

EA02025

TEXAS INSTRUMENTS, INC.'S

9/10/03 ATTACHMENT TO ODI

BOX 4, PARTS A - N

PART D

VALENTINE TOOL & STAMPING, INC.

111 WEST MAIN ST. NORTON, MASS. 02788
(617) 245-6811

MATERIAL CERTIFICATION

DATE : FRIDAY JUNE 14, 1991

CUSTOMER : TEXAS INSTRUMENTS INC

CUSTOMER P.O. NO : 508083392

SUPPLIER INVOICE NO., 19580

PART DESCRIPTION : 27713-1 CUP REV.A

SUPPLIER PJO NO. : 18571

QUANTITY SHIPPED : 1,085

SHIPMENT DATE : 06/14/91

**WE CERTIFY THAT THE MATERIAL USED
TO PRODUCE THE PRODUCT IN THIS
SHIPMENT, NAMELY
[C1008]
CONFORMS TO T.I. DRAWINGS AND
T.I. PURCHASE ORDER REQUIREMENTS.**

**SIGNED Jeanne Laffamme
(Supplier Representative)**

Jeanne Laffamme Quality Control Manager

TI-NHTSA 005553

VALENTINE TOOL & STAMPING, INC.

171 WEST MAIN ST. NORTON, MASS. 01966
(508) 285-8911 226-8840

CERTIFICATE OF CONFORMANCE

DATE : FRIDAY JUNE 14, 1991

CUSTOMER : TEXAS INSTRUMENTS INC

CUSTOMER P.O. NO : 505053392

SUPPLIER INVOICE NO.: T888D

PART DESCRIPTION : 27713-1 CUP REV.A

SUPPLIER FJO NO. : 18571

QUANTITY SHIPPED : 1,085

SHIPMENT DATE : 06/14/91

WE CERTIFY THAT ALL ITEMS SHIPPED ON THIS ORDER MEET THE REQUIREMENTS
OF THE PURCHASE ORDER AND APPLICABLE DRAWINGS/SPECIFICATIONS. RESULTS
OF REQUIRED MECHANICAL, VISUAL, FUNCTIONAL AND CHEMICAL TESTS ARE ON
FILE IN OUR QUALITY CONTROL DEPARTMENT.

SIGNED *Jeanne Leflame*
Jeanne Leflame
Quality Control Manager

TI-NHTSA 005554

110 1301
 315 336
 8 823 313

SALES CODE
 502416

1510 HENRY ST BOX 180
 NORTON, MA 01940

17712

0 1 0 0 0 0 0 0

DATE INVOICE NO
 07/26/91 02740

VOICE TO: VALENTINE TOOL & STAMPING, INC.
 171 W MAIN ST
 NORTON, MA 02766

SHIP TO: VALENTINE TOOL & STAMPING, INC.
 171 W MAIN ST
 NORTON, MA

ATTN: JEANNE LAFLAMME, Q.C. MGR.

TITLE (LINE) NO. CUS. NO. 2000 ON BILL PAYING COMPANY SHIPPED BY
 16,154 040 06 CUMF R S S

REMARKS OF:
 ORDER NO 13428

MT NO C RR P S SI RT CR NO
 465709 07 34 012 006 01
 AL MM CR CA

125 025MM X 50.80MM

04000 X 2.0000

101 -001 +005 -005

125 -025MM +127 -127MM

LENGTH R 50 MAX
 IMAGE

NOJ SLIT

MT NO
 02450

CONS OF CUT

COIL

LENGTH

220 PLW 16 36

COLOR CODE

PREPAID COLLECT PREPAID

440 LAS

STRENGTH

GRADE

3000

NUMBER

MARK

PICTA MARK

GRID MARK

WATER

3/4"

CARBON

GBIC

FOR HT

SAMPH

PLATINUM

CHAINS

WASTERS

STAPLES

GIL

BOC

CONES

1.4%

T.PCS

CLASS ALUM KILD
 AIR NO. C-1006

TEST REPORT

Certificate of Compliance

TEST: 1

027 07205 35 030241

Notary Public, Dade County
 My commission expires 7/1/92

DATE 2/27/91

I certify that the above figures are a true and correct copy of those contained in the records of this corporation.

A. J. Ingulini
 ROYAL STEEL CO., INC.

09. 25. 91 10:37 AM

294

September 25, 1991

To: Donna Moynihan 12-27
From: Beth Kili 10-16
Subject: Material Confirmation
TSL Request # 110832

Sample Description:

P/N 74176-1 Seal Teflon and Kapton

Results:

DSC results confirm the presence of Teflon by the characteristic melt point at 316 - 319 degrees C.

Kapton is confirmed in the seal by the IR scan. It shows the same characteristic absorbances exhibited by the sample known to be Kapton. See the enclosed scan.

Finally, the Teflon is confirmed to be on the surface of both sides of the seal by EDAX analysis.

Regards,

Beth X3069

TI-NHTSA 005557

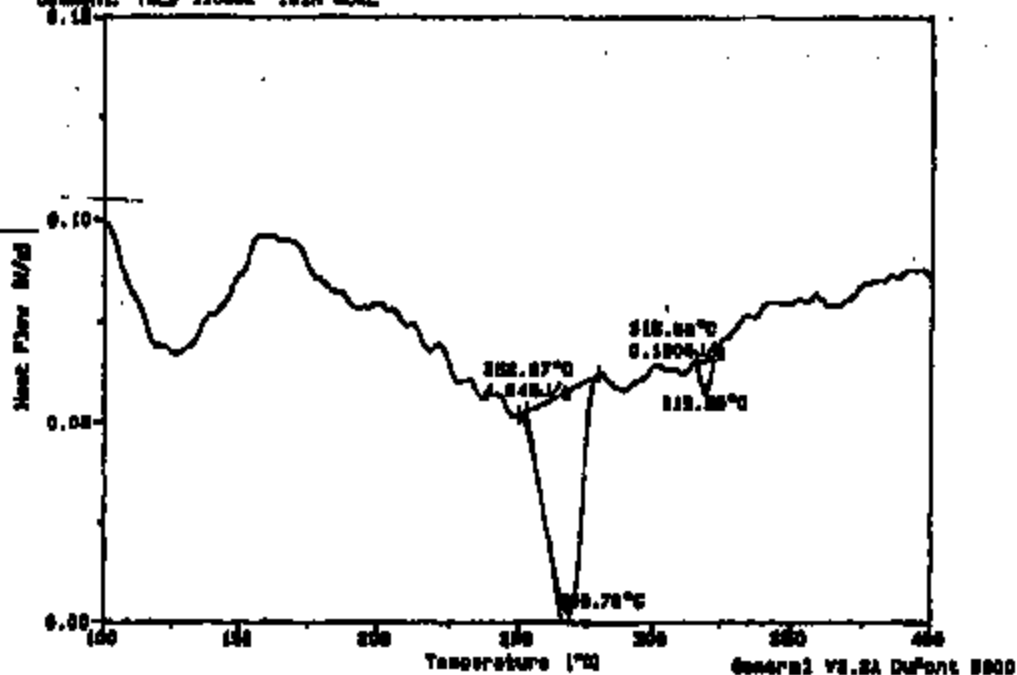
08-25-81 10:37 AM

707

Sample: 78478-1 KAPTON TAPE
 Size: 3.8808 g
 Method: KAPTON
 Comment: TML 110832 182R DUAL

DSC

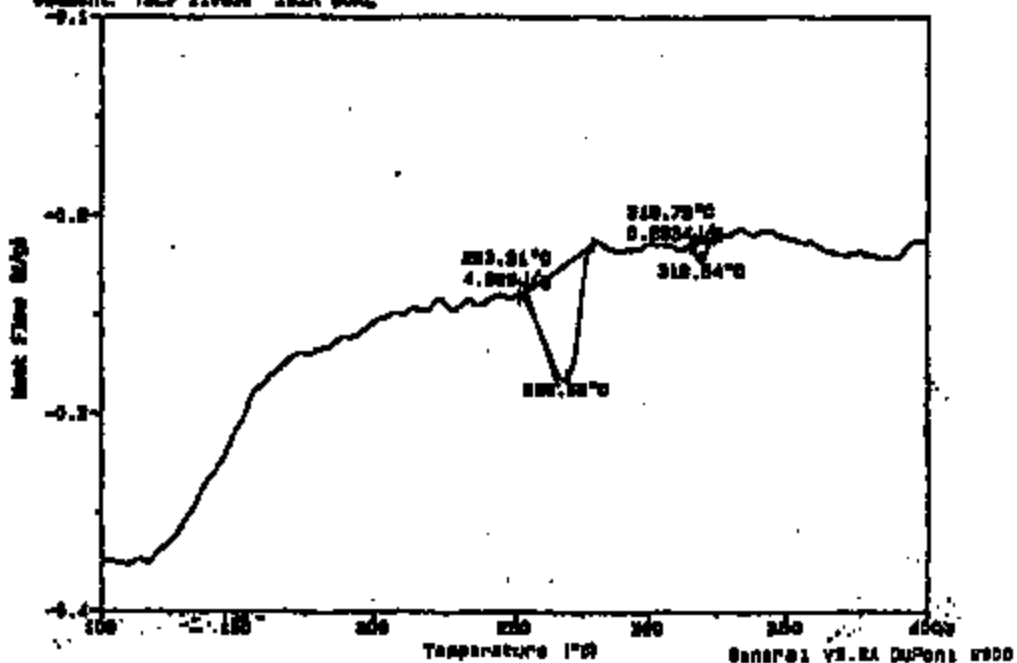
File: DKAFTON.08
 Operator: K ROSS
 Run Date: 08/25/81 08:18



Sample: 78478-2 KAPTON TAPE
 Size: 3.8808 g
 Method: KAPTON
 Comment: TML 110832 182R DUAL

DSC

File: DKAFTON.09
 Operator: K ROSS
 Run Date: 08/25/81 08:18

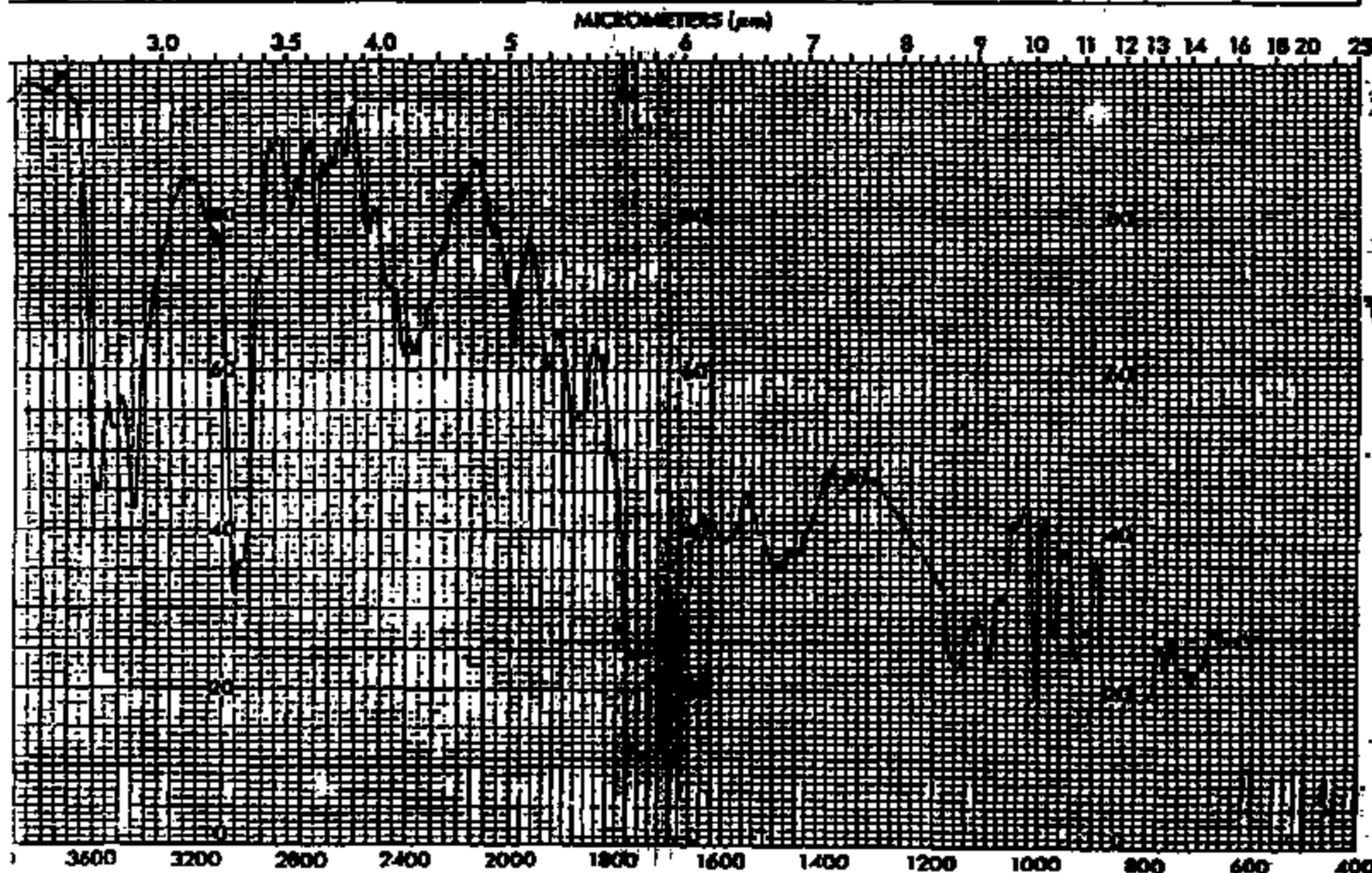


TI-NHTSA 005558

NO. 007-1493

PERKIN-ELMER

CONCENTRATION _____	SCAN MODE	ACCY. ☐	SURVEY ☐	SPECTRUM NO. _____
THICKNESS _____		HI ENERGY ☐	CAL ☐	SAMPLE <u>110932</u>
WAVE _____		RESOLUTION ☒		<u>Kapton - Teflon</u>
REMARKS _____	OPERATOR <u>EX</u>	DATE <u>9/13/91</u>		ORIGIN _____



08.25.91

10:27 AM

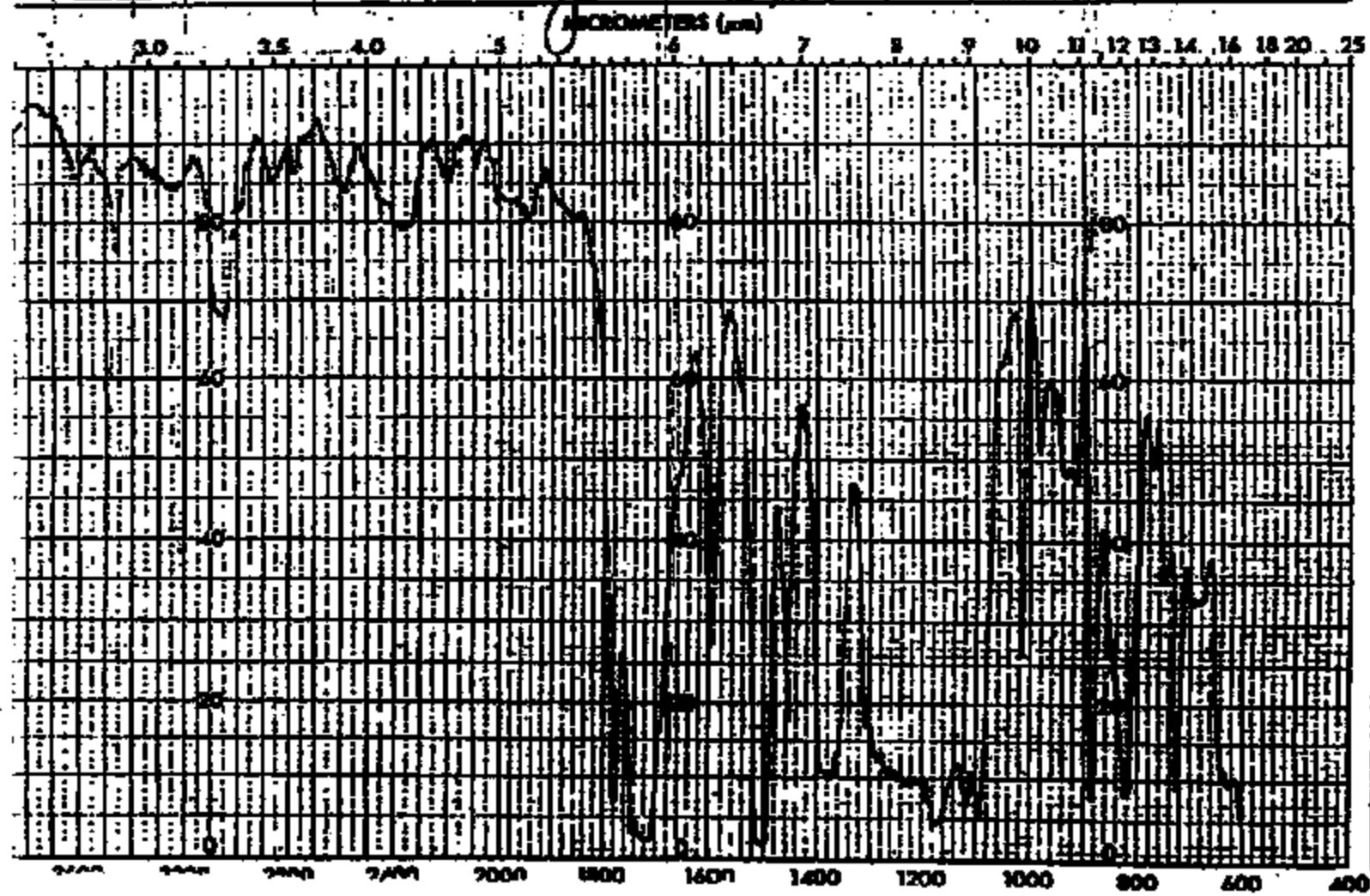
SAMPLE

SPECTRUM NO.

P08

TI-NHTSA 005559

CONCENTRATION _____	SCAN MODE	ACQ. ☐	SURVEY ☐	SPECTRUM NO. _____
COMES _____		HI ENERGY ☐	CAL. ☐	SAMPLE <u>DUPONT KAPTON</u>
AGE _____		RESOLUTION ☒		<u>100FNa99</u>
LABS _____	OPERATOR <u>JS</u>	DATE <u>3/4/77</u>		ORIGIN _____



SAMPLE

SPECTRUM NO.

08:28.91 10:37 AM

208

TI-NHTSA 005580

TJ-NHTSA 005561



DLEMMASTERS

CERTIFICATE OF CONFORMANCE

SHIP TO:

TEXAS
INSTRUMENTS



FROM
Dlemasters Manufacturing, Inc.

767 Industrial Drive
Elmhurst, Illinois 80126

DATE SHIPPED: 6/18/91 PURCHASE ORDER #: 50000082
SHIPPING OR INVOICE NUMBER: 00121
MATERIAL TRACE NUMBER (P.O. # HEAT, LOT, OR ROUTE SHEET NUMBER): 63-7196
QUANTITY SHIPPED: 75,790
PART NUMBER: 27639-1 REVISION: D
PART DESCRIPTION: WASHER
OPERATION PERFORMED: MANUFACTURING
SPECIFICATION: 27639-1 REVISION: D

THE MATERIAL DESCRIBED ABOVE WAS PROCESSED, INSPECTED AND FOUND TO CONFORM TO THE DRAWING(S) AND SPECIFICATION(S) LISTED.

Quality Control
QUALITY CONTROL

08-14-91
DATE

ENCLOSURES: ☒ CERTIFICATE OF RAW MATERIAL

TRACEABLE LOT# 79

☐ INDEPENDENT LABORATORY TEST REPORT OF RAW MATERIAL

☐ INSPECTION REPORT(S)

☒ ^{HEAT TREAT} SUB PLATING SUPPLIER'S CERTIFICATION(S) OF CONFORMANCE

☐ FORM _____ NON-CONFORMANCE RELEASED BY: _____

☐ REWORK EXPLANATION

TI-NHTSA 005563

RIVERDALE PLATING & HEAT TREATING, INC.

880 West 134th Street Riverdale, Illinois 60627-1194

TELEPHONES
(708) 448-2650
(312) 588-2400

DIEMASTERS MANUFACTURING, INC.
747 INDUSTRIAL DR
HEMIONST

IL 60126-1525

27639-1

AN-3100

THIS IS TO CERTIFY THAT THE PARTS, FURNISHED AGAINST THE LISTED
PURCHASE ORDER, WERE PROCESSED IN ACCORDANCE TO SPECIFICATION.

ORDER NO.	DATE	DESCRIPTION	QTY	UNIT PRICE	DATE
133431	100657	AUSTEMPER TO S/C 40-55	74,315	1,559	5/29/91
133431	108657	ZINC .0012 - .0006	74,315	1,559	5/29/91

Subscribed and sworn to before me

THIS 27 DAY OF MAY, 1991

Leonard O. Brynteson

Notary Public

"OFFICIAL SEAL"

Leonard O. Brynteson

Notary Public, State of Illinois
My Commission Expires 7/26/92

RIVERDALE PLATING & HEATING TREATING, INC.

Robert K. Nelson

Vice President

TI-NHTBA 009364

that material meets ordered specification

Bally Diagnostics
TEXAS INSTR.
27639-1

QUALITY CONTROL
APR 30 1991
L BALLO

Size
1 3/8 x 0.985
PO Number
021540
MIL Number
62276

Heat						AISI			Rockwell		
657196						C-105			B 74/78		
%C	%Mn	%P	%S	%Si	%Ni	%Cr	%Mo	%Al	%Cu	%V	%Co
0.52	0.78	0.15	0.02	0.23							
Tensile Strength (psi)			.2% Yield Strength (psi)			% Elongation in 2"					
Surface		Inclusion Rating		Grain Size							
Decarburization				Microstructure							
Cold Bend											
Parallel to the rolling direction over a						Radius Bend					
Perpendicular to the rolling direction over a						Radius Bend					
Hardness						Microhardness					

I certify that the above data is correct

[Signature] Date 4/26/91

Notary Public, State of New York, County of Onondaga

My commission expires *[Signature]*

ROME STRIP STEEL
530 Henry St.
Rome, NY 13440
315-336-5500
FAX 315-336-5510

TI-NHTSA 005585

THIS BOOK, SUPPLEMENT FROM NO. 40 DALLAS 2-28-58

[illegible]

TI-NHTSA 005566



K. F. BASSLER COMPANY, INC.
PRECISION TOOLING & METAL STAMPINGS

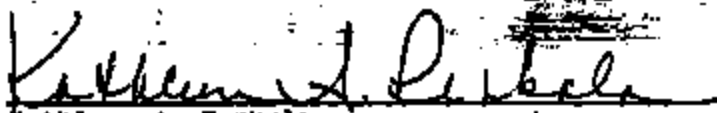
45 John William St. • Attleboro, MA 02703 • (508) 222-1081 • Fax: (508) 228-1808

MATERIAL CERTIFICATION

CUSTOMER: Texas Instruments Inc. - Attleboro
CUSTOMER ORDER NO.: 505097078
CUSTOMER PART NO.: 27406-1
REVISION: E
QUANTITY THIS SHIPMENT: 21,000
LOT NO. THIS SHIPMENT: 143
SHIPMENT DATE: 6.25.91

WE CERTIFY THAT THE MATERIAL USED TO PRODUCE THE PRODUCT IN THIS SHIPMENT, NAMELY, AK 1008 CES, CONFORMS TO TI DRAWING AND PURCHASE ORDER REQUIREMENTS.

AUTHORIZED SIGNATURE:


Kathleen A. Pankala
Inside Sales Specialist



TI-NHTSA 005567

TELEX 984214
FAX 215-838-5810
PHONE 215-838-5900
CABLE 225-0120

ROME STRIP STEEL COMPANY, INC.
530 HENRY ST. BOX 188
ROME, NEW YORK 13440

COMPLIANCE

SALES CODE
08072016

01000000

DATE 02/28/91 INVOICE NO. 02786

INVOICE TO: K. F. BASSLER CO., INC.
P. O. BOX 995
ATTLEBORO, MA

02703

SHIP TO: K. F. BASSLER CO., INC.
13TH-JOHN WILLIAM STS
ATTLEBORO, MA

QUANTITY (LBS) 19,636 NO. COILS 135 NO. PDS OR BLS 13 DRYAL COMPLETE PART

SHIPPED BY PAUL H

ST NO 486708 C 07 36 014 008 01
AL IN CO CA

NETS DIMENSIONS OF:

COIL ORDER NO 14474

COLOR CODE

21MM X 25.40MM

ROLL NO 58100

PREPAID

STRAPPING

PAPER WRAP

REMS

COATINGS

Q01

.04600 X 1.0000

TEMPER

B 50 MAX

COIL ON CUT

200 LBS

PAWS

SK'D SIZE

PLD RT

WASTERS

COMES

INSTRUMENT

+00050-00050+005 -005

NO3 SLIT

200 PIN 16 34

REWORK

SPACERS

THROUD

SHARDS

CAPS

+013 -013MM +127 -127MM

ALUMINUM C-1000

DRUM

CARAK

FLATHEAD

ONE

T-PCS

500/096

TEST REPORT

(8,907 XG)

19,636

Certificate of Compliance

ATTEST:

057-08-80-42-030291

Notary Public, Oneida County
My commission expires 3/1/92

DATE 3/1/91

I certify that the above figures are a true and correct copy of those contained in the records of this corporation.

A. Zingales
ROME STRIP STEEL CO., INC.

TI-NHTSA 005568



PLASTIC FABRICATORS DIVISION
155 NO. MAIN STREET, FRANKLIN, N.H. 03235
603-833-2770

CERTIFICATE OF CONFORMANCE

TO: TEXAS INSTRUMENTS

DATE: JUN 3 1991

ATT: QUALITY CONTROL SUP.

THIS CERTIFIES THAT:

SHIPMENT # 159462

PART # 23958-1 REVISION 6

QUANTITY 122,000

MAT'L DESC. 50A200A #1

IS IN CONFORMANCE WITH THE REQUIREMENTS, SPECIFICATIONS, AND DRAWINGS
ON YOUR ORDER # 004168700400

BY: INSULFAB PLASTICS
FRANKLIN, NH 03235

And Vigney
QUALITY CONTROL MANAGER

INSULFAB
MILANNE
SILICONES
ETC.

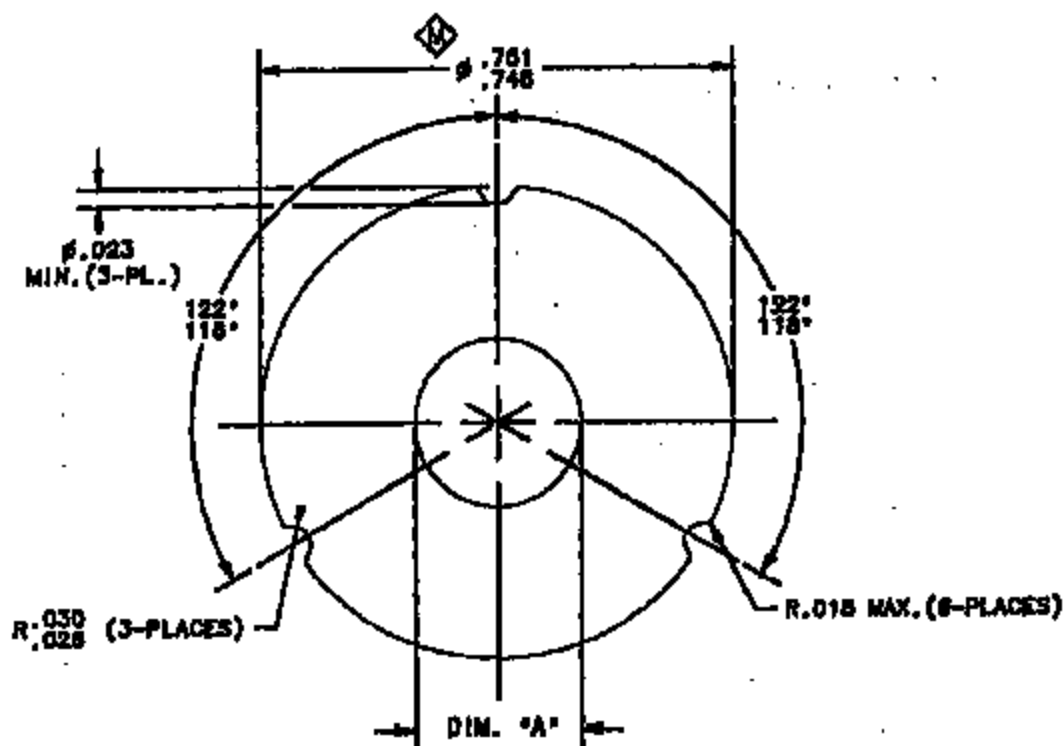
DISTRIBUTORS AND FABRICATORS OF
TEFLON • FEP • PTFE • FLEXIGLAS • POLYSTYRENE
ETC.

TI-NHTSA 005570

SPACER

REV. C

73958



NOTES:

1. .001 MAX. BURR ALLOWABLE.
2. PARTS TO BE SHIPPED, ISSUED, AND STORED IN SEALED PLASTIC BAGS.
3. ALL CONTAINERS OF PARTS MUST BE DATE CODED. DATE CODE IS TO REFLECT ANY MATERIAL LOT, TOOL OR PROCESS CHANGES. CERTIFIED PRINT
3. MATERIAL CERTIFICATION REQUIRED WITH EACH LOT.

ENG. STD. E9898 REV. E

Date JUL 1 1991

ATTACHED THIS PART HAS THE INFORMATION AND
 RECORDS OF THE PARTS AND THE PARTS
 RECORDS OF THE PARTS AND THE PARTS
 RECORDS OF THE PARTS AND THE PARTS
 RECORDS OF THE PARTS AND THE PARTS

73958-3	MADE FROM 74224-1 (KAPTON TAPE)	NO HOLE
73958-2	DUPONTS, KAPTON 200H, .0017 - .0023 THICK	NO HOLE
73958-1	KAPTON .0017 - .0023 THICK	.280/.270
PART NO.	MATERIAL	DIM "A"

THIS DWG. SUPERSEDES 73958 REV. "F" DATED 10-14-88

BY TOM DALL 10-10-88

CH.

REV. *John Harold* 10/16/90

MAKEPAGE



TEXAS INSTRUMENTS

ATLANTA, MASSACHUSETTS 02455

NIXON

DRYDEN, MASSACHUSETTS 02455

SIZE

A

DWG. NO.

73958

74224

TITLE

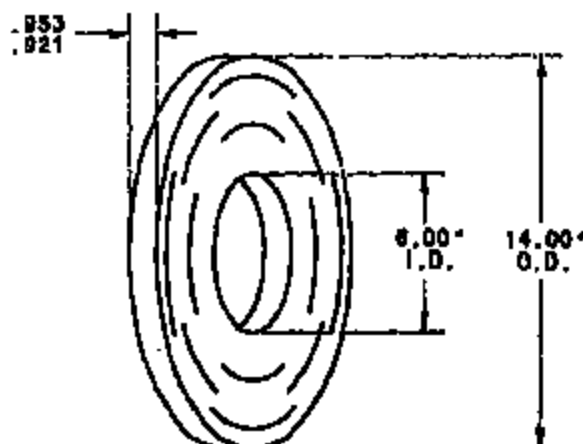
KAPTON TAPE

REV.
F

74224

NOTES:

1. ROLLS SLITTED FROM ENDS OF MASTER COIL NOT ACCEPTABLE.
2. BUCKLING OF THE CORE ALLOWED UP TO 1/4" MEASURED RADIALLY AWAY FROM THE CORE.
3. DENTS, RIPS, OR JAGGED EDGES ON MATERIAL NOT ALLOWED.
4. ROLLS ARE TO BE SHIPPED WITH PROTECTIVE INSERT CORES IN THE PACKING BOX.



74224-1	DUPONTS, KAPTON 20GH	.0017/.0023
PART NUMBER	MATERIAL	THICKNESS

THIS DWG. SUPERSEDES 74224 REV. 'E' DATED 10-14-88

REVISION

BY TOM DALL 10-14-88

CH.

ENG. *Att. as K. 10-14-90*

MAKEPRACT



TEXAS INSTRUMENTS

ATTLEBORO, MASSACHUSETTS 01901

KIDRON

CENTRAL PROCESSING
DIVISION

REV.

A

PART NO.

74224

TI-NHTSA 003572

VALENTINE TOOL & STAMPING, INC.

171 WEST MAIN ST. MORTON, MASS. 02768
(508) 285-4911

MATERIAL CERTIFICATION

DATE : TUESDAY APRIL 30, 1991
CUSTOMER : TEXAS INSTRUMENTS INC

CUSTOMER P.O. NO : 805053715 SUPPLIER INVOICE NO.: 18918
PART DESCRIPTION : 74797-1 CRIMP RING REV.B
SUPPLIER PJO NO. : 18573
QUANTITY SHIPPED : 20,640
SHIPMENT DATE : 04/30/91

WE CERTIFY THAT THE MATERIAL USED
TO PRODUCE THE PRODUCT IN THIS
SHIPMENT, NAMELY
SC52 AL
CONFORMS TO T.I. DRAWINGS AND
T.I. PURCHASE ORDER REQUIREMENTS.

SIGNED

Jeanne Lofthouse
(Supplier Representative)

JEANNE LATHOUSE Quality Control Manager

TI-NHTSA 005573

VALENTINE TOOL & STAMPING, INC.

111 WEST MAIN ST. NORTON, MASS. 02766
(508) 285-6911 228-0342

CERTIFICATE OF CONFORMANCE

DATE : TUESDAY APRIL 30, 1991

CUSTOMER : TEXAS INSTRUMENTS INC

CUSTOMER P.O. NO : 505069716

SUPPLIER INVOICE NO.: 19319

PART DESCRIPTION : 74757-1 CHIMP RING REV.8

SUPPLIER P.O. NO. : 18573

QUANTITY SHIPPED : 20,449

SHIPMENT DATE : 04/30/91

WE CERTIFY THAT ALL ITEMS SHIPPED BY THIS ORDER MEET THE REQUIREMENTS
OF THE PURCHASE ORDER AND APPLICABLE DRAWINGS/SPECIFICATIONS. RESULTS
OF REQUIRED MECHANICAL, VISUAL, FUNCTIONAL AND CHEMICAL TESTS ARE ON
FILE IN OUR QUALITY CONTROL DEPARTMENT.

SIGNED

Jeanne Lafleur
Jeanne Lafleur
Quality Control Manager

TI-NHTSA 005574

UNITED ALUMINUM CORPORATION

100 UNITED DRIVE • NORTH HAVEN, CONNECTICUT 06473 • (203) 238-1551



1281

VALENTINE TOOL & STAMPING, INC.
171 WEST MAIN STREET
NORTON, MA 02766-0469
ATTN: DICK WHITNEY

DATE 4/18/91
P.O. # 13876
SHIPPED 4/19/91
UA ORDER # 151499

THIS IS TO CERTIFY THAT THE MATERIAL LISTED BELOW CONFORMS WITH THE CHEMICAL COMPOSITION LIMITS OF 6061-T6 AND THE FOLLOWING ARE THE LIMITS:

AA 6062

CHEMICAL COMPOSITION

	MIN.	MAX.
SILICON		0.25
IRON		0.40
COPPER		0.1
MANGANESE		0.1
MAGNESIUM	2.2	2.8
CHROMIUM	0.15	0.35
ZINC		0.1
TITANIUM		
OTHER ELEMENTS (EACH)		.05
OTHER ELEMENTS (TOTAL)		.15
ALUMINUM	REMAINDER	

MECHANICAL PROPERTIES

TENSILE STRENGTH	28.3 KSI
ELONGATION IN 2"	20%

.032

2.312

5052-0

UNITED ALUMINUM CORPORATION

07197-1

TI-NHTSA 005575

74797

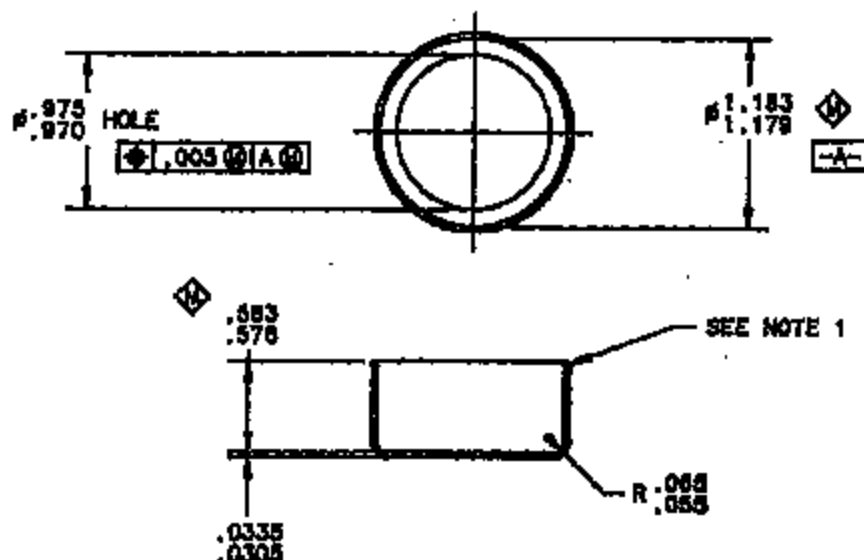
TITLE

CRIMP RING

REV.

B

74797



NOTES:

1. PINCH OFF RADIUS ALLOWED.
2. .002 MAX. BURR ALLOWED.
3. PARTS TO BE SHIPPED, ISSUED, AND STORED IN SEALED PLASTIC BAGS.
4. MATERIAL CERTIFICATION REQUIRED WITH EACH SHIPMENT.



SUPERSEDES DNG. 74797 REV. A DATED 11-2-90

74797-1	ALUMINUM 8082	
PART NO.	MATERIAL	FINISH

BY: [Signature]
CL: [Signature]
ENG: [Signature]
DATE: 11-2-90

TEXAS INSTRUMENTS
ATLANTA, MASSACHUSETTS 01901

KLIXON
CENTRAL AMERICA
DIVISION

QWS. REC. A

DWS. REC.

74797

TI-NHTSA 005576

Paratech, Inc.

A DIVISION OF JOHN PARR CO. INC.
MINIATURE TECHNICAL CERAMICS

12540 MINNESOTA AVENUE • P.O. BOX 718 • PARAMOUNT, CALIFORNIA 90713
TELEPHONE (213) 633-2045 • FAX (213) 633-8807

MATERIAL CERTIFICATION

DATE: 4-22-91

TEXAS INSTRUMENTS, INC.

ORDER NO.: 505049981

PART NO : 74078-146 REV. NO.: F

QUANTITY THIS SHIPMENT: 75,000

SHIPMENT DATE: 4-22-91

PART DESCRIPTION: PIN

WE CERTIFY THAT THE MATERIAL USED TO PRODUCE THE PRODUCT IN THIS
SHIPMENT, NAMELY PIN / STRATITE - L3, CONFORMS TO T.I.
DRAWING AND T.I. PURCHASE ORDER REQUIREMENTS.


PRODUCTION MANAGER

73220221

TEXAS INSTRUMENTS, INC.
P.O. BOX 644
ATLIDONG, IN 42743

PARKE MANIFEX CORPORATION
JUL DIVISION
WEST CRAFT CIRCLE
SPRINGFIELD, ILL. 62702
TELEPHONE (312) 673-7332

J.B.L. Division of Parker Seal certifies that the material used to produce the product
in this shipment, namely SILICONE/ 17517. Conforms to TI drawing and TI purchase
order requirements.

PART TITLE... ENVIRONMENTAL SEAL

QNTY P/N... 17517-1 REV 2

DAYS SHIPPED

P/N... 304423712

J.B.L. P/N... 107212

P/N... 11447-1

10-21-61

SILICONE COMPOUND... 17519

QNTY... 1,000

Very Truly Yours,
J.B.L. Division

Don T. Johnson

JOHN T. JOHNSON
Quality Control Manager

ATL/IN

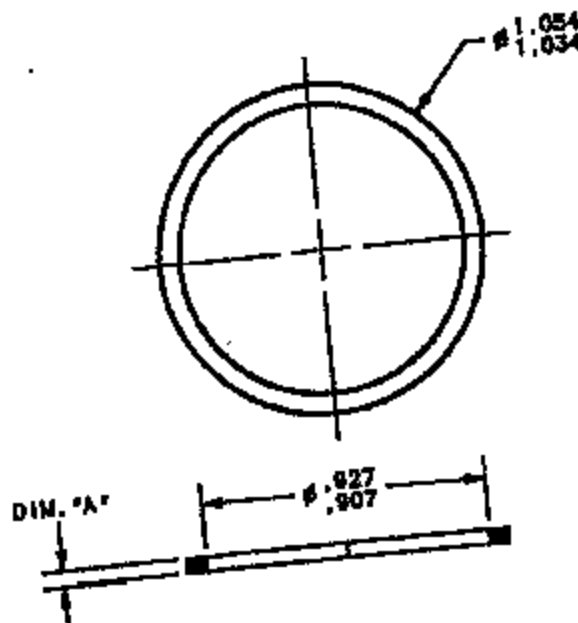
DID

TI-NHTSA 005579

DEVICE # 52/57PS
PROJ. # 3355

ENVIRONMENTAL SEAL

74247



- NOTES:
1. MATERIAL CERTIFICATION REQUIRED WITH EACH SHIPMENT.
 2. 74247-3 IS TO BE RED IN COLOR WITH 3 BLACK MARKS ON THE EXTERNAL CIRCUMFERENCE AT 120° INTERVALS.

THIS DWG. SUPERSEDES 74247 REV. "D" DATED 10-14-88

PART NO.	MATERIAL	DURUMETER	COLOR	DIM. "A"
74247-1	SILICONE JBL (T-B-D)	55 - 65	BLUE	.045-.055
74247-2	SILICONE JBL 97424-8	55 - 65	SEE NOTE 2	.045-.055
74247-3	SILICONE JBL 97424-8	55 - 65	RED	.040-.050
74247-4	BUNA N JBL K7014-50	50 - 60	BLACK	.040-.050

3-4 AND NOTE 2.
DIM. "A" TO TABLE.
CR. MODS 7, 10-1-91 CM

TOM DALL 8-19-91



TEXAS INSTRUMENTS
ATTENDING, WARRICKVILLE 42703

ELDON
CONTROL PRODUCTS
INDUSTRIES

A

74247

TI-NHTSA 00

Cap

CERTIFICATE OF CONFORMANCE

TO: TEXAS INSTRUMENTS
ATTLEBORD, MASSACHUSETTS

PURCHASE ORDER NUMBER: 500023124
CUSTOMER PART NUMBER: 74179-2
PART DESCRIPTION: .347 - 3/2" THICK RCD
OUR JOB NUMBER: 16356-5-1

The supplier hereby certifies that adequate data is on file showing that all components and materials used in the article furnished comply with the physical and chemical properties required by our firm.

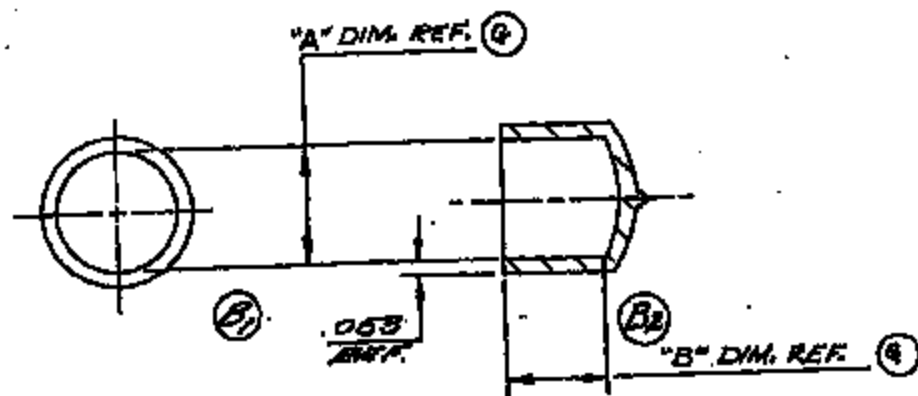
Roger J. Linkus 5 31-91
Roger J. Linkus
Quality Assurance Manager

SINCLAIR & RUSH COMPANY

1918 SOUTH BROADWAY, ST. LOUIS, MO 63111-3197 • PHONE: (800) 827-CAPS • TELEX: 442584 SINCLARUSH STL • FAX: (314) 481-2701

TI-NHTSA 005581

74179



NOTE: IDENTIFICATION MEMO MUST ACCOMPANY EACH SHIPMENT STATING THE FOLLOWING:
SUNCLARK RUBB #3C 0.342-6(20"11)TK 701-1A

CERTIFIED PRINT

CERTIFIED PRINT
Printed in the United States of America

ENG. STD. E9898 REV. E

Date JUL 1 1991

REOPEN THIS FILE FOR THE APPROXIMATE DATE
MAY 1968 IN SD NY AND ADVISE BUREAU OF RESULTS.
I-107 MAY BE YOUR FILE NUMBER. ADVISE BUREAU
OF RESULTS AND INDICATE ANY INFO ON FILE.
CLOSING BY JPM/ST

74179-2	VINYL	.333/343	.313/.438	SINCLAIR & RUSH	RED
74179-1	VINYL	.355/365	.281/343	MOCAP	RED
PART NOS.	MATERIAL	DIM."A"	DIM."B"	VENDOR	COLOR

BY *Tom Dill* 2/2/84

CH. *R. H. Williams* 2/11/84

ENG. *D. Smith* 2/1/84



TEXAS INSTRUMENTS
INCORPORATED
ATLLENBORG, MASS., U.S.A.

KILPATRICK

RESEARCH & DEVELOPMENT

Q14 Q1-1 M21-1

P37-1 P35-1

Q14 Q1-1 M21-1

P37-1 P35-1

Q14 Q1-1 M21-1

P37-1 P35-1

74179

TI-NHTSA 005583

ES TESTS PARTIAL

TI-NHTSA 004584

MEMORANDUM

14 April 1992

TO: Bruce Maeroff - Ford Motor Co.

CC: Dave Czarn
Jeff DiDomenico
Norm Freda
~~XXXXXXXXXX~~
Jim Matt

FR: Steve Offiler

RE: ES Testing for Full ISR Submission for: F2AC-9F924-AA
F3DC-9F924-AA

The proposed methodology to complete the full ISR submissions for the above referenced part numbers is as follows. A complete battery of ES tests per Ford Engineering Specification (delta) F2VC-9F924-AA will be performed on F2AC. The only difference between this device and F3DC is the fact that F3DC includes a "snubber" which is an .020" nominal diameter orifice in the fluid passage. Therefore, the only tests to be run on F3DC are those which may be somehow impacted by this orifice, specifically the Impulse test and the Thermal Cycle test. Furthermore, as can be seen in the attached Flow Chart (marked-up) the F3DC parts will not be required until 920605, giving sufficient time to obtain production quantities from the supplier.

So 72043

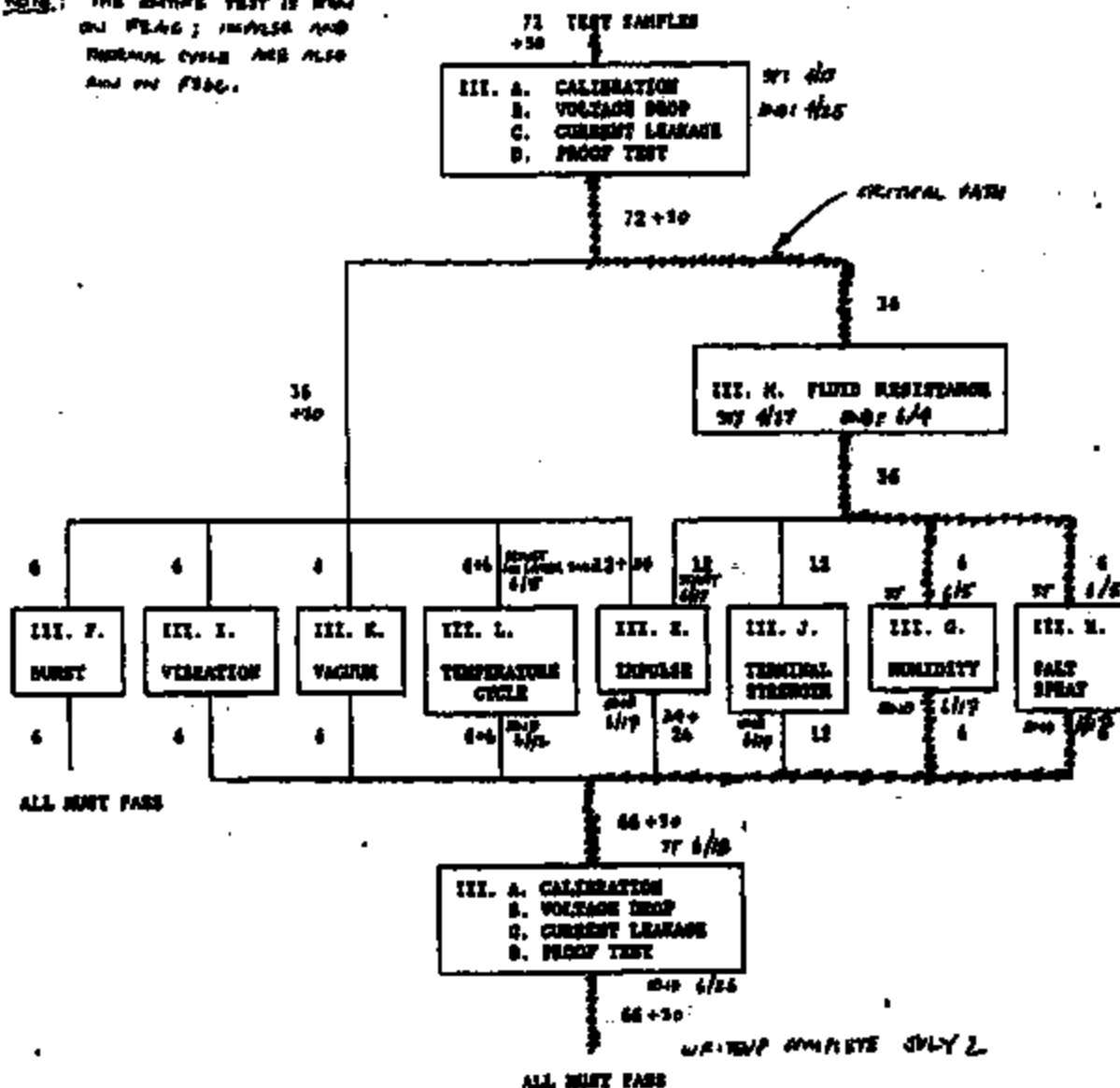
TI-NHTSA 005585

Engineering Specification

MAKED-UP BY STEVE APPLER
10. 721413

COMBINED FLAC 721413 & F3069F921413 PRODUCTION VALIDATION FLOW CHART

NOTE: THE ENTIRE TEST IS RUN ON FLAC; IMPULSE AND FREQUENCY CYCLE ARE ALSO RUN ON F306.



4	18		VER-7213-97921-11
FRAME	OF	REVISED	NUMBER

WAX PD 3947-82 Previous version may NOT be used

TI-NHTSA 005586

MEMORANDUM

9 April 1992 - Page 1 of 3

To: Bruce Maeroff Ford Motor Co. Fax: 313-323-1924

CC: Dave Czarn TI Design Eng. Supv.
Norm Freda TI Field Sales Fax: 313-553-1673
Elaine Rose TI QRA

Fr: Steve Offiler TI Design Eng.

RE: EN53 PARTIAL ISR / VALIDATION PLAN FOR F2AC-9F924-AA

=====

Bruce, it is my understanding that we'll be pulling together an ISR package for your perusal during your visit to our plant on Monday, 13 April. This package will be essentially based upon similarity to the F2VC-9F924-AA ISR, since only two components will be changing. Those two components are the pressure-sensing disc and the molded plastic base (switch housing). The base will undergo a First Article Inspection (FAI) which is a detailed study of all print dimensions, and material certifications from the manufacturer will be included. Below you will find detail of the ES tests which will/will not be completed for the Partial ISR (from ES F2VC-9F924-AA):

III. A. Calibration, B. Voltage Drop, C. Current Leak, D. Proof.

Only the Calibration test will be performed on the 24 devices undergoing the Impulse test (E.) below.

III. E. Impulse.

A complete 500,000 cycle Impulse test will be performed per the ES, with the exception that no devices will undergo the Fluid Resistance Test (M.) beforehand. The Impulse test is an excellent test of the ability of the entire device to withstand mechanical (pressure) cycles combined with electrical loads at elevated temperatures, and is a key test to validate the pressure-sensing disc.

TI-NHTSA 005587

MEMORANDUM

9 April 1992 - Page 2 of 3

III. F. Burst.

Changes to the base and disc should have no effect on burst performance.

III. G. Humidity, M. Fluid Resistance.

The new base material, General Electric Noryl GTX 830, has been tested previously by TI per Ford ES F3AH-19D594-AA along with a host of other engineering plastics. This CCD ES includes Humidity, and Fluid Resistance tests which are similar to the tests called out in ES F2VC-9F924-AA. Noryl was found to pass all tests.

III. H. Salt Spray.

It has been deemed unlikely that changes to the base and disc would have any effect on salt spray performance. Bear in mind that the Fluid Resistance test invoked above included a saturated salt solution, helping to prove that chemical attack will not be an issue; furthermore the environmental sealing system has not been changed in any way providing confidence that salt ingress during salt spray testing will not be an issue either.

III. I. Vibration.

Changes to the base and disc should have no effect on vibration performance.

III. J. Terminal Strength.

The terminal strength test will be performed per the ES, with the exception that no devices will undergo the Fluid Resistance Test (M.) beforehand.

III. K. Vacuum.

Changes to the base and disc should have no effect on vacuum performance.

MEMORANDUM

9 April 1992 - Page 3 of 3

III. L. Temperature Cycle.

Extensive thermal characterizations have been performed on several materials recently, including the Celanex 4300 PBT material presently used on F2VC-9F924-AB, as well as Ultem, Noryl, and Fortron. While these results are presently undocumented officially, the consistently higher performance of Noryl in terms of dimensional stability relative to Celanex during these tests gives high confidence that changes to the base should have no effect on Thermal Cycle performance.

As 920409

REPORT OF PARTIAL ISR TESTING
 FORD PASSENGER CAR
 ELECTRONIC SPEED CONTROL
 DEACTIVATION PRESSURE SWITCH
 PS/92/62

TEXAS INSTRUMENTS INCORPORATED
 CONTROL PRODUCTS DIVISION
 PRECISION CONTROLS DEPARTMENT
 34 FOREST STREET
 ATTLEBORO, MA 02703

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY <i>LDH</i>	 TEXAS INSTRUMENTS MATERIALS & CONTROLS GROUP ATTLEBORO, MA 02703	DOG.
DATE 12-04-11		PAGE 1

FORM 5286

TI-NHTSA 005590

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3.3	IMPULSE	5
3.4	TERMINAL STRENGTH	6
4.0	APPENDICES	
4.1	Memorandum	7
4.2	Data # 242	11
4.3	Data # 241	13

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY	TEXAS INSTRUMENTS 	MATERIALS & CONTROL GROUP
DATE 12-22-13		ATTLEBORO, MA 01703
FORM 8258		

1.0 GENERAL

1.1 Customer: Ford Motor Company, Passenger Car Brake Systems Engineering

1.2 TI Part Number: 77PSL3-1

1.3 Customer Part Number: F2AC-9F924-AA

1.4 Specifications: Ford Engineering Specification number (delta) ES-F2VC-9F924-AA

1.5 Date of Completion: 920413

1.6 Quantity of Units Tested: 36

1.7 Disposition of Tested Units:

1.7.1 All devices are retained under quarantine.

1.8 TI test number: 241-11-12
242-03-24

1.9 TI Pressure Switch test report number: PS/92/62

2.0 OBJECTIVE

See Memorandum in Appendix 4.1 which explains the scope, extent, and intention of this partial ISR. A full battery of ES tests is planned in the near future to complete a full ISR submission.

3.0 TEST PROCEDURES AND RESULTS

All switches were tested to Ford Engineering Specification (delta) ES-F2VC-9F924-AA, sections III. E. and J., with initial and final characterizations consisting of III. A. Raw data is included in Appendix 4.2 and 4.3.

TEST LOT NO.	TEST	DEVICE
TESTED BY	TEXAS INSTRUMENTS  MATERIALS & CONTROLS GROUP ATTLBORO, MA 01703	DOC.
APPROVED BY		PAGE
DATE 03-04-92		

FORM 4255

TI-NHTSA 005592

3.1 CALIBRATION

- 3.1.1 Procedure: Calibration is checked at room temperature using ambient air as the pressure medium. Calibration settings, as specified on the part drawing, are actuation (electrical contacts opening) at 90 - 160 psig, and release (contacts reclosing) at 20 psig minimum. For the purpose of stabilization, actuation values are recorded on the sixth cycle, after subjecting the switch to two (2) pressure cycles to 800 psig minimum and back to zero, followed by three (3) cycles to 1.1 times actuation pressure minimum and back to zero. The change in continuity is measured while conducting 750 +/- 50 milliamps at 13.0 +/- 1.0 volts DC.
- 3.1.2 Equipment: Custom TI designed and built pressure check station, using Heise Model CM96365 pressure gage calibrated on a regular quarterly schedule. Continuity change measured on custom TI designed and built equipment meeting the above electrical parameters.
- 3.1.3 Initial Results: All 36 devices tested were found to be within specification.
- 3.1.4 Final Results: All 36 devices tested were found to be within specification.

3.2 VOLTAGE DROP

- 3.2.1 Equipment: Fluke Model 8020B Digital Multimeter, calibrated quarterly, used in conjunction with the continuity equipment in 3.1.2.
- 3.2.3 Final results: Performed on the Impulse devices only, as a check of degradation of the electrical contacts during the powered portion of the Impulse cycles. All values are significantly below the specification of 200 millivolts maximum.

TEST LOT NO.	TEST	DEVICE
TESTED BY	TEXAS INSTRUMENTS  MATERIALS & CONTROLS GROUP ATTLEBORO, MA 01900	DOCL
APPROVED BY		PAGE
DATE 12-14-11		

FORM 4394

3.3 IMPULSE

3.3.1 Devices tested: 242-03-01 thru -24

3.3.2 Procedure: Twenty four devices were run on the Impulse test as specified in the ES, with the exception that no devices were run on the Fluid Resistance test due to time constraints. The cycle rate used was actually 163 cycles per minute, again due to time constraints. All other parameters were as specified in the ES.

3.3.3 Equipment: Thermotron model S-4 Mini-Max environmental chamber capable of -55 C to +200 C, humidity uncontrolled. Custom TI Designed and built cycler, utilizing Enerpak integrated hydraulic pressure source, TI315 Programmable Logic Controller, Moog servovalve and controller, Simpson signal generator, and opposing-piston fluid isolators, to produce a hydraulic-fluid flow-type primary with a brake-fluid dead-end-type secondary terminated with a 24-station manifold equipped with internal heaters. Capability to 5 Hz at 0-1450 psig cycle. Custom TI designed and built 24 station Switch Monitor Circuit which automatically stops the cycler in the event of abnormal switch action, defined as continuity change which does not track the signal from the signal generator. Thermocouple readouts calibrated quarterly. 12-station inductive load bank, per the schematic found in the ES (frame 18 of 18; figure 4.) used in the last 25K cycles.

3.3.4 Results: All devices passed.

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY		
DATE 22-04-71	TEXAS INSTRUMENTS 	MATERIALS & CONTROLS GROUP ATTLEBORO, MA 01702
		DOC.
		PAGE 1

FORM 4285

TI-NHTSA 005594

3.4 TERMINAL STRENGTH

- 3.4.1 Devices tested: 241-11-01 thru -12
- 3.4.2 Equipment: Custom TI designed and built fixtures for gaging terminal movement after force application and for application of impact via a pendulum. This equipment is regularly used on the 57PS/77PS assembly lines in testing to TI Quality Assurance Specifications.
- 3.4.3 Results: All twelve devices passed the acceptance criteria found in the ES.

TEST LOT NO.	TEST	DEVICE
TESTED BY	 TEXAS INSTRUMENTS	DOC.
APPROVED BY		PAGE
DATE 02-04-11		

FORM 0215

TI-NHT8A 005595

Appendix. 4.1
Memorandum

TEST LOT NO.	TEST	DEVOR
TESTED BY	 TEXAS INSTRUMENTS	DOQ.
APPROVED BY		PAGE
DATE 12-24-11		
MATERIALS & CONTROLS GROUP ATTLEBORO, MA 02760		

FORM 5298

TI-NHTSA 005586

MEMORANDUM

9 April 1992 - Page 1 of 3

To: Bruce Maeroff Ford Motor Co. Fax: 313-323-1924

CC: Dave Czarn TI Design Eng. Supv.
Norm Freda TI Field Sales Fax: 313-553-1673
Elaine Rose TI QRA

Fr: Steve Offiler TI Design Eng.

RE: EM53 PARTIAL ISR / VALIDATION PLAN FOR F2AC-9F924-AA

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TI-NHTSA 005597

MEMORANDUM

9 April 1992 - Page 2 of 3

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MEMORANDUM

9 April 1992 - Page 3 of 3

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As 920409

Appendix 4.2
Data # 242

TEST LOT NO.	TEST	DEVICE
TESTED BY	TEXAS INSTRUMENTS  MATERIALS & CONTROLS GROUP ATTLEBORO, MA 02706	DOC.
APPROVED BY		PAGE
DATE 88-04-13		11

FORM 5295

PRESSURE SWITCH DATA

Form 21605

TEST NO. 242-03-24

DEVICE 77PSL3-1	DATE REQUESTED 9/20/10	REQUESTED BY Steve Gifford	REQUESTED COMPL. DATE
PERFORMED BY Jeffrey D. Donatello	DATE STARTED 9/20/10	DATE COMPLETED 9/20/10	APPROVED BY
PROJECT TITLE: Speed Control			

CUSTOMER:

PURPOSE OF TEST: Partial ISR of 77PSL3-1

PROCEDURE: Impulse test, per Ford ES, at 24 production devices.

Device #	En: A-1-AH	Pos: A-1-AH	Mod: Imp						
20-03-01	119-102	X	119-102	16.3	✓				
-01	121-119	"	121-119	3.6					
-02	126-101	"	126-102	5.6					
-03	125-114	P	122-110	2.6					
-04	129-116	4	122-107	25.9					
-05	122-102	1	123-102	3.7					
-06	126-116		124-109	0.3					
-07	127-113	3	126-110	21.5					
-08	124-113	5	124-107	0.5					
-09	129-112		122-105	26.7					
-10	126-121	7	120-104	2.5					
-11	122-105	5	129-105	4.2					
-12	128-113		126-106	2.2					
-13	121-117	7	125-107	10.3					
-14	124-109		123-100	9.7					
-15	129-112		122-111	5.8					
-16	129-112		129-111	3.7					
-17	125-110		127-109	4.3					
-18	124-102		125-107	5.6					
-19	126-103		125-107	2.0					
-20	125-113		120-113	6.7					
-21	125-101		123-102	15.1					
-22	122-103		120-101	6.6					
-23	127-101		124-101	6.1					

TI-NHTSA 005601

Appendix 4.3
Data # 241

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY		DOQ.
DATE 08-04-97	TEXAS INSTRUMENTS  MATERIALS & CONTROL GROUP ATTLEBORO, MA 01760	PAGE 13

FORM 0398

TI-NHTSA 005602

TEST NO. 241-11-12

PROJECT TITLE: Seed Control

PURPOSE OF TEST: Part of Neural base/silent disc validation

PROCEDURE: Production build 77PS with natural vnyl bases and 1st "P" silent disc. Characterize in pressure tester. Run standard terminal strength tests per Fold ES and characterize.

TI-NHTSA 005603

MISC.

TI-NHTSA 005604

QUIET SWITCH - PRELIMINARY STUDIES

TI CONFIDENTIAL
TI STRICTLY PRIVATE

I) Plastic connector stability

Purpose: To determine the acceptable pin lengths for quiet switch production given that the quiet disc has a smaller pin window. Also to evaluate the effects of a connector material change to increase the pin window so the device could be manufactured cost effectively.

Procedure: Devices were assembled at various contact preloads (pin lengths) using both calenax and noryl connectors. If the material changes dimensional with temperature it can result in an increased or decreased actuation pressure. The actuation and release pressures were measured at low and high temps.

Results: The results for Calenax are shown in Figure 1. Noryl results are shown in Fig 2. The Noryl provided stable actuation and release pressure over a greater pin range. This matches other test results showing greater dimensional stability with noryl. During the test the parts were exposed to temps from -40 to +150, one cycle and there was no visual impact on the material.

II) Plastic connector stability

Purpose: Understand the ability of Noryl material to survive the typical underhood automotive environment.

Procedure: Connectors were fully qualified in Noryl material for an underhood Automotive Pressure Transducer (APT). This includes thermal cycling, chemical resistance, dimensional stability, impulse testing, impact strength, etc.

Results: The Noryl is fully qualified as a connector to 135C. Long term storage has been acceptable at 150C.

III) Quiet Disc development

Purpose: A lower differential disc was needed to reduce the sound generated when the disc snapped.

Procedure: Various discs were developed. The differential was measured by building the disc into a sensor assembly and then measuring the disc deflection vs pressure with an lvdt (linear variable differential transformer).

Results: Figure 3 shows both a noisy production disc and a quiet disc. Note that the differential has been reduced from 100psi to approx 30psi. Correspondingly the available pin window has been reduced from 14.5 mils to 10 mils.

IV) Switch sound evaluation

Purpose: To quantify the sound level from different switch configurations and to identify the source of the sound.

Procedure: Switches were mounted on an air calibration stand. An accelerometer was attached to the top of the switch using beeswax. The accelerometer axis was along the long axis of the switch. A microphone was mounted on a "T" fitting to the switch pressure port. The accelerometer and microphone signal were feed into a spectrum analyzer.

Results: The result for a production 'noisy' switch is shown in Figure 4 & 5. Figure 4 shows the frequency decay, while figure 5 shows the frequency spectrum or resonant frequency. Figure 6 shows a quiet disc. The quiet disc clearly produces less acceleration and less noise. The same evaluation held true on a hydraulic system.

Pressure shift vs pin length at various temps: CRILMAX

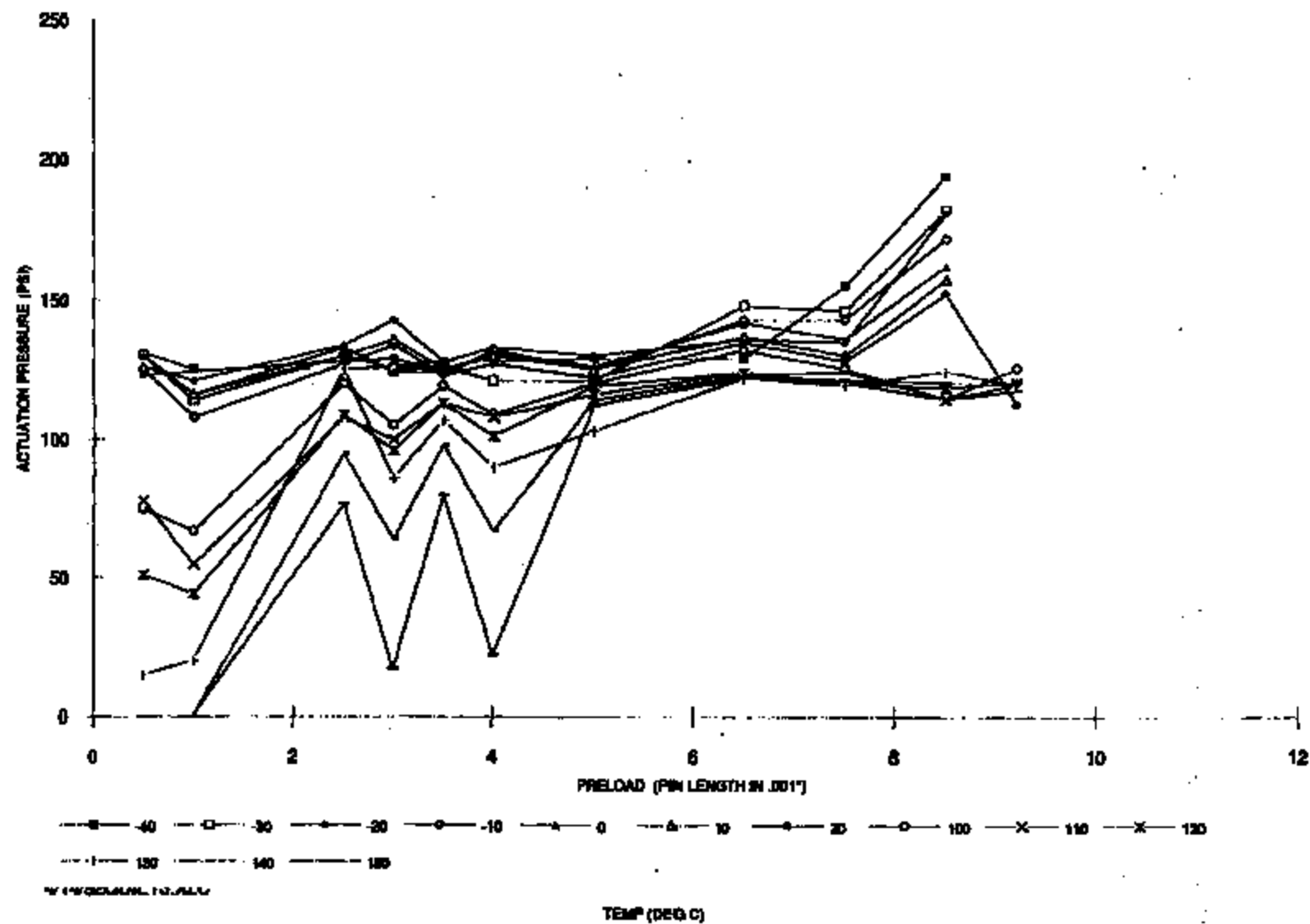
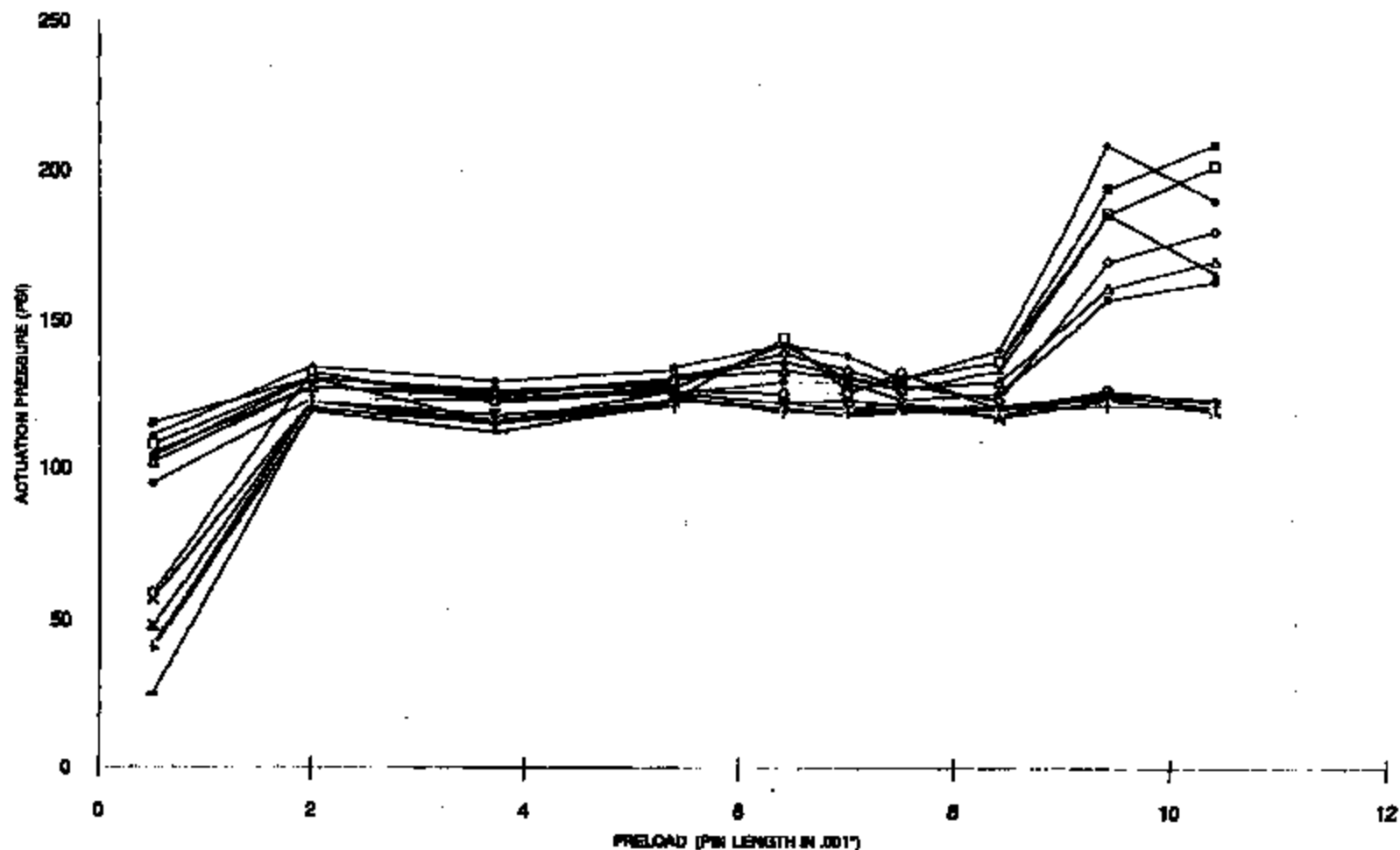


FIG 1

Pressure shift vs pin length at various temps: NORTL



40 60 80 100 110 120 130 140 150

TEMP (DEG C)

P 16 2

TI-NHTSA 005603

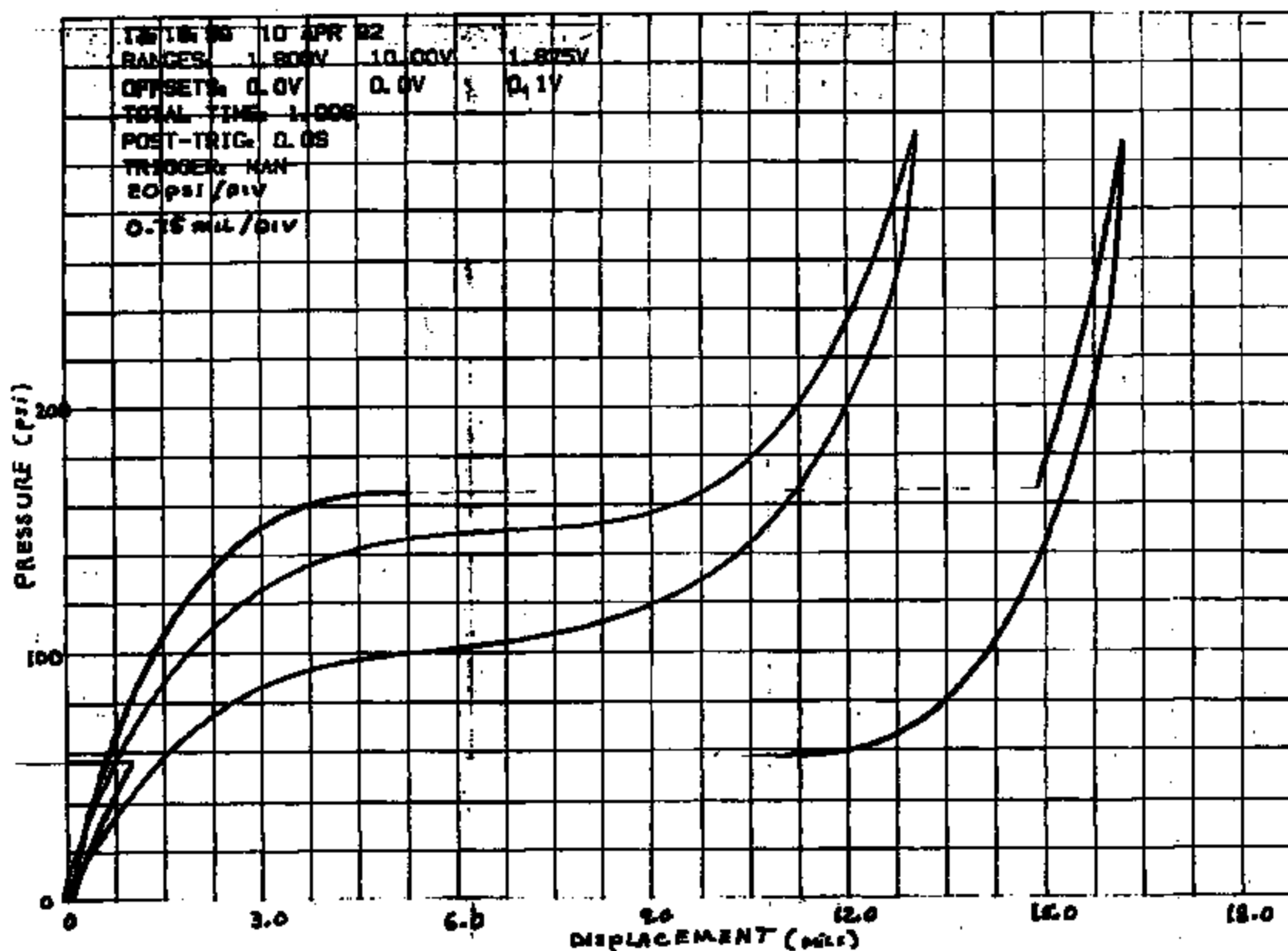


FIGURE 3



Briel & Kjaer

Type 2034

Page No.
60

Sign.:

Meas.
Object:

PZ ACTUATION

112

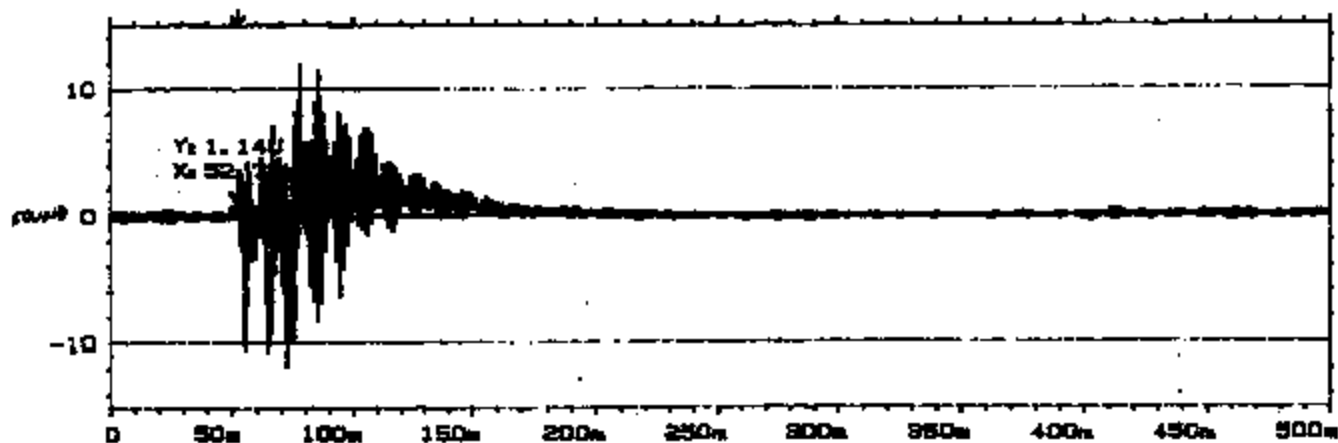
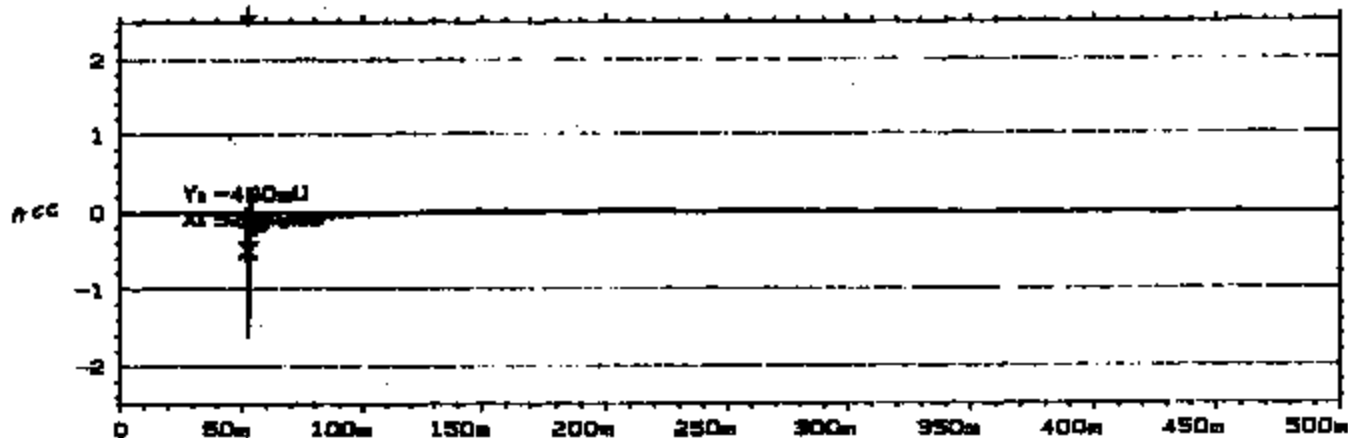
Comments:

3/13/92 BRS

10mV/g

W1 TIME CH. A REAL
Y: 2.50U
X: 0.00ms + 500ms
SETUP W1 OVERLOAD

MAIN Y: -480mU
X: 52.72ms



W1 TIME CH. B REAL
Y: 15.0U
X: 0.00ms + 500ms
SETUP W1 OVERLOAD

INPUT MAIN Y: 1.14U
X: 52.72ms

FIG 4

TI-NHTSA 005610



Brüel & Kjær

Type 2034

Page No.
39

Sign.:

Meas.
Object:

DE RETURITION
SLANT RAMP
ACT = 13.4 ps
REL = 5%
ATR

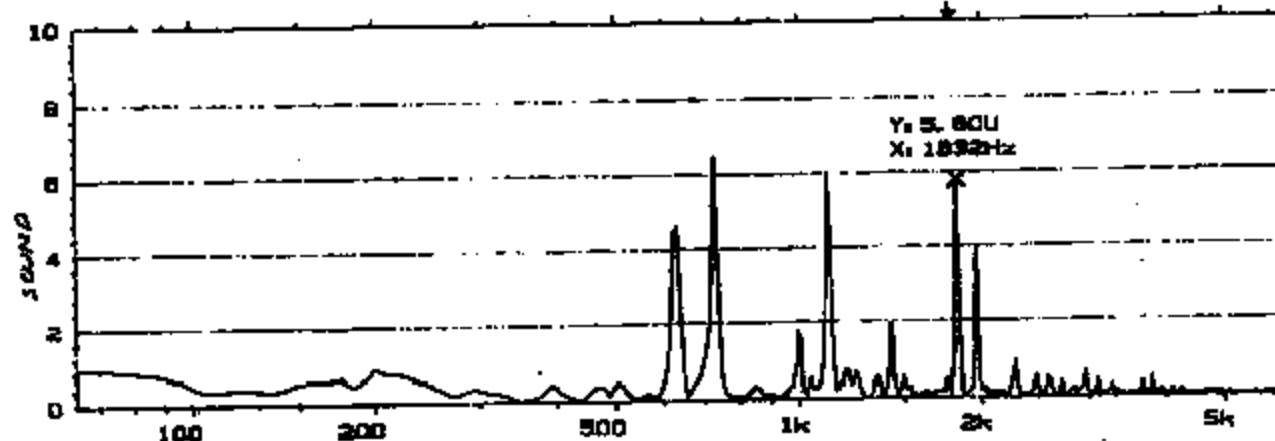
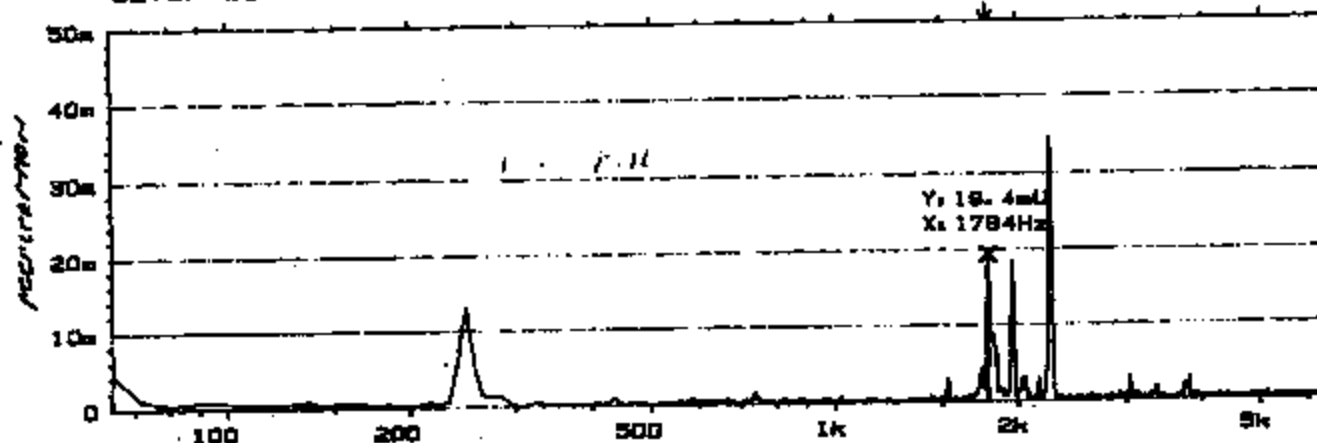
Comments:

AS MICROSCOPE
AS ACCELEROMETER
LENSMOUNT

M1 INST SPEC CH. B MAG
Y: 50.0mU RMS LIN
X: 84Hz TO 8.4kHz LOG
SETUP W1

INPUT

MAIN Y: 18.4mU
X: 1784Hz



W1 INST SPEC CH. A MAG
Y: 10.0U RMS LIN
X: 84Hz TO 8.4kHz LOG
SETUP W1

MAIN Y: 189mU
X: 1784Hz

FIG 5



Brüel & Kjær

Type 2034

Page No.
45

Signal

Meas.
Object:

Q2. power supply

RETURNING

SLIDE ARM

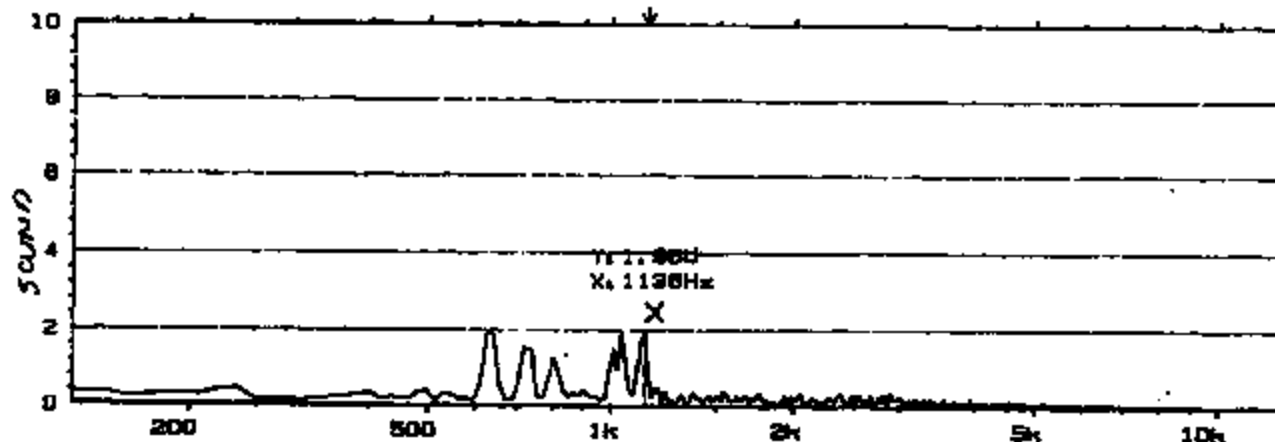
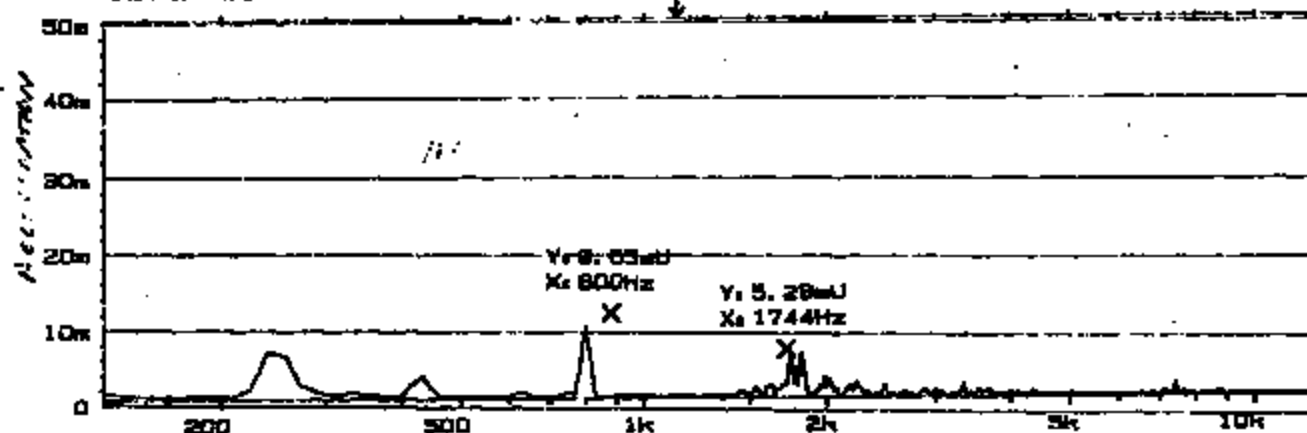
RIP

TRUCK RAIL?

Comments:

W1 INST SPEC CH. B MAG
Y: 50.0mV RMS LIN
X: 120Hz TO 12.0kHz LOG
SETUP W1

MAIN Y: 98.5mV
X: 1136Hz



W1 INST SPEC CH. A MAG
Y: 10.0V RMS LIN
X: 120Hz TO 12.0kHz LOG
SETUP W1 OVERLOAD

INPUT

MAIN Y: 1.99V
X: 1136Hz

FIG 6

PS/92/61

**REPORT OF PLASTIC MATERIAL
EVALUATIONS FOR USE IN
PRESSURE SWITCH BASES
March 30, 1992**

**TEXAS INSTRUMENTS INCORPORATED
CONTROL PRODUCTS DIVISION
PRECISION CONTROLS DEPARTMENT
34 FOREST STREET
ATTLEBORO, MA 02703**

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY	TEXAS INSTRUMENTS 	MATERIALS & CONTROLS GROUP ATTLEBORO, MA 02703
DATE 3/30/92		DOC. PAGE 1

FORM 8285

TI-NHTSA 005613

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PRIMARY TEST RESULTS.....	8
PRIMARY CONCLUSIONS.....	9
SECONDARY (NORYL) TEST PROCEDURES.....	10
SECONDARY TEST RESULTS.....	12
APPENDIX: ENGINEERING SPECIFICATION.....	14

TEST NO.	TEST	DEVICE
ED BY	TEXAS INSTRUMENTS 	DDO.
MOVED BY <i>S. B. B. B.</i>		PAGE 2

DATE

1.0

OVERVIEW

The testing summarized in this report was conducted in order to find the optimal material for use in the injection molded plastic bases of pressure switches. The report will be divided into two sections: 1) primary testing to select which material to use and 2) secondary testing of the chosen material to confirm its performance. All test bases were designed after the Ford F3LB RPCO A/C pressure switch.

The testing clearly indicates that the Ultem material meets the performance requirements of an A/C application most fully. However, the cost of Ultem is much greater than that of the other materials tested and as a result Noryl GTX 830 was selected as the optimal material given both performance and cost considerations.

TEST LOT NO.	TEST	OFFICE
TESTED BY		
APPROVED BY <i>S. [Signature]</i>	TEXAS INSTRUMENTS	MATERIALS & CONTROLS GROUP ATTLEBORO, MA 01702
DATE		DOC. PAGE 3

FORM 5296

PRIMARY TEST MATERIALS

<u>NAME</u>	<u>MATERIAL TYPE</u>	<u>COMPANY</u>
NORYL	MOD. PPO	G.E. PLASTICS
STANYL	NYLON 4/6	DSM ENGINEERING PLASTICS
MINDEL	PSU ALLOY	AMOCO PERFORMANCE PRODUCTS
AMODEL	PPA	AMOCO PERFORMANCE PRODUCTS
AMODEL (a)	PPA	AMOCO PERFORMANCE PRODUCTS
CELANEX	PBT	HOSCHT CELANESE PLASTICS
CELANEX (a)	PBT	HOSCHT CELANESE PLASTICS
ULTEM	PEI	G.E. PLASTICS
BYTEL	NYLON 6/6	DUPONT POLYMER PRODUCTS

TEST LOG NO.	TEST	DEVICE
TESTED BY	TEXAS INSTRUMENTS 	DOC.
APPROVED BY <i>S. [Signature]</i>		MATERIALS & CONTROLS GROUP ATTLEBORO, MA 01732
DATE		PAGE 4

FORM 6296

TI-NHTSA 005616

2.0 PRIMARY TEST PROCEDURES

2.1 FLUID COMPATIBILITY

2.1.1 Equipment:

Humidity chamber RK model 58; various test fluids.

2.1.2 Procedures:

Switches were tested per Section 3.16 of the ES.

2.1.3 Criteria:

After testing, the switch must meet the requirements of Sections 3.1 through 3.7 of the ES.

2.2 DSC / TGA / TMA

2.2.1 Equipment:

Testing performed at Technical Services Lab

2.3 INSERTION FORCE

2.3.1 Equipment:

Chatillon Digital Force Gauge DFG-100

2.3.2 Procedure:

Force was applied to terminal end of pins until they were pushed fully into base.

2.3.3 Criteria:

Minimize required force.

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY <i>S. P. H.</i>	TEXAS INSTRUMENTS 	MATERIALS & CONTROL GROUP ATTLEBORO, MA 01703
DATE <i>9/20/78</i>		DOC. PAGE <i>5</i>

FORM 1000

2.4 PUSH OUT FORCE

2.4.1 Equipment:
Chatillon Digital Force Gauge DFG-100

2.4.2 Procedure:
Force was applied to shank end of pins until they were pushed fully out of bases.

2.4.3 Criteria:
Maximize required force.

2.5 AIR LEAK

2.5.1 Equipment:
Custom TI designed and built test station using an Aalborg Flowmeter.

2.5.2 Procedure:
Pressurize switch to 8 psi and check for leakage.

2.5.3 Criteria:
Switch must be able to maintain system pressure of 8 psi.

2.6 REFRIGERANT LEAKAGE

2.6.1 Equipment:
Custom TI designed and built test station, including a Heise pressure gauge model 69016, Inficon Halogen Leak Detector and HLD-2 GE Halogen Leak Standard Type L5-20.

2.6.2 Procedure:
Switches were tested per Section 3.6 of the ES.

2.6.3 Criteria:
R-134a Refrigerant leakage at 300 psig is not to exceed an equivalent leak rate of 5 grams/year.

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY <i>S. Butler</i>	TEXAS INSTRUMENTS	MATERIALS & CONTROLS GROUP ATTLEBORO, MA 01703
DATE <i>3/26/92</i>		PAGE <i>6</i>

FORM 5200

TI-NHTSA 005618

2.7 BASE ROTATION

2.7.1 Equipment:
Base fixture and torque wrench

2.7.2 Procedure:
While holding base with fixture, use torque wrench to find maximum torque before base begins to turn in crimp.

2.7.3 Criteria:
Maximize torque (desire > 15 in-lb).

2.8 HYDROSTATIC BURST

2.8.1 Equipment:
Custom TI designed and built test station using an Enerpac P-392 hand operated hydraulic pump with Enerpac hydraulic oil as the pressure medium. US gauge #33714, and safety enclosure.

2.8.2 Procedure:
Switches were tested per Section 3.7 of the ES.

2.8.3 Criteria:
Switches must withstand 1250 psig internal pressure for 30 seconds without any signs of leakage.

2.9 HOUSING STRENGTH

2.9.1 Equipment:
Custom TI designed and built pendulum test station

2.9.2 Procedure:
Apply a 52 pound side load at a rate of 20 inches per minute at the locking tab.

2.9.3 Criteria:
Switch housing must not break or crack.

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY <i>S. B. [Signature]</i>	TEXAS INSTRUMENTS 	DOC.
DATE <i>3/10/92</i>		PAGE <i>2</i>

FORM 8215

TEST	NORYL MOD. PPO	STANYL NYLON 46	MINDEL PBI ALLOY	AMODEL PPA	CELANEX PET	AMODEL PPA	CELANEX PET	ULTEM PEI	ZYTEL NYLON 66
1 FLUID COMPATIBILITY	FAIL (BATT ACID)	FAIL (BATT ACID)	PASS	PASS	PASS	PASS	PASS	PASS	
2 DISC/SLV OTHER MAT'L ANAL			DEGRADED DRYNESS	MOLD TEMP TOO LOW?					
3 INSERTION FORCE (LB)	41 30	47 35	43 30	55 25	44 35	50 45	44 32		
4 PUSH OUT FORCE (LB)	38 28	38 31	29 23	34 31	28 20	29 22	29 23		
5 INSERT. FORCE/ PUSH OUT RATIO	1.4 1.2	1.3 0.9	2.0 1.5	1.7 1.3	1.6 1.3	1.7 1.3	1.5 1.4		
6 AIR LEAK	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	
7 REPRIM. LEAK	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	
8 BASE ROTATION TORQUE, IN-LB	20+	20+	20+	20+	20+	20+	20+	20+	20+
9 AIR LEAK AFTER 16 TEMP EXP.	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	PASS	FAIL
10 REPRIM. LEAK AFTER 16 TEMP EXP.	PASS	PASS	FAIL	PASS	PASS	PASS	PASS	PASS	PASS
11 BASE ROTATION TORQUE, IN-LB AFTER 16 TEMP EXP.	11	10	9	6	8	6	6	30	7
12 BURST (PSIG)	2250 1250	2250 2250	1850 1850	2200 2200	1800 1725	2200 2200	1850 1875	2200 2200	2200 2175
13 HOUSING STRENGTH	PASS	PASS	FAIL CRACK AT LOCK TAB	PASS	PASS	PASS	PASS	PASS	PASS
COST (\$/LB)	1.85	3.35-3.75	2.85-3.25	3.00	1.85	3.00	1.85	5.50	2.60
	NORYL	STANYL	MINDEL	AMODEL	CELANEX	AMODEL	CELANEX	ULTEM	ZYTEL

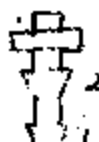
LO. BARS
2M. BARS
LO. BARS
2M. BARS
LO. BARS
2M. BARS

DESIRE > 15 IN-LB

NO 16 TEMP EXP
POST 16 TEMP EXP.

AM,050,101,9/5/91

* $\phi .921-.973 / \phi .978-.979$ (B-61/B-62)
* $\phi .063-.069 / \phi .074-.075$



4.0 PRIMARY CONCLUSIONS

The Primary Test Results indicate that the material properties of the various plastics are quite similar for most of the tests. The High Temperature Base Rotation test provided some differentiation among the plastics. Ultem, Noryl and Stanyl gave the most acceptable base rotation results. Of these three, Ultem clearly delivers the best performance but does so at 3 times the cost of Noryl and 1.5 times the cost of Stanyl. The final decision on material selection must be based on the cost vs. performance criteria for a given application. It would appear that in most situations Noryl would be the optimal choice.

<u>PERFORMANCE RANK</u>	<u>MATERIAL</u>	<u>COST (\$/LB)</u>
1	Ultem	5.60
2	Noryl	1.85
3	Stanyl	3.25-3.75
4	Zytel	2.60
5	Amodel	3.00
6	Celanex	1.86
7	Mindel	2.65-3.35

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY <i>[Signature]</i>	TEXAS INSTRUMENTS  MATERIALS & CONTROLS GROUP ATTLEBORO, MA 01702	DOO
DATE <i>9/30/92</i>		PAGE <i>9</i>

FORM 5285

TI-NHTSA 005621

5.0

SECONDARY TEST PROCEDURES

Further testing was performed on the Noryl bases to confirm that their performance capabilities were acceptable

5.1 FLUID COMPATIBILITY (TEST NO. 62-15-06)

5.1.1 Equipment:

Same setup as in Primary test with the exception of battery acid. The battery acid had caused degradation of the Noryl in the Primary test and was subsequently deemed an unnecessary part of the specification.

5.1.2 Procedure:

Same as Primary Test.

5.1.3 Criteria:

Same as Primary Test

5.1.4 Results:

The Noryl passed the modified fluid compatibility test.

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY <i>S. [Signature]</i>	TEXAS INSTRUMENTS	MATERIALS & CONTROLS GROUP ATTLEBORO, MA 01937
DATE <i>8/20/97</i>		DOC. <i>PAGE 10</i>

FORM 9222

TI-NHTSA 005822

5.2 TEMPERATURE/PRESSURE/AGE (TEST NO. 54-15-6)

5.2.1 Equipment:
Thermotron Model 88 programmable temperature chamber

5.2.2 Procedure:
Obtain vessel volume. Charge vessel with R-134a. Charge vessel with oil. Weigh vessel. Run 126 thermal cycles on vessel as follows:

- (3) hours min. @ -29 C
- (1) hour min. ramp up to 125 C
- (3) hours min. @ 125 C
- (1) hour min. ramp down to -29 C

Weigh vessels every 21 cycles.

5.2.3 Criteria:
Decrease in weight of vessel should not exceed 0.05% of initial weight.

5.2.4 Results:
Three samples using the Noryl material were run against three samples using the PBT material used in previous devices. The Noryl bases showed a significant improvement in leak resistance over the PBT bases.

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY <i>S. B. B.</i>	TEXAS INSTRUMENTS	MATERIALS & CONTROL GROUP ATTLEBORO, MA 01702
DATE 3/4/92		DEC. PAGE //

FORM 5215

TI-NHTSA 005623

E SWITCH DATA

Form 31605

TEST NO.

41-2-2

DATE REQUESTED 12 15 72	REQUESTED BY J. J. J.
DATE STARTED 03 05 72	DATE COMPLETED 03 11 72
APPROVED BY J. J. J.	

INTERNAL

TEST: TO EVALUATE RELAY'S OPERATION
 SWITCHING TIME, ETC.

TEST: TO EVALUATE RELAY'S OPERATION
 SWITCHING TIME, ETC.

PRE-TEST							POST-TEST						
ACT	REL	ACT	REL	ACT	REL	ACT	ACT	REL	ACT	REL	ACT	REL	ACT
01	410	234	1.5	1.2	2	1	409	237	1.5	2.2	2	1	1
02	421	244	1.6	2.3	2	1	423	245	1.5	2.3	2	1	1
03	410	243	1.6	1.3	2	1	414	243	1.6	2.3	2	1	1
04	421	252	1.6	2.3	2	1	422	253	1.6	2.4	2	1	1
05	422	240	1.6	1.2	2	1	426	248	1.6	2.4	2	1	1
06	423	244	1.6	1.4	2	1	428	242	1.5	2.4	2	1	1

TEST: ALL 11H-VT PASSED - POST-TEST REQUIREMENTS
 CUT-IN/CUT-OUT SET POINT CHANGE AT 1%

TEST NO. 5-15-6

PROPOSED COMPL. DATE 12/1/84

APPROVED BY

PROJECT TITLE: TEMPERATURE - PRESSURE AGE CYCLING

PHASE OF TEST:

PROCEDURE: ① OBTAIN VESSEL VOLUME = 1223.0 CM³

Q R134a C-424E = 75.0 gm

③ $O'L = 4.35 \text{ gm}$

② WHEEL VESSEL

⑤ 430 GL

⑥ $\angle D = 2134^\circ$

42 CYCLES OF:

(20 HOURS MIN) @ -29°C

(1) HOLD (HIS) RAMP UP TO 125°C

(3) ABOVE for $n = 1$ @ 125°C

10 Home (in) RAIN DOWN TO -29°C

10	YES	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫
#	#	INIT WT	WT - 01L	WT - 01H - 006	WT - 021000	Δ 01/C	WT - 024000	Δ 02/C	WT - 025000	Δ 03/C	WT - 030000	Δ 04/C
P2-209	R1	426.818	431.160	505.824	504.526	0.110	503.888	0.237	502.553	0.501		
PAT 219	R3	628.984	433.354	508.327	502.860	0.096	502.257	0.214	505.195	0.482		
P5-246	R6	628.242	432.882	502.700	441.585	13.024	-REMOVED FROM TEST					
N-1	9	408.927	405.287	483.320	482.300	0.001	480.250	0.015	478.240	0.017		
N-2	15	404.305	408.645	483.550	483.531	0.004	483.489	0.013	483.466	0.017		
N-3	16	401.260	405.684	480.477	480.429	0.006	480.192	0.059	479.534	0.196		

WEIGHT: VESSEL, SW HOUSING, DEFLATE, ADAPTE / FOR 99 - CMLV

WE 5--8: W. 1st A. HWS ~ 6.35g dry

WILSON C. WEIGHT 3 21/25 RUS COFFEE

[illegible]

[illegible]

C. Summary of ES Tests and Acceptance Parameters (Cont.)

Nr.	Characteristics	PV or IP	Lower Tolerance	Target	Upper Tolerance	Minimum Conformance to Tolerance
3.10	Vibration Durability	PV	36 hours, 20 Hz-2000 Hz	Maximize	...	
3.11	Connector Housing/Terminal Strength	PV	52 lb hmg load; 12/2.25 lb norm. load	Maximize		
3.12	Drop Test	PV	1.5 meters	Maximize		
3.13	Impact Test	PV	200 gram weight dropped 0.5 meters	Maximize		
3.14	Humidity Test	PV	120 hours	Maximize		
3.15	Salt Spray	PV	240 hours	Maximize		
3.16	Fluid Compatibility	PV	Immersion plus humidity exposure	Maximize		
3.17	Dust Exposure	PV	24 hours	Maximize		

III. TEST PROCEDURES AND REQUIREMENTS

3.1 Calibration

1. Switch settings are to be checked at 16° to 35°C using ambient dry air.
2. Calibration shall be as specified on the part drawing, with the setting checked after 2 or more cycles. A relay load (-14A560-) or FED approved equivalent must be used. Calibration is to be checked while conducting 0.1-0.3 amperes when 10.0-14.0 volt. D.C. is applied and the CCD-FED approved load is employed.
3. The cut-out set point is to be checked with increasing pressure, and the cut-in set point is to be checked with decreasing pressure. The differential set point is to be calculated using the cut-in pressure minus the cut-out pressure.

ENGINEERING SPECIFICATION

4. Calibration criteria after Test Sections 3.9, 3.10, 3.11, 3.13, 3.14, 3.15, 3.16 and 3.17 is:

- a. Cut-out set point pressure cannot change more than $\pm 5\%$ from the cut-out pressure initially measured in Section 3.1, paragraph 2.
- b. Cut-in set point pressure cannot change more than $\pm 5\%$ from the cut-in pressure initially measured in Section 3.1, paragraph 2.

3.2 Continuity

1. Check is to be made at 16° to 35°C using ambient dry air, on the first switch cycle.
2. Test with an electrical load of 0.1-0.3 amperes at 10-14 volts D.C. using the approved (-14A640-) relay (PV), or with the production pressure/creep/continuity tester load of approximately 10-40 milliamps at 20-28 volts D.C. or equivalent (IP). Continuity must be monitored during the entire test. Pressurize the switch to 500 psig at a rate of 50 psi/second max. Continuity must change to an open circuit when the cut-out pressure is reached, and remain open at pressures above the cut-out pressure.
3. Reduce the pressure at a rate of 50 psi/second max until 0 psig is reached. Continuity must change to a closed circuit when the compressor cut-in pressure is reached, and remain closed at pressures less than the cut-in pressure.

3.3 Creep Check

1. Switch is to be creep checked at 16 to 35°C using ambient dry air.
2. The creep check is to be made after the switch has been cycled one or more times while employing relay (-14A640- or equiv.) load (PV) or production pressure/creep/continuity tester load or equivalent (IP). The current is to be 0.1-0.3 amperes at 10-14 volts D.C. (PV) or approximately 10-40 milliamps at 20-28 volts D.C. (IP).
3. As the switch pressure is increased, the positive disc snap must occur within 5 milliseconds of electrical discontinuity at the cut-out point. The rate of pressure rise is to be no greater than 10 psi/second at the creep check point.
4. As the switch pressure is decreased, the positive disc snap must occur within 5 milliseconds of electrical continuity at the cut-in point. The rate of pressure decay is to be no greater than 10 psi/second at the creep check point.

ENGINEERING SPECIFICATION

3.4 Voltage Drop

1. Voltage drop is to be measured after 2 or more cycles employing relay load (-14A640-) or equivalent with 0.1 to 0.3 amperes, 10-14 volt D.C. through the switch. Under these conditions at room ambient with switch closed the voltage drop across the switch is to be measured. Millivolt connection interface at terminals to be less than 10mVolts.
2. Voltage drop not to exceed 200 mvolts at 0.1-0.3 amperes, 10-14 volt D.C.

3.5 Current Leakage

1. Current leakage is to be checked with 500 volts, 60 Hz. A.C.
2. Current leakage is to be checked:
 - a. Between the switch leads with contacts open.
 - b. Between each lead and the switch housing with contacts open.
 - c. Between either switch lead and the switch housing with the switch closed.
3. Current leakage not to exceed one milliamperes.

3.6 Refrigerant Leakage

1. Refrigerant Leakage to be checked at room ambient, $24 \pm 6^\circ\text{C}$ using refrigerant or an acceptable tracer gas. Increase the pressure to 300 ± 10 psig using dry nitrogen or air.
2. Total equivalent leak rate of the switch, as an assembly not to exceed 5 gr/yr.

3.7 Hydrostatic Burst

1. Hydrostatically pressurize the switch with hydraulic fluid until 1250 psig pressure is reached.
2. Switch must not show evidence of leakage while being held at this pressure for 30 seconds.

3.8 High Pressure Durability

1. Subject the switch to 200,000 cycles of 0 psig to 300 ± 10 psig pressure, at a cycling rate of 25 ± 10 cycles per minute, while maintaining the switch in an ambient temperature of $125 \pm 3^\circ\text{C}$. The pressure must be increased and decreased at an even rate to eliminate transient pressure spikes. Refrigerant oil or ATF may be used as the pressure medium.
2. At the completion of the cycling test, subject the switch to 50 cycles of 0 to 711 ± 25 mm (28 ± 1 inch) of mercury vacuum, maintaining the vacuum for a minimum of 5 minutes at room ambient.
3. After pressure cycling and vacuum cycling, switch must conform to Section 3.6.

JAN
1979 3947a1E

(Previous editions may NOT be used)

PA02,007/814

SEP 30 '91 15:42 FROM CDD/PEO 337-5678

TI-NHTSA 005629

ENGINEERING SPECIFICATIONS

3. Repeat steps "1" and "2" above, positioning the sensor such that the point of impact occurs 0.2 inches from end of surface connector housing, perpendicular to the housing.
4. After impact test, the switch must conform to Sections 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7 and 3.8. Additionally, the switch electrical connector housing must not break or crack.

3.14 Humidity

1. Mount the switch by its normal mounting means (valve stem and O-ring seal) in the vertical position in the humidity chamber, the switch pressure port pointing down (terminals up). The valve stem may be plugged to prevent moisture from entering the switch directly. Mating electrical connector (CCD-P80 to supply) and wiring drip loop must be installed before start of test.
2. Subject the switch to 10 humidity cycles as follows:
 - a. 8 hours at 38°C (minimum) at 90 to 100% relative humidity.
 - b. Lower temperature to 34°C (maximum) over a two hour period.
 - c. Raise temperature to 38°C (minimum) and humidity to 90 to 100% over a two hour period.
3. After completion of the last humidity cycle, the switch must conform to Sections 3.1, 3.2, 3.3, 3.4, 3.5 and 3.6.

3.15 Salt Spray

1. Mount the switch by its normal mounting means (valve stem and O-ring seal) in the vertical position in the salt spray chamber, the switch pressure port pointing down (terminals up).
2. Switch is to be tested with the Ford released electrical connector installed (CCD-P80 to supply) with electrical continuity of the CCD-P80 approved relay load (-14A640-).
3. The switch is to be pressurized at 300 ± 10 psig for the duration of the test.
4. Expose the assembly to salt spray for 240 hours per ASTM B117.
5. After exposure, the switch must conform to Sections 3.1, 3.2, 3.3, 3.4, 3.5 and 3.6.

3.16 Fluid Compatibility

1. With the switch pressure port plugged, and the mating electrical connector/wiring installed, submerge switch for five seconds in each of the following fluids: engine oil, gasoline, diesel fuel, engine coolant (Ethylene Glycol), automatic transmission fluid, brake fluid, windshield wiper solvent, and saturated salt water solution.
2. Allow switch/connector assembly to drip dry for five minutes at room temperature.

JAN
1979 3947a1E

(Previous editions may NOT be used)

7/98-188 124-001 WORK 25:51 16, 00 033

TI-NHTSA 005630

ENGINEERING SPECIFICATION

3. Repeat steps "1" and "2" above five times. At the completion of the 5th cycle, subject switch/connector assembly to 100°C and 85% relative humidity for eight hours.
4. After fluid exposure test, the switch must conform to Sections 3.1, 3.2, 3.3, 3.4, 3.5, 3.6 and 3.7.

3.17 Dust Exposure

1. With the switch pressure port plugged, and the mating electrical connector/wiring installed, place the switch in the dust chamber in the vertical position (switch terminals up).
2. Expose the switch for 24 hours to Portland cement dust that is agitated for two seconds every 15 minutes.
3. After dust exposure test, check the switch must conform to Sections 3.1, 3.2, 3.3, 3.4 and 3.5.

IV. RE-VALIDATION REQUIREMENTS

In addition to the requirements of Section II., re-validation shall be required whenever requested by the Product Engineering Office (PEO) and prior to each model year production. Yearly re-validation shall consist of Test 3.9 (Pressure/Thermal Cycling).

The supplier and the design-responsible Product Engineering Office will jointly determine which potential changes to the process, materials or material sources would have significant impact on the product's function, performance, durability or appearance. The supplier will describe these conditions in the Control Plan, along with either (1) the revalidation plan that would be followed in each case, or (2) a provision to submit an amended Control Plan for approval if any of those process changes are planned.

V. INSTRUCTIONS AND NOTES

Control Plans address all significant design and process characteristics, which include all ES tests and Control Item characteristics. They describe the process potential studies that will be performed for product validation (including PV tests) and the ongoing product and process evaluation for continuing improvement (including IP tests). They include acceptance criteria, sample sizes, frequencies, data analysis methods and reaction plans.

The Control Plan is developed, and updated as necessary, by the supplier in conjunction with the design responsible Product Engineering Office and other appropriate functions such as SQA. The Control Plan defines the management of the upstream production process and part variables (significant process characteristics) that affect the outcome of the ES tests or other significant

SEPTEMBER 17, 1991

TO: ANDY MCKENNA
RON RUGGIERI

CC: HANK GRIFFIN

FROM: KAREN ROSS

RE: DSC, TGA TESTING TEL # 109884

WE RECEIVED 5 SAMPLES OF DIFFERENT REBING IN BOTH THE MOLDED AND PRE-MOLDED FORMS, ALONG WITH 2 SAMPLES OF BASES WHICH WERE ANNEALED. DSC, TGA, AND TMA TESTS WERE PERFORMED ON THEM (ATTACHED). FURTHER DISCUSSION WILL BE NECESSARY IN ORDER TO FULLY UNDERSTAND THE RESULTS.

REGARDS,

KAREN ROSS

TI-NHTSA 005632

STL # 107823

EXAMPLE 1

NOVYL BTX830

POLYPHENYLENE OXIDE (PPO)

G.E. PLASTICS 413-448-6341

STANLY

4/6 NYLON

DSM ENGINEERING PLASTICS

215-320-6992

MINDEL 8322

POLYBLENONES MODIFIED

AMOCO PERFORMANCE PRODUCTS

800-621-4557

AMODEL 1133H3

POLYPHTHAMIDE (PPA)

AMOCO PERFORMANCE PRODUCTS

CELANEX 4300

POLYBUTYLENE TEREPHTHALATE

CELANESE

908-231-2062

TEST RESULTS

CELANEX BASE

Tg 49.48 78.92
47.27 79.52
Tm 227°C
HDT 219°C
50.17 % GLASS

CELANEX PRE-MOL

Tg 80.4 69.01
Tm 227°C

CELANEX BASE

Tg 31°C
Tm 226°C
HDT 218
29.77 % GLASS

TEST RESULTS

NOVEL BASE
Tg 18.80°C 49.10
Tm 262°C
29.71 % GLASS
HDT 285°C

NOVEL PRE-MOLD
Tg 30.92°C
Tm 263°C
HDT 285°C

STANYL BASE
Tg 16.66 25.78
Tm 292°C
31.46 % GLASS

STANYL PRE-MOLD
Tg 18.98°C 32.50°C
Tm 292°C
27.64 % GLASS

MINDEL BASE
EXOTHERM
9.37 66.65 117.90
Tm 233°C
HDT 233.13

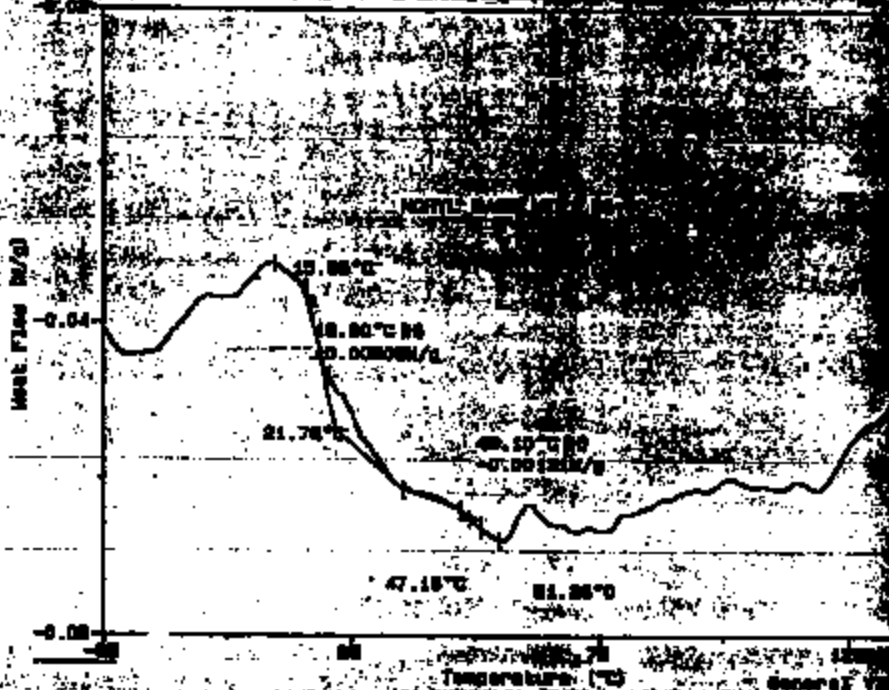
MINDEL PRE-MOLD
Tg 16.11 80.82
EXO 124.35
Tm 252°C

AMODEL BASE
Tg 15.45 50.97 80.93
EXO 116.65 150.13
Tm 310°C
HDT 298°C
35.16 % GLASS

AMODEL BASE
ANNEALED
Tg 9.43 66.28
exo 117.97 150.36
Tm 319.14

AMODEL PREMOLD
Tg -18.47 12.77 75.45
-18.43 16.02 75.45
exo 120.72
Tm 252°C

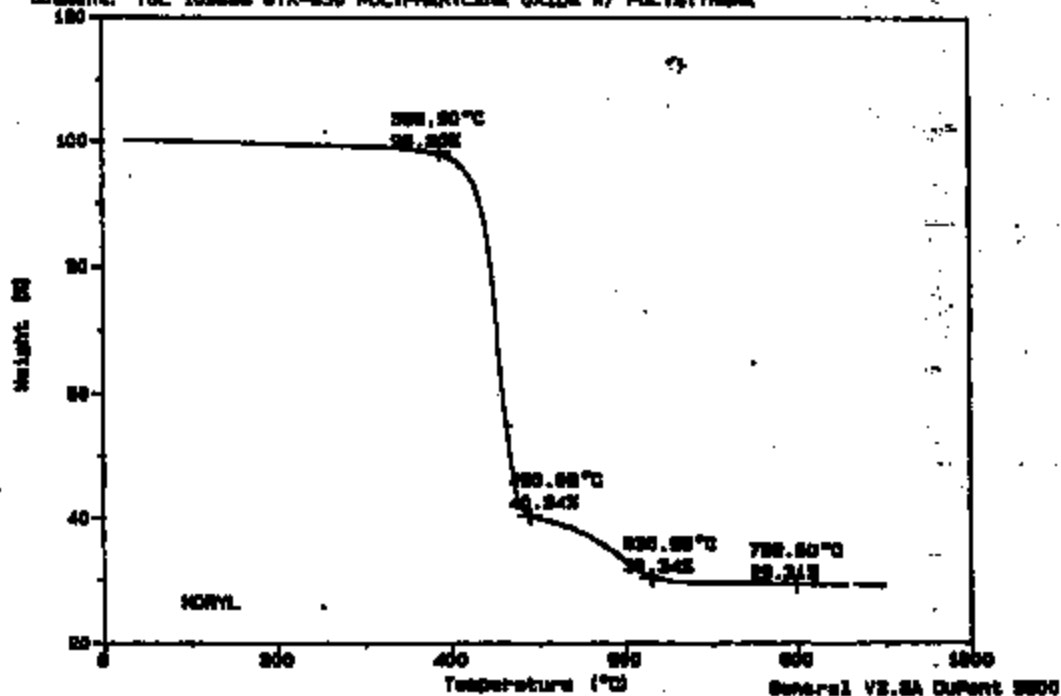
Sample: NORVIL ID 38-00-01
 Size: 10.0000 mg
 Method: DSC/10/300
 Comment: TML1000000 NORVIL NORVIL BASE



Sample: NORYL II 38-00-01
 Size: 17.7800 g
 Method: 10/300/150
 Comment: TSL 105888 STX-830 POLYPHENYLENE OXIDE W/ POLYSTYRENE

TGA

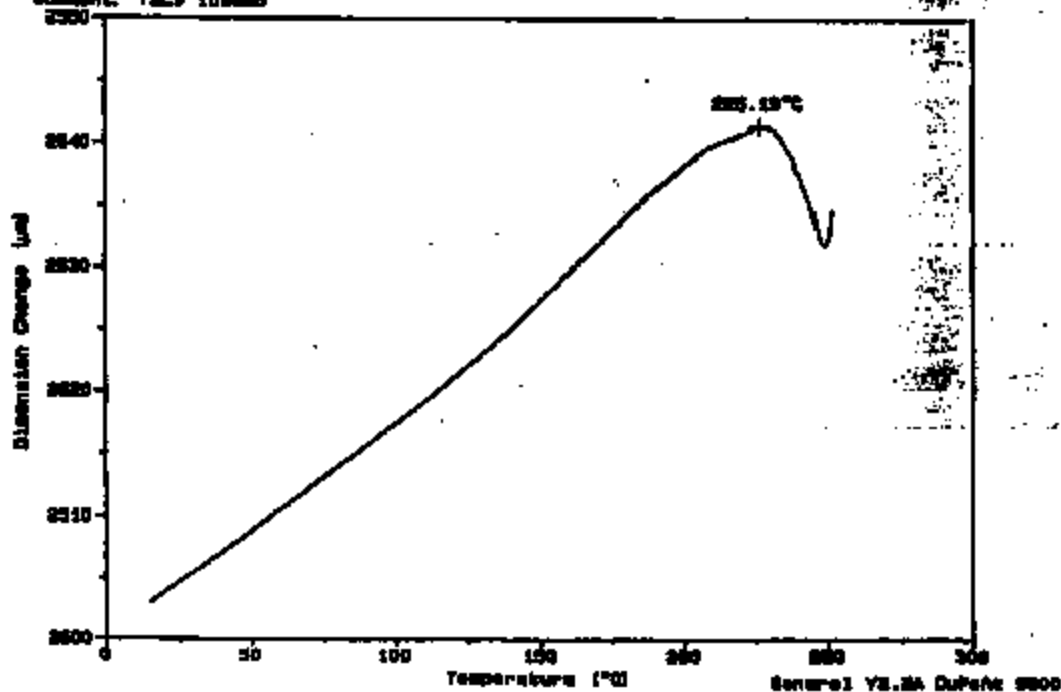
File: THERM.05
 Operator: K ROSS
 Run Date: 07/08/81 12:38



Sample: NORYL
 Size: 218.0600 mm
 Method: 10/386
 Comment: TSL 105888

TMA

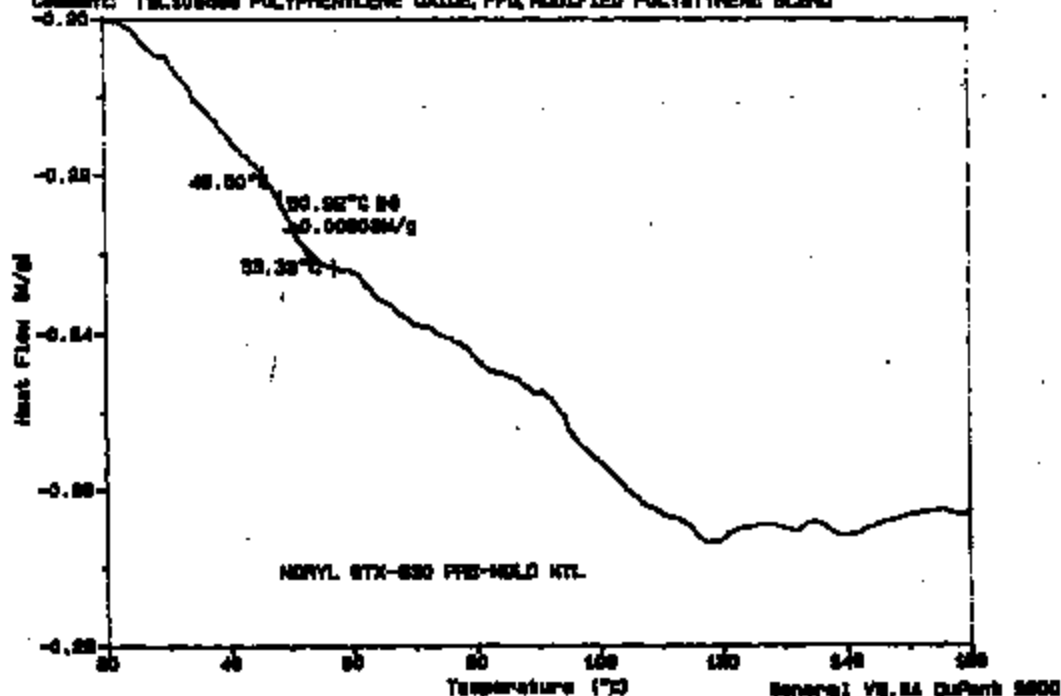
File: THERM.72
 Operator: K ROSS
 Run Date: 08/08/81 14:38



Sample: NORYL GTX-830 PRE-HOLD
 Size: 8.7000 mg
 Method: QCN/10/350
 Comment: TML100000 POLYPHENYLENE OXIDE, PPD, MODIFIED POLYSTYRENE BLEND

DSC

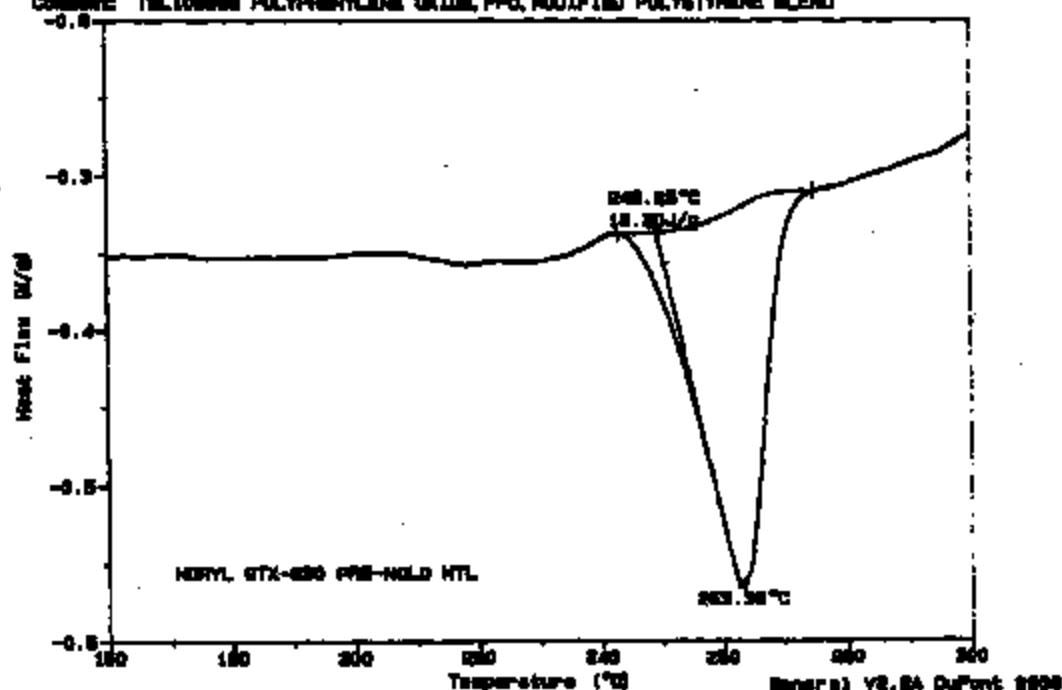
File: DSC001.78
 Operator: K0000
 Run Date: 07/01/91 14:10



Sample: NORYL GTX-830 PRE-HOLD
 Size: 11.8960 mg
 Method: QCN/10/350
 Comment: TML100000 POLYPHENYLENE OXIDE, PPD, MODIFIED POLYSTYRENE BLEND

DSC

File: DSC001.78
 Operator: K0000
 Run Date: 07/01/91 14:10

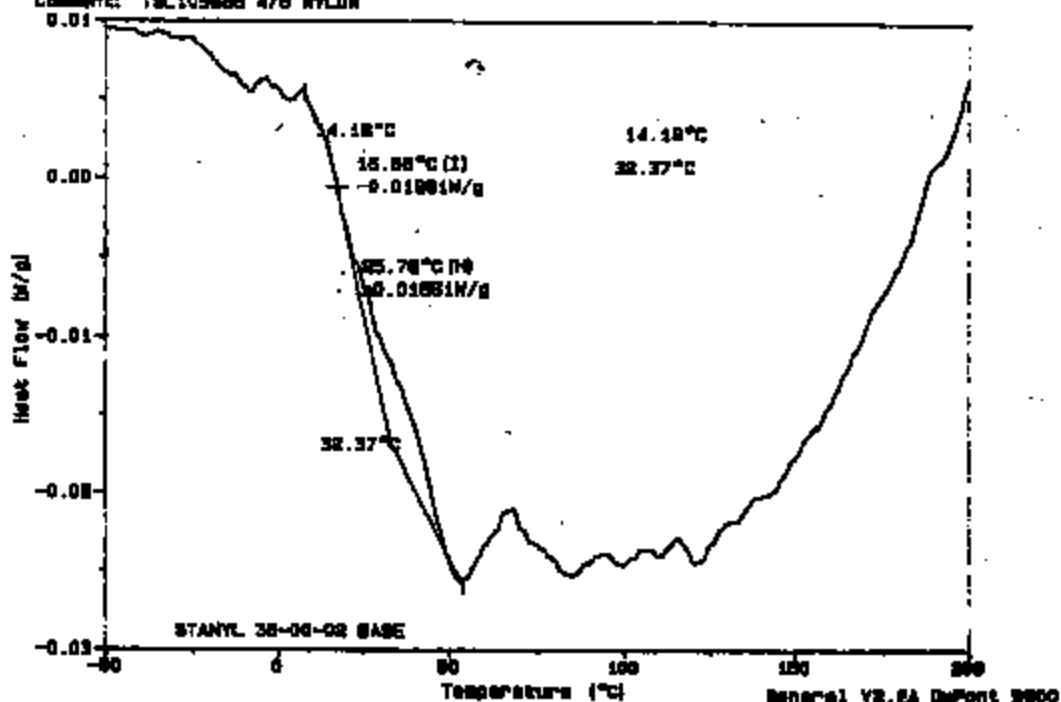


TI-NHTSA 005638

Sample: STANYL ID 38-00-02 BASE
 Size: 11.4000 mg
 Method: BSM/10/200
 Comment: TSL105888 4/5 NYLON

DSC

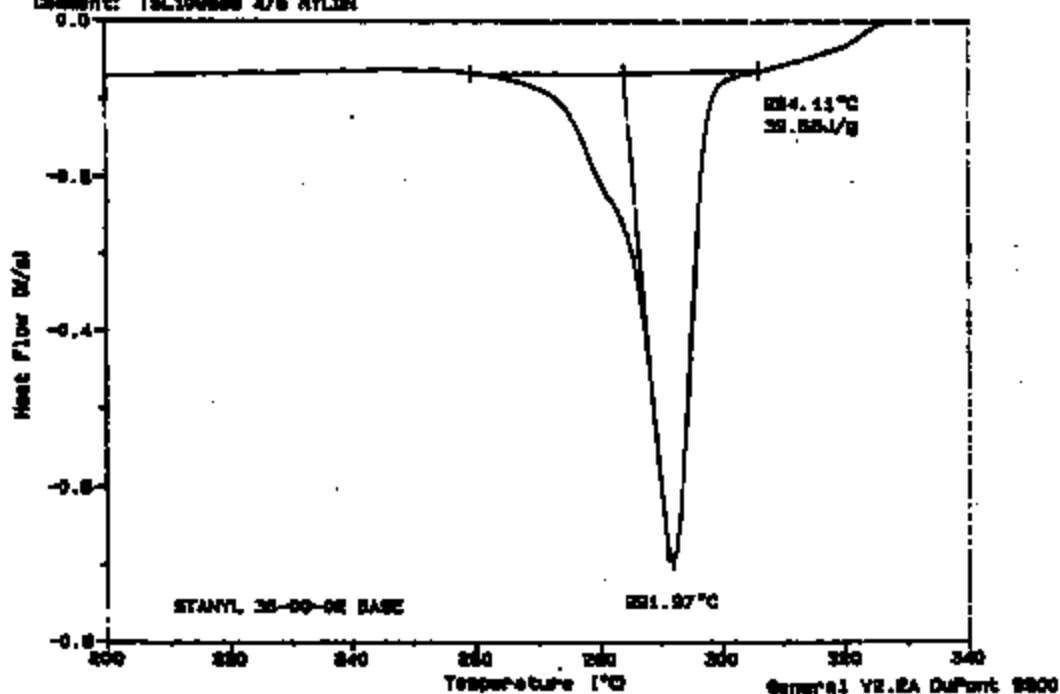
File: DSC001.DP
 Operator: KROUSE
 Run Date: 07/02/91 08:38



Sample: STANYL ID 38-00-02 BASE
 Size: 8.8000 mg
 Method: BSM/10/200
 Comment: TSL105888 4/5 NYLON

DSC

File: DSC001.DP
 Operator: KROUSE
 Run Date: 07/02/91 08:38

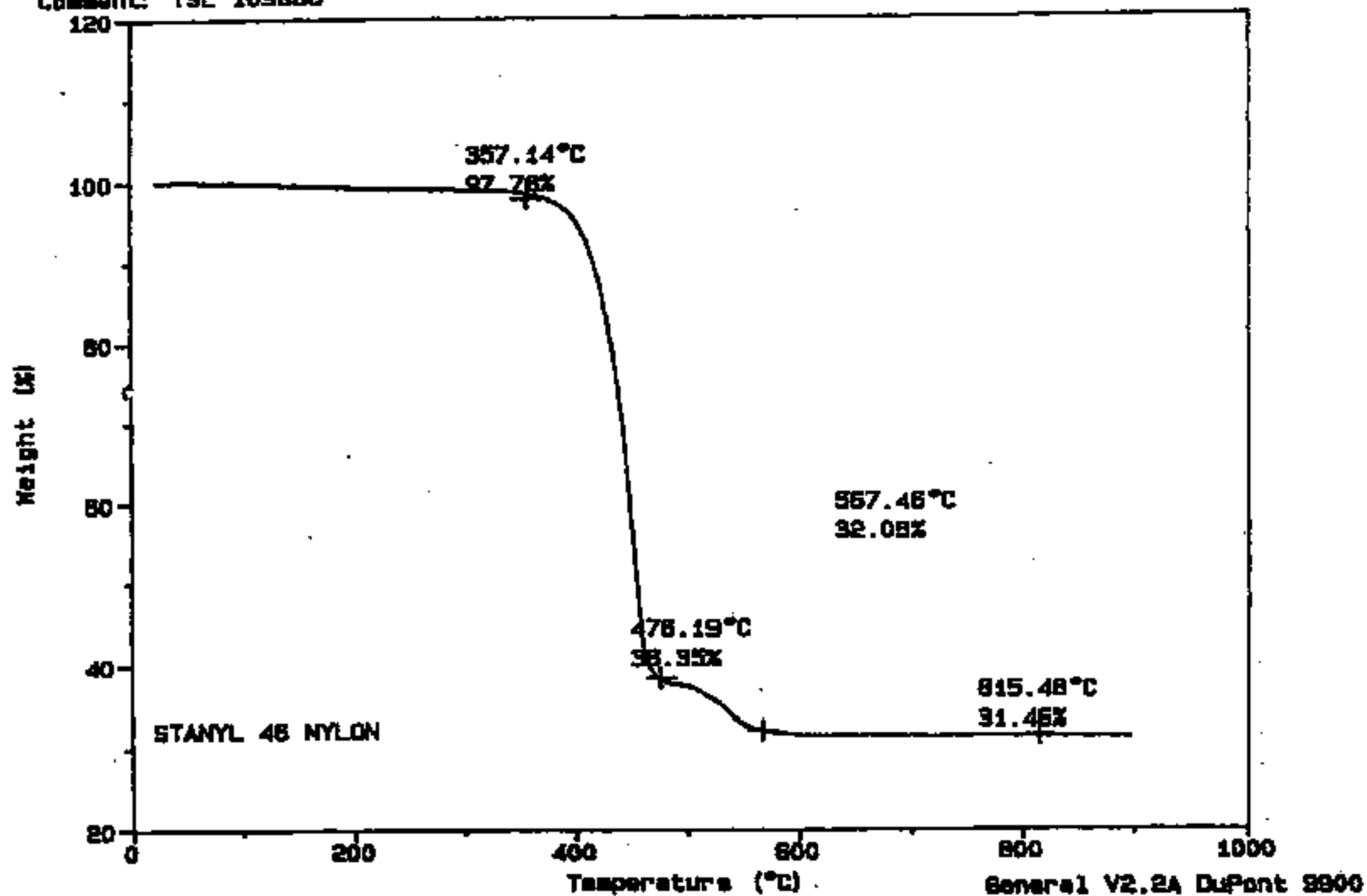


TI-NHTSA 005639

Sample: STANYL 46 NYLON ID 58-00-02
Size: 30.1580 mg
Method: 10/900/ISO
Comment: TSL 109885

TGA

File: T80N8.07
Operator: KROSS
Run Date: 07/10/91 09:56

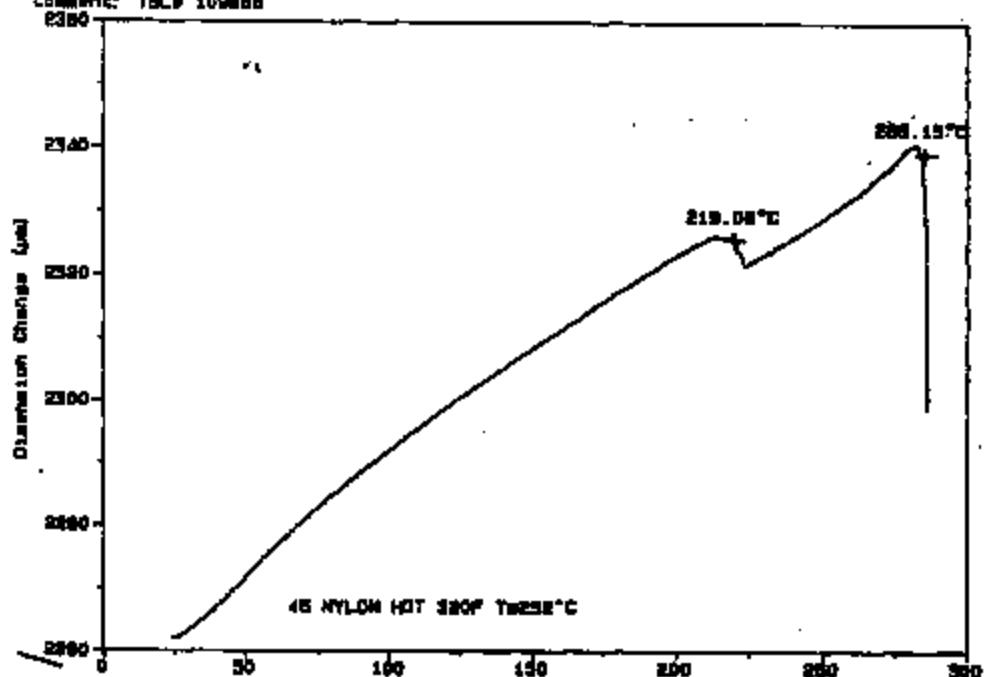


TI-NHTSA 005840

Sample: STANYL 47X 830
 Size: 308.0000 mg
 Method: 10/320
 Comment: TBL 102888

TMA

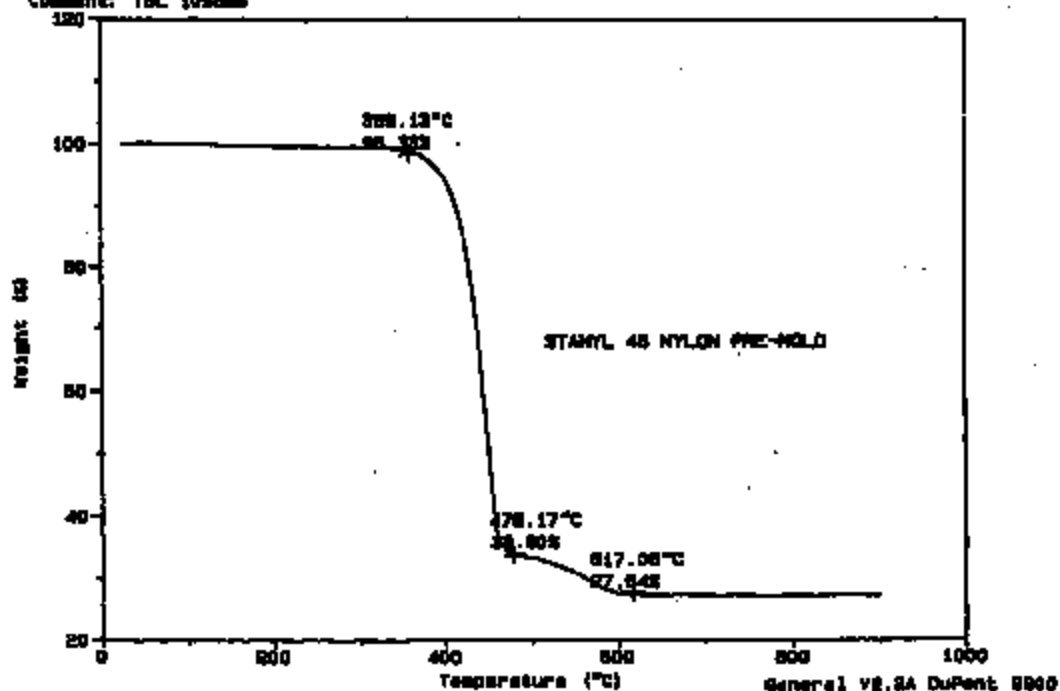
File: TMA81.74
 Operator: K ROSE
 Run Date: 05/06/81 08:58



Sample: STANYL 48 PRE-HOLD MATERIAL
 Size: 45.0720 mg
 Method: 10/800/180
 Comment: TBL 102888

TGA

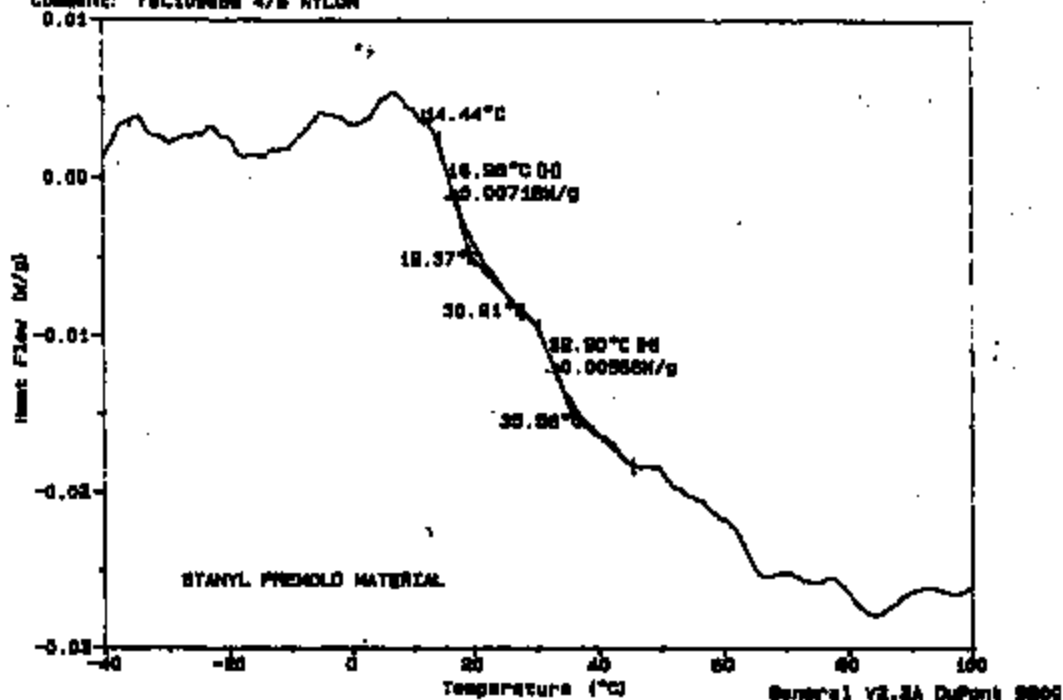
File: TMA81.08
 Operator: KROSE
 Run Date: 07/11/81 08:07



Sample: BTANYL 4/S PRE-MOLD NTL
 Size: 10.2540 mg
 Method: SDN/10/280
 Comment: TEL109888 4/S NYLON

DSC

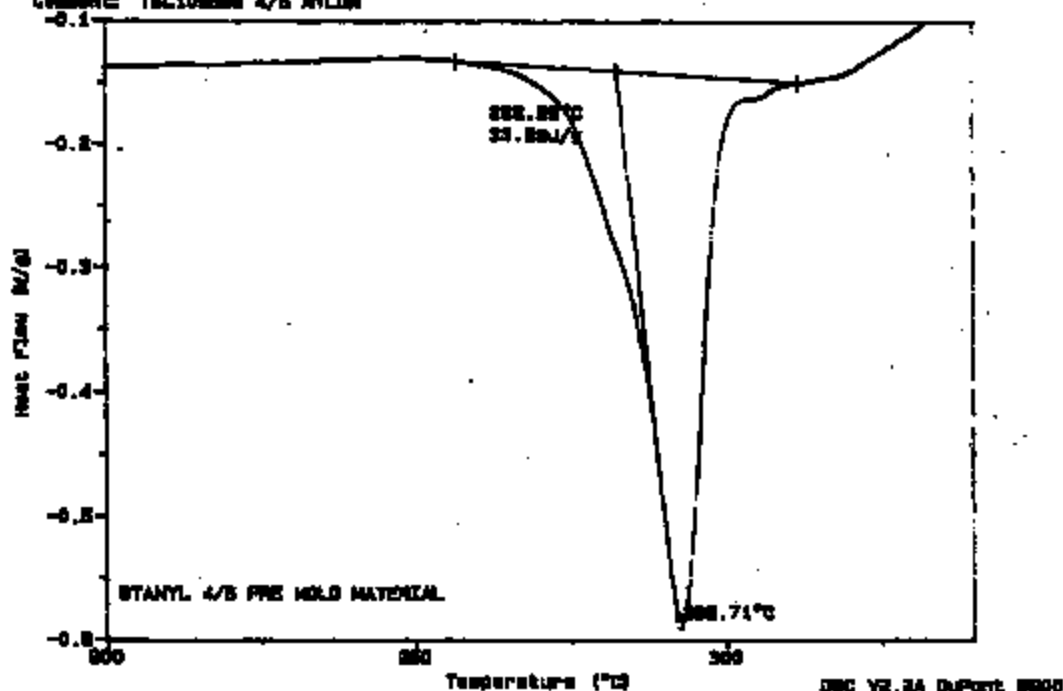
File: DSCM1.82
 Operator: KJGMM
 Run Date: 07/02/81 10:28



Sample: BTANYL 4/S PRE-MOLD NTL
 Size: 14.1000 mg
 Method: SDN/10/280
 Comment: TEL109888 4/S NYLON

DSC

File: DSCM1.82
 Operator: KJGMM
 Run Date: 07/02/81 10:28

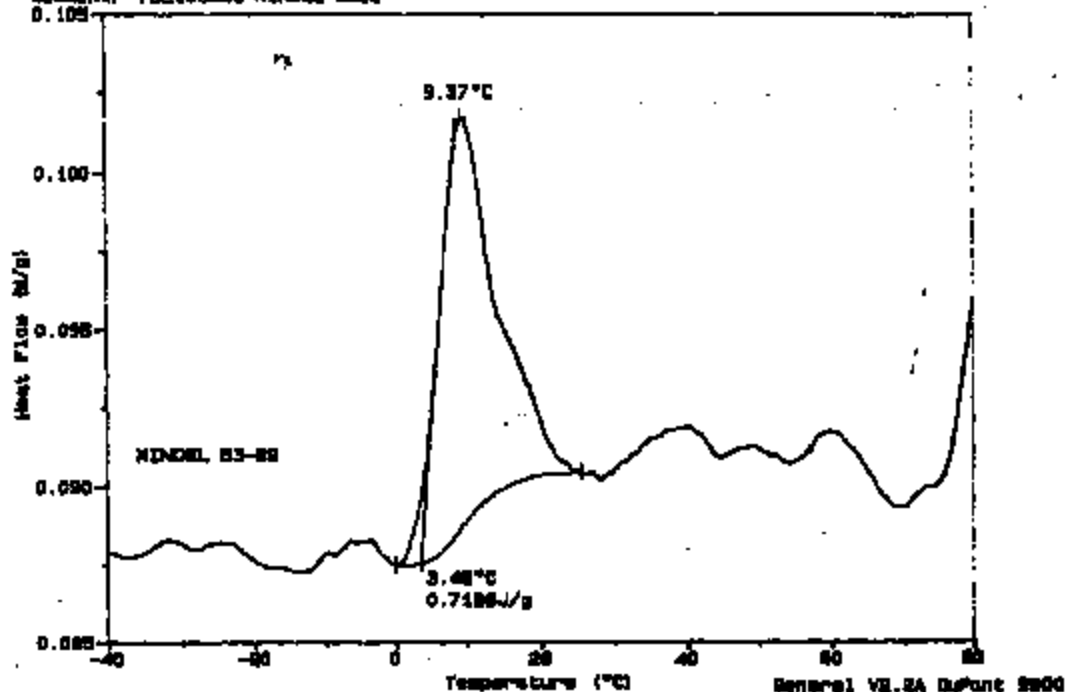


TI-NHTSA 005642

Sample: NINDEL 13 30-00-03 BASE
 Size: 10.3500 mg
 Method: SEN/10/300
 Comment: TEL100000 NINDEL BASE
 0.100

DSC

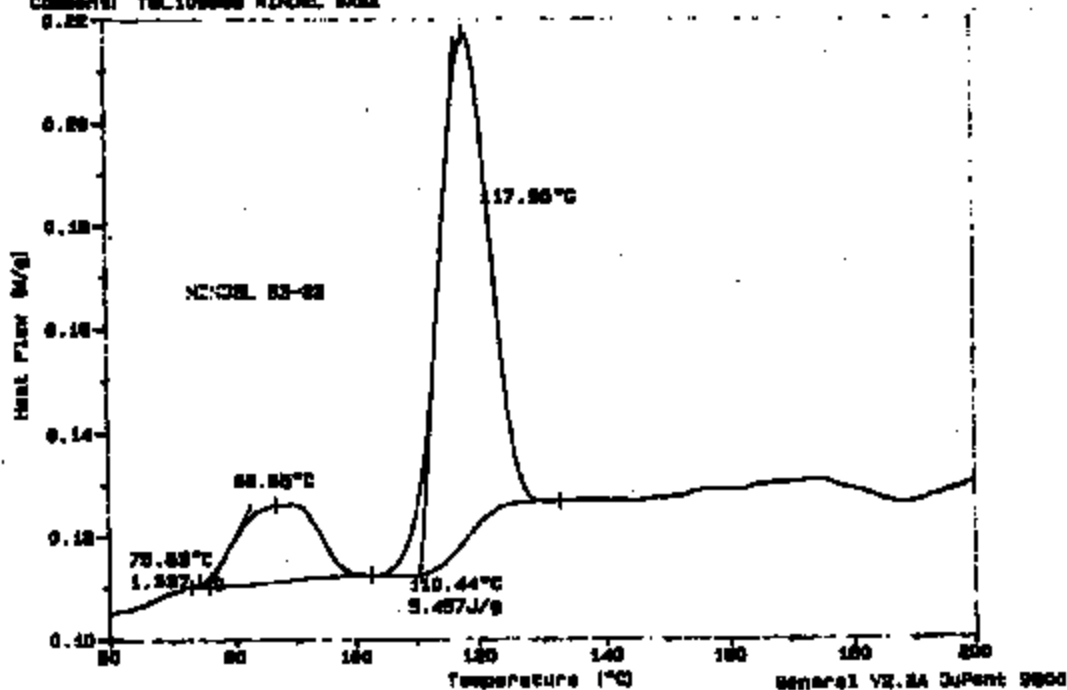
File: DSC01.06
 Operator: KROES
 Run Date: 07/02/91 06:00



Sample: NINDEL 13 30-00-03 BASE
 Size: 6.0000 mg
 Method: SEN/10/300
 Comment: TEL100000 NINDEL BASE
 0.22

DSC

File: DSC01.07
 Operator: KROES
 Run Date: 07/02/91 06:00

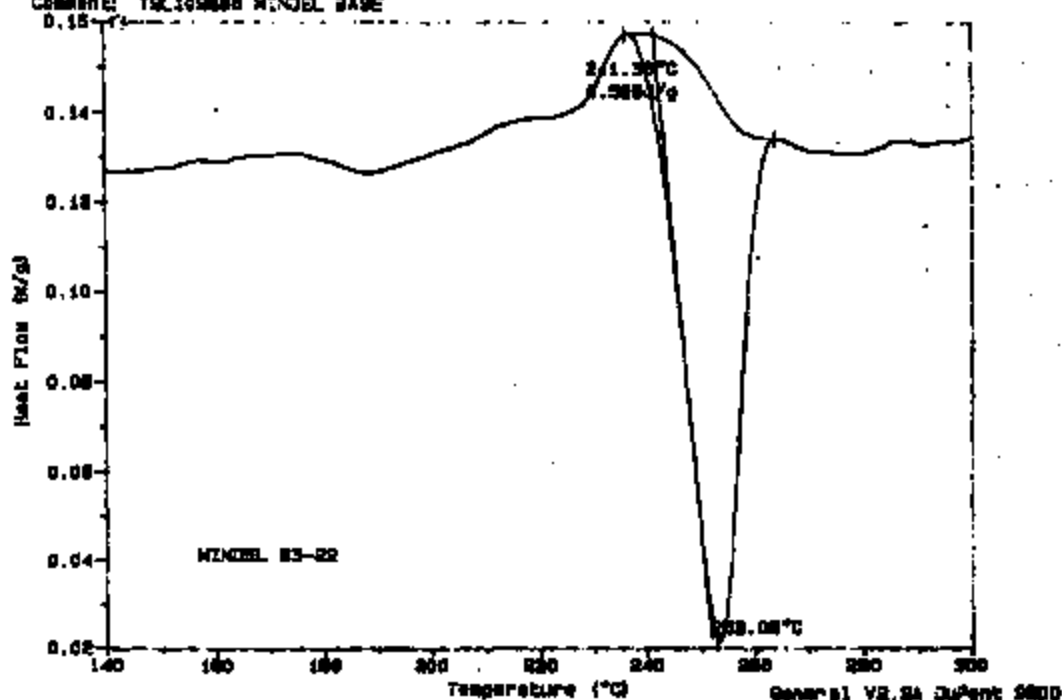


TI-NHTSA 005643

Sample: MINDEL ID 38-00-03 BASE
 Size: 6.0500 mg
 Method: GEN 10/350
 Comment: TSL100000 MINDEL BASE

DSC

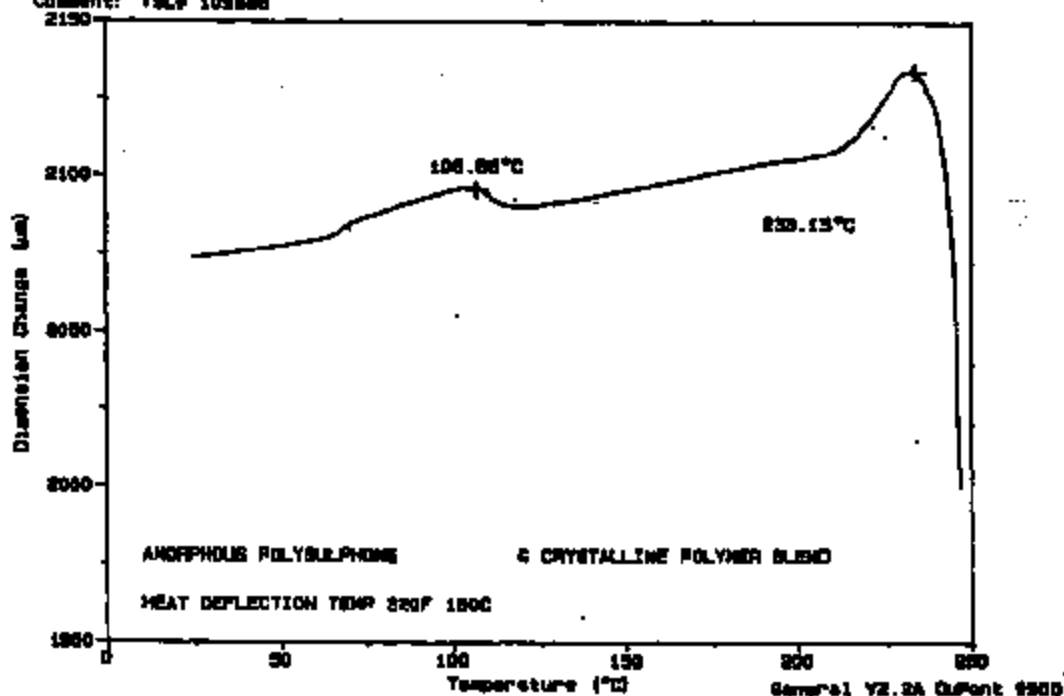
File: DSC001.67 ✓
 Operator: KROSS
 Run Date: 07/03/94 08:59



Sample: MINDEL BASE
 Size: 206.0000 mg
 Method: 10/350
 Comment: TSL100000

TMA

File: TMA001.66
 Operator: KROSS
 Run Date: 08/03/94 08:59

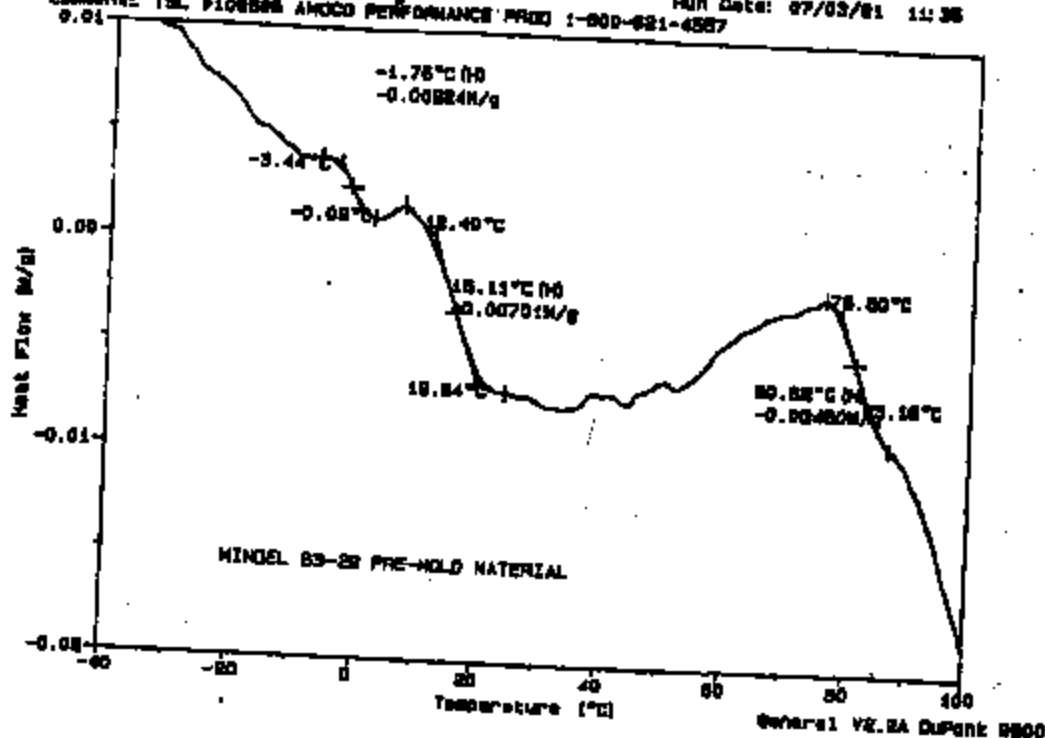


TI-NHTSA 005644

Sample: MINDEL 83-22 PRE-HOLD
 Size: 10.0000 mg
 Method: DSC/10/400
 Comment: TML #100888 AMOCO PERFORMANCE PROD 1-800-821-4887

DSC

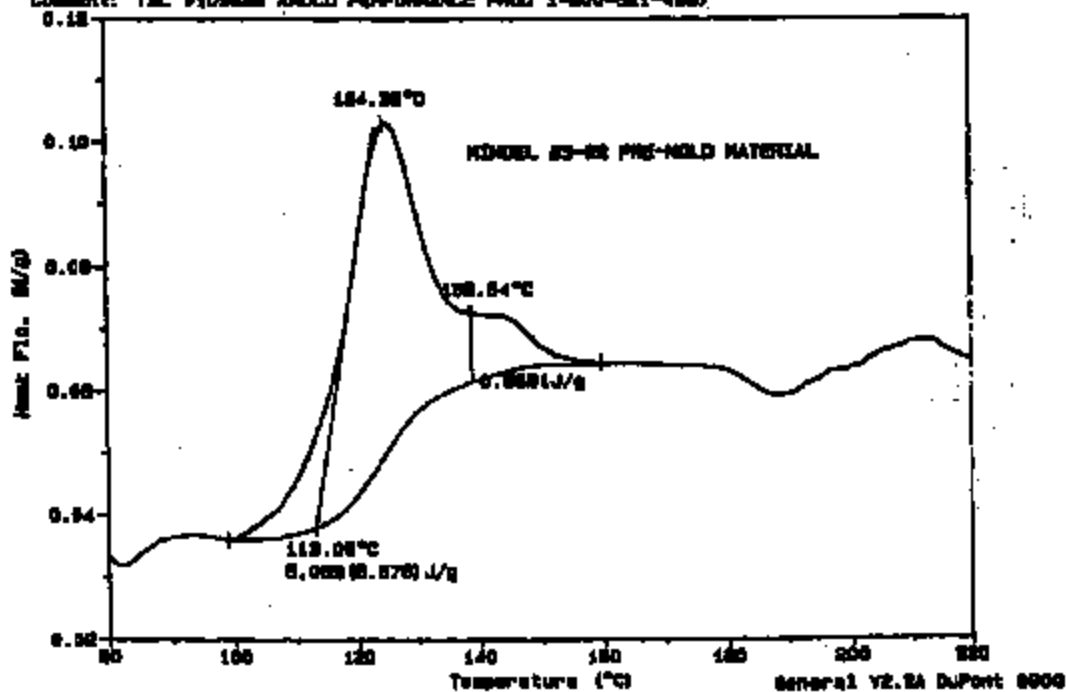
File: DSC08.21
 Operator: KROGG
 Run Date: 07/03/91 11:36



Sample: MINDEL 83-22 PRE-HOLD
 Size: 14.0000 mg
 Method: DSC/10/400
 Comment: TML #100888 AMOCO PERFORMANCE PROD 1-800-821-4887

DSC

File: DSC08.20
 Operator: KROGG
 Run Date: 07/03/91 12:25



Sample: MINDEL B3-22 PRE-MOLD

Size: 14.0000 mg

Method: GEN/10/400

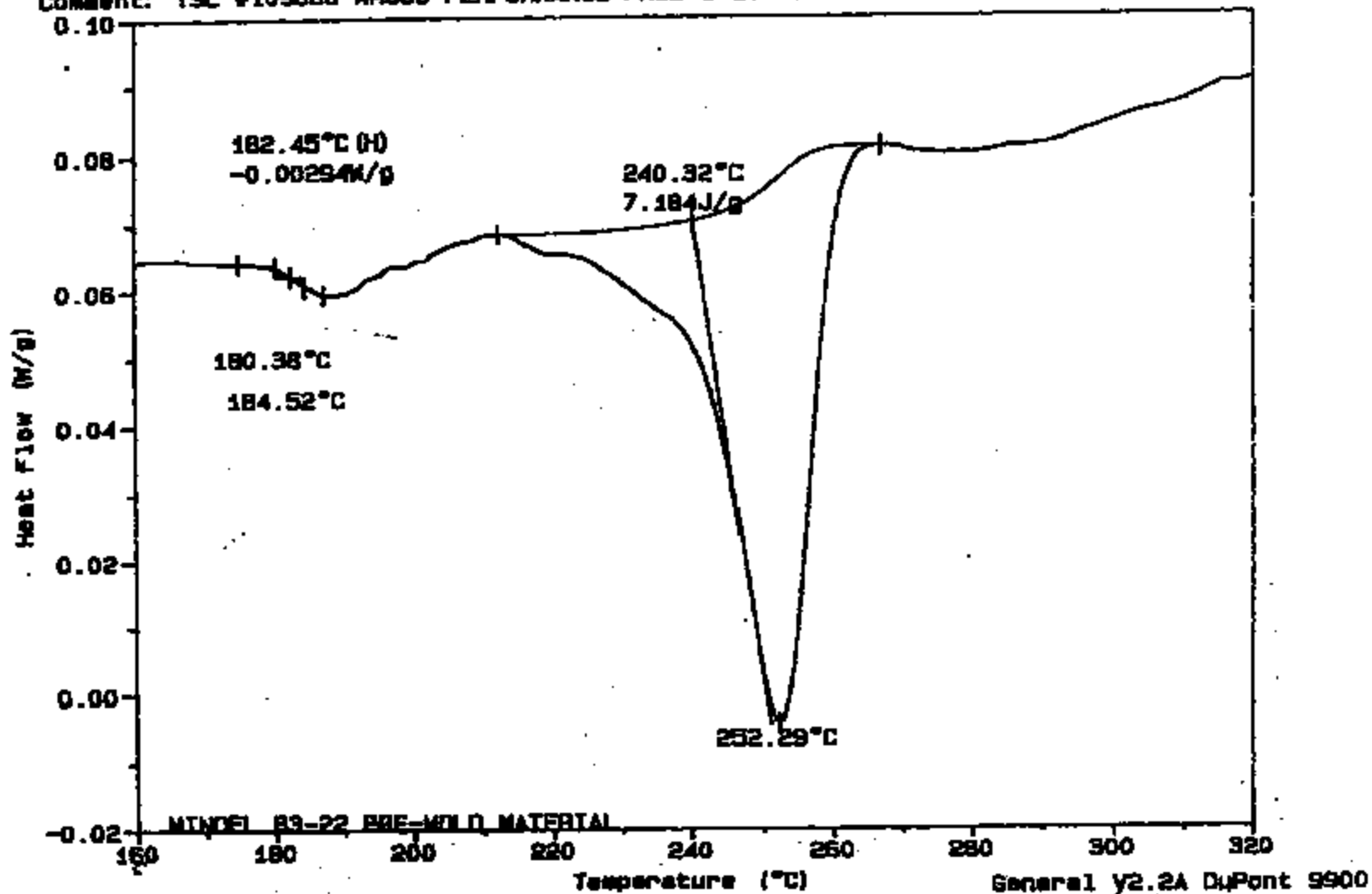
Comment: TSL #109888 AMOCO PERFORMANCE PROD 1-800-621-4567

DSC

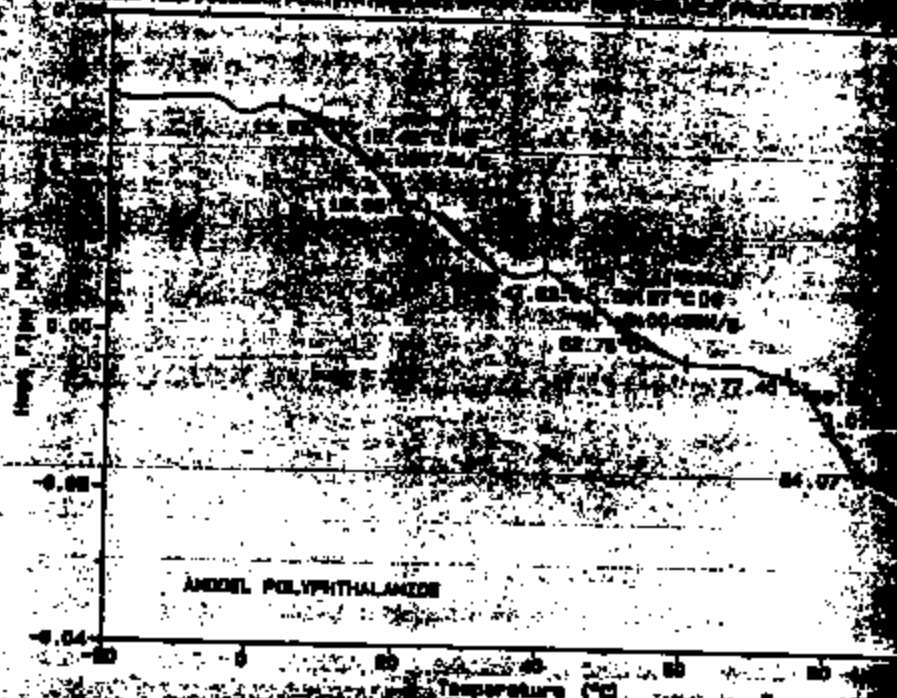
File: DRDNR190 ✓

Operator: KROSS

Run Date: 07/03/91 11:36



TJ-NHTSA 005648



Sample: AMCEL 13 50-55-54 5466
 Size: 7.1000 mg
 Method: WEA/10/400
 Comment: TEL 0500000 POLYPHTHALAMIDE (PPA) AMCEL PERFORMANCE PRODUCTS

DSC File: 07001.00
 Operator: KROSE
 Run Date: 07/03/81



Sample: AMODEL ID 38-00-04 BASE

Size: 10.3700 mg

Method: GEN/10/400

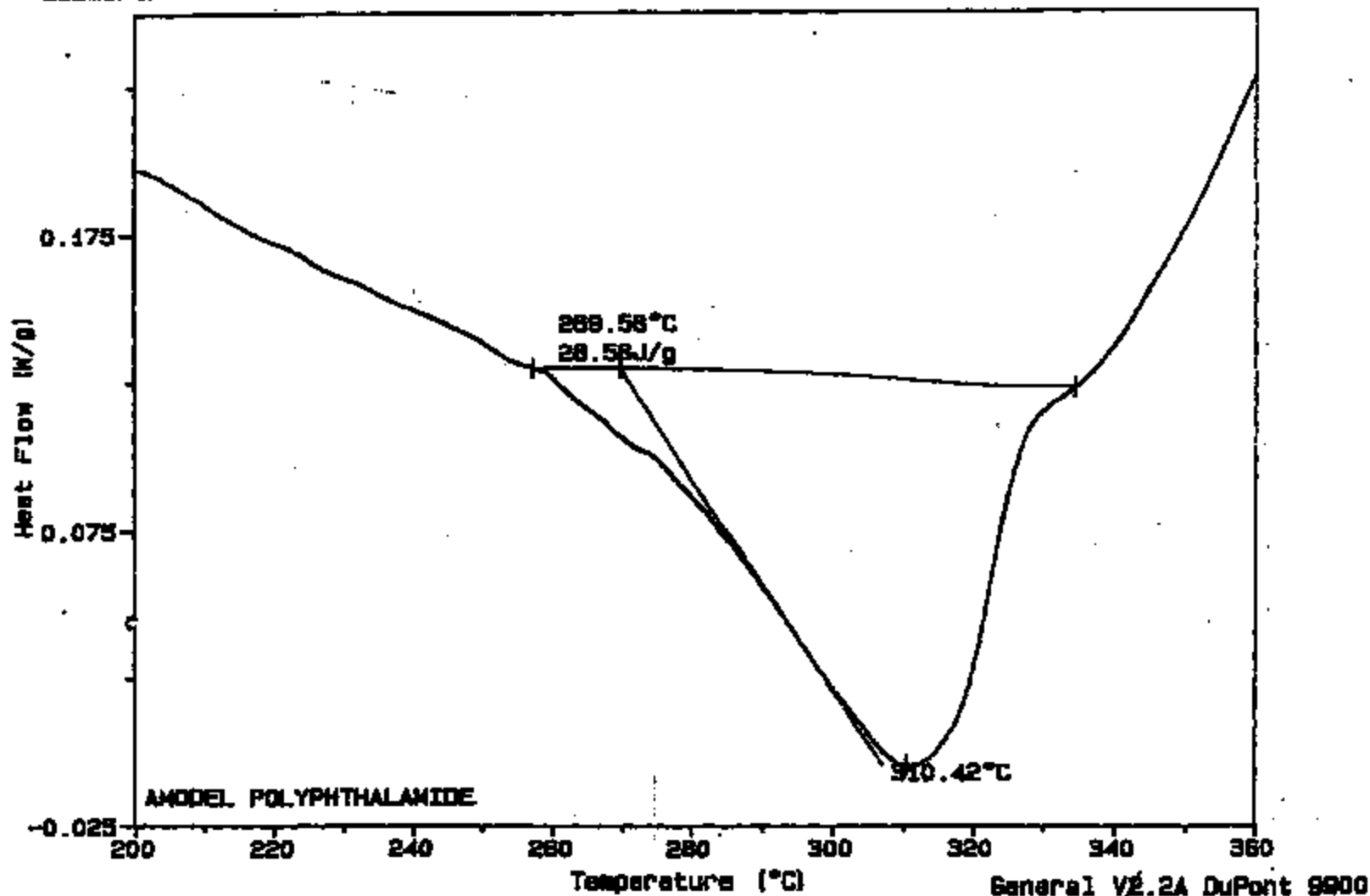
Comment: TSL #109888 POLYPHTHALANIDE (PPA) AMOCO PERFORMANCE PRODUCTS

DSC

File: DR0NR.92 ✓

Operator: KROSS

Run Date: 07/03/91 13:53

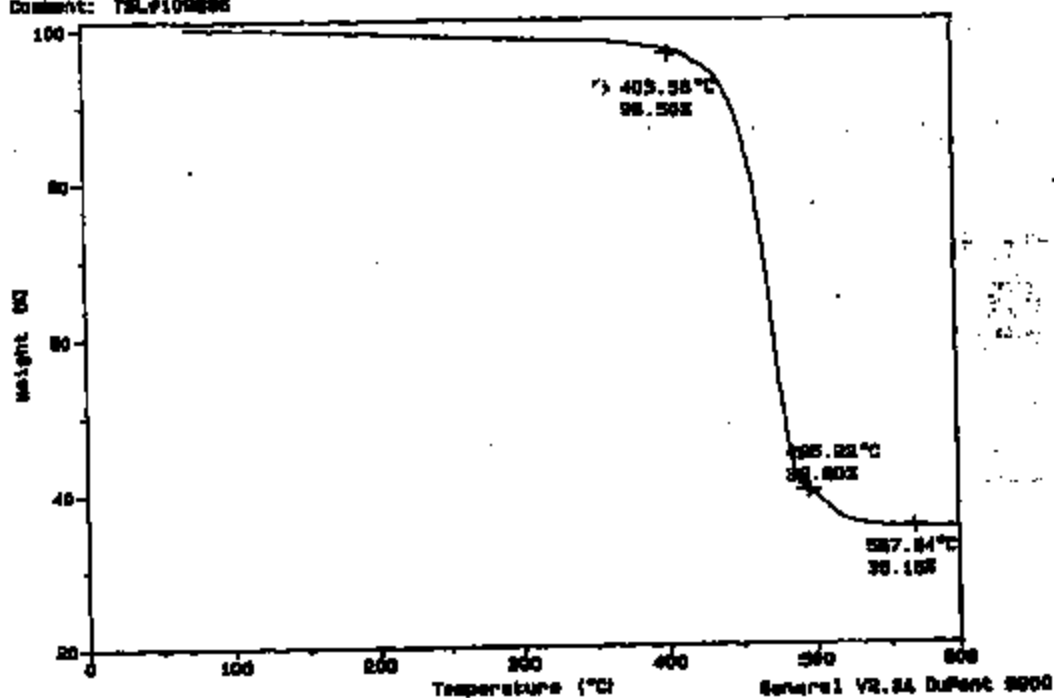


TI-NHTSA 005849

Sample: ANODEL BAGE
Size: 25.2840 mg
Method: 10/500/120
Comment: TSL#108888

TGA

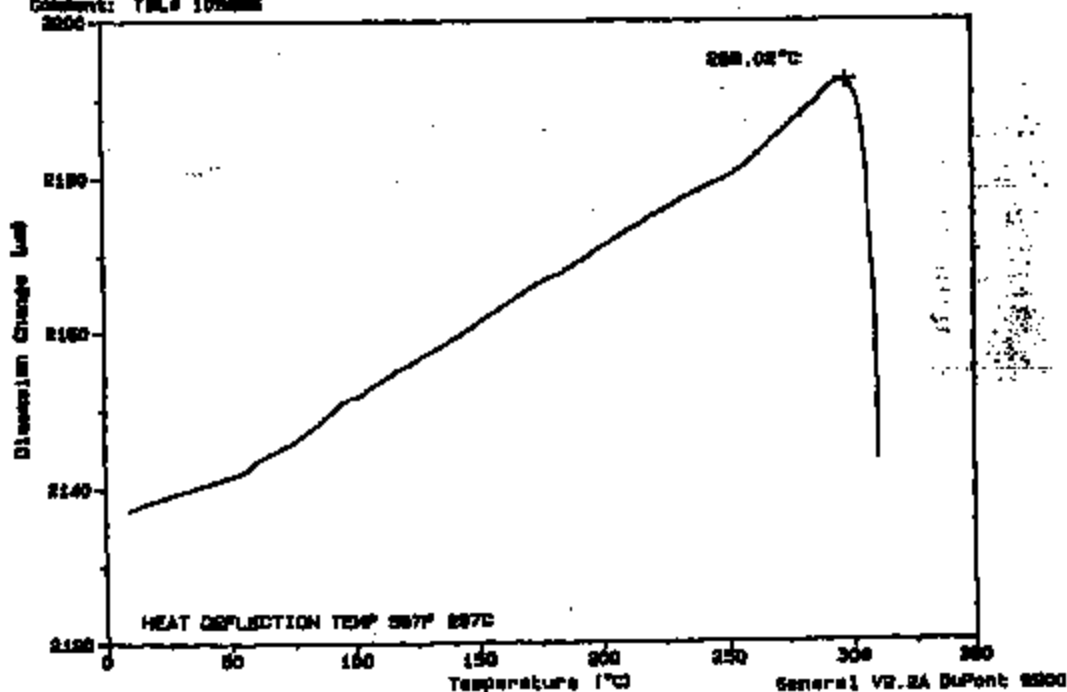
File: THERM.55
Operator: K ROSS
Run Date: 08/18/94 11:37



Sample: ANODEL BAGE
Size: 208.0000 mm
Method: 10/300
Comment: TSL# 108888

TMA

File: THERM.70
Operator: K ROSS
Run Date: 08/08/94 11:08

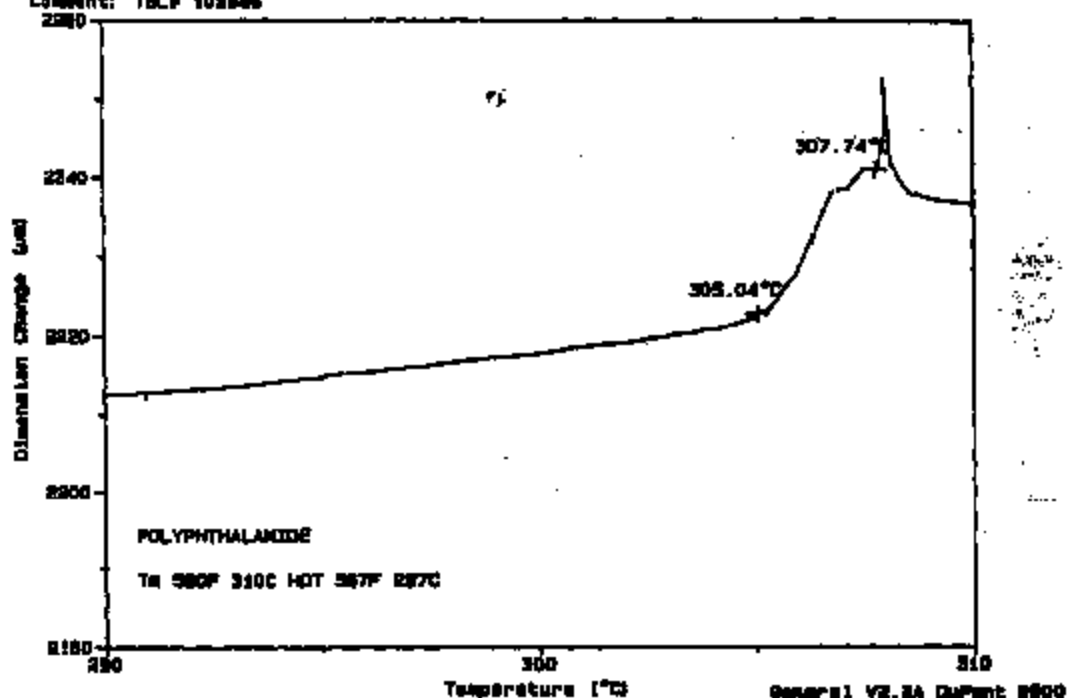


TI-NHTSA 005649

Sample: ANODEL ANNEALED
 Size: 305.0000 mm
 Method: 10/380
 Comment: TMLP 102886

TMA

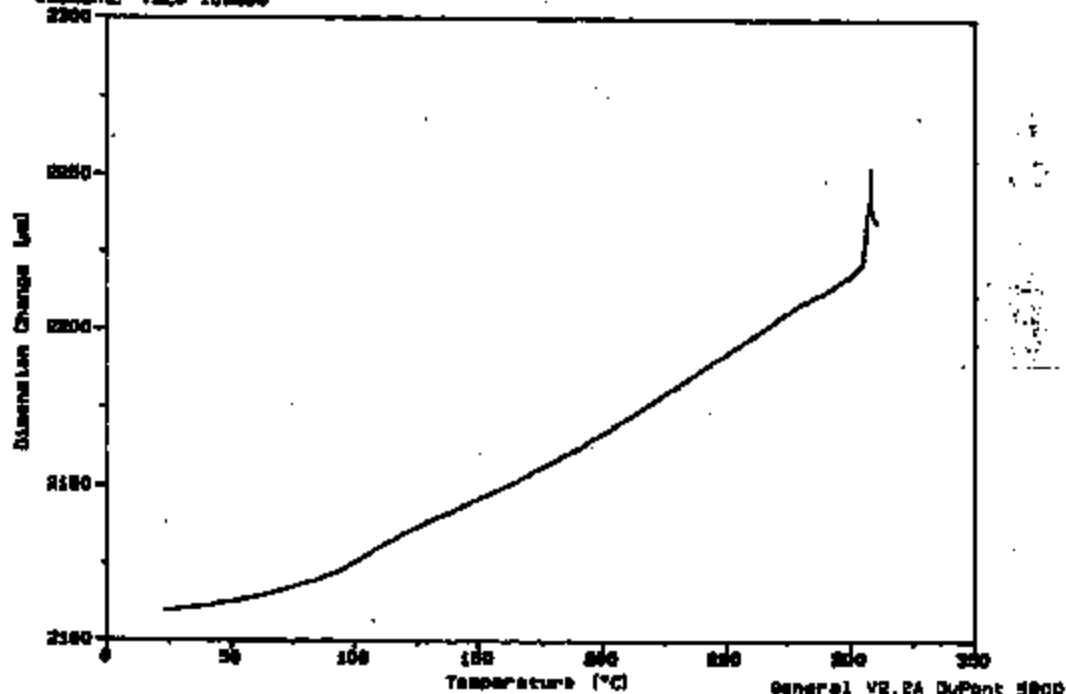
File: TMON.71
 Operator: K ROSS
 Run Date: 08/08/91 12:22



Sample: ANODEL ANNEALED
 Size: 305.0000 mm
 Method: 10/380
 Comment: TMLP 102886

TMA

File: TMON.71
 Operator: K ROSS
 Run Date: 08/08/91 12:22



Sample: AMODEL ID 38-00-05

Size: 11.4400 mg

Method: GEN/10/400

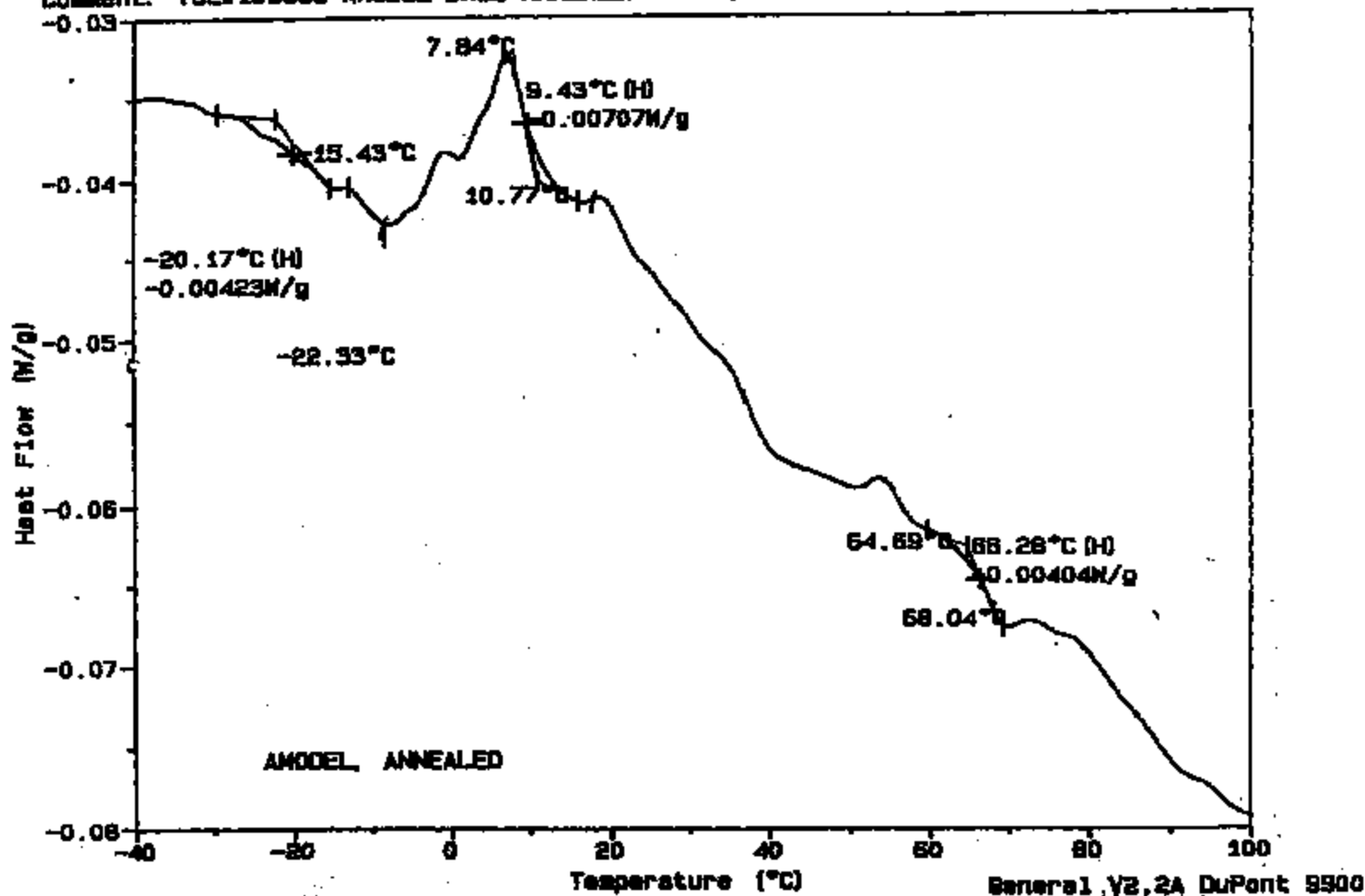
Comment: TSL#109886 AMODEL BASE ANNEALED 400°F. 204°C VACUUM 1 HR

DSC

File: DRONR,03

Operator: KROSS

Run Date: 07/08/91 13:45



TI-NHTSA 006651

Sample: AMOCEL ID 38-00-08

Size: 11.4400 mg

Method: GEN/10/400

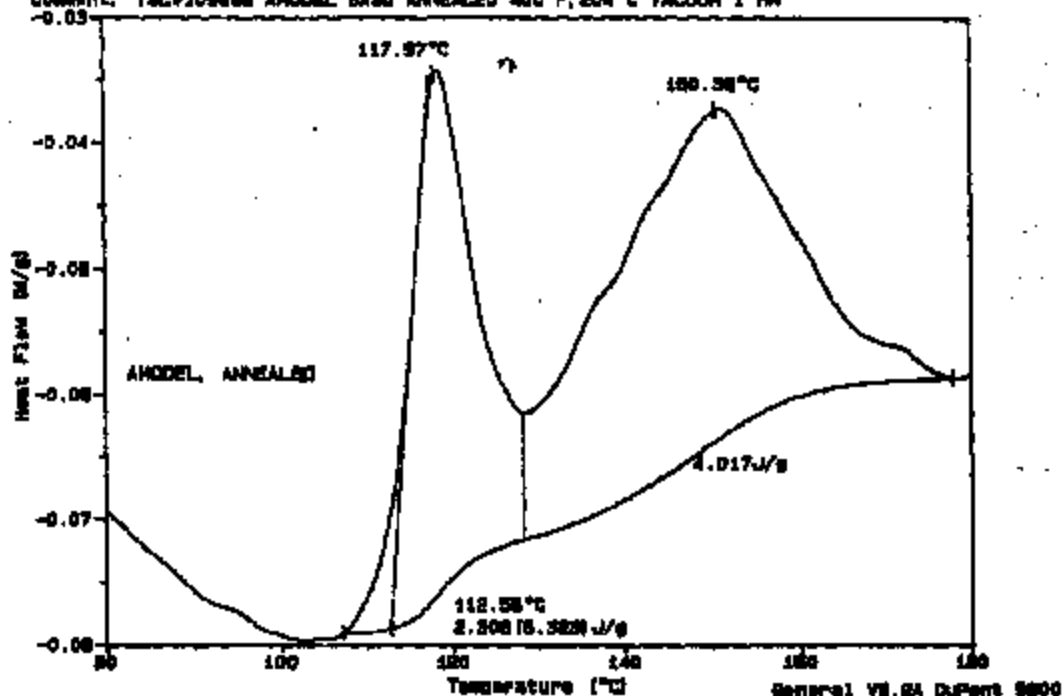
Comment: TEL#109888 AMOCEL BARE ANNEALED 400°F, 204°C VACUUM 1 HR

DSC

File: DSC08.08

Operator: KROUSE

Run Date: 07/08/01 13:48



Sample: AMOCEL ID 38-00-08

Size: 11.4400 mg

Method: GEN/10/400

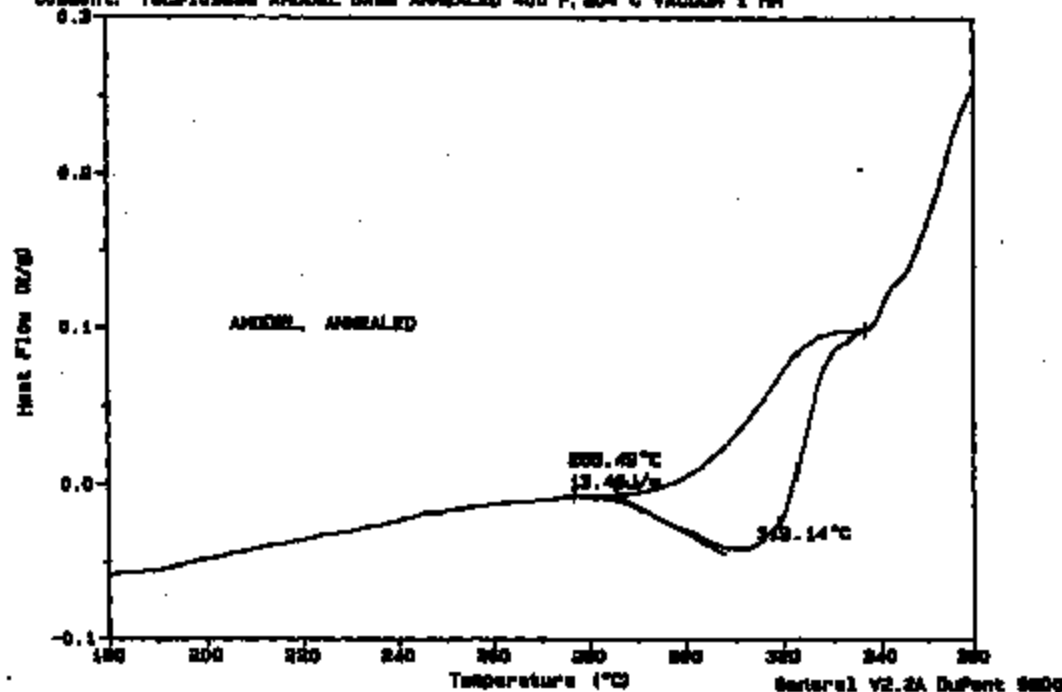
Comment: TEL#109888 AMOCEL BARE ANNEALED 400°F, 204°C VACUUM 1 HR

DSC

File: DSC08.08

Operator: KROUSE

Run Date: 07/08/01 13:48



TI-NHTSA 005652

Sample: AMODEL PRE-MOLD

Size: 12.3500 mg

Method: GEN/10/400

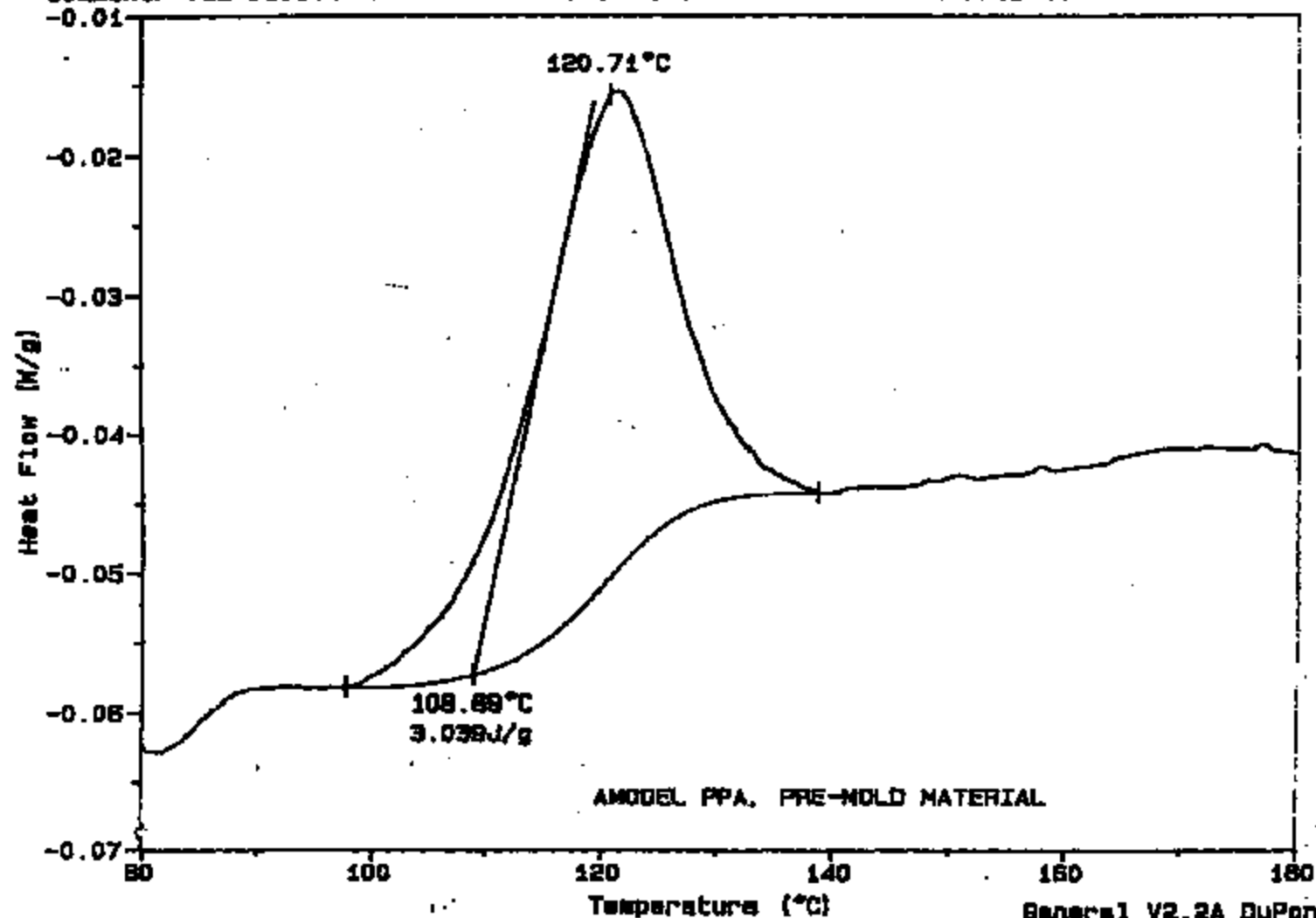
Comment: TSL #108888 POLYPHTHAMIDE (PPA) AMOCO PERFORMANCE PRODUCTS

DSC

File: DRONA.95

Operator: KROSS

Run Date: 07/08/91 07:30



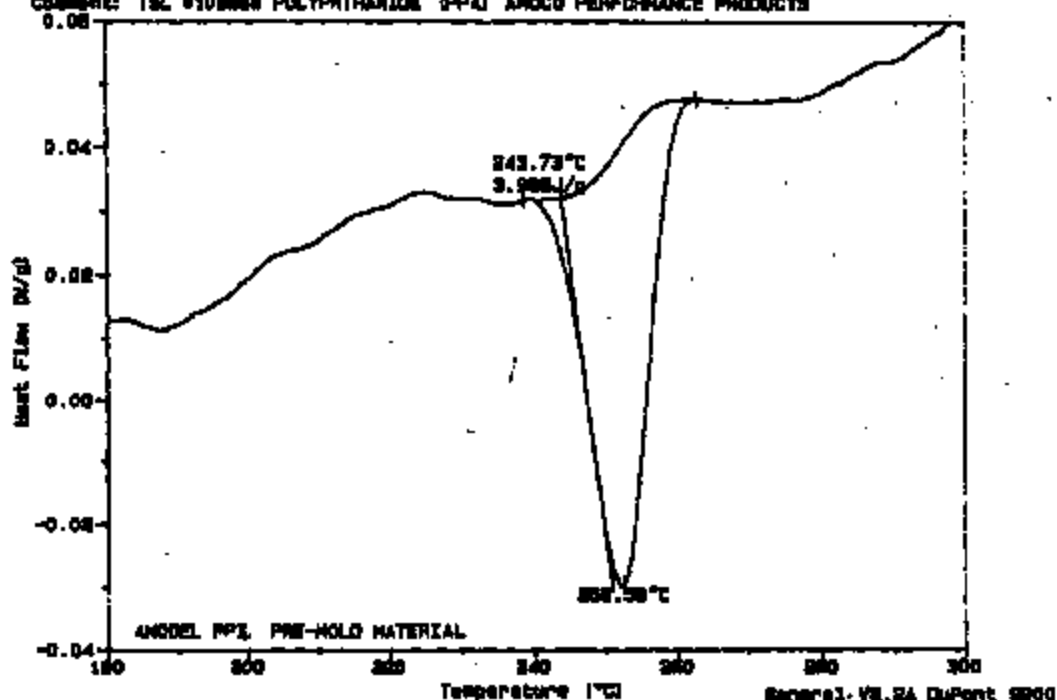
General V2.2A DuPont 9900

TI-NHTSA 005653

Sample: AMOEL PRE-HOLD
 Size: 12.7500 mg
 Method: QM/10/480
 Comment: TSL #108888 POLYPHTHALIMIDE (PPA) AMOCO PERFORMANCE PRODUCTS

DSC

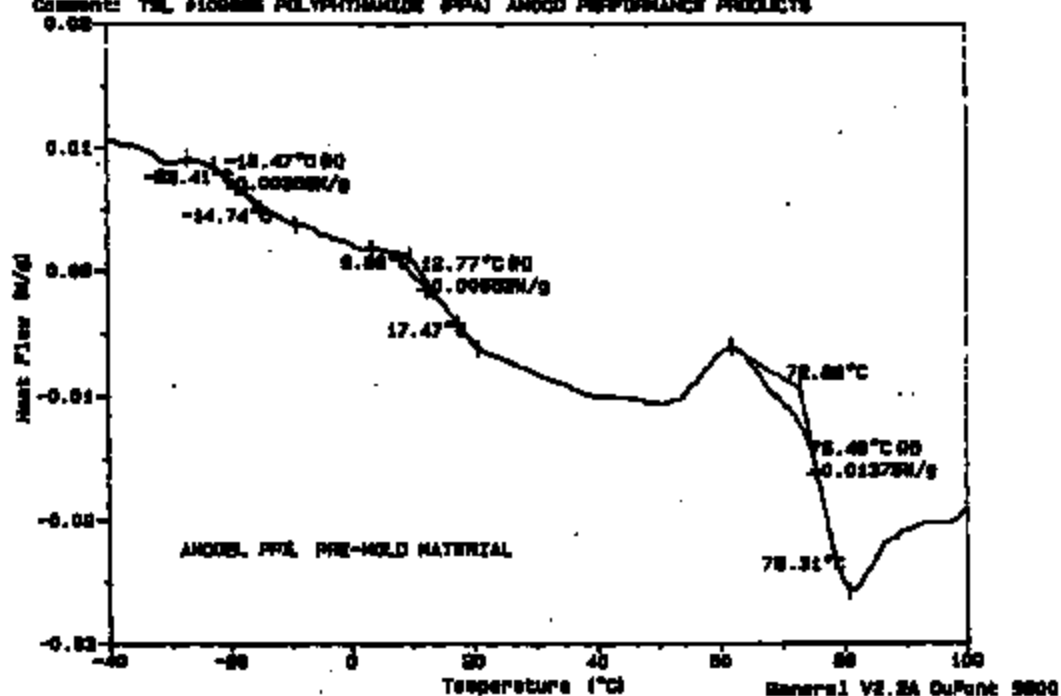
File: DDMR.84
 Operator: KROBE
 Run Date: 07/06/91 07:30



Sample: AMOEL PRE-HOLD
 Size: 12.7500 mg
 Method: QM/10/480
 Comment: TSL #108888 POLYPHTHALIMIDE (PPA) AMOCO PERFORMANCE PRODUCTS

DSC

File: DDMR.84
 Operator: KROBE
 Run Date: 07/06/91 07:30



TI-NHTSA 005654

Sample: HINDEL 83-22 PRE-MOLD

Size: 10.0000 g

Method: DSC/10/400

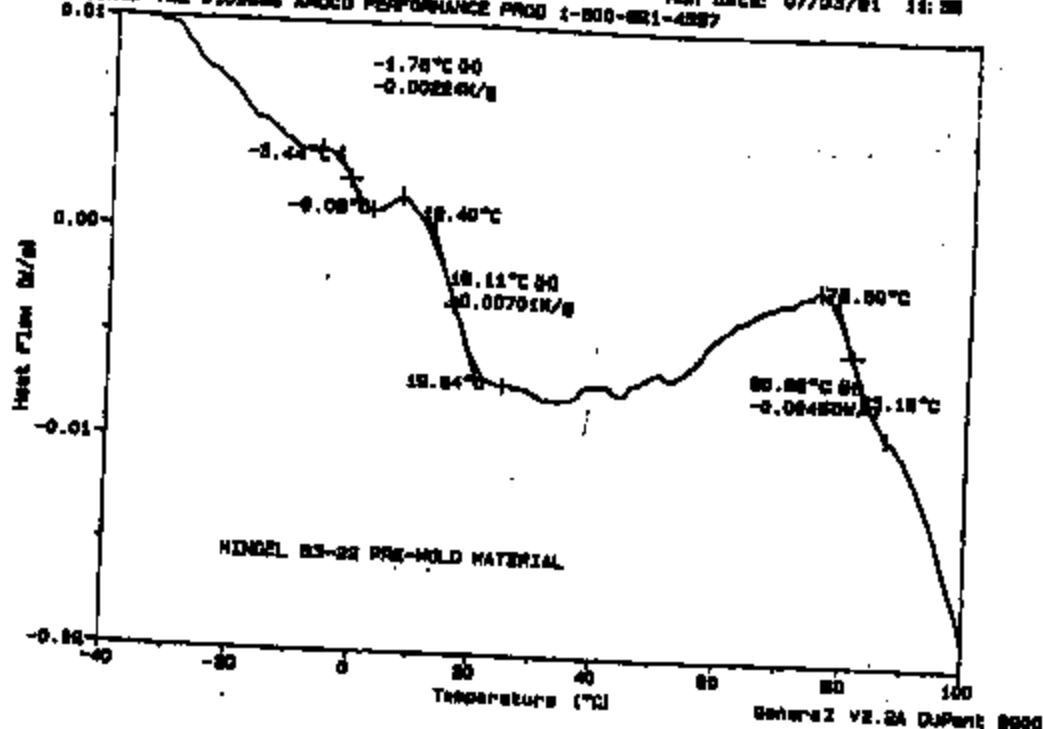
Comment: TEL #109886 AMOCO PERFORMANCE PROD 1-800-821-4887

DSC

File: DSC001.01

Operator: KROES

Run Date: 07/03/91 14:38



Sample: HINDEL 83-22 PRE-MOLD

Size: 14.0000 g

Method: DSC/10/400

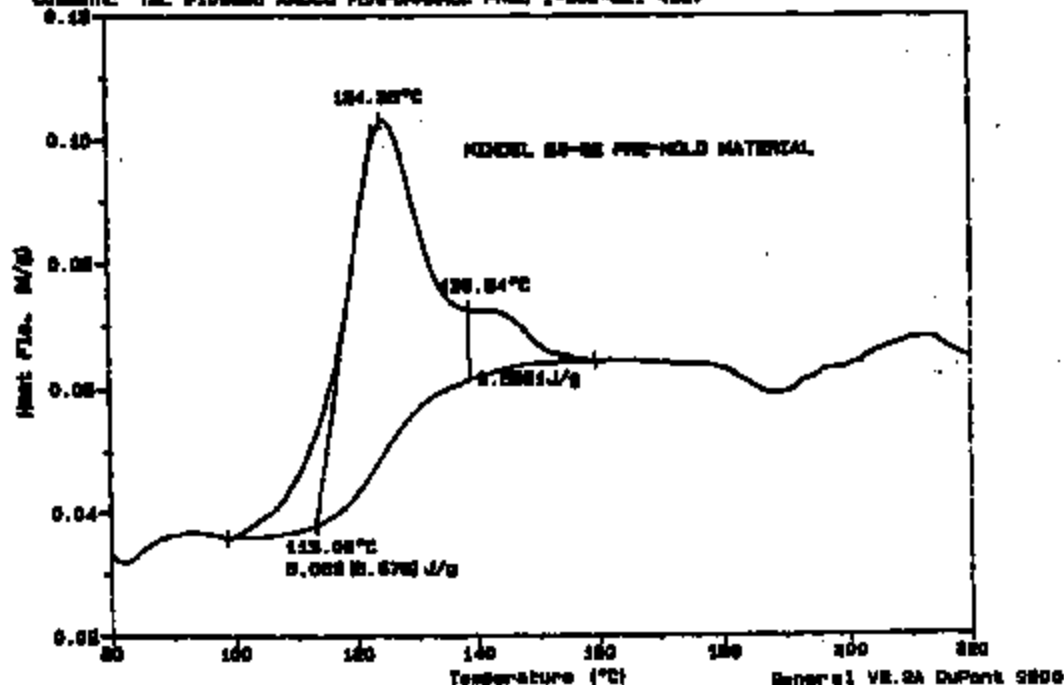
Comment: TEL #109886 AMOCO PERFORMANCE PROD 1-800-821-4887

DSC

File: DSC001.00

Operator: KROES

Run Date: 07/03/91 12:38

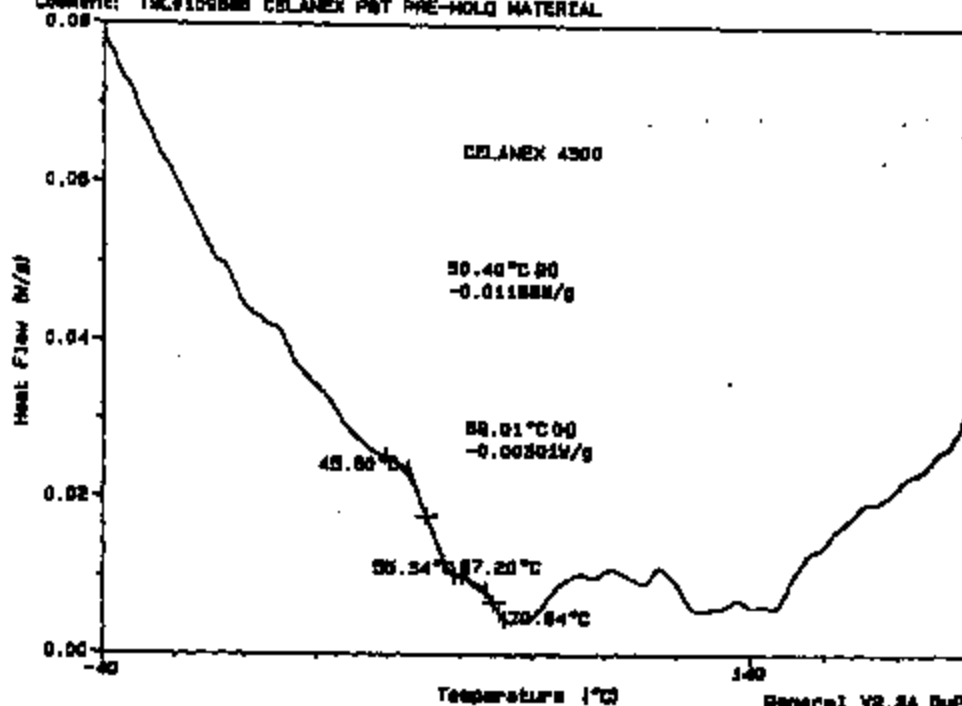


TI-NHTSA 005655

Sample: CELANEX 4300 PBT
 Size: 10.7800 mg
 Method: GEN/10/375
 Comment: TSL#105888 CELANEX PBT PRE-HOLD MATERIAL

DSC

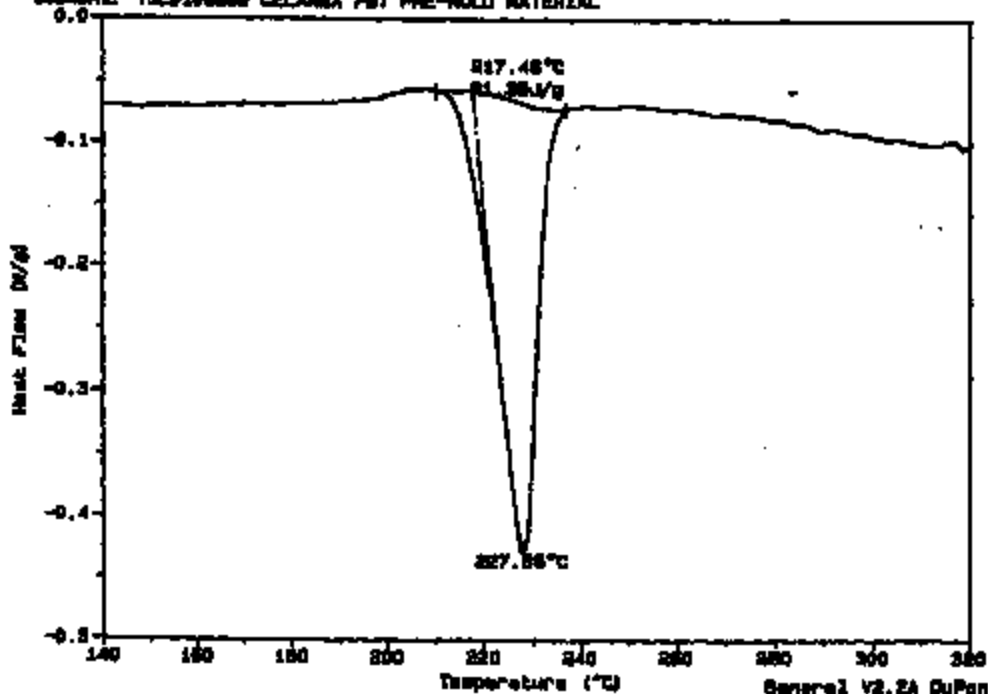
File: DDMR.11
 Operator: KROSB
 Run Date: 07/08/91 11:33



Sample: CELANEX 4300 PBT
 Size: 13.1300 mg
 Method: GEN/10/375
 Comment: TSL#105888 CELANEX PBT PRE-HOLD MATERIAL

DSC

File: DDMR.12
 Operator: KROSB
 Run Date: 07/08/91 11:33

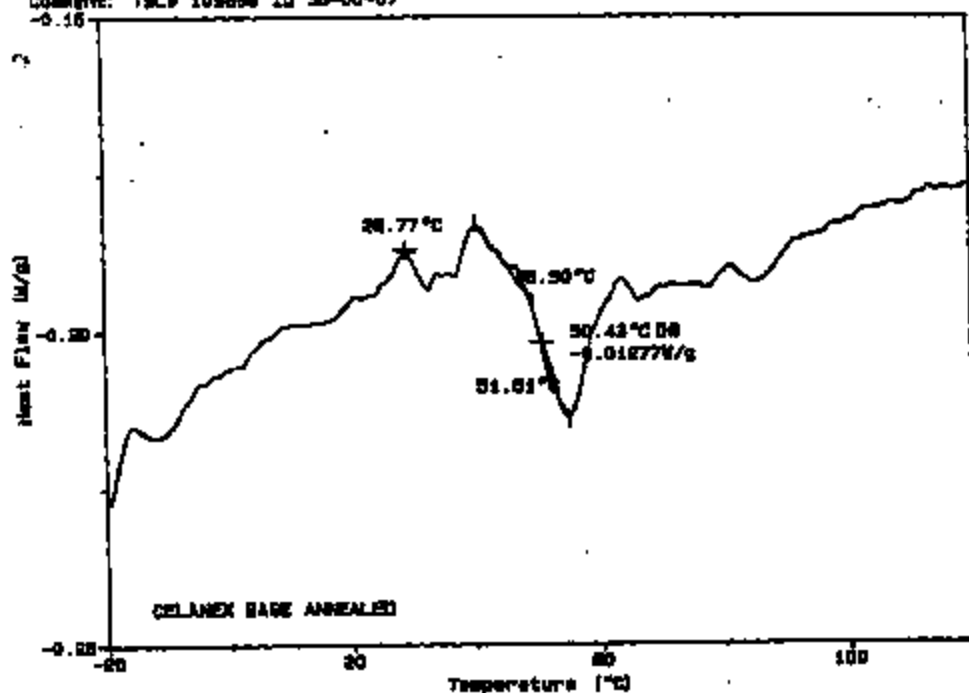


TI-NHTSA 005656

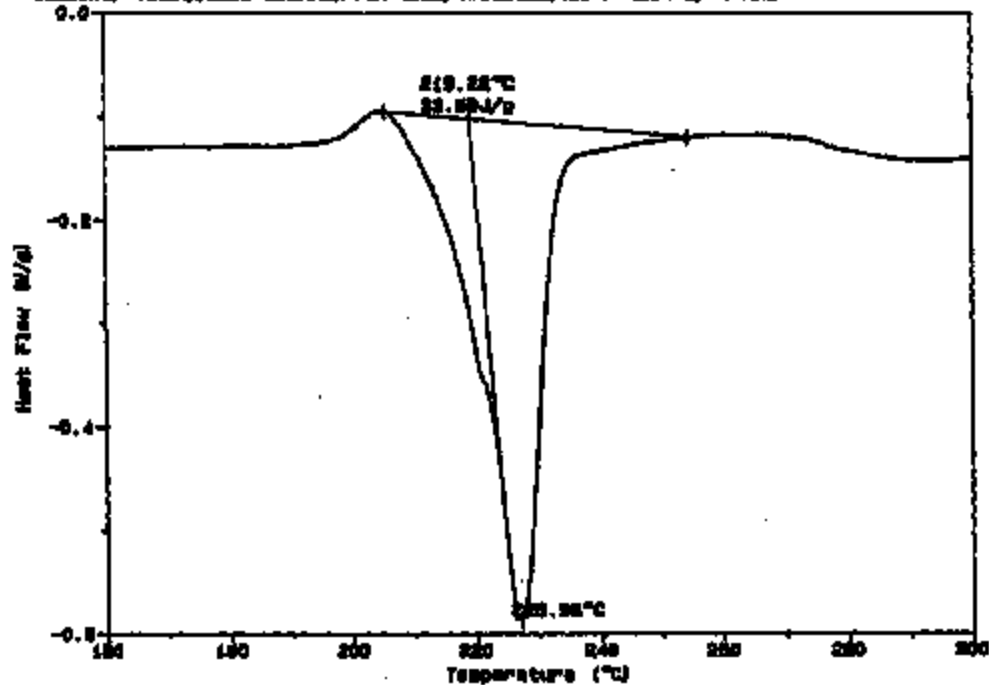
Sample: CELANEX BAGE ANNEALED
 Size: 10.7000 mg
 Method: 10/360
 Comment: TPL# 105808 ID 35-00-07

DSC

File: Q6069.B4
 Operator: K JONES
 Run Date: 09/14/91 10:13



Method: WDA/10/375
 Comment: TPL#105808 CELANEX PBT BAGE ANNEALED-400°F (204°C) 4 HRS

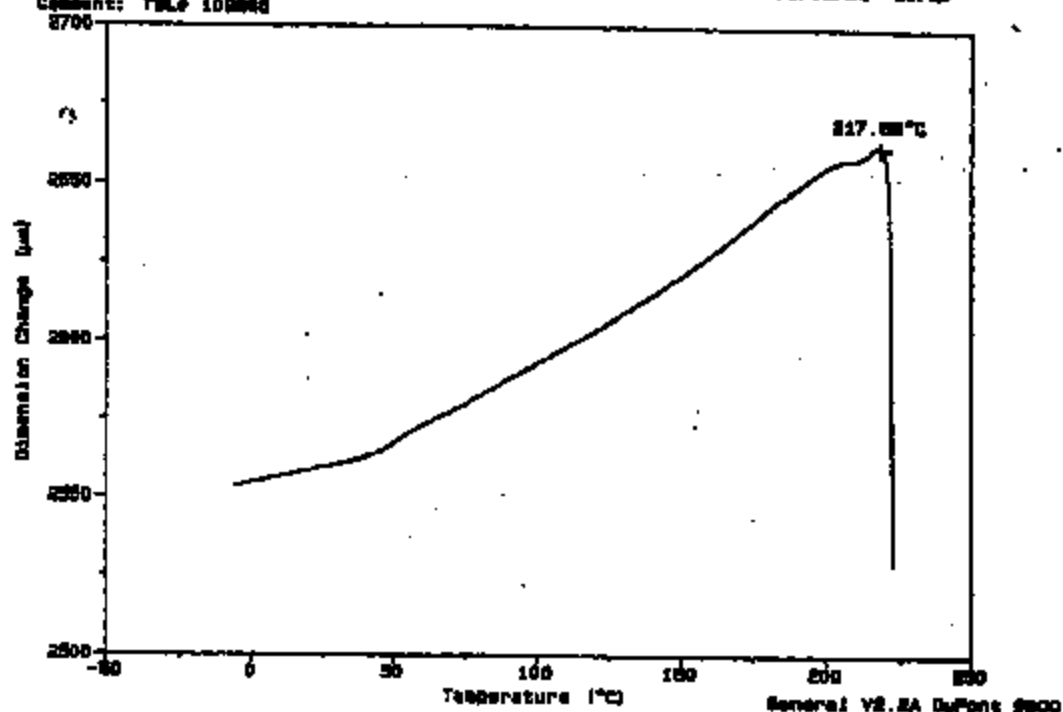


TI-NHTSA 005657

Size: 357.0000 mm
 Method: 10/220
 Comment: TBL 102220

IMA

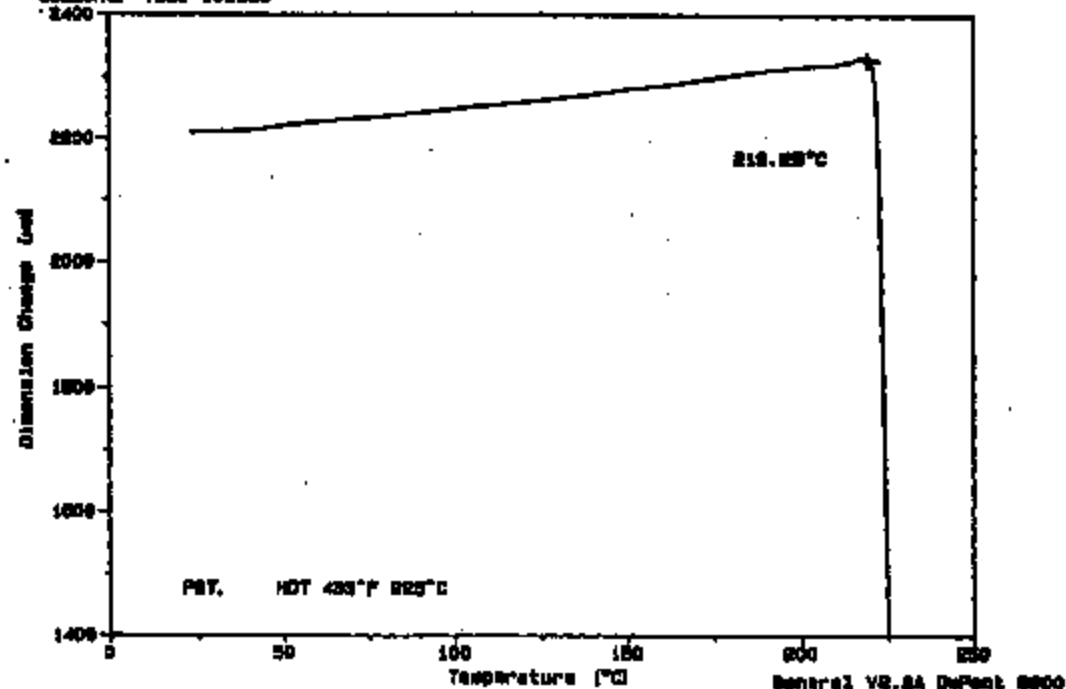
File: T0001.75
 Operator: K ROSE
 Run Date: 02/05/81 10:30



Sample: CBLANEX 4300
 Size: 888.0000 mm
 Method: 10/220
 Comment: TBL 102220

TMA

File: T0001.75
 Operator: K ROSE
 Run Date: 02/05/81 10:37

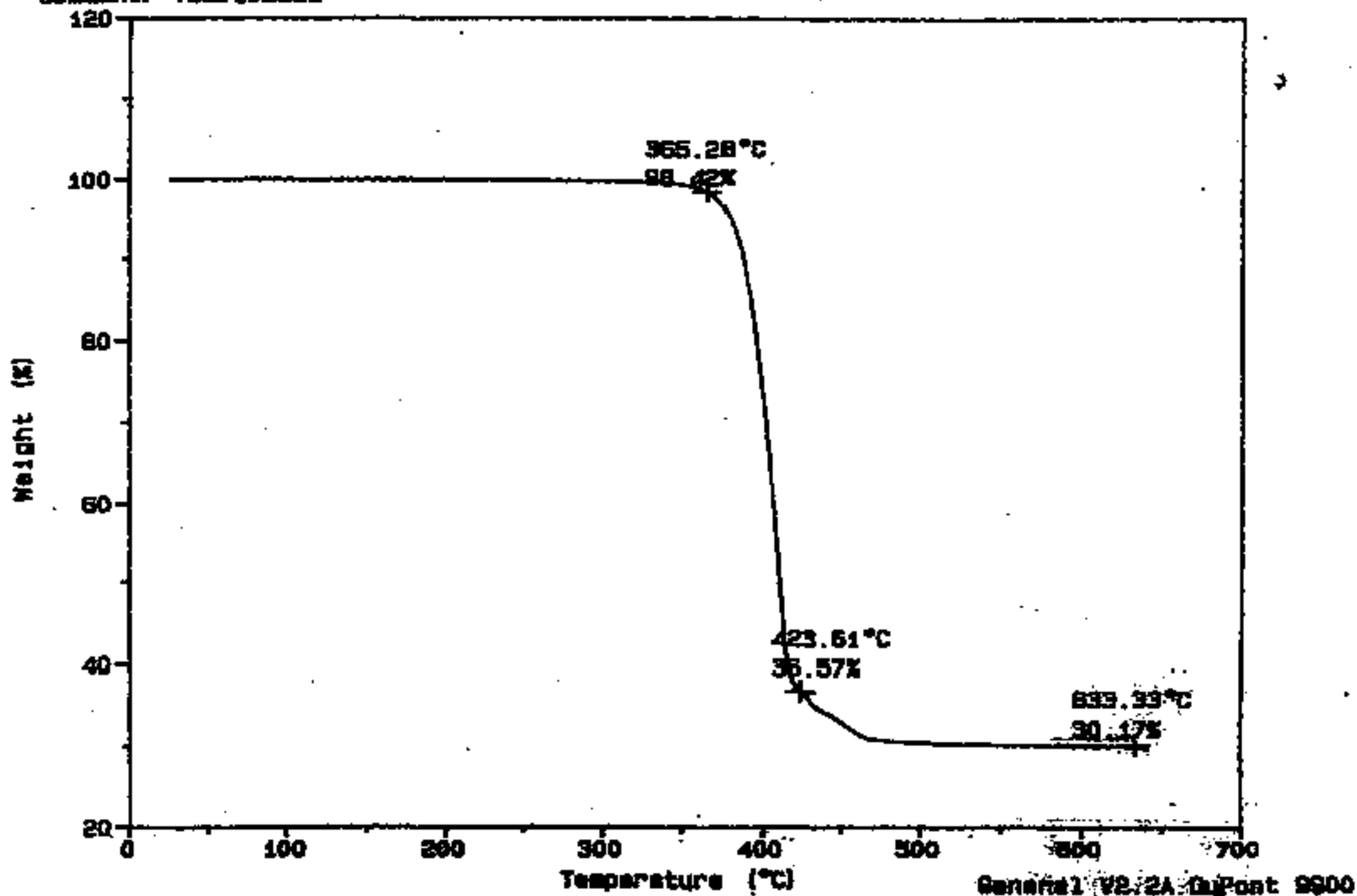


TI-NHTSA 005658

Sample: CELANEX BASE
Size: 24.7530 mg
Method: 10/500/180
Comment: TSL#102888

TGA

File: TRONR.84
Operator: K ROSS
Run Date: 09/16/91 14:36



TI-NHTSA 005659