EA02025

TEXAS INSTRUMENTS, INC.'S

9/10/03 ATTACHMENT TO ODI

BOX 4, PARTS A - N

PART E

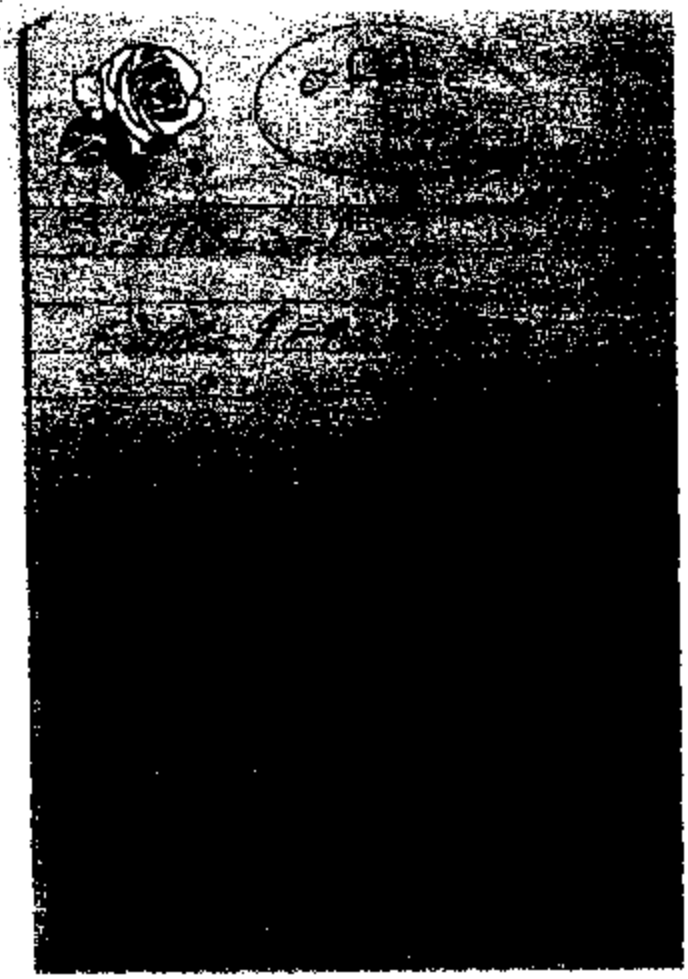
TEXAS INSTRUMENTS

ISIR SUBMISSION

TO FORD MOTOR COMPANY
FOR PART NUMBERS F2AC – 9F924 – AA
CRUISE CONTROL PRESSURE SWITCH
FOR EN53 PLATFORM

APRIL 13, 1992

TEXAS INSTRUMENTS INCORPORATED • 34 FOREST STREET • ATTLEBORO, MA 02703
508-699-3000 • TELEX 210601 • CABLE TEXINS



TTPS 43

Sep

Norma Freda

Thurs. 4-8-93 5:00pm

Ex

Bruce Moeroff

[illegible] FQE

[illegible] ES [illegible] results

full [illegible] in 1992

OPERATING UNIT:

DATE:

GENERAL PLANNING FORM

FINAL INSPECTION 77PSL3-1

DATE:

CUSTOMER P/N F2XC-9F924-AA

DISC LOT	MAT.I.D.	DISC LOT	MAT.I.D.
REEL #	CUP LOT #	REEL #	CUP LOT #
LOT #	CONV.LOT	LOT #	CONV. LOT
WASHER LOT	QTY.	WASHER LOT	QTY.

	TEST	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
1A	ACTUATION																		
	RELEASE																		
2	VISUAL																		
3	DIMENSION	---	---	---	---	---					---	---	---	---	---				
4B	VOLT DROP	---	---	---	---	---					---	---	---	---	---				
5C	CUR.LEAK	---	---	---	---	---					---	---	---	---	---				
6D	PROOF	---	---	---	---	---					---	---	---	---	---				
7	IMPULSE						---	---	---	---						---	---	---	---
A	ACTUATION																		
	RELEASE																		
B	WASHDROP						---	---	---	---						---	---	---	---
C	CUR.LEAK						---	---	---	---						---	---	---	---
D	PROOF						---	---	---	---						---	---	---	---
9J	TERM. STR	---	---	---	---	---					---	---	---	---	---				
A	ACTUATION	---	---	---	---	---					---	---	---	---	---				
	RELEASE	---	---	---	---	---					---	---	---	---	---				
B	VOLT DROP	---	---	---	---	---					---	---	---	---	---				
C	CUR.LEAK	---	---	---	---	---					---	---	---	---	---				
D	PROOF	---	---	---	---	---					---	---	---	---	---				
9	BURST	---	---	---	---	---					---	---	---	---	---				

INSPECTION TEST SUMMARY

TEXAS INSTRUMENTS

34 FOREST STREET, ATTLEBORO, MA 02703

PART NO.: 77PS REV.:

PART NAME: Cruise Control Pressure Switch

QAS NO.: 208 REV.: SR:

TI ORDER NO./DATE CODE:

CUSTOMER: Ford

CUSTOMER P.O. NO.:

CUSTOMER PART NO.: Various

APPROVED BY: Michael [signature] DATE: 4/13/92

LOT NO.	DATE	SUB NO.	LOT SIZE	SAMPLE SIZE	DISP. AC.	DISP. RE.	BILL NO.	INSP. NO.
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								

	FINAL INSPECTION							LOT AUDIT INSPECTION								
INSPECTION METHOD	A.P.E.	Comparator	Co/Radio Gauge	Visual												
CHARACTERISTIC	Calibration Voltage Drop	Terminal Location	Threads	Workmanship/Coding				Calibration	Voltage Drop	Impulse Test	Current Leakage	Proof Test	Burst Tst	Terminal Strength	Dimensional	
AQL	0065	2/	3/	5/				9	4	5	4	4	4	4	4	

FORM 22420

TI-NHTSA 005684

INSPECTION TEST SUMMARY

TEXAS INSTRUMENTS

34 FOREST STREET, ATTLEBORO, MA 02703

PART NO. 77PS REV.

PART NAME Cruise Control Pressure Switch

QAS NO. 208 REV. SR

TI ORDER NO./[illegible]

CUSTOMER Ford

CUSTOMER P.O. NO.

CUSTOMER PART NO. Various

APPROVED BY

DATE

	Final Inspection							Lot Audit Inspection								
INSPECTION METHOD	A.R.T.	[illegible]	Go/No Go Gages	Visual												
CHARACTERISTIC	Calibration, Voltage Drop	Terminal Location	Threads	Workmanship / Coding				Calibration	Voltage Drop	Impulse Test.	Current Leakage	Proof Test	Burst Test	Terminal Strength	Dimensional	
AQL	4		4	4				4	4	5	4	4	4	4	4	

LOT NO.	DATE	SUB NO.	LOT SIZE	SAMPLE SIZE	DISP. AC.	DISP. RE.	REJ. NO.	INSP. NO.
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								

FORM [illegible]

TEXAS INSTRUMENTS

DIMENSIONAL ANALYSIS ON PART NUMBER

F2AC-9F924-AA

ENVELOPE DIMENSIONS TO BASE ONLY

	BLUEPRINT SPEC	CAVITY # A ACTUAL	CAVITY # B ACTUAL	CAVITY # C ACTUAL	CAVITY # D ACTUAL
1	11.40 - 11.90	11.806	11.817	11.817	11.794
2	~~12.90 - 13.21~~	13.043	13.043	13.072	13.094
3	16.56 - 16.76	16.698	16.652	16.671	16.673
		16.661	----	16.680	16.668
3	19.45 - 19.81	19.752	19.754	19.787	19.799
4	2.84 - 3.05	2.930	2.93	2.944	2.951
	Ⓟ 0.1 Ⓢ A	1.897 0.003	1.923 0.023	1.945 0.045	1.885 0.015
6	31DEG +/- 2DEG	29DEG 29MIN	29DEG 38MIN	29DEG 58MIN	29DEG 34MIN
5	1.95 - 2.06	1.927	1.966	1.969	1.978
6	1.24 - 1.55	1.365	1.387	1.423	1.400
7	1.24 - 1.45	1.269	1.268	1.275	1.308
8	11.60 - 11.92	11.768	11.768	11.759	11.777
		11.729	11.740	11.789	11.747
11	13.43 - 13.85	13.010	13.769	13.786	13.647
9	0.25 - 0.75	0.490 0.475	0.519 0.523	0.573 0.635	0.619 0.593
10	2.79 - 3.10	2.900	2.909	2.912	2.908
	2 PL	2.903	2.915	2.913	2.911

TEXAS INSTRUMENTS INCORPORATED • 34 FOREST STREET • ATTLEBORO, MA 02703
[illegible] • TELEX [illegible] TWX [illegible] • CABLE TEXINS

DRAWINGS AVAILABLE UPON REQUEST

TEXAS INSTRUMENTS

DIMENSIONAL ANALYSIS ON PART NUMBER

F2AC-9F924-AA

	BLUEPRINT SPEC	CAVITY # A ACTUAL	CAVITY # B ACTUAL	CAVITY # C ACTUAL	CAVITY # D ACTUAL
14	0.05 - 0.26	0.151	0.153	0.124	0.076
	2 PL	0.113	0.142	0.163	0.147
17	19.05 MAX	18.667	18.709	18.671	18.704
		18.701	18.748	18.565	18.757
18	12.59 - 13.11	12.800	12.829	12.802	12.819
		12.829	12.800	12.842	12.824
13	0.68 - 1.30	1.085	1.105	1.122	1.175
14	2.79 - 3.41	3.076	3.0612	3.152	3.109
19	7.23 - 7.75	7.579	7.501	7.514	7.545
15	6.60 - 6.81	6.701	6.673	6.715	6.677
21	29DEG +/- 2DEG	MEASURED	29DEG 24MIN	ON CROSS	SECTIONED
	4 X	PART	30DEG 06MIN	----	----
		----	29DEG 58MIN	----	----
		----	29DEG 47MIN	----	----
16	NO FLASH/BURRS	SLIGHT	FLASH ON	EDGES	@ 10X

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TEXAS INSTRUMENTS

DIMENSIONAL ANALYSIS ON PART NUMBER

F2AC-9F924-AA

	BLUEPRINT SPEC	CAVITY # A ACTUAL	CAVITY # B ACTUAL	CAVITY # C ACTUAL	CAVITY # D ACTUAL
19	8.30-8.72 2X	8.535	8.559	8.484	8.578
		8.726	8.512	8.570	8.519
24	2.15-2.42 2X	2.162	2.171	2.282	2.271
		2.212	2.236	2.297	----
25	25DEG +/- 2DEG	24DEG 25MIN	24DEG 56MIN	24DEG 47MIN	24DEG 06MIN
	2 X	24DEG 10MIN	24DEG 14MIN	24DEG 06MIN	24DEG 43MIN
26	45DEG +/- 2DEG	46DEG 10MIN	42DEG 44MIN	43DEG 44MIN	45DEG 03MIN
	APL	44DEG 35MIN	43DEG 47MIN	44DEG 47MIN	45DEG 01MIN
		45DEG 22MIN	44DEG 47MIN	45DEG 49MIN	46DEG 11MIN
		44DEG 08MIN	45DEG 37MIN	46DEG 38MIN	43DEG 50MIN
27	(71.5DEG) 2X	72DEG --	71DEG 31MIN	71DEG 20MIN	72DEG 01MIN
		71DEG 07MIN	72DEG --	72DEG 10MIN	71DEG 12MIN
28	1.42-1.63 2X	1.538	1.538	1.582	1.609
		1.539	1.612	1.602	1.596
29	0.35-0.66 4X	0.546 0.547	0.570 0.590	0.598 0.580	0.581 0.556
		0.592 0.614	0.561 0.574	0.576 0.603	0.556 0.575
30	0.35-0.66 4X	0.501 0.471	0.467 0.502	0.459 0.520	0.477 0.443
		0.378 0.417	0.320 0.344	0.357 0.382	0.398 0.398
		0.493 0.506	0.494 0.539	0.436 0.482	0.486 0.518
		0.382 0.395	0.450 0.484	0.384 0.393	0.373 0.409

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508-699-9800 • TELEX 95-7799 TWX 710-348-0549 • CABLE TEXINS

TEXAS INSTRUMENTS

DIMENSIONAL ANALYSIS ON PART NUMBER

F2AC-9F924-AA

	BLUEPRINT SPEC	CAVITY # A ACTUAL	CAVITY # B ACTUAL	CAVITY # C ACTUAL	CAVITY # D ACTUAL
31	0.86 - 1.17	1.023	1.012	1.026	1.021
	4 X	0.985	0.998	0.988	1.041
		1.023	0.992	1.026	1.014
		0.976	0.978	0.991	0.984
32	TERM.HOUSING	BLACK ONLY	AVAILABLE	TO QUALIFY	MOLD
	NATURAL)				

A 1.. L46
A 50.. L94

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508-699-8800 • TELEX 94-7703 TWX 710-349-6848 • CABLE TEXINS

TEXAS INSTRUMENTS

ATTLEBORO, MASSACHUSETTS 02703

PAGE 1 OF 2

SAMPLE REPORT

(77PSL3-1)

REASON FOR REPORT		VENDOR	DATE	P.O.	PART NO.	REV.
NEW PART		——			77PSL2-1	G
REPLACEMENT TOOL		REPORT REQ. BY	DATE	INSPECTED BY		DATE
CORRECTED TOOL		E. Rose	4/2/92	Elaine Gravel		4/7/92
REPAIRED TOOL						
REVIEW						
OTHER Dimensional Analysis	X					

THE DIMENSIONS INDICATED BELOW REPRESENT TEXAS INSTRUMENTS' FINDINGS REGARDING THE ACTUAL VALUES FOR ALL CHARACTERICS MEASURED. IN CASES WHERE ACTUAL VALUES DEVIATE FROM THE SPECIFIED DIMENSIONS, THE DISPOSITION MUST INDICATE THE REQUIRED ACTION FOR EACH NON-CONFORMANCE IN THE APPROPRIATE COLUMN.

	(CIRCLE ALL OUT OF TOLERANCE DIMENSIONS)					DISPOSITION		
		A	B	C	D	Inspect Method		
1	11.40 – 11.90	11.806	11.797	11.817	11.794	TM		
2	12.80 – 13.21	13.043	13.043	13.072	13.094	TM		
3	16.56 – 16.76	[illegible]	16.652	[illegible]	[illegible]	MIC		
4	19.45 – 19.81	19.757	19.754	19.787	19.799	MIC		
5	2.84 – 3.05	2.930	2.93	2.944	2.951	MIC		
	⊕ 0.1 Ⓢ A	[illegible]	[illegible]	[illegible]	⌀ 0.015	TM		
6	31° ± 2°	29° 29'	29° 30'	30° 57'	29° 34'	↓		
7	1.85 – 2.06	1.927	1.966	1.969	1.978			
8	1.24 – 1.55	1.365	1.387	1.423	1.400			
9	1.24 – 1.45	1.361	[illegible]	1.275	1.308	↓		
10	11.60 – 11.92	[illegible]	[illegible]	[illegible]	11.747	MIC		
11	13.43 – 13.85	13.010	13.769	13.786	13.449	TM		
12	0.25 – 0.75	[illegible]	[illegible]	[illegible]	[illegible]			
13	2.79 – 3.10 4X 1	2.900	2.909	2.912	2.908	↓		
	2	2.903	2.915	2.913	2.911	MIC		
14	0.05 – 0.26 4X	[illegible]	[illegible]	[illegible]	[illegible]	TM		
15	⌀ 19.05 MAX.	[illegible]	[illegible]	[illegible]	[illegible]	TM		
16	12.59 – 13.11	[illegible]	[illegible]	[illegible]	[illegible]	TND		
N/A	11.65 – 12.17	N/A No Terminals →						
17	0.68 – 1.30	1.085	1.105	1.122	1.195	TM		
18	2.79 – 3.41	3.096	3.061	3.152	3.109			
19	7.23 – 7.75	7.579	7.581	7.574	7.545			
20	6.60 – 6.21	6.701	6.673	6.715	6.679			
21	29° ± 2° 4X	——	[illegible]	——	——			
		——	[illegible]	——	——	↓		
22	No Flash on bosses at –	Slight	Flash	on edges			ⓐ / OK	

REMARKS AND/OR INSTRUCTIONS:

– Noryl GTX 830 –

for 77PSL3-1 (new material)

DISPOSITION: TOOL APPROVED FOR PROD.		RESUBMISSION REQ'D	
MFG. ENG.:		QRA ENG.:	
		PURCH. AGENT:	

FORM NO. 30788

TI-NHTSA 005671

TEXAS INSTRUMENTS

ATTLEBORO, MASSACHUSETTS 02703

PAGE 2 OF 2

SAMPLE REPORT

(77PSL3-1)

REASON FOR REPORT		VENDOR	P.O.	PART NO.	REV.
NEW PART				77PSL2-1	C
REPLACEMENT TOOL.		REPORT REQ. BY	DATE	INSPECTED BY	DATE
CORRECTED TOOL.		E. Rose	4/02/92		4/7/92
REPAIRED TOOL.					
REVIEW					
OTHER					

THE DIMENSIONS INDICATED BELOW REPRESENT TEXAS INSTRUMENTS' FINDINGS REGARDING THE ACTUAL VALUES FOR ALL CHARACTERICS MEASURED. IN CASES WHERE ACTUAL VALUES DEVIATE FROM THE SPECIFIED DIMENSIONS, THE DISPOSITION MUST INDICATE THE REQUIRED ACTION FOR EACH NON-CONFORMANCE IN THE APPROPRIATE COLUMN.

	(CIRCLE ALL OUT OF TOLERANCE DIMENSIONS)	A	B	C	D	DISPOSITION		
~~23~~	Land on surface					TM		
~~25A~~ 22A	1.80 - 2.216 2X 1	1.651	1.651	1.651	1.651	↓		
	2	1.651	1.772	1.651	1.651			
23 ~~24~~	8.30 - 8.72 2X 1	8.535	8.653	8.484	8.512			
	2	8.786	8.602	8.570	8.519			
24 ~~25~~	2.15 - 2.42 2X 1	2.162	2.171	2.272				
	2	2.212	2.236	2.237	2.271			
25 ~~26~~	25°±2° 2X 1	24°25'	24°56'	24°42'	24°06'			
	2	24°18'	24°14'	24°06'	24°43'			
26 ~~27~~	45°±2° 4 places 1	[illegible]	[illegible]	[illegible]	[illegible]			
	2	44°25'	43°49'	44°47'	45°01'			
	3	[illegible]	[illegible]	[illegible]	[illegible]			
	4	44°02'	42°53'	46°38'	43°50'			
27 ~~28~~	(71.5°) 2X 1	72°	71°41'	71°20'	72°01'			
	2	71°02'	72°	72°10'	71°12'			
28 ~~29~~	1.42 - 1.63 2X 1	1.538	1.538	1.582	1.603			
	2	1.539	1.612	1.602	1.596			
29 ~~30~~	0.35 - 0.66 4X 1	0.546	0.570	0.581	0.571			
	2	0.542	0.580	0.580	0.553			
	3	0.572	0.581	0.576	0.532			
	4	0.614	0.574	0.612	0.575			
30 ~~31~~	0.35 - 0.66 4X 1	[illegible]	[illegible]	[illegible]	[illegible]			
	2	[illegible]	[illegible]	[illegible]	[illegible]			
	3	[illegible]	[illegible]	[illegible]	[illegible]			
	4	[illegible]	[illegible]	[illegible]	[illegible]			
31 ~~32~~	0.86 - 1.17 4X 1	1.029	1.078	1.046	1.021			
	2	0.985	0.987	0.985	1.001			
	3	1.023	0.973	1.082	1.014			
	4	0.978	1.997	0.991	1.384	↓		
32 ~~33~~	Term. housing Brown	black	ok per Elaine Rose.		Trying	new material		

REMARKS AND/OR INSTRUCTIONS:

DISPOSITION: TOOL APPROVED FOR PROD.		RESUBMISSION REQ'D	
MFG. ENG.:		QRA ENG.:	
		PURCH. AGENT:	

FORM NO. 28762

Elaine - I'll be out
4/9 — begin assembling
ISR for Quiet Disc
CCPS — Get P/N
etc. See you Friday
MD

Do: Ford format
control Plan
Get: from matt

Customer
visit be in
Mon. 4-13-98

-MSG M#= 206305 FR=ZARN TO=MD3 SENT=04/07/92 11:05 AM
R#=060 ST=C DIV=0050 CC=00101 BY=ZARN AT=04/07/92 11:05 AM

APRIL 7, 1992

TO:	STEVE OFFILER	SB01	**********
	BILL SWEET	WS4	PLEASE HAND DELIVER MSG.
	MATT SELLERS	MJS2	THANK YOU!
	JIM WATT	PCQA	**********
	DICK GARIEPY	MFPC	
	DALE SOGGE	FFUN	
	TED BALLARD	ETB	
	MIKE DEMATTIA	MD3	
	NORM FREDA	WHLZ	
	RUSTY STROBLE	RC82	
	CHARLIE DOUGLAS	CMP1	
CC:	TOM CHARBONEAU	TC	
	RAY TOURANGEAU	RGT2	
	ANDY McGUIRK	PCQA	
	BILL CONGDON	MFPC	
	JOHN KOURTESIS	MDES	
	STEVE WALTERS	MLDG	
	JEFF DIDOMENICO	ELB	
	RICH TURNER	ELB	
	GARY SNYDER	CPPC	
	STEVE MAJOR	SMFH	
	DICK MULHERN	PCTL	
FR:	DAVE CZARN	ZARN	

RE: CCP6 QUIET SWITCH

Meetings will be held daily at 3:30 in the cafeteria.

****
NEXT MEETING:
****

DATE: TUESDAY 4/07
TIME: 3:30
PLACE: CAFETERIA CUBE

TERMINOLOGY:
AB1 SWITCH = LOW DIFF'L W/SNUBBER
AB2 SWITCH = ULTRA-LOW DIFF'L - NO SNUBBER
AB3 SWITCH = ULTRA-LOW DIFF'L W/SNUBBER (TRUCK UL DISCS)
AB4 SWITCH = " " ("F" LOT DISCS)

DESIGN ASSUMPTIONS:

THERE WILL BE TWO TYPES OF P/C SWITCHES; ONE FOR EN53 PLATFORM @ ~110K/YR (2K/WK) AND ONE FOR SHO TAURUS @ ~20K/YR. BOTH WILL USE NORYL BASES; THE LATTER WILL INCLUDE A SNUBBER.

BASE: NORYL GTX 830 - COLOR:NATURAL
DISC: 3-5 PSIG DIFFERENTIAL @ 500F H.T. TO ESTABLISH SETTINGS
POST H.T. @ 600F
HEXPORT: NO SNUBBER FOR EN53 PLATFORM
SNUBBER FOR SHO TAURUS PLATFORM
(DEVICE P/N TO DIFFERENTIATE)

.PINNING RANGE TO BE ESTABLISHED TO ALLOW FOR AN
ESTIMATED (-)1 mil SHIFT AT -40C AND (+)3 mil SHIFT AT +150C
.P/N TO BE SUPPLIED BY FORD ON 4/9

MFG. ASSUMPTIONS:

.APPROXIMATE 6 MIL PINNING RANGE TOTAL
.SENSOR ASM W/PIN TO BE MEASURED TO ESTABLISH PIN TARGET
.HYPOT TEST FOR LONG PINS

****
ACTIONS
****
P = PRIORITY ITEM

MARKETING/FIELD SALES

P UPDATED GANTT CHART BY WED. 4/8	DOUGLAS	
. GET P/N's FOR EN53 AND SHO SWITCHES	FREDA	
P LETTER OUTLINING QUIET SW. RISKS	SNYDER	
P PRELIMINARY QUOTE FOR AB3's BY WED. 4/8	DOUGLAS	

DESIGN ENG.

. OUTLINE PROPOSED BUILD PROCEDURE	SOGGE	
. DEFINE BASE MATERIAL (NORYL GTX830 - COLOR:NATURAL)	TEAM	COMP.
. DEFINE DISC (3-5 PSIG DIFF'L @ 500F H.T., FLWD. BY 600F H.T.)	TEAM	COMP.
P SNUBBER DESIGN (PER 4/7 DISCUSSION W/MAEROFF, FULLY MACHINED NEXPORTS OK FOR MONDAY	SOGGE	
P 20 AB3 SWITCHES FOR HAND DELIV. MON. 4/13 - W/MOD. SHOP SNUB NEXPORTS	OFFILER	
. PRINTS:		
P BASE (ADD -3 AS NAT'L NORYL/OFFSET)	OFFILER	
P DISC (NEW SET-UP)	SOGGE	
- ENVELOPE DRAWINGS (WHEN REQUESTED)	CZARN	
P PARTS LISTS (UPDATE) (START W/ HAND MARKED COPY)	OFFILER	
P THERMAL TESTING - NORYL	SOGGE	
P THERMAL TESTING - NORYL(USING CYCLER)	OFFILER	
. WEIBULL TESTING FOR M. SPEARS	OFFILER	
P SHIP 9 AB3's TO NORM TUES. 4/7	OFFILER	
P SHIP POST-IMPULSE AB2'S TO NORM 4/7	OFFILER	
. EVALUATE PILOT RUN DEVICES - HYPOT CHECK, DIMENSIONAL, ETC.	SOGGE	

MANUFACTURING ENG./MECHANISATION

P PROCESS FLOW	SELLERS/ SWEET
. PROCESS SPECS	SELLERS
P PILOT RUNS BEGINNING 4/7	SWEET/ BALTHAZAR
. SET-UP SPC FILES	SELLERS
. DEVELOP FIXTURING, ETC.	SELLERS
. REVIEW PFMEA	SELLERS

. IDENTIFY REQ'D MECHANIZATION WORK	SELLERS	
P PRIORITIZE MECH. WORK - SOFTWARE CHANGES TO B.A.M. - FIXTURING ?	KOURTESIS	

DISC MFG. ENG.

P DEFINE PROCESS FOR QUIET DISC	BALLARD	
. DEVELOP FIXTURING, ETC.	BALLARD	
P PROVIDE PROD'N DISC LOTS AS NEEDED (BEGINNING 4/7)	BALLARD	
P COMMUNICATE COST IMPACT TO MKTG. BY 4/8 - IF ANY		

difference in Base L2-1/L3-1 disc
copy of P/C pkg!

MANUFACTURING

. REVIEW PROCESS FLOW TO ID ANY AREAS THAT NEED FURTHER WORK	GARIEPY	
. MECHANISM TO AVOID MIXING PARTS	GARIEPY	
P BUILD 1K AB2's FOR AIR SHIP FRI 4/10	GARIEPY/ STRUBLE	****CRITICAL ****ITEM
(MAY SHIP TO DANA OR ONTARIO; NEED ANSWER ASAP NORM)		

color NATURAL (QUIET disc sw't'ch)

QUALITY

F8AC-9F924-AA → 77PSL3-1 warrant & paperwork ?

P PARTIAL ISR FOR EN53>PROD'N NEEDS TO BE SUBMITTED BY MON. 4/13	DEMATTIA	Basic Tests - ASAP-
P FAI - SW. W/NORYL BASE - ENV. DWG.	DEMATTIA	MONDAY

(MIKE, I FIGURED JIM'S ACTION WOULD DEFAULT TO YOU (?))

MARK up Control plan: add Hypot

PURCHASING

P HAVE ELCO QUOTE SNUBBER W/2nd OPS	KOTCH	

PRODUCTION CONTROL

P ORDER BASES/DISCS FOR QUIET SW. (NEED TO BUILD 1K AB2"S BY 4/10)	STRUBLE	

DRAFTING

. PRIORITIZE DWG AND P/L CHANGES AS THEY COME THROUGH	MULHERN	

MISC. ACTIONS FROM HI-TEMP MTGS.

. ADD CONTINUITY CHK AT 0 PSIG TO P-TESTER	SELLERS	
. MEASURE OFFSET ON SWITCHES FROM 45 TO 54 MIL OFFSET LOT (SEE DISCUSSION NOTE ABOVE)	OFFILER	
. 250K CYCLE IMPULSE TEST 45 TO 54 MIL OFFSET LOT	OFFILER	
* 25K POWERED IMPULSE TEST 60 MIL OFFSET LOT	OFFILER comp.	
. REPEAT THERMAL CHARACT. AFTER IMPULSE	OFFILER	

ON ABOVE 2 LOTS

UNDERSTANDING THE PROBLEM CAUSE

. REPEAT THERMAL EXPANSION TEST W/ OFFILER
  1. CYLINDRICAL PORTION OF BASE ONLY
  2. ENTIRE BASE - NOT CRIMPED TO SENSOR
  3. BASE MODIFIED WITH LARGER SENSOR NESTING DIAMETER, CRIMPED TO DUMMY SENSOR WITHOUT THE ENVIRON. SEAL

. REPRAT THERMAL EXPANSION W/ALT. BASE MAT'LS OFFILER

REGARDS,
DAVE CZARN
\1-QUIET

Product Quality Documentation

CERTIFICATE OF COMPLIANC

Customer Order Number	Customer Part Number	GE Requisition Number	Material, Grade and Color
SAMPLE/SELECTIVE		1281498(1	NOM(1) 070830 111

Lot Number	Qty. Shipped	U.M.	Shipped From	Date Shipped	Shipper's Number
M9291	100	LB	WISE SERVICE INC	04/06/92	01329195

It is hereby certified that the product indicated above conforms to our standard internal specifications for the designated material. This certification is subject to our standard conditions of sale applying to products sold by the General Electric Company.

Specification

Specification Originator

Specification Comments

TEST	REFERENCE	REQUIREMENT	(ENGLISH)	(METRIC)
LOT DATA:				
HDT @264 PSI - 1/4"	ASTM D648	450.0 DEG F MINIMUM	460.0 DEG F	238 DEG C
NOTCHED IZOD IMPACT-1/8"	ASTM D256	1.5 FT-LB/IN MINIMUM	2.0 FT-LB/IN	107.0 J/M
% ELONGATION	ASTM D638	4 % MINIMUM	8 %	
TENSILE YIELD	ASTM D638	20,000 PSI MINIMUM	26,690 PSI	183.9 MPA
FLEXURAL MODULUS	ASTM D790	1,000,000 PSI MINIMUM	1,265,000 PSI	8,715.9 MPA
FLEXURAL STR @ YIELD	ASTM D790	28,000 PSI MINIMUM	37,890 PSI	261.0 MPA
SPECIFIC GRAVITY	ASTM D792	1.31-1.35 G/CC		1.33 G/CC
% MOISTURE CONTENT	MFG. FISCHER	0.50 % MAXIMUM	0.09 %	
PRODUCT AUDIT DATA:			*DATE OF LAST AUDIT: 05/91*	
FLAMMABILITY,.062" THICK	FMVSS 302	4.00 IN/MIN MAXIMUM	SELF-EXTINGUISHING W/NO BURN RATE	

ROBERT O. MATTHEWS
Quality Manager

THOMAS HEEPS
Manufacturing Manager

If you have any questions concerning this, please contact:

[redacted]

TEXAS INSTRUMENTS INC
ACCOUNTS PAYABLE DEPT
PO BOX 695
ATTLEBORO MA 02703-0695
Attn: JIM KEANN

04-09-92 03:22 PM P01

DRAWINGS AVAILABLE UPON REQUEST

Initial Sample Report – Dimensional

No. 112389

Page ____ of ____

TO BE COMPLETED BY SUPPLIER

SUPPLIER	LOCATION	CODE	PART NUMBER
Texas Instruments	Attleboro, MA.	T097K	F2AC-9F924-AA

BUYER	CODE	FORD CONSUMER DIV.	NO. OF SAMPLES	PRODUCT ENGRG. DESIGNATED CONTROL ITEM (▽)
				YES ☐ NO ☒

REASON FOR SAMPLES

NEW PART ☐ CHANGED PART ☐ NEW LOCATION ☐ NEW TOOLS ☐ MULTIPLE CAVITY DIES ☐

PART NAME: NEXT GENERATION SPEED CONTROL Deactivation Safety Switch

SUP DATE | MODEL YEAR AND PRODUCT LINE

☐ DISPOSITION PENDING | AUTHORIZING DEVIATION NO.

SAMPLE MADE ON PRODUCTION SET-UP AND TOOLS: YES ☐ NO ☐

ADDITIONAL HAND OR TOOL ROOM WORK PERFORMED: YES ☐ NO ☐

WE HEREBY CERTIFY THE INSPECTION RESULTS BELOW ARE CORRECT AND THAT OUR SAMPLE MEETS FORD MOTOR COMPANY SPECIFICATIONS

SAMPLES MADE TO SUP DATED | DATE INSPECTED | SIGNATURE OF RESPONSIBLE OFFICIAL | TITLE | DATE

CHARACTERISTIC / DIMENSION OR SPECIFICATION	CLASS* ▽	SUPPLIER INSPECTION RESULTS	CONSUMER VERIFICATION OF INSPECTION RESULTS	PROCESS CAPABILITY STUDY ACQUIRED	PROCESS CAPABILITY STUDY COMPLETED
Partial		FAI results	Exceeded on TI Format		

TO BE COMPLETED BY CONSUMER

DISPOSITION	SIGNAL NO.	APPROVED	REJECTED	NOT REQ'D.			
DIMENSIONAL SUP DATED	JOLUX				INSPECTION AND TESTING INSTRUCTIONS APPROVED	YES ☐ NO ☐	SPECIAL BASIS APPROVED YES ☐ NO ☐ NOT REQ'D ☐
					INITIAL SAMPLE APPROVAL MUST BE GIVEN PRIOR TO APPROVAL OF FIRST PRODUCTION SHIPMENT	YES ☐ NO ☐	CONTROL PLAN APPROVED YES ☐ NO ☐ NOT REQ'D ☐
MATERIAL TEST SYS FORM					APPROVED BY STYLING YES ☐ NO ☐ NOT REQ'D ☐		APPROVED BY YES ☐ NO ☐ NOT REQ'D ☐
IS TEST SYS FORM					DIVISION	AUTHORIZED SIGNATURE	DATE

Ford Part No. 292a

*DESIGNATED CHARACTERISTIC CLASS
▽ – CONTROL ITEM

COPY 1

TI-NHTSA 005680

DRAWINGS AVAILABLE UPON REQUEST

INITIAL SAMPLE WARRANT

No. 112389

PART INFORMATION

Part Name Next Generation Speed Control Deactivation Safety Switch Part Number F2AC-9F924-A

Control Item ☐ Yes ☐ No Engineering Change Level _____ Date _____

Engineering Change Authorization Bruce Mansoff Date _____

Shown on Drawing No. F2AC-9F924-A Part Weight .062 kg

Reason for Initial Sample:

- ☐ Initial Submission
- ☑ Engineering Change(s)
- ☐ Tooling Transfer
- ☐ Other – Please Specify _____
- ☐ Change in Optional Construction or Material
- ☐ Additional, Replacement, or Refurbished Tooling
- ☐ Correction of Discrepancy (Resubmission No. _____)
- ☐ Process Change
- ☐ Change in Subcontractor or Source
- ☐ Parts Produced at Additional Location

SUPPLIER INFORMATION (Manufacturing Location)

Supplier Name Texas Instruments Street Address 34 Forest ST.

City Attleboro State MA Postal Code 02703 Country USA

Supplier Mfg. Location Code – DUNS T097K/7325814 Customer Assigned _____

CUSTOMER INFORMATION

Customer Name Ford Motor Co NAAO Buyer Fred Hemmerlein Buyer Code 165

Purchase Order Number _____ Sample Acceptance Level _____

Application Next Generation Speed Control Deactivation Safety Switch

RESULTS

The results for dimensional measurements ☐, material tests ☐, and functional (SR) tests ☐ meet all drawing and specification requirements ☐ Yes ☐ No

Submission Checklist

- ☑ Checked Print
- ☐ Auxiliary Drawings/Sketches
- ☐ Correct Number of Samples
- ☑ Dimensional Results
- ☐ Material Test Results
- ☑ Certifications
- ☑ Functional (SR) Test Results Pending!
- ☐ Product Engineering Approval
- ☑ Control Plan
- ☑ Process Capability Results
- ☑ Process Flow Diagram
- ☑ Gage (Measurement) Studies

Supporting data for all requirements are available upon request.

COMMENTS:

Partial Tooling to expedite use of "Quick" switch; Full Submission to be complete by 6/22/98 - Bruce Mansoff verified TI on 4/13, Wind to Review process in Status.

DECLARATION

I affirm that the samples represented by this warrant are representative of our parts and have been made to the applicable engineer drawings and specifications from specified materials, on regular production tooling with no operations other than the regular production process.

Authorized Signature _____ Date _____

Print Name _____ Title _____ Phone No. _____

APPROVAL (when required by customer procedure) ☐ Approved ☐ Rejected

Signature _____ Date _____

Form 2920

TEXAS INSTRUMENTS

DIMENSIONAL ANALYSIS ON PART NUMBER

F2AC-9F924-AA

ENVELOPE DIMENSIONS TO BASE ONLY

	BLUEPRINT SPEC	CAVITY # A ACTUAL	CAVITY # B ACTUAL	CAVITY # C ACTUAL	CAVITY # D ACTUAL
1	11.40 - 11.90	11.806	11.817	11.817	11.794
2	12.80 - 13.21	13.043	13.043	13.072	13.094
3	16.56 - 16.76	16.638	16.652	16.671	16.673
		16.661	----	16.680	16.668
4	19.45 - 19.81	19.752	19.754	19.787	19.799
5	2.80 - 3.05	2.930	2.93	2.944	2.951
	0.1 S A	1.897 0.003	1.923 0.023	1.945 0.045	1.885 0.015
6	31DEG +/- 2DEG	29DEG 29MIN	29DEG 38MIN	29DEG 58MIN	29DEG 34MIN
7	1.85 - 2.06	1.927	1.966	1.969	1.978
8	1.24 - 1.55	1.365	1.387	1.423	1.400
9	1.24 - 1.45	1.269	1.268	1.275	1.308
10	11.60 - 11.92	11.768	11.768	11.753	11.777
		11.729	11.740	11.789	11.747
11	13.43 - 13.85	13.010	13.769	13.786	13.647
12	0.25 - 0.75	0.490 0.475	0.519 0.523	0.573 0.635	0.618 0.593
13	2.79 - 3.10	2.900	2.909	2.912	2.908
	2 PL	2.903	2.915	2.913	2.911

TEXAS INSTRUMENTS INCORPORATED • 34 FORBES STREET • ATTLEBORO, MA 02703
508-699-4888 • TELEX 95-7708 TWX 710-348-0886 • CABLE TEXINS

![Texas Instruments]

DIMENSIONAL ANALYSIS ON PART NUMBER

F2AC-9F924-AA

	BLUEPRINT SPEC	CAVITY # A ACTUAL	CAVITY # B ACTUAL	CAVITY # C ACTUAL	CAVITY # D ACTUAL
14	0.05 - 0.26	0.151	0.153	0.124	0.076
	2 PL	0.113	0.142	0.163	0.147
15	19.05 MAX	18.667	18.709	18.671	18.704
		18.701	18.748	18.565	18.757
16	12.59 - 13.11	12.800	12.829	12.802	12.819
		12.829	12.800	12.842	12.824
17	0.69 - 1.30	1.085	1.105	1.122	1.175
18	2.79 - 3.41	3.076	3.0612	3.152	3.109
19	7.23 - 7.75	7.579	7.501	7.514	7.545
20	6.60 - 6.81	6.701	6.673	6.715	6.677
21	29DEG +/- 2DEG	MEASURED	29DEG 24MIN	ON CROSS	SECTIONED
	4 X	PART	30DEG 06MIN	----	----
		----	29DEG 58MIN	----	----
		----	29DEG 47MIN	----	----
22	NO FLASH/BURRS	SLIGHT	FLASH ON	EDGES	@ 10X
~~22A~~	~~1.80-2.21- 2X~~	~~1.651~~	~~1.651~~	~~1.651~~	~~1.651~~
		1.651	1.778	~~1.651~~	~~1.651~~

TI-NHTSA 005684

TEXAS INSTRUMENTS

DIMENSIONAL ANALYSIS ON PART NUMBER

F2AC-9F924-AA

	BLUEPRINT SPEC	CAVITY # A ACTUAL	CAVITY # B ACTUAL	CAVITY # C ACTUAL	CAVITY # D ACTUAL
23	8.30-8.72 2X	8.535	8.553	8.484	8.578
		8.726	8.512	8.570	8.519
24	2.15-2.42 2X	2.162	2.171	2.282	2.271
		2.212	2.236	2.237	----
25	25DEG +/- 2DEG	24DEG 25MIN	24DEG 56MIN	24DEG 47MIN	24DEG 06MIN
	2 X	24DEG 10MIN	24DEG 14MIN	24DEG 06MIN	24DEG 43MIN
26	45DEG +/- 2DEG	46DEG 10MIN	42DEG 44MIN	43DEG 44MIN	45DEG 03MIN
	4PL	44DEG 35MIN	43DEG 47MIN	44DEG 47MIN	45DEG 01MIN
		45DEG 22MIN	44DEG 47MIN	45DEG 49MIN	46DEG 11MIN
		44DEG 08MIN	45DEG 37MIN	46DEG 38MIN	43DEG 50MIN
27	(71.5DEG) 2X	72DEG --	71DEG 31MIN	71DEG 20MIN	72DEG 01MIN
		71DEG 07MIN	72DEG --	72DEG 10MIN	71DEG 12MIN
28	1.42-1.63 2X	1.538	1.538	1.582	1.603
		1.539	1.612	1.602	1.596
29	0.35-0.66 4X	0.546 0.547	0.570 0.590	0.598 0.580	0.581 0.556
		0.592 0.614	0.561 0.574	0.576 0.603	0.558 0.575
30	0.35-0.66 4X	0.501 0.471	0.467 0.502	0.459 0.520	0.477 0.443
		0.378 0.417	0.320 0.344	0.357 0.382	0.338 0.398
		0.493 0.506	0.494 0.539	0.436 0.482	0.486 0.518
		0.382 0.395	0.450 0.484	0.384 0.393	0.373 0.409

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TEXAS INSTRUMENTS

DIMENSIONAL ANALYSIS ON PART NUMBER

F2AC-9F924-AA

	BLUEPRINT SPEC	CAVITY # A ACTUAL	CAVITY # B ACTUAL	CAVITY # C ACTUAL	CAVITY # D ACTUAL
31	0.86 - 1.17	1.023	1.012	1.026	1.021
	4 X	0.985	0.998	0.988	1.041
		1.023	0.992	1.026	1.014
		0.976	0.978	0.991	0.984
32	TERM.HOUSING	BLACK ONLY	AVAILABLE	TO QUALIFY	MOLD
	NATURAL				

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DIMENSIONAL ANALYSIS ON PART NUMBER

F2AC-9F924-AA

ENVELOPE DIMENSIONS TO BASE ONLY

	BLUEPRINT SPEC	CAVITY # A ACTUAL	CAVITY # B ACTUAL	CAVITY # C ACTUAL	CAVITY # D ACTUAL
1	11.40 - 11.90	11.806	11.817	11.817	11.794
2	12.80 - 13.21	13.043	13.043	13.072	13.094
3	16.56 - 16.76	16.638	16.652	16.671	16.673
		16.661	----	16.690	16.668
4	19.45 - 19.81	19.752	19.754	19.787	19.799
5	2.80 - 3.05	2.930	2.93	2.944	2.951
	0.1 % A	1.897 0.003	1.923 0.023	1.945 0.045	1.885 0.015
6	31DEG +/- 2DEG	29DEG 29MIN	29DEG 38MIN	29DEG 58MIN	29DEG 34MIN
7	1.85 - 2.06	1.927	1.966	1.969	1.978
8	1.24 - 1.55	1.365	1.387	1.423	1.400
9	1.24 - 1.45	1.269	1.268	1.275	1.308
10	11.60 - 11.92	11.768	11.768	11.753	11.777
		11.729	11.740	11.789	11.747
11	13.43 - 13.85	13.010	13.769	13.786	13.647
12	0.25 - 0.75	0.490 0.475	0.519 0.529	0.573 0.635	0.618 0.593
13	2.79 - 3.10	2.900	2.909	2.912	2.908
	2 PL	2.909	2.915	2.913	2.911

DIMENSIONAL ANALYSIS ON PART NUMBER

F2AC-9F924-AA

	BLUEPRINT SPEC	CAVITY # A ACTUAL	CAVITY # B ACTUAL	CAVITY # C ACTUAL	CAVITY # D ACTUAL
14	0.05 - 0.26	0.151	0.159	0.124	0.076
	2 PL	0.113	0.142	0.163	0.147
15	19.05 MAX	18.667	18.709	18.671	18.704
		18.701	18.748	18.565	18.757
16	12.59 - 13.11	12.800	12.829	12.802	12.819
		12.829	12.800	12.842	12.824
17	0.68 - 1.30	1.085	1.105	1.122	1.175
18	2.79 - 3.41	3.076	3.0612	3.152	3.109
19	7.23 - 7.75	7.579	7.501	7.514	7.545
20	6.60 - 6.91	6.701	6.679	6.715	6.677
21	29DEG +/- 2DEG	MEASURED	29DEG 24MIN	ON CROSS	SECTIONED
	4 X	PART	30DEG 06MIN	----	----
		----	29DEG 58MIN	----	----
		----	29DEG 47MIN	----	----
22	NO FLASH/BURRS	SLIGHT	FLASH ON	EDGES	@ 10X
22A	1.80-2.21r 2X	1.651	1.651	1.651	1.651
		1.651	1.778	1.651	1.651

DIMENSIONAL ANALYSIS ON PART NUMBER

F2AC-9F924-AA

	BLUEPRINT SPEC	CAVITY # A ACTUAL	CAVITY # B ACTUAL	CAVITY # C ACTUAL	CAVITY # D ACTUAL
23	8.30-8.72 2X	8.535	8.559	8.484	8.578
		8.726	8.512	8.570	8.519
24	2.15-2.42 2X	2.162	2.171	2.282	2.271
		2.212	2.236	2.237	----
25	25DEG +/- 2DEG	24DEG 25MIN	24DEG 56MIN	24DEG 47MIN	24DEG 06MIN
	2 X	24DEG 10MIN	24DEG 14MIN	24DEG 06MIN	24DEG 43MIN
26	45DEG +/- 2DEG	46DEG 10MIN	42DEG 44MIN	43DEG 44MIN	45DEG 03MIN
	4PL	44DEG 35MIN	43DEG 47MIN	44DEG 47MIN	45DEG 01MIN
		45DEG 22MIN	44DEG 47MIN	45DEG 49MIN	46DEG 11MIN
		44DEG 08MIN	45DEG 37MIN	46DEG 38MIN	43DEG 50MIN
27	(71.5DEG) 2X	72DEG --	71DEG 31MIN	71DEG 20MIN	72DEG 01MIN
		71DEG 07MIN	72DEG --	72DEG 10MIN	71DEG 12MIN
28	1.42-1.63 2X	1.538	1.538	1.582	1.603
		1.599	1.612	1.602	1.596
29	0.35-0.66 4X	0.546 0.547	0.570 0.590	0.598 0.580	0.581 0.556
		0.592 0.614	0.561 0.574	0.576 0.603	0.558 0.575
30	0.35-0.66 4X	0.501 0.471	0.467 0.502	0.459 0.520	0.477 0.443
		0.378 0.417	0.320 0.344	0.357 0.382	0.338 0.398
		0.493 0.506	0.494 0.539	0.436 0.482	0.486 0.518
		0.382 0.395	0.450 0.484	0.384 0.393	0.373 0.409

DIMENSIONAL ANALYSIS ON PART NUMBER

F2AC-9F924-AA

	BLUEPRINT SPEC	CAVITY # A ACTUAL	CAVITY # B ACTUAL	CAVITY # C ACTUAL	CAVITY # D ACTUAL
31	0.86 - 1.17	1.023	1.012	1.026	1.021
	4 X	0.985	0.998	0.988	1.041
		1.023	0.992	1.026	1.014
		0.976	0.978	0.991	0.984
32	TERM.HOUSING	BLACK ONLY	AVAILABLE	TO QUALIFY	MOLD
	BROWN:				

DIMENSIONAL ANALYSIS ON PART NUMBER

F2AC-9F924-AA

ENVELOPE DIMENSIONS TO BABE ONLY

	BLUEPRINT SPEC	CAVITY # A ACTUAL	CAVITY # B ACTUAL	CAVITY # C ACTUAL	CAVITY # D ACTUAL
1	11.40 - 11.90	11.806	11.817	11.817	11.794
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6	31DEG +/- 2DEG	29DEG 29MIN	29DEG 36MIN	29DEG 56MIN	29DEG 34MIN
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13	2.79 - 3.10	2.900	2.909	2.912	2.908
	2 PL	2.903	2.915	2.913	2.911

DIMENSIONAL ANALYSIS ON PART NUMBER

F2AC-9F924-AA

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	4 X	PART	30DEG 06MIN	----	----
		----	29DEG 58MIN	----	----
		----	29DEG 47MIN	----	----
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		1.651	1.778	1.651	1.651

DIMENSIONAL ANALYSIS ON PART NUMBER

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	2 X	24DEG 10MIN	24DEG 14MIN	24DEG 06MIN	24DEG 43MIN
26	45DEG +/- 2DEG	46DEG 10MIN	42DEG 44MIN	43DEG 44MIN	45DEG 03MIN
	4PL	44DEG 35MIN	43DEG 47MIN	44DEG 47MIN	45DEG 01MIN
		45DEG 22MIN	44DEG 47MIN	45DEG 49MIN	46DEG 11MIN
		44DEG 08MIN	45DEG 37MIN	46DEG 38MIN	43DEG 50MIN
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28	1.42-1.63 2X	1.538	1.598	1.582	1.603
		1.539	1.612	1.602	1.596
29	0.35-0.66 4X	0.546 0.547	0.570 0.590	0.598 0.580	0.581 0.556
		0.592 0.614	0.561 0.574	0.576 0.609	0.558 0.575
30	0.35-0.66 4X	0.501 0.471	0.467 0.502	0.459 0.520	0.477 0.443
		0.378 0.417	0.320 0.344	0.357 0.382	0.338 0.398
		0.493 0.506	0.494 0.539	0.436 0.482	0.486 0.518
		0.382 0.395	0.450 0.484	0.384 0.399	0.379 0.409

DIMENSIONAL ANALYSIS ON PART NUMBER

F2AC-9F924-AA

	BLUEPRINT SPEC	CAVITY # A ACTUAL	CAVITY # B ACTUAL	CAVITY # C ACTUAL	CAVITY # D ACTUAL
31	0.86 - 1.17	1.023	1.012	1.026	1.021
	4 X	0.985	0.998	0.989	1.041
		1.023	0.992	1.026	1.014
		0.976	0.978	0.991	0.984
32	TERM.HOUSING	BLACK ONLY	AVAILABLE	TO QUALIFY	MOLD
	BROWN:				

P/C L21

DIMENSIONAL ANALYSIS ON PART NUMBER

F2VC-9F924-AB

	BLUEPRINT SPEC	CAVITY # 1B ACTUAL	CAVITY # 2B ACTUAL	CAVITY # 3C ACTUAL	CAVITY # 4D ACTUAL	CAVITY # 5D ACTUAL	CAVITY # 6B ACTUAL	COMMENTS
1	19.49 - 19.91	19.55	19.61	19.59	19.56	19.57	19.57	
2	16.56 - 16.76	16.59/16.58	16.62/16.64	16.62/16.63	16.58/16.59	16.56/16.56	16.59/16.59	
3	13.00 - 13.21	12.974	13.051	13.035	13.049	13.078	12.946	
4	11.40 - 11.90	11.788	11.808	11.775	11.773	11.758	11.795	
5	2.84 - 3.05	2.93	2.92	2.92	2.92	2.93	2.93	
	0.1 A	11.859/0.041	11.920/0.020	11.933/0.033	11.869/0.031	11.905/0.015	11.887/0.013	
6	11.60 - 11.92	11.69/11.71	11.67/11.71	11.72/11.68	11.60/11.63	11.63/11.67	11.65/11.65	
7	1.24 - 1.45	1.282	1.280	1.280	1.280	1.290	1.265	
8	1.24 - 1.55	1.402	1.397	1.400	1.389	1.397	1.397	
9	1.85 - 2.06	2.004	1.974	1.995	1.994	1.994	1.986	
10	13.43 - 13.85	13.772	13.693	13.800	13.686	13.686	13.756	
11	31DEG +/- 2DEG	30DEG 38MIN	29DEG 53MIN	31DEG	29DEG 04MIN	29DEG 03MIN	30DEG 08MIN	
12	2.79 - 3.10 2X	2.90/2.89	2.90/2.90	2.90/2.90	2.90/2.90	2.89/2.89	2.90/2.94	
13	0.25 - 0.75	0.506/0.841	0.480/0.800	0.442/0.673	0.490/0.671	0.490/0.744	0.460/0.757	OUT OF SPEC.
14	0.05 - 0.26 2X	0.051/0.069	0.074/0.127	0.140/0.076	0.127/0.135	0.153/0.163	0.0711/0.036	
		0.140/0.147	0.092/0.089	0.086/0.114	0.048/0.081	0.096/0.019	0.137/0.165	
15	0 19.05 MAX	18.64 18.56	18.57 18.66	18.54 18.66	18.60 18.77	18.63 18.71	18.61 18.67	

DIMENSIONAL ANALYSIS ON PART NUMBER

F2VC-9F924-AB

	BLUEPRINT SPEC	CAVITY # 1B ACTUAL	CAVITY # 2C ACTUAL	CAVITY # 3C ACTUAL	CAVITY # 4B ACTUAL	CAVITY # 5D ACTUAL	CAVITY # 6D ACTUAL	COMMENTS
16	37.15 MAX	35.65	35.70	35.71	35.70	35.69	35.68	
17	12.59 - 13.11	12.74/12.84	12.72/12.84	12.77/12.76	12.76/12.77	12.75/12.81	12.73/12.80	
18	11.69 - 12.17	11.68/11.79	11.85/11.64	11.73/11.79	11.88/11.84	11.78/11.86	11.73/11.88	
19	14.23 MAX	13.66	13.65	13.67	13.65	13.65	13.66	
20	9.39 - 9.66	9.59/9.63	9.61/9.66	9.57/9.64	9.49/9.62	9.58/9.74	9.55/9.67	OUT OF SPEC.
21	8.12 MIN	8.98/9.29	9.13/9.54	9.12/9.18	8.98/9.56	9.14/9.22	9.11/9.14	
22	1.92 - 2.04	2.040	1.732	1.783	1.727	1.781	1.796	
23	0 7.82-8.03	7.94/7.50	7.94	7.97/7.99	7.97	7.98	7.96	
24	6.60 - 6.81	6.640	6.698	6.693	6.647	6.665	6.642	
24A	29DEG+/-2DG 6X	29DEG 54MIN 30DEG 57MIN	30DEG 24MIN 28DEG 46MIN	MEASURED	ON A CROSS	SECTIONED	PART	
25	1.90-2.21A 2X	1.84-1.84	1.84-1.84	1.84-1.84	1.84-1.84	1.84-1.84	1.84-1.84	
26	7.23-7.75	7.74	7.52	7.58	7.54	7.55	7.53	
26A	NO FLASH OR BURRS ALLOWED ON SURFACE	OK	OK	FLASH	OK	OK	FLASH	
27	2.79-3.41	3.145	3.093	3.160	3.150	3.119	3.107	
28	0.68-1.30	1.115	1.168	1.179	1.148	1.161	1.153	

DIMENSIONAL ANALYSIS ON PART NUMBER

F2VC-9F924-AB

	BLUEPRINT SPEC	CAVITY # 1B ACTUAL	CAVITY # 2C ACTUAL	CAVITY # 3C ACTUAL	CAVITY # 4B ACTUAL	CAVITY # 5B ACTUAL	CAVITY # 6B ACTUAL	COMMENTS
28A	STAMP DATE	INVERTED	DELTA	OMITTED.	HAS SINCE	BEEN	INCLUDED	
	CODE & PART#	IN DOWNS	OPERATION.					
29	0.25MIN X 45 -	N/A THREADS	HAVE BEEN	ADDED				
	45DEG CHAMFER							
30	3/8-24UNF-2A	OK	OK	OK	OK	OK	OK	
31	1.10-1.40	1.316	MEASURED	ON A CROSS	SECTIONED	PART		
32	0.16 D	0.050	0.048	0.048	0.009	0.030	0.056	
33	2.5 C	OK	MEASURED	ON A CROSS	SECTIONED	PART		
34	41DEG - 43DEG	41DEG 21MIN	MEASURED	ON A CROSS	SECTIONED	PART		
35	40-50DEG CHAMF	N/A THREADS	HAVE BEEN	ADDED				
36	32.51 MAX	31.64 31.62	31.46 31.48	31.45 31.46	31.50 31.47	31.46 31.48	31.50 31.50	
37	14.02-14.53HEX	14.11	14.11	14.11/14.13	14.11/14.13	14.12/14.13	14.11/14.12	
38	3.30-3.60	3.45 - 3.46	3.45 - 3.43	3.43 - 3.42	3.45 - 3.46	3.44 - 3.47	3.45 - 3.45	
39	7.23-7.37	7.27 7.28	7.35 7.32	7.33 7.33	7.31 7.37	7.32 7.30	7.37 7.37	
40	5.38-5.85	5.61 5.69	5.72-5.68	5.44-5.66	5.67-5.70	5.60-5.66	5.61-5.63	
41	71.52DEG +/-	72DEG 30MIN	72DEG 11MIN	72DEG 12MIN	72DEG 24MIN	71DEG 59MIN	72DEG 10MIN	
	2DEG 2X	72DEG 30MIN	72DEG 14MIN	72DEG 50MIN	72DEG 37MIN	72DEG 11MIN	72DEG 36MIN	

DIMENSIONAL ANALYSIS ON PART NUMBER

F2VC-9F924-AB

	BLUEPRINT SPEC	CAVITY # 1B ACTUAL	CAVITY # 2C ACTUAL	CAVITY # 3C ACTUAL	CAVITY # 4D ACTUAL	CAVITY # 5B ACTUAL	CAVITY # 6D ACTUAL	COMMENTS
42	1.42-1.63 2X	1.62-1.62	1.63-1.63	1.59-1.63	1.62-1.60	1.60-1.59	1.60-1.57	
43	0.38-0.66 4X	1.46-0.65	0.57-0.59	0.57-0.60	0.58-0.58	0.56-0.57	0.57-0.58	
		0.57-0.59	0.59-0.55	0.59-0.57	0.59-0.56	0.56-0.55	0.55-0.56	
44	8.30-8.72 2X	8.43-8.46	8.51-8.44	8.41-8.44	8.42-8.42	8.39-8.43	8.42-8.56	
45	2.15-2.62 2X	2.13-2.21	2.18-2.22	2.30-2.15	2.20-2.16	2.16-2.18	2.23-2.16	#1 OUT OF SPEC
46	250DEG+/-2 2X	240EG 36MIN	240EG 41MIN	238DEG 14MIN	238EG 35MIN	238DEG 09MIN	238DEG 34MIN	
		238DEG 06MIN	238DEG 43MIN	240EG 31MIN	238EG 53MIN	238DEG 58MIN	240EG 24MIN	
47	HOUSING BROWN	BROWN	BROWN	BROWN	BROWN	BROWN	BROWN	
48	450EG+/-2 4X	446EG 36MIN	446EG 47MIN	446EG 09MIN	445EG 08MIN	445EG 37MIN	420EG	
		453EG 46MIN	445EG 15MIN	443EG 20MIN	445EG 04MIN	446EG 11MIN	446EG 05MIN	
		446EG 43MIN	445EG 46MIN	446EG 44MIN	445EG 15MIN	446EG 07MIN	446EG 01MIN	
		443EG 12MIN	445EG 23MIN	445EG 39MIN	446EG 48MIN	453EG 34MIN	446EG 34MIN	
49	0.86-1.17 4X	0.96-0.95	0.98-1.03	0.97-1.02	0.98-1.02	0.99-1.03	0.99-1.03	
		0.95-0.93	0.96-0.97	0.96-1.00	0.93-1.00	0.97-0.97	0.93-0.96	
50	0.35-0.66 4X	0.34-0.54	0.45-0.44	0.46-0.48	0.46-0.50	0.45-0.54	0.51-0.49	
		0.48-0.51	0.49-0.52	0.34-0.53	0.52-0.52	0.50-0.54	0.51-0.44	

DIMENSIONAL ANALYSIS ON PART NUMBER

F2VC-9F924-AB

	BLUEPRINT SPEC	CAVITY # 1B ACTUAL	CAVITY # 2C ACTUAL	CAVITY # 3C ACTUAL	CAVITY # 4D ACTUAL	CAVITY # 5D ACTUAL	CAVITY # 6B ACTUAL	COMMENTS
51	2.59-2.80 2X	2.725	2.710	2.708	2.713	2.710	2.739	
	0.2 ⓜ A C	2.393	2.499	2.579	2.482	2.457	2.515	
	D	0.072	0.034	0.113	0.017	0.008	0.050	
	2.59-2.80 2X	2.695	2.709	2.715	2.703	2.695	2.710	
	0.2 ⓜ A C	2.499	2.522	2.360	2.377	2.427	2.443	
	D	0.034	0.057	0.065	0.069	0.039	0.022	
52	13-19DEG 2X	17DEG 23MIN	MEASURED	ON A CROSS	SECTIONED	PART		
		19DEG 45MIN	MEASURED	ON A CROSS	SECTIONED	PART		OUT OF SPEC +45MIN
53	0.66-0.87	0.755	MEASURED	ON A CROSS	SECTIONED	PART		
54	0.10-0.31	0.262	MEASURED	ON A CROSS	SECTIONED	PART		
55	0.58-0.68	0.632	MEASURED	ON A CROSS	SECTIONED	PART		

[redacted]

Quality Check

Dear Customer:

This is the first copy of your order. I have compared this proof with the originals and determined that it meets Kinko's quality standards.

All subsequent copies are produced to match this proof.

We appreciate your business and look forward to meeting your needs

[redacted] 3/7/00

kinko's

DRAWINGS AVAILABLE UPON REQUEST

SEPTEMBER 17, 1991

TO: ANDY MCKENNA
RON RUGGIERI

CC: HANK GRIFFIN

FROM: KAREN ROSS

RE: DSC,TGA TESTING TSL # 109886

WE RECEIVED 5 SAMPLES OF DIFFERENT RESINS 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

TSL # 109086

SAMPLES:

NORYL GTX830
POLYPHENYLENE OXIDE (PPO)
G.E. PLASTICS 413-448-6341

STANYL
4/6 NYLON
DSM ENGINEERING PLASTICS
215-320-6992

MINDEL B322
POLYSULFONES, MODIFIED
AMOCO PERFORMANCE PRODUCTS
800-621-4557

AMODEL A-1133HS
POLYPHTHAMIDE (PPA)
AMOCO PERFORMANCE PRODUCTS

CELANEX 4300
POLYBUTYLENE TERETHYLATE
CELANESE
908-231-2062

SPEC SHEETS

Tm 530-578°F (276-303°C)
30% GLASS FILLED

Tm 559°F (293°C)
HDT 320@264 psi

Tm 610-660°F
33 % GLASS FILL

Tm 430-500°F (221-260°C)

TEST RESULTS

CELANEX BASE	Tg 49.48 78.92 49.27 79.52 Tm 227^C HDT 219^C 30.17 % GLASS
CELANEX PRE-HOLE	Tg 50.4 69.01 Tm 227^C
CELANEX BASE	Tg 51^C Tm 226^C HDT 218 29.77 % GLASS

TEST RESULTS

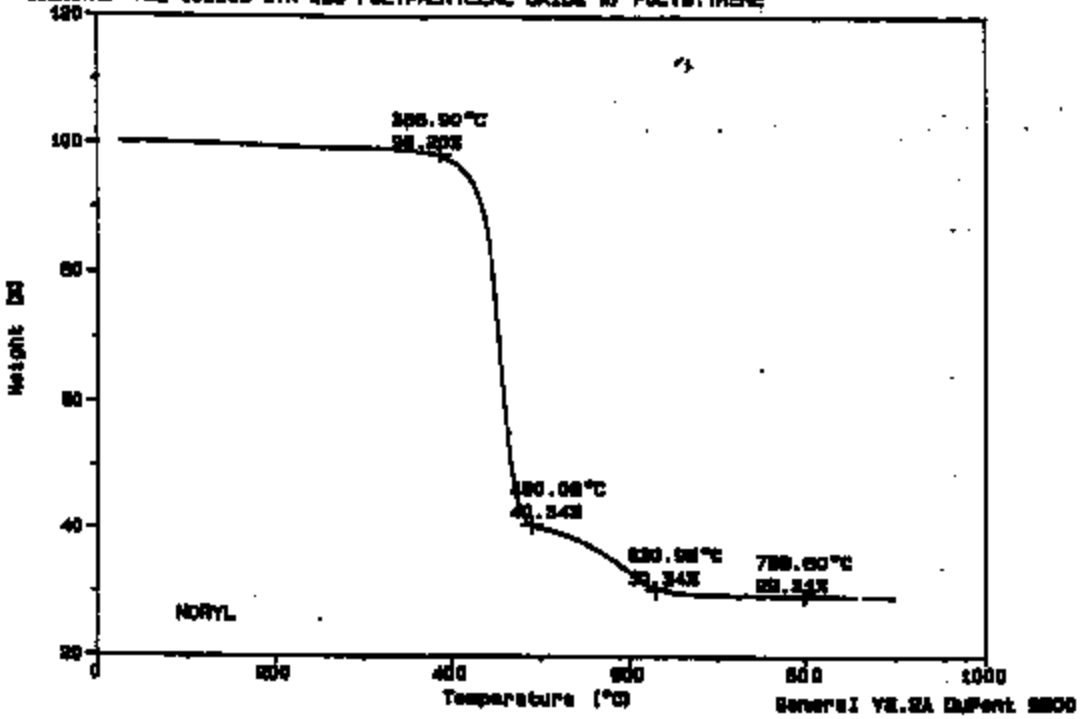
NORYL BASE	Tg 18.80^C 49.10 Tm 262^c 29.11 % GLASS HDT [illegible]
NORYL PRE-MOLD	Tg 30.92^C Tm 253^C HDT 285^C
STANYL BASE	Tg 16.96 25.78 Tm 292^C 31.46 % GLASS
STANYL PRE-MOLD	Tg 16.98^C 32.90^C Tm 292^C 27.64 % GLASS
MINDEL BASE	EXOTHERM 9.37 86.65 117.93 Tm 253^c HDT 233.13
MINDEL PRE-MOLD	Tg 16.11 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


Heat Flow W/g
-0.04
-0.08
47.16°C
Temperature (°C)
DSC
NORYL BASE RTL. 30-00-01

Sample: NORYL II 38-90-01
Size: 27.7900 mg
Method: 10/900/ISO
Comment: YSL 108866 STX-830 POLYPHENYLENE OXIDE W/ POLYSTYRENE

TGA

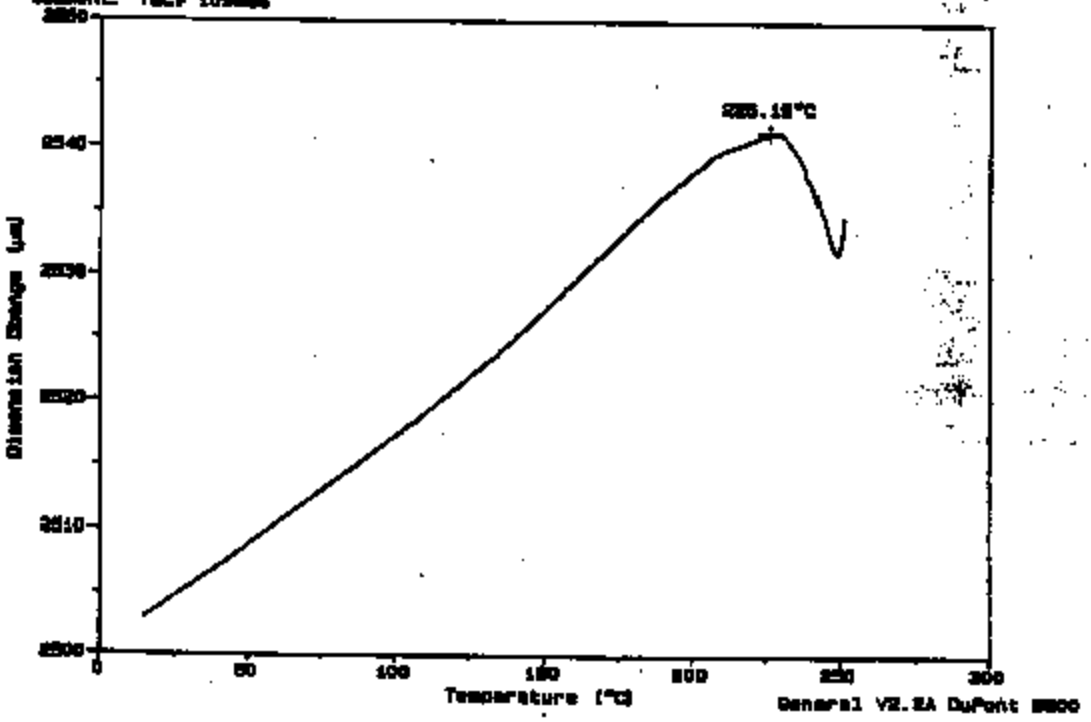
File: TNONR.08
Operator: KNOWS
Run Date: 07/08/91 11:20

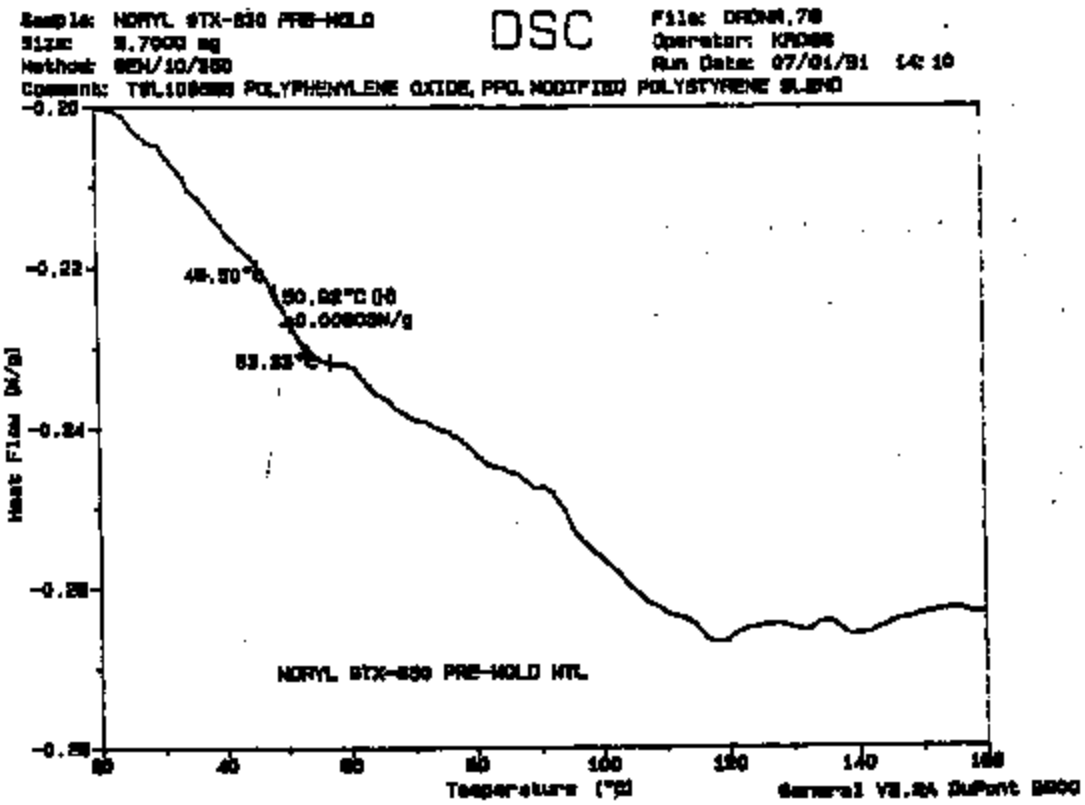


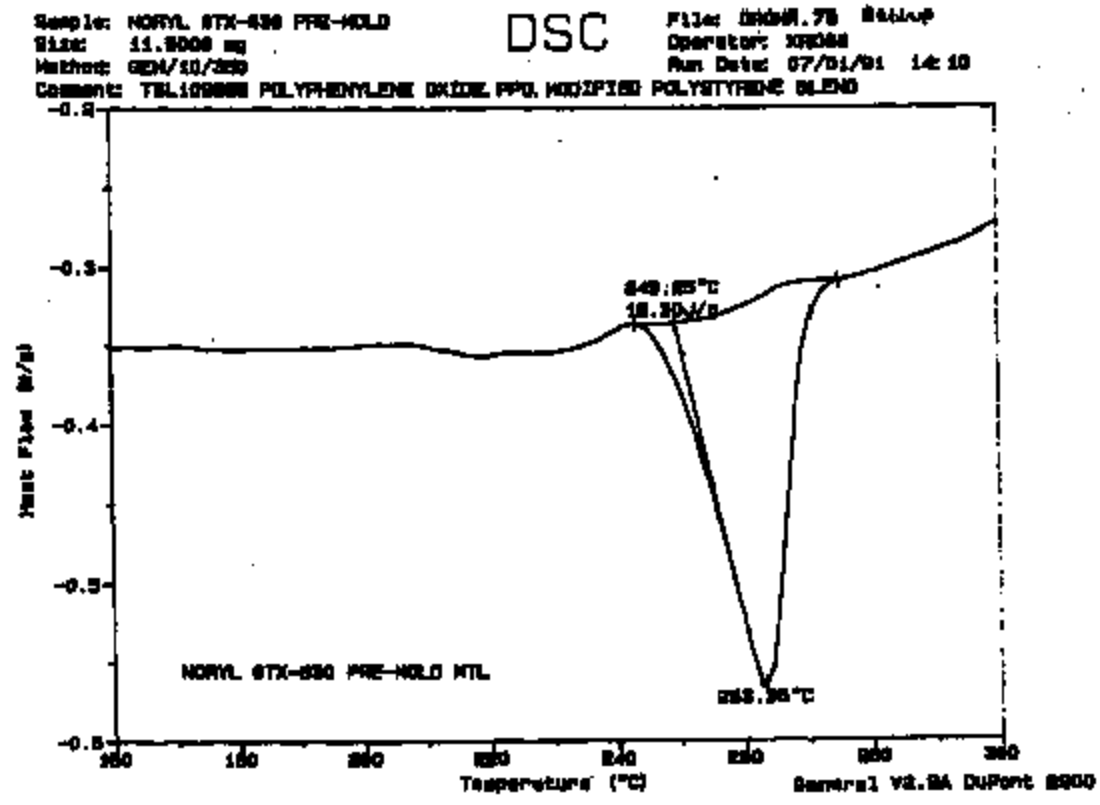
Sample: NORYL
Size: 918.0000 mm
Method: 10/220
Comment: TSL# 108866

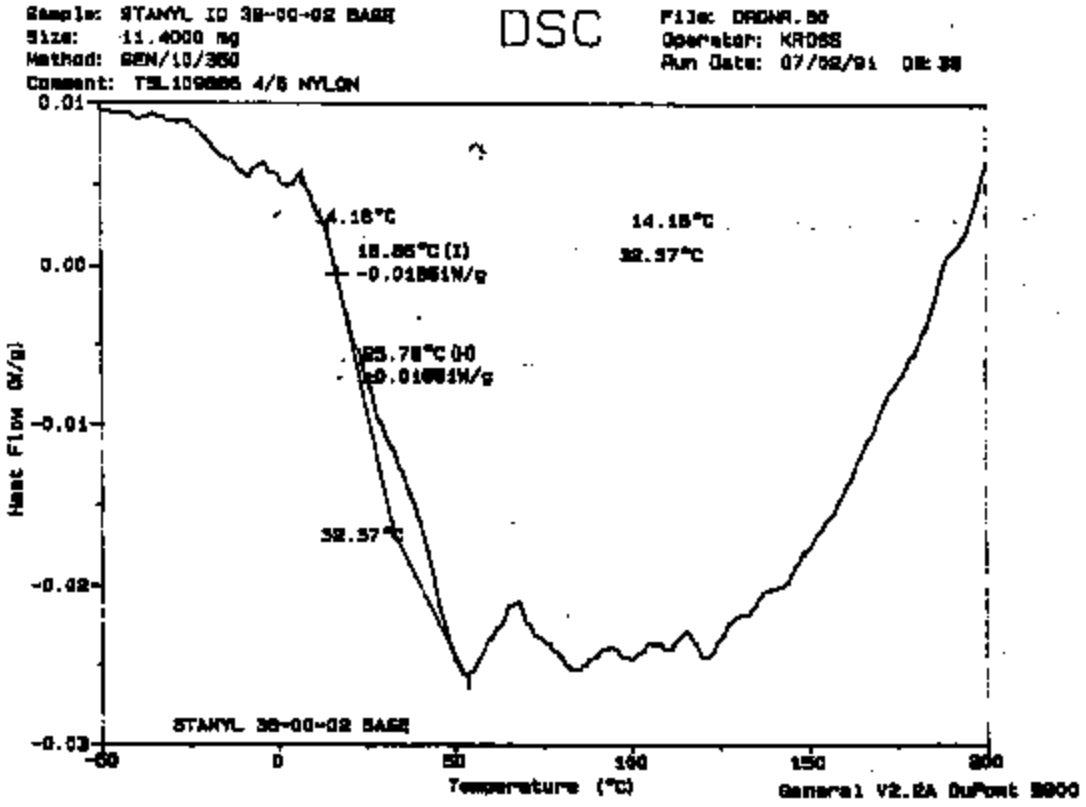
TMA

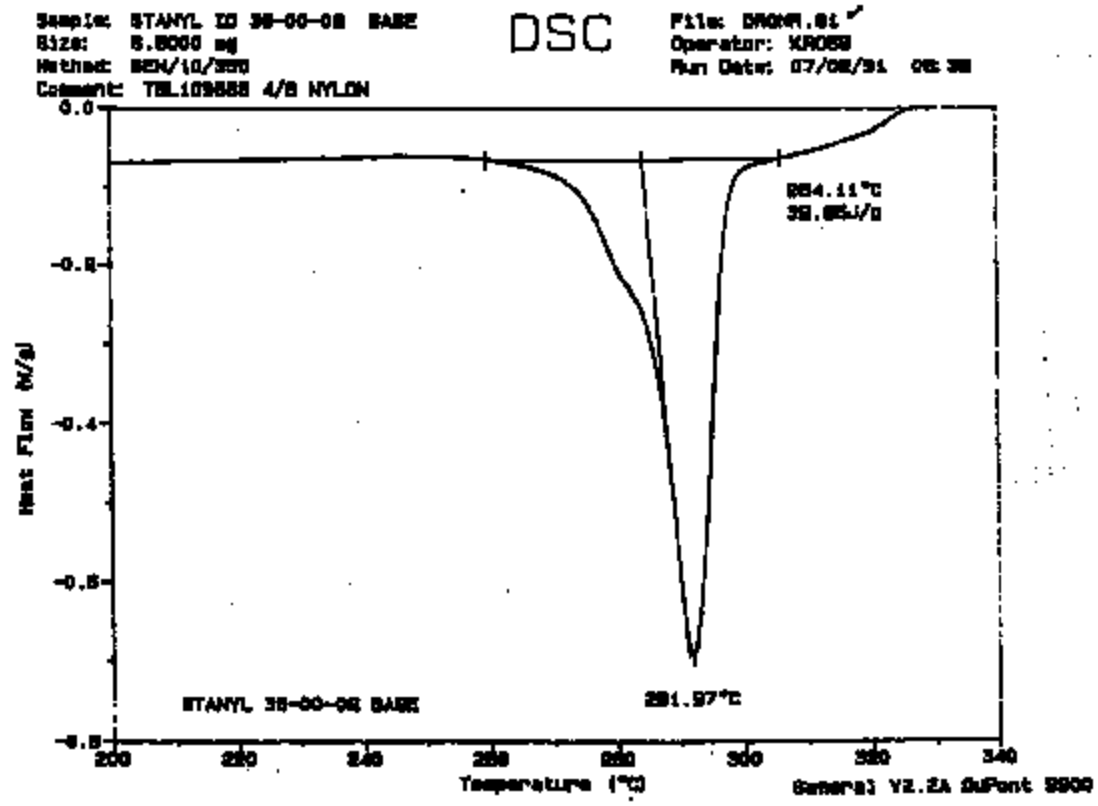
File: TNONR.72
Operator: K ROSS
Run Date: 08/08/91 14:30




Sample: NORYL STX-830 PRE-HOLD
Size: 5.7000 mg
Method: GEN/10/350
Comment: TBL109888 POLYPHENYLENE OXIDE, PPO, MODIFIED POLYSTYRENE BLEND
DSC
File: DRONR.7B
Operator: KR088
Run Date: 07/01/91 14:10
-0.20
-0.22
-0.24
-0.26
-0.28
Heat Flow (W/g)
48.50°C
50.08°C (H)
-0.00803W/g
53.23°C
NORYL STX-830 PRE-HOLD MTL
40
60
80
100
120
140
160
Temperature (°C)
General V2.2A DuPont 2900


Sample: NORYL STX-830 PRE-HOLD
Size: 11.9000 mg
Method: GEN/10/350
Comment: TBL109888 POLYPHENYLENE OXIDE, PPO, MODIFIED POLYSTYRENE BLEND
DSC
File: DRONR.7B Baseline
Operator: KR088
Run Date: 07/01/91 14:10
-0.2
-0.3
-0.4
-0.5
-0.6
Heat Flow (W/g)
18.30J/g
NORYL STX-830 PRE-HOLD MTL
150
200
250
300
350
Temperature (°C)
General V2.2A DuPont 2900

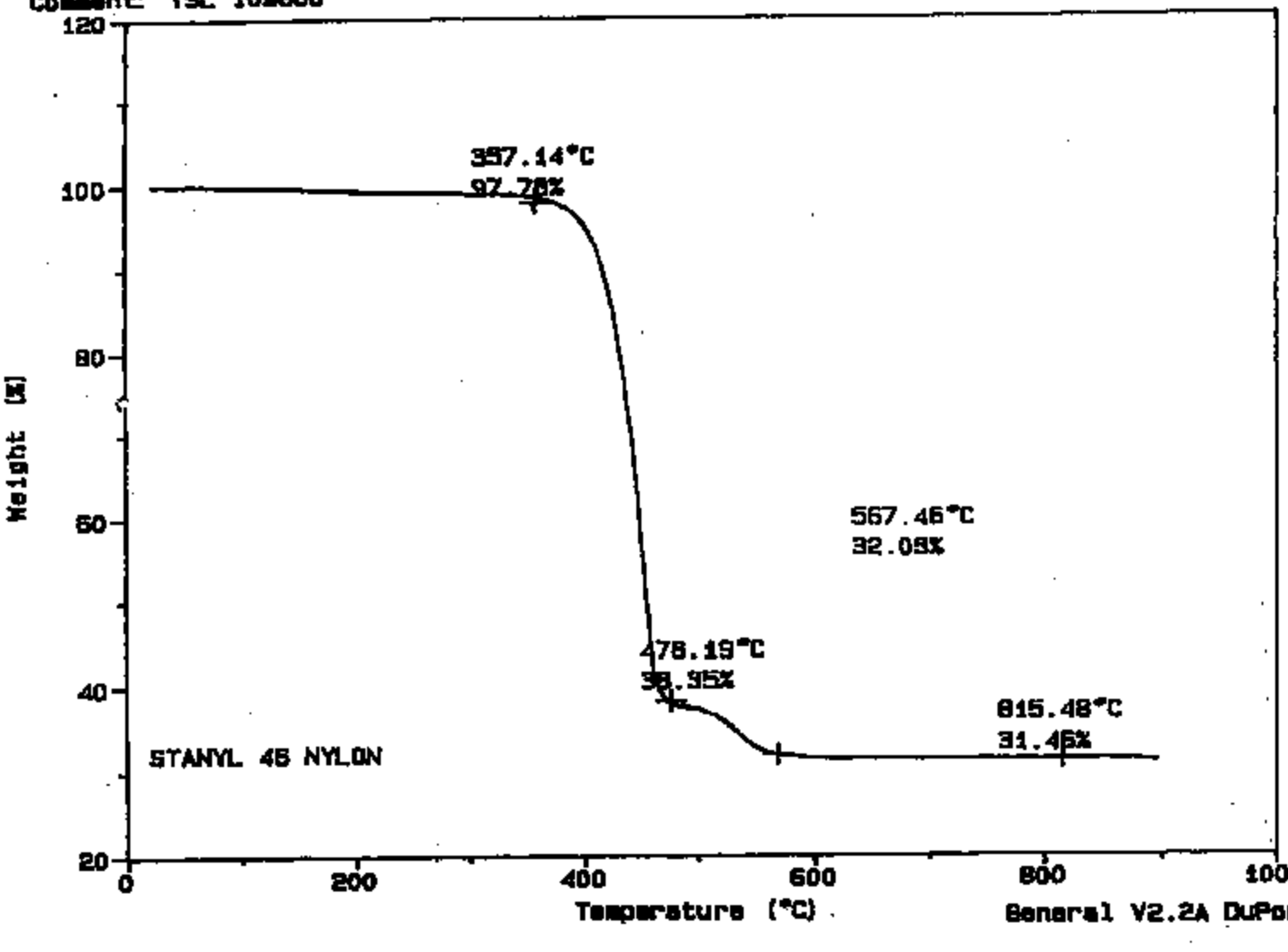

Sample: STANYL ID 38-00-02 BASE
Size: 11.4000 mg
Method: GEN/10/350
Comment: TSL109888 4/6 NYLON
DSC
File: DRONR.80
Operator: KROSS
Run Date: 07/02/91 08:38
14.18°C
18.86°C (I)
-0.01861W/g
14.18°C
32.57°C
32.57°C
STANYL 38-00-02 BASE
Heat Flow W/g
Temperature (°C)
General V2.2A DuPont 2900


Sample: STANYL ID 38-00-08 BASE
Size: 8.8000 mg
Method: GEN/10/350
Comment: TSL109888 4/6 NYLON
DSC
File: DRONR.81
Operator: KROSS
Run Date: 07/02/91 08:38
284.11°C
38.85J/g
281.97°C
STANYL 38-00-08 BASE
Heat Flow W/g
Temperature (°C)
General V2.2A DuPont 2900

Sample: STANYL 46 NYLON ID 38-00-02
Size: 30.1880 mg
Method: 10/900/ISO
Comment: TSL 109866

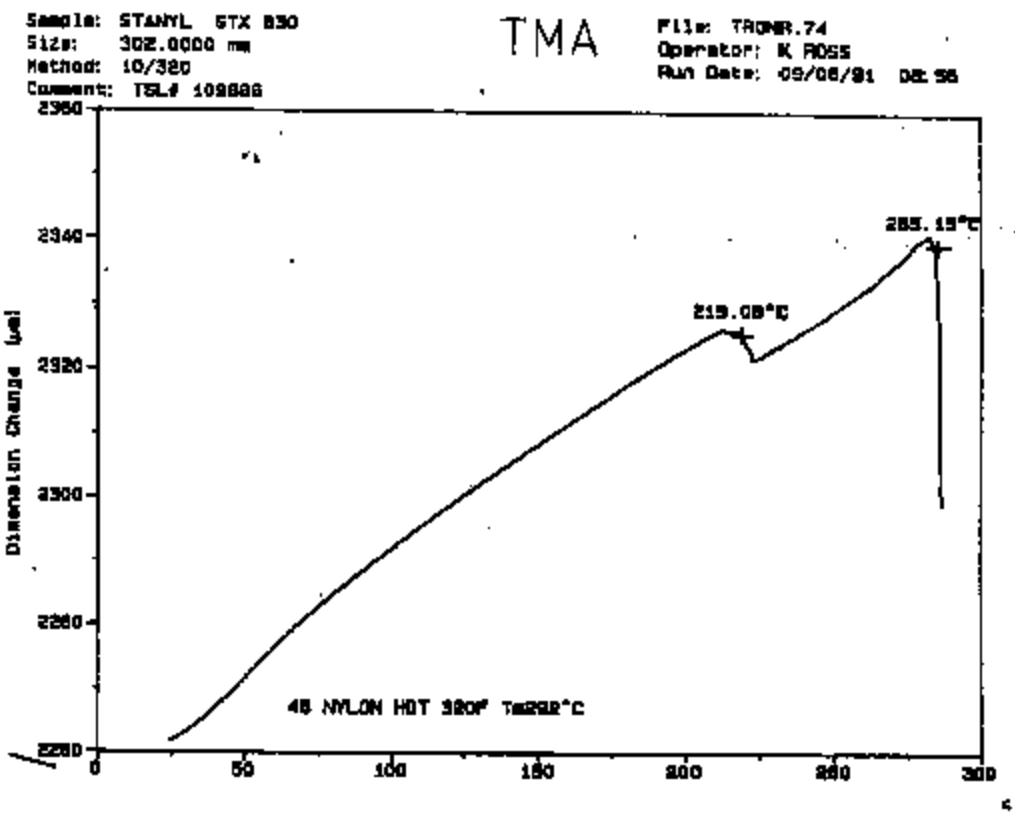
TGA

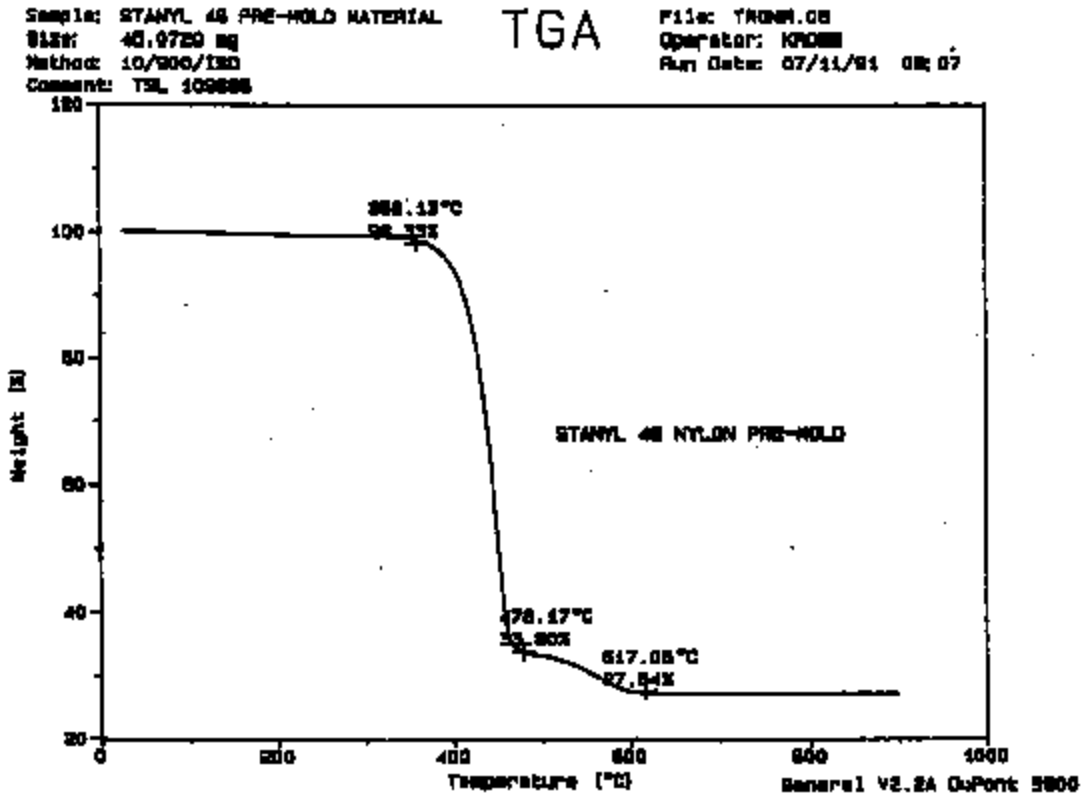
File: TRONB.07
Operator: KROSS
Run Date: 07/10/91 09:58

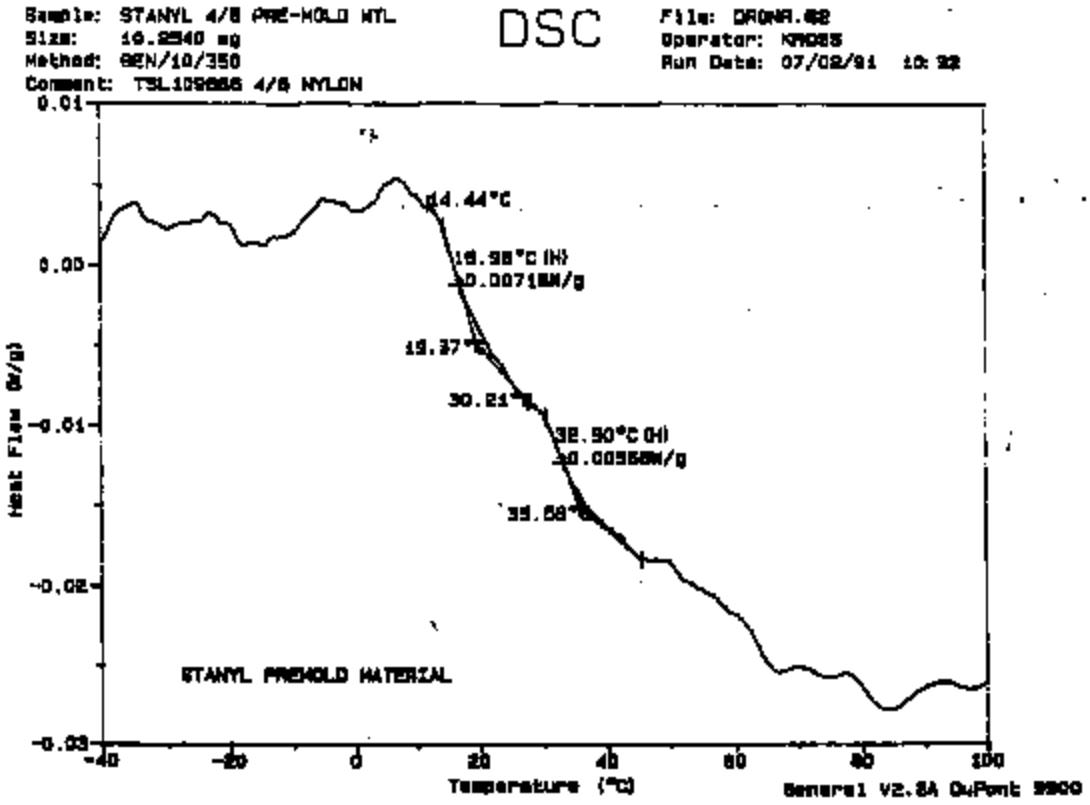


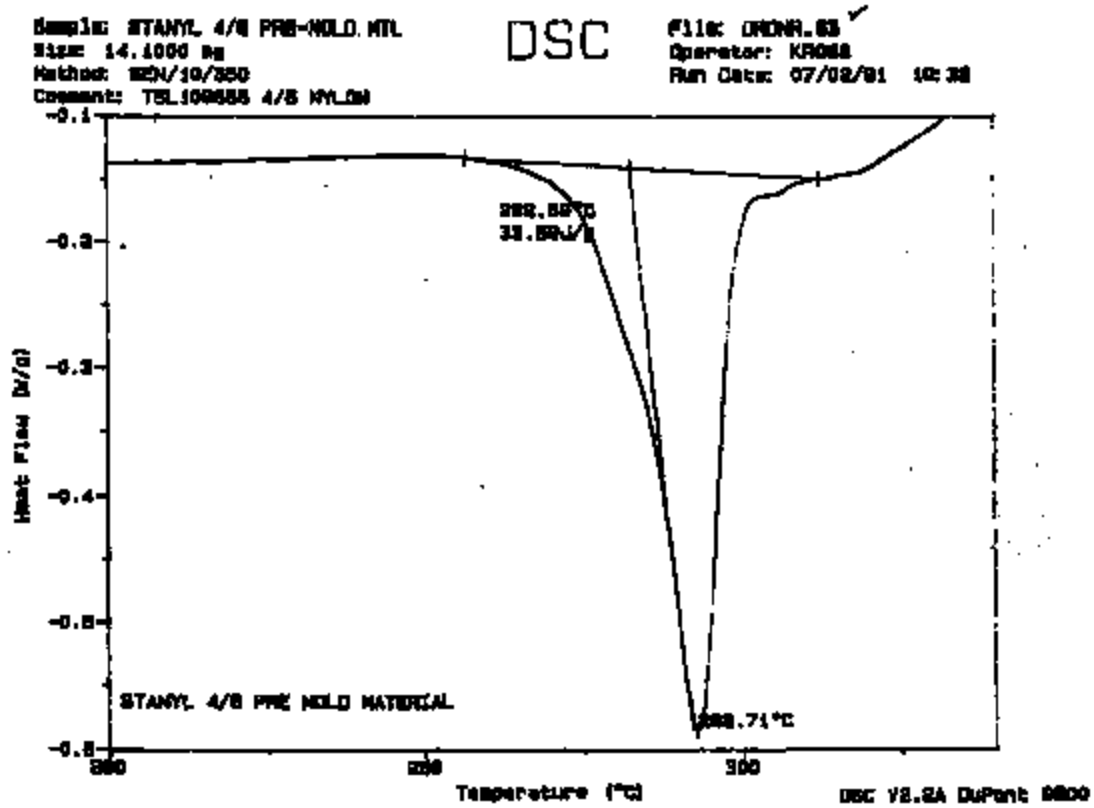
General V2.2A DuPont 9900

TANHTSA 000710


Sample: STANYL STX 830
Size: 302.0000 mg
Method: 10/320
Comment: TSL# 109888
TMA
File: TRONR.74
Operator: K ROSS
Run Date: 09/06/91 08:56
Dimension Change (µm)
2960
2940
2920
2900
2880
0
50
100
150
200
250
300
285.15°C
219.08°C
48 NYLON HOT 320F TM292°C


Sample: STANYL 46 PRE-HOLD MATERIAL
Size: 40.9720 mg
Method: 10/900/130
Comment: TSL 109886
TGA
File: TRONR.08
Operator: KROSS
Run Date: 07/11/91 08:07
Weight (%)
100
80
60
40
20
0
200
400
600
800
1000
Temperature (°C)
368.13°C
378.17°C
617.08°C
STANYL 46 NYLON PRE-HOLD
General V2.2A DuPont 2900

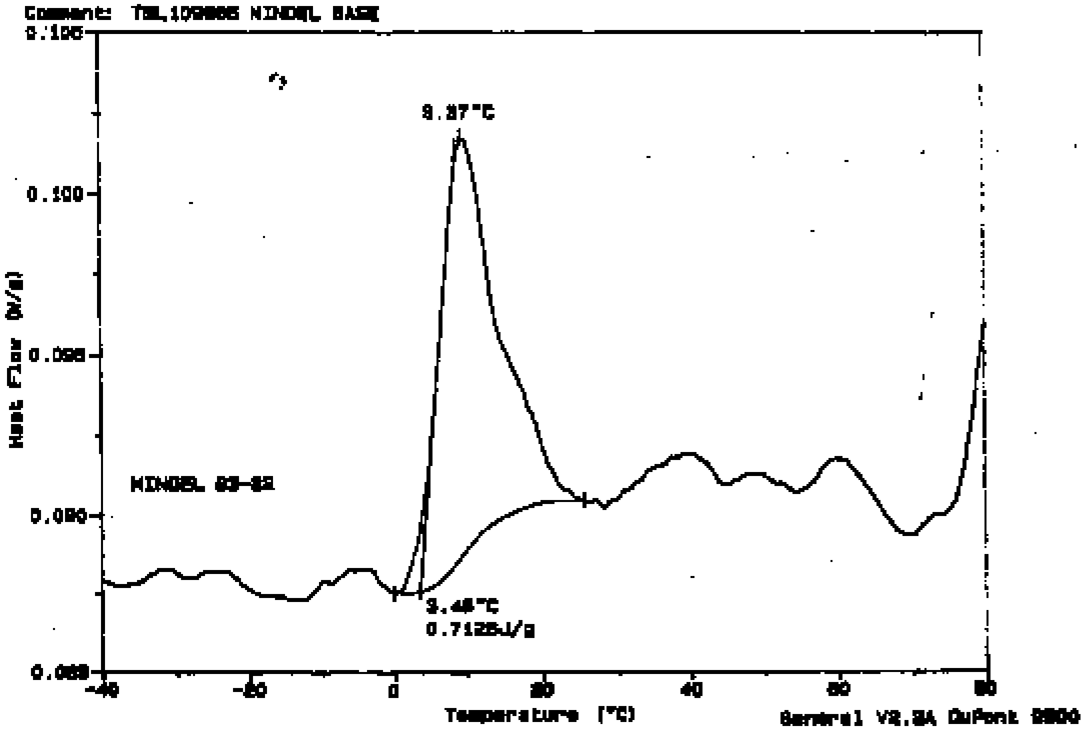

Sample: STANYL 4/6 PRE-HOLD MTL
Size: 10.2540 mg
Method: GEN/10/350
Comment: TSL109666 4/6 NYLON
DSC
File: DRONR.02
Operator: KR068
Run Date: 07/02/91 10:32
0.01
0.00
-0.01
-0.02
-0.03
Heat Flow W/g
44.44°C
18.98°C (H)
-0.0071W/g
15.37°C
30.21°C
38.90°C (H)
-0.0035W/g
35.58°C
STANYL PREMOLD MATERIAL
-40
-20
0
20
40
60
80
100
Temperature (°C)
General V2.2A DuPont 9900


Sample: STANYL 4/6 PRE-HOLD MTL
Size: 14.1000 mg
Method: GEN/10/350
Comment: TSL109666 4/6 NYLON
DSC
File: DRONR.03
Operator: KR068
Run Date: 07/02/91 10:38
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
Heat Flow W/g
288.88°C
33.89J/g
288.71°C
STANYL 4/6 PRE MOLD MATERIAL
200
300
Temperature (°C)
DSC V2.2A DuPont 9900

Sample: MINDEL ID 30-00-03 BASE
Size: 10.5800 mg
Method: GEN/10/360
Comment: TBL,109886 MINDEL BASE

DSC

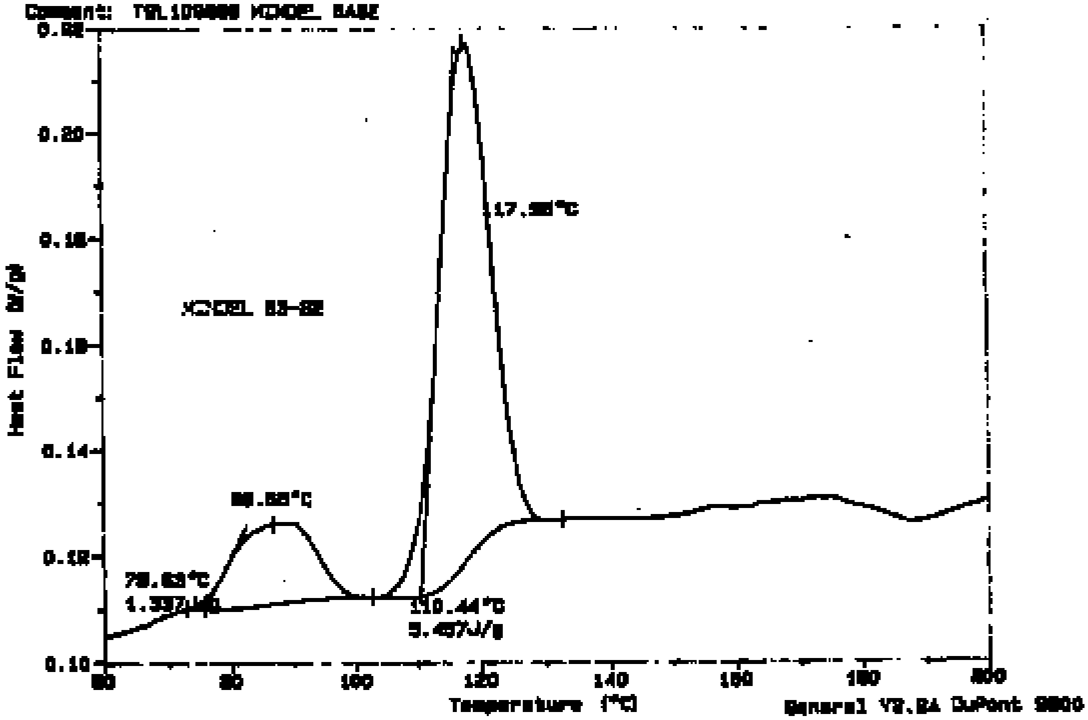
File: ORONR.88
Operator: KROSS
Run Date: 07/03/91 08:59

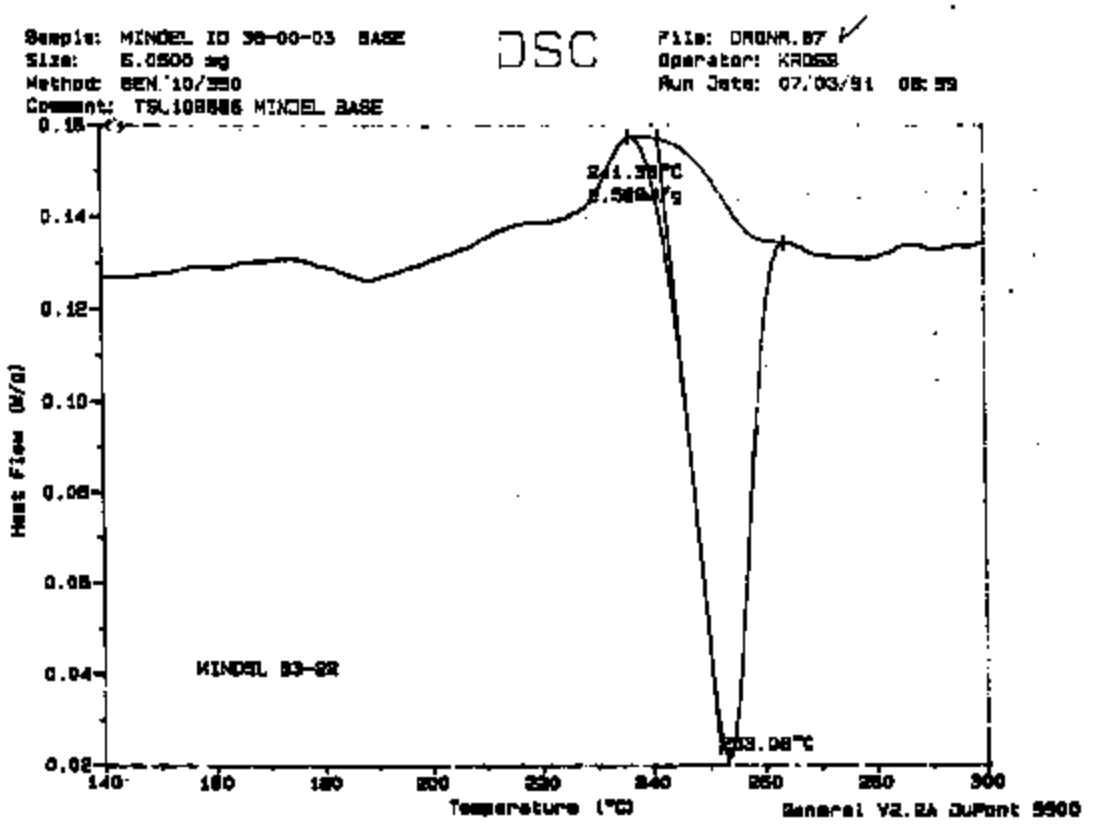


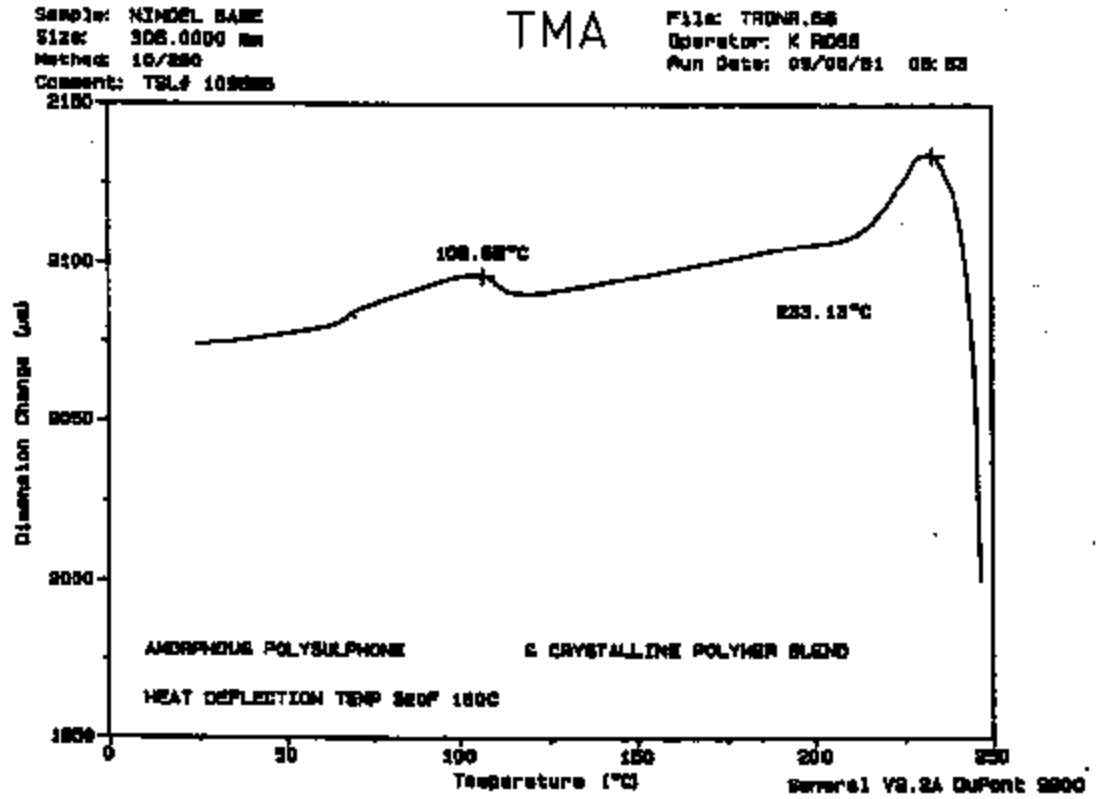
Sample: MINDEL ID 30-00-03 BASE
Size: 8.0800 mg
Method: GEN/10/360
Comment: TBL,109888 MINDEL BASE

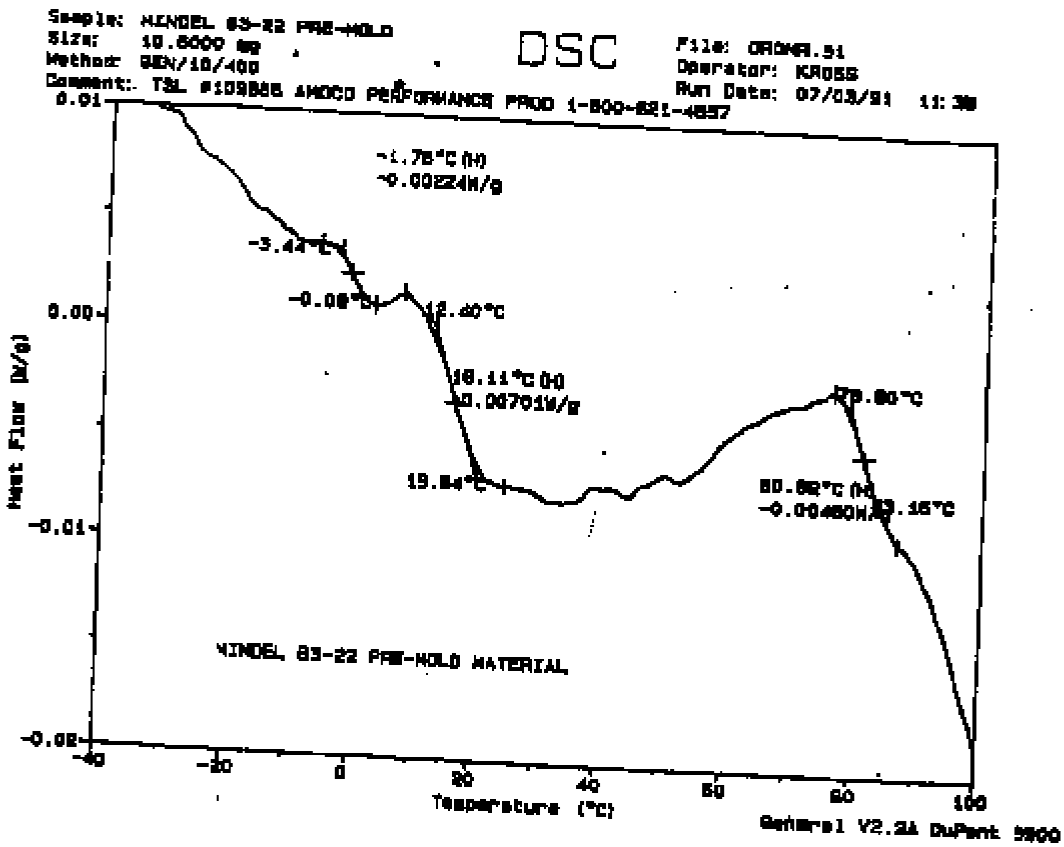
DSC

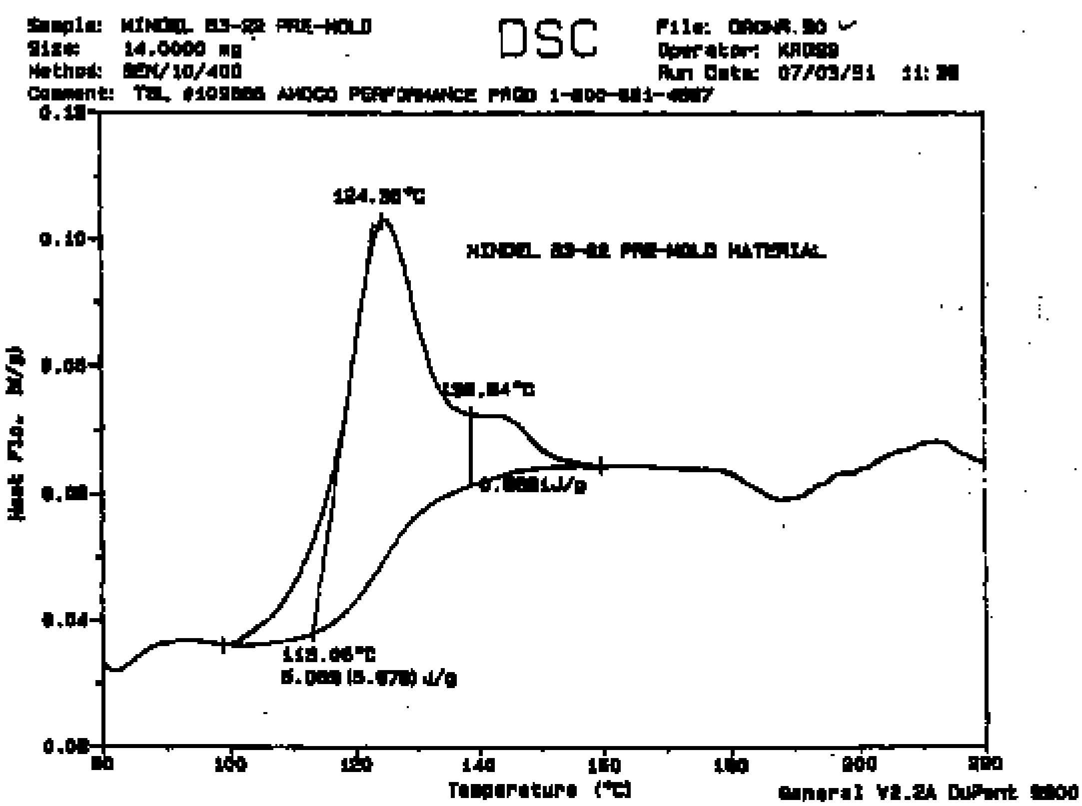
File: ORONR.87
Operator: KROSS
Run Date: 07/03/91 08:50

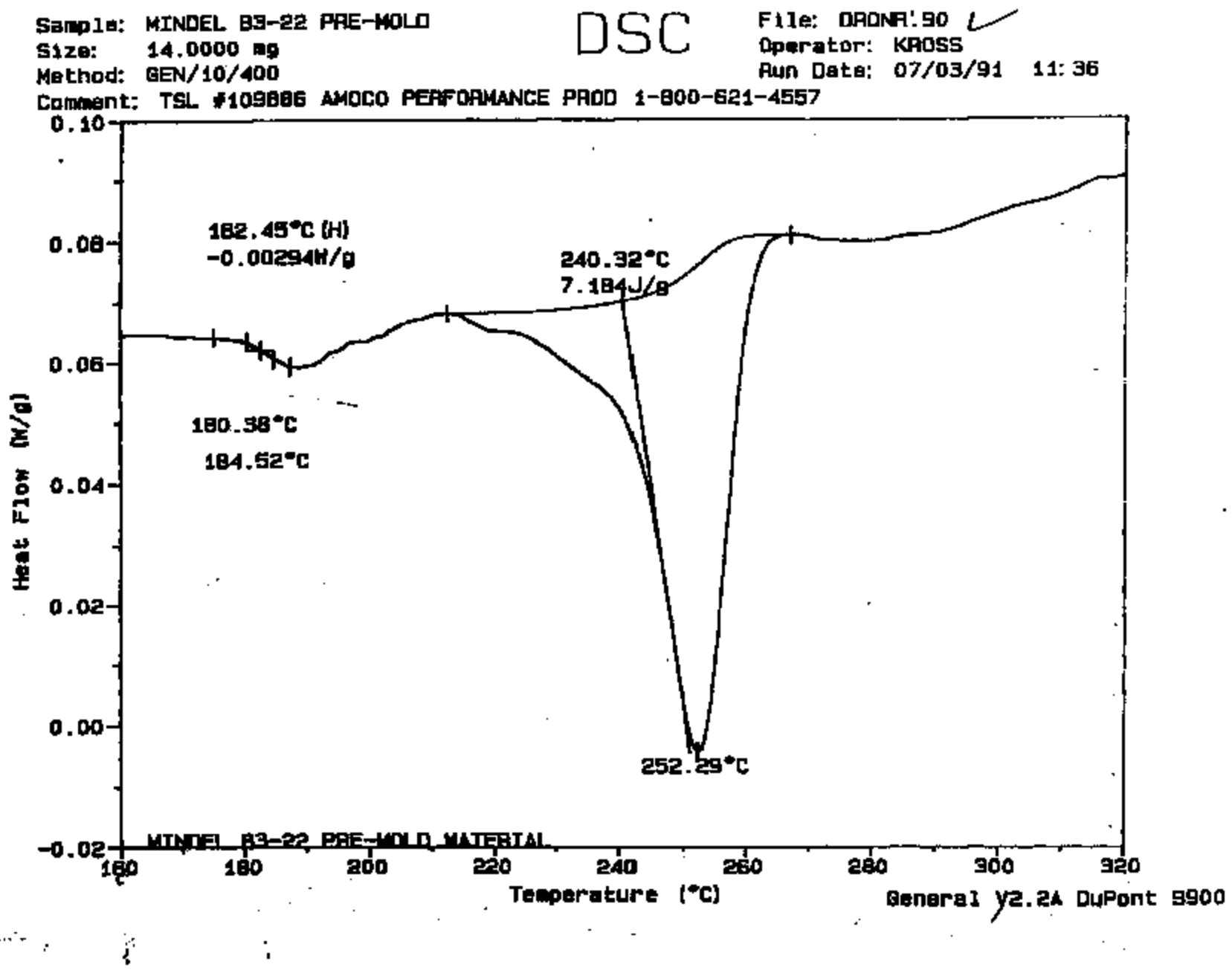



Sample: MINDEL ID 30-00-03 BASE
Size: 5.0500 mg
Method: GEN.'10/350
Comment: TSL108586 MINDEL BASE
DSC
File: DRGNR.87
Operator: KRDSS
Run Date: 07/03/91 08:59
Heat Flow (W/g)
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
MINDEL B3-02
203.08°C
140
160
180
200
220
240
260
280
300
Temperature (°C)
General V2.2A DuPont 9900


Sample: MINDEL BASE
Size: 306.0000 mm
Method: 10/250
Comment: TSL# 109586
TMA
File: TRGNR.86
Operator: K RDSS
Run Date: 09/06/91 08:52
Dimension Change (µm)
2150
2100
2050
2000
1950
108.68°C
233.13°C
AMORPHOUS POLYSULPHONE
& CRYSTALLINE POLYMER BLEND
HEAT DEFLECTION TEMP 360F 180C
0
50
100
150
200
250
Temperature (°C)
General V2.2A DuPont 9900


Sample: MINDEL 83-22 PRE-MOLD
Size: 10.6000 mg
Method: GEN/10/400
Comment: TSL #109866 AMOCO PERFORMANCE PROD 1-800-621-4557
DSC
File: ORGNR.51
Operator: KROSS
Run Date: 07/03/91
-1.78°C (H)
-0.00224W/g
-3.44°C
-0.09°C
18.11°C (H)
-0.00701W/g
19.84°C
79.80°C
80.82°C (H)
-0.00460W/g
MINDEL 83-22 PRE-MOLD MATERIAL
0.01
0.00
-0.01
-0.02
Heat Flow (W/g)
-40
-20
0
20
40
60
80
100
Temperature (°C)
General V2.2A DuPont 9900


Sample: MINDEL 83-22 PRE-MOLD
Size: 14.0000 mg
Method: GEN/10/400
Comment: TSL #109866 AMOCO PERFORMANCE PROD 1-800-621-4557
DSC
File: ORGNR.50
Operator: KROSS
Run Date: 07/03/91
124.38°C
MINDEL 83-22 PRE-MOLD MATERIAL
0.10
0.04
Heat Flow (W/g)
115.06°C
80
100
120
140
160
180
200
220
Temperature (°C)
General V2.2A DuPont 9900



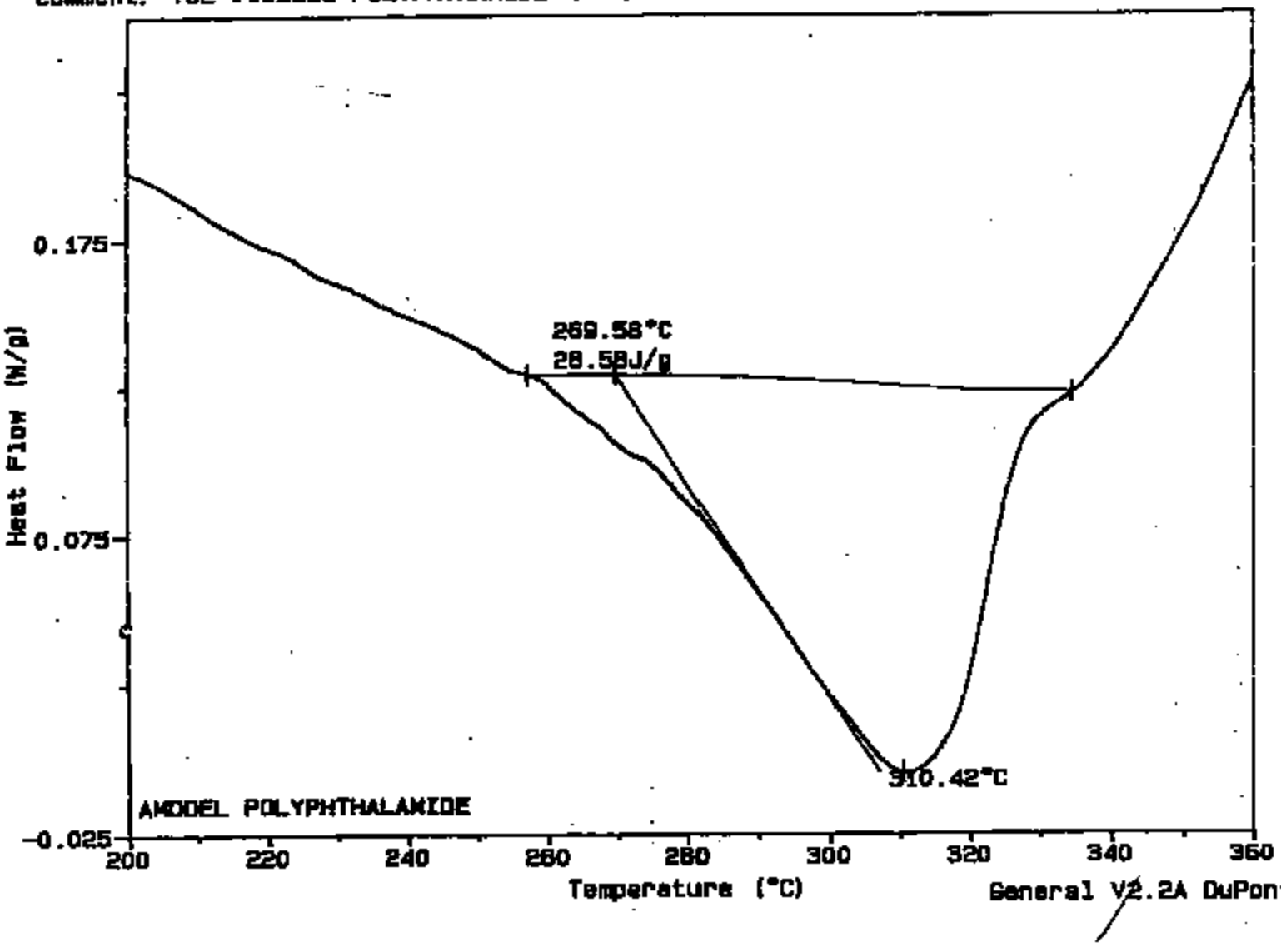
TI-NHTSA 005710


ANODEL POLYPHTHALAMIDE
Temperature (°C)
DSC
Operator: KROSS
Run Date: 07/01/9
Sample: ANODEL II 30-GF-01 BLACK
Size: 7.1000 mg
Method: SEV/10/400
Comment: TGL #160888-POLYPHTHAMIDE,(PPA) ANODEL PERFORMANCE PRODUCTS
Universal V2.5H TA Instruments

Sample: AMODEL ID 38-00-04 BASE
Size: 10.3700 mg
Method: GEN/10/400
Comment: TSL #109886 POLYPHTHAMIDE (PPA) AMOCO PERFORMANCE PRODUCTS

DSC

File: DRONA.92
Operator: KROSS
Run Date: 07/09/91 13:53



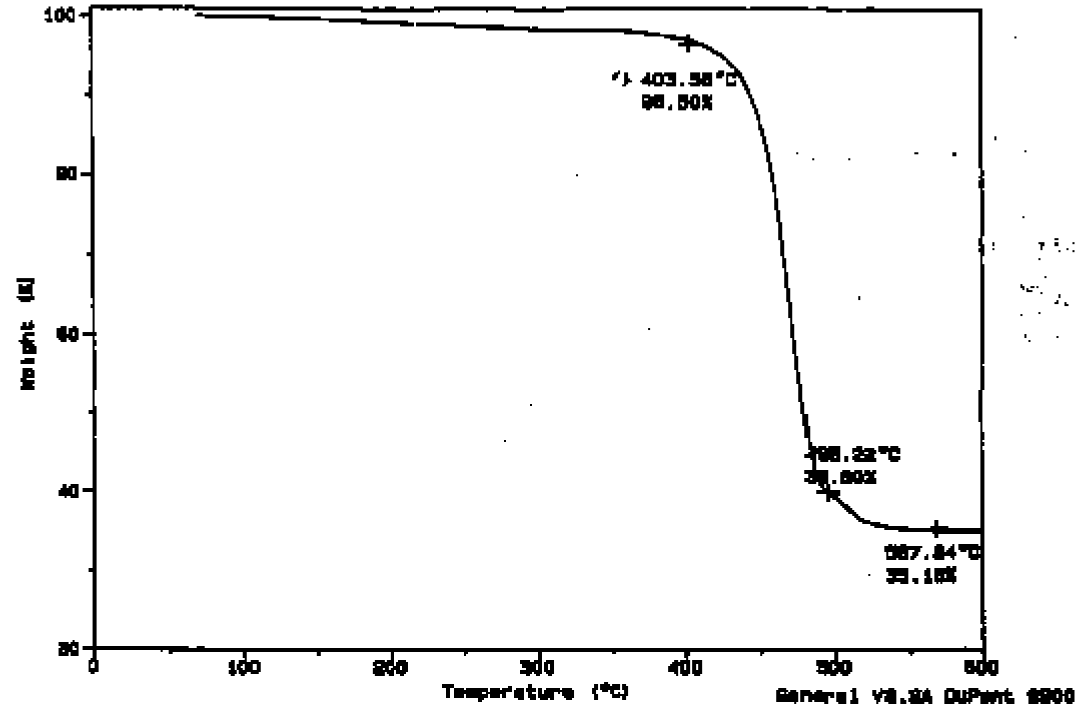
General V2.2A DuPont 9900

TI-NHTSA 005718

Sample: AMODEL BASE
Size: 19.2860 mg
Method: 10/600/IGO
Comment: TSL#108886

TGA

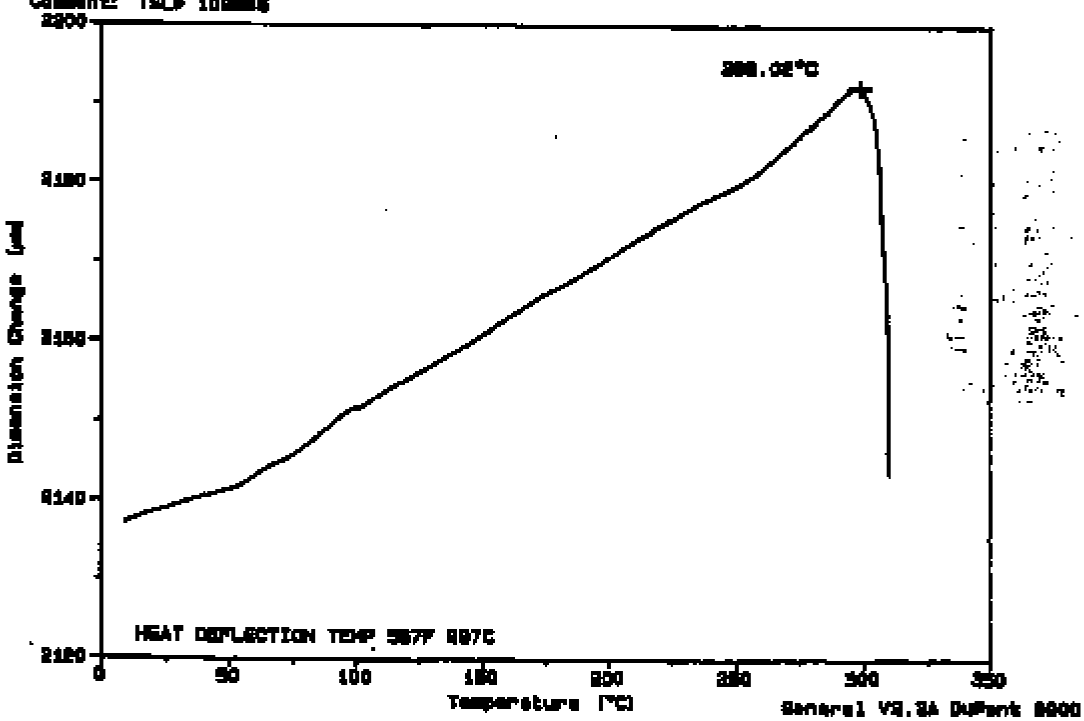
File: TRONR.B3
Operator: K ROSS
Run Date: 09/18/91 11:57



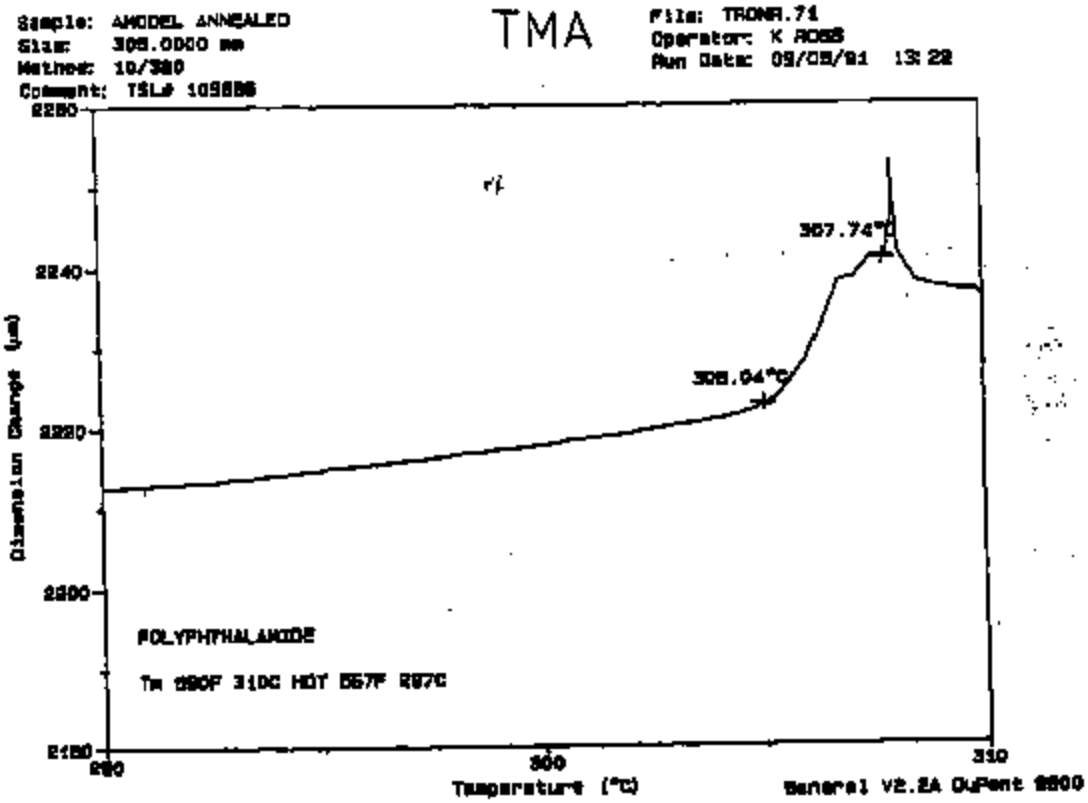
Sample: AMODEL BASE
Size: 305.0000 mm
Method: 10/380
Comment: TSL# 108885

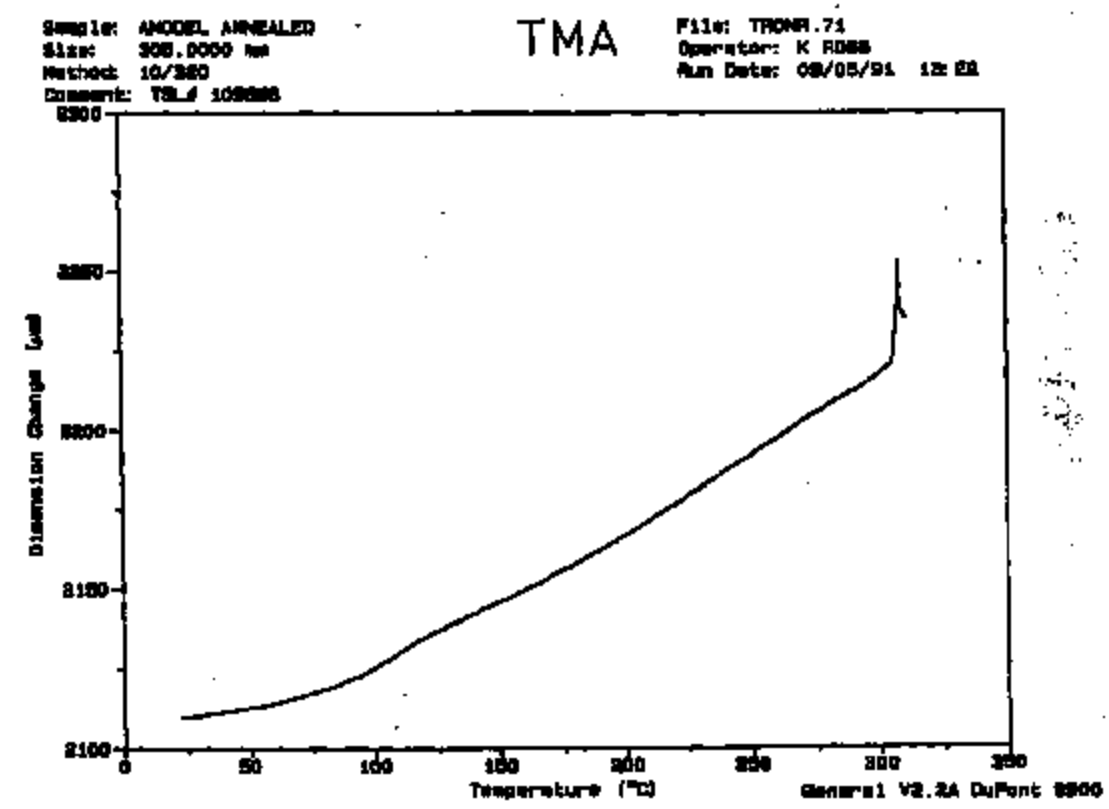
TMA

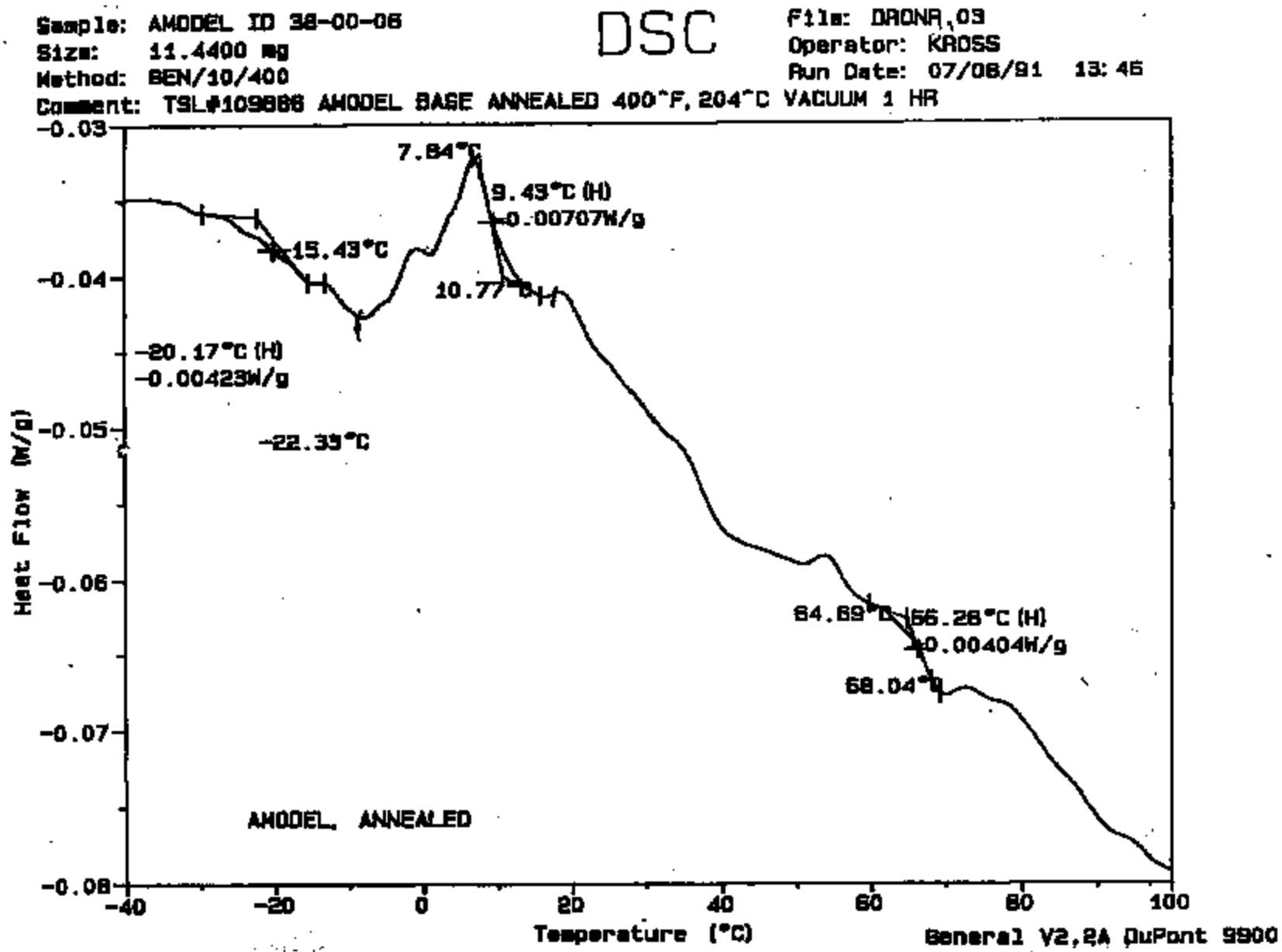
File: TRONR.7B
Operator: K ROSS
Run Date: 09/05/91 11:08



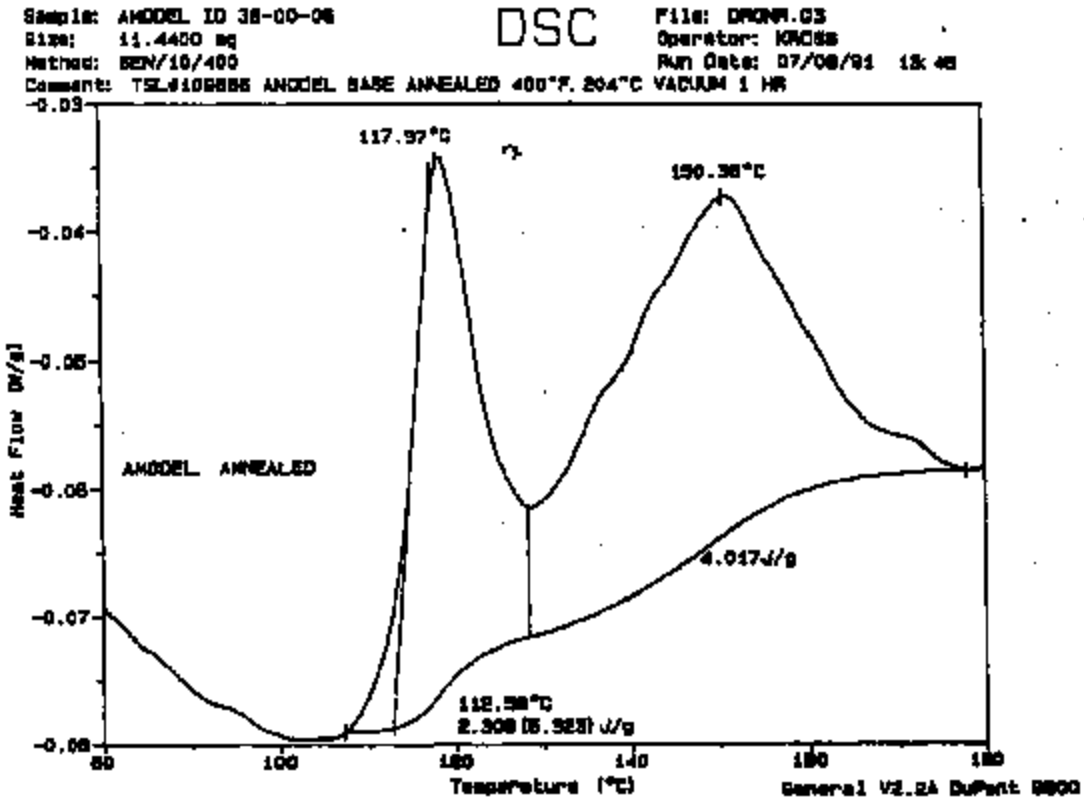
TI-NHTSA 005719

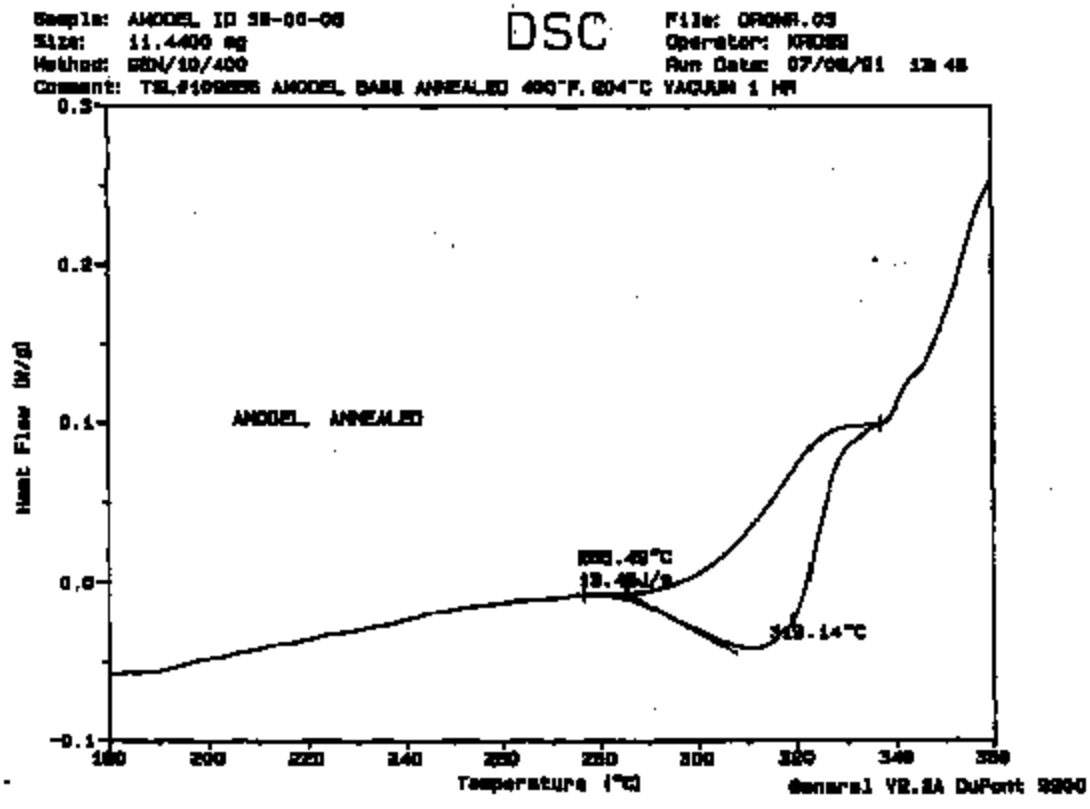

Sample: AMODEL ANNEALED
Size: 308.0000 mm
Method: 10/380
Comment: TSL# 109886
TMA
File: TRONR.71
Operator: K ROSS
Run Date: 09/05/91 13:22
307.74°C
305.04°C
POLYPHTHALAMIDE
Tm 280F 310C HDT 557F 292C
Dimension Change (µm)
Temperature (°C)
General V2.2A DuPont 9900

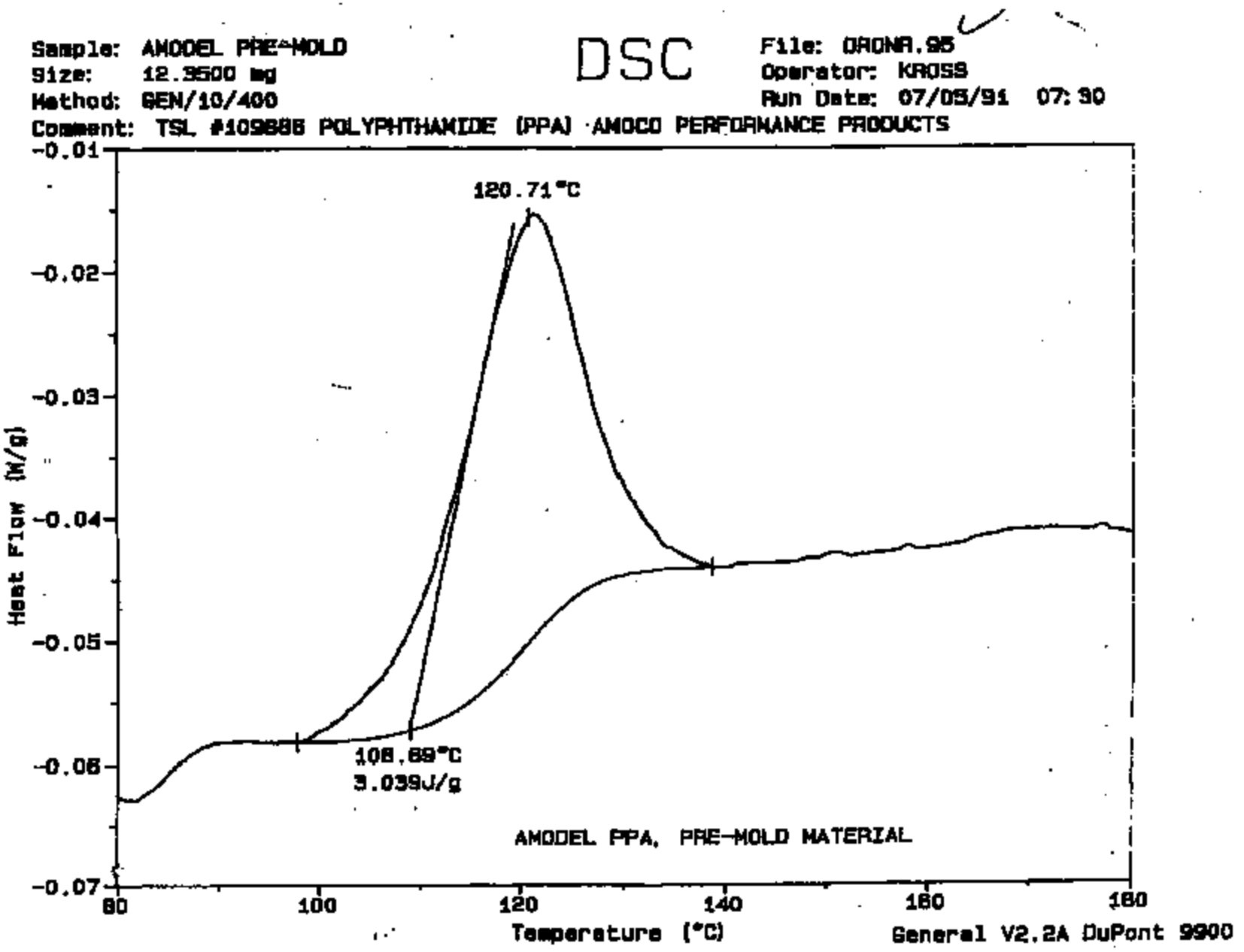

Sample: AMODEL ANNEALED
Size: 308.0000 mm
Method: 10/380
Comment: TSL# 109886
TMA
File: TRONR.71
Operator: K ROSS
Run Date: 09/05/91 13:22
Dimension Change (µm)
Temperature (°C)
General V2.2A DuPont 9900



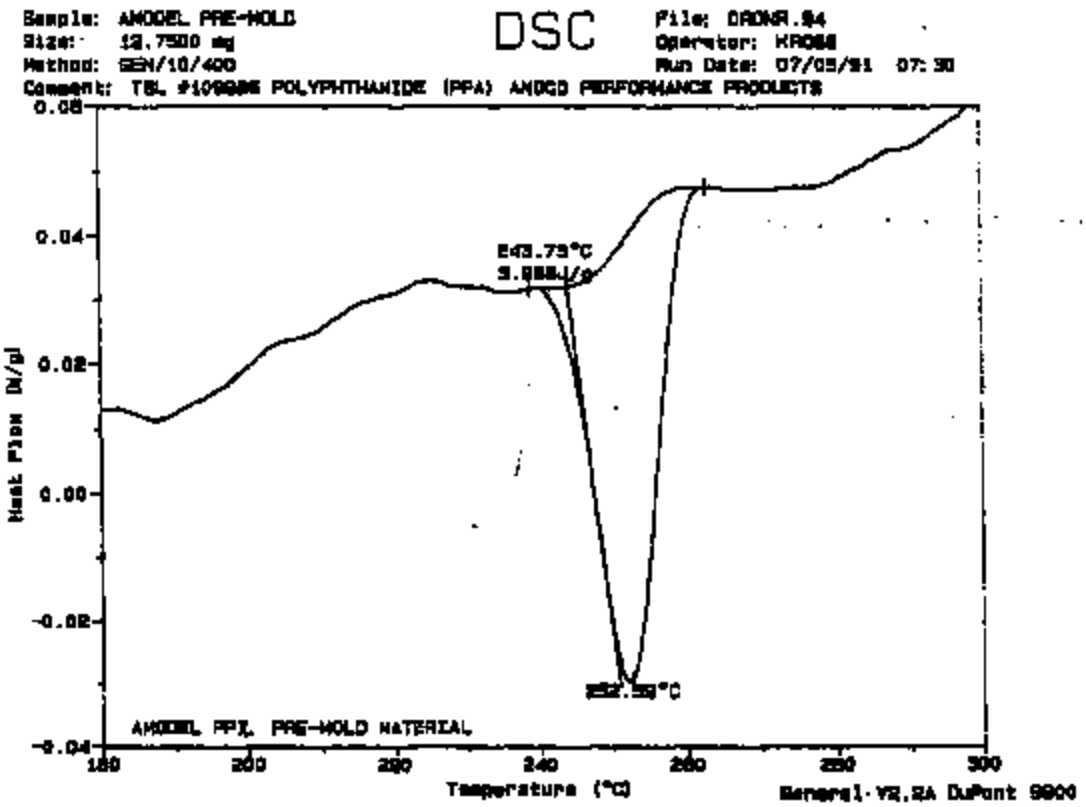
TI-NHTSA 005721

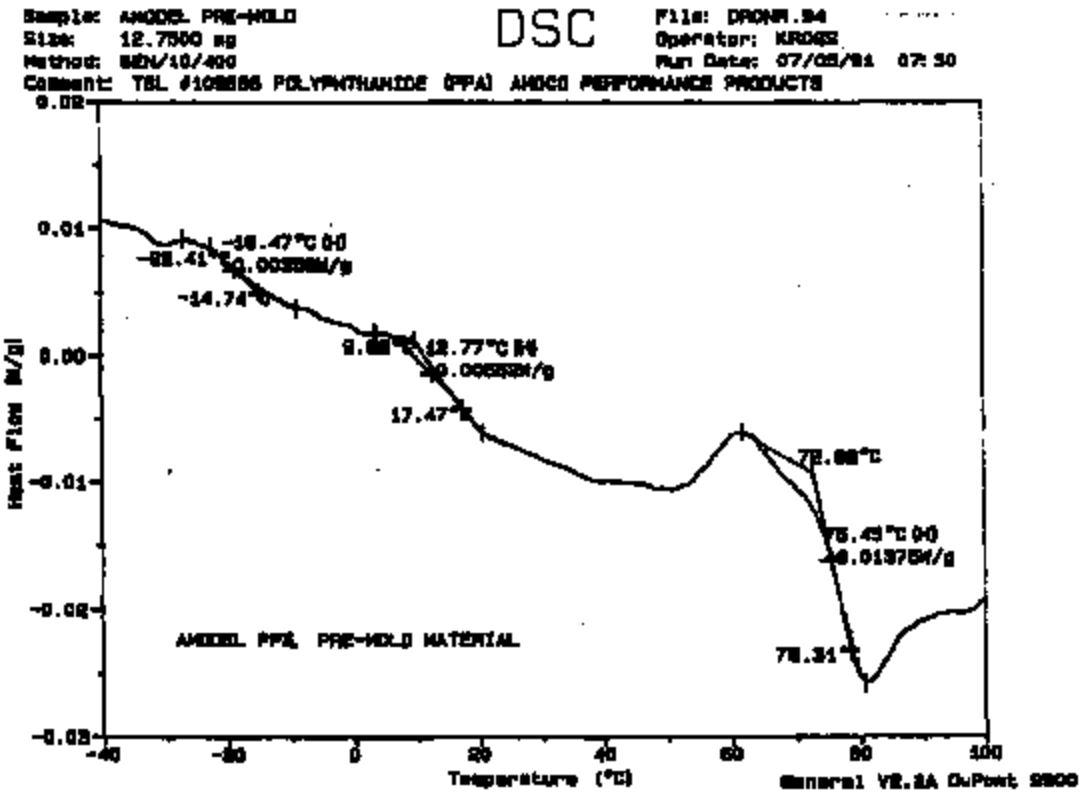

Sample: AMODEL ID 38-00-06
Size: 11.4400 mg
Method: BEN/10/400
Comment: TSL#108886 AMODEL BASE ANNEALED 400°F. 204°C VACUUM 1 HR
DSC
File: DRONR.03
Operator: KROSS
Run Date: 07/08/91 12:48
117.97°C
150.38°C
AMODEL ANNEALED
4.017J/g
112.58°C
2.308 (5.923) J/g
Heat Flow W/g
Temperature (°C)
General V2.2A DuPont 9900

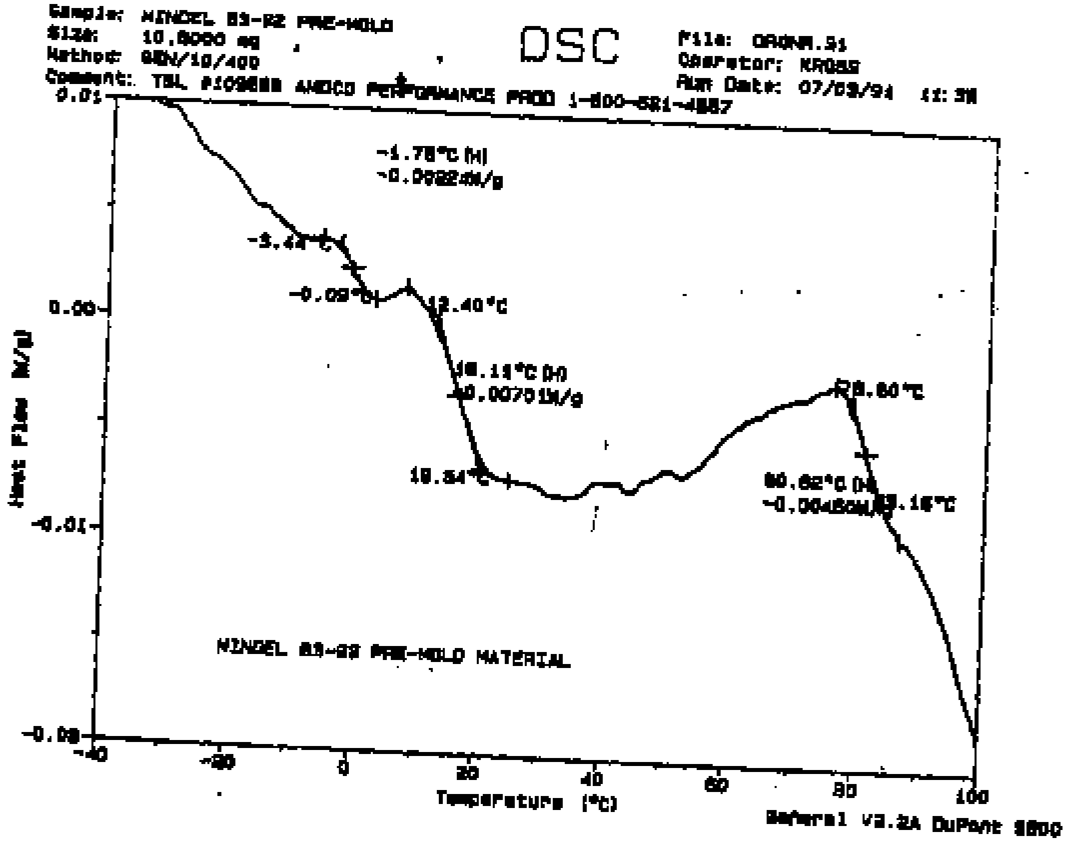

Sample: AMODEL ID 38-00-06
Size: 11.4400 mg
Method: BEN/10/400
Comment: TSL#108886 AMODEL BASE ANNEALED 400°F. 204°C VACUUM 1 HR
DSC
File: DRONR.03
Operator: KROSS
Run Date: 07/08/91 12:48
AMODEL ANNEALED
Heat Flow W/g
Temperature (°C)
General V2.2A DuPont 9900

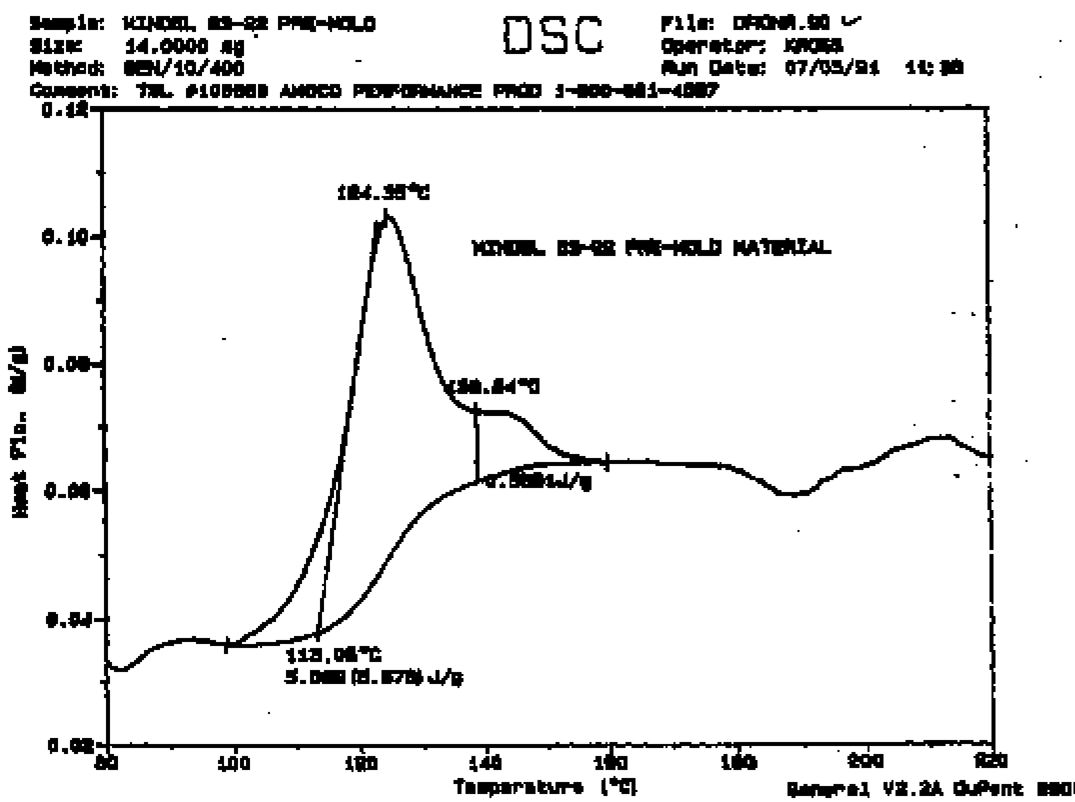


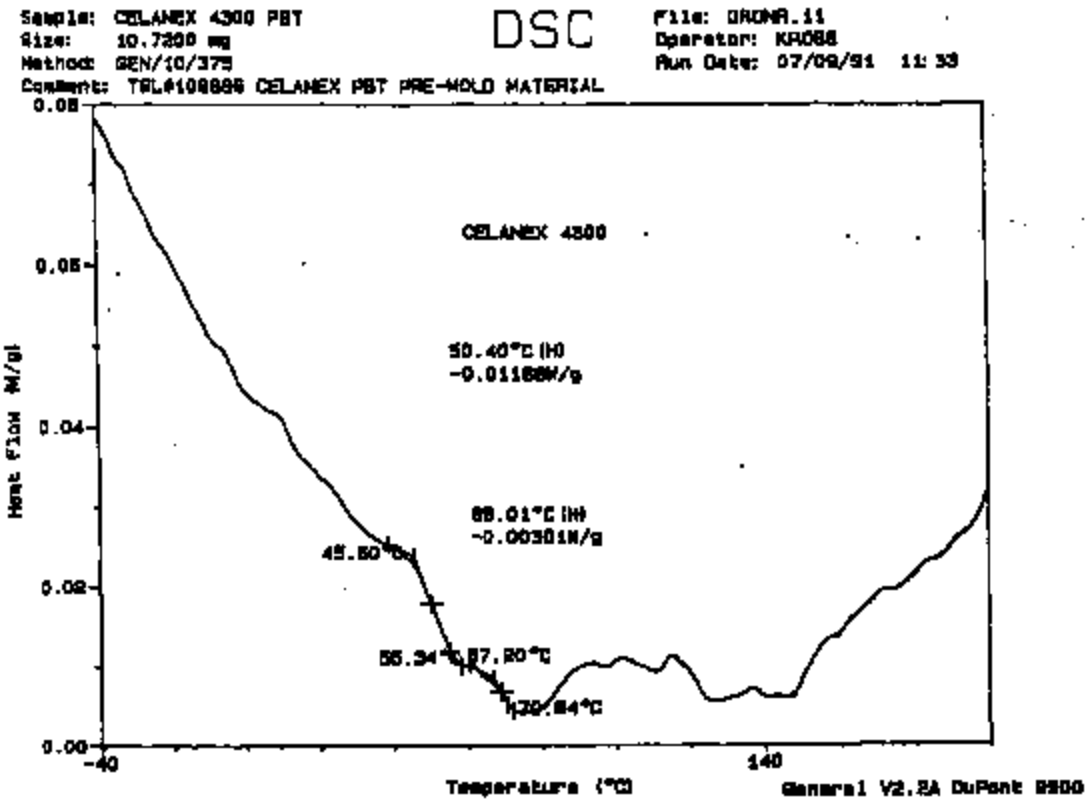
TI-NHTSA 005723

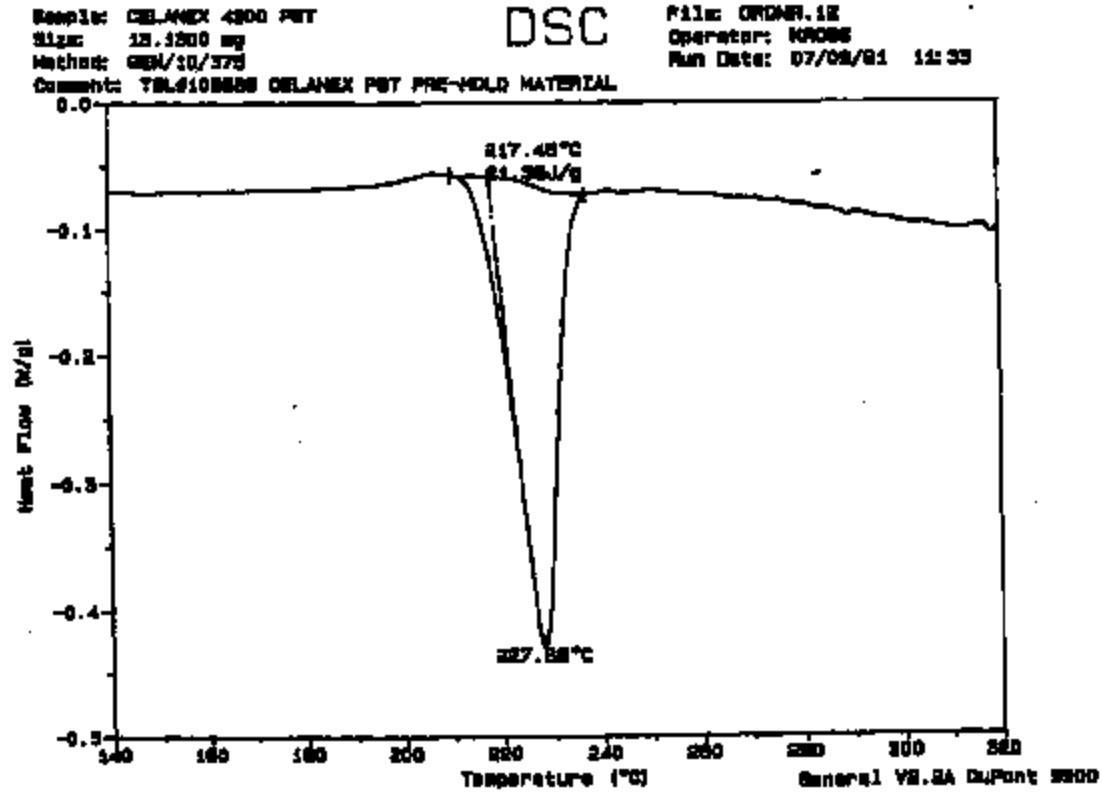

Sample: AMODEL PRE-HOLD
Size: 12.7500 mg
Method: GEN/10/400
Comment: TBL #109886 POLYPHTHAMIDE (PPA) AMOCO PERFORMANCE PRODUCTS
DSC
File: DRONR.94
Operator: KROSS
Run Date: 07/05/91 07:30
Heat Flow W/g
Temperature (°C)
AMODEL PPA PRE-HOLD MATERIAL
Universal V2.2A DuPont 9900


Sample: AMODEL PRE-HOLD
Size: 12.7500 mg
Method: GEN/10/400
Comment: TBL #109886 POLYPHTHAMIDE (PPA) AMOCO PERFORMANCE PRODUCTS
DSC
File: DRONR.94
Operator: KROSS
Run Date: 07/05/91 07:50
Heat Flow W/g
Temperature (°C)
AMODEL PPA PRE-HOLD MATERIAL
Universal V2.2A DuPont 9900


Sample: MINDEL B3-92 PRE-MOLD
Size: 10.8000 mg
Method: GEN/10/400
Comment: TSL #109888 AMOCO PERFORMANCE PROD 1-800-881-4887
DSC
File: DRGNR.91
Operator: KROSS
Run Date: 07/03/91
MINDEL B3-92 PRE-MOLD MATERIAL
Heat Flow (W/g)
Temperature (°C)
General V2.2A DuPont 9900


Sample: MINDEL B3-92 PRE-MOLD
Size: 14.0000 mg
Method: GEN/10/400
Comment: TSL #109888 AMOCO PERFORMANCE PROD 1-800-881-4887
DSC
File: DRGNR.90
Operator: KROSS
Run Date: 07/03/91
MINDEL B3-92 PRE-MOLD MATERIAL
Heat Flow (W/g)
Temperature (°C)
General V2.2A DuPont 9900

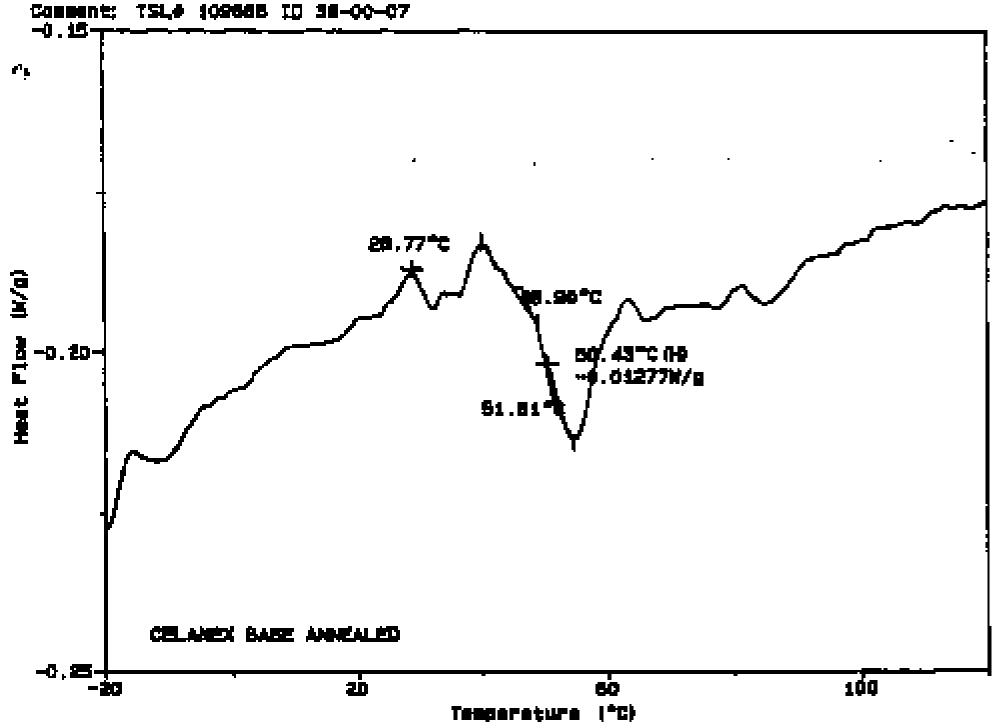

Sample: CELANEX 4300 PBT
Size: 10.7200 mg
Method: GEN/10/375
Comment: TBL#108886 CELANEX PBT PRE-MOLD MATERIAL
DSC
File: ORDNR.11
Operator: KROSS
Run Date: 07/09/91 11:33
CELANEX 4300
50.40°C (H)
-0.01168W/g
89.01°C (H)
-0.00301W/g
45.50°C
55.34°C
87.20°C
129.84°C
Heat Flow W/g
Temperature (°C)
General V2.2A DuPont 9900


Sample: CELANEX 4300 PBT
Size: 12.1300 mg
Method: GEN/10/375
Comment: TBL#108886 CELANEX PBT PRE-MOLD MATERIAL
DSC
File: ORDNR.12
Operator: KROSS
Run Date: 07/09/91 11:39
217.48°C
Heat Flow W/g
Temperature (°C)
General V2.2A DuPont 9900

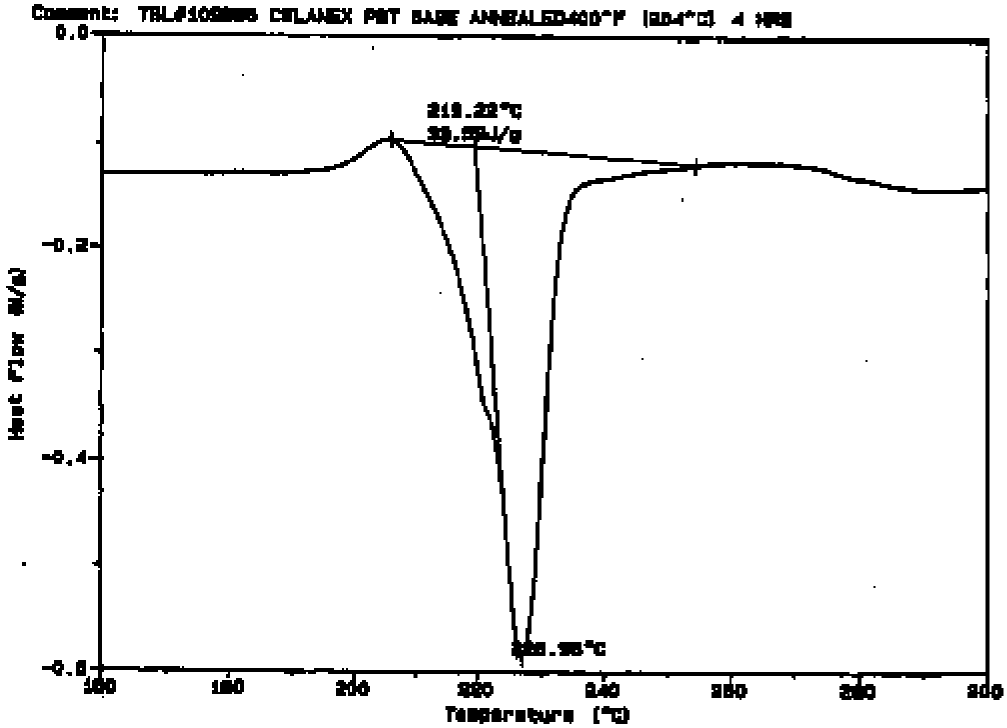
Sample: CELANEX BASE ANNEALED
Size: 10.7000 mg
Method: 10/350
Comment: TSL# 109665 ID 38-00-07

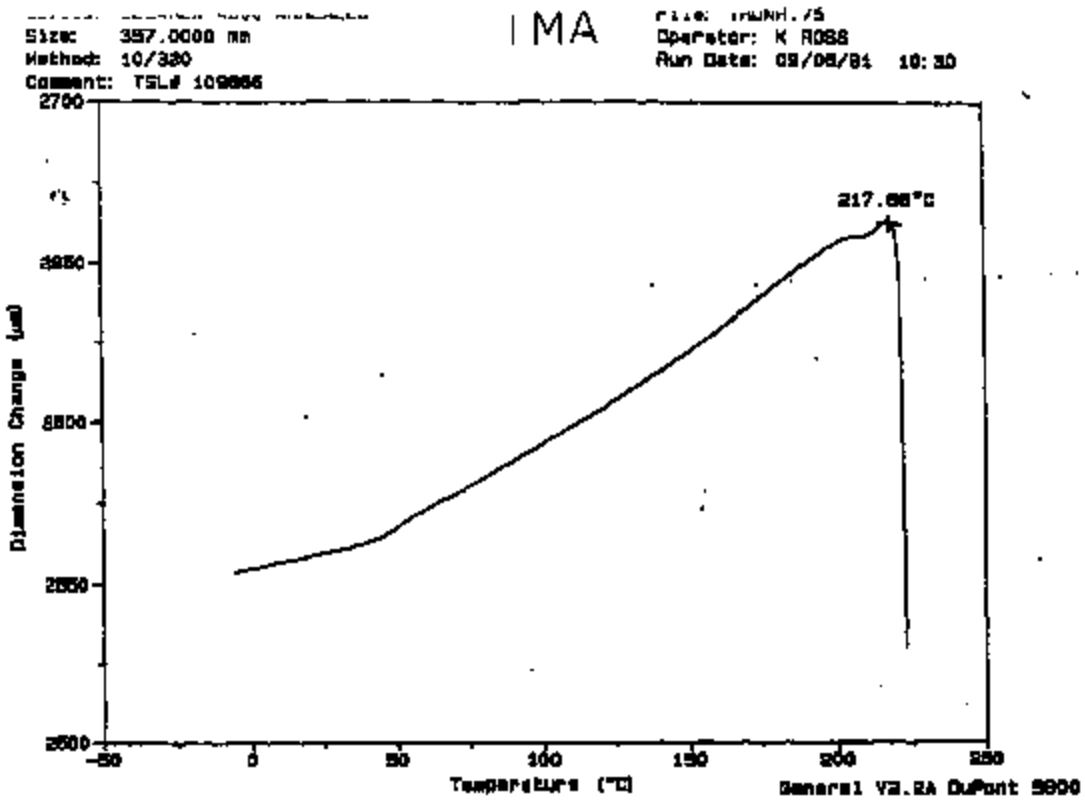
DSC

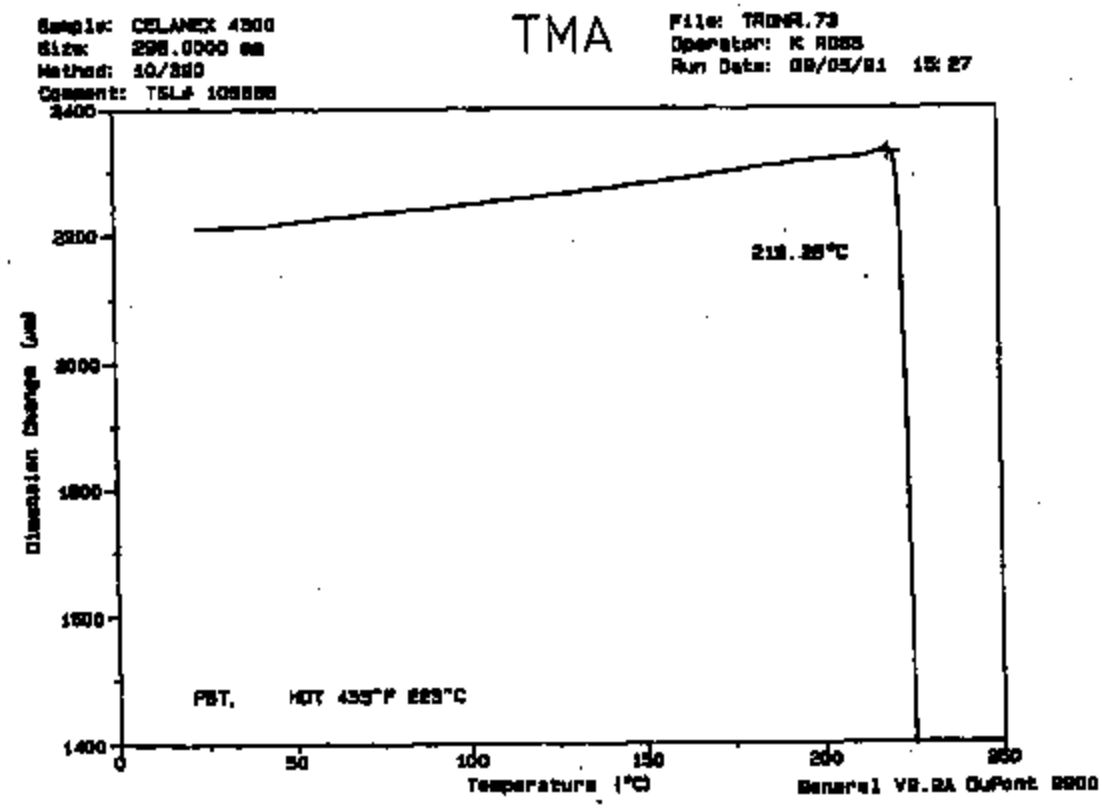
File: ORGNR.94
Operator: K ROSS
Run Date: 09/14/91 10:13



Method: SEM/10/375
Comment: TSL#109665 CELANEX PBT BASE ANNEALED400°F (204°C) 4 HRS



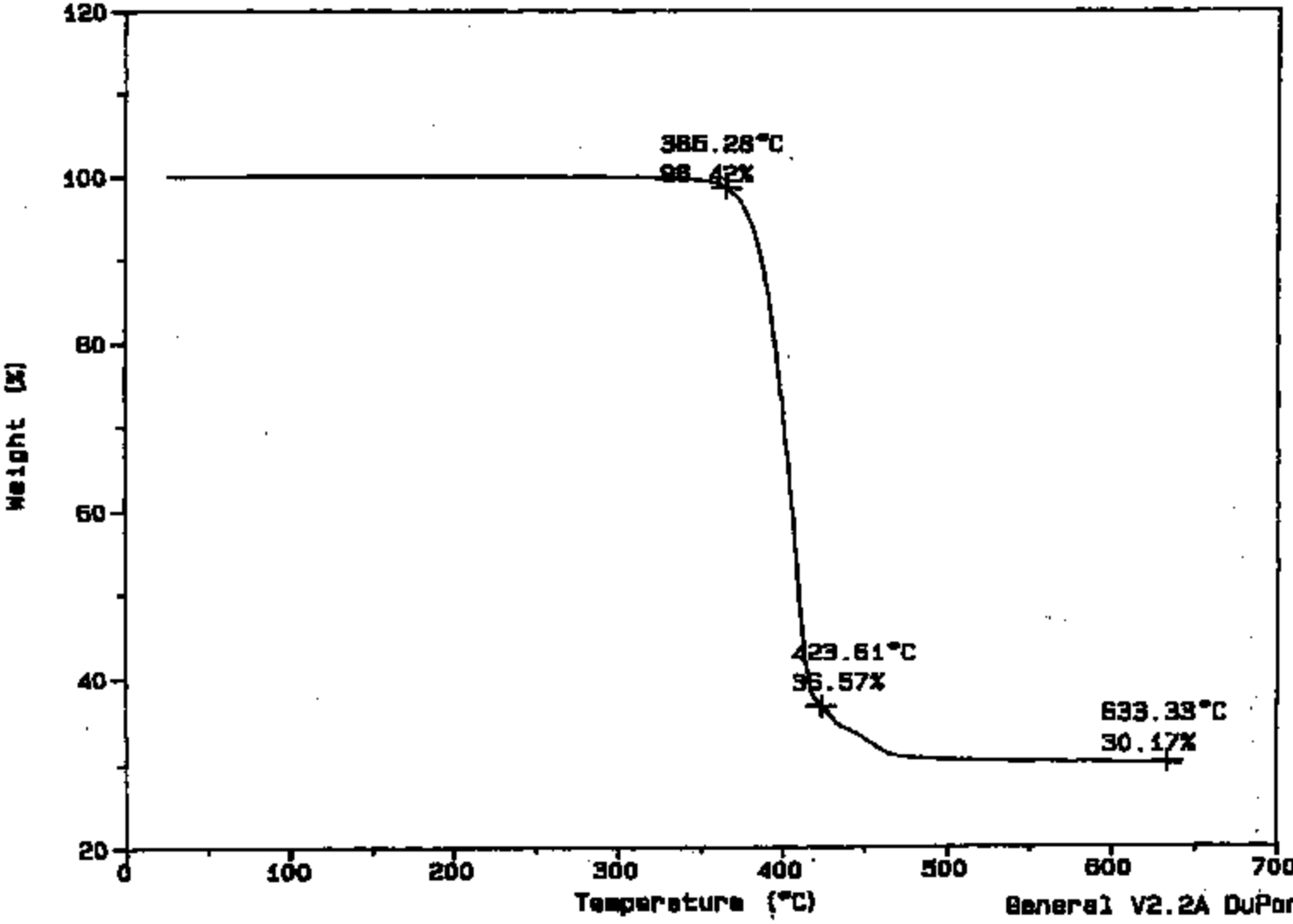

Size: 357.0000 mm
Method: 10/320
Comment: TSL# 109866
TMA
Operator: K ROSS
Run Date: 09/06/01 10:30
217.66°C
Dimension Change (µm)
Temperature (°C)
General V2.2A DuPont 2900


Sample: CELANEX 4300
Size: 298.0000 mm
Method: 10/320
Comment: TSL# 109866
TMA
File: TRONR.73
Operator: K ROSS
Run Date: 09/05/01 15:27
218.38°C
PBT, HDT 435°F 223°C
Dimension Change (µm)
Temperature (°C)
General V2.2A DuPont 2900

Sample: CELANEX BASE
Size: 24.7890 mg
Method: 10/900/ISO
Comment: TSL#109885

TGA

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



General V2.2A DuPont 9900

TI-NHTSA 005728

QUIET SWITCH - PRELIMINARY STUDIES

TI CONFIDENTIAL
TI STRICLY 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 celenax 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 Celenax are shown in Figure 1. Norly 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 Norly material for an underhood Automotive Pressure Transducer (APT). This includes thermal cycling, chemical resistance, dimensional stability, impulse testing, impact strength, etc.

Results: The Norly 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 reduce from 100psi to approx 30psi. Correspondingly the available pin window has been reduce from 14.5 mils to 10 mils.

IV) Switch sound evaluation

Purpose: To quantify the sound level form 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 axes 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.

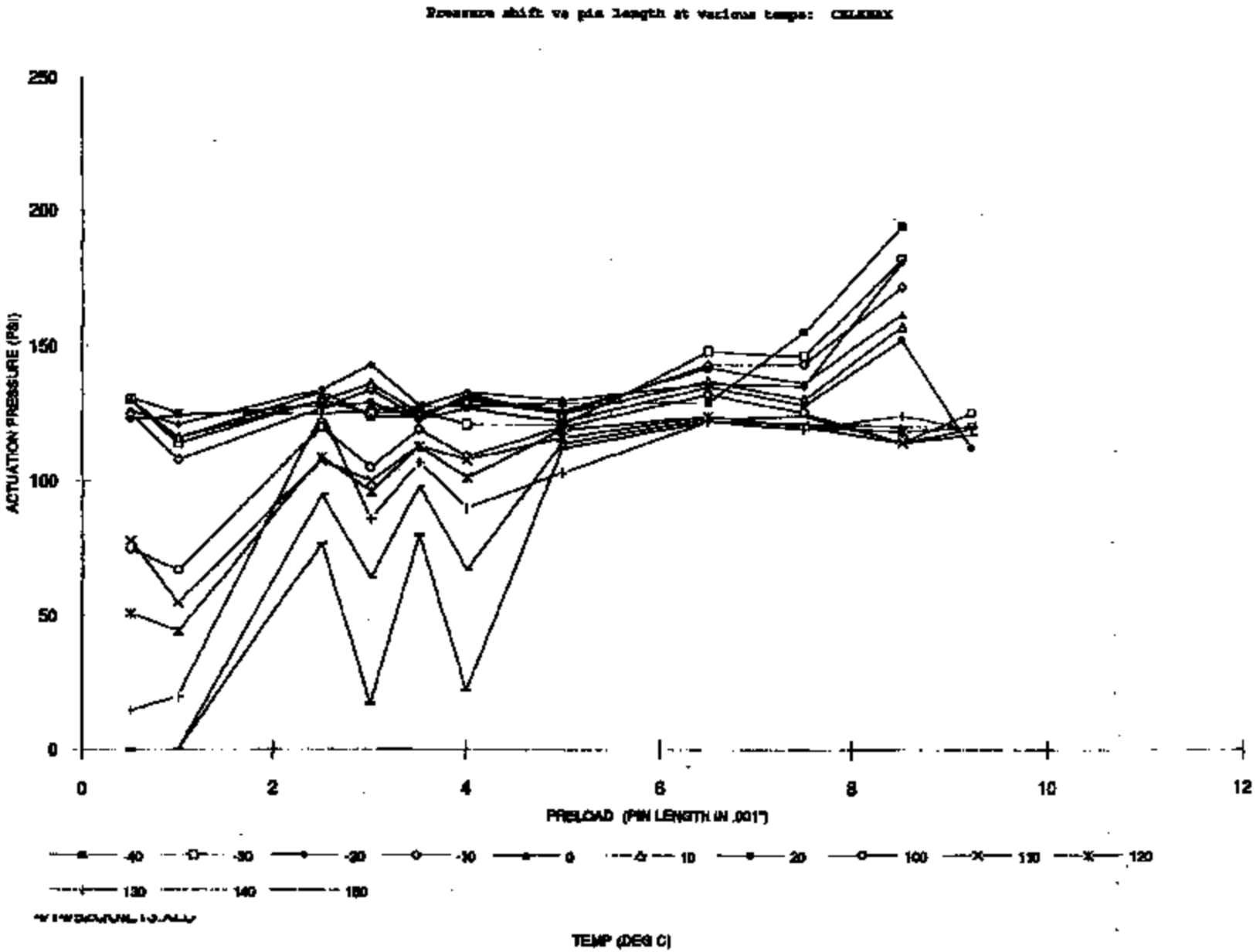


Fig 1

Pressure shift vs pin length at various temps: 80MIL

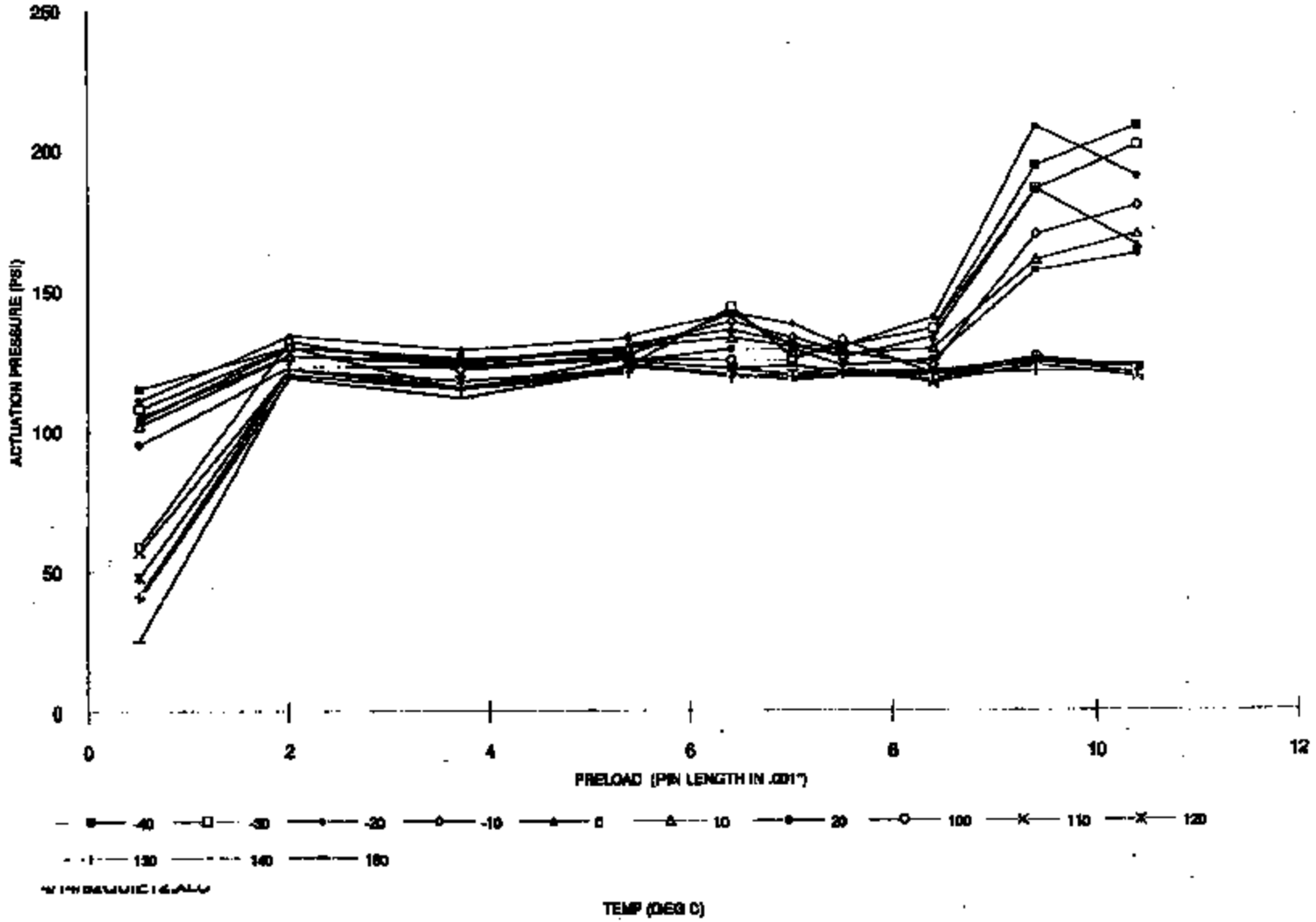


Fig 16 2

TL-NHTSA 008733

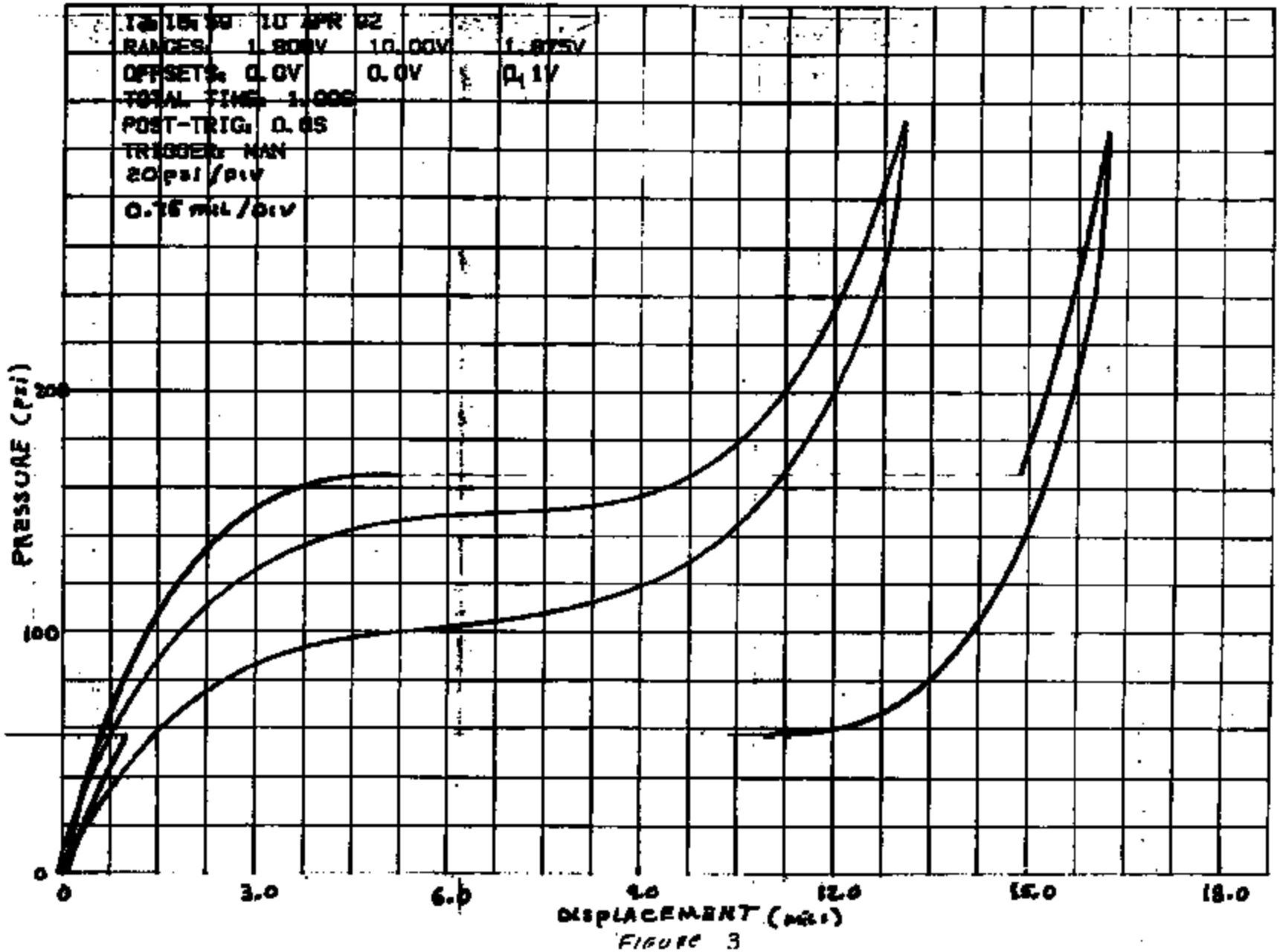


Figure 3

Brüel & Kjær

Type 2034

Page No.
80

Sign.:

Meas.
Object:

92 ACCELERATION
PULSE

Comments:

3/23/92 PAS
10mV/g

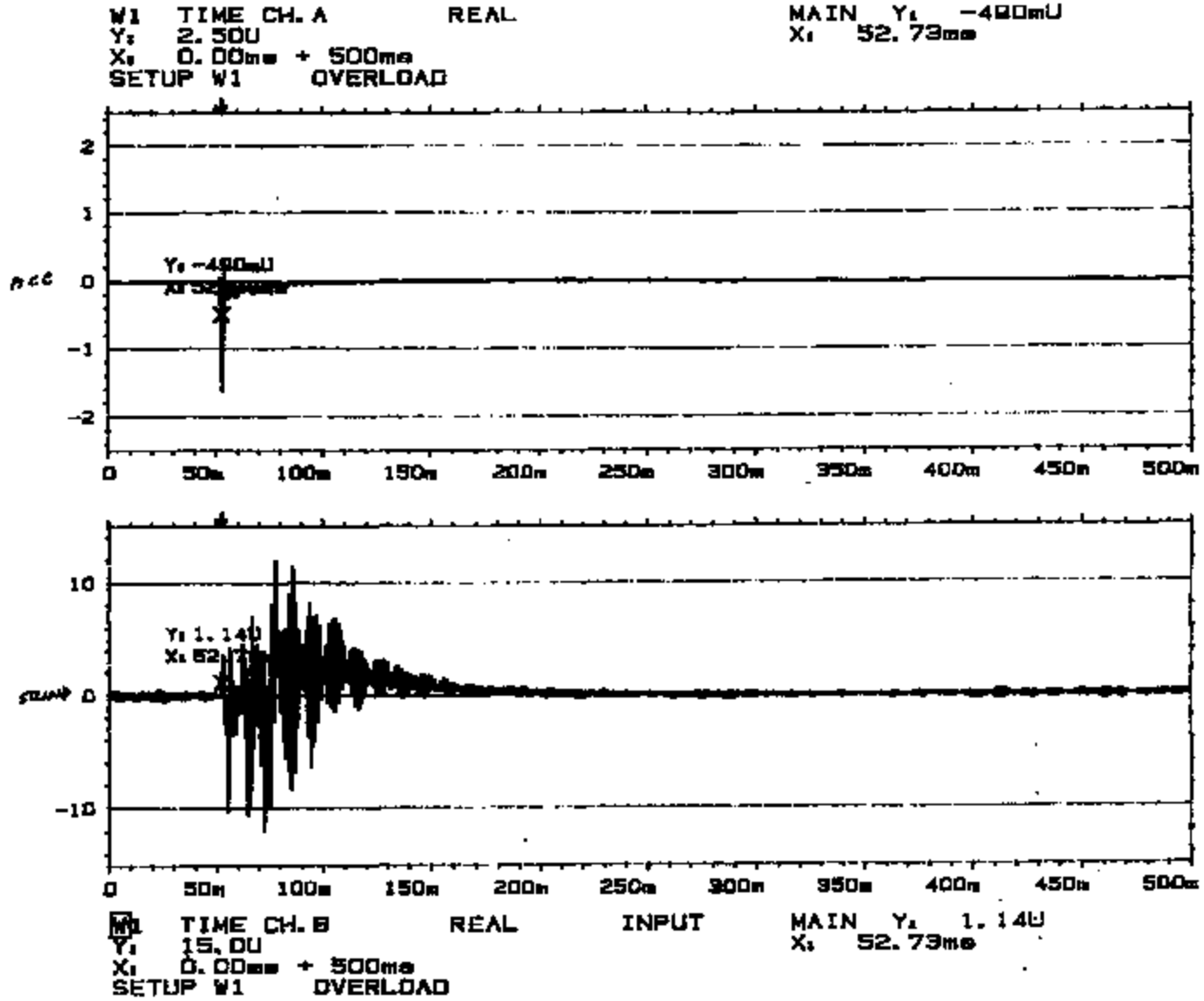


FIG 4

Brüel & Kjær

Type 2034

Page No.
39

Sign.:

Meas.
Objects:

pr. accumulator
slow charge
Acc = 13.4 psi
Ref = 5%
A:B

Comments:

A = microphone
B = accumulator
(enclosure)

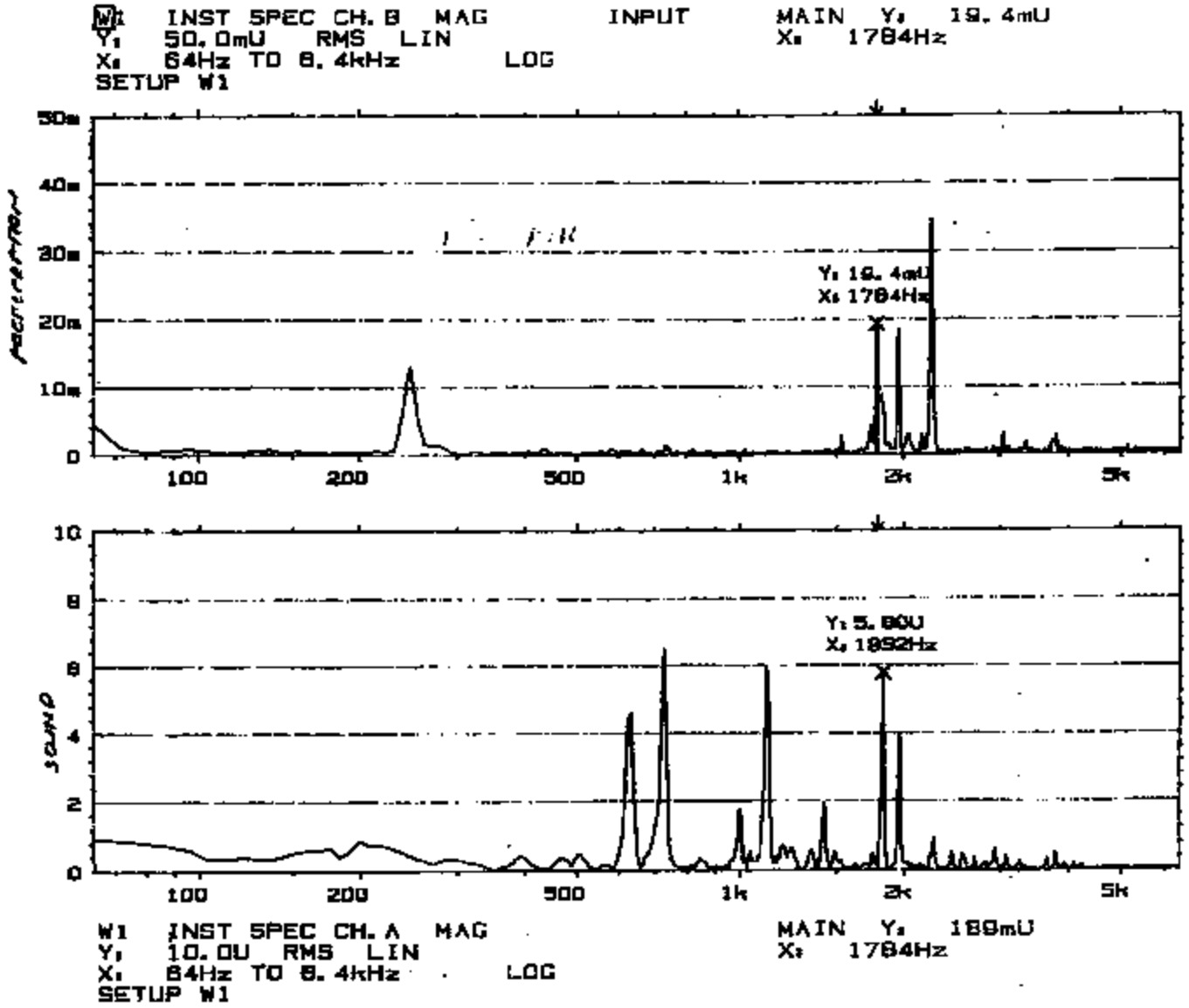


FIG 5

Brüel & Kjær

Type 2034

Page No.
45

Sign.:

Meas.
Object:

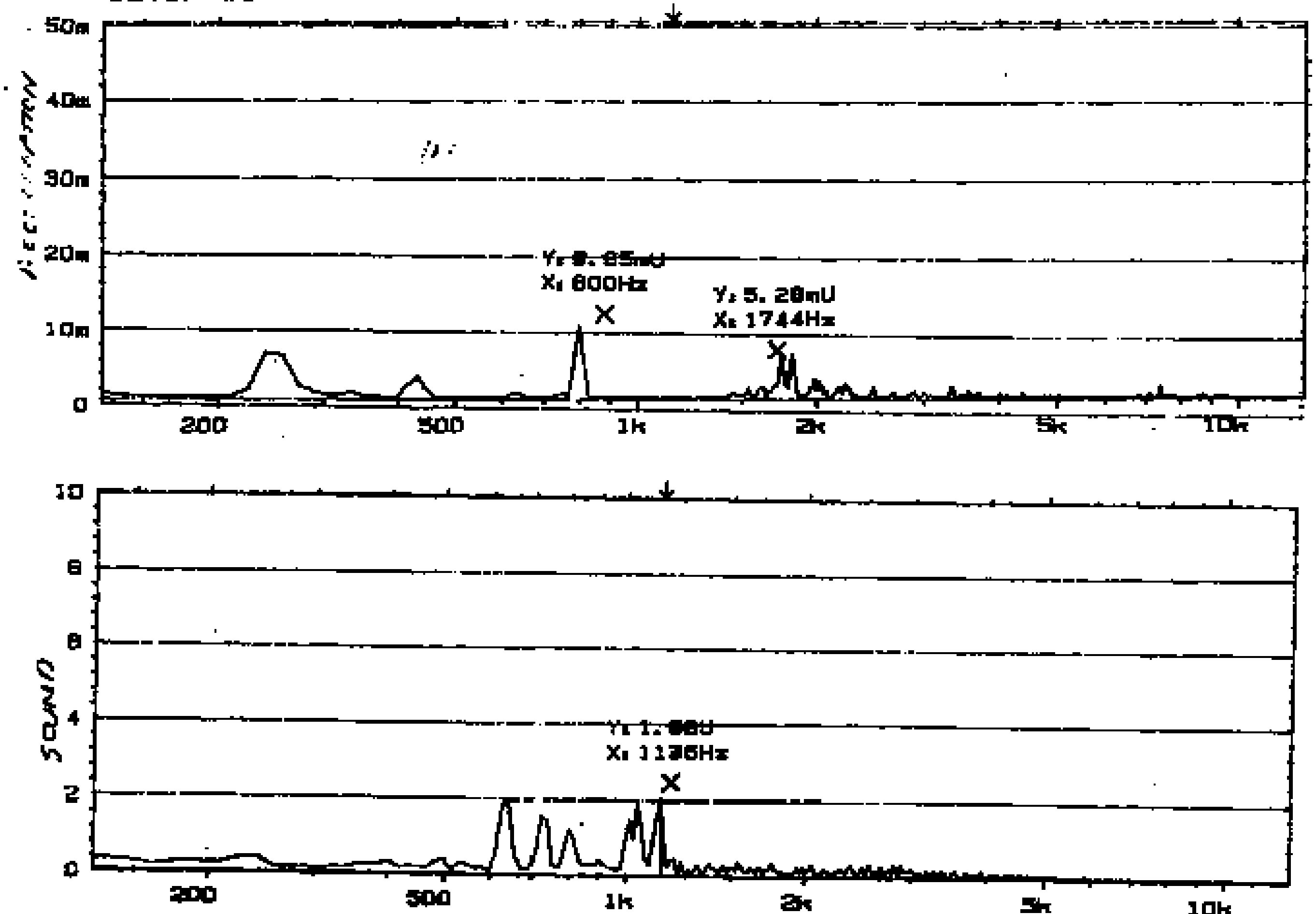
Q1 quiet switch
Actuation
slow ramp
Air

Truck ? ?

Comments:

W1 INST SPEC CH. B MAG
Y: 50.0mU RMS LIN
X: 128Hz TO 12.8kHz LOG
SETUP W1

MAIN Y: 88.5μU
X: 1136Hz



W1 INST SPEC CH. A MAG INPUT
Y: 10.0U RMS LIN
X: 128Hz TO 12.8kHz LOG
SETUP W1 OVERLOAD

MAIN Y: 1.98U
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	DOC.
DATE 3/30/92		PAGE 1

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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 HPCO 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.

PRIMARY TEST MATERIALS

NAME	MATERIAL TYPE	COMPANY
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
ZYTEL	NYLON 6/6	DuPONT POLYMER PRODUCTS

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY	TEXAS INSTRUMENTS MATERIALS & CONTROLS GROUP ATTLEBORO, MA 02703	DOC.
DATE		PAGE 4

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2.0 PRIMARY TEST PROCEDURES

2.1 FLUID COMPATIBILITY

2.1.1 Equipment:
Humidity chamber RK model 5S; 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.

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.

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 Enerpak 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	NORYL MOD. PPO	STANYL NYLON 4/6	MINDEL PSU ALLOY	AMODEL PPA	CELANEX PBT	AMODEL(M) PPA	CELANEX(M) PBT	ULTEM PEI	ZYTEL NYLON 6/6	
1 FLUID COMPATIBILITY	FAIL (BATT ACID)	FAIL (BATT ACID)	PASS	PASS	PASS	PASS	PASS			
2 DEC/TGA/ OTHER MATL ANAL			DEGRADED DRYING?	MOLD TEMP TOO LOW?						
3 INSERTION FORCE (LB)	41 30	47 35	43 34	44 39	44 31	50 43	44 32			LG. BARB SM. BARB
4 PUSH OUT FORCE (LB)	30 28	36 31	22 32	34 31	29 28	29 32	29 23			LG. BARB SM. BARB
5 INSERT. FORCE/ PUSH OUT RATIO	1.4 1.2	1.3 0.9	2.0 1.5	1.7 1.3	1.5 1.3	1.7 1.3	1.5 1.4			LG. BARB SM. BARB
6 AIR LEAK	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	
7 REFRIG. LEAK	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS	
8 BASE ROTATION TORQUE, IN-LB	30+	30+	30+	30+	30+	30+	30+	30+	30+	
9 AIR LEAK AFTER HI TEMP EXP.	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	PASS	FAIL	
10 REFRIG. LEAK AFTER HI TEMP EXP.	PASS	PASS	FAIL	PASS	PASS	PASS	PASS	PASS	PASS	
11 BASE ROTATION TORQUE, IN-LB AFTER HI TEMP EXP.	11	10	3	6	5	6	6	>30	7	OSURE >15 IN-LB
12 BURST (PSIG)	2260 2260	2200 2200	1060 1060	2260 2260	1800 1725	2200 2200	1680 1675	2200 2200	2260 2175	NO HI TEMP EXP POST HI TEMP EXP.
13 HOUSING STRENGTH	PASS	PASS	FAIL CRACK AT LOCK TAB	PASS	PASS	PASS	PASS	PASS	PASS	
COST ($/LB)	1.85	2.55-3.75	2.65-3.35	3.00	1.45	3.00	1.85	5.60	2.60	
	NORYL	STANYL	MINDEL	AMODEL	CELANEX	AMODEL(M)	CELANEX(M)	ULTEM	ZYTEL	

* ϕ.072-.073/ϕ.078-.079 (B-6 1/B-6 2)

** ϕ.065-.069/ϕ.074-.075

AJM,050,101,9/5/91

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.

PERFORMANCE RANK	MATERIAL	COST ($/LB)
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

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: S. [illegible]	TEXAS INSTRUMENTS MATERIALS & CONTROLS GROUP ATTLEBORO, MA 02703	DOC.
DATE 5/22/92		PAGE 10

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

5.2.1 Equipment:
Thermotron Model S8 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 S. Bailey	TEXAS INSTRUMENTS MATERIALS & CONTROLS GROUP ATTLEBORO, MA 02703	DOC.
DATE 3/30/97		PAGE 11

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S SWITCH DATA Form 21605 TEST NO. [illegible]

	DATE REQUESTED	REQUESTED BY	
[illegible]	[illegible]	[illegible]	
BY	DATE STARTED	DATE COMPLETED	APPROVED BY
[illegible]	[illegible] 92	[illegible] 92	

[illegible] CONFIRMATION TEST

INTERNAL

TEST: TO EVALUATE [illegible]

[illegible]

[illegible] 19059 [illegible]

PRE-TEST					POST-TEST					
	ACT REL	T.T ACT REL	MID FREQ		ACT REL	T.T ACT REL	MID FREQ	CUT [illegible] LEAKAGE	BURST
01	410 234	1.5 1.2	2 ✓		409 237	1.5 2.[illegible]	2 ✓	✓	✓
02	421 244	1.6 2.3	2 ✓		423 245	1.5 2.3	2 ✓	✓	✓
03	410 243	1.6 1.3	2 ✓		414 243	1.6 2.3	2 ✓	✓	✓
04	421 252	1.6 2.3	2 ✓		422 [illegible]	1.6 2.4	2 ✓	✓	✓
05	422 240	1.6 1.7	2 ✓		426 238	1.6 2.[illegible]	[illegible] ✓	✓	✓
06	423 244	1.6 1.4	2 ✓		428 242	1.5 2.4	2 ✓	✓	✓

RESULTS: ALL UNITS PASSED POST TEST REQUIREMENTS

CUT-IN/CUT-OUT SET POINT CHANGE AT 1%.

PRESSURE SWITCH DATA FORM 21605 **TEST NO.** 5--15-6

DEVICE	DATE REQUESTED	REQUESTED BY	REQUESTED COMPL. DATE
EX3445-16, 20	11/01/91	D CZARN	

PERFORMED BY	DATE STARTED	DATE COMPLETED	APPROVED BY
R RUGGIER / R TURNER	11/05/91		

PROJECT TITLE: TEMP - PRESSURE AGE CYCLING

CUSTOMER:

PURPOSE OF TEST:

PROCEDURE: ① OBTAIN VESSEL VOLUME = 1223.0 CM3
② R134a CHARGE = 75.0 gm
③ OIL = 4.35 gm
④ WELD VESSEL
⑤ ADD OIL
⑥ ADD R134a

42 CYCLES OF:
(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

ID #	VESSEL #	Ⓐ INIT WT	Ⓑ WT + OIL	Ⓒ WT + OIL + CHG	Ⓓ WT @ 1 WK	% Ⓔ CHANGE C-D/C	Ⓕ WT @ 2 WK	% Ⓖ CHANGE C-F/C	Ⓗ WT @ 6 WK	% Ⓘ CHANGE C-H/C
PST 209	R1	426.818	431.160	505.084	504.526	0.110	503.888	0.237	502.553	0.501
PST 211	R3	428.984	433.354	508.347	507.860	0.096	507.257	0.214	505.899	0.482
PST 206	R4	428.242	432.282	507.709	441.585	13.024	REMOVED FROM TEST			—
N-1	9	406.927	405.282	480.320	480.300	0.001	480.250	0.015	480.240	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	405.604	480.477	480.449	0.006	480.194	0.059	479.534	0.196

WEIGHT A: VESSEL, SW HOUSING, DEFLATOR, ADAPTER (FOR PST ONLY)
WEIGHT B: WEIGHT A PLUS ~ 4.35g OIL
WEIGHT C: WEIGHT B PLUS R134a CHARGE

NOTE 1: VESSEL #R4 HAD TO BE RECHARGED BEFORE TEST DUE TO POSSIBLE LEAK BETWEEN ADAPTER AND VESSEL - UNKNOWN OCCURRENCE.

ID #	VESSEL #	(G) WT @ 84 CYC	(J) % CHANGE G-J/G	(L) WT @ 85 CYC	(M) % CHANGE G-L/G	(N) WT @ 126 CYC	(O) % CHANGE G-N/G			
PST 209	A1	501.980	0.615	501.064	0.796	498.524	1.259			
PST 219	A1	505.320	0.598	504.399	0.777	501.812	1.286			
PST 246	A4	—	—	—	—	—	—	—		
N-1	9	480.101	0.029	480.112	0.043	480.100	0.046			
N-2	15	483.409	0.029	483.332	0.045	483.306	0.050			
N-3	16	479.191	0.268	478.738	0.362	477.948	0.526			

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	32 lb bag load; 12/2.25 lb term.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	Immersions 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 (-14A640-) or FEO approved equivalent must be used. Calibration is to be checked while conducting 0.1-0.3 amperes when 10.0-14.0 volts D.C. is applied and the CCD-FEO 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.

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 ± 5% from the cut-out pressure initially measured in Section 3.1, paragraph 2.

   b. Cut-in set point pressure cannot change more than ± 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.

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 that 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 milliampere.

3.6 Refrigerant Leakage

1. Refrigerant Leakage to be checked at room ambient, 24 ± 6°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 500 ± 10 psig pressure, at a cycling rate of 25 ± 10 cycles per minute, while maintaining the switch in an ambient temperature of 125 ± 3°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.

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-PEO 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 24°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-PEO to supply) with electrical continuity of the CCD-PEO 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.

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

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	TEXAS INSTRUMENTS — MATERIALS & CONTROLS GROUP, ATTLEBORO, MA 02703	DOC.
DATE 92-04-13		PAGE 1

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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.

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.

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.

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		
APPROVED BY	TEXAS INSTRUMENTS MATERIALS & CONTROLS GROUP ATTLEBORO, MA 02703	DOC.
DATE 93-04-13		PAGE 6

FORM 8284

Appendix. 4.1
Memorandum

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY	TEXAS INSTRUMENTS MATERIALS & CONTROLS GROUP ATTLEBORO, MA 02703	QQL
DATE 92-04-13		PAGE 7

FORM 6295

M E M O R A N D U M
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-AB 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.

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.

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.

920409

Appendix 4.2
Data # 242

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY	TEXAS INSTRUMENTS MATERIALS & CONTROLS GROUP ATTLEBORO, MA 02703	DOC.
DATE 82-04-13		PAGE 11

FORM 8289

PRESSURE SWITCH DATA Form 21605 **TEST NO.** 242-03-24

DEVICE	DATE REQUESTED	REQUESTED BY	REQUESTED COMPL. DATE
77PSL3-1	920410	Steve Offiley	

PERFORMED BY	DATE STARTED	DATE COMPLETED	APPROVED BY
Jeffrey D. Dameiro	920410	920413	

PROJECT TITLE: Speed Control

CUSTOMER:

PURPOSE OF TEST: Partial ISR of 77PSL3-1

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

Device #	Init Act - Rel		Post Act - Rel	mv drop
242-03-01	139-103	I	137-109	15.7 mV
-02	133-114		136-110	3.6
-03	136-101	M	134-102	5.6
-04	135-114	P	137-110	2.6
-05	139-116	u	133-107	15.7
-06	137-103	l	139-102	3.2
-07	136-116		134-109	4.3
-08	137-113	s	136-110	22.5
-09	141-118	e	141-113	0.5
-10	134-112		133-105	4.7
-11	140-121		140-114	7.1
-12	132-108		139-105	4.2
-13	138-118		136-105	2.2
-14	141-117		135-107	10.3
-15	139-109		133-108	9.7
-16	139-113		137-111	3.8
-17	135-118		138-111	9.7
-18	135-110		137-109	4.8
-19	135-102		135-107	5.6
-20	138-103		135-107	7.4
-21	135-113		140-113	6.4
-22	135-103		133-105	15.1
-23	112-103		120-101	6.6
-24	117-101		124-103	6.1

TI-NHTSA 008766

Appendix 4.3
Data # 241

TEST LOT NO.	TEST	DEVICE
TESTED BY		
APPROVED BY	TEXAS INSTRUMENTS MATERIALS & CONTROLS GROUP ATTLEBORO, MA 02703	DOC.
DATE 93-04-13		PAGE 13

FORM 8298

PRESSURE SWITCH DATA Form 21605 TEST NO. 241-11-12

DEVICE	DATE REQUESTED	REQUESTED BY	REQUESTED COMPL. DATE
77PS	920409	Steve Offiler	

PERFORMED BY	DATE STARTED	DATE COMPLETED	APPROVED BY
Rich Pierce	920409	920410	

PROJECT TITLE: Speed Control

CUSTOMER:

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

PROCEDURE: Production build 77PS with natural Noryl bases and 1st "F" silent discs. Characterize in pressure tester. Run standard terminal strength tests per Ford ES and recharacterize.

Device #	Init Act/Rel	Final Act/Rel							
241-11-01	134 - 104	114 - 103							
-02	127 - 95	110 - 95							
-03	119 - 86	123 - 90							
-04	124 - 100	126 - 101							
-05	124 - 95	126 - 97							
-06	131 - 101	132 - 101							
-07	132 - 101	132 - 103							
-08	120 - 93	129 - 96							
-09	132 - 102	129 - 107							
-10	124 - 97	129 - 101							
-11	129 - 95	129 - 100							
-12	131 - 101	131 - 101							

M E M O R A N D U M
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-AB 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.

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III. E. Impulse.

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920409

TEXAS INSTRUMENTS

April 14, 1992

Bruce J. Maeroff
Supervisor
Passenger Car Brake Systems
Engineering Department
Body and Chassis Engineering
Car Product Development
2000 Rotunda Drive
Building #5 - Chassis Engineering
Dearborn, MI 48121

Dear Bruce;

With your visit to Texas Instruments, Inc. (Precision Controls Department); on 4-13-92 and 4-14-92; we have reviewed the joint response of both Ford and Texas Instruments to the switch noise issue for the Next Generation Speed Control Safety Switch for the EN53 application. We have jointly reviewed this partial ISW submission for the purpose of releasing Texas Instrument's first pass at a quiet version of this Next Generation Speed Control Safety Switch.

Additionally, as a result of your visit the following W-cubed has been agreed to:

- Jointly reviewed and approved ES test plan for combined testing of F2AC and F3DC switches.....4/13/92.....Maeroff Offiler DeMattia

- Begin ES testing for final 7/2/92 ISW submission.....4/13/92.....Offiler

- 20 switches (F3DC9F924AA) B. Maeroff.....4/14/92.....Offiler

- 1 box of F2AC9F924AA switches to B.Maeroff.....4/14/92.....Douglas

- 5 F3DC9F924AA switches with 500K impulse cycles to B. Maeroff for receipt by 4/21/92.....Offiler

- 5 F3DC9F924AA switches with 500K impulse cycles hand carried to Atlanta.....4/21/92.....Offiler

- Participation in the DN5 3PP build in Atlanta.....4/21/92.....Offiler

- Proposal for "Test Buck" construction.....4/24/92.....Sogge

- Forward additional information on thermal testing done to date on Noryl base material.....4/24/92.....Offiler Freda

- Coordinate final ISW submission for 7/2/92.....Watt

Our plan is to submit the complete ISW package on or before 7/2/92. this is an aggressive schedule designed to meet Ford's 7/18/92 JOB 1 release date.

If you have any further questions, please call me at 508-699-3090

Sincerely

Materials and Controls Group
Control Products Division

Michael De Mattia
Senior Quality Engineer
Precision Controls Department

TI: Charlie Douglas
Dale Sogge
Dave Csarn
Steve Offiler
Bill Sweet
Matt Sellers
Jim Watt

Ford: Bruce Masroff

WARRANTS

INITIAL SAMPLE WARRANT

No. 112389

PART INFORMATION

Part Name Next Generation Speed Control Deactivation Safety Switch Part Number PZAC-9F924-AA

Control Item ☐ Yes ☐ No Engineering Change Level _____ Date _____

Engineering Change Authorization Bruce Masroff Date _____

Shown on Drawing No. PZAC-9F924-AA Part Weight .062 kg

Reason for Initial Sample:

☐ Initial Submission ☐ Change in Optional Construction or Material ☐ Process Change
☐ Engineering Change(s) ☐ Additional, Replacement, or Refurbished Tooling ☐ Change in Subcontractor or Source
☐ Tooling Transfer ☐ Correction of Discrepancy (Resubmission No. _____) ☐ Parts Produced at Additional Location
☐ Other – Please Specify _____

SUPPLIER INFORMATION (Manufacturing Location)

Supplier Name Texas Instruments Street Address 34 Forest St.

City Attleboro State MA Postal Code 02703 Country USA

Supplier Mfg. Location Code – DUNS 199TK/7325814 Customer Assigned _____

CUSTOMER INFORMATION

Customer Name Ford Motor Co. EAAC Buyer Fred Hemkerabot Buyer Code 165

Purchase Order Number _____ Sample Acceptance Level _____

Application Next Generation Speed Control Deactivation Safety Switch

RESULTS

The results for dimensional measurements ☒, material tests ☒, and functional (ER) tests ☒ meet all drawing and specification requirements ☒ Yes ☐ No Partial

Submission Checklist

☒ Checked Print ☐ Material Test Results ☒ Control Plan
☐ Auxiliary Drawings/Statistics ☒ Certifications ☐ Process Capability Results
☐ Correct Number of Samples ☒ Functional (ER) Test Results Partial ☒ Process Flow Diagram
☒ Dimensional Results ☐ Product Engineering Approval ☒ Gage (Measurement) Studies

Supporting data for all requirements are available upon request.

COMMENTS:

Partial ISW to expedite use of "Quiet" Switch. Full submission to be complete by 6/22/92. Bruce Masroff visited TI on 4/13, 4/14 to review program status.

DECLARATION

I affirm that the samples represented by this warrant are representative of our parts and have been made to the applicable customer drawings and specifications from specified materials, on regular production tooling with no operations other than the regular production process.

Authorized Signature Michael DeMattia Date 4-13-92

Print Name Michael DeMattia Title SQA Engineer Phone No. (508) 699-3090

APPROVAL (when required by customer procedure) ☐ Approved ☐ Rejected

Signature _____ Date _____

Form 292c

Initial Sample Report – Dimensional

No. 112389

TO BE COMPLETED BY SUPPLIER

Page ___ of ___

SUPPLIER	LOCATION	CODE	PART NUMBER
Texas Instruments Incorporated	Attleboro, MA	[illegible]	[illegible]-AA

BUYER	CODE	FORD CONSUMER DIV.	NO. OF SAMPLES	PRODUCT SHOWN DESIGNATED CONTROL ITEM (▽)
				YES ☐ NO ☒

REASON FOR SAMPLES: NEW PART ☐ CHANGED PART ☐ NEW LOCATION ☐ NEW TOOLS ☐ MULTIPLE CAVITY DIES ☐

PART NAME: Next Generation Speed Control Deactivation Safety Switch

ISP DATE: Pending

MODEL YEAR AND PRODUCT LINE: 92.5 EN53

ISP DISPOSITION PENDING ☐

AUTHORIZING DEVIATION NO.:

SAMPLE MADE ON PRODUCTION SET-UP AND TOOLS: YES ☐ NO ☐

ADDITIONAL [illegible] WORK PERFORMED: YES ☐ NO ☐

SAMPLES MADE TO ISP DATED:

DATE INSPECTED:

WE HEREBY CERTIFY THE INSPECTION RESULTS BELOW ARE CORRECT AND THAT OUR SAMPLE PARTS [illegible] FORD MOTOR COMPANY SPECIFICATIONS

SIGNATURE OF [illegible]: *(signature)* TITLE: [illegible] DATE: 4/14/92

CHARACTERISTIC DIMENSION OR SPECIFICATION	CLASS ▽		SUPPLIER INSPECTION RESULTS	CONSUMER VERIFICATION OF INSPECTION RESULTS	PROCESS CAPABILITY STUDY REQUIRED	PROCESS CAPABILITY STUDY COMPLETED
Partial			FAI Results recorded on TI Format			

TO BE COMPLETED BY CONSUMER

DISPOSITION	SERIAL NO.	APPROVED	REJECTED	NOT REQ'D.
DIMENSIONAL ISP DATED	XXXX			
MATERIAL TEST [illegible] FORM				
[illegible] TEST [illegible] FORM				

INSPECTION AND TESTING INSTRUCTIONS APPROVED: YES ☐ NO ☐

SPECIAL GAGES APPROVED: YES ☐ NO ☐ NOT REQ'D ☐

INITIAL SAMPLE APPROVAL MUST BE [illegible] PRIOR TO [illegible] OF FIRST PRODUCTION SHIPMENT: YES ☐ NO ☐

CONTROL PLAN APPROVED: YES ☐ NO ☐ NOT REQ'D ☐

APPROVED BY STYLING: YES ☐ NO ☐ NOT REQ'D ☐

APPROVED BY FORD ENGINEERING: YES ☐ NO ☐ NOT REQ'D ☐

DIVISION: AUTHORIZED SIGNATURE: DATE:

[illegible] 292a

*DESIGNATED CHARACTERISTIC CLASS
▽ – CONTROL ITEM

COPY 1

TI-NHTSA 005778

INITIAL SAMPLE WARRANT

No. 112384

PART INFORMATION

Part Name: NEXT GENERATION SPEED CONTROL — Part Number: F2VC-9F924-AB

Control Item: ☒ Yes ☐ No — Engineering Change Level: G — Date: 4-11-91

Engineering Change Authorization: BRUCH RELEASE — Date:

Shown on Drawing No.: F2VC-9F924-AB — Part Weight: 062 lbs

Reason for Initial Sample:

- ☐ Initial Submission
- ☐ Engineering Change(s)
- ☐ Tooling Transfer
- ☐ Other — Please Specify: SEE BELOW
- ☐ Change in Optional Construction or Material
- ☐ Additional, Replacement, or Refurbished Tooling
- ☒ Correction of Discrepancy (Resubmission No. ____)
- ☐ Process Change
- ☐ Change in Subcontractor or Source
- ☐ Parts Produced at Additional Location

SUPPLIER INFORMATION (Manufacturing Location)

Supplier Name: TEXAS INSTRUMENTS — Street Address: 34 FOREST STREET

City: ATTLEBORO — State: MA — Postal Code: 02703 — Country: USA

Supplier Mfg. Location Code – DUNS: TQ97K — Customer Assigned: FORD MOTOR CO - EED

CUSTOMER INFORMATION

Customer Name: FORD MOTOR CO - EED — Buyer: FRED HENDERSHOT — Buyer Code: 165

Purchase Order Number: ____ — Sample Acceptance Level: 2

Application: NEXT GENERATION SPEED CONTROL

RESULTS

The results for dimensional measurements ☒ material tests ☒ and functional (ED) tests ☒ meet all drawing and specification requirements ☒ Yes ☐ No

Submission Checklist

- ☐ Checked Print
- ☐ Auxiliary Drawings/Sketches
- ☐ Correct Number of Samples
- ☒ Dimensional Results
- ☐ Material Test Results
- ☐ Certifications
- ☒ Functional (ED) Test Results
- ☐ Product Engineering Approval
- ☐ Control Plan
- ☐ Process Capability Results
- ☐ Process Flow Diagram
- ☐ Gage (Measurement) Studies

Supporting data for all requirements are available upon request.

COMMENTS:

ISR SUPPLEMENT WITH ADDITIONAL TESTING TO CLOSE OUT ALERT NO. A10166193;
ALSO, CORRECTED BASE MOLD DIMENSIONS. PART PREVIOUSLY APPROVED ON
ISW # 112384, DATED 7/01/91

DECLARATION

I affirm that the samples represented by this warrant are representative of our parts and have been made by the applicable customer drawings and specifications from specified materials, on regular production tooling with no operations other than the regular production process.

Authorized Signature: Jim Watt — Date: 12/20/91

Print Name: JIM WATT — Title: QA ENGINEER — Phone No.: 508-699-1719

APPROVAL (when required by cognizant Ford activity) ☒ Approved ☐ Rejected

Signature: [signature] — Date: 1/14/92

Form No. 2920 Vehicle Operations SQA

TEXAS INSTRUMENTS

DIMENSIONAL ANALYSIS ON PART NUMBER

F2AC-9F924-AA

ENVELOPE DIMENSIONS TO BASE ONLY

	BLUEPRINT SPEC	CAVITY # A ACTUAL	CAVITY # B ACTUAL	CAVITY # C ACTUAL	CAVITY # D ACTUAL
1	11.40 - 11.90	11.806	11.817	11.817	11.794
2	16.56 - 16.76	16.638	16.652	16.671	16.673
		16.661	---	16.680	16.668
3	19.45 - 19.8	19.752	19.754	19.787	19.799
4	2.84 - 3.05	2.930	2.93	2.944	2.951
5	1.85 - 2.06	1.927	1.966	1.969	1.978
6	1.24 - 1.55	1.365	1.387	1.429	1.400
7	1.24 - 1.45	1.269	1.268	1.275	1.308
8	11.60 - 11.92	11.769	11.768	11.753	11.777
		11.729	11.740	11.789	11.747
9	0.25 - 0.75	0.490 0.475	0.519 0.523	0.573 0.635	0.618 0.593
10	2.79 - 3.10	2.900	2.909	2.912	2.908
	2 PL	2.903	2.915	2.913	2.911
11	19.05 MAX	18.667	18.709	18.671	18.704
		18.701	18.748	18.545	18.757
12	12.59 - 13.11	12.800	12.829	12.802	12.819
		12.829	12.800	12.842	12.824

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508-699-2800 • TELEX 94-7703 TWX 710-348-0696 • CABLE TEXINS

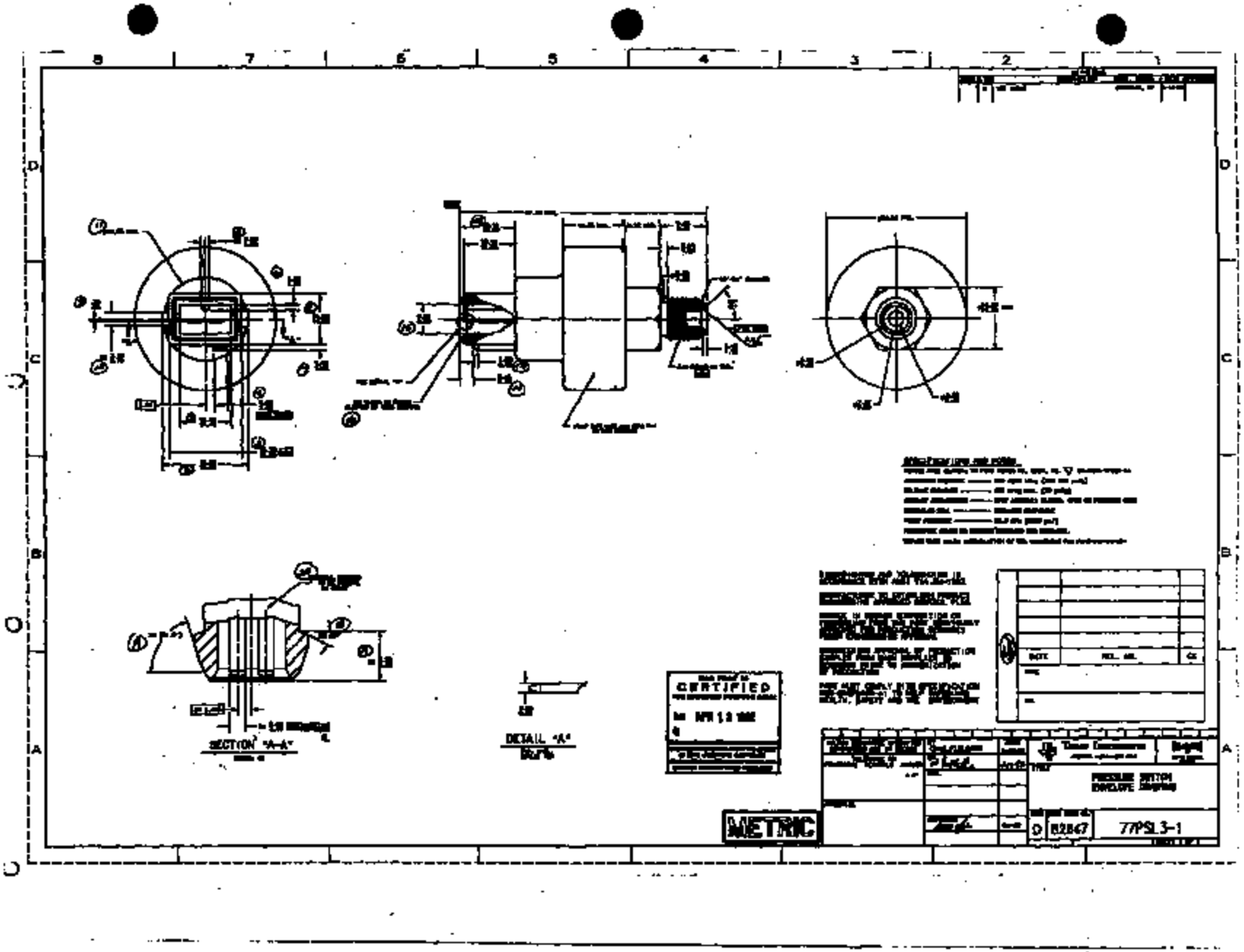
TEXAS INSTRUMENTS

DIMENSIONAL ANALYSIS ON PART NUMBER

F2AC-9F924-AA

	BLUEPRINT SPEC	CAVITY # A ACTUAL	CAVITY # B ACTUAL	CAVITY # C ACTUAL	CAVITY # D ACTUAL
13	0.42 - 1.30	1.085	1.105	1.122	1.175
14	2.79 - 3.41	3.076	3.061	3.152	3.109
15	6.60 - 6.81	6.701	6.673	6.715	6.677
16	NO FLASH/BURRS	SLIGHT	FLASH ON	EDGES	@ 10X
17	8.30-8.72 2X	8.535	8.553	8.484	8.578
		8.726	8.512	8.570	8.519
18	25DEG +/- 4DEG	24DEG 25MIN	24DEG 56MIN	24DEG 47MIN	24DEG 06MIN
		24DEG 10MIN	24DEG 14MIN	24DEG 06MIN	24DEG 43MIN
19	(71.5DEG) 2X	72DEG --	71DEG 31MIN	71DEG 20MIN	72DEG 01MIN
		71DEG 07MIN	72DEG --	72DEG 10MIN	71DEG 12MIN
20	TERM.+HOUSING NATURAL	BLACK ONLY	AVAILABLE	TO QUALIFY	MOLD

TEXAS INSTRUMENTS INCORPORATED • 34 FOREST STREET • ATTLEBORO, MA 02703
508-699-8800 • TELEX 95-7705 TWX 710-348-0585 • CABLE TEXINS



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