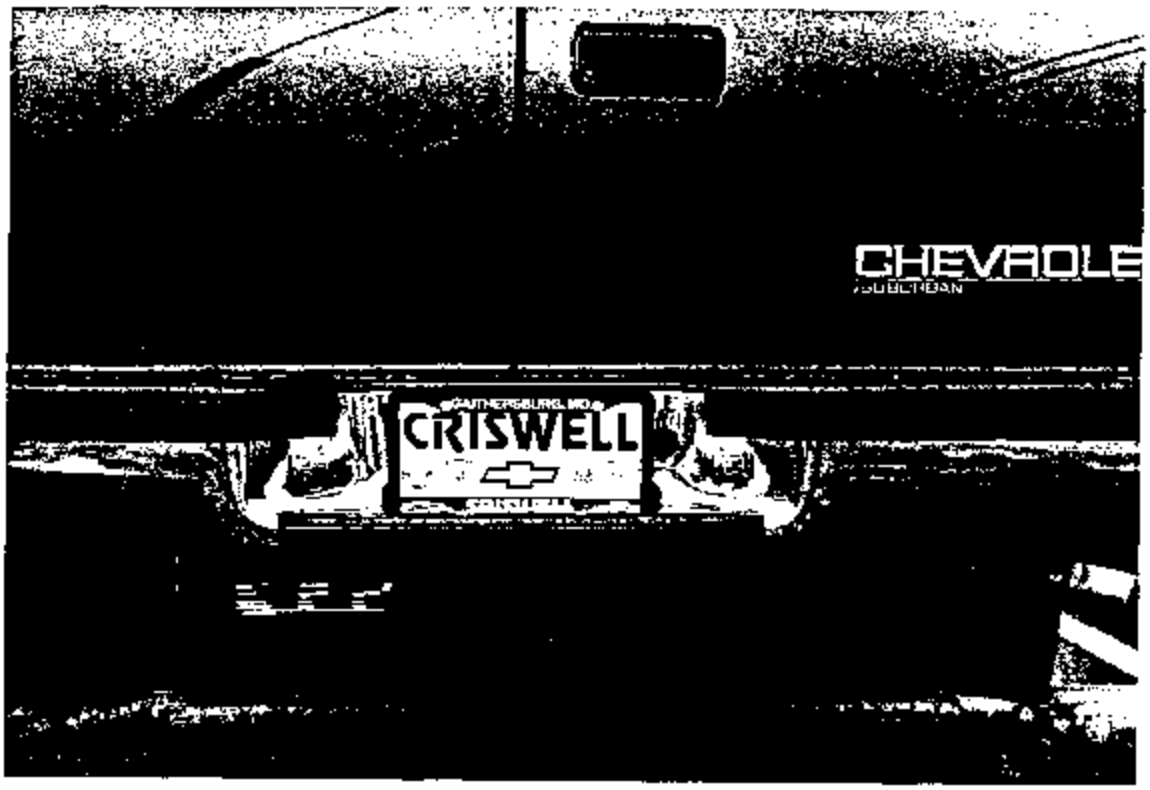
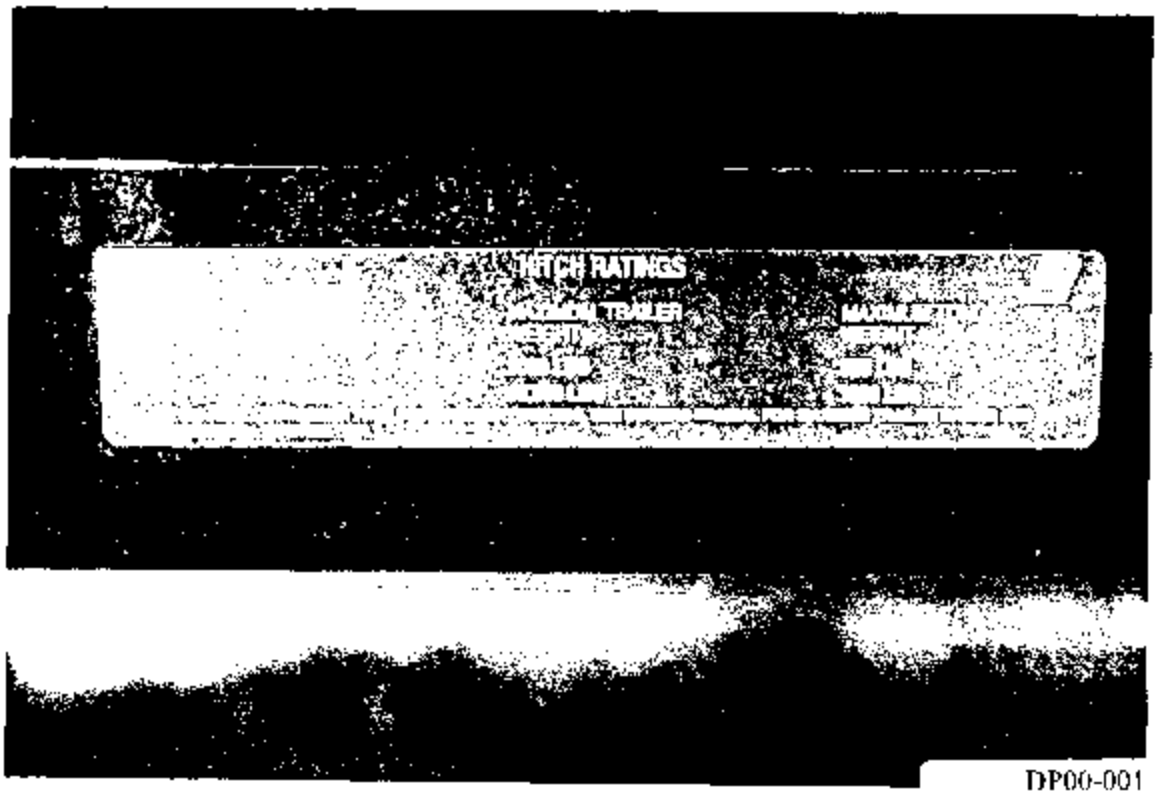

15153212
TRAILER HITCH RATINGS
HITCH TYPE
MAXIMUM
TRAILER
WEIGHT CARRYING
WEIGHT DISTRIBUTING
TOW HOOKS


HOCKEY


V-5
SUBURBAN HITCH RATING
MAXIMUM WEIGHT DISTRIBUTING
TRAILER
TONGUE
V-5
BLAZER & YUKON HITCH RATING
MAXIMUM DEAD WEIGHT
MAXIMUM WEIGHT DISTRIBUTING
TRAILER
TONGUE





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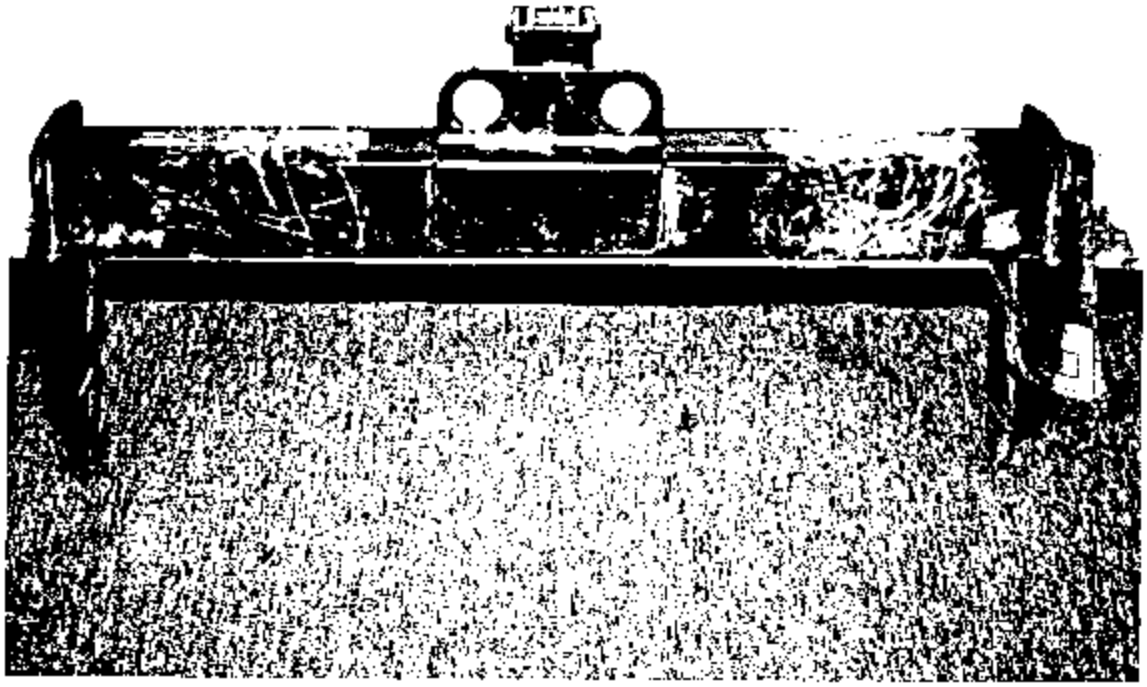

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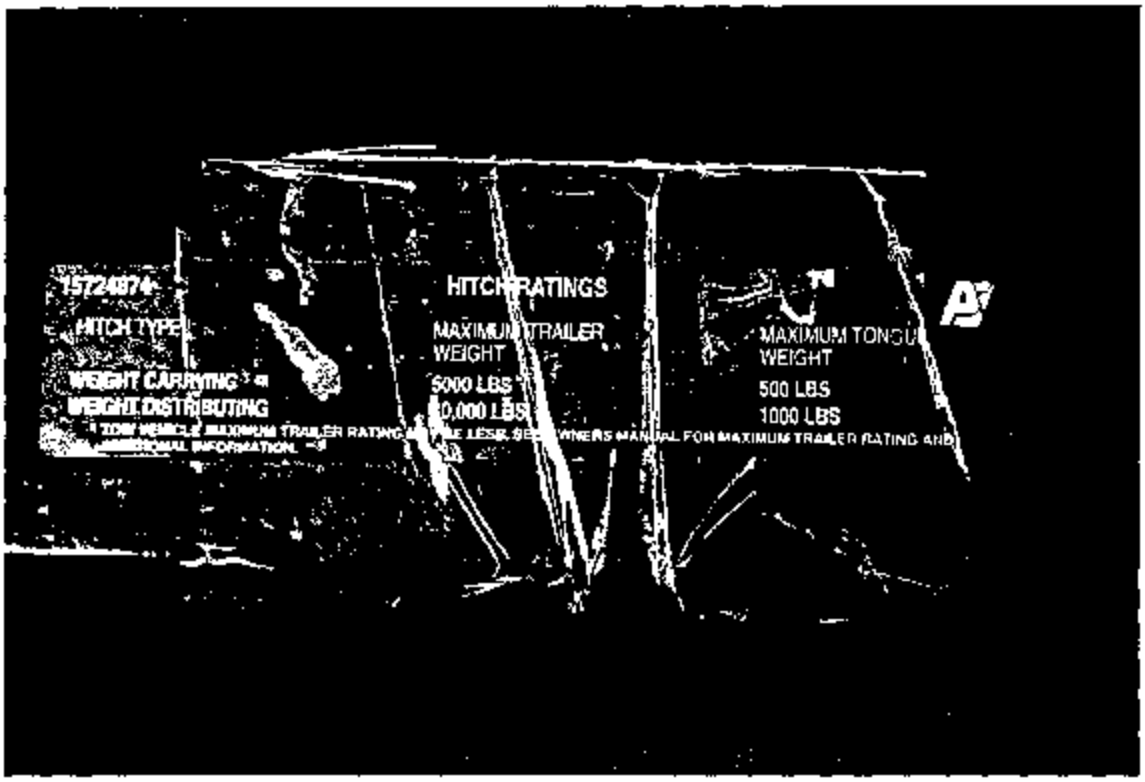
15724874
HITCH TYPE
WEIGHT CARRYING
WEIGHT DISTRIBUTING
HITCH RATINGS
MAXIMUM TRAILER WEIGHT
5000 LBS
MAXIMUM TONGUE WEIGHT
500 LBS
1000 LBS

2 Slides - New hitch, in box

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Suburban OEM Receivers

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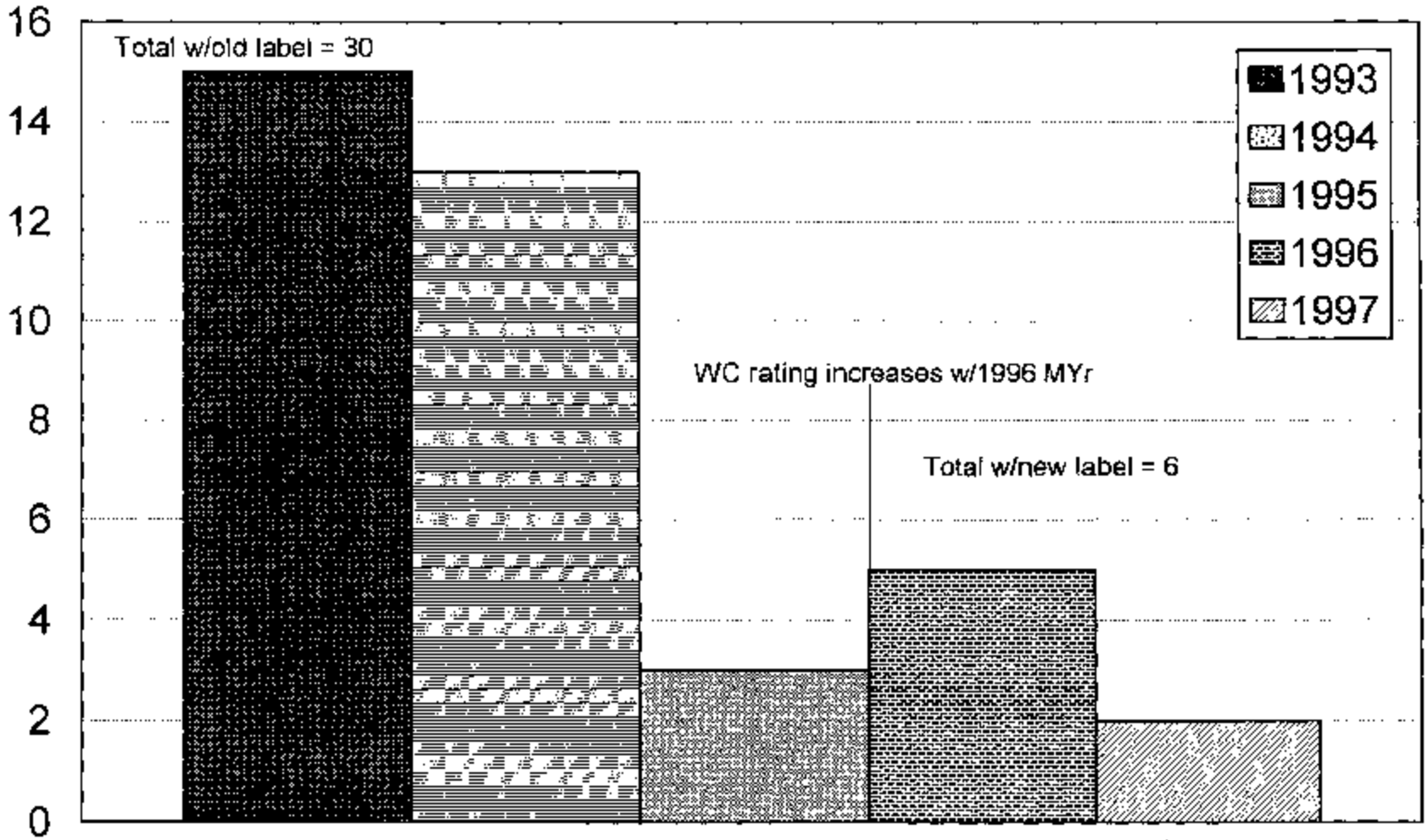

(d) *Requisites for fastening devices.* — The fastening devices specified in this section shall be fastened with an adequate load binder of standard make or other appropriate fastening device.

(e) *Repair or replacement of fastening devices.* — The fastening devices specified in this section may not be repaired or replaced by any material other than of the size, strength, and material specified in this section. (An. Code 1957, art. 66½, § 14-106; 1977, ch. 14, § 2; 1983, ch. 235; 1984, ch. 255; 1986, ch. 472, § 1; 1988, ch. 6, § 1; ch. 720; 1994, ch. 165, § 3; ch. 166, § 3; 1995, ch. 3, § 2.)

§ 24-106.3. Same — Persons liable for violations.

The owner of the vehicle, if present in the vehicle, or, in his absence, the driver of the vehicle is presumed to be responsible for any violation of §§ 24-106 through 24-106.2 of this title, if:

(1) The violation is caused by an occupant of the vehicle;

(2) The vehicle has two or more occupants; and

(3) It cannot be determined which occupant is the violator. (An. Code 1957, art. 66½, § 14-106; 1977, ch. 14, § 2.)

§ 24-107. Trailers and towed vehicles.

(a) *Strength and length of connection between towed vehicles.* — While one vehicle is towing another, the towbar or other connection used:

(1) Shall be strong enough to pull the weight towed; and

(2) Except for the connection between any two vehicles carrying poles, pipe, machinery, or other objects of a structural nature that cannot be readily dismembered, may not exceed 15 feet from one vehicle to the other.

(b) *Trailers to be equipped with towbars.* — (1) Every full trailer shall be equipped with a towbar and means of attaching the towbar to the towing and towed units.

(2) The towbar and means of attaching the towbar to the units shall:

(i) Be structurally adequate for the weight drawn;

(ii) Be mounted properly and securely, without excessive slack, but with enough play to allow for universal action of the connection; and

(iii) Have a suitable locking device to prevent accidental separation of the towed and towing vehicles.

(c) *Mounting trailer hitch.* — The mounting of the trailer hitch (pintle-eye or equivalent mechanism) of the towing vehicle shall include sufficient reinforcement or bracing of the frame to provide sufficient strength and rigidity to prevent undue distortion of the frame.

(d) *Safety chains.* — (1) Every trailer and semitrailer equipped with a towbar and any special mobile equipment being towed shall be coupled directly to the frame of the towing vehicle with one or more safety or "stay" chains or cables. Attachment to the pintle hook does not meet this requirement.

(2) No more slack may be left in these chains or cables than is needed for proper turning.

(3) These chains or cables shall be connected to the towed and towing vehicle and to the towbar to prevent the towbar from dropping to the ground if it fails.

(e) *Sway limits.* — A hitching device used in a combination of vehicles shall be designed, constructed, and installed to insure that a towed vehicle does not shift or swerve more than 6 inches to either side of the path of the towing vehicle while the towing vehicle is moving in a straight line on a level, smooth, paved surface.

(f) *Display of warning flag.* — While one vehicle is towing another and the connection is a chain, rope, or cable, a white, red, or orange-fluorescent warning flag or cloth at least 18 inches square shall be displayed on the connection.

(g) *Rules and regulations.* — (1) Except for the vehicles described in paragraph (2) of this subsection, the Administration may adopt rules and regulations that establish standards for hitching devices and towing procedures for towing and towed vehicles.

(2) This subsection does not apply to tractor-trailer combination or semitrailer combination designed and used for carrying freight or merchandise in furtherance of any commercial enterprise. (An. Code 1957, art. 66½, §§ 11-806, 14-107; 1977, ch. 14, § 2; 1988, ch. 604; 1989, ch. 768, § 1.)

§ 24-108. Load limits of axles.

(a) *How distance between coupled axles to be measured.* — For purposes of this section, the distance between coupled axles (commonly known as "tandem" axles) shall be measured horizontally between their centerlines.

(b) *Limits.* — (1) Subject to paragraph (2) of this subsection, the gross weight imposed on the ground surface by the

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wheels of an axle or ax
not exceed the followin

No. of Axles	
Single axle	
Single axle	
Coupled axle	
Coupled axle	

No. of Axles	
Single axle	
Coupled axles	Axles
Coupled axles	Axles

(2) Except for veh
a permit issued under
the gross weight imp
surface by the wheels
vehicle combination m
the lesser of:

(i) The sum of t
ities for each tire on
provided in subsection

(ii) The sum of t
ities indicated by the
each tire on the axle wi
originally was equippe
in subsection (c) of thi

(3) (i) Except as p
graph (ii) of this par
with a gross maximun
73,000 pounds may t
highways, except whil
or pickup, and then on
the shortest available
the State highway for
ing such delivery or p
City, the shortest av
shall be only on desig

(ii) If approved
ing body and the Stat
tration, in Dorcheste

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Trailer Committee

James D. Fait, Chairman - U-Haul International

Subcommittees

Boat Trailer - Gerald G. Wiertsema, Midwest Industries, Inc.
Trailer Hitch - David A. Young, Draw-Tite Inc.

Scope

The Committee shall develop and maintain SAE Standards, Recommended Practices and Information Reports applicable to trailers normally towed by conventional passenger cars, light duty commercial vehicles, light trucks and multi-purpose passenger vehicles.

The Committee shall maintain liaison with such groups as the National Marine Manufacturers Association (NMMA), the Recreation Vehicle Industry Association (RVIA), the International Organization for Standardization (ISO), SAE related committees and other organizations as necessary.

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35 Trailers

TRAILER COUPLINGS, HITCHES, AND SAFETY CHAINS—AUTOMOTIVE TYPE—SAE J684 JUN98

SAE Standard

Report of the Passenger Car Division approved January 1938. Completely revised by the Trailer Hitch Committee May 1987. Revised by the SAE Trailer Committee March 1994, completely revised April 1997 and revised June 1998.

1. Scope—This SAE Standard includes couplings, hitches, and safety chains used in conjunction with all types of trailers or towed vehicles whose Gross Vehicle Weight Rating (GVWR) does not exceed 4540 kg (10 000 lb). This includes such types as utility, boat, camping, travel, and special purpose trailers which are normally towed by conventional passenger cars, light-duty commercial vehicles, light trucks, and multipurpose passenger vehicles. This document is intended primarily for ball-and-socket type of couplings and hitches. It should not be construed as a limitation to this type alone but should apply where appropriate to ring-and-pintle, clevis-and-pin, or any other draft means designed to serve this purpose.

2. References

2.1 Applicable Publications—There are no referenced publications specified herein.

3. Definitions—Coupling and Hitch Nomenclature—The following nomenclature has been adopted for uniformity in the terms used for the component parts of the trailer-coupling mechanism:

3.1 Hitch—That part of the connecting mechanism including the ball support platform and ball and those components that extend and are attached to the towing vehicle, including bumpers intended to serve as hitches.

3.1.1 WEIGHT DISTRIBUTING HITCH (OR EQUALIZING HITCH)—A mechanical device that connects the trailer to the towing vehicle and by means of leverage applied on both trailer and towing vehicle structures, when properly adjusted, distributes the imposed vertical load of the hitch and coupling connection between structures of towing vehicle and trailer.

3.1.2 WEIGHT CARRYING HITCH—A mechanical and/or structural device that connects the trailer to the towing vehicle, and that does not employ features designed to redistribute the load imposed at the hitch and coupling connection.

3.2 Coupling—That part of the trailer connecting mechanism by which the connection is actually made to the trailer hitch. This does not include any structural member, extension of the trailer frame, or brake actuator.

4. Trailer Classification

4.1 Class 1—All types of trailers with a trailer Gross Vehicle Weight Rating (GVWR) (trailer weight including its load) not to exceed 910 kg (2000 lb).

4.2 Class 2—All types of trailers with a trailer GVWR of over 910 kg (2000 lb) and not to exceed 1590 kg (3500 lb) GVWR.

4.3 Class 3—All types of trailers with a trailer GVWR of over 1590 kg (3500 lb) and not to exceed 2270 kg (5000 lb) GVWR.

4.4 Class 4—All types of trailers with a trailer GVWR of over 2270 kg (5000 lb) and not to exceed 4540 kg (10 000 lb) GVWR.

5. Couplings

5.1 Coupling Classification—There shall be four designations of couplings to cover all trailers up to 4540 kg (10 000 lb) GVWR. The designated classification of the coupling shall be based on the GVWR of the trailer rather than the weight imposed vertically down on the ball by the coupling. The Class 1 coupling shall be used on Class 1 trailers; the Class 2 coupling, on Class 2 trailers; the Class 3 coupling, on Class 3 trailers; and the Class 4 coupling, on Class 4 trailers. This is not intended to limit the number or variety of couplings in a given class or to restrict the use of a heavier-duty coupling or hitch ball being used on a lighter class of trailer.

5.2 Attachment of Couplings—All couplings are to be attached to the trailer's structural attaching member by bolting, welding, or riveting in such a manner that the loads indicated in Table 1 may be applied without incurring loss of attachment or distortion or failure which would affect the safe towing of trailers.

5.2.1 Manufacturers of trailer couplings shall provide instructions for the attachment of coupling housings to trailers.

TABLE 1—STRENGTH TEST LOADS FOR COUPLING ATTACHMENTS

Mode	Minimum Static Test Load
Longitudinal Tension and Compression	1.5 x Maximum Trailer GVWR
Transverse Thrust	0.5 x Maximum Trailer GVWR
Vertical Tension and Compression	0.5 x Maximum Trailer GVWR

5.3 Provision for Safety—Couplings in all classes shall be equipped with a manually operated mechanism so adapted as to prevent disengagement of the unit while in operation.

5.4 Identification—Trailer couplings which meet the minimum standards set forth in Table 2 shall be permanently marked with the following information:

5.4.1 Coupling manufacturer's name, initials, or trademark

5.4.2 Part, style, or model number.

5.4.3 SAE coupling classification and maximum trailer GVWR.

5.4.4 Ball diameters for which coupling is designed.

5.5 Coupling Ratings—There shall be a minimum strength test for couplings by class as indicated in Table 2.

5.6 Test Fixture—Basic drawings of typical test fixtures (Figure 1) for use in determining conformance of couplings to the minimum strength test load requirements of Table 2 are included in this document to promote uniformity in test results by various testing laboratories.

TABLE 2—STRENGTH TEST LOADS FOR BALL AND TRAILER COUPLINGS[1][2]

Trailer Classification	Trailer Coupling Designation	Typical Ball Diameter, mm (in) (where ball-type hitch is used)	Minimum Test Load Requirements, kN (lb)
Class 1	Class 1	47.6 (1-7/8)	Longitudinal Tension: 26.7 (6000) Longitudinal Compression: 26.7 (6000) Transverse Thrust: 8.9 (2000) Vertical Tension: 11.1 (2500) Vertical Compression: 11.1 (2500)
Class 2	Class 2	50.8 (2)	Longitudinal Tension: 46.7 (10 500) Longitudinal Compression: 46.7 (10 500) Transverse Thrust: 13.3 (3000) Vertical Tension: 20.0 (4500) Vertical Compression: 20.0 (4500)
Class 3	Class 3	50.8 (2)	Longitudinal Tension: 66.7 (15 000) Longitudinal Compression: 66.7 (15 000) Transverse Thrust: 17.8 (4000) Vertical Tension: 31.1 (7000) Vertical Compression: 31.1 (7000)
Class 4	Class 4	Ball and ball shall be of such size and strength as to conform to the minimum breaking strength requirements of the mating coupling required for the specific load of Class 4 trailer	Longitudinal Tension: Gross trailer Weight, N (lb) x 3 Longitudinal Compression: Gross trailer weight, N (lb) x 3 Transverse Thrust: Gross trailer weight, N (lb) x 1 Vertical Tension: Gross trailer weight, N (lb) x 1.3 Vertical Compression: Gross trailer weight, N (lb) x 1.3

1. Vertical Tension Load Requirement—The vertical tension load requirement is extremely important because of the mechanics of holding the ball in the socket. On vertical-tension (or pull-out) testing, the major portion of the tensile load is transferred from the lip of the coupling to the ball clamp and its supporting rod, rivet, or inclined plane. While relatively little distortion occurs in the coupling housing, the ball clamp is forced back and downward until the final restricting force retaining the ball is lost and pull-out occurs. The load at which retention is maintained is highly critical and loss of purchase on the ball occurs suddenly, going from safe retention to complete separation.
2. Coupling versus High Strength Bench Test Load Requirements—Coupling strength design criteria are necessarily different than those for hitches and will be greater because of the stresses to which each is subjected. Couplings are welded or bolted to trailer tongues with only the socket and latching mechanism exposed. The coupling socket must take the concentrated dynamic shock load as well as the varying stresses induced from normal trailering, and is the point of highest stress.
The hitch load is distributed through the hitch components, spring deflections in the towing vehicle, shock absorbers, and the vehicle structure, and is affected by entirely different force distribution than the coupling. Hitches are actually subjected to much lower unit forces than are the coupling and the ball.

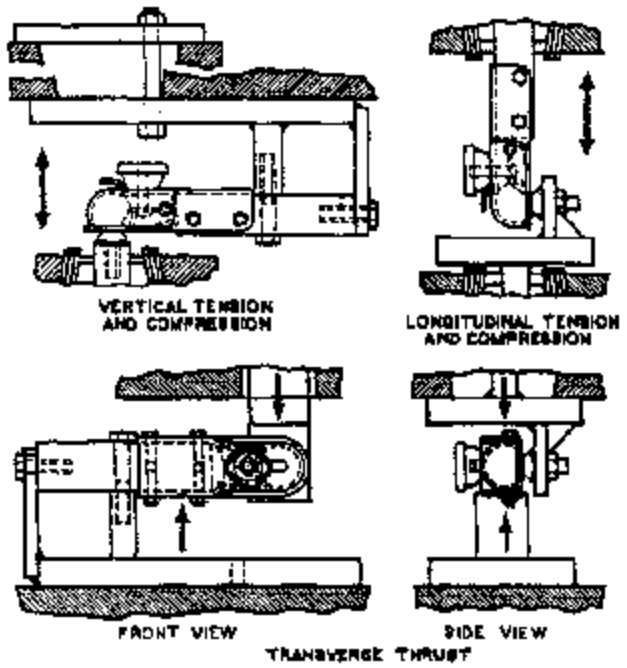

FIGURE 1—TYPICAL TRAILER COUPLING TEST FIXTURE ARRANGEMENT

5.9 **Coupling Test Procedure**—A coupling or ball shall withstand the test loads indicated in Table 2 without incurring failure. For the purpose of this section, failure is defined as the point at which the coupling or ball will accept no additional test load without separation of the ball from the coupling ball socket, or the occurrence of a metal fracture of either coupling ball or coupling assembly which results in separation of the ball from the coupling ball socket. Distortion or bending of the ball or of a coupling assembly component occurring during testing does not constitute a failure as defined herein unless actual separation of the ball from the coupling socket occurs prior to the designated test loads indicated in Table 2. When conducting tests, a new coupling or ball shall be used for each mode of load application.

6. *Hitches*

6.1 **Hitch Strength Requirements**—The hitch shall meet the test load requirements indicated in Table 3 of this document.

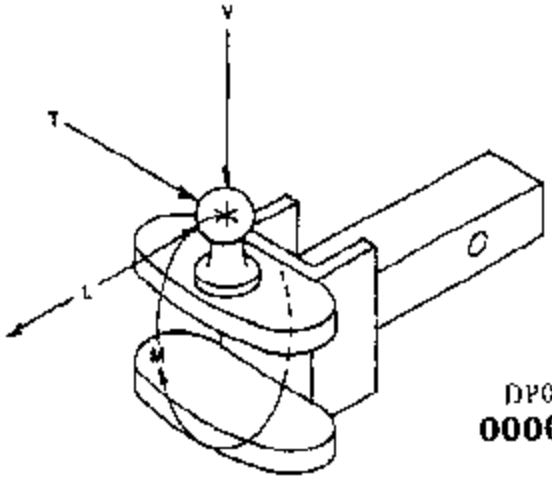

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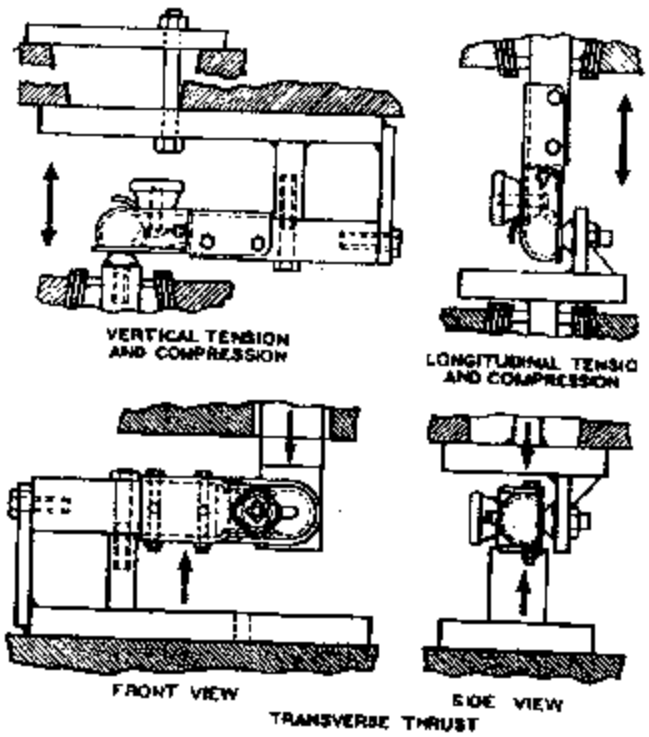
FIGURE 2—HITCH TEST FORCES APPLICATION

TABLE 1

BREAKING STRENGTH FOR COUPLINGS AND BALLS

Trailer Classification	Trailer Couplings Designation	Minimum Nominal Ball Diameter-Inches	Minimum Breaking Point Requirements	Pounds
Class 1 (2,000 lbs. or less MGTW)	No. 1	1⅞	Longitudinal tension	6,000
			Longitudinal compression	6,000
			Transverse thrust	2,000
			Vertical tension	2,500
			Vertical compression	2,500
Class 2 (2,001 – 3,500 lbs. MGTW)	No. 2	2	Longitudinal tension	10,500
			Longitudinal compression	10,500
			Transverse thrust	3,000
			Vertical tension	4,500
			Vertical compression	4,500
Class 3 (3,501 – 5,000 lbs. MGTW)	No. 3	2	Longitudinal tension	15,000
			Longitudinal compression	15,000
			Transverse thrust	4,000
			Vertical tension	7,000
			Vertical compression	7,000
Class 4 (5,001 – 10,000 lbs. MGTW)	No. 4	Ball and bolt shall be of such size and strength as to conform to the minimum breaking strength requirements of the mating coupling required for the specific load of Class 4 trailer.	Longitudinal tension	MGTW × 3
			Longitudinal compression	MGTW × 3
			Transverse thrust	MGTW × 1
			Vertical tension	MGTW × 1.3
			Vertical compression	MGTW × 1.4



NOTE: *Test fixture bars to be solid and fit snugly inside housing channels.*

FIGURE 1

TYPICAL COUPLER AND BALL TEST FIXTURE ARRANGEMENT

5. HITCHES

5.1 Hitch Rating. Hitches shall be rated by the maximum gross trailer weight (MGTW) and the maximum vertical load on the hitch (tongue weight) each is qualified to tow.

5.2 Hitch Strength Requirements. Each hitch, when subjected to a static bench test, shall conform to the minimum strength requirements contained in Table 2.

5.3 Attachment of Hitch. Each hitch shall be attached to the towing vehicle in such a manner that the tension, compression and transverse thrust loads shown in Table 2 are transferred to that vehicle without residual distortion or failure of either the attachment or the vehicle structure which would affect the safe towing of trailers, as defined in Table 2.

5.4 Maximum Vertical Load on Hitch (Tongue Weight). The weight load carried by the hitch at its connection with the trailer coupling shall not, when on a level surface, exceed the maximum tongue weight load recommended by the manufacturer for the hitch.

NTMVSAct of 1966 ... extract

80 STAT. 719

(11) "Defect" includes any defect in performance, construction, components, or materials in motor vehicles or motor vehicle equipment.

(12) "United States district courts" means the Federal district courts of the United States and the United States courts of the Commonwealth of Puerto Rico, Guam, the Virgin Islands, the Canal Zone, and American Samoa.

(13) "Vehicle Equipment Safety Commission" means the Commission established pursuant to the joint resolution of the Congress relating to highway traffic safety, approved August 20, 1958 (72 Stat. 635), or as it may be hereafter reconstituted by law.

72 USC 313 note.

Standards.

Sec. 103. (a) The Secretary shall establish by order appropriate Federal motor vehicle safety standards. Each such Federal motor vehicle safety standard shall be practicable, shall meet the need for motor vehicle safety, and shall be stated in objective terms.

60 Stat. 237.
5 USC 1001 note.

(b) The Administrative Procedure Act shall apply to all orders establishing, amending, or revoking a Federal motor vehicle safety standard under this title.

Effective date.

(c) Each order establishing a Federal motor vehicle safety standard shall specify the date such standard is to take effect which shall not be sooner than one hundred and eighty days or later than one year from the date such order is issued, unless the Secretary finds, for good cause shown, that an earlier or later effective date is in the public interest, and publishes his reasons for such finding.

(d) Whenever a Federal motor vehicle safety standard established under this title is in effect, no State or political subdivision of a State shall have any authority either to establish, or to continue in effect, with respect to any motor vehicle or item of motor vehicle equipment any safety standard applicable to the same aspect of performance of such vehicle or item of equipment which is not identical to the Federal standard. Nothing in this section shall be construed to prevent the Federal Government or the government of any State or political subdivision thereof from establishing a safety requirement applicable to motor vehicles or motor vehicle equipment procured for its own use if such requirement imposes a higher standard of performance than that required to comply with the otherwise applicable Federal standard.

Revocation.

(e) The Secretary may by order amend or revoke any Federal motor vehicle safety standard established under this section. Such order shall specify the date on which such amendment or revocation is to take effect which shall not be sooner than one hundred and eighty days or later than one year from the date the order is issued, unless the Secretary finds, for good cause shown, that an earlier or later effective date is in the public interest, and publishes his reasons for such finding.

(f) In prescribing standards under this section, the Secretary shall—

(1) consider relevant available motor vehicle safety data, including the results of research, development, testing and evaluation activities conducted pursuant to this Act;

(2) consult with the Vehicle Equipment Safety Commission, and such other State or interstate agencies (including legislative committees) as he deems appropriate;

(3) consider whether any such proposed standard is reasonable, practicable and appropriate for the particular type of motor vehicle or item of motor vehicle equipment for which it is prescribed; and

(4) consider the extent to which such standards will contribute to carrying out the purposes of this Act.

Proposed Rule Making

National Highway Safety Bureau

[49 CFR Part 571]

[Docket No. 1–20; Notice 2]

TRAILER HITCHES, COUPLINGS, AND SAFETY CHAIN; TRAILERS

Notice of Proposed Motor Vehicle Safety Standard

On October 14, 1967 (32 F.R. 14278) an advance notice of proposed rule making requested comments on structural and installation requirements to insure the integrity of trailer hitches and mating attachments for passenger cars and multipurpose passenger vehicles.

Although information concerning causes of accidents is often speculative, data that is available indicates that a passenger car pulling a trailer is four times more likely to be involved in an accident than one that is not. This data also indicates that in 20 percent of the accidents involving a vehicle towing a trailer, the trailer hitch was a factor that contributed to the accident. In addition to accidents in which hitch separation is a factor, the higher accident rate cited is also believed to result in part from the fact that vehicles towing trailers may suffer degradation in handling performance due to the effects of the dynamic characteristics of the trailer on the towing vehicle. One factor that creates potentially hazardous trailer-towing situations is the coupling of trailers to vehicles equipped with hitches of insufficient strength to tow the trailers. After consideration of comments received, the Director has decided, as an initial step in the improvement of the performance of vehicles towing trailers, to propose a new Federal motor vehicle safety standard, "Trailer Hitches, Couplings, and Safety Chain." The proposed standard, in addition to prescribing minimum strength requirements for hitches, couplings, and safety chain that will minimize the possibility of separation, will also preclude the mating of trailers to hitches that are unsuited for the weight of the trailer. The additional but closely related problem of selecting a hitch that is appropriate for the towing vehicle is being dealt with in a companion proposed Consumer Information regulation "Trailer Towing Performance" (Docket 28–8), which is being

[49 CFR Part 575]

[Docket No. 28-8; Notice 2]

MOTOR VEHICLE SAFETY REGULATIONS

Consumer Information; Trailer Towing Performance—Passenger Cars and Multipurpose Passenger Vehicles

On October 5, 1968 (33 F.R. 14971) the Federal Highway Administrator published an advance notice of a proposed Consumer Information regulation concerning the performance of passenger cars and multipurpose passenger vehicles when towing trailers. This is a notice of proposed Consumer Information regulation, which would require manufacturers of passengers cars and multipurpose passenger vehicles to provide information concerning the trailer towing performance of their vehicles in specific test driving situations.

The proposed rule would require manufacturers to indicate the types of trailer hitch they recommend, and every trailer-towing package which they offer, for use with the vehicle. The manufacturer would then be required to specify the maximum size trailer, based upon predetermined specifications, which he recommends for use with each recommended hitch or towing package. The predetermined specifications for trailer size limit the maximum trailer size that may be recommended to a gross vehicle weight rating of 6,500 pounds. This limitation is consistent with the maximum gross vehicle weight rating of a trailer permitted to be equipped with a coupling for use with a ball-type hitch, as proposed in the notice of proposed rulemaking on "Trailer Hitches, Couplings, and Safety Chain" (Docket 1-20) which is being published simultaneously with this notice. For each recommended combination of vehicle equipment, hitch and maximum trailer size, the regulation would require performance data to be supplied. This data would consist of test results obtained when the vehicle and trailer are tested pursuant to two test procedures prescribed by the regulation.

The test procedures are designed to reflect handling characteristics and yaw stability, two major aspects of trailer-towing performance. The handling test requires the recording of the maximum speed at which the towing vehicle and trailer combination can remain within a 12-foot lane while negotiating a prescribed "S" curve. The test for yaw stability consists of driving the vehicle on a specified yaw stability test course that contains prescribed ridges, and recording the maximum speed at which the vehicle can remain within the course.

In addition to the above test results, the manufacturer would be required to furnish a diagram of the vehicle that indicates attachment points for all recommended towing hitches. Diagrams of the two test procedures would also be supplied. It is anticipated that the final rule will allow these diagrams to be simplified in the presentation to consumers. Finally, a description of all motor vehicle equipment in each recommended trailer-towing package would be included.

In consideration of the foregoing, it is proposed that Part 575 of Title 49, Code of Federal Regulations, be amended by adding a new Consumer Information regulation, § 575.308, *Trailer towing performance—passenger cars and multipurpose passenger vehicles*, as set forth below. Interested persons are invited to submit written data, views or arguments concerning the proposed regulation. Submissions are particularly requested concerning recommended unsprung weights and performance and design specifications for suspensions for the standardized trailers used in the proposed regulation. Submissions should refer to Docket 28-8, Notice No. 2 and be submitted to: Docket Section, National Highway Safety Bureau, 400 Seventh Street SW., Washington, D.C. 20591. It is requested, but not required, that 10 copies be submitted. All submissions received before the close of business on December 11, 1970, will be considered. All submissions will be available for examination in the docket room at the above address both before and after the closing date. Submissions filed after the above date will also be considered by the Bureau. The rulemaking action may, however, proceed at any time after that date, and comments received too late for consideration in regard to the action will be treated as suggestions for future rulemaking. The Bureau will continue to file relevant material, as it becomes available, in the docket after the closing date, and it is recommended that interested persons continue to examine the docket for new materials.

National Highway Safety Bureau

Docket No. 1-20; Notice 2 (Notice of Proposed Rule Making--Trailer Hitches, Couplings and Safety Chain; Trailers)

Docket No. 28-8; Notice 2 (Proposed Consumer Information Regulation--Trailer Towing Performance-Passenger Cars and Multipurpose Passenger Vehicles)

SUBMISSION

OF THE

TRAILER HITCH MANUFACTURERS ASSOCIATION

December 11, 1970

DP00-001
00000665

1999

Federal Vehicle Standards

Office of Vehicle Acquisition and Leasing Services

One Information Source?

Tow vehicle manufacturer
Trailer manufacturer
Receiver platform
Hitch manufacturer

A Supplement To

CAMPING LIFE®

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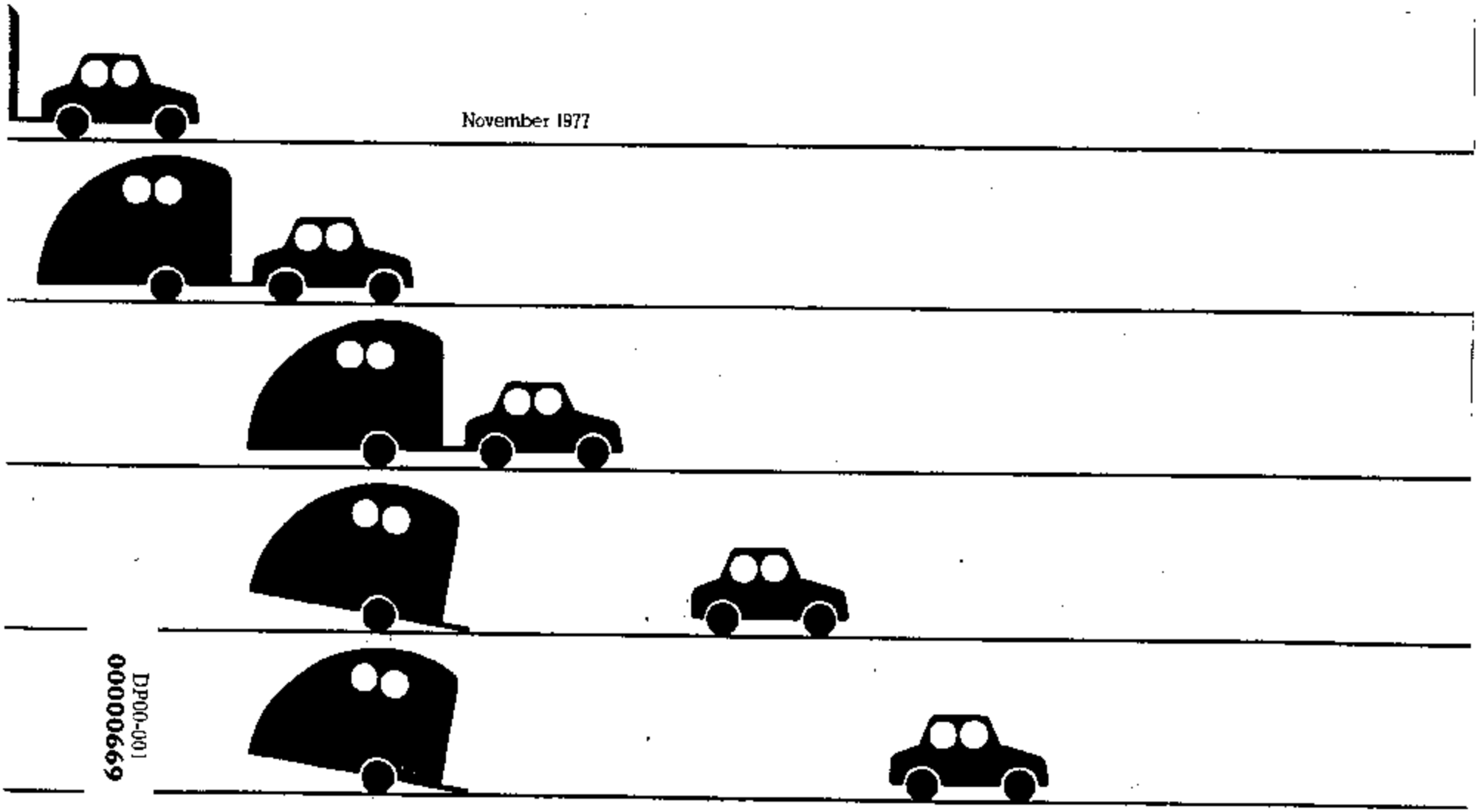
Produced by the editors of *Trailer Boats* magazine in conjunction with ...

Travel & Camper Trailer Safety

U.S. Department of Transportation,
National Highway Traffic Safety Administration,
Washington, D.C. 20590



November 1977

NHTSA Draft

Towing a Trailer
Being Equipped for Safety

Introduction

Hitch systems, towing packages, tongue weight, and driving permits–there's a lot more to towing a trailer than just hitching up and taking off down the road. This brochure provides general information and tips that can help you make safe decisions when purchasing and driving a towing vehicle and trailer for noncommercial, personal use. It covers the following topics:

- How the size and weight of a trailer determine the selection of a towing vehicle
- Things to consider if you already have a towing vehicle
- The importance of manufacturers' tow ratings
- How to measure the weight of a trailer
- The hitching, brake, and wiring systems that connect towing vehicles with trailers
- Tire safety
- Proper loading and weight distribution of cargo and equipment
- State and local requirements for towing a trailer
- A pre-departure checklist
- Safety tips for driving with a trailer
- Safety tips for maintaining a towing vehicle and trailer

This brochure is not a substitute for the technical information found in manufacturers' towing guides and vehicle owner's manuals. Its purpose is to give you some basic information about factors to consider and equipment you will need to ensure your safety and that of your passengers, as well as the safety of other people on the road, when you are towing a trailer.

Selecting a Towing Vehicle

SUVs, pickup trucks, vans, minivans, and passenger cars can all be equipped to tow a trailer. However, the selection of an appropriate towing vehicle and the proper equipment to tow a trailer depend on the type of trailer and its size and weight. There are numerous types of trailers, but, in general, they all fall into four categories: flat bed or open trailers, boat trailers, enclosed trailers, and recreational travel trailers.

Most vehicle manufacturers offer predesigned towing packages that delineate the equipment necessary to tow different types of trailers depending on their fully loaded weight and size. A towing package may include a heavy duty radiator, battery, flasher system, alternator, suspension, and brakes, as well as an engine-oil cooler, transmission-oil cooler, wiring harness, specific axle ratio, and special wheels and tires.

Towing packages may also include the trailer **hitch receiver**, which is mounted to the

U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

400 Seventh Street, S.W.
Washington, D.C. 20590

July 5, 2001

Mr. Ewart Phillips
President
Wally Byam Caravan Club International, Inc.
P.O. Box 612
Jackson Center, Ohio 45334-0612

Dear Mr. Phillips:

As you may know, Doug Showker (the WBCCI Safety Committee chairman) invited our agency to participate in this year's International Rally. While there, we inspected a few rigs, interviewed owners, and, on June 28th from 10:30 a.m. to noon, conducted a towing safety seminar. I'm writing to thank you for your organization's hospitality and provide a brief description of our findings during the inspections.

I am grateful for the way I was treated by each and every WBCCI member I met during my visit. Each was friendly and accommodating. All were outstanding ambassadors for your organization and are obviously taking Mr. Byam at his word: "Adventure is where you find it, any place, every place, except at home in the rocking chair."

I am particularly indebted to Buzz and Carol Wallen (#6254). Any concern I had about the reception I would be given by WBCCI and its members was quickly dispelled after meeting this wonderful couple. Because Mr. Showker was unable to attend this year's rally, Buzz was thrown into the breech and responded with good humor and a "can do" attitude. Thanks to him, what started out as an apparent disaster soon came right. And Carol made certain that I was included in many of the evening activities while keeping me well fed! I must say, the opening ceremony was particularly moving.

Now for the survey results: Initially, I had intended that each member be given a survey sheet upon arrival at the fairgrounds. In it, I asked that they inspect their hitch receiver and, if cracks were noted, notify the safety committee so that I could meet with them on June 27th. However, this did not happen. So, Buzz and I "cold-called" owners of 1982-1999 GM Suburbans which were being used to tow 34' Airstream travel trailers (the longest produced by the company). During the interview, the tow vehicle's hitch receiver was inspected for cracks.

The Chevrolet/GMC Suburban is rated to tow trailers weighing no more than 10,000 lbs. Likewise, these vehicles are rated to tow trailers with tongues weighing no more than 1,000 lbs. Likewise, 1992-1999 Suburbans carry a Gross Combination Weight Rating (GCWR) of no more than 17,000 lbs. and only then if properly equipped (7.4L engine with 4.10 rear gear ratio). Some of the Suburbans we inspected were not equipped to tow the maximum GCW specified by GM and may have been overloaded as a result.

We also found cracked receivers--both OEM and aftermarket. All had identical weight ratings (maximum of 10,000 lbs. with 1,000 lb. tongue weight).

None of the owners surveyed had weighed their current rig and none knew the trailer's gross and/or tongue weight nor the weight of the tow vehicle while traveling. Of those with cracked receivers at the rally, none had ever inspected it to assess its condition before towing. The cracks we observed were consistent with an overload condition resulting in a slow propagating fatigue separation, which would be readily noticeable during routine, pre-trip, inspections.

In conversation with your members, I found many did not realize the importance of each and every vehicle weight rating. Hopefully the WBCCI safety committee will be able to provide more information to more of your members concerning this subject.

I trust you will find this information helpful. It was a pleasure meeting the fine people in your organization. Good luck as you embark upon your term as President.

Sincerely,

Bob Young
Vehicle Defects Investigator
NHTSA/ODI

cc: Craig H. Lundberg, Immediate Past President, WBCCI

Suburban w/Cracked Receiver Platforms
WBCCI Sioux Falls Rally, June 27, 2001

NO	Vehicle	VIN	Last Inspected	Last weighed	Complaint
1	96 Sub	1GNGC26JXTJ376115	Never	Never	OEM D/S stress crack
2	92 Sub	1GNGC26N6NJ338886	Never	Never	Aftermarket (EAZ-LIFT) both sides stress crack
3	92 Sub	1GNEC16K6NJ358482	Never	Never	OEM both sides stress crack
4	94 Sub	1GNGC26N6RJ316439	June '98	Never	Reinforcement welded in June '98 after cracking
5	97 Sub	1GKEC16R2VJ727624	June '99	Never	OEM replaced w/OEM when cracked 2 years ago
6	92 Sub	1GKGC26N0RJ770456	Never	Never	OEM both sides stress crack