Lockheed

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(NASA-CR-192535) ASRM TEST REPORT: AUTOCLAVE CURE PROCESS DEVELOPMENT Final Report (LMSC) 276 p

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ASRM TEST REPORT

AUTOCLAVE CURE PROCESS DEVELOPMENT
FINAL REPORT

Contract No. NAS8-37800

DR-TM04

TYPE 3

THIS DOCUMENT WAS REVIEWED
BY
STEVE SKLADANEK

SYSTEMS ENGINEER

D. Blevins

Designee

Prepared By:

D.L. Nachbar 5/8/92

D.L. Nachbar, Manager
Insulated/Lined Segment Product Development Team

Suzanne Mitchell 5/8/92

Suzanne Mitchell
SRM&QA

Approved By:

M.L. Davis

M.L. Davis, Manager
Manufacturing Engineering

R Carroll 6/10/92

R.L. Carroll, Manager
Engineering Design

TM04514-03

AUTOCLAVE CURE PROCESS DEVELOPMENT FINAL REPORT

I/LSPDT Approved for Release

5/12/92
AAD Manufacturing Engineering

5/13/92
AAD Fabrication & Assembly

5/28/92
AAD Manufacturing Loadmaster

5/29/92
AAD Mfg Production Control

5/29/92
AAD Manufacturing Tooling

D. Angeloni, 5-12-92
AAD Industrial Engineering

Weaver, 6-2-92
AAD Procurement

5/29/92
AAD Quality Assurance

5/8/92
AAD Engineering

Suzanne Mitchell, 5/8/92
LMSC SRM&QA

David Blevins, 5/8/92
LMSC SE&I

6/1/92
AAD Environmental Affairs

5/12/92
AAD PP&C / Master Scheduling

M. Sperling 5/28/92
AAD Safety

5/8/92
AAD PDT Manager

FOREWORD

The Autoclave Cure Process Development Final Test Report is submitted in accordance with the requirements of DPD TM04. The requirement for use of International Systems of Units has been waived for this document per NASA DPD No. 716.

To: Lockheed Missiles & Space Company, Inc.
Missile Systems Division
One NASA Drive
Iuka, MS 38852-8999

From: Aerojet ASRM Division
One NASA Drive
Iuka, MS 38852-8998

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1.0 INTRODUCTION

ASRM insulated segments will be autoclave cured following insulation pre-form installation and stripwind operations. Following competitive bidding, Aerojet ASRM Division (AAD) Purchase Order 100142 was awarded to American Fuel Cell and Coated Fabrics Company, Inc. (Amfuel), Magnolia, AR, for subcontracted insulation autoclave cure process development in accordance with AAD Statement of Work No. I/LSPDT-015, Revision D, dated 26 August, 1991. Autoclave cure process development test requirements were included in Task 3 of TM05514, Manufacturing Process Development Specification for Integrated Insulation Characterization and Stripwind Process Development.

2.0 OBJECTIVE

The test objective was to establish autoclave cure process parameters for ASRM insulated segments. As shown in the logic plan, ***Figure 1***, six tasks were completed to:

- Evaluate cure parameters that control acceptable vulcanization of ASRM Kevlar-filled EPDM insulation material.
- Identify first and second order impact parameters on the autoclave cure process.
- Evaluate insulation material flow-out characteristics to support pre-form configuration design.

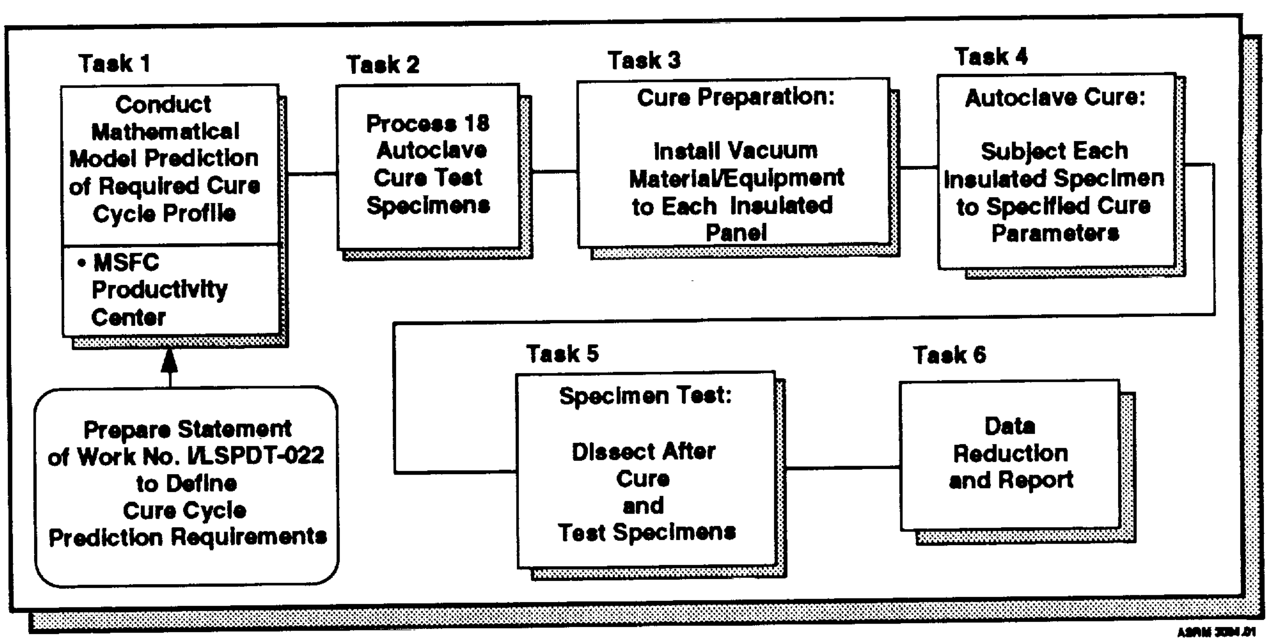


Figure 1. Insulation Autoclave Cure Process Development Logic Plan

3.0 SUMMARY

3.1 Test Sequence

A Taguchi-type statistical experiment was conducted using the L_{18} orthogonal array shown in ***Figure 2***. Amfuel prepared twenty 10-in. by 10-in. by 8-in.-thick Kevlar-filled EPDM insulation specimens with imbedded thermocouples; eighteen were for the statistical experiment and two were spares in the event an autoclave cure process upset occurred that would invalidate the test data.

After vacuum bagging and autoclave cure, each specimen was dissected and subjected to the following evaluation tests:

- Compaction:
  - Visual inspection for voids, delaminations, or other evidence of improper cure.
- Degree of Cure
  - Shore A hardness measurements.
  - Differential Scanning Calorimetry (DSC) in accordance with ASTM E794
  - "Dog Bone" tensile tests in accordance with ASTM D412
- Degree of Flow
  - Visual evaluation of flow pattern into an extrusion groove.
- Shrinkage Rate Assessment
  - Measurements of shrinkage at specified time intervals after cure.

3.2 Test Results

The analysis effort was completed using analysis of variance (ANOVA), main effects, Least Significant Difference (LSD), and Pareto analysis techniques. The Pareto analysis, ***Figure 3***, indicated the overall effect and importance of the factors on degree of cure. The results for the Pareto analysis are based on the conclusions made from the shrinkage and tensile data only; elongation, Shore A, and DSC data did not provide clear discriminators for degree of cure. The baseline autoclave cure cycle based on test result analyses and facility capabilities are shown in Figure 4.

3.2.1

The baseline cure cycle selected is based upon the data contained in this report, Yellow Creek equipment capabilities, and experience gained curing ASRM 44010 insulation on the 48 inch motor program and the 150 inch stripwinder pilot plant program (SWPP). Specific differences in the baseline cure cycle and the test data are discussed below.

We selected 325+ deg F based on 48 inch and 150 inch test article cure experience. Both programs produced consistently acceptable parts using 325 deg F and the added 15 degrees allows improved processing times in the autoclave. This is more important since the program has been reduced to a single autoclave by funding constraints.

FACTORS (Cure Parameters)

Test Number (Specimen S/N)	A	B	C	D	E	F	G	H
1	1	1	1	1	1	1	1	1
2	1	1	2	2	2	2	2	2
3	1	1	3	3	3	3	3	3
4	1	2	1	1	2	2	3	3
5	1	2	2	2	3	3	1	1
6	1	2	3	3	1	1	2	2
7	1	3	1	2	1	3	2	3
8	1	3	2	3	2	1	3	1
9	1	3	3	1	3	2	1	2
10	2	1	1	3	3	2	2	1
11	2	1	2	1	1	3	3	2
12	2	1	3	2	2	1	1	3
13	2	2	1	2	3	1	3	2
14	2	2	2	3	1	2	1	3
15	2	2	3	1	2	3	2	1
16	2	3	1	3	2	3	1	2
17	2	3	2	1	3	1	2	3
18	2	3	3	2	1	2	3	1

FACTOR	DEFINITION	FACTOR LEVEL 1	2	3
A	Temperature at vulcanization (T_a), *deg F*	310	350	- - -
B	Length of time at T_a, *hours*	1	3	6
C	Temperature at flowout (T_b), *deg F*	200	230	260
D	Length of time at T_b, *hours*	1	3	5
E	Vacuum Level , *in Hg*	28.5	26.0	20.0
F	Pressure, *psia*	50	100	135
G	Heating rate, *deg F / min*	1	0.5	Maximum
H	Queue Humidity, *time at RH*	4	8	12

ASRM 3084.02

Figure 2. Insulation Autoclave Cure Test Matrix

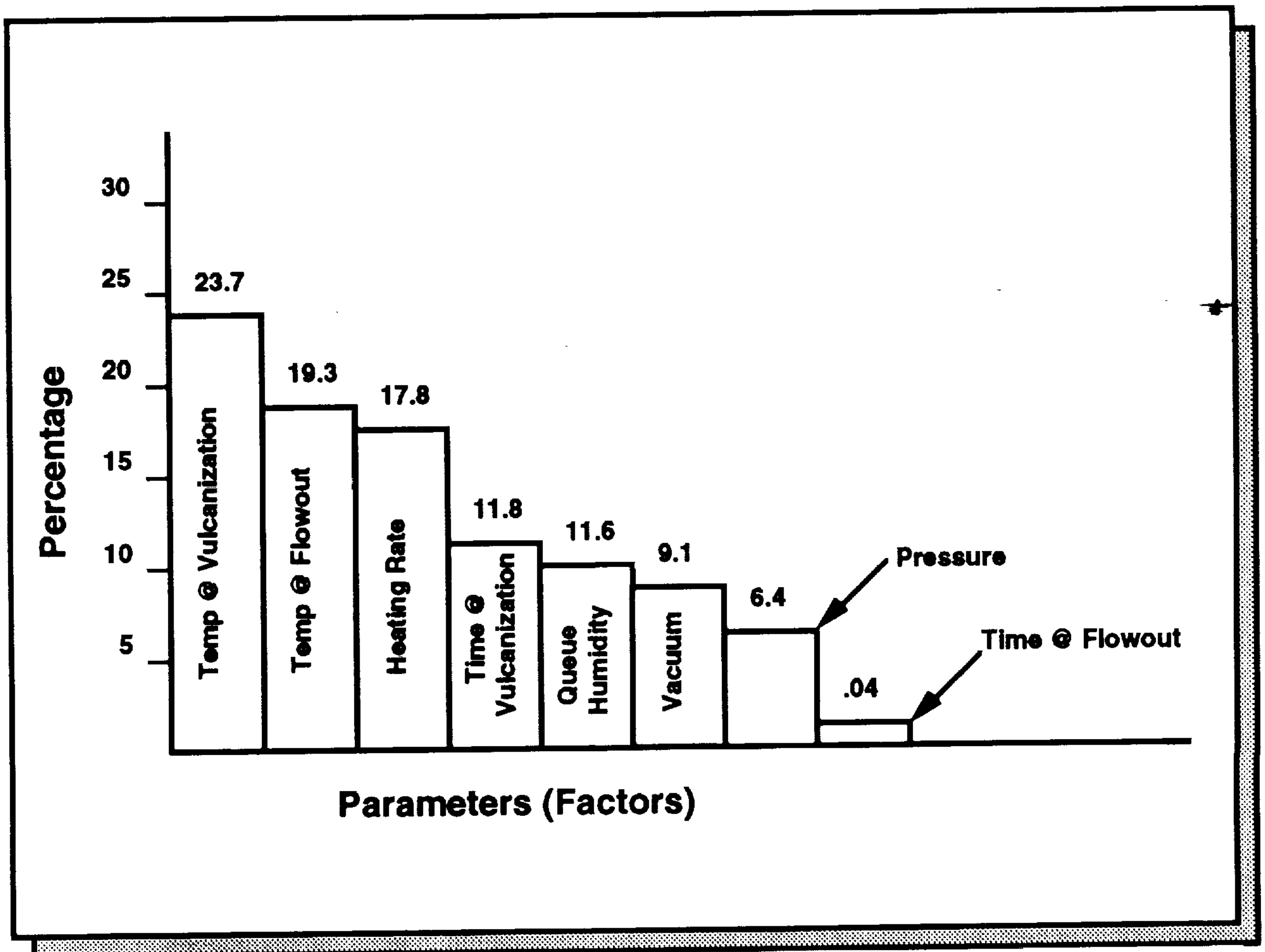


Figure 3. Pareto Analysis

FACTORS	from TM04514-03 LEVELS 1	2	3	REVISED BASELINE PARAMETERS 1/3
• Temperature @ Vulcanization, deg F	$\boxed{310}$	350	-	
• Time @ Vulcanization Temperature, hours	$\boxed{1}$	$\boxed{3}$	6	2, Minimum
• Temperature @ Flowout, deg F	200	230	$\boxed{260}$	250 ± 10
• Time @ Flowout Temperature, hours	2	$\boxed{5}$	10	2, Minimum
• Vacuum, in.-Hg	28.5	$\boxed{26}$	20	23, Minimum
• Autoclave Pressure, psig	100	50	$\boxed{135}$	100, +25, - 0
• Heating Rate, deg F / hour	$\boxed{1}$	$\boxed{0.5}$	max	30-90° F/hr
• Queue Humidity, hours @ % RH				No Limit 2

1 Autoclave cure cycle environment must induce these conditions in thickest section as measured by imbedded lagging thermocouple
2 Unvulcanized stock for stripwind and unvulcanized components stored in sealed containers during stabilization to room temperature. Normally, sufficient unvulcanized material for a segment build is moved into the work cell at one time.
3 These revised baseline parameters were selected based on the results of the Autoclave Cure Process Development Test, 48 inch motor experience and the capabilities of the Yellow Creek equipment.

ASRM 3084.0

Figure 4. Autoclave Cure Process Development Test Results

For hold time at vulcanization we selected a 2 hour minimum. This is the mid point of the data and it also improves processing times.

The baseline flowout temperature is 250+ 10 deg F. Acceptable 48 inch and 150 inch article results have been obtained at this level. Processing time is also slightly reduced at 250 deg F.

For flowout we selected 2 hours minimum. As above, acceptable results were seen on articles cured at this level and processing times are significantly reduced.

23 in Hg minimum vacuum was selected as baseline. This level has produced acceptable parts, results in better processing timelines, and precludes needless Nonconformance Reports driven by artificially higher levels.

An autoclave pressure of 100 + 25, -0 psig was selected based on the capabilities of the Yellow Creek autoclave. The autoclave in place has an upper limit of 150 psig and we desired sufficient margin so we did not have to operate at the upper limits of the equipment. 100 psig has produced acceptable 48 inch and 150 inch components.

The baseline heating rate is defined over an hour span. Defining the rate within 1 deg F per minute would result in needless nonconformances due to equipment capabilities.

4.0 TECHNICAL DISCUSSION

4.1 Test Plan

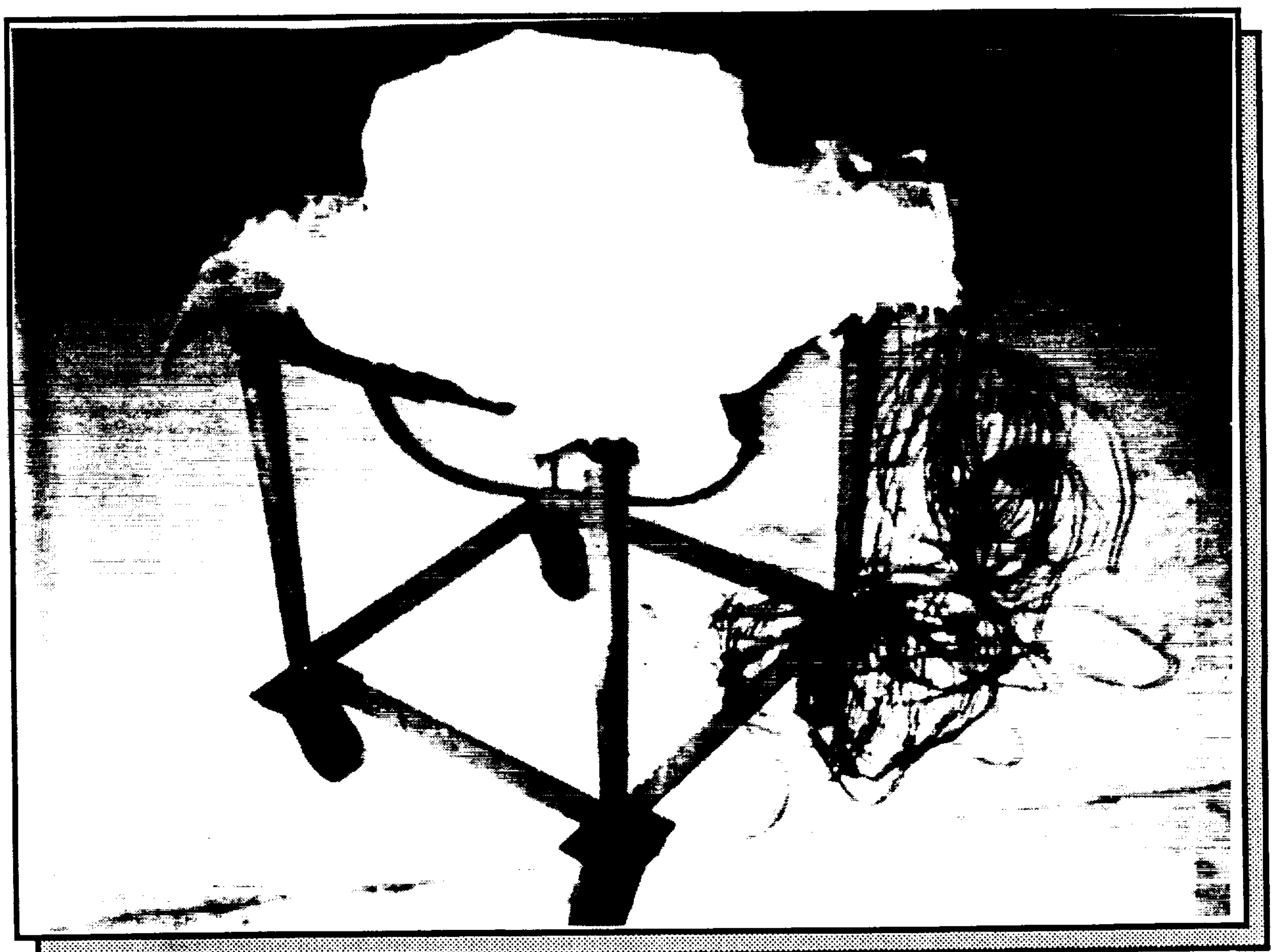
Autoclave cure process development task requirements were as follows:

- Task 1 - Cure cycle profile prediction
- Task 2 - Test specimen preparation
- Task 3 - Cure preparation
- Task 4 - Autoclave cure
- Task 5 - Specimen test
- Task 6 - Data reduction and report

Test requirements were defined in AAD Statement of Work No. I/LSPDT-015, Revision D, dated 26 August, 1991, which is included as **Attachment 1.** Task 1 was accomplished at the MSFC Productivity Center, using material and preliminary material property data furnished by AAD. Tasks 2 through 6 were subcontracted to Amfuel.

4.2 Task 1 - Cure Cycle Profile Prediction

The Task 1 objective was to derive cure cycle profile predictions for ASRM Kevlar-filled EPDM using thermal model analyses. These predictions then were used to update the experiment factors and levels for the Task 4 autoclave cure test matrix.



ASRM 3084.05

Figure 5. Typical Process Specimen Ready for Vulcanization

ASRM insulation cure cycle prediction requirements were defined in AAD Statement of Work No. I/LSPDT-022, dated 15 March, 1991, and is included as **Attachment 2**. The Task 1 final report is included as **Attachment 3.**

4.3 Tasks 2 Through 6

Tasks 2 through 6 were accomplished by Amfuel from August through December, 1991. Prior to starting the required experiment matrix, Amfuel prepared and vulcanized several pathfinder specimens to calibrate autoclave parameters and verify instrumentation. A typical specimen ready for autoclave cure in shown in ***Figure 5.***

Amfuel's final report is included as **Attachment 4.**

4.4 Data Analysis

The 90 and 95% confidence levels were used as the criteria for determining if a parameter was significant in the ANOVA. If there were significant parameters, the main effects plots were generated; also the LSD technique was used to determine the optimum level for that parameter.

Visual inspection of all dissected specimens showed that full flow occurred into the extrusion channel (Attachment 1, Figure 7) in all tests. This verified the excellent flow properties previously evidenced in 12- and 48-inch motors, and in 150" test article S/N 3 recently autoclave cured at Lockheed, Sunnyvale.

5.0 CONCLUSIONS

An insulation autoclave cure cycle baseline for subsequent material, component, and process developments has been established (Figure 3).

6.0 RECOMMENDATIONS

As indicated in AAD Statement of Work No. I/LSPDT-015, Attachment 1, Figure 1, logical follow-on testing should include the following:

- Establish allowable production tolerances of high impact process parameters and evaluate effect of potential production upsets, as illustrated in ***Figure 6.***
- Verify mechanical and bond system properties at tolerance extremes.

7.0 LIST OF ATTACHMENTS

The following is a list of attachments included in this report:

Attachment	Description
1	AAD Statement of Work No. I/LSPDT-015, Revision D Insulation Cure Process Development
2	AAD Statement of Work No. I/LSPDT-022 ASRM Insulation Cure Cycle Prediction Requirements
3	Task 1 ASRM Insulation Cure Cycle Prediction Final Report
4	Amfuel Report No. 1291-1, Test Report for Statement of Work I/LSPDT-015, Revision D
5	Analysis of Amfuel Test Data

PARETO EFFECT RANKING	FACTORS	PROCESS BASELINE	EXAMPLES OF POTENTIAL PROCESS UPSETS
1	• Temperature @ Vulcanization, deg F	325 ± 10	< 310 Excursion for 1 hour
2	• Temperature @ Flowout, deg F	260 ± 10	< 200 Excursion for 1 hour
3	• Heating Rate, deg F / hour	1.0 ± 0.5	Based on YC autoclave capability
4	• Time @ Vulcanization Temperature, hours	2, Minimum	Loss of power after 1 hour
5	• Vacuum	26, Minimum	Loss after start of cure cycle
6	• Pressure, psig	100, +35 - 0	Loss after start of cure cycle

ASRM 3084.06

Figure 6. Recommended Evaluation of Production Upset Environments

ATTACHMENT 1

AAD Statement of Work No. I/LSPDT-015, Revision D, Insulation Cure Process Development

Revision D: 26 August, 1991

STATEMENT OF WORK
NO. I/LSPDT -015

INSULATION CURE PROCESS DEVELOPMENT

January, 1991

GenCorp
Aerojet
ASRM Division
1 NASA Drive
Iuka, MS 38852-8998

STATEMENT OF WORK
NO. I/LSPDT - 015

INSULATION CURE

PROCESS DEVELOPMENT

Approved for Release

2/19/91
AAD Engineering

2/20/91
AAD Fabrication & Assembly

2/7/91
LMSC SRM&QA

1/25/91
AAD Manufacturing Engineering

2/11/91
LMSC SE&I (SE)

2/22/91
AAD Manufacturing Tooling

2/11/91
LMSC SE&I (SI)

2/14/91
AAD Industrial Engineering
and Production Planning

2/12/91
12 FEB 91
AAD PP&C and Master
Scheduling

2/20/91
AAD Procurement

2-22-91
AAD Safety & Environ Affairs

2/11/91
AAD Quality Assurance

1/25/91
AAD RDT Manager

REVISION SHEET

Statement of Work I/LSPDT-015

REVISION LETTER	DESCRIPTION OF CHANGE	RELEASE DATE
	Original Release	1/25/91
A	General - Revision A released to correct figure references, and to clarify task requirements. 1. Section 3.2, Material/Hardware/Equipment Page 2. • Revised estimated quantity of ASRM 44010 Insulation from 1000 to 2000 lbs. • Added RC-3000-22 as alternative bleeder cloth. 2. Section 3.4, Task 2, Page 3 • In 2nd paragraph, all references to Figure3 should be Figure 2. • Added to 2nd paragraph: " . . . The supplier will provide a mold to hold the sides of the rubber block in place during bagging and cure operations." 3. Section 3.5, Task 3, Page 3 • Added: ". . . or RC-3000-22 . . ." 4. Section 3.6, Task 4, Pages 3 and 4 • All references to Figure 4 should be Figure 3. • Reference to Figure 5 should be Figure 4. 5. Section 3.7.2, Degree of Cure, Pages 4 and 5 • Revise 3 places: ". . . dissected Section "A" . . " should be ". . . dissected Section "B" . . " • Reference to Figure 6 should be Figure 5. • Reference to Figure 7 should be Figure 6. 6. Section 3.7.4, Shrink Rate Assessment, Page 5 • ". . . dissected Section "B" . ." should be ". . . dissected Section "A" . ."	2/9/91

REVISION SHEET

Statement of Work I/LSPDT-015

REVISION LETTER	DESCRIPTION OF CHANGE	RELEASE DATE
A (Continued)	6. Section 3.7.4, Page 5 (continued) • Added: "Define points across dissected Section "A" as shown in Figure 8. Measurements will be taken across the same points at the specified intervals after cooldown." 7. Section 3.8, Task 6, Page 5 • ". . . ship to AAD dissected Section "A" . . ." was ". . . Section "B" . ." 8. Figure 3, Sheet 2 of 3 Factors: E Vacuum Level at Ta F Vacuum Level at Tb Levels: 1 / 2 / 3 -is- 28.5 / 26 / 20 -was- 26 / 18 / 10 9. Figure 6, Tensile Specimen Preparation, was Figure 7. 10. Figure 7, Flow-Out Inspection, was Figure 6. 11. Added Figure 8, Shrink Rate Assessment 12. Figure 9, Schedule, was Figure 8.	
B	1. Section 3.1, Page 1 • ". . .(L_{27} orthogonal array) was (L_{36} . . ." 2. Section 3.2, Page 2 • "Insulation material will be provided by AAD . ." was "Acceptable sources of supply defined in Attachment 1" • Added HD-800 flim for vacuum bag material	3/15/91

REVISION SHEET

Statement of Work I/LSPDT-015

REVISION LETTER	DESCRIPTION OF CHANGE	RELEASE DATE
B (Continued)	3. Section 3.4, Page 3 • "The supplier will process 29 insulation auto-clave cure test specimens . . ." was "The supplier will process 38 . . ." 4. Section 3.5, Page 3 • Added reference to HD-800 vacuum bag material. 5. Section 3.6, Page 4 • Second paragraph: ". . .each specimen will be assigned serial numbers from 1 to 27 . . ." was ". . 1 to 36 . ." 6. Figure 2, Sheet 2 of 2 • Location of thermocouple #4 is ~4.0-in. from top of specimen -was- ~3.0-in. 7. Figure 3, Sheets 1 and 2 • Reduced scope of cure test matrix from 38 to 27 tests. 8. Figure 6 • Location of thermocouple #4 "Dogbone" tensile sample cuting plane is ~4.0-in. from top of specimen -was- ~3.0-in. 9. Figure 9 • Adjusted schedule to reflect delay in Purchase Order release. 10. Deleted Attachment 1. 11. General • [Supplier name] was "supplier" 12. Figure 1, Logic • In Task 2 box, "Process 29 . . ." was "Process 38 . . ."	

REVISION SHEET

Statement of Work I/LSPDT-015

REVISION LETTER	DESCRIPTION OF CHANGE	RELEASE DATE
C	1. Section 3.2, Page 2 • HS-800 -was- HD-800 2. Section 3.4, Page 3 • Revised last paragraph to clarify pre-use storage and start of autoclave cure operations. 3. Section 3.5, Page 3 • HS-800 or equivalent -was- HD-800 4. Figure 3.0, Sheet 2 • Revised and added notes to clarify factor level tolerances, measurements, and location. 5. Figure 3.0, Sheet 3 • Made the vacuum bag leak check an optional operation 6. Figure 9 • Revised schedule to reflect a completion date of 27 Sept, 1991. Schedule revision due to changes reflected in Revision C, Item 3.	7/21/91 Original signed by DennisAdkins Tom McCabe D. Nachbar
D	1. General • Amfuel -was- The [supplier] 2. Section 3.1, Page 1 • (L_{18} orthogonal array) -was- L_{27} 3. Section 3.4, Page 3 • "Amfuel will process 20 insulation specimens . . . -was- " . . 29 insulation specimens . . ." 4. Section 3.6, Page 4 • . . . assigned serial numbers from 1 to 18 . . . -was- ". . . from 1 to 27 . . ."	8/26/91 Original signed by DennisAdkins D. Nachbar

REVISION SHEET

Statement of Work I/LSPDT-015

REVISION LETTER	DESCRIPTION OF CHANGE	RELEASE DATE
D (Continued)	5. Section 3.6, Page 4 • Revised wording of last paragraph to be consistent with Note 6 in revised Figure 3, Sheet 2, test matrix 6. Section 6.0, Page 6 • "Testing will be completed and final report submitted no later than 13 December, 1991" -was- " . . . in accordance with Figure 9." 7. Revised Figure 3, Sheets 1 and 2, to reflect reduced scope matrix. 8. Deleted Figure 9.	

STATEMENT OF WORK I/LSPDT - 015

INSULATION CURE PROCESS DEVELOPMENT

1.0 SCOPE

This Statement of Work defines the requirements for ASRM insulation autoclave cure process development.

2.0 APPLICABLE DOCUMENTS

The following documents, the latest issue in effect, are a part of this statement of work to the extent specified herein.

ASRM Specifications

ASRM-44010	Kevlar-Filled EPDM Insulation Material (Unvulcanized Stock)

ASTM Standards

ASTM D412	Test Methods for Rubber Properties in Tension
ASRM E794	Melting and Crystallizing Temperatures by Thermal Analysis

3.0 REQUIREMENTS |B|D

3.1 Summary

This Statement of Work defines requirements to establish the autoclave cure process parameters for ASRM insulated segments. A Taguchi-type statistical experiment (L_{18} orthogonal array), will be conducted. An overview of the task requirements are as follows: |D

- √ Task 1 - Cure cycle profile prediction
- √ Task 2 - Test specimen preparation
- √ Task 3 - Cure preparation
- √ Task 4 - Autoclave cure
- √ Task 5 - Specimen test

Statement of Work No. I/LSPDT-015

√ Task 6 - Data reduction and report

An insulation autoclave cure process development logic plan is illustrated in *Figure 1.*

3.2 Material/Hardware/Equipment

Amfuel will provide the following materials, hardware, and equipment to accomplish the tasks defined herein.

Identification Number	Description	Quantity	
ASRM 44010 (1)	Insulation, Kevlar-Filled EPDM	2,000 lbs	A
-	Mild Steel Test Panels 12", min x 12", min, with 0.5" Extrusion Groove	A/R to support required tasks	
TMI-939703	Pattern Cloth	200 ft^2	
Super 18 Airweave or R-3000-22	Bleeder Cloth, Low Density High Loft	200 ft^2	A
HS-800	Vacuum Bag	200 ft^2	C
GS43MR	Tacky Tape	10 rolls	
Range 0-500^{o}F	Thermocouple, Wire or Probe	220 (4 Spare)	
	TeflonTape	2 rolls	

(1) Insulation material per ASRM 44010 will be provided by **AAD.** B
Amfuel will define total quantity, sheet sizes, sheet thicknesses, and on-dock delivery requirements

Identification Number	Description	Quantity
-	Vacuum Equipment	A/R to support required tasks
-	Autoclave Equipment	A/R to support required tasks

3.3 Task 1 - Cure Cycle Profile Prediction

Aerojet ASRM Division (**AAD**) will derive a cure cycle profile prediction using thermal model analyses. This prediction will be used to establish the levels specified in the Task 4 experiment test matrix.

3.4 Task 2 - Test Specimen Preparation

|A|B |D

Amfuel will process 20 insulation autoclave cure test specimens as illustrated in **Figure 2** and as defined in the following sections.

A 10" by 10" by 8" block of ASRM 44010 unvulcanized, calendered, insulation will be layed-up on a teflon coated or taped mild steel panel to the configuration defined in **Figure 2.** During layup, 6 thermocouples will be installed insofar as possible into the center of the insulation section at the depths defined in Figure 2. Amfuel will provide a mold to hold the sides of the rubber block in place during bagging and cure operations to confine rubber flow within the boundary of the panel.

All ASRM insulation unvucalized stock will be stored at 40 degF until used, except when the exposure to humidity environments are required. Autoclave cure operations will begin 5 to 6 hours after start of insulation lay-up. |C| D

3.5 Task 3 - Cure Preparation

|A|B|C

Install TMI-939703 pattern cloth, Super 18 Airweave or RC-3000-22 bleeder cloth, and HS-800 or equivalent vacuum bag material over the specimen and seal. Install required vacuum source and transducer to

meet specified autoclave conditions. Vacuum level will be measured at the cure specimen, not at the vacuum source.

3.6 Task 4 - Autoclave Cure

|A|B|D

Autoclave cure each specimen in accordance with the experiment test matrix defined in **Figure 3**; definition of the factors (process parameters) in the matrix are included in Figure 3.

Prior to autoclave cure, each specimen will be assigned serial numbers from 1 to 18 to correspond with the test matrix. If an incident occurs (i.e. loss of vacuum, equipment malfunction, loss of measurement, etc.) that invalidates the data, repeat that specific experiment using a replacement specimen.

During the cure cycle, the following measurements will be continuously recorded:

- Autoclave temperature
- Autoclave pressure
- Output of the 6 specimen thermocouples
- Vacuum level at the specimen

The "queue" factor humidity measurements will be recorded when material is removed from 40 degF storage and all during specimen processing prior to autoclave cure.

After the cure cycle, each specimen will be dissected as defined in **Figure 4**.

3.7 Task 5 - Specimen Test

Autoclave cure will be assessed as follows:

3.7.1 Compaction

|D

Amfuel will visually inspect dissected sections; record observations, such as voids, delaminations, or other evidence of

improper cure.

3.7.2 Degree of Cure A

Shore A hardness measurements will be taken on dissected Section "B" from each specimen as defined in **Figure 5**. Measurements will be taken on the section face that was adjacent to the center of the specimen.

On samples taken from Section "B", conduct Differential Scanning Calorimetry testing in accordance with ASTM E794.

Prepare and test tensile specimens from dissected Section "B" as defined in **Figure 6** and in accordance with ASTM D412.

3.7.3 Degree of Flow A

AAD Manufacturing Engineering will evaluate the extent of flow into the extrusion groove as illustrated in **Figure 7.**

3.7.4 Shrinkage Rate Assessment A

Sample the shrinkage rate by measuring dissected Section "A" 1-, 2-, 7-, and 14-days after cooldown. Define points across dissected Section "A" as illustrated in **Figure 8**. Measurements will be taken across the same points at the specified intervals after cooldown.

3.8 Task 6 - Data Reduction and Report A D

Amfuel will reduce all data to tabular format for each test, and will include copies of all recorded measurements in a test report to **AAD**. Three copies plus the original will be required. The [supplier] will package and ship to **AAD** dissected Section "A" from each specimen tested. The Amfuel will discard the remaining dissected sections.

4.0 RESPONSIBILITY

4.1 Aerojet ASRM Division

AAD will be responsible for technical direction of the tasks defined in this statement of work, and for accomplishment of Task 1, Section 3.3 and the Degree of Flow evaluation, Task 5, Section 3.7.3.

4.2 AMFUEL

Amfuel will provide resources, equipment, and materials required for conduct of Tasks 2 through Task 6, and will be responsible for adherence to all federal and local safety and environmental protection procedures.

5.0 QUALITY ASSURANCE PROVISIONS

AAD quality assurance will provide source surveillance at the supplier's facility primarily during conduct of Tasks 4 and 5 and as defined in the Request for Quotation and/or the Purchase Order.

6.0 SCHEDULE

Testing will be completed and final report submitted no later than 13 December, 1991. |A|B|D

Attachment 1

Acceptable Sources of Supply for ASRM 44010 Insulation Material:

- √ **Burke Rubber, San Jose, California**
- √ **Master Processing, Long Beach, California**
- √ **RM Engineering Products, North Charleston, South Carolina**
- √ **Kirkhill Rubber, Brea, California**

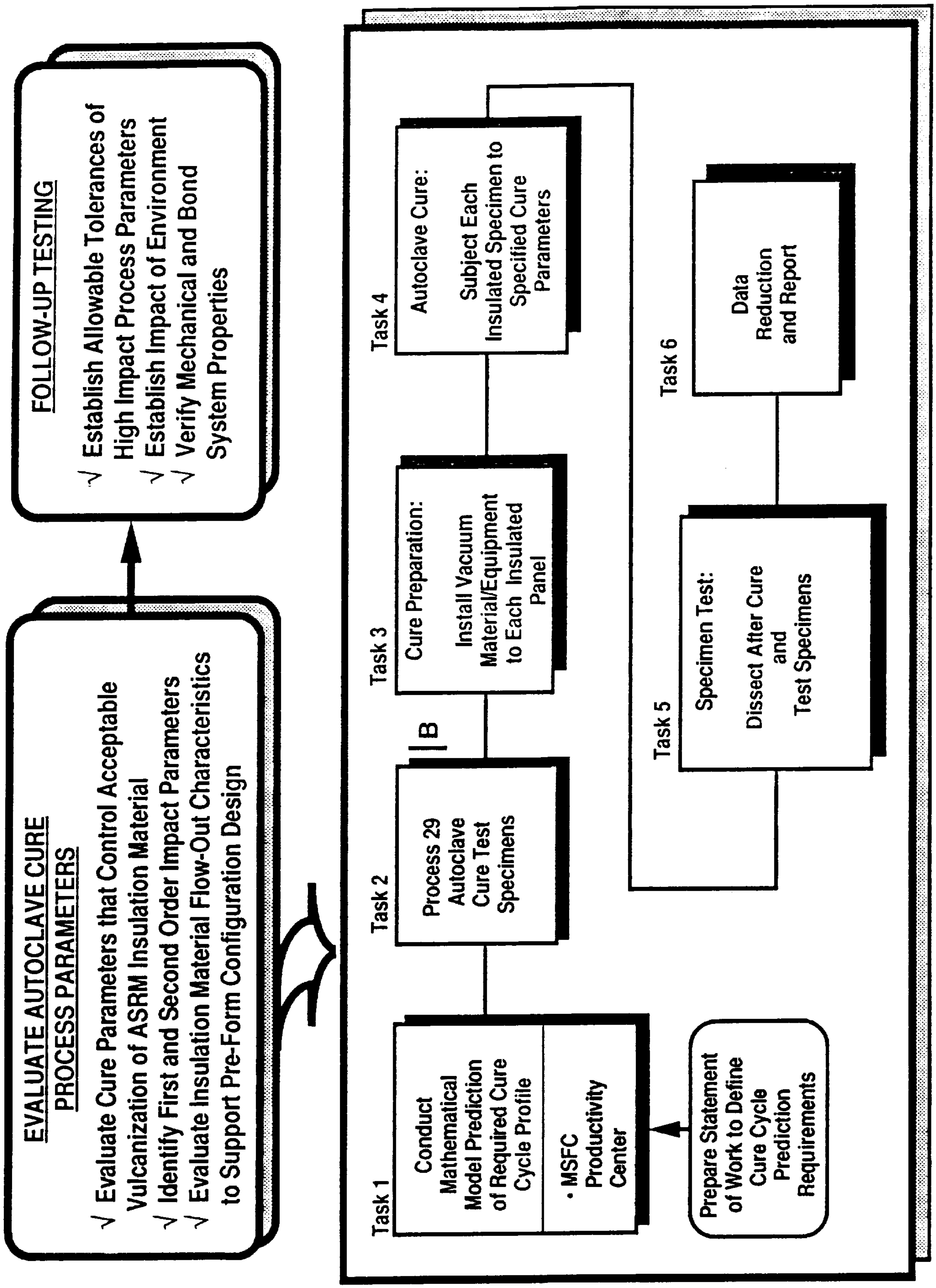


Figure 1. Insulation Autoclave Cure Process Development Logic Plan

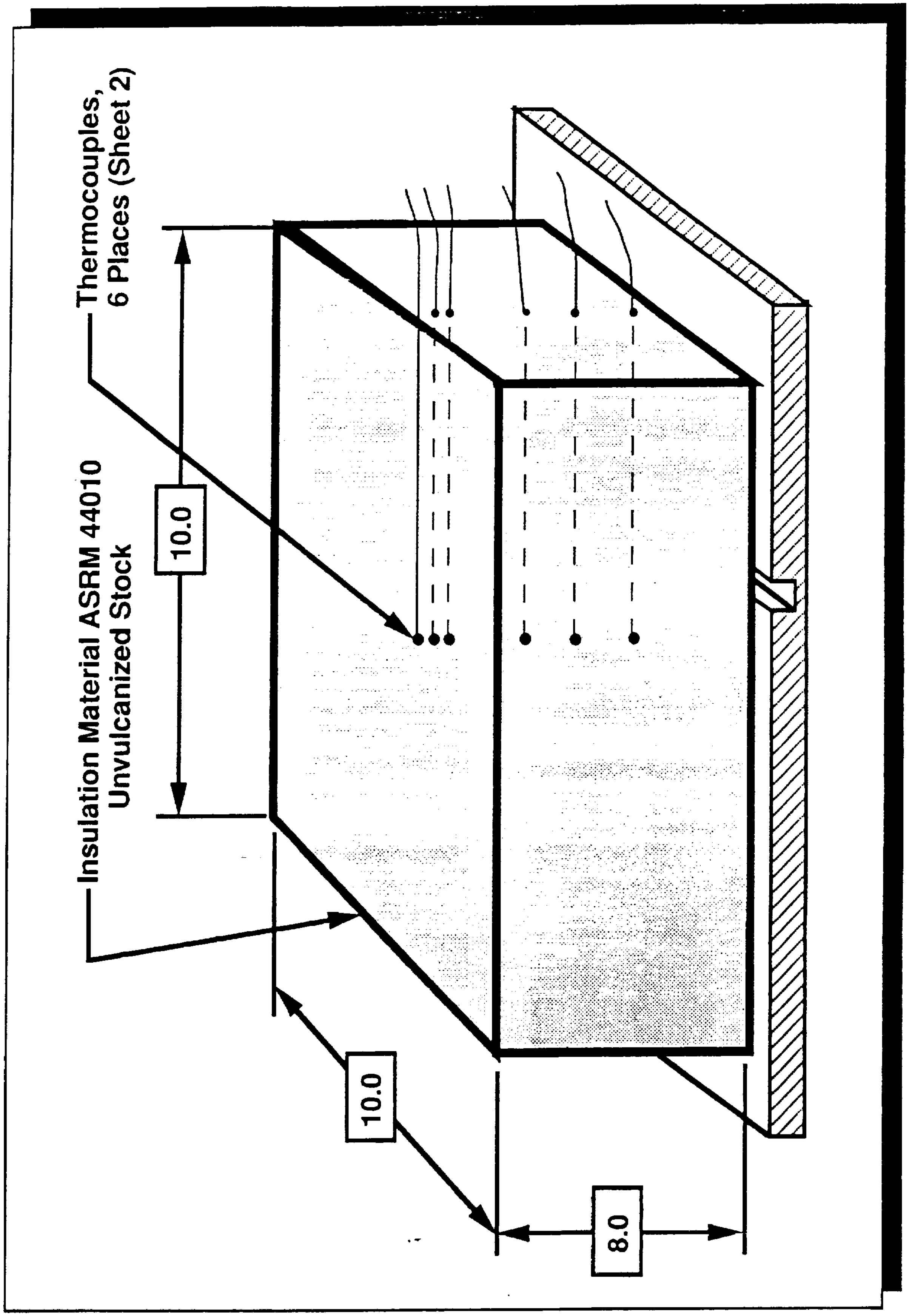


Figure 2. Configuration of Insulation Cure Test Specimen , Sheet 1 of 2

B

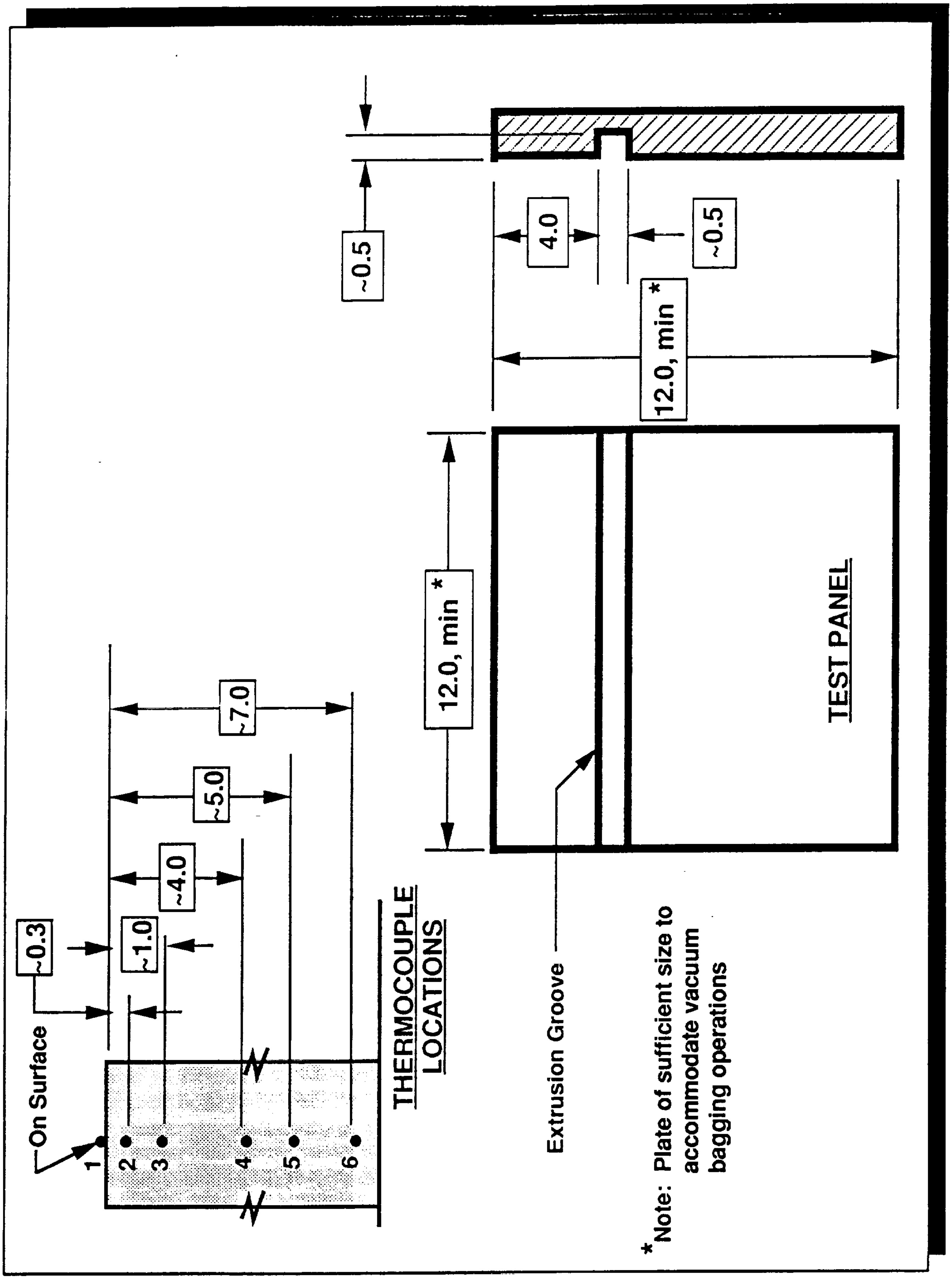


Figure 2. Configuration of Insulation Cure Test Specimen, Sheet 2 of 2

A

FACTORS (Cure Parameters)

Test Number (Specimen S/N)	A	B	C	D	E	F	G	H
1	1	1	1	1	1	1	1	1
2	1	1	2	2	2	2	2	2
3	1	1	3	3	3	3	3	3
4	1	2	1	1	2	2	3	3
5	1	2	2	2	3	3	1	1
6	1	2	3	3	1	1	2	2
7	1	3	1	2	1	3	2	3
8	1	3	2	3	2	1	3	1
9	1	3	3	1	3	2	1	2
10	2	1	1	3	3	2	2	1
11	2	1	2	1	1	3	3	2
12	2	1	3	2	2	1	1	3
13	2	2	1	2	3	1	3	2
14	2	2	2	3	1	2	1	3
15	2	2	3	1	2	3	2	1
16	2	3	1	3	2	3	1	2
17	2	3	2	1	3	1	2	3
18	2	3	3	2	1	2	3	1

Figure 3. Insulation Cure Test Matrix, Sheet 1 of 3 |D

FACTOR	DEFINITION	FACTOR LEVEL 1	FACTOR LEVEL 2	FACTOR LEVEL 3	
A	Temperature at vulcanization (T_b), *degF*	310 [1][8]	350 [1][8]	- - -	
B	Length of time at T_b, *hours*;	1 [2][8]	3 [2][8]	6 [2][8]	
C	Temperature at flowout (T_a), *degF*	200 [1][8]	230 [1][8]	260 [1][8]	
D	Length of time at T_a, *hours*	1 [2][8]	3 [2][8]	5 [2][8]	
E	Vacuum Level , *in Hg*	28.5 [3]	26.0 [3]	20.0 [3]	
F	Pressure, *psia*	50 [4]	100	135	
	Cooling Rate - Deleted				
G	Heating rate, *degF / min*	1 [5]	0.5 [5]	[7] [5]	D
	Queue Temperature - Deleted				
H	Queue Humidity, *time at RH*	4 [6]	8 [6]	12 [6]	

[1] ± 10 deg F (best effort within equipment capability)

[2] ± 15 minutes

[3] + 0, - 3.5 in. Hg

[4] ± 5 psia

[5] Average rate during heat-up based on autoclave air temperature; on cool down, hold until lagging theromcouple is 200 degF

[6] Remove material from 40 degF storage into average 55% RH, 75 + 5 degF environment and allow warm-up for indicated time intervals before preparing specimen. Record start and stop time of specimen preparation.

[7] Maximum equipment capability; record measured value

[8] Lagging thermocouple (i.e. most likely #4, Figure 2. Sheet 2)

Figure 3. Insulation Cure Test Matrix , Sheet 2 of 3

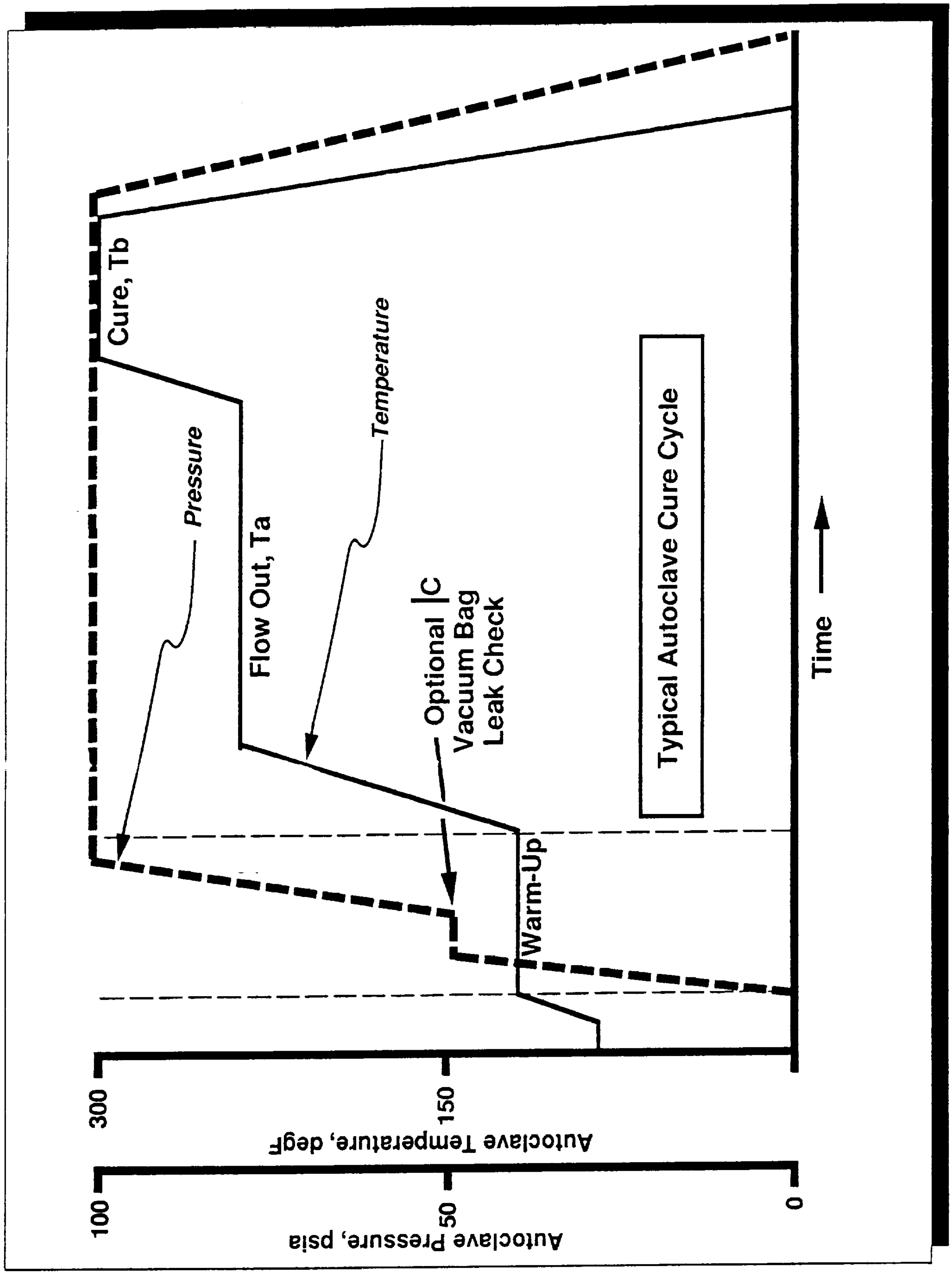


Figure 3. Insulation Cure Test Matrix, Sheet 3 of 3

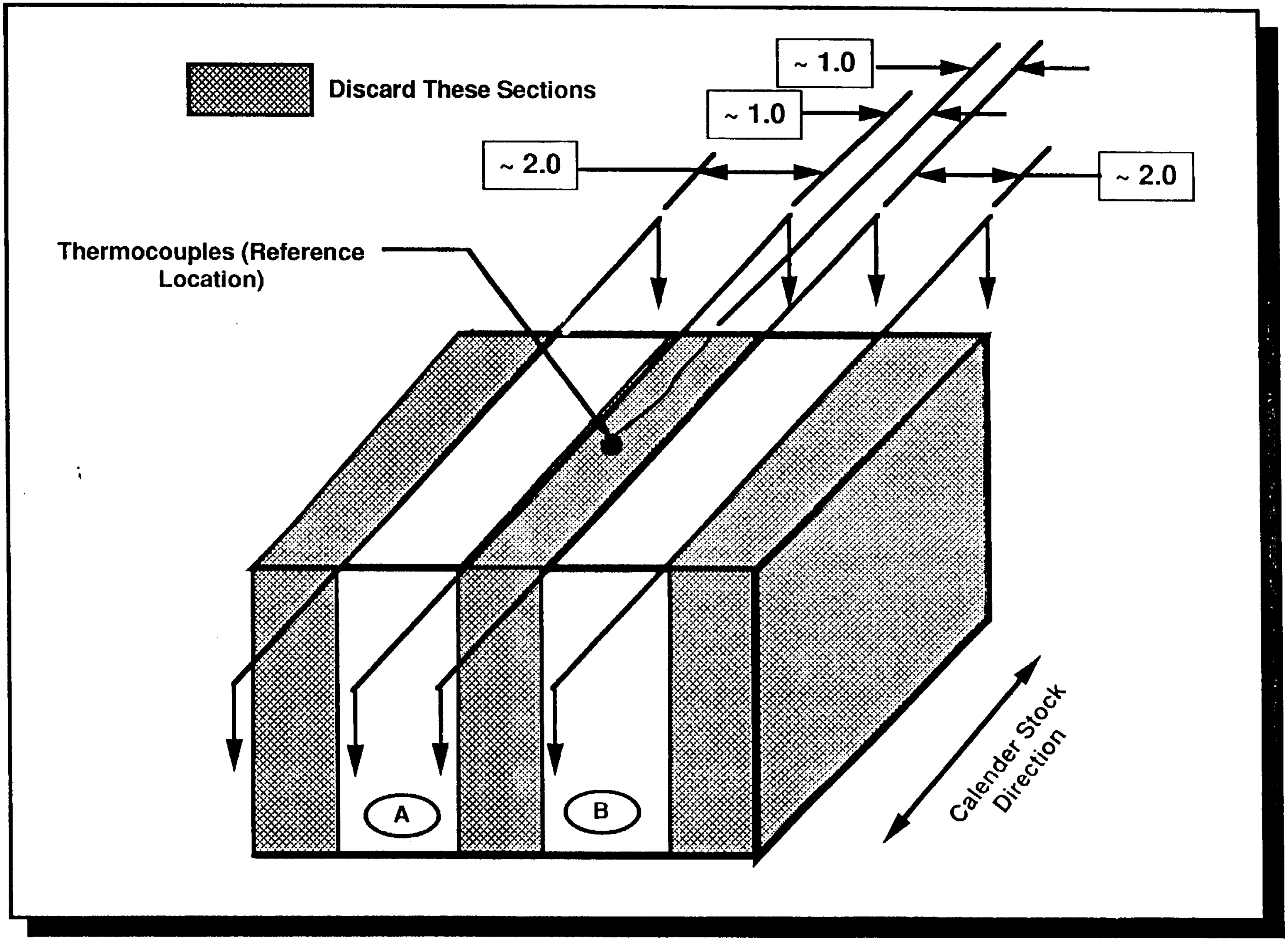


Figure 4. Insulated /Cured Panel Dissection Requirements

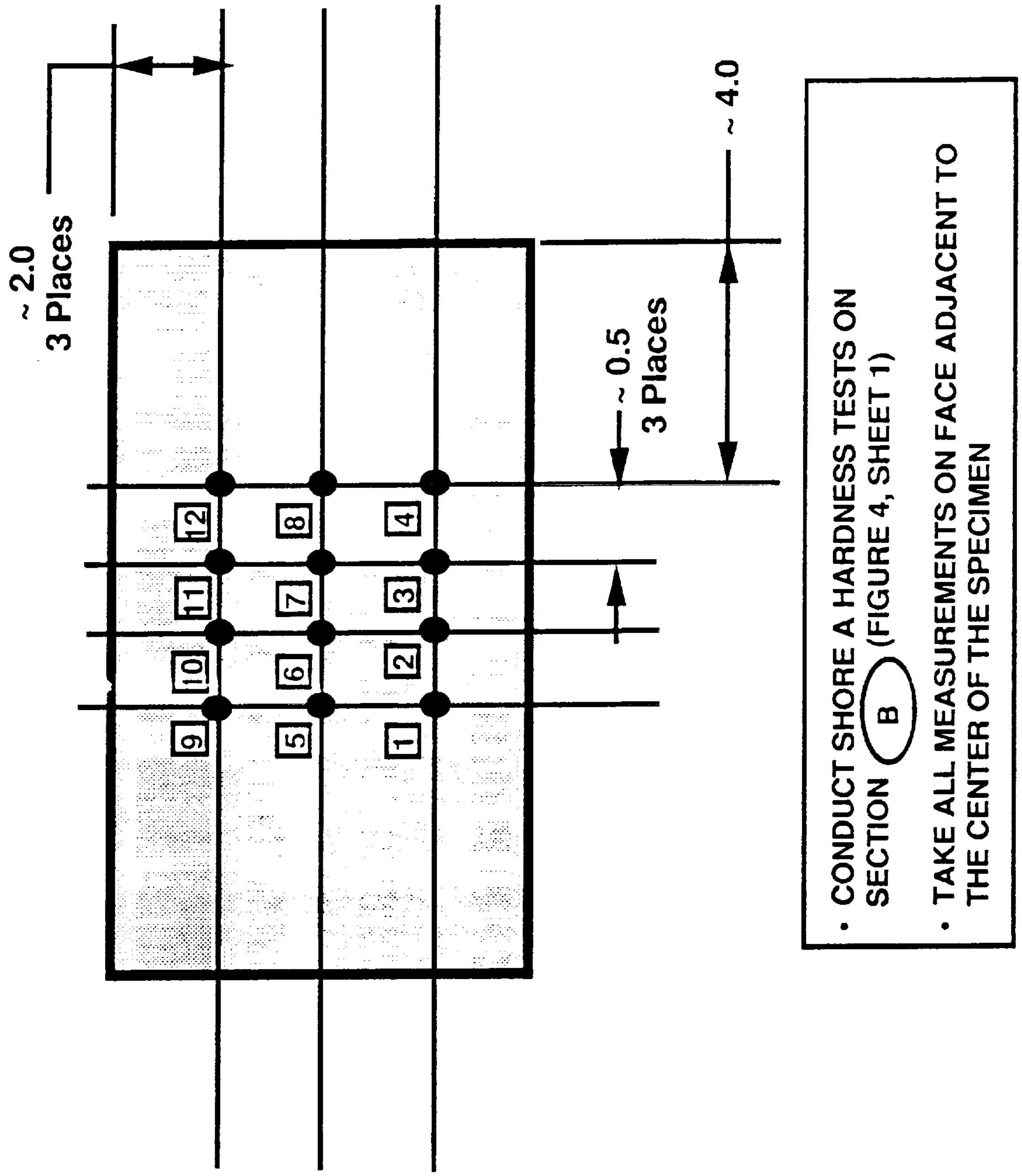


Figure 5. Hardness Inspection of Cured Insulation Test Specimen

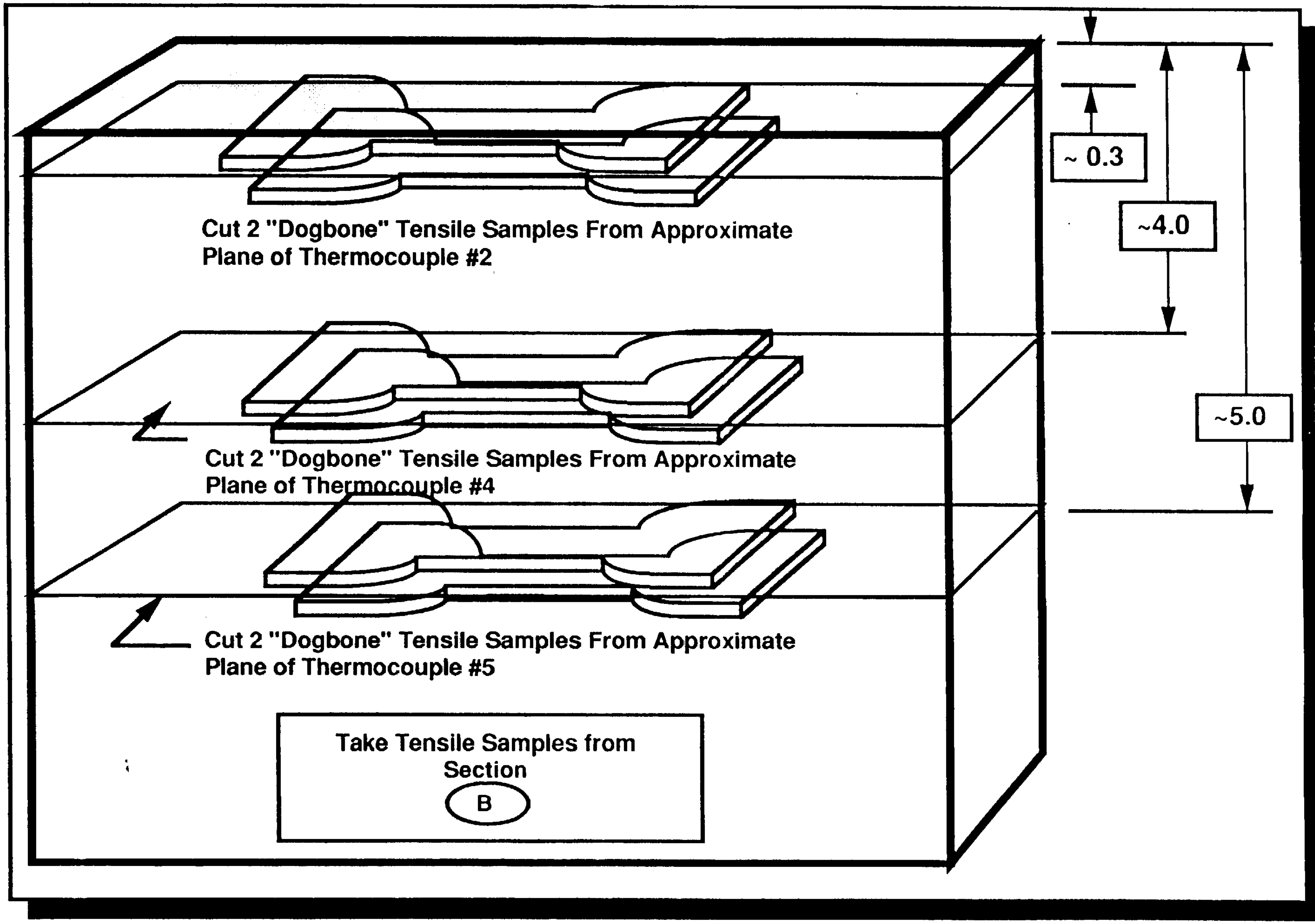


Figure 6. Tensile Specimen Preparation

A | B

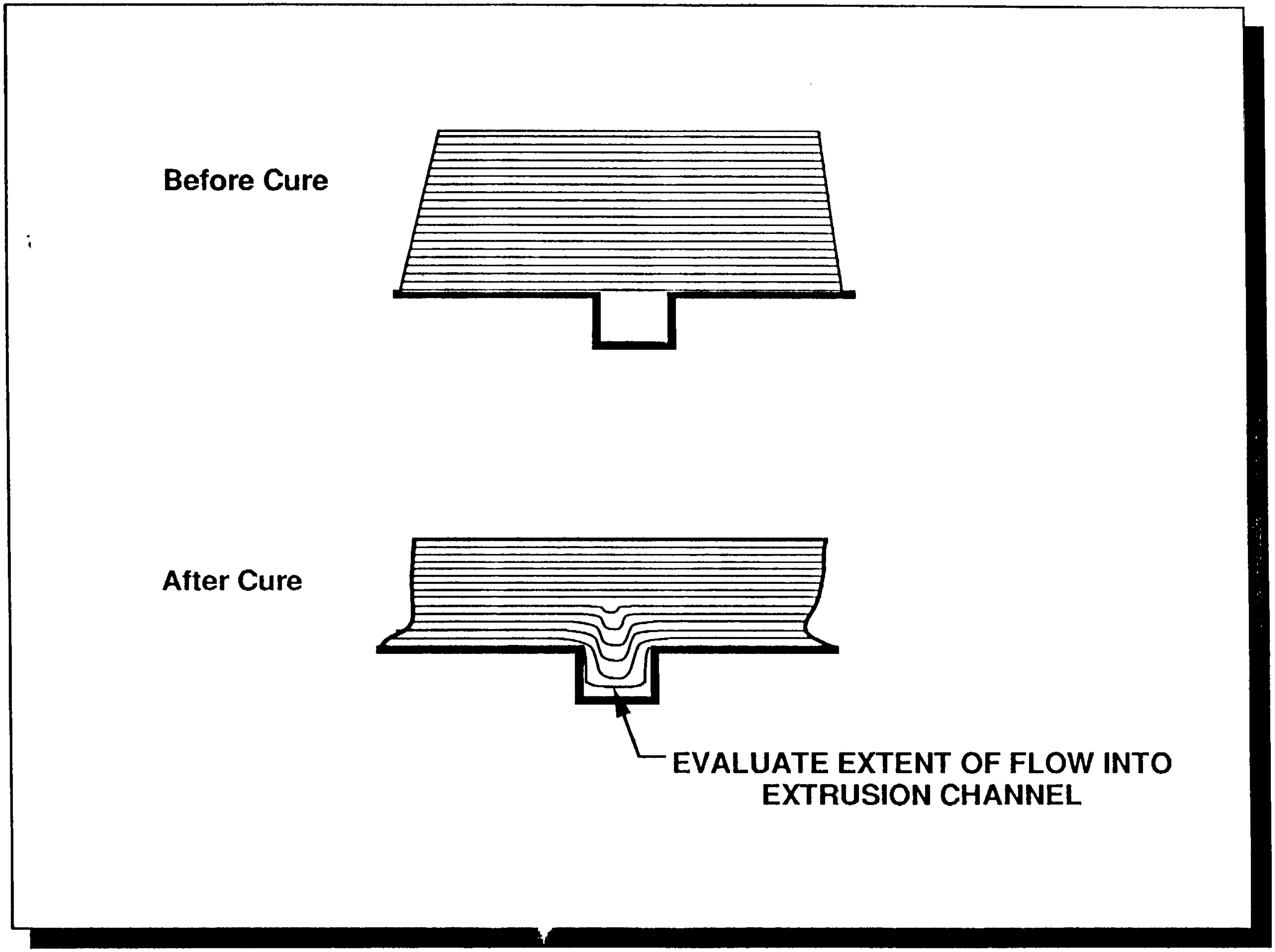


Figure 7. Flow-Out Inspection of Cured Insulation Test Specimen

A

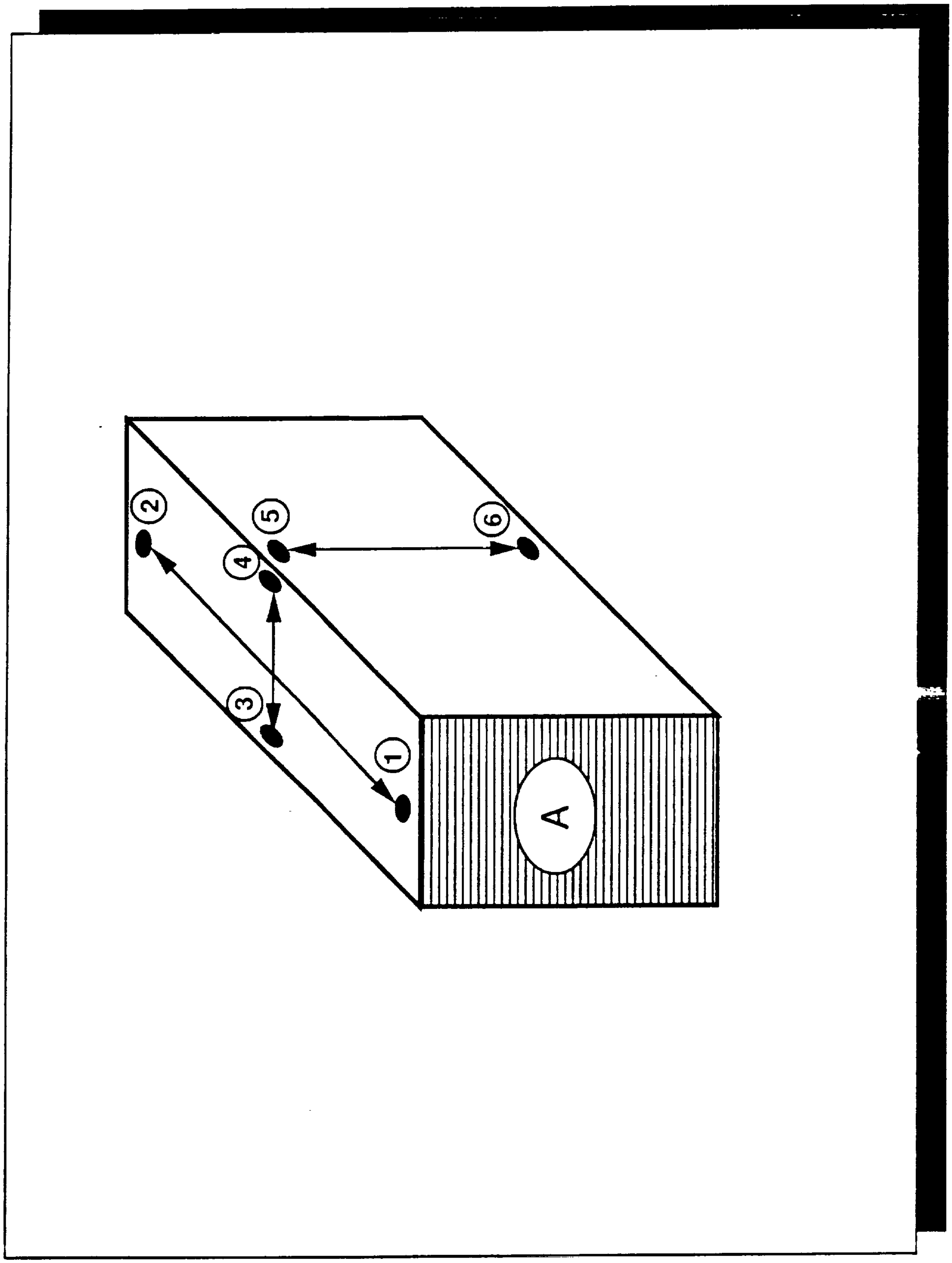


Figure 8. Shrinkage Rate Assessment Measurement Plan

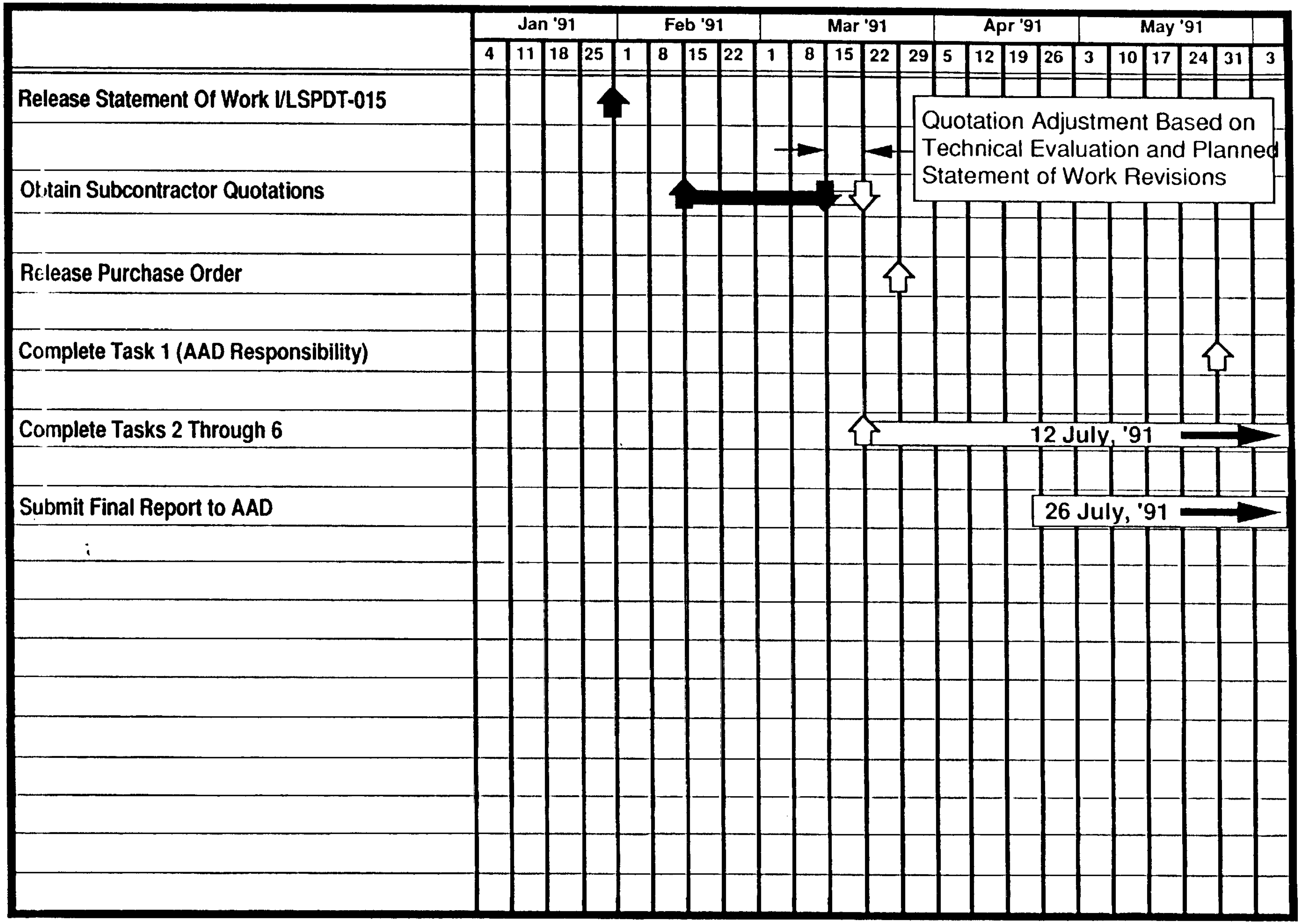


Figure 9. Insulation Autoclave Cure Process Development Schedule

A | B

ATTACHMENT 2

AAD Statement of Work No. I/LSPDT-022, ASRM Insulation Cure Cycle Prediction Requirements

STATEMENT OF WORK
NO. I/LSPDT -022

ASRM INSULATION CURE CYCLE PREDICTION

March, 1991

GenCorp
Aerojet
ASRM Division
1 NASA Drive
Iuka, MS 38852-8998

STATEMENT OF WORK
NO. I/LSPDT - 022

ASRM INSULATION AUTOCLAVE

CURE CYCLE PREDICTION

Approved for Release

for W.F.S. TAM 3/15/91
AAD Engineering

3/15/91
AAD PDT Manager

David Blasius 3/15/91
LMSC SE&I (SE)

REVISION SHEET

Statement of Work I/LSPDT-022

REVISION LETTER	DESCRIPTION OF CHANGE	RELEASE DATE
	Original Release	3/15/91

STATEMENT OF WORK I/LSPDT - 022

ASRM INSULATION AUTOCLAVE CURE CYCLE PREDICTION

1.0 SCOPE

This Statement of Work provides the data needed to accomplish an autoclave cure cycle prediction for ASRM insulation as installed in a 150-in.-dia dome process development test article. This data will be used to support ASRM insulation autoclave cure process development defined in Aerojet ASRM Division (AAD) Statement of Work I/LSPDT-015.

2.0 APPLICABLE DOCUMENTS

The following documents, the latest issue in effect, are a part of this statement of work to the extent specified herein:

AAD Drawings

3802001 150" Insulated Dome Process Development Test Article

3.0 REQUIREMENTS

3.1 Summary

As illustrated in the ASRM insulation autoclave cure process development logic plan, Figure 1, the initial task is to derive an autoclave cure cycle prediction. This task will provide a predicted temperature for component flowout and vulcanization, and the time at temperature required to achieve acceptable cure. This data will be used as the starting factors (cure parameters) and nominal levels in the cure statistical experiment design.

The insulation configuration for cure prediction is defined in AAD Drawing 3802001.

This analytical prediction task effort will not exceed 100 labor hours.

3.2 ASRM Insulation Thermal Data

Available thermal data for the ASRM insulation formulation is

provided in the Attachment. Technical AAD contact is W.F.S. (Bill) Tam, (916) 355-4810.

4.0 SCHEDULE

The insulation autoclave cure process development schedule is shown in Figure 2. Insulation autoclave cure prediction is needed by the week ending 26 April, 1991, to support final definition of the statistical experiment matrix.

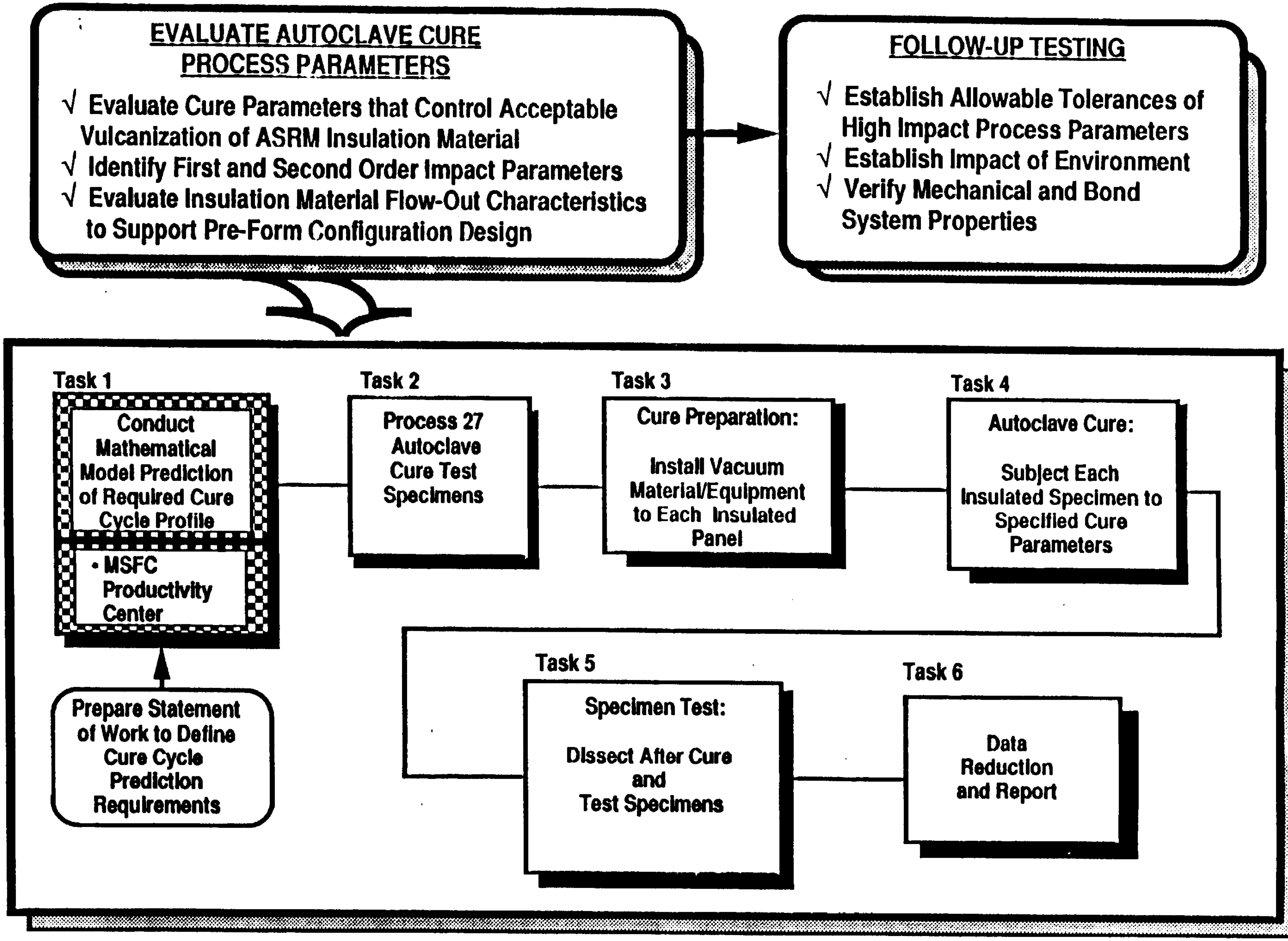


Figure 1. Insulation Autoclave Cure Process Development Logic Plan

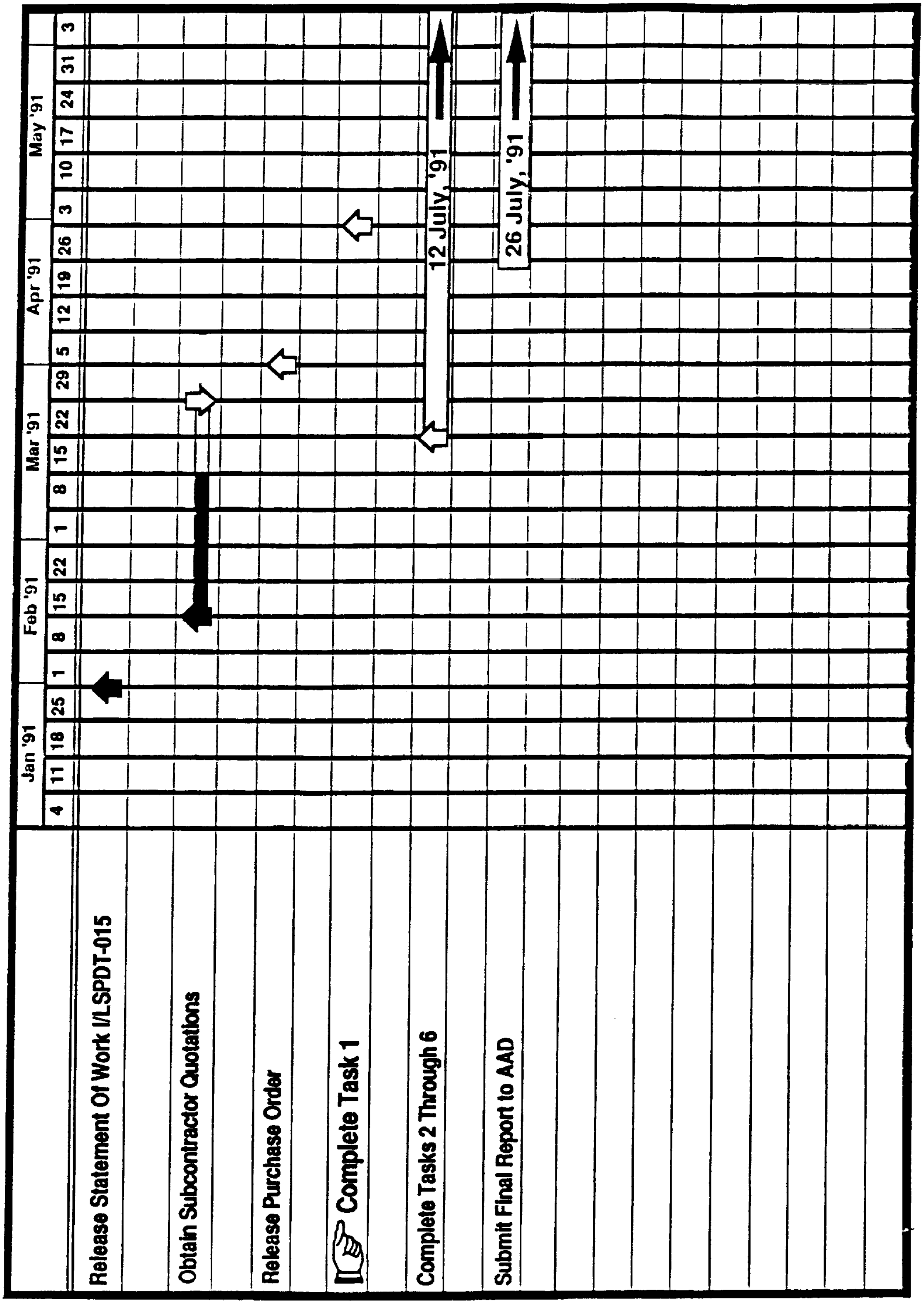


Figure 2. Insulation Autoclave Cure Process Development Schedule

Statement of Work No. I/LSPDT-022

Attachment

Available Thermal Property Data for ASRM Insulation Material

Thermal Calculations

Temperature		Density	Specific Heat	Diffusivity	Conductivity	
deg C	deg F	gm/cm^3	watt-sec/gm-deg K	cm^2/sec	watts/cm-deg K	BTU, in/hr-ft^2-F
23	73	1.160	1.323	0.00154	0.00236	1.64
75	167	1.160	1.469	0.00135	0.00230	1.60
150	302	1.160	1.640	0.00116	0.00221	1.53
225	437	1.160	1.809	0.00097	0.00204	1.41
315	599	1.160	2.180	0.00057	0.00133	0.93

Cure Reaction Model

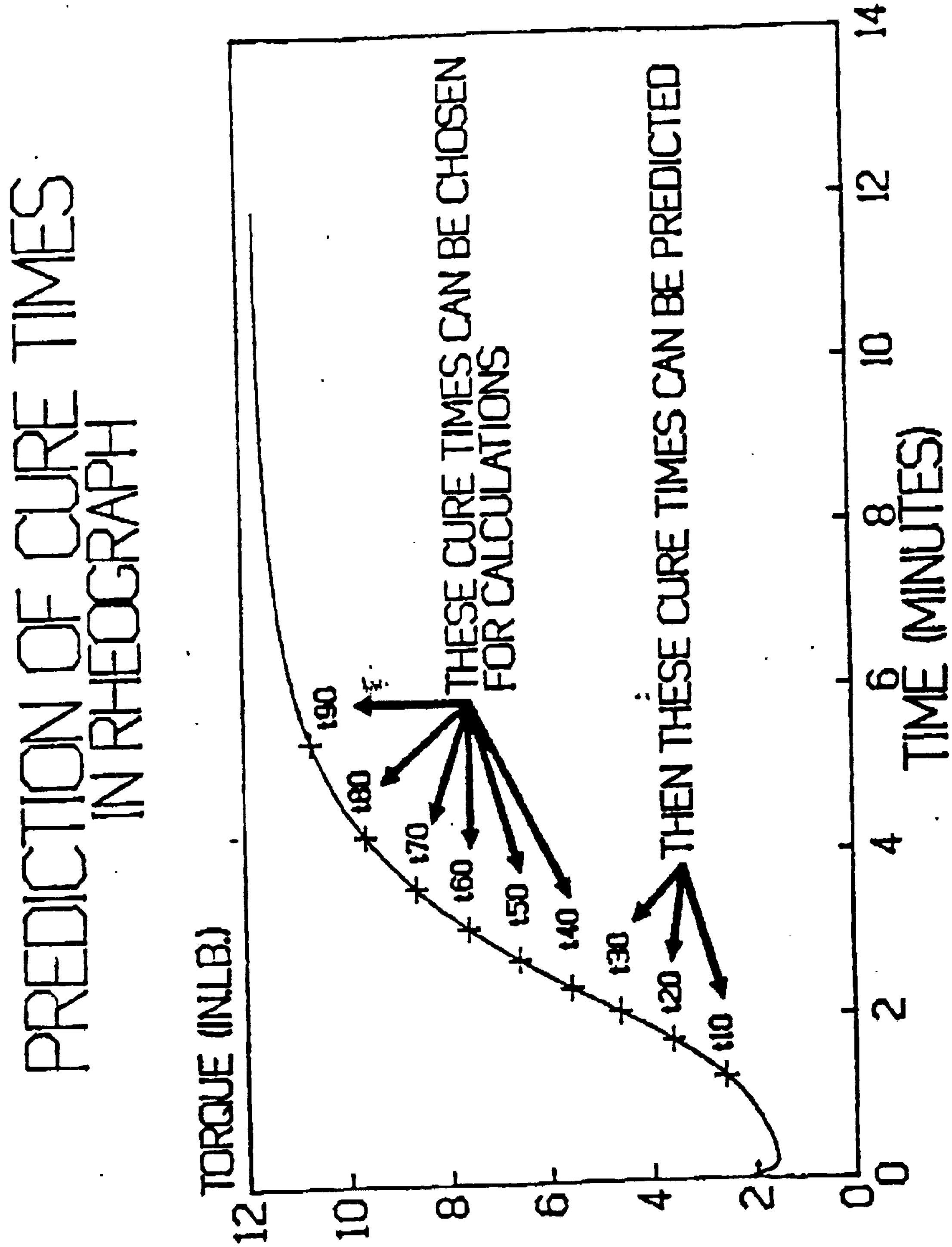
$$dx/dt = k^{(n)} (1-x)^{n} \quad (t > t_i)$$

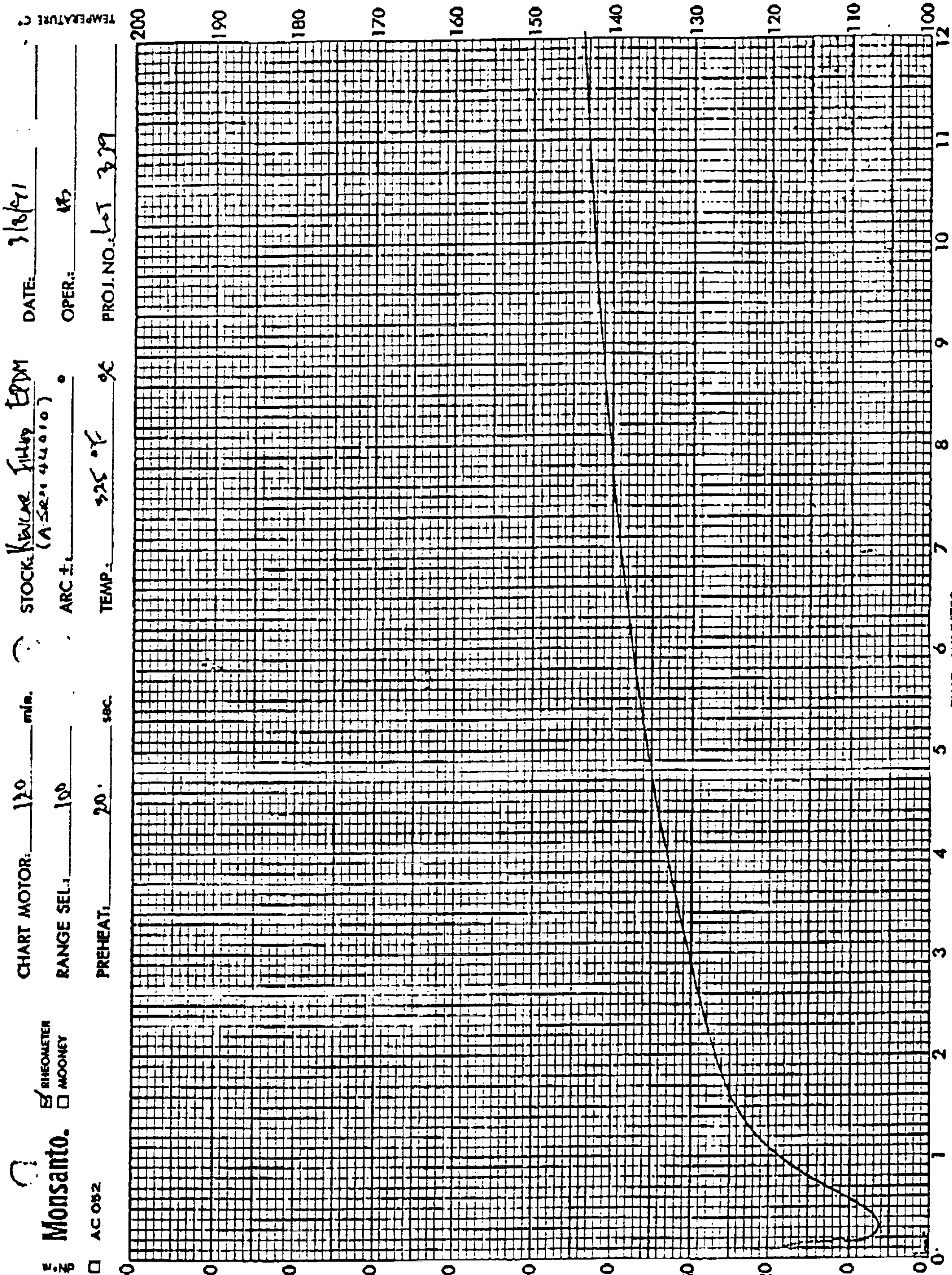
Where t_i = Reaction Incubation Time

n = Reaction Order

$k^{(n)}$ = Reaction Rate Constant

x = % cure


PREDICTION OF CURE TIMES
IN RHEOGRAPH
TORQUE (IN.LB.)
THESE CURE TIMES CAN BE CHOSEN
FOR CALCULATIONS
THEN THESE CURE TIMES CAN BE PREDICTED
t10
t20
t30
t40
t50
t60
t70
t80
t90
TIME (MINUTES)
0
2
4
6
8
10
12
14


Monsanto.
AC 052
RHEOMETER
MOONEY
CHART MOTOR: 120 min.
RANGE SEL.: 100
PREHEAT: 20 sec.
STOCK: Kevlar Filled EPDM
ARC ±: °
TEMP: 325 °F °C
DATE: 3/8/91
PROJ. NO.: Lot 379
TEMPERATURE C°
TIME, MINUTES

ATTACHMENT 3

Task 1 ASRM Insulation Cure Cycle Prediction Final Report

Thiokol CORPORATION

SPACE OPERATIONS

MSFC Advanced Programs and Technology
Mischell Letson
Engineering, Quality Assurance, and Test

19 July 1991
G920-FY91-12:MAL

TO Robert C. Bunker

FROM: Mischell Letson

CC: William Askew, Ken Jones M/S EE-51, Mary Jo Kurczi M/S EE74,
John W. Edwards M/S E40

INSULATION AUTOCLAVE CURE CYCLE PREDICTIONS

It was requested by NASA through a technical directive that Thiokol Corporation derive an autoclave cure cycle for Kevlar filled EPDM insulation. The insulation is installed in a 150 inch diameter ASRM dome process development test article. The model grid for the test article is shown in figure 1. Specific requirements included temperature profiles and time at temperature required to achieve an acceptable cure.

Values of density, specific heat and thermal conductivity were supplied by Aerojet Corporation. (Table-1 shows these values) In order to model the cure of the EPDM, cure kinetics are required. DCS testing was done at MSFC by Thiokol to obtain the desired data. Results of the DSC testing are shown in Figure-2. Due to the limited amount of material we were given no RDS testing was possible. Therefore, the cure kinetics obtained could possibly have been made more accurate with additional testing.

TABLE 1: THERMAL PROPERTIES

TEMPERATURE DEG C	DEG F	DENSITY GM/CM^3	SPECIFIC HEAT WATT-SEC/GM-DEGK	DIFFUSIVITY CM/SEC^2	CONDUCTIVITY BTU-IN/HR-FT^2-F
23	73	1.160	1323	0.00154	1.64
75	167	1.160	1.469	0.00135	1.60
150	302	1.160	1.640	0.00116	1.53
225	437	1.160	1.809	0.00097	1.41
315	599	1.160	2.180	0.00057	0.93

6767 Old Madison Pike, NW, Suite 490, Huntsville, AL 35806 (205) 722-4935

The model was completed after all of the data was obtained. The cure of EPDM was modeled using a single reaction based on an arrehnius temperature dependent equation. The next step was to develop a test matrix of cure cycles based on varying ramp rates, hold times and cure temperatures. The test matrix used is shown in Table-2.

TABLE 2: CURED CYCLE TEST MATRIX

TEST#	RAMP RATE	1ST HOLD TEMP	1ST HOLD TIME	2ND HOLD TEMP	2ND HOLD TIME
1	1 F/MIN	190 F	1 HOUR	320 F	4 HOUR
2	1 F/MIN	190 F	2 HOUR	320 F	4 HOUR
3	1 F/MIN	190 F	3 HOUR	320 F	5 HOUR
4	5 F/MIN	190 F	1 HOUR	320 F	4 HOUR
5	5 F/MIN	190 F	2 HOUR	320 F	4 HOUR
6	5 F/MIN	190 F	3 HOUR	320 F	5 HOUR
7	5 F/MIN	200 F	4 HOUR	325 F	5 HOUR
8	5 F/MIN	225 F	3 HOUR	350 F	5 HOUR
9	.25 F/MIN	-	-	325 F	11 HOUR

Results were reviewed with NASA, Lockheed and Aerojet. Based on results of the first set of cure cycles a second test matrix was decided upon. Table-3 shows this matrix. In addition the autoclave manufacturers suggested cycle was analyzed.

TABLE 3: CURED CYCLE TEST MATRIX

TEST#	RAMP RATE	TEMP	1ST HOLD TIME	1ST HOLD TEMP	2ND HOLD TIME
1	1 F/MIN	250 F	10 HOUR	315	10 HOUR
2	1 F/MIN	250 F	10 HOUR	325	10 HOUR
3	1 F/MIN	250 F	10 HOUR	335	10 HOUR
4	.5 F/MIN	250 F	10 HOUR	315	10 HOUR
5	.5 F/MIN	250 F	10 HOUR	325	10 HOUR
6	.5 F/MIN	250 F	10 HOUR	335	10 HOUR
7	MANUFACTURERS CYCLE SEE FIGURE-3				

Results of all the cure cycles are shown in Figures-4 thru 33. It was found that a high cure temperature approximately 335-340°F results in a faster cure. But, lower cure temperatures (310-325°F) with longer hold times also produce a fully cured part. Results have been given to Lockheed and Aerojet and final selection of a cycle will be made by them based on the model results.

Mischell A. Letson

Mischell A. Letson

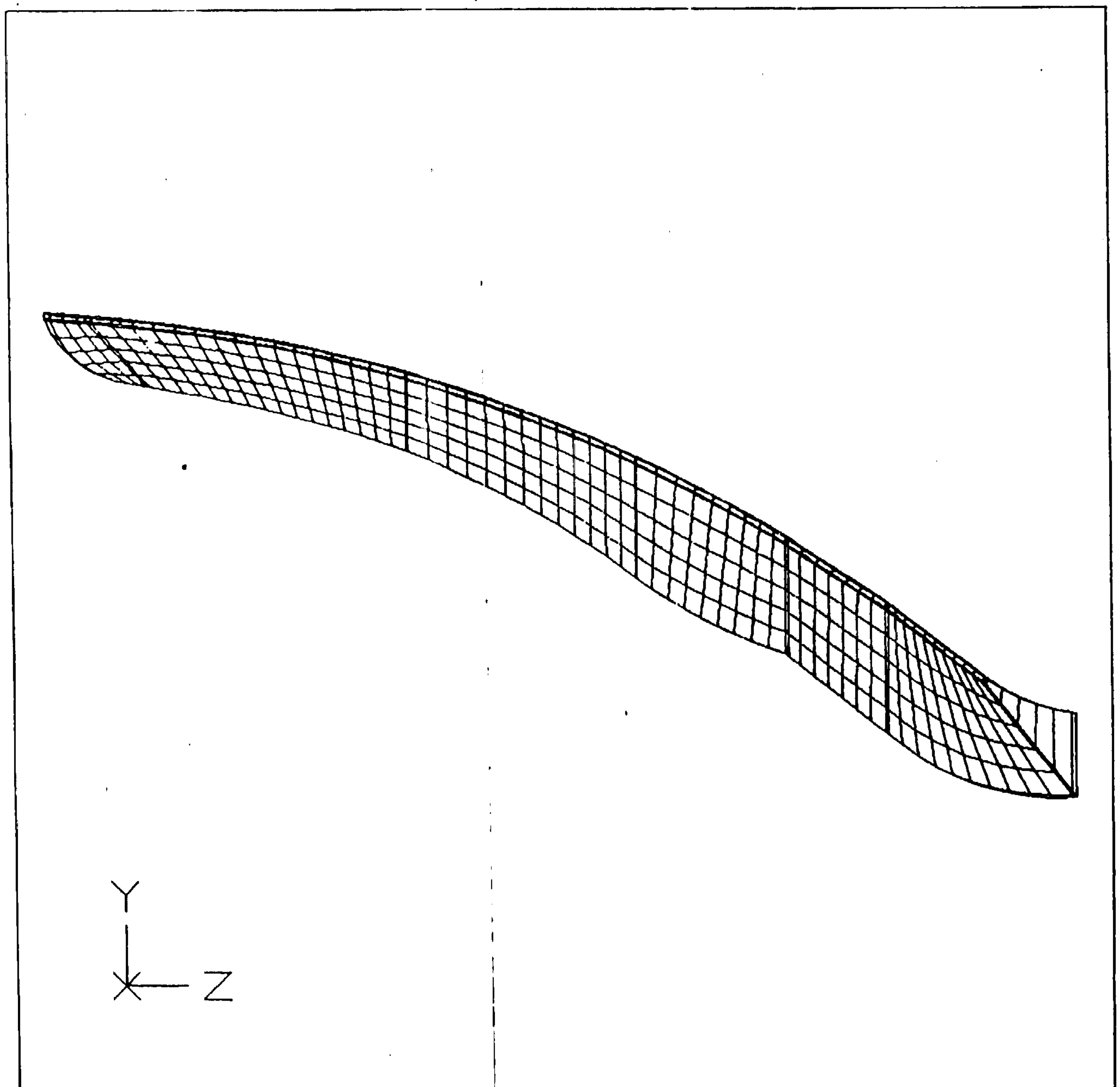
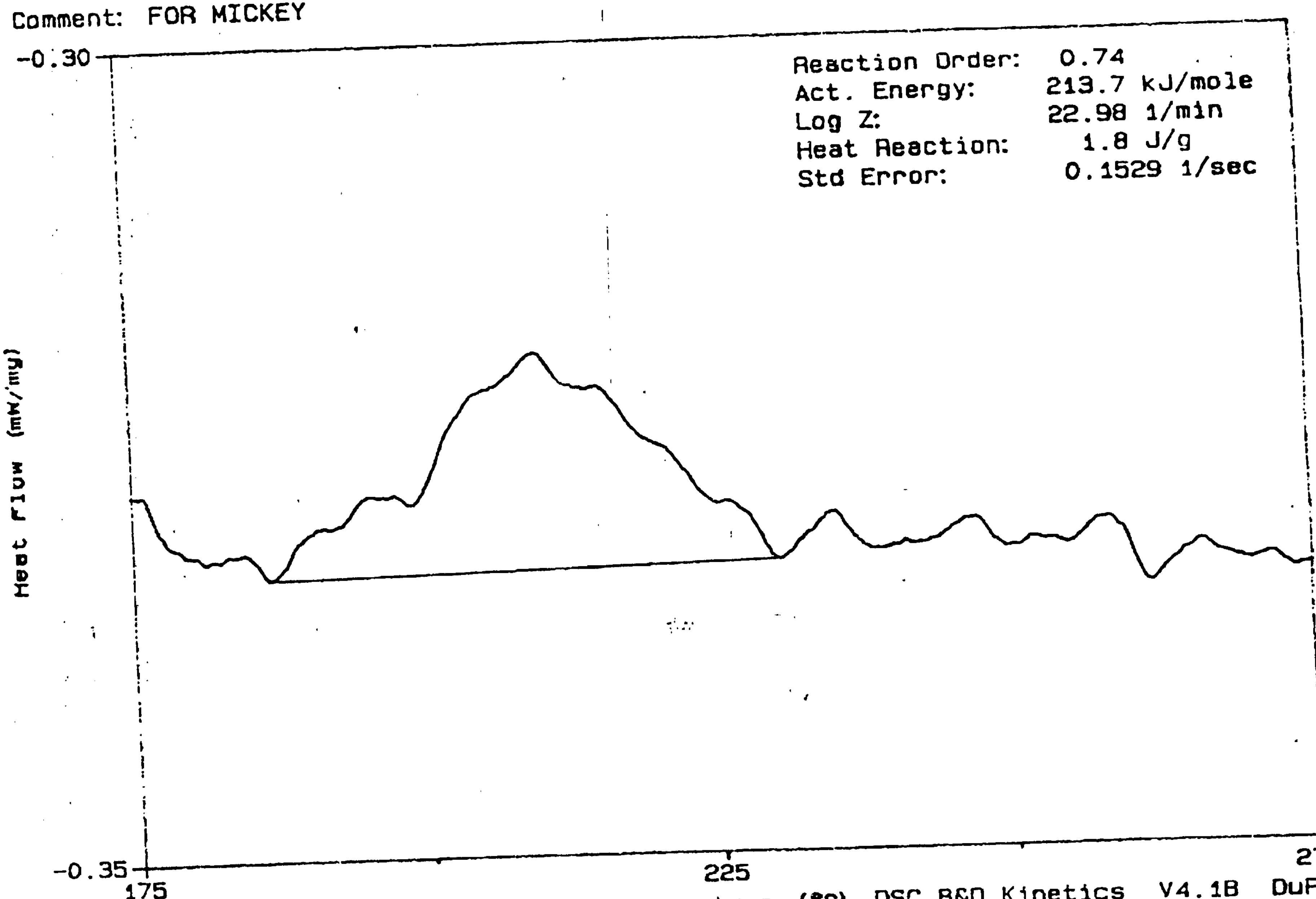


FIGURE 1

Sample: ASRM-44010 LOT B-39 KEVLAR/EPDM
Weight: 33.00 mg Kcell: 1.365
Method: GLASS PHENOLIC
Comment: FOR MICKEY

DSC

DSC File: A:DSC.40
Operator: B. COOLEY
Run date: 7-Jun-91 17:21



DSC B&D Kinetics V4.1B DuPont 210

FIGURE 2

Cure Cycle Profile

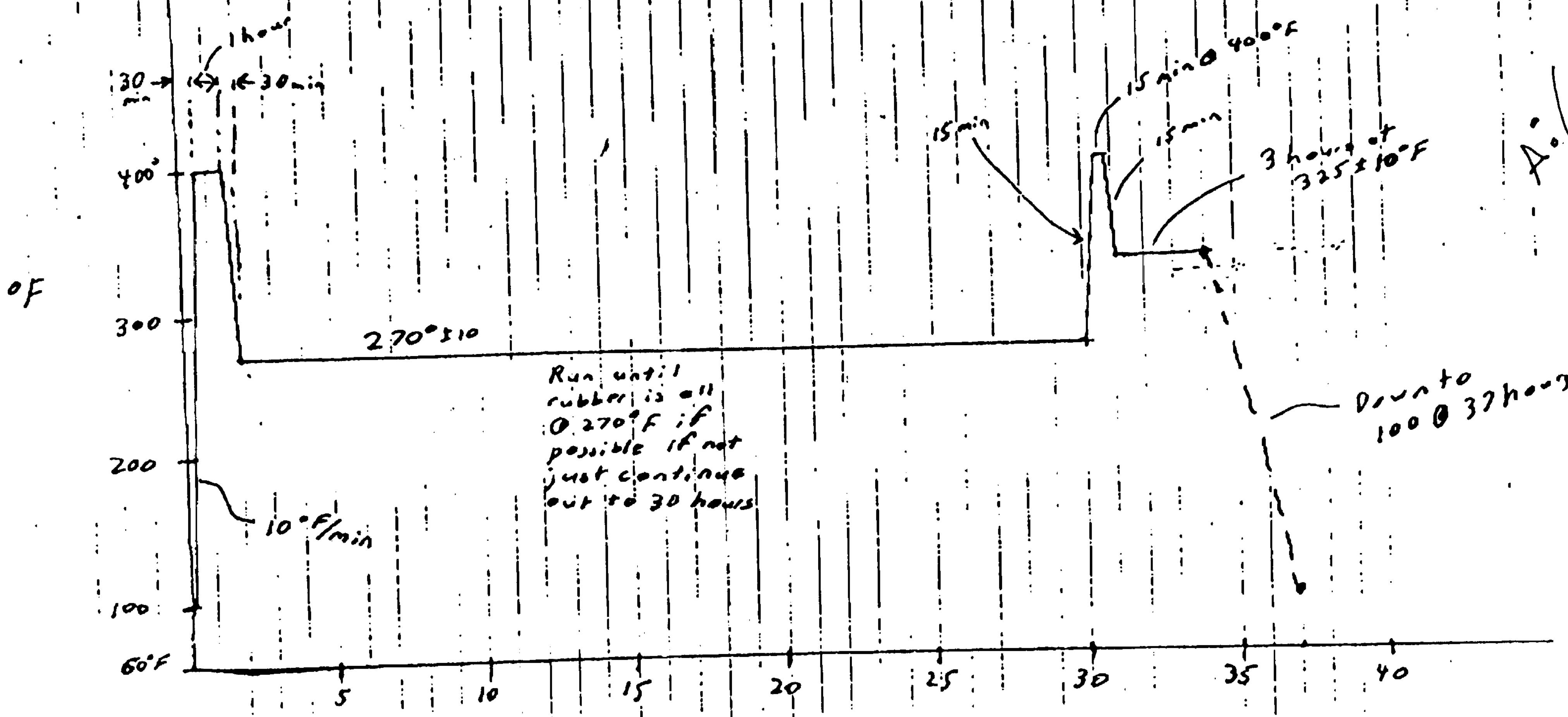


FIGURE 3

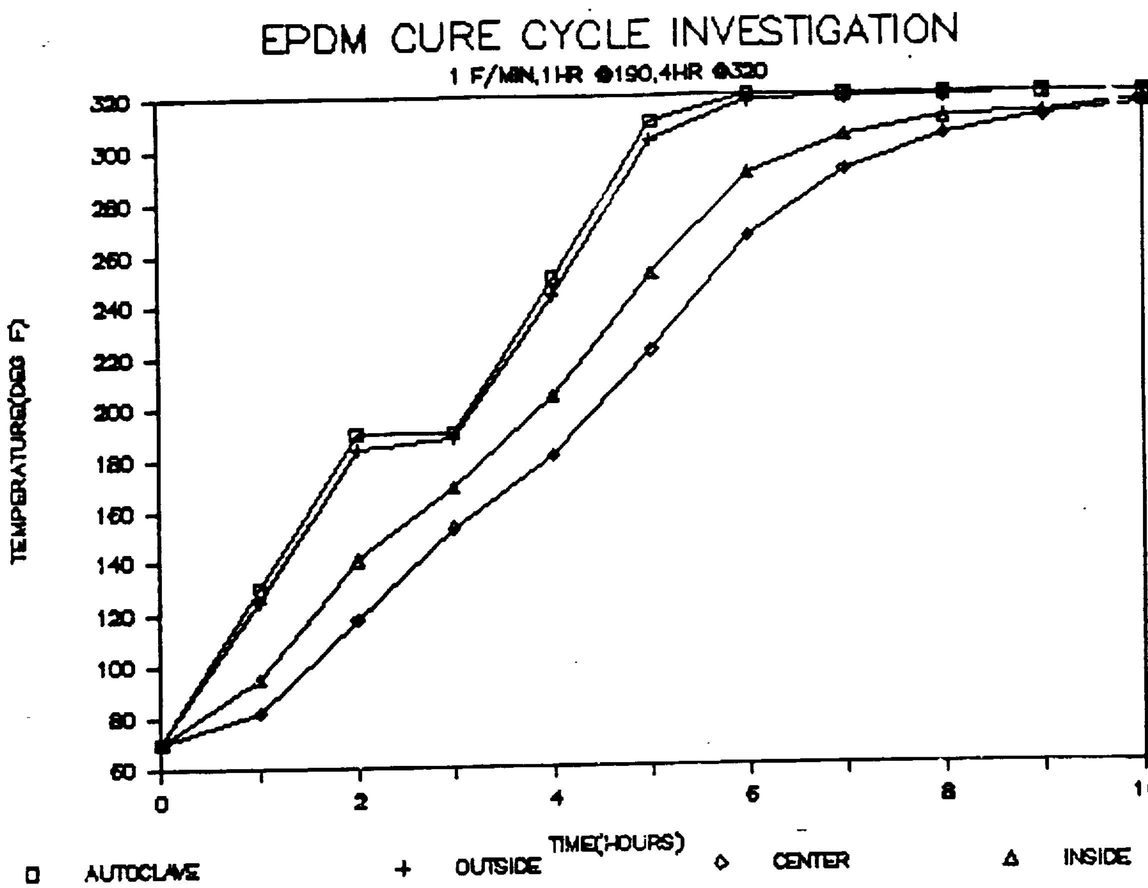


FIGURE 4

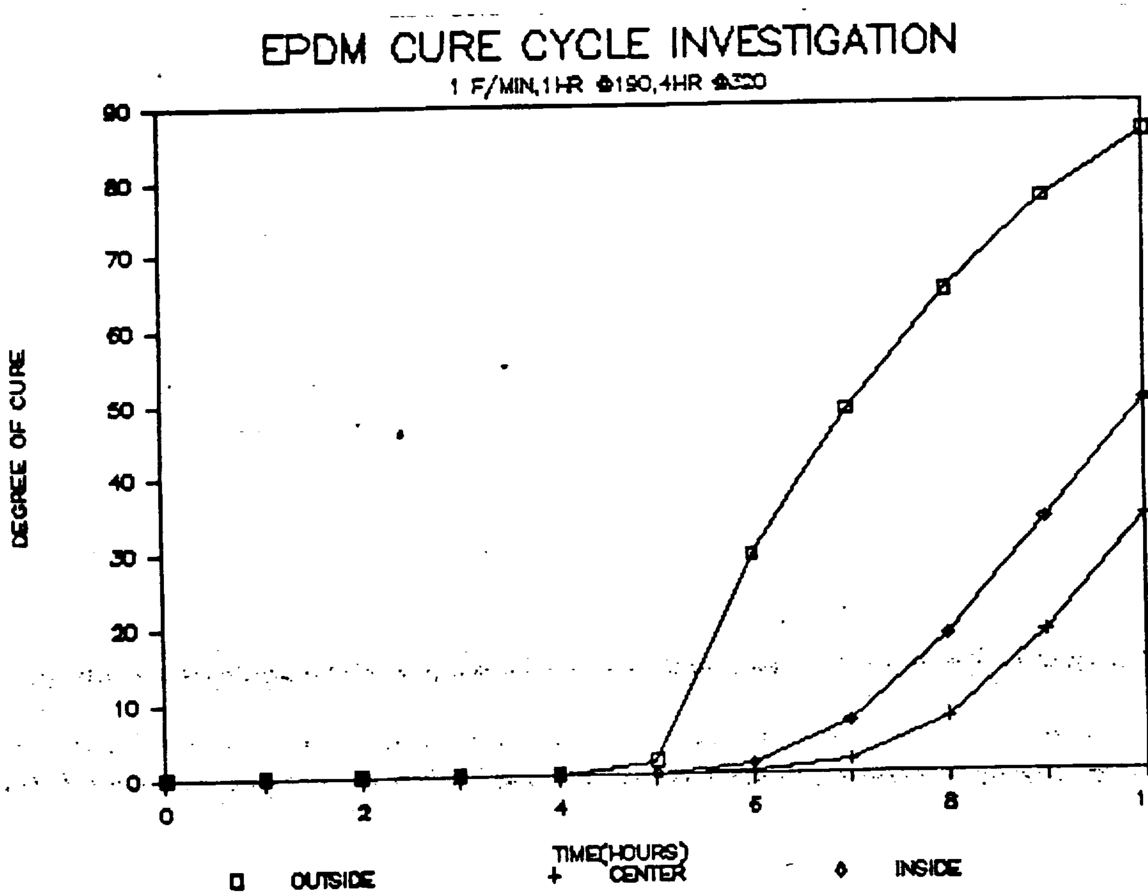


FIGURE 5

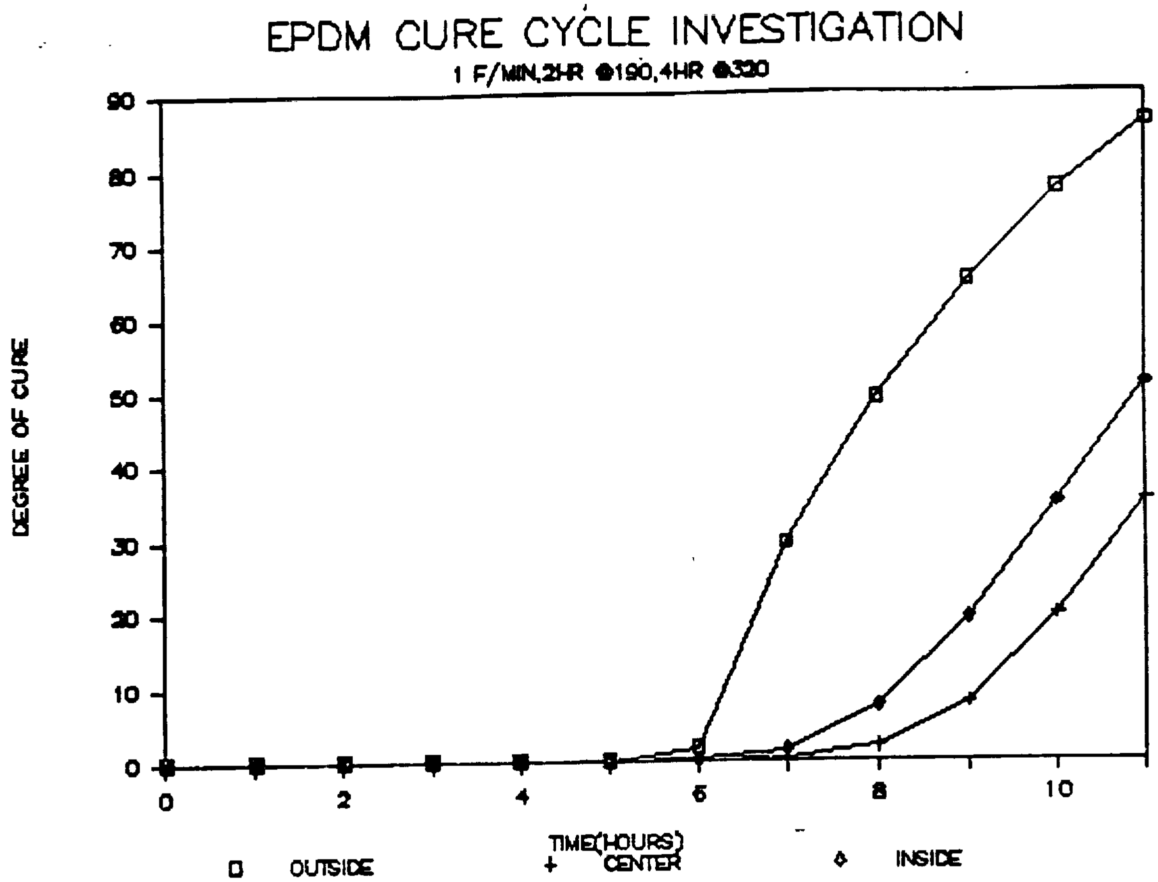


FIGURE 6

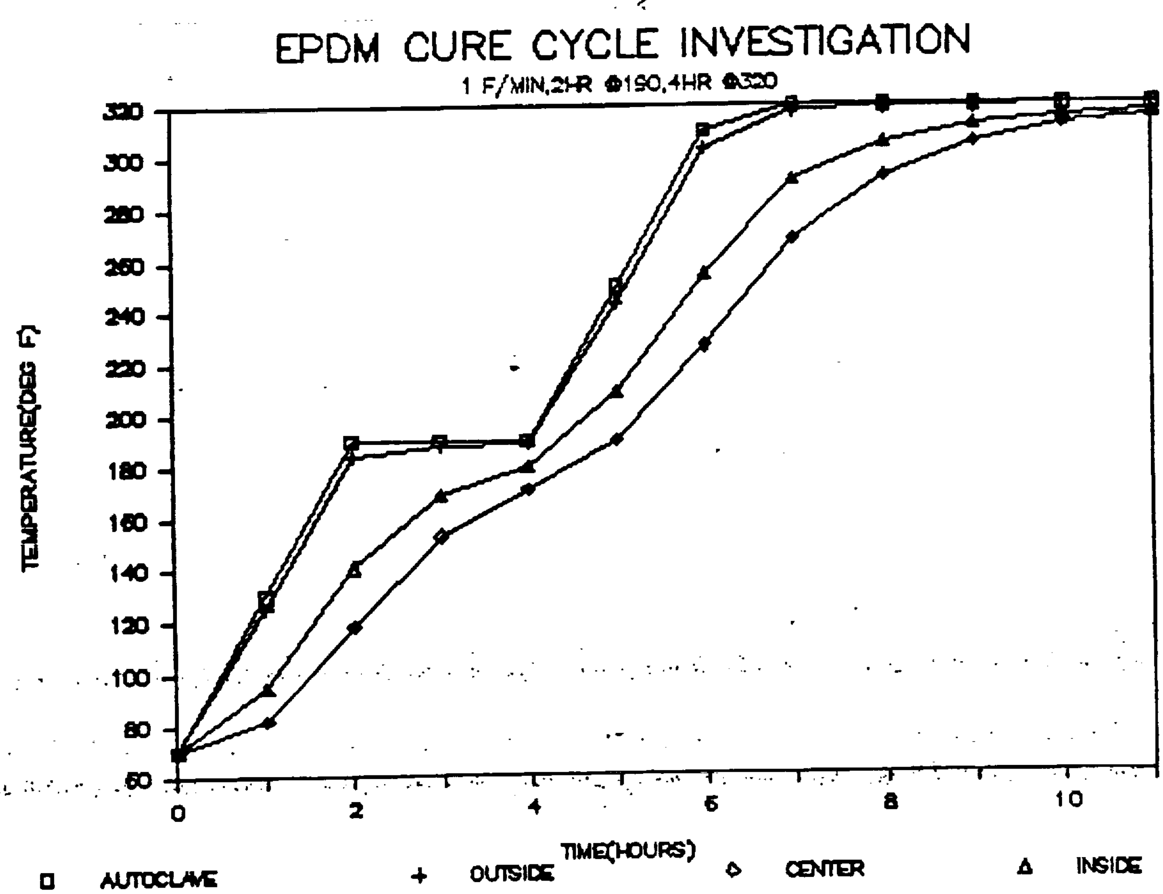


FIGURE 7

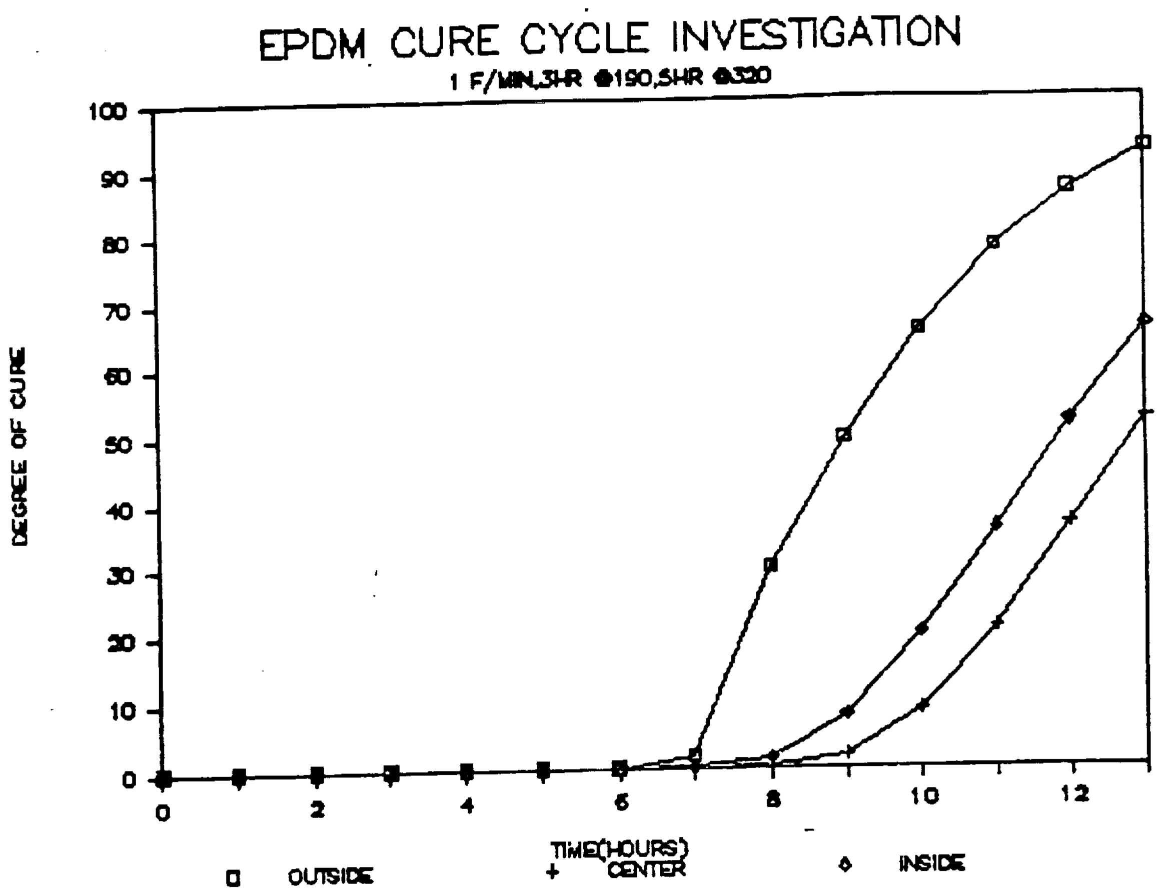


FIGURE 8

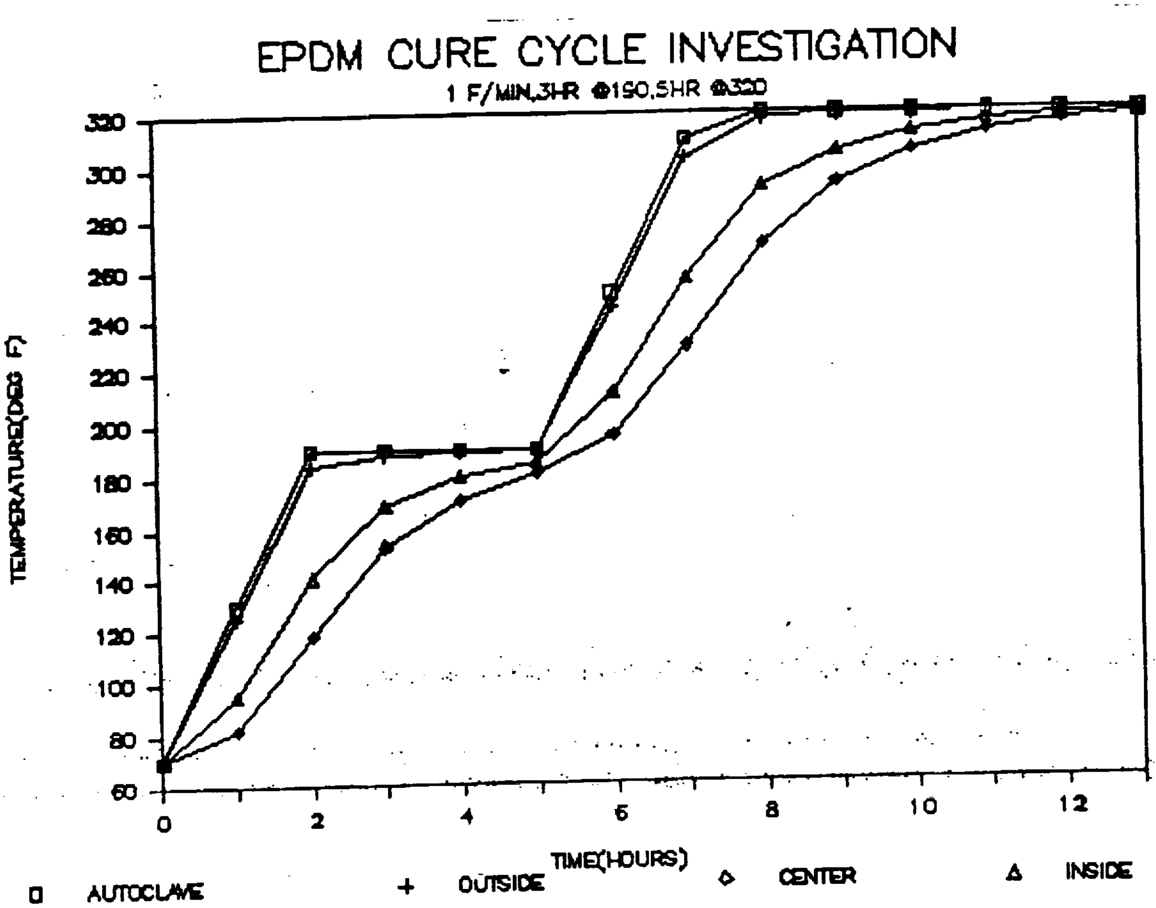


FIGURE 9

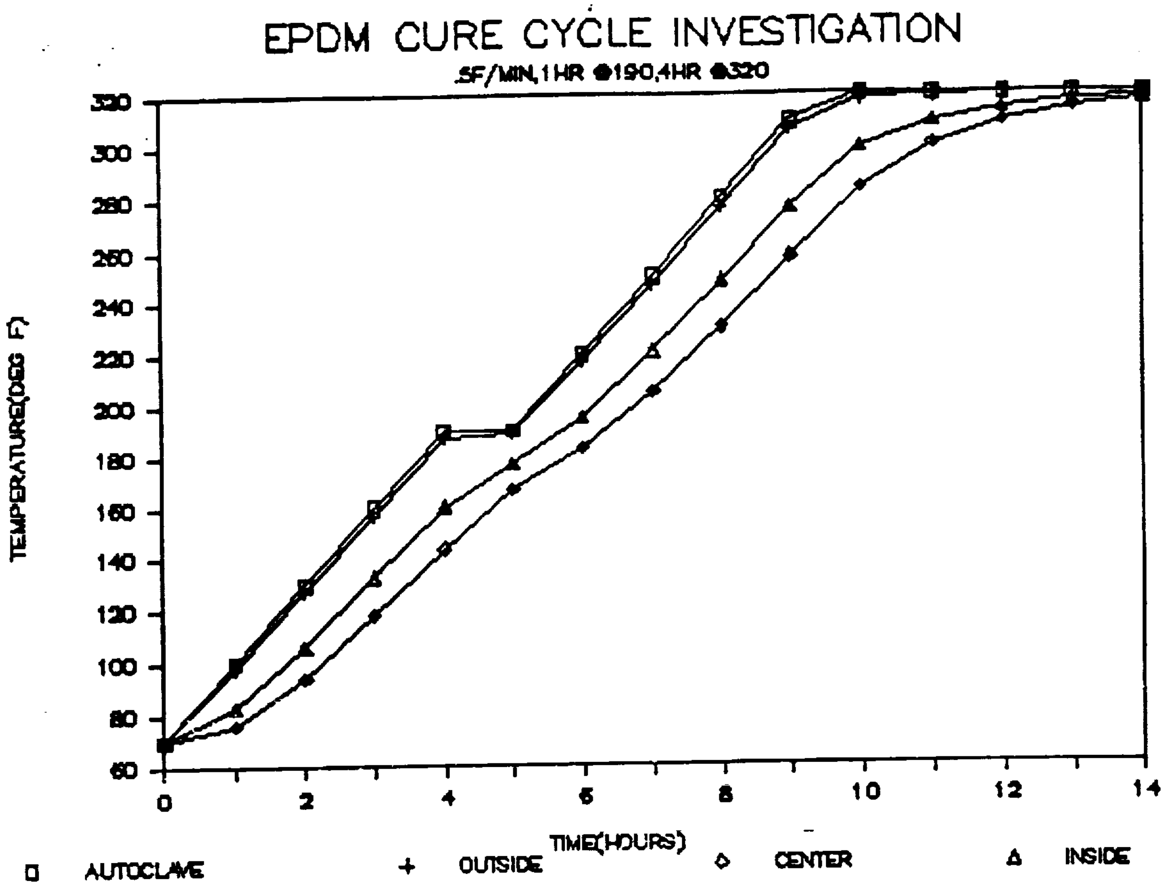


FIGURE 10

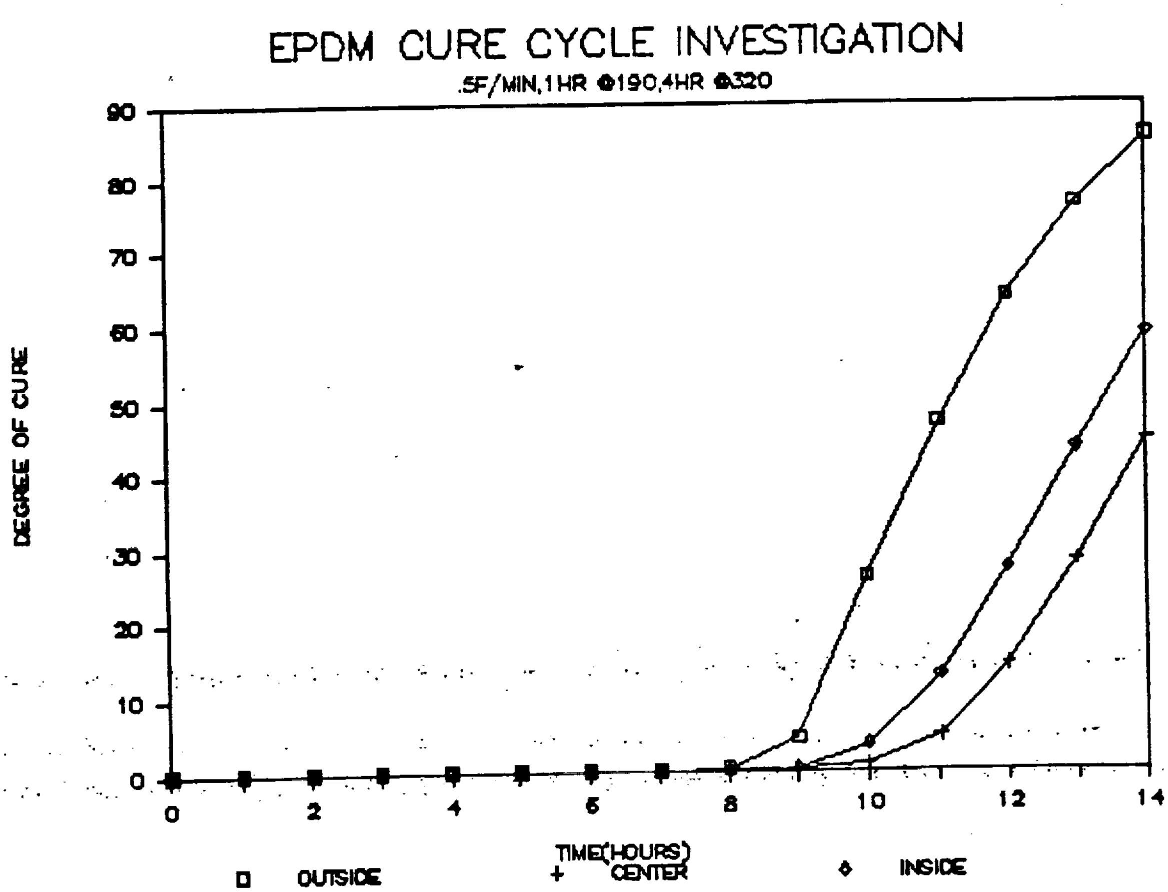
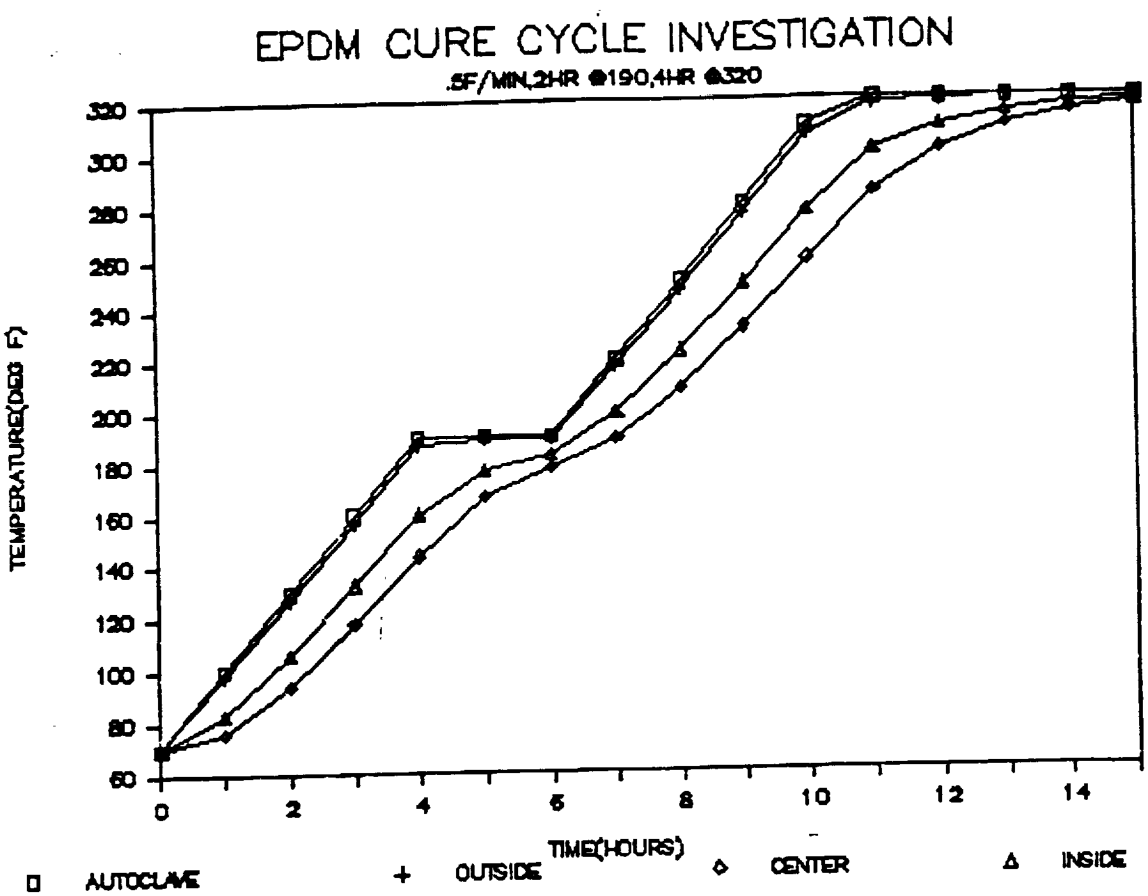


FIGURE 11



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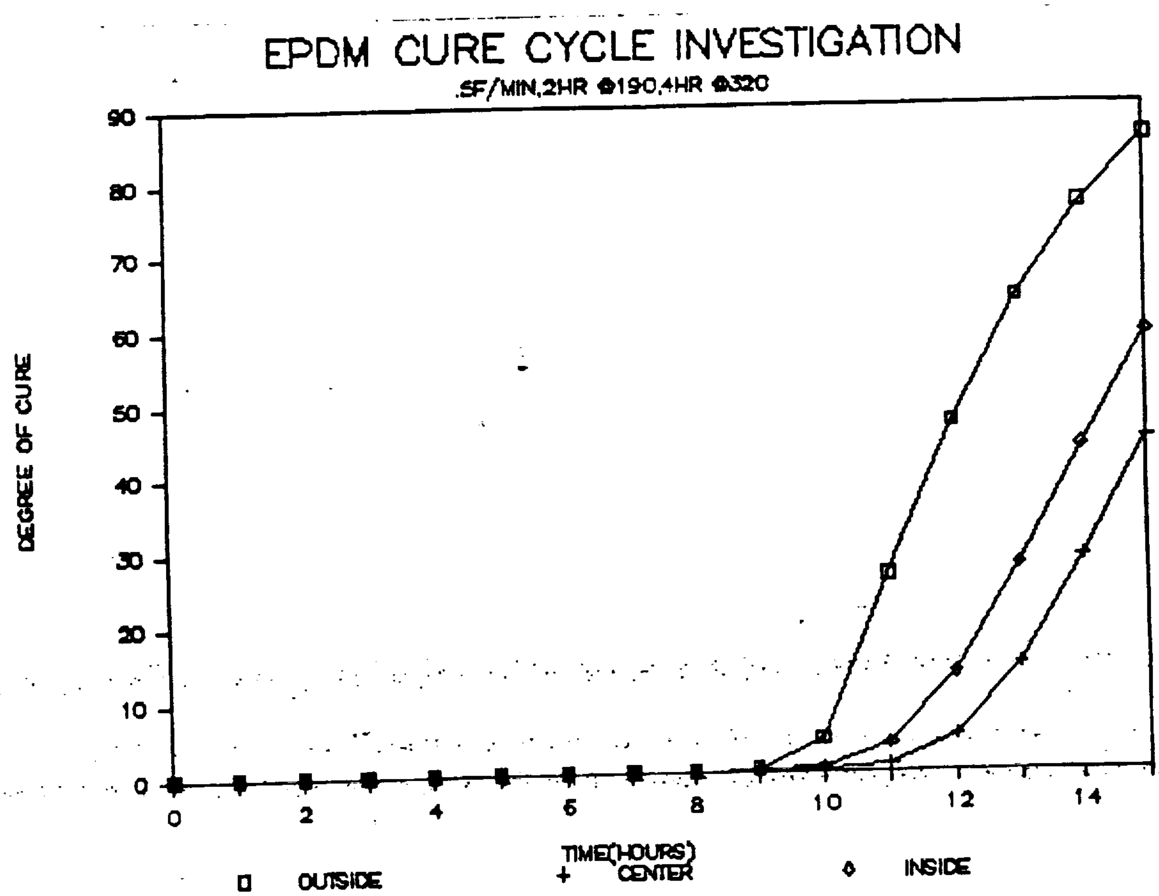


FIGURE 13

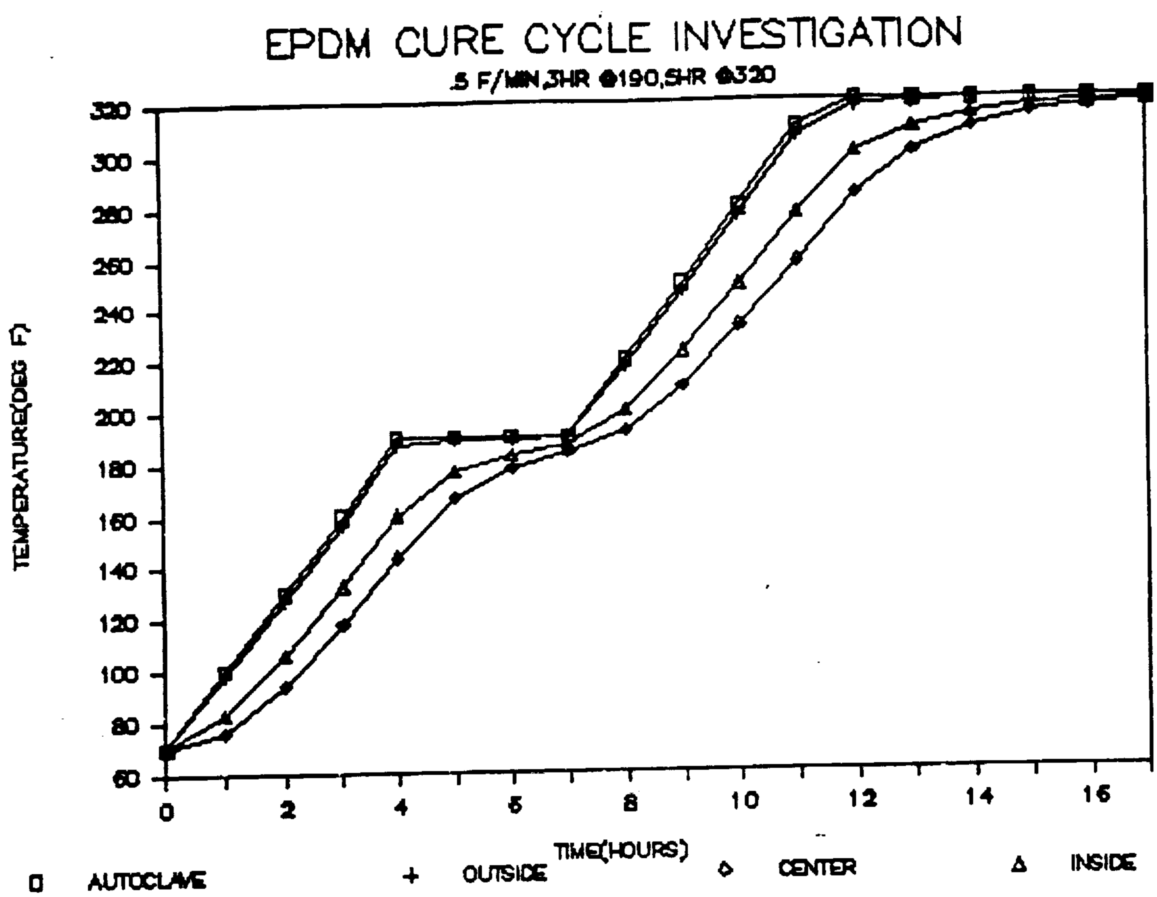


FIGURE 14

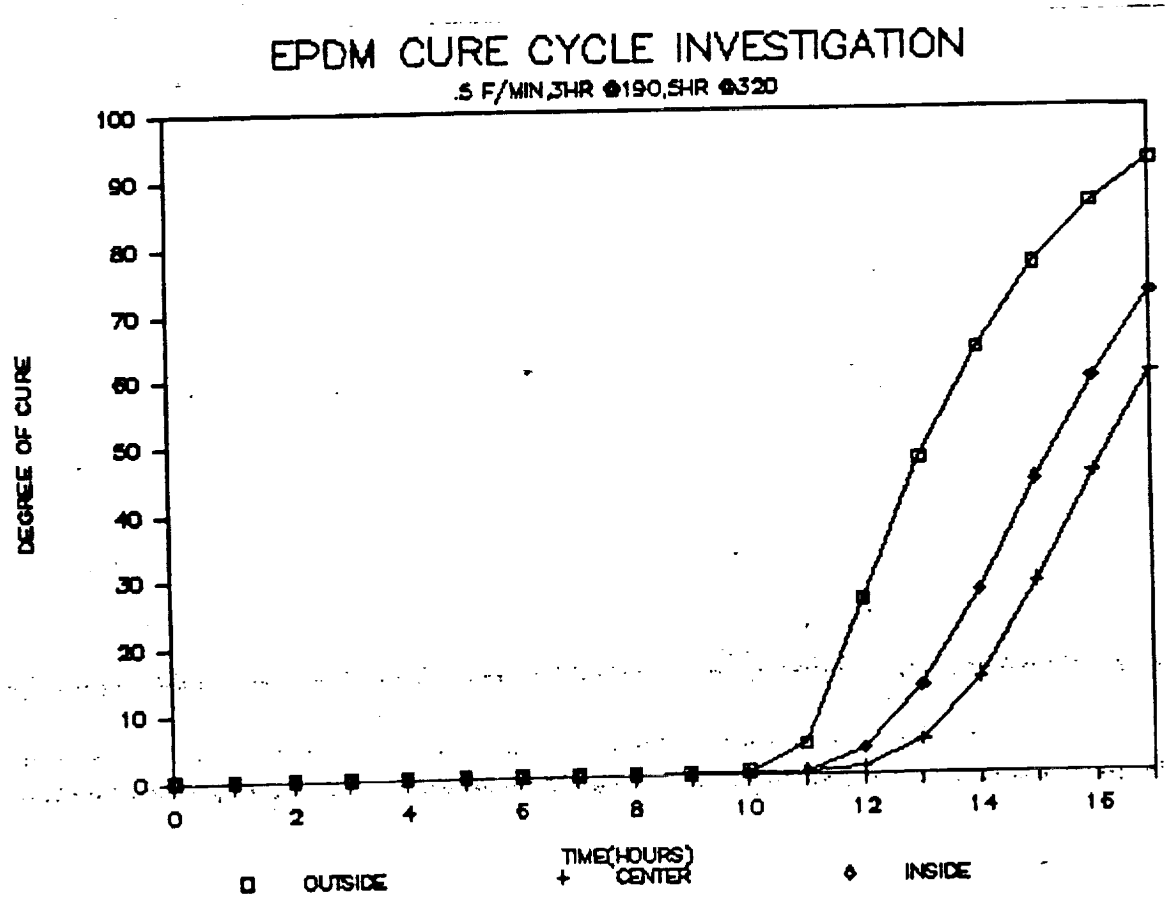


FIGURE 15

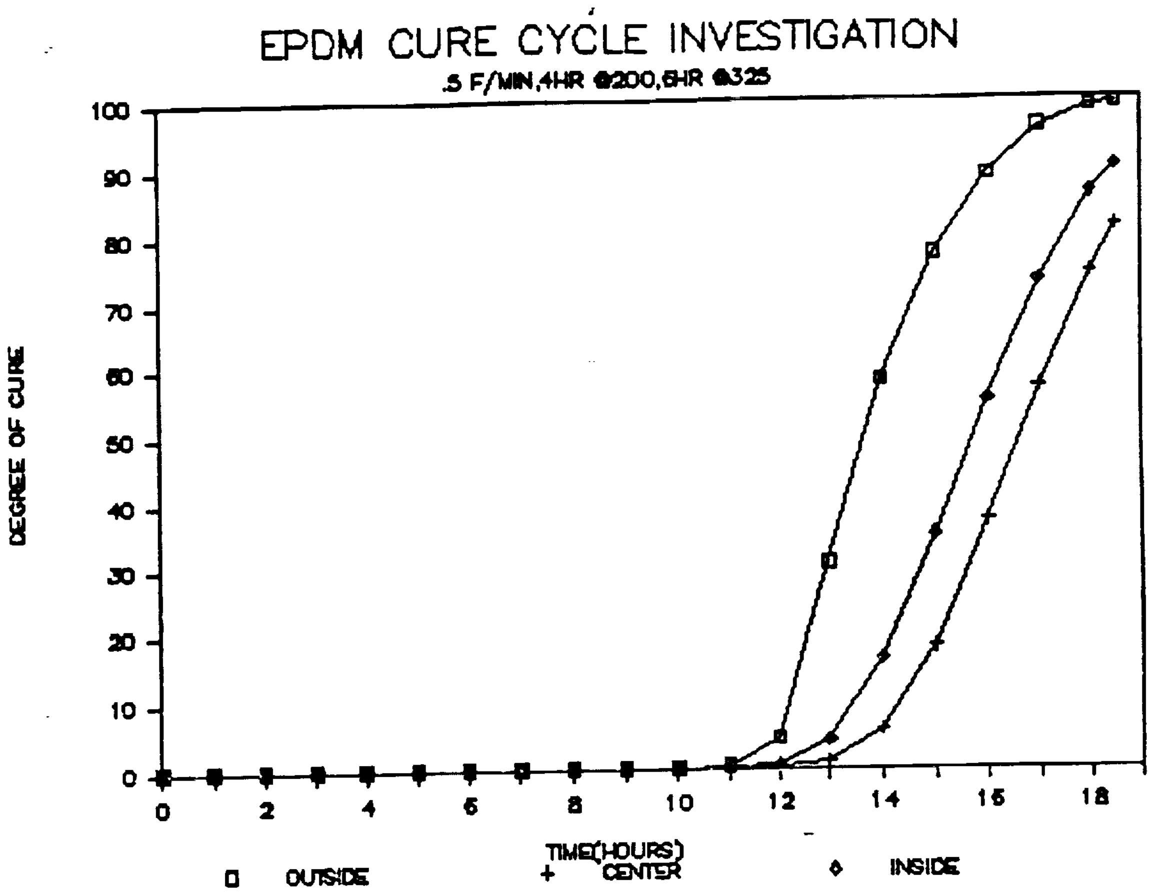


FIGURE 16

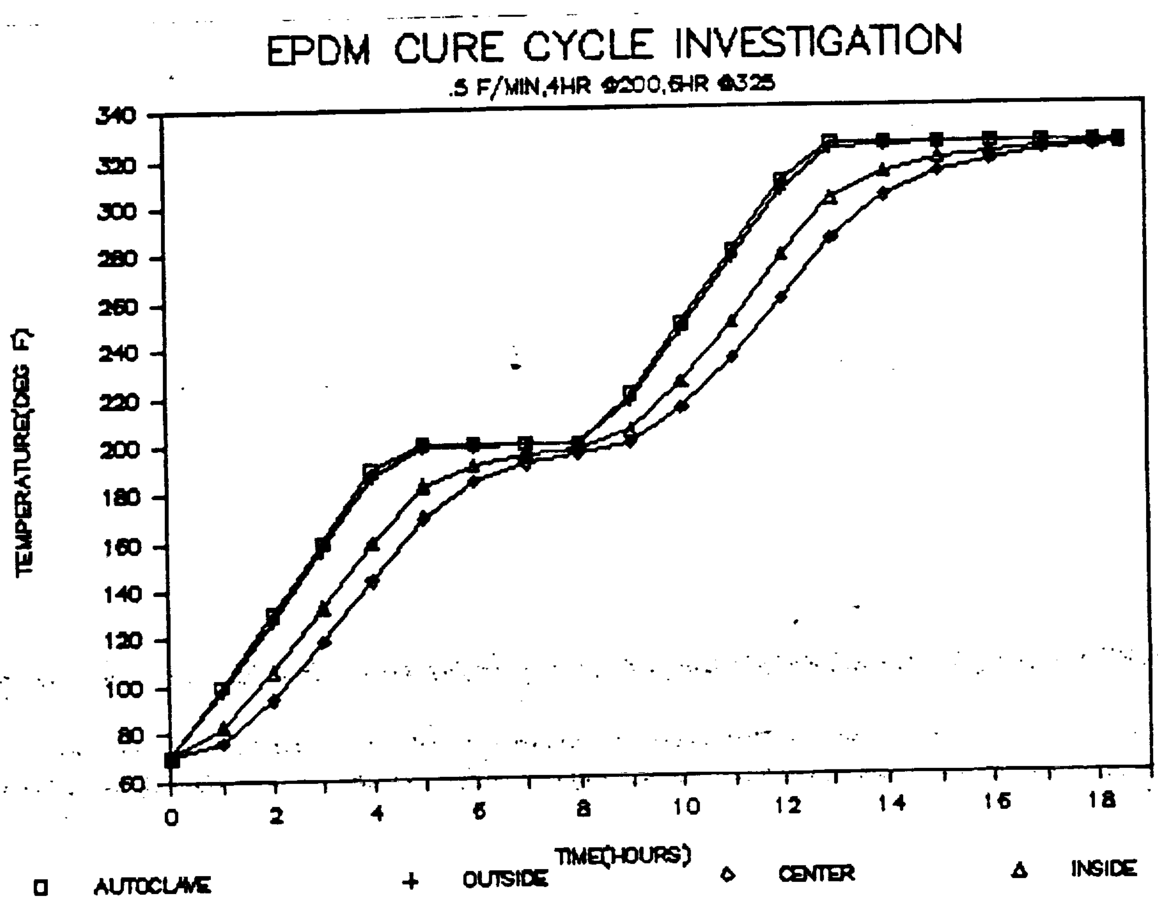


FIGURE 17

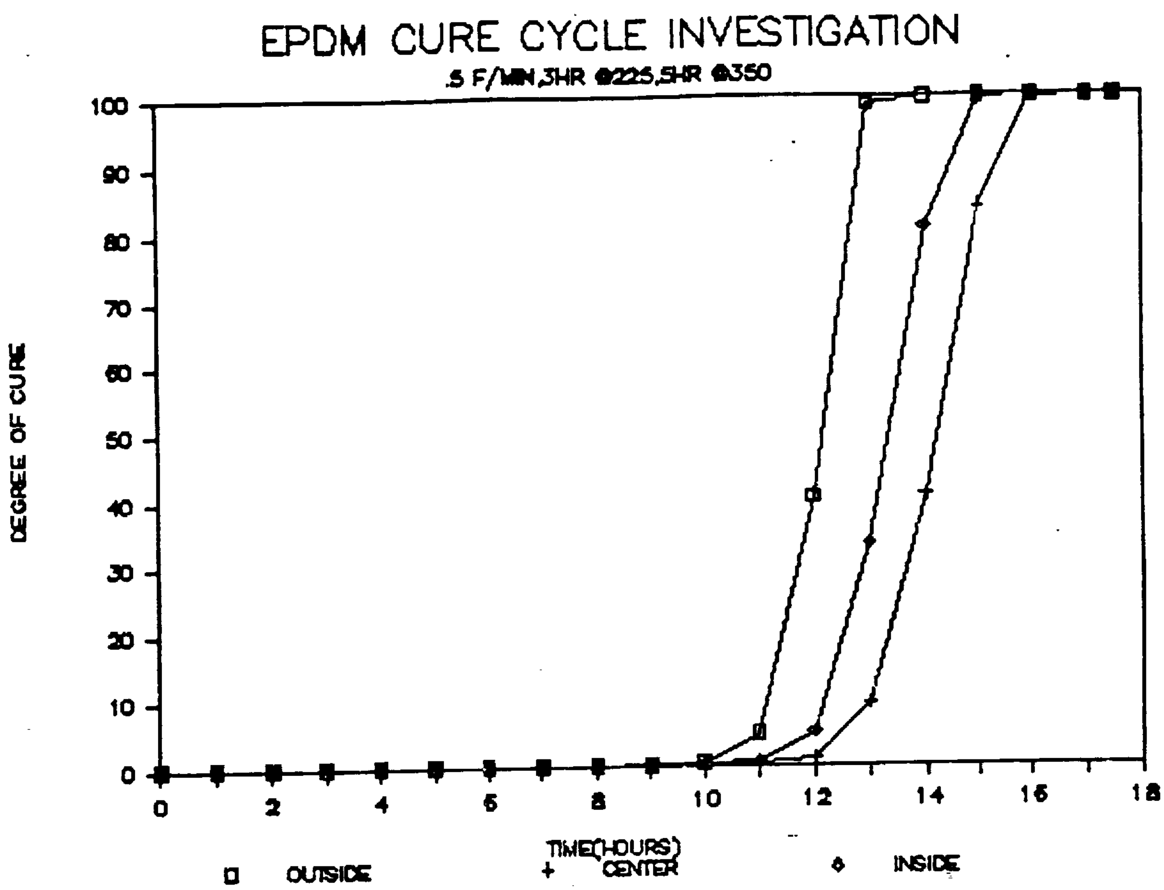


FIGURE 18

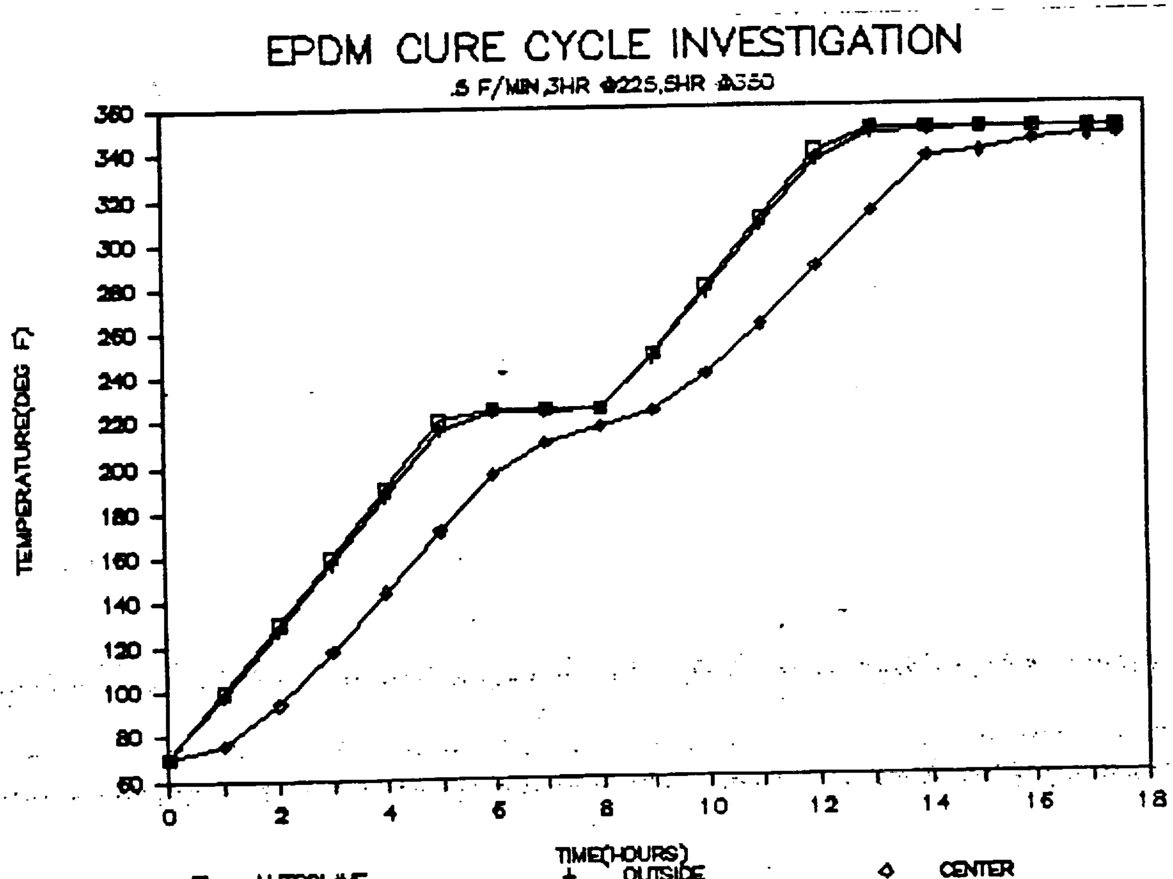


FIGURE 19

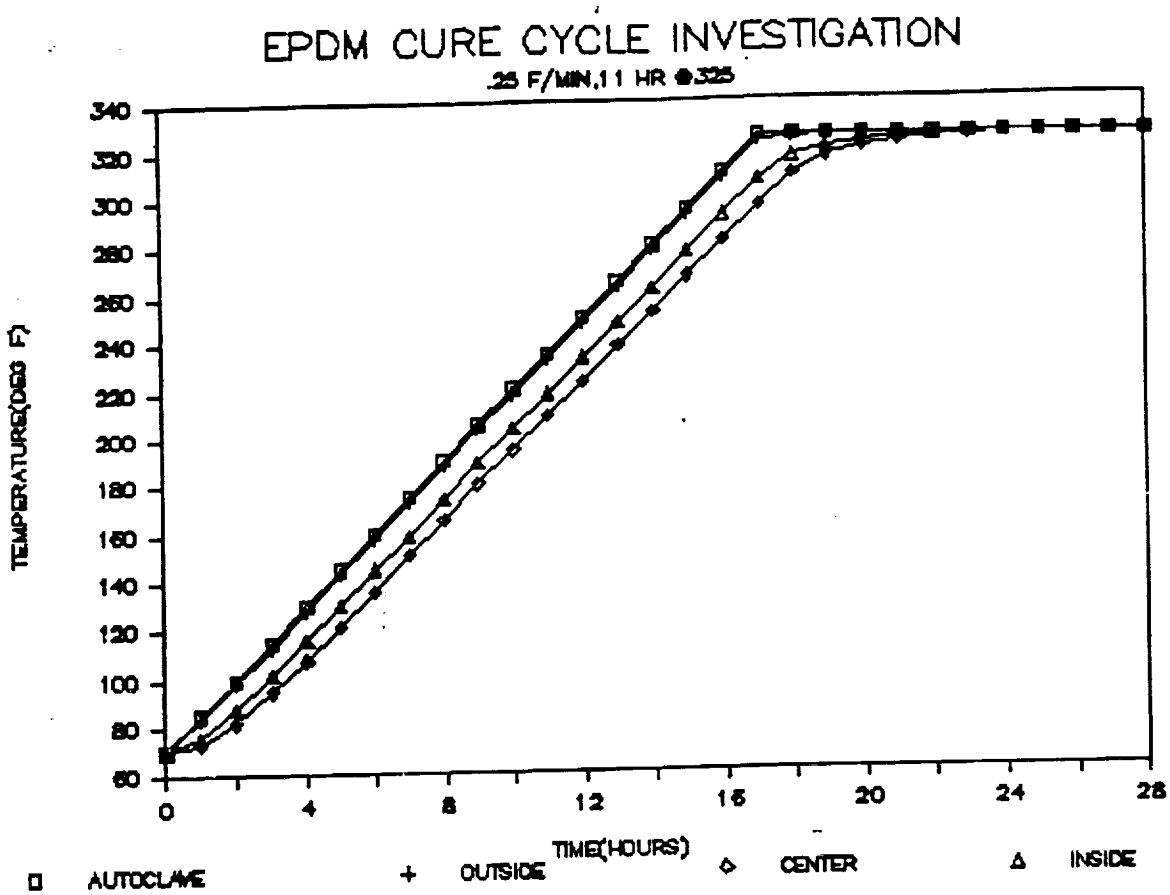


FIGURE 20

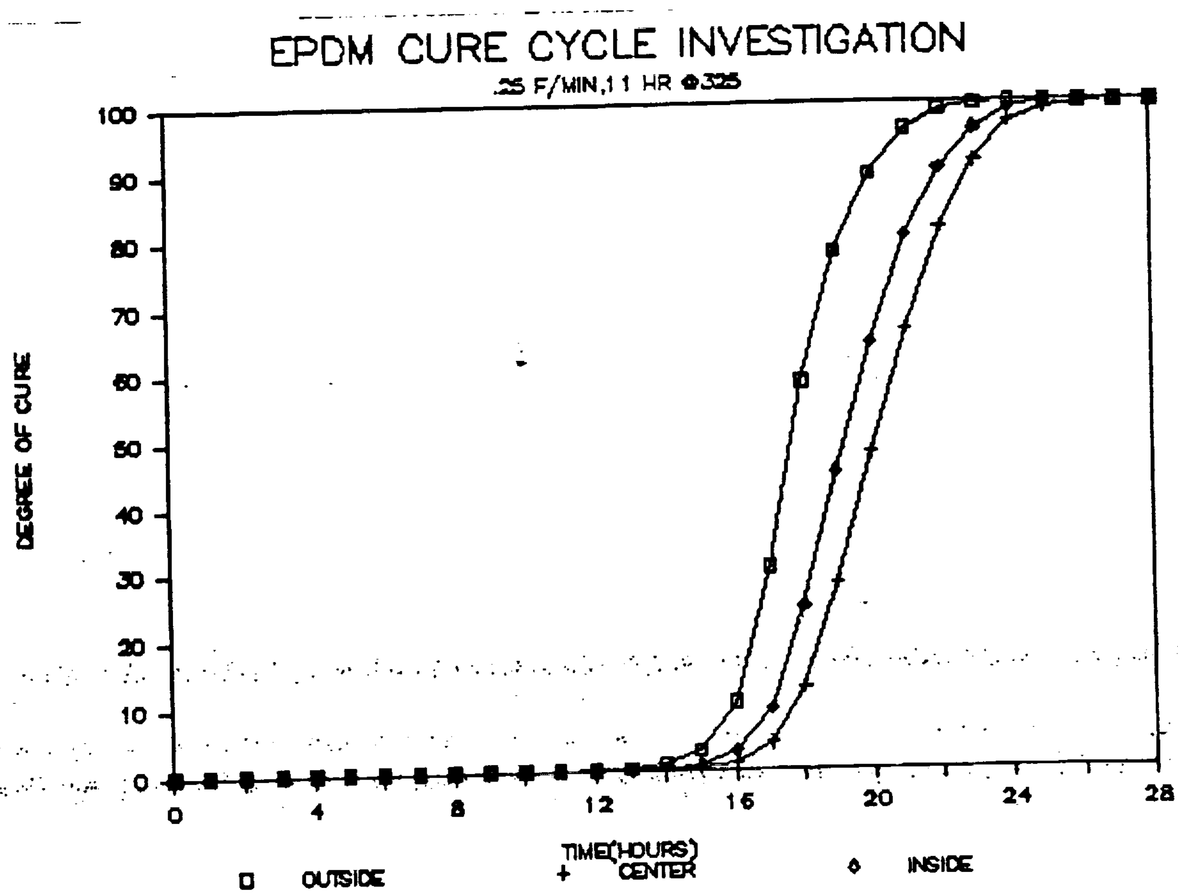


FIGURE 21

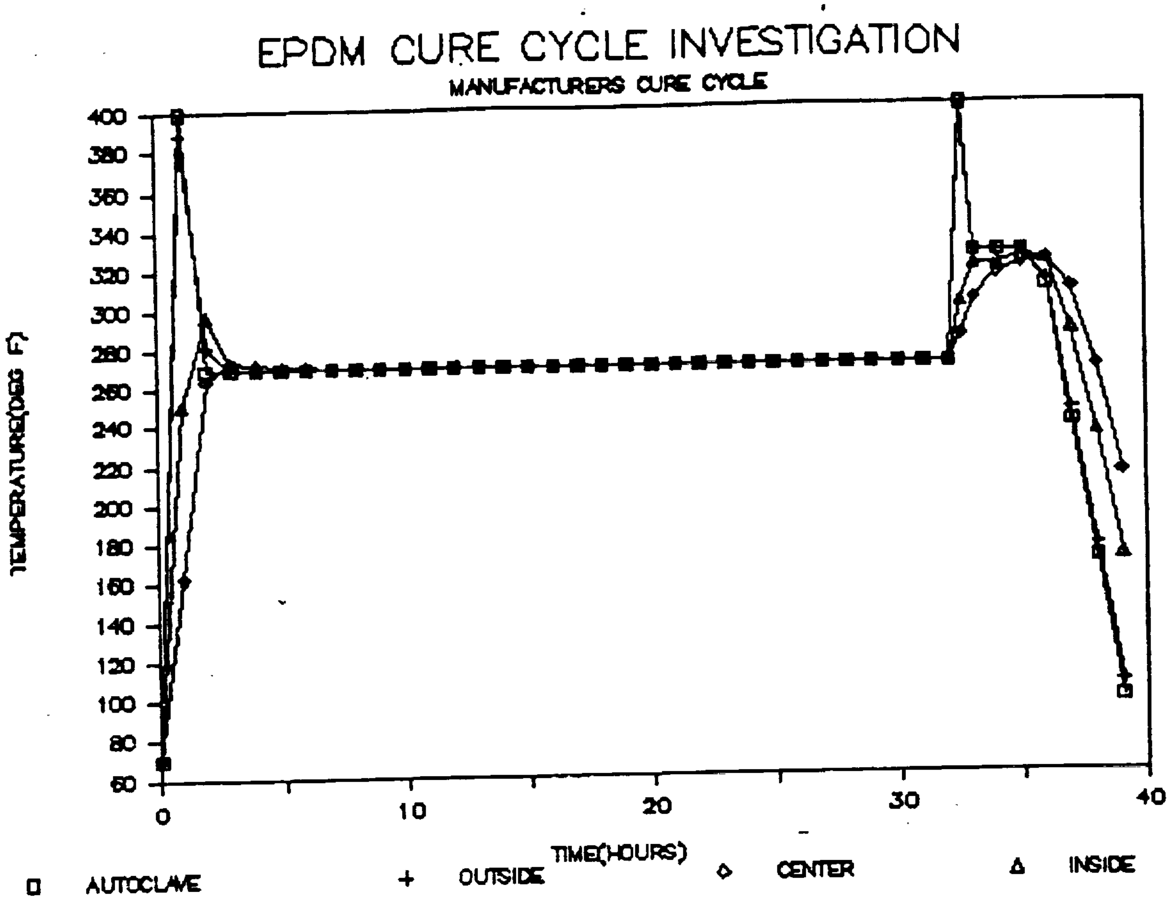


FIGURE 22

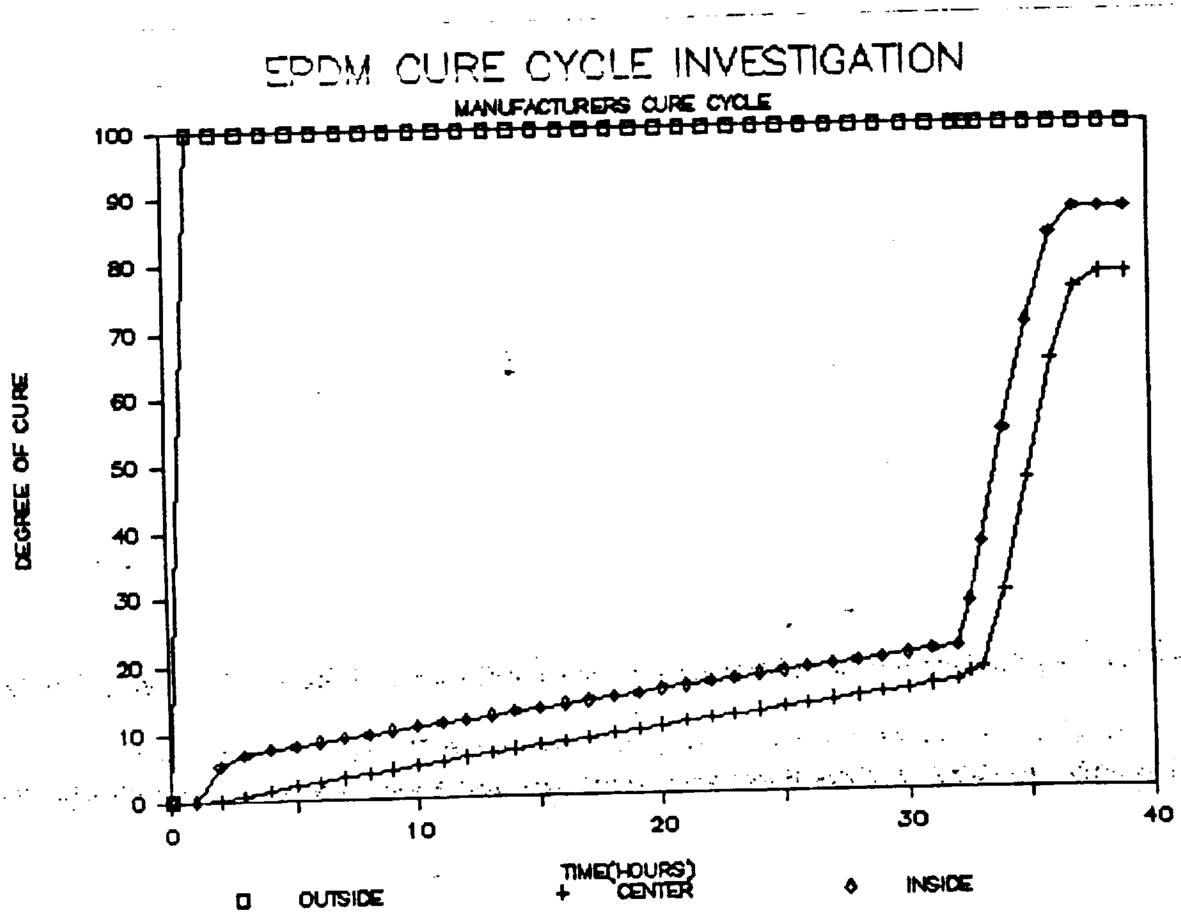


FIGURE 23

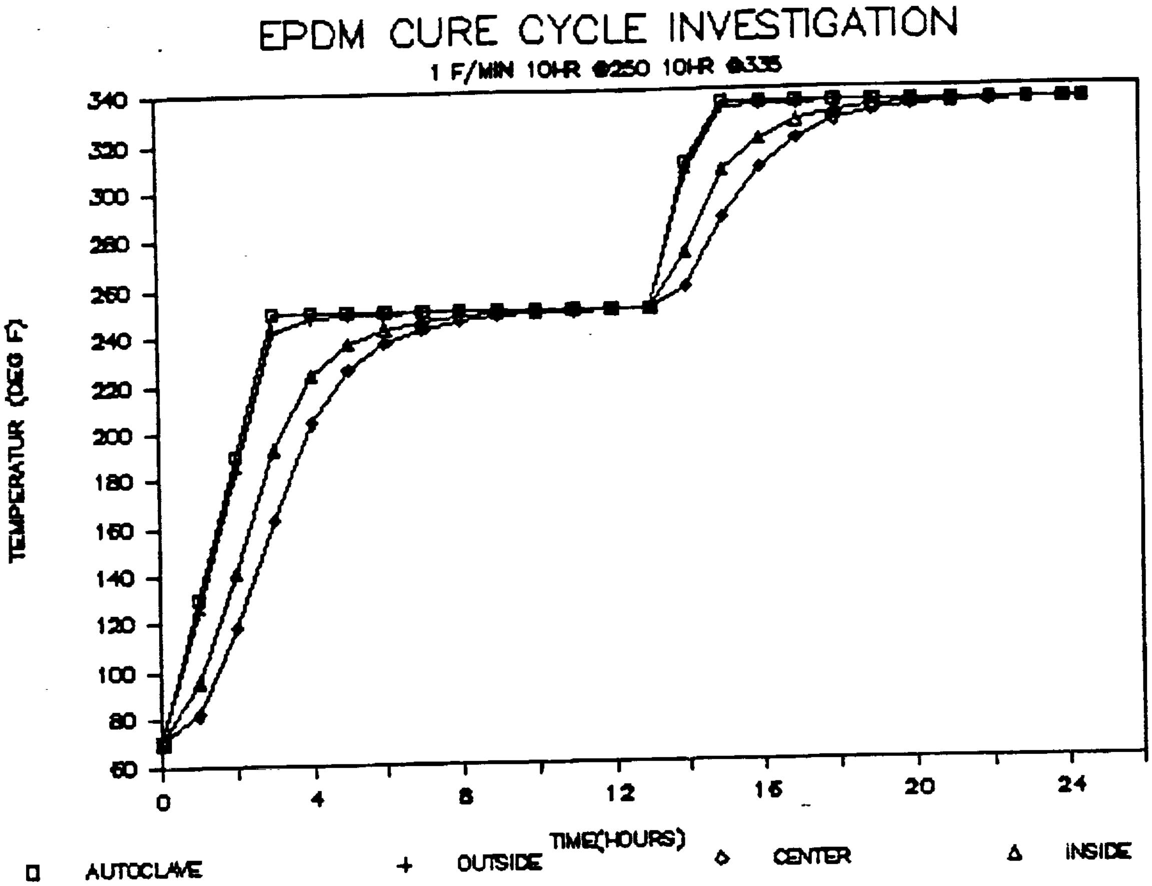


FIGURE 24

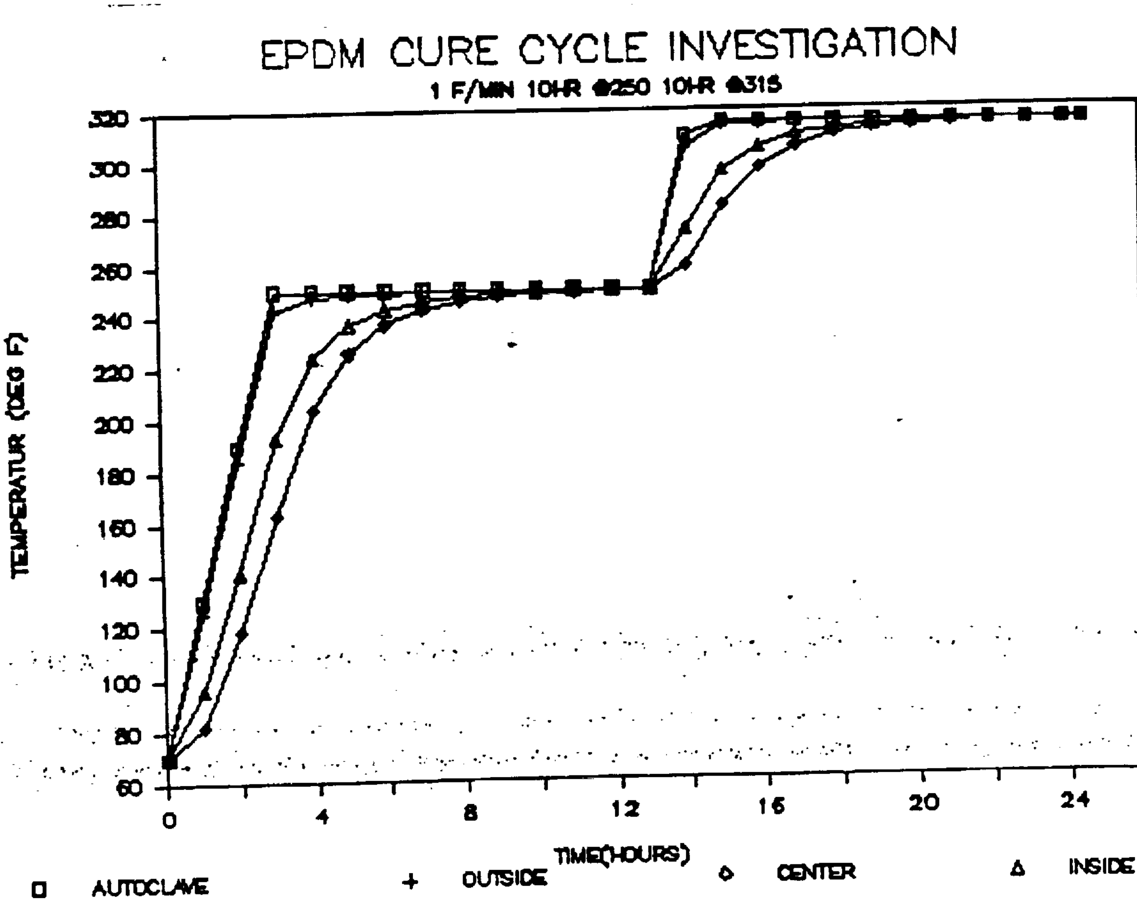
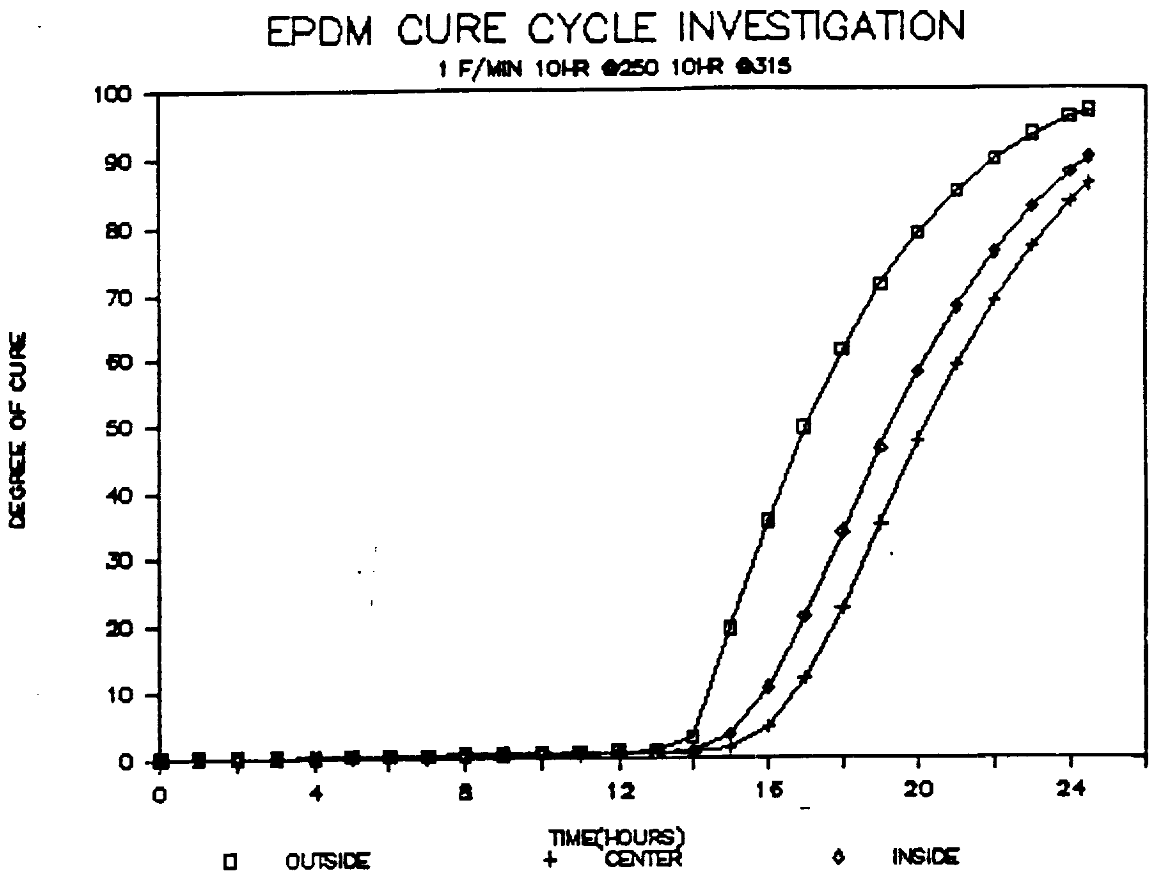


FIGURE 25



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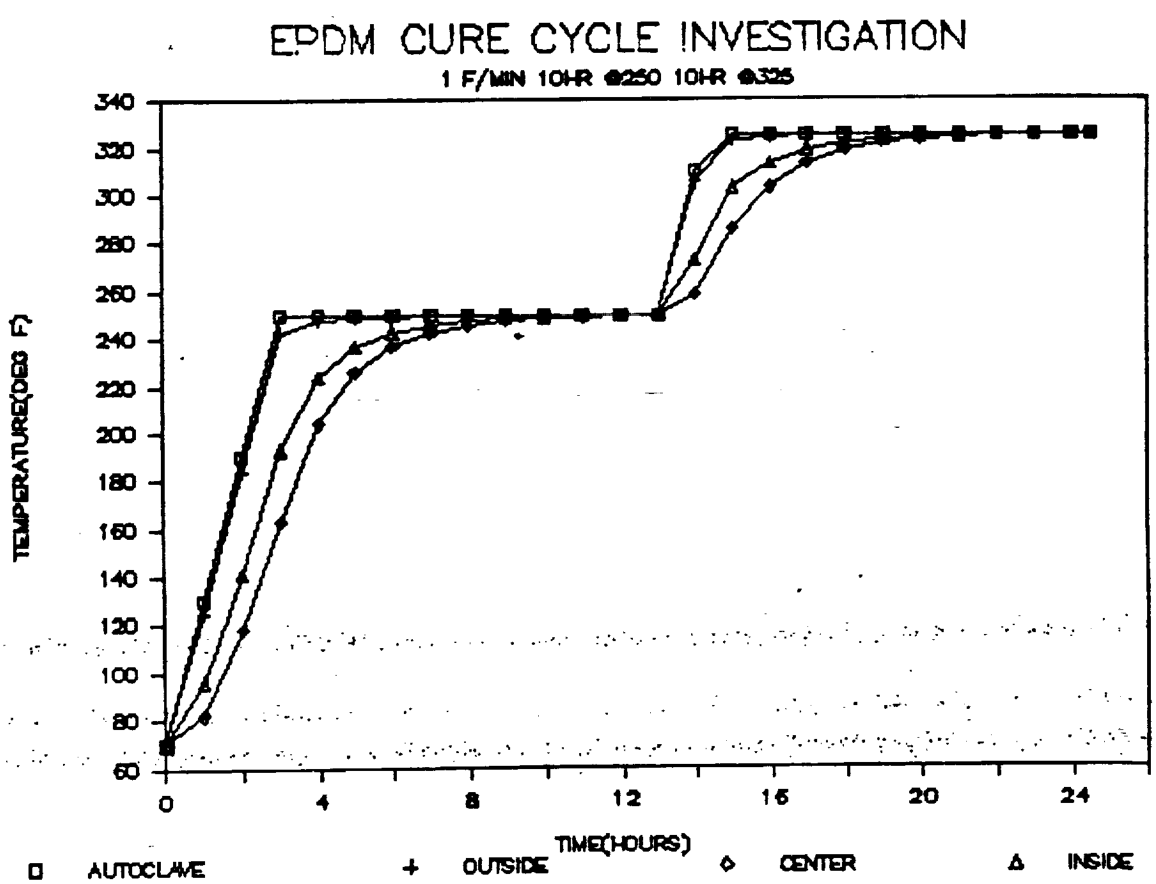

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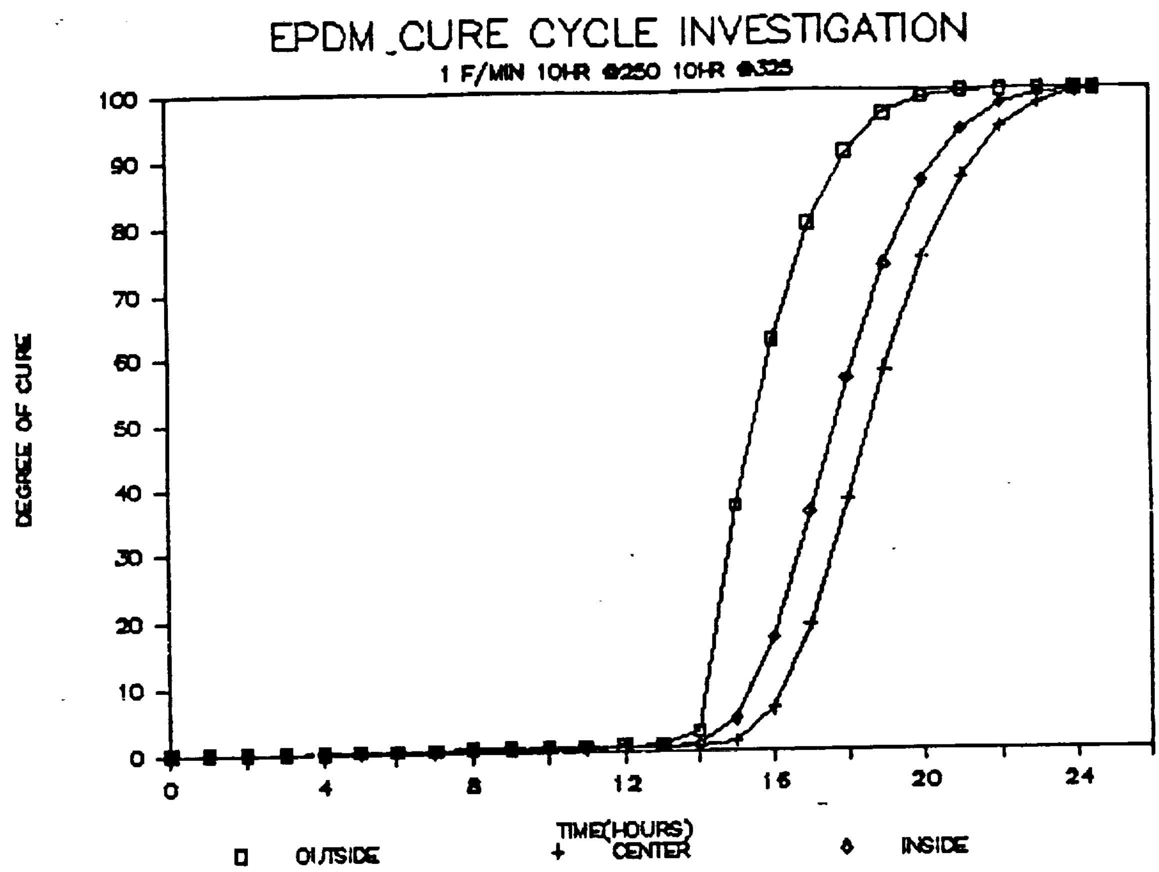


FIGURE 28

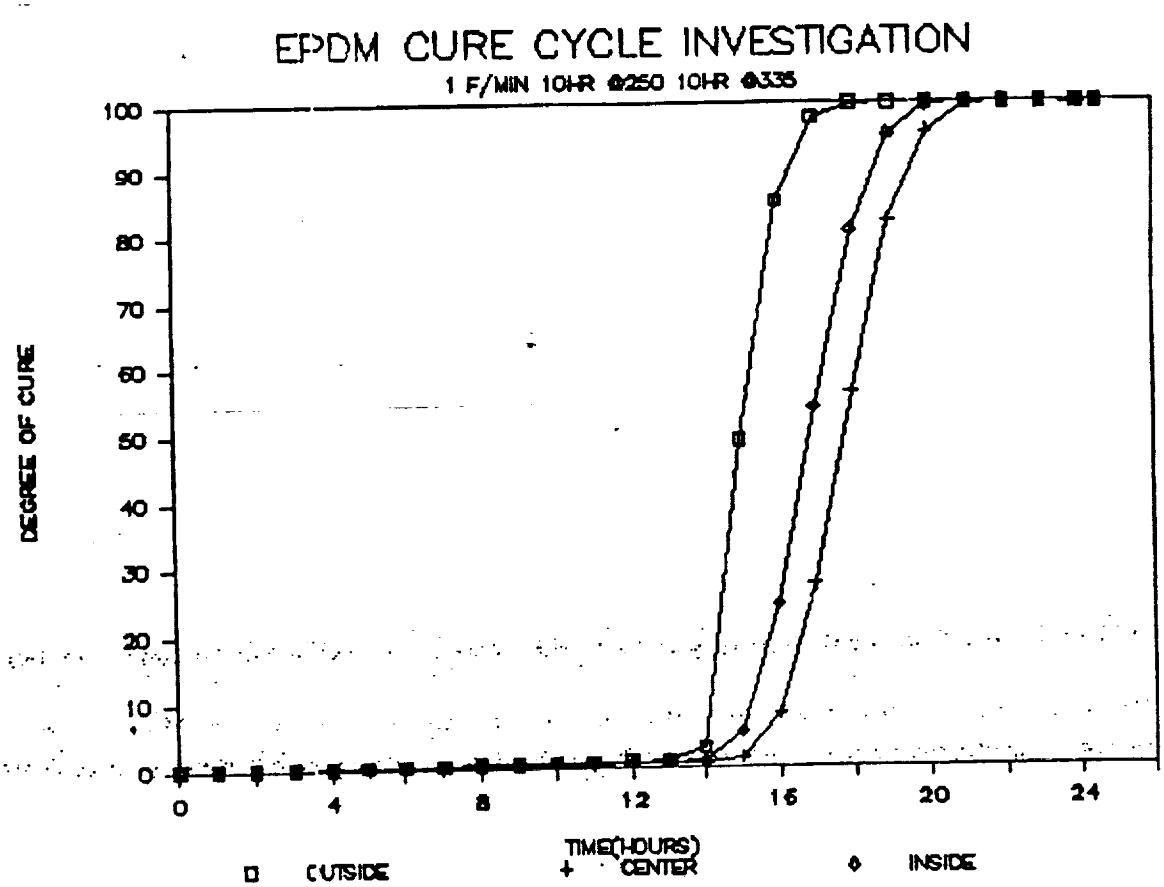


FIGURE 29

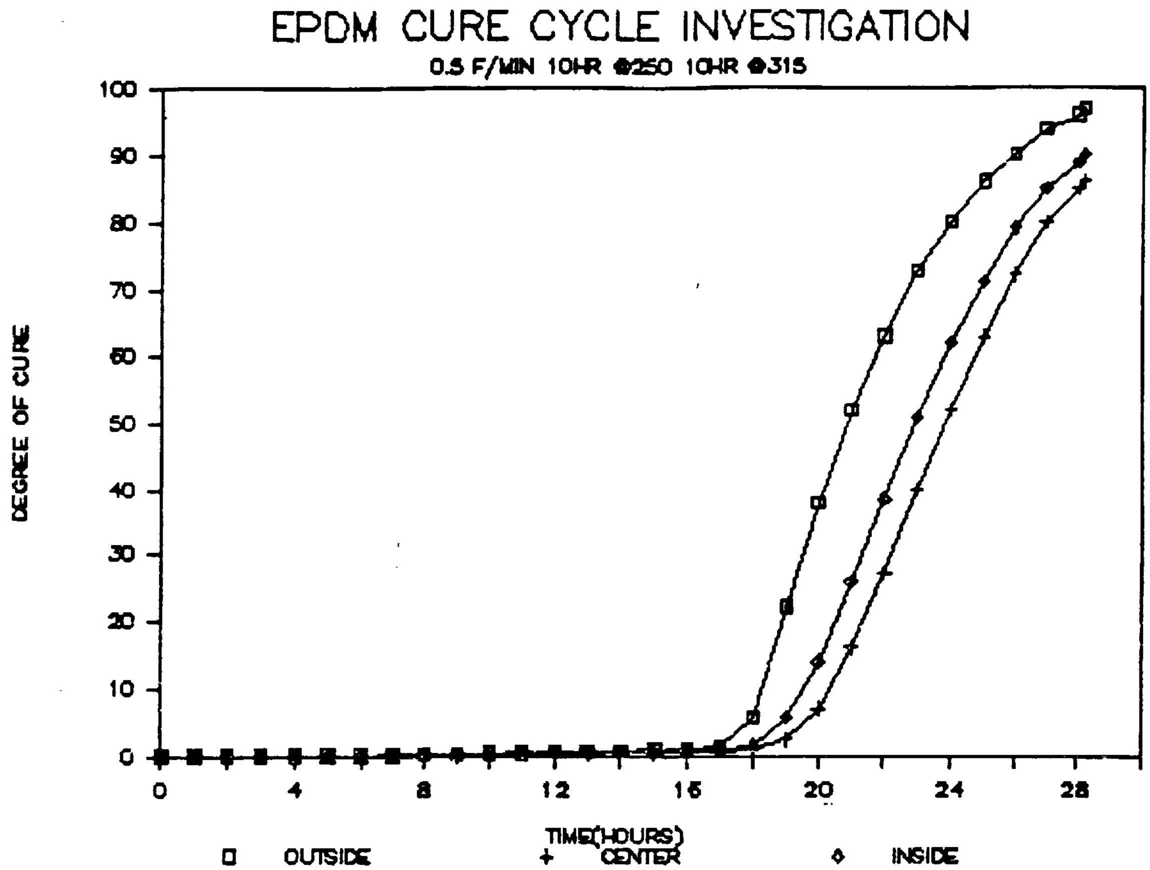


FIGURE 30

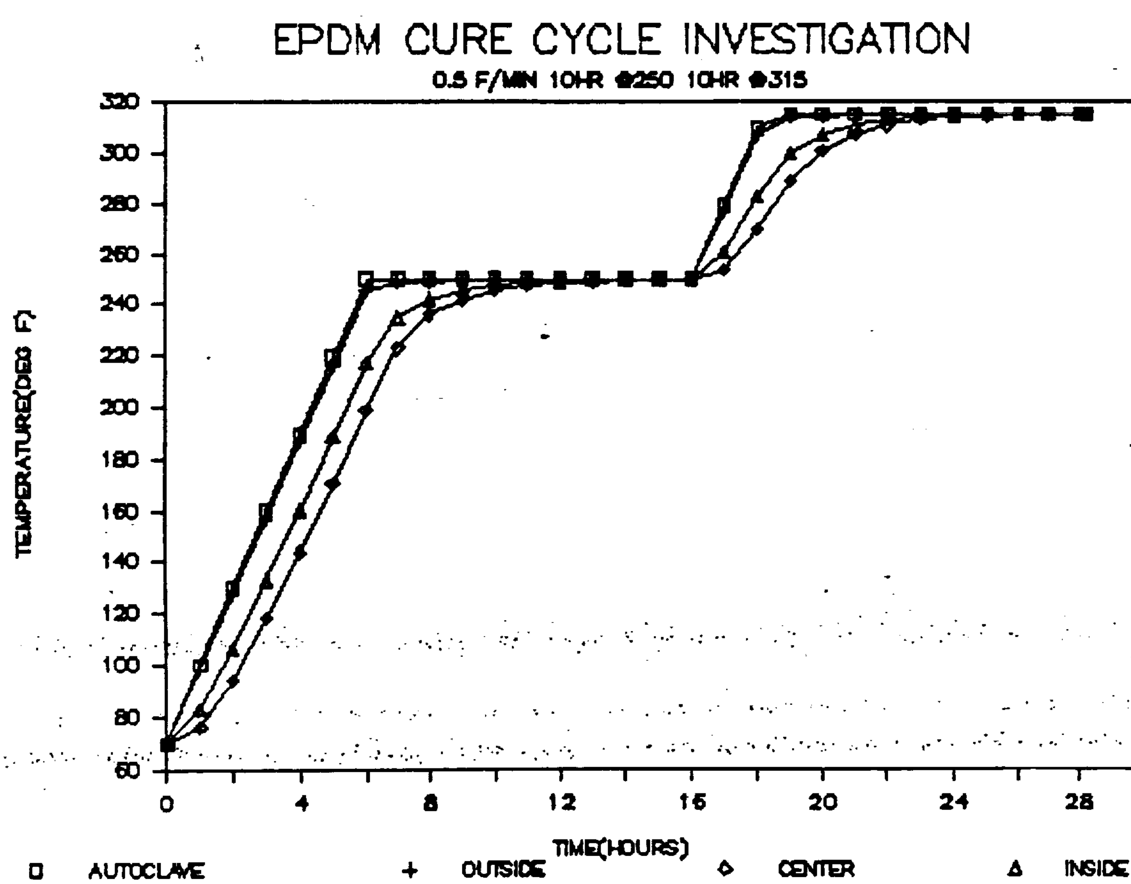


FIGURE 31

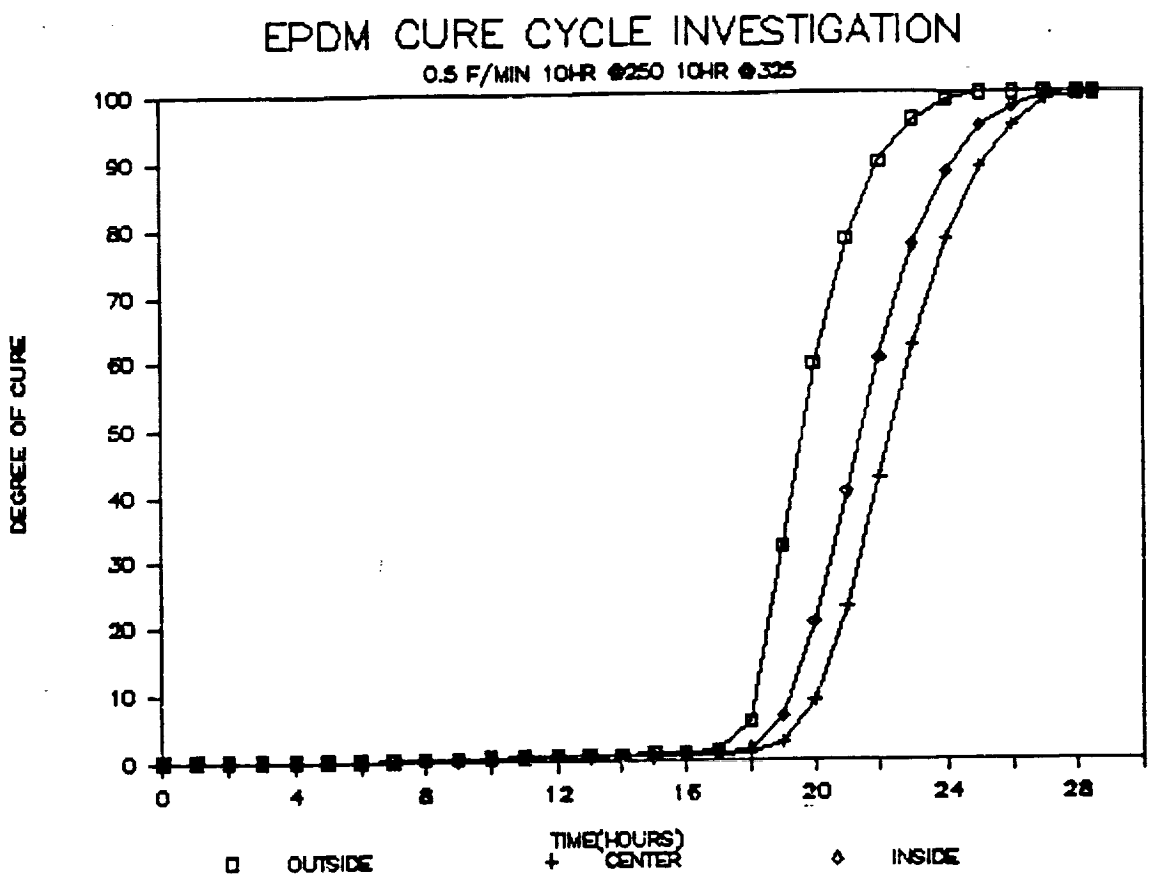


FIGURE 32

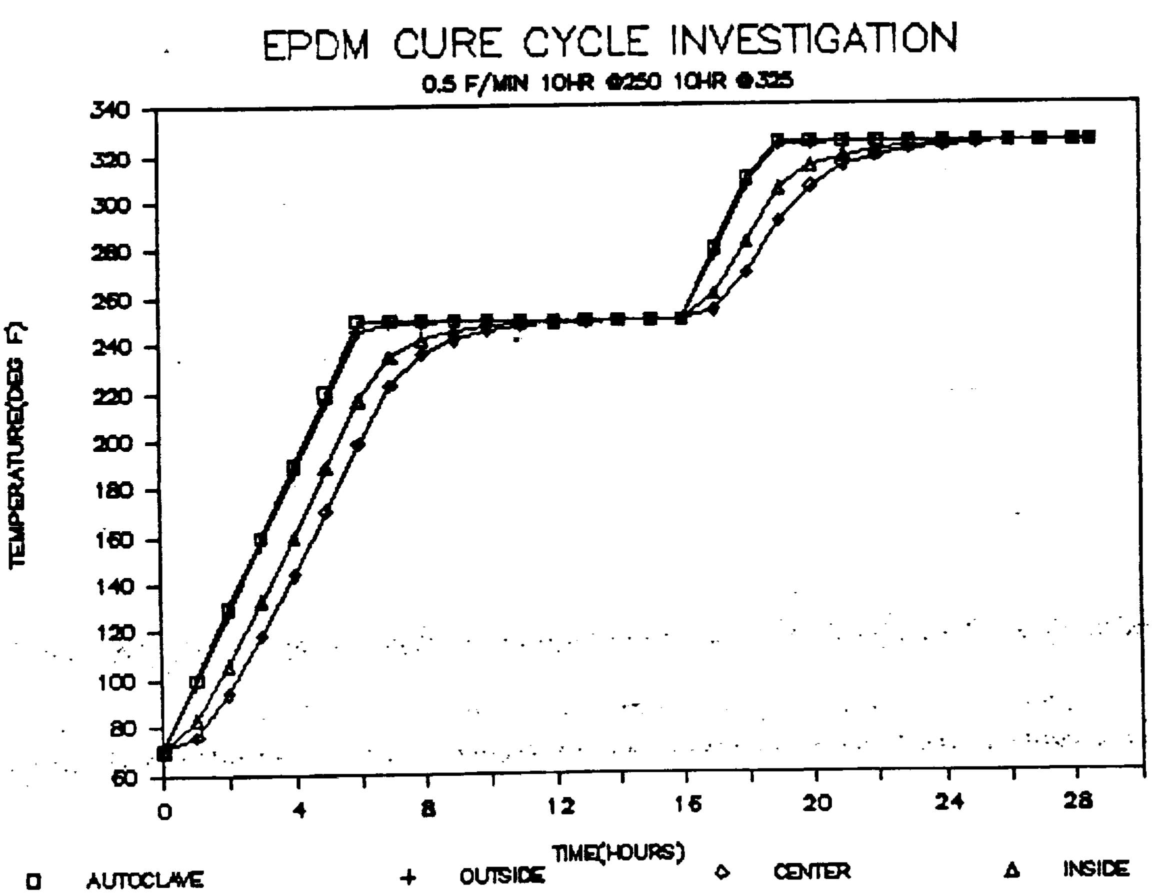


FIGURE 33

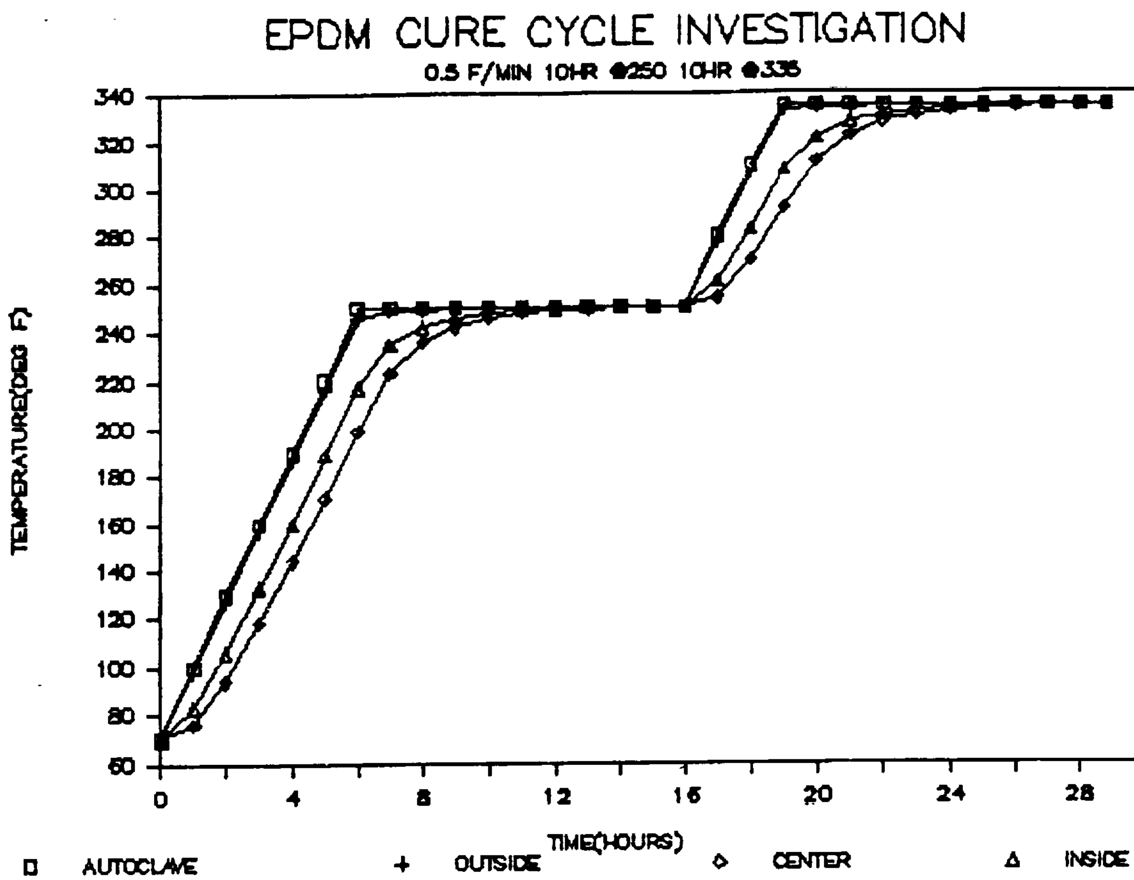


FIGURE 34

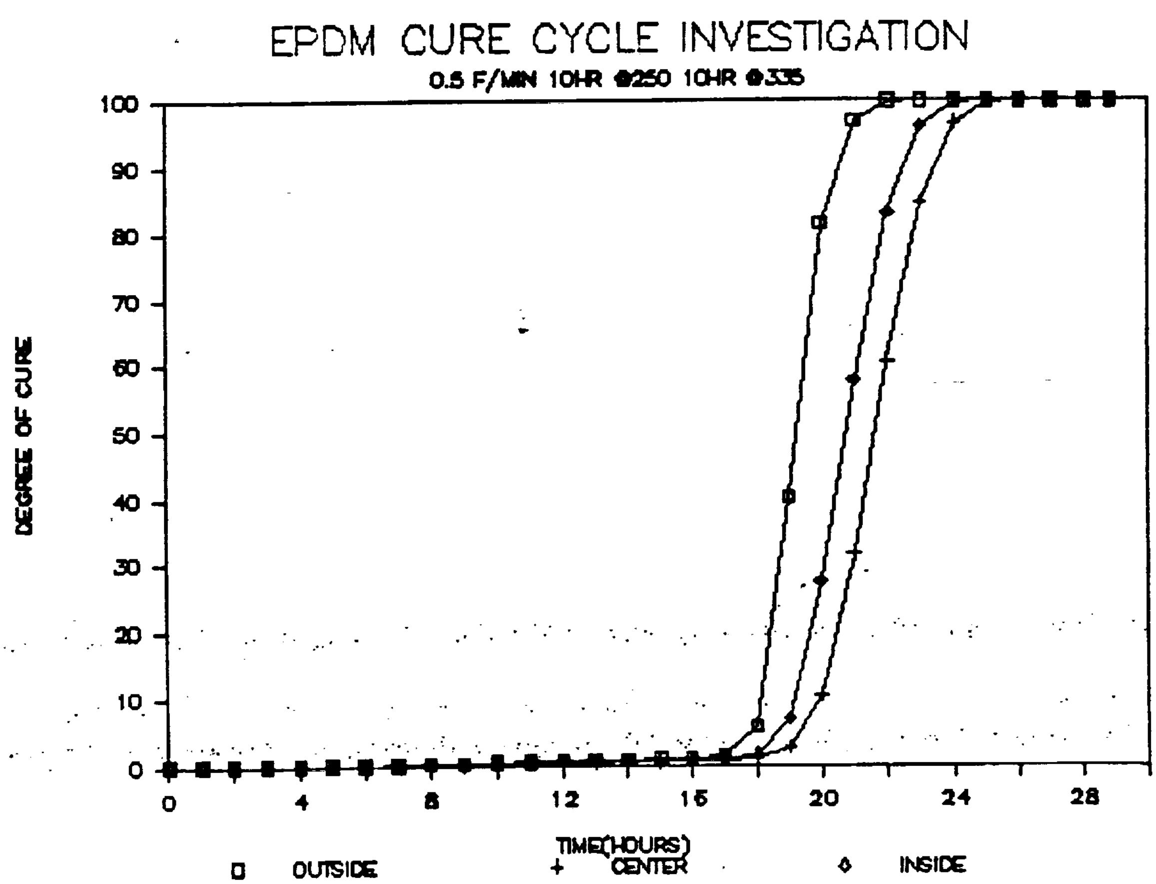
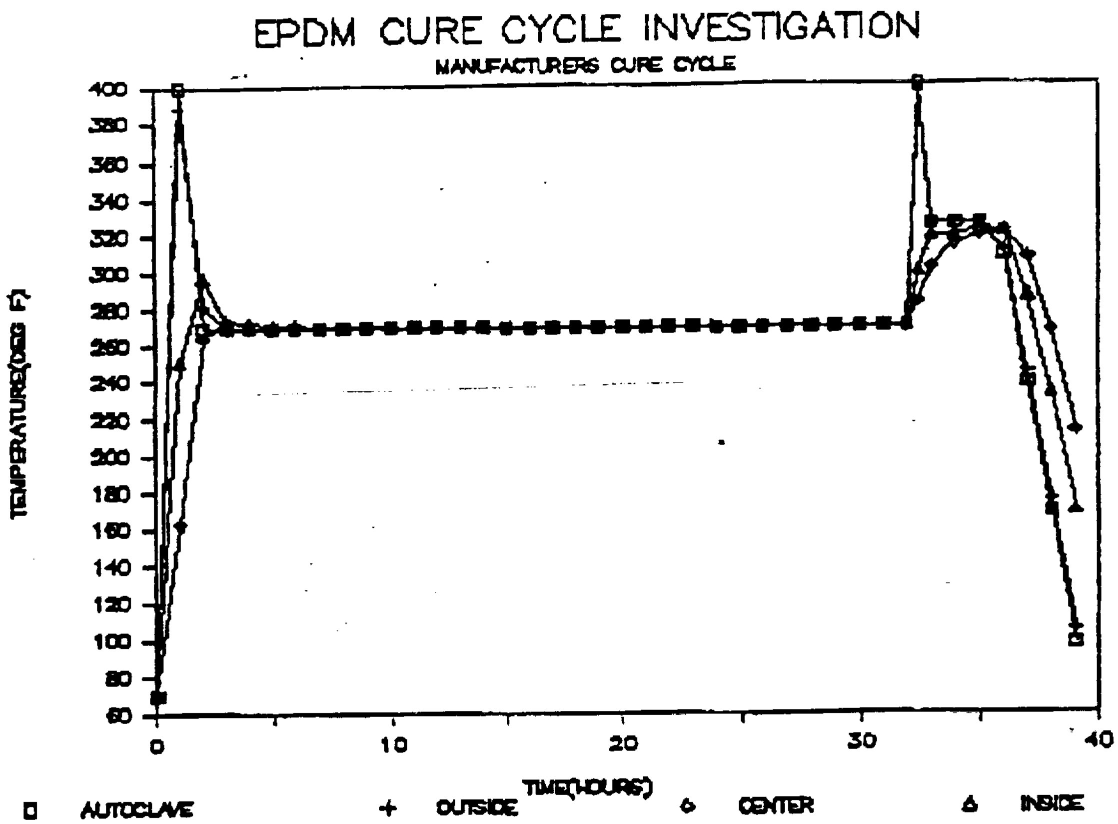
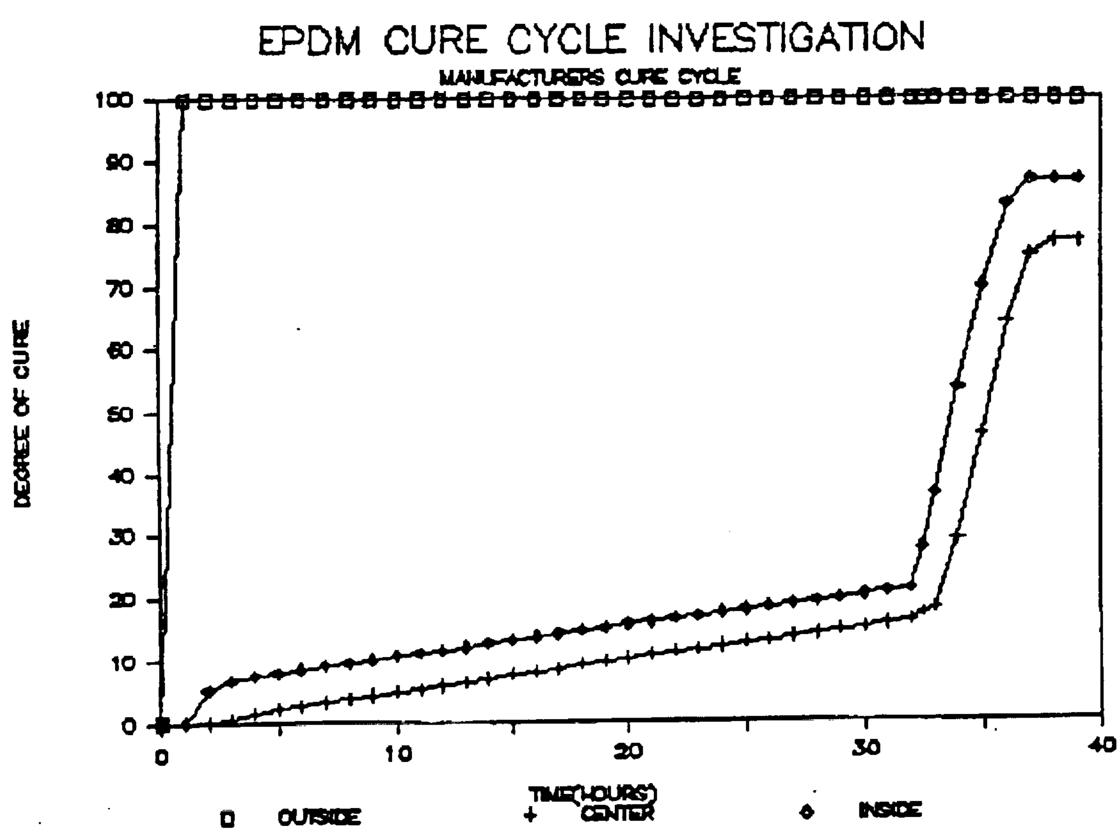


FIGURE 35


EPDM CURE CYCLE INVESTIGATION
MANUFACTURERS CURE CYCLE
TEMPERATURE(DEG F)
TIME(HOURS)
AUTOCLAVE
OUTSIDE
CENTER
INSIDE


EPDM CURE CYCLE INVESTIGATION
MANUFACTURERS CURE CYCLE
DEGREE OF CURE
TIME(HOURS)
OUTSIDE
CENTER
INSIDE

ATTACHMENT 4

Amfuel Report No. 1291-1, Test Report for Statement of Work I/LSPDT-015, Revision D

American Fuel Cell & Coated Fabrics Company
Report No. 1291-1

TEST REPORT

for

STATEMENT OF WORK I/LSPDT-015 Rev. D

Prepared by [illegible]

Date 1-15-92

Approved by [illegible]

Date 1-15-92

American Fuel Cell & Coated Fabrics Company
Report No. 1291-1

I. Introduction

This report is compiled to provide the test results in compliance with Section 3.8, Task 6 of SOW I/LSPDT-015 Rev D. The following results are presented:

A. Shore A Hardness Measurements

B. Shrinkage Rate Measurements

C. Differential Scanning Calorimetry Results

D. Tensile Results

E. Visual Inspection

In accordance with Purchase Order 100142, vendor note 1, Amfuel conducted a Taguchi-type statistical experiment to define any critical process parameters. The results of this experiment are also included as an addendum to this report.

II. SHORE A HARDNESS MEASUREMENTS

Shore A measurements were performed IAW Section 3.7.2 and Figure 5 of SOW I/LSPDT-015 Rev D.

#	PT1	PT2	PT3	PT4	PT5	PT6	PT7	PT8	PT9	PT10	PT11	PT12
1	78	78	77	79	79	80	80	80	79	81	80	80
2	77	77	78	78	80	79	80	80	80	79	79	79
3	79	80	79	80	80	80	80	80	80	79	80	80
4	77	77	79	79	79	80	80	80	81	82	81	81
5	79	79	80	80	79	80	81	80	79	79	80	80
6	76	78	79	80	80	79	78	79	79	80	80	80
7	78	78	78	79	79	80	81	80	78	79	80	80
8	80	81	80	80	80	79	81	79	80	80	79	79
9	78	80	78	78	79	79	79	79	78	78	80	80
10	79	80	81	80	80	79	79	80	81	80	79	81
11	78	78	78	77	78	78	80	78	79	80	78	79
12	79	79	80	80	80	80	80	80	79	79	79	80
13	79	78	79	80	80	79	80	79	80	80	80	80
14	79	78	77	79	79	79	79	80	79	80	81	80
15	79	80	80	80	78	80	80	81	81	80	81	81
16	77	78	80	80	79	78	79	79	80	80	79	80
17	77	79	79	80	80	80	80	80	78	79	80	80
18	79	79	78	80	80	81	80	80	80	81	80	80
AVG	78	79	79	79	79	79	80	80	79	80	80	80

III. SHRINKAGE RATE MEASUREMENTS

Shrinkage rate measurements were performed IAW Section 3.7.4 and Figure 8 of SOW I/LSPDT-015 Rev D. The following initial dimensions were used for all 18 samples:

Initial measurement for Pts 1-2 is 8.000 inches.
Initial measurement for Pts 3-4 is 1.500 inches.
Initial measurement for Pts 5-6 is 7.000 inches.
Percentage formula: (1-(Actual/Initial))*100.

Shrinkage Measurement at 1 Day

#	Pt 1-2		Pt 3-4		Pt 5-6	
	Actual	Percent	Actual	Percent	Actual	Percent
1	7.999	.013	1.499	.067	6.992	.114
2	7.999	.013	1.499	.067	6.988	.171
3	7.998	.025	1.497	.200	6.997	.043
4	7.994	.075	1.496	.267	6.983	.243
5	7.998	.025	1.498	.133	6.998	.029
6	7.993	.088	1.499	.067	6.980	.286
7	7.996	.050	1.499	.067	6.984	.229
8	7.987	.163	1.491	.600	6.984	.229
9	7.992	.100	1.498	.133	6.984	.229
10	7.998	.025	1.499	.067	6.992	.114
11	7.999	.013	1.499	.067	6.982	.257
12	7.996	.050	1.499	.067	6.993	.100
13	7.997	.038	1.497	.200	6.994	.086
14	7.997	.038	1.499	.067	6.992	.114
15	7.997	.038	1.499	.067	6.996	.057
16	7.998	.025	1.499	.067	6.996	.057
17	7.998	.025	1.499	.067	6.997	.043
18	7.996	.050	1.496	.267	6.991	.129
AVG	7.996	.047	1.498	.141	6.990	.140

Shrinkage Measurement at 2 Days

#	Pt 1-2		Pt 3-4		Pt 5-6	
	Actual	Percent	Actual	Percent	Actual	Percent
1	7.997	.038	1.498	.133	6.983	.243
2	7.992	.100	1.496	.267	6.980	.286
3	7.994	.075	1.492	.533	6.990	.143
4	7.988	.150	1.486	.933	6.943	.814
5	7.992	.100	1.496	.267	6.991	.129
6	7.987	.163	1.497	.200	6.974	.371
7	7.988	.150	1.496	.267	6.963	.529
8	7.985	.188	1.482	1.20	6.972	.400
9	7.975	.313	1.489	.733	6.978	.314
10	7.994	.075	1.486	.933	6.987	.186
11	7.996	.050	1.497	.200	6.976	.343

12	7.992	.100	1.498	.133	6.984	.229
13	7.994	.075	1.492	.533	6.981	.271
14	7.992	.100	1.498	.133	6.986	.200
15	7.992	.100	1.497	.200	6.991	.129
16	7.993	.088	1.496	.267	6.987	.186
17	7.997	.038	1.498	.133	6.991	.129
18	7.989	.138	1.492	.533	6.982	.257
AVG	7.991	.113	1.494	.422	6.980	.287

Shrinkage Measurement at 7 Days

#	Pt 1-2		Pt 3-4		Pt 5-6	
	Actual	Percent	Actual	Percent	Actual	Percent
1	7.992	.100	1.489	.733	6.962	.543
2	7.987	.163	1.493	.467	6.969	.443
3	7.988	.225	1.489	1.20	6.980	1.41
4	7.982	.225	1.482	1.20	6.901	1.41
5	7.983	.213	1.488	.800	6.972	.400
6	7.976	.300	1.493	.467	6.966	.486
7	7.986	.175	1.489	.733	6.956	.629
8	7.981	.238	1.469	2.07	6.969	.443
9	7.967	.413	1.486	.933	6.974	.371
10	7.990	.125	1.486	.933	6.964	.514
11	7.988	.150	1.489	.733	6.970	.429
12	7.985	.188	1.495	.333	6.980	.286
13	7.983	.213	1.485	1.00	6.976	.343
14	7.986	.175	1.493	.467	6.972	.400
15	7.988	.150	1.494	.400	6.980	.286
16	7.987	.163	1.486	.933	6.979	.300
17	7.988	.150	1.490	.667	6.968	.457
18	7.980	.250	1.484	1.07	6.964	.514

Shrinkage Measurement at 14 Days

#	Pt 1-2		Pt 3-4		Pt 5-6	
	Actual	Percent	Actual	Percent	Actual	Percent
1	7.988	.150	1.482	1.20	6.950	.714
2	7.983	.213	1.483	1.33	6.963	.529
3	7.985	.188	1.485	1.00	6.971	.414
4	7.978	.275	1.476	1.60	6.888	1.60
5	7.980	.250	1.487	.876	6.967	.471
6	7.971	.363	1.483	1.33	6.894	1.51
7	7.984	.200	1.485	1.00	6.951	.700
8	7.956	.550	1.458	2.80	6.964	.514
9	7.957	.538	1.452	3.20	6.968	.457
10	7.986	.175	1.481	1.27	6.952	.686
11	7.986	.175	1.483	1.33	6.967	.471
12	7.982	.225	1.491	.600	6.976	.343
13	7.979	.263	1.482	1.20	6.969	.443
14	7.980	.250	1.490	.667	6.960	.571

15	7.980	.250	1.490	.667	6.961	.557
16	7.985	.188	1.480	1.33	6.974	.371
17	7.986	.175	1.481	1.27	6.959	.586
18	7.978	.275	1.482	1.20	6.960	.571

IV. DIFFERENTIAL SCANNING CALORIMETRY

Differential Scanning Calorimetry testing was performed IAW Section 3.7.2 of SOW I/LSPDT-015 Rev D, and ASTM E794, and further clarification from Bill Tam, Aerojet. Hardcopy printouts of each scan are included in the addendum.

#	RESULT Deg/C (Glass Transition Temperature)
1	-43.65
2	-44.20
3	-42.25
4	-43.53
5	-43.93
6	-44.90
7	-41.33
8	-44.68
9	-43.39
10	-43.82
11	-44.25
12	-45.61
13	-45.00
14	-42.89
15	-41.99
16	-43.47
17	-44.01
18	-43.45

V. TENSILE RESULTS

Tensile tests were performed IAW Section 3.7.2 and Figure 6 of SOW I/LSPDT-015 Rev D, and ASTM D412. In the following table, "-A" results are from a sample taken above the plane shown in Figure 6 and "-B" results are from a sample taken below the plane.

TENSILE (LBS/SQ IN)

#	#2-A	#2-B	#4-A	#4-B	#5-A	#5-B
1	2849	2554	2617	2691	1925	2819
2	2723	2782	3000	2409	2562	2829
3	2815	2800	2937	2100	1140	2805
4	2884	2791	2791	2857	2809	2322
5	2530	2267	2444	2625	2878	2553
6	2876	2756	2778	2652	2747	2543
7	2829	2718	2851	2841	1802	2483
8	2450	2860	2622	2674	2568	2382
9	2899	2488	2844	2649	2372	2200
10	2691	2469	2769	2634	2231	2056
11	1462	1756	2436	2575	2675	1827
12	2434	2346	2675	2585	2675	2456
13	2222	1855	1928	1951	2000	1675
14	1976	1926	1775	1835	1852	1747
15	2557	2394	2337	2543	2244	2341
16	2565	2346	1951	2262	2220	2597
17	2069	2456	2120	1853	1812	2050
18	2568	2617	2410	2526	2325	2195

ELONGATION (PERCENT)

#	#2-A	#2-B	#4-A	#4-B	#5-A	#5-B
1	20	20	20	20	15	20
2	20	20	20	20	20	20
3	20	20	20	15	20	20
4	20	20	20	20	20	20
5	20	20	20	20	20	15
6	20	20	20	20	20	20
7	30	20	20	20	20	20
8	20	20	20	20	20	20
9	15	20	20	20	15	20
10	20	20	15	20	15	20
11	15	30	15	20	20	20
12	20	20	20	20	20	20
13	20	20	20	20	20	20
14	20	20	20	20	20	20
15	20	20	20	20	20	20
16	20	20	20	15	20	20
17	20	20	15	20	20	20
18	40	30	30	30	15	15

VI. VISUAL INSPECTION OF SAMPLES

All samples were visually inspected after cure and after dissection for voids and any other unusual results. No voids were found in any of the samples. The only unusual findings were some cracks which were evident in some of the discarded sections that were several weeks old.

TABLE OF AVERAGES
AMFUEL

Date: 01-15-1992

EXPERIMENT ID: Shrink 1-2 1d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	0.061333	0.033556		
2	Vulc Time	0.023167	0.050333	0.068833	
3	Flow Temp	0.037667	0.046167	0.058500	
4	Flow Time	0.044000	0.037667	0.060667	
5	Vacuum Level	0.042000	0.060667	0.039667	
6	Pressure	0.062833	0.050167	0.029333	
7	Heating Rate	0.041833	0.039833	0.060667	
8	Queue Humidity	0.052333	0.046167	0.043833	

```
*****************************************************************************
*                                                                           *
*     ANALYSIS OF VARIANCE (ANOVA)                    Date: 01-15-1992      *
*     AMFUEL                                                                *
*                                                                           *
*****************************************************************************
```

EXPERIMENT ID: Shrink 1-2 1d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	0.003472	1	0.003472	1.33	> 25%	3.44
2	Vulc Time	0.006331	2	0.003166	1.21	> 25%	4.43
3	Flow Temp	0.001317	2	0.000658	0.25	> 25%	0.00
4	Flow Time	0.001694	2	0.000847	0.32	> 25%	0.00
5	Vacuum Level	0.001590	2	0.000795	0.30	> 25%	0.00
6	Pressure	0.003433	2	0.001717	0.66	> 25%	0.00
7	Heating Rate	0.001585	2	0.000793	0.30	> 25%	0.00
8	Queue Humidity	0.000231	2	0.000116	0.04	> 25%	0.00
	ERROR	0.005230	2	0.002615			92.13
	TOTAL	0.024884	17				

OPTIMAL COMBINATION — Date: 01-15-1992

AMFUEL

EXPERIMENT ID:	Shrink 1-2 1d	RESPONSE:	% shrink
DEPARTMENT:	Amfuel	UNITS OF MEAS.:	
SET UP BY:	C. Marshall	SAMPLING METHOD:	
RECORDED BY:	crm	NO. OF SAMPLES TO TEST:	1

FIXED SETUP:

SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	-	NOT CRITICAL	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
7	Heating Rate	-	NOT CRITICAL	
	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL:	0.047444		
USING 95% CONFIDENCE:	-0.004412	TO	0.099301
USING 99% CONFIDENCE:	-0.072180	TO	0.167069

TABLE OF AVERAGES
AMFUEL

Date: 01-15-1992

EXPERIMENT ID: Shrink 3-4 1d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % Shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	0.177889	0.104000		
2	Vulc Time	0.089167	0.133500	0.200167	
3	Flow Temp	0.122500	0.166833	0.133500	
4	Flow Time	0.111333	0.133500	0.178000	
5	Vacuum Level	0.100333	0.189167	0.133333	
6	Pressure	0.178000	0.144667	0.100167	
7	Heating Rate	0.089000	0.067000	0.266833	
8	Queue Humidity	0.200167	0.100167	0.122500	

ANALYSIS OF VARIANCE (ANOVA) Date: 01-15-1992

AMFUEL

EXPERIMENT ID: Shrink 3-4 1d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % Shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	0.024568	1	0.024568	6.25	25%	6.66
2	Vulc Time	0.037462	2	0.018731	4.77	25%	9.56
3	Flow Temp	0.006395	2	0.003198	0.81	> 25%	0.00
4	Flow Time	0.013832	2	0.006916	1.76	> 25%	1.93
5	Vacuum Level	0.024196	2	0.012098	3.08	25%	5.27
6	Pressure	0.018299	2	0.009149	2.33	> 25%	3.37
7	Heating Rate	0.144084	2	0.072042	18.33	10%	43.98
8	Queue Humidity	0.033062	2	0.016531	4.21	25%	8.14
	ERROR	0.007861	2	0.003931			21.10
	TOTAL	0.309759	17				

```
***********************************************************************
*                                                                     *
*      OPTIMAL COMBINATION                      Date: 01-15-1992      *
*      AMFUEL                                                         *
*                                                                     *
***********************************************************************
```

EXPERIMENT ID: Shrink 3-4 1d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % Shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	-	NOT CRITICAL	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
7	Heating Rate	-	NOT CRITICAL	
	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL:	0.140944		
USING 95% CONFIDENCE:	0.077369	TO	0.204520
USING 99% CONFIDENCE:	-0.005714	TO	0.287603

TABLE OF AVERAGES
AMFUEL

Date: 01-15-1992

EXPERIMENT ID: Shrink 5-6 1d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % Shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	0.174778	0.106333		
2	Vulc Time	0.133167	0.135833	0.152667	
3	Flow Temp	0.140500	0.140500	0.140667	
4	Flow Time	0.157167	0.124000	0.140500	
5	Vacuum Level	0.188167	0.142833	0.090667	
6	Pressure	0.143000	0.166667	0.112000	
7	Heating Rate	0.107167	0.150000	0.164500	
8	Queue Humidity	0.112000	0.181000	0.128667	

ANALYSIS OF VARIANCE (ANOVA) Date: 01-15-1992

AMFUEL

EXPERIMENT ID: Shrink 5-6 1d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % Shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	0.021081	1	0.021081	1.30	> 25%	4.01
2	Vulc Time	0.001342	2	0.000671	0.04	> 25%	0.00
3	Flow Temp	2.0862E-07	2	1.0431E-07	0.00	> 25%	0.00
4	Flow Time	0.003300	2	0.001650	0.10	> 25%	0.00
5	Vacuum Level	0.028565	2	0.014283	0.88	> 25%	0.00
6	Pressure	0.009019	2	0.004510	0.28	> 25%	0.00
7	Heating Rate	0.010664	2	0.005332	0.33	> 25%	0.00
8	Queue Humidity	0.015555	2	0.007778	0.48	> 25%	0.00
	ERROR	0.032388	2	0.016194			95.99
	TOTAL	0.121914	17				

```
*****************************************************************************
*                                                                           *
*     OPTIMAL COMBINATION                        Date: 01-15-1992           *
*     AMFUEL                                                                *
                                                                            *
*****************************************************************************
```

EXPERIMENT ID: Shrink 5-6 1d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % Shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	______
2	Vulc Time	-	NOT CRITICAL	______
3	Flow Temp	-	NOT CRITICAL	______
4	Flow Time	-	NOT CRITICAL	______
5	Vacuum Level	-	NOT CRITICAL	______
6	Pressure	-	NOT CRITICAL	______
7	Heating Rate	-	NOT CRITICAL	______
	Queue Humidity	-	NOT CRITICAL	______

OPTIMAL RESPONSE:

OPTIMAL:	0.140556		
USING 95% CONFIDENCE:	0.011511	TO	0.269601
USING 99% CONFIDENCE:	-0.157129	TO	0.438240

TABLE OF AVERAGES
AMFUEL

Date: 01-15-1992

EXPERIMENT ID: Shrink 1-2 2d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % Shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	0.141889	0.084889		
2	Vulc Time	0.073000	0.114667	0.152500	
3	Flow Temp	0.096000	0.096000	0.148167	
4	Flow Time	0.114833	0.110500	0.114833	
5	Vacuum Level	0.106500	0.121000	0.112667	
6	Pressure	0.100333	0.146000	0.093833	
7	Heating Rate	0.123167	0.104333	0.112667	
8	Queue Humidity	0.106500	0.131500	0.102167	

```
*****************************************************************************
*                                                                           *
*     ANALYSIS OF VARIANCE (ANOVA)                      Date: 01-15-1992    *
*     AMFUEL                                                                *
*                                                                           *
*****************************************************************************
```

EXPERIMENT ID: Shrink 1-2 2d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % Shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	0.014621	1	0.014621	2.16	> 25%	10.83
2	Vulc Time	0.018975	2	0.009488	1.40	> 25%	7.50
3	Flow Temp	0.010885	2	0.005443	0.80	> 25%	0.00
4	Flow Time	7.5147E-05	2	3.7573E-05	0.01	> 25%	0.00
5	Vacuum Level	0.000635	2	0.000318	0.05	> 25%	0.00
6	Pressure	0.009698	2	0.004849	0.72	> 25%	0.00
7	Heating Rate	0.001069	2	0.000534	0.08	> 25%	0.00
8	Queue Humidity	0.003008	2	0.001504	0.22	> 25%	0.00
	ERROR	0.013539	2	0.006769			81.67
	TOTAL	0.072506	17				

OPTIMAL COMBINATION
AMFUEL

Date: 01-15-1992

EXPERIMENT ID: Shrink 1-2 2d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % Shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	-	NOT CRITICAL	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
7	Heating Rate	-	NOT CRITICAL	
	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL:	0.113389		
USING 95% CONFIDENCE:	0.029955	TO	0.196823
USING 99% CONFIDENCE:	-0.079079	TO	0.305856

TABLE OF AVERAGES

AMFUEL

Date: 01-15-1992

EXPERIMENT ID: Shrink 3-4 2d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % Shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	0.503667	0.340556		
2	Vulc Time	0.366500	0.377667	0.522167	
3	Flow Temp	0.511000	0.366667	0.388667	
4	Flow Time	0.388667	0.333333	0.544333	
5	Vacuum Level	0.244333	0.500000	0.522000	
6	Pressure	0.388667	0.588667	0.289000	
7	Heating Rate	0.277667	0.333333	0.655333	
8	Queue Humidity	0.544333	0.366667	0.355333	

ANALYSIS OF VARIANCE (ANOVA) Date: 01-15-1992

AMFUEL

EXPERIMENT ID: Shrink 3-4 2d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % Shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	0.119724	1	0.119724	1.12	> 25%	0.70
2	Vulc Time	0.090474	2	0.045237	0.42	> 25%	0.00
3	Flow Temp	0.072563	2	0.036282	0.34	> 25%	0.00
4	Flow Time	0.143630	2	0.071815	0.67	> 25%	0.00
5	Vacuum Level	0.285897	2	0.142948	1.34	> 25%	3.92
6	Pressure	0.279468	2	0.139734	1.31	> 25%	3.57
7	Heating Rate	0.498830	2	0.249415	2.33	> 25%	15.50
8	Queue Humidity	0.134830	2	0.067415	0.63	> 25%	0.00
	ERROR	0.213830	2	0.106915			76.32
	TOTAL	1.839247	17				

****
*
* OPTIMAL COMBINATION Date: 01-15-1992 *
* AMFUEL *
*
****

EXPERIMENT ID: Shrink 3-4 2d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % Shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	-	NOT CRITICAL	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
7	Heating Rate	-	NOT CRITICAL	
	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL:	0.422111		
USING 95% CONFIDENCE:	0.090533	TO	0.753690
USING 99% CONFIDENCE:	-0.342783	TO	1.187005

TABLE OF AVERAGES

AMFUEL

Date: 01-15-1992

EXPERIMENT ID: Shrink 5-6 2d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % Shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	0.358778	0.214444		
2	Vulc Time	0.238333	0.319000	0.302500	
3	Flow Temp	0.371500	0.247833	0.240500	
4	Flow Time	0.328667	0.283500	0.247667	
5	Vacuum Level	0.323833	0.340667	0.195333	
6	Pressure	0.273833	0.342833	0.243167	
7	Heating Rate	0.216833	0.271667	0.371333	
8	Queue Humidity	0.224000	0.295167	0.340667	

ANALYSIS OF VARIANCE (ANOVA) Date: 01-15-1992

AMFUEL

EXPERIMENT ID:	Shrink 5-6 2d	RESPONSE:	% Shrink
DEPARTMENT:	Amfuel	UNITS OF MEAS.:	
SET UP BY:	C. Marshall	SAMPLING METHOD:	
RECORDED BY:	crm	NO. OF SAMPLES TO TEST:	1

FIXED SETUP:

SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	0.093744	1	0.093744	2.78	25%	12.24
2	Vulc Time	0.021793	2	0.010897	0.32	> 25%	0.00
3	Flow Temp	0.065016	2	0.032508	0.96	> 25%	0.00
4	Flow Time	0.019770	2	0.009885	0.29	> 25%	0.00
5	Vacuum Level	0.075834	2	0.037917	1.12	> 25%	1.70
6	Pressure	0.031270	2	0.015635	0.46	> 25%	0.00
7	Heating Rate	0.073621	2	0.036810	1.09	> 25%	1.25
8	Queue Humidity	0.041492	2	0.020746	0.61	> 25%	0.00
	ERROR	0.067496	2	0.033748			84.81
	TOTAL	0.490036	17				

OPTIMAL COMBINATION
AMFUEL

Date: 01-15-1992

EXPERIMENT ID: Shrink 5-6 2d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % Shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	-	NOT CRITICAL	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
7	Heating Rate	-	NOT CRITICAL	
	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL:	0.286611		
USING 95% CONFIDENCE:	0.100321	TO	0.472902
USING 99% CONFIDENCE:	-0.143129	TO	0.716351

TABLE OF AVERAGES

AMFUEL

Date: 01-15-1992

EXPERIMENT ID: Shrink 1-2 7d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	0.228000	0.173778		
2	Vulc Time	0.158500	0.212667	0.231500	
3	Flow Temp	0.166833	0.181500	0.254333	
4	Flow Time	0.198000	0.200333	0.204333	
5	Vacuum Level	0.191667	0.187833	0.223167	
6	Pressure	0.198167	0.225167	0.179333	
7	Heating Rate	0.208667	0.177167	0.216833	
8	Queue Humidity	0.179333	0.233667	0.189667	

ANALYSIS OF VARIANCE (ANOVA) Date: 01-15-1992
AMFUEL

EXPERIMENT ID: Shrink 1-2 7d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	0.013230	1	0.013230	5.22	25%	12.13
2	Vulc Time	0.017235	2	0.008618	3.40	25%	13.80
3	Flow Temp	0.026352	2	0.013176	5.20	25%	24.14
4	Flow Time	0.000123	2	6.1423E-05			
					0.02	> 25%	0.00
5	Vacuum Level	0.004511	2	0.002255	0.89	> 25%	0.00
6	Pressure	0.006369	2	0.003184	1.26	> 25%	1.47
7	Heating Rate	0.005265	2	0.002632	1.04	> 25%	0.22
8	Queue Humidity	0.009990	2	0.004995	1.97	> 25%	5.58
	ERROR	0.005070	2	0.002535			42.64
	TOTAL	0.088144	17				

```
************************************************************************
*                                                                      *
*      OPTIMAL COMBINATION                       Date: 01-15-1992      *
*      AMFUEL                                                          *
*                                                                      *
************************************************************************
```

EXPERIMENT ID: Shrink 1-2 7d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	-	NOT CRITICAL	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
7	Heating Rate	-	NOT CRITICAL	
	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL:	0.200889		
USING 95% CONFIDENCE:	0.149832	TO	0.251946
USING 99% CONFIDENCE:	0.083109	TO	0.318669

TABLE OF AVERAGES

AMFUEL

Date: 01-15-1992

EXPERIMENT ID: Shrink 3-4 7d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	0.955555	0.711111		
2	Vulc Time	0.711000	0.722333	1.066667	
3	Flow Temp	0.899833	0.866833	0.733333	
4	Flow Time	0.777667	0.733333	0.989000	
5	Vacuum Level	0.700000	0.900000	0.900000	
6	Pressure	0.877833	0.822333	0.799833	
7	Heating Rate	0.699833	0.589000	1.211167	
8	Queue Humidity	0.977833	0.755500	0.766667	

ANALYSIS OF VARIANCE (ANOVA) Date: 01-15-1992
AMFUEL

EXPERIMENT ID: Shrink 3-4 7d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	0.268888	1	0.268888	19.19	5.0%	9.12
2	Vulc Time	0.490387	2	0.245193	17.50	10%	16.55
3	Flow Temp	0.093268	2	0.046634	3.33	25%	2.34
4	Flow Time	0.223988	2	0.111994	7.99	25%	7.01
5	Vacuum Level	0.160002	2	0.080001	5.71	25%	4.72
6	Pressure	0.019343	2	0.009672	0.69	> 25%	0.00
7	Heating Rate	1.321675	2	0.660838	47.17	5.0%	46.30
8	Queue Humidity	0.188298	2	0.094149	6.72	25%	5.74
	ERROR	0.028021	2	0.014010			8.21
	TOTAL	2.793871	17				

OPTIMAL COMBINATION
AMFUEL

Date: 01-15-1992

EXPERIMENT ID: Shrink 3-4 7d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	1	310	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	-	NOT CRITICAL	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
7	Heating Rate	3	2	
	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL:	1.333389		
USING 95% CONFIDENCE:	1.093327	TO	1.573450
USING 99% CONFIDENCE:	0.779608	TO	1.887169

```
******************************************************************************
*                                                                            *
*     TABLE OF AVERAGES                              Date: 01-15-1992        *
*     AMFUEL                                                                 *
*                                                                            *
******************************************************************************
```

EXPERIMENT ID: Shrink 5-6 7d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % Shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	0.681667	0.392111		
2	Vulc Time	0.604167	0.554167	0.452333	
3	Flow Temp	0.623167	0.428667	0.558833	
4	Flow Time	0.582667	0.435833	0.592167	
5	Vacuum Level	0.500167	0.528000	0.582500	
6	Pressure	0.426333	0.608667	0.575667	
7	Heating Rate	0.383333	0.469167	0.758167	
^	Queue Humidity	0.450000	0.395333	0.765333	

```
**********************************************************************
*                                                                    *
*     ANALYSIS OF VARIANCE (ANOVA)              Date: 01-15-1992     *
*     AMFUEL                                                         *
*                                                                    *
**********************************************************************
```

EXPERIMENT ID: Shrink 5-6 7d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % Shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	0.377291	1	0.377291	6.18	25%	17.03
2	Vulc Time	0.071847	2	0.035923	0.59	> 25%	0.00
3	Flow Temp	0.117825	2	0.058913	0.96	> 25%	0.00
4	Flow Time	0.092181	2	0.046091	0.75	> 25%	0.00
5	Vacuum Level	0.021048	2	0.010524	0.17	> 25%	0.00
6	Pressure	0.113270	2	0.056635	0.93	> 25%	0.00
7	Heating Rate	0.462777	2	0.231389	3.79	25%	18.34
8	Queue Humidity	0.478647	2	0.239323	3.92	25%	19.20
	ERROR	0.122169	2	0.061084			45.44
	TOTAL	1.857054	17				

OPTIMAL COMBINATION   Date: 01-15-1992
AMFUEL

EXPERIMENT ID: Shrink 5-6 7d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % Shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	-	NOT CRITICAL	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
7	Heating Rate	-	NOT CRITICAL	
	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL: 0.536889
USING 95% CONFIDENCE: 0.286260 TO 0.787518
USING 99% CONFIDENCE: -0.041269 TO 1.115047

TABLE OF AVERAGES Date: 01-15-1992
AMFUEL

EXPERIMENT ID: Shrink 1-2 14d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	0.303000	0.219556		
2	Vulc Time	0.187667	0.275167	0.321000	
3	Flow Temp	0.208500	0.268833	0.306500	
4	Flow Time	0.260500	0.237667	0.285667	
5	Vacuum Level	0.235500	0.283500	0.264833	
6	Pressure	0.287667	0.287667	0.208500	
7	Heating Rate	0.266833	0.229333	0.287667	
[illegible]	Queue Humidity	0.275000	0.290000	0.218833	

* ANALYSIS OF VARIANCE (ANOVA) Date: 01-15-1992
* AMFUEL

EXPERIMENT ID: Shrink 1-2 14d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	0.031333	1	0.031333	1.50	> 25%	4.66
2	Vulc Time	0.055069	2	0.027535	1.32	> 25%	5.93
3	Flow Temp	0.029325	2	0.014663	0.70	> 25%	0.00
4	Flow Time	0.006917	2	0.003459	0.17	> 25%	0.00
5	Vacuum Level	0.007025	2	0.003513	0.17	> 25%	0.00
6	Pressure	0.025069	2	0.012535	0.60	> 25%	0.00
7	Heating Rate	0.010486	2	0.005243	0.25	> 25%	0.00
8	Queue Humidity	0.016888	2	0.008444	0.40	> 25%	0.00
	ERROR	0.041786	2	0.020893			89.40
	TOTAL	0.223899	17				

OPTIMAL COMBINATION
AMFUEL

Date: 01-15-1992

EXPERIMENT ID: Shrink 1-2 14d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	-	NOT CRITICAL	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
[illegible]	Heating Rate	-	NOT CRITICAL	
[illegible]	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL:	0.261278		
USING 95% CONFIDENCE:	0.114700	TO	0.407855
USING 99% CONFIDENCE:	-0.076851	TO	0.599406

TABLE OF AVERAGES
AMFUEL

Date: 01-15-1992

EXPERIMENT ID: Shrink 3-4 14d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	1.548111	1.037778		
2	Vulc Time	1.056000	1.022333	1.800500	
3	Flow Temp	1.267167	1.311667	1.300000	
4	Flow Time	1.511667	1.000000	1.367167	
5	Vacuum Level	1.055500	1.355500	1.467833	
6	Pressure	1.367167	1.511667	1.000000	
7	Heating Rate	1.311167	1.078833	1.488833	
	Queue Humidity	1.334000	1.522000	1.022833	

ANALYSIS OF VARIANCE (ANOVA) Date: 01-15-1992

AMFUEL

EXPERIMENT ID: Shrink 3-4 14d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	1.171976	1	1.171976	3.17	25%	10.39
2	Vulc Time	2.321915	2	1.160957	3.14	25%	20.49
3	Flow Temp	0.006390	2	0.003195	0.01	> 25%	0.00
4	Flow Time	0.834984	2	0.417492	1.13	> 25%	1.24
5	Vacuum Level	0.545269	2	0.272635	0.74	> 25%	0.00
6	Pressure	0.834990	2	0.417495	1.13	> 25%	1.24
7	Heating Rate	0.507284	2	0.253642	0.69	> 25%	0.00
8	Queue Humidity	0.762669	2	0.381334	1.03	> 25%	0.31
	ERROR	0.739050	2	0.369525			66.33
	TOTAL	7.724525	17				

OPTIMAL COMBINATION
AMFUEL

Date: 01-15-1992

EXPERIMENT ID: Shrink 3-4 14d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	-	NOT CRITICAL	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
-	Heating Rate	-	NOT CRITICAL	
	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL:	1.292944		
USING 95% CONFIDENCE:	0.676507	TO	1.909382
USING 99% CONFIDENCE:	-0.129069	TO	2.714958

```
*************************************************************************
*                                                                       *
*       TABLE OF AVERAGES                          Date: 01-15-1992     *
*       AMFUEL                                                          *
*                                                                       *
*************************************************************************
```

EXPERIMENT ID: Shrink 5-6 14d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % Shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	0.767667	0.511000		
2	Vulc Time	0.526167	0.858667	0.533167	
3	Flow Temp	0.752333	0.523667	0.642000	
4	Flow Time	0.730833	0.509500	0.677667	
5	Vacuum Level	0.756167	0.652333	0.509500	
6	Pressure	0.685000	0.735667	0.497333	
7	Heating Rate	0.487833	0.761333	0.668833	
	Queue Humidity	0.585500	0.630167	0.702333	

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ANALYSIS OF VARIANCE (ANOVA) Date: 01-15-1992
AMFUEL

****

EXPERIMENT ID: Shrink 5-6 14d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % Shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	0.296449	1	0.296449	1.54	> 25%	5.02
2	Vulc Time	0.433111	2	0.216556	1.13	> 25%	2.34
3	Flow Temp	0.156928	2	0.078464	0.41	> 25%	0.00
4	Flow Time	0.160190	2	0.080095	0.42	> 25%	0.00
5	Vacuum Level	0.184053	2	0.092027	0.48	> 25%	0.00
6	Pressure	0.189177	2	0.094589	0.49	> 25%	0.00
7	Heating Rate	0.232239	2	0.116119	0.60	> 25%	0.00
8	Queue Humidity	0.041705	2	0.020853	0.11	> 25%	0.00
	ERROR	0.384421	2	0.192211			92.64
	TOTAL	2.078274	17				

OPTIMAL COMBINATION
AMFUEL

Date: 01-15-1992

EXPERIMENT ID: Shrink 5-6 14d
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: % Shrink
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	-	NOT CRITICAL	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
	Heating Rate	-	NOT CRITICAL	
	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL:	0.639333		
USING 95% CONFIDENCE:	0.194747	TO	1.083919
USING 99% CONFIDENCE:	-0.386249	TO	1.664916

****

TABLE OF AVERAGES Date: 01-15-1992

AMFUEL

****

EXPERIMENT ID: TENSILE #2 TC
DEPARTMENT: AMFUEL
SET UP BY: C. MARSHALL
RECORDED BY: W. COLEN

RESPONSE: TENSILE
UNITS OF MEAS.: LBS/SQ IN
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 2

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES: LBS/SQ IN

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	2715.056	2261.611		
2	Vulc Time	2473.417	2419.500	2572.083	
3	Flow Temp	2564.417	2271.417	2629.167	
4	Flow Time	2429.917	2490.917	2544.167	
5	Vacuum Level	2407.250	2594.333	2463.417	
6	Pressure	2477.250	2567.833	2419.917	
7	Heating Rate	2431.667	2610.000	2423.333	
	Queue Humidity	2567.167	2394.167	2503.667	

```
***************************************************************************
*                                                                         *
*     ANALYSIS OF VARIANCE (ANOVA)                  Date: 01-15-1992      *
*     AMFUEL                                                              *
*                                                                         *
***************************************************************************
```

EXPERIMENT ID: TENSILE #2 TC
DEPARTMENT: AMFUEL
SET UP BY: C. MARSHALL
RECORDED BY: W. COLEN

RESPONSE: TENSILE
UNITS OF MEAS.: LBS/SQ IN
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 2

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	1850512	1	1850512	55.08	0.1%	41.09
2	Vulc Time	143712.0	2	71856.00	2.14	25%	1.73
3	Flow Temp	872112.0	2	436056.0	12.98	0.1%	18.20
4	Flow Time	78448.00	2	39224.00	1.17	> 25%	0.25
5	Vacuum Level	221184.0	2	110592.0	3.29	10%	3.48
6	Pressure	133504.0	2	66752.00	1.99	25%	1.50
7	Heating Rate	266864.0	2	133432.0	3.97	5.0%	4.52
8	Queue Humidity	183808.0	2	91904.00	2.74	10%	2.64
	ERROR	671888.0	20	33594.40			26.59
	TOTAL	4422032	35				

OPTIMAL COMBINATION
AMFUEL

Date: 01-15-1992

EXPERIMENT ID: TENSILE #2 TC
DEPARTMENT: AMFUEL
SET UP BY: C. MARSHALL
RECORDED BY: W. COLEN

RESPONSE: TENSILE
UNITS OF MEAS.: LBS/SQ IN
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 2

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES: LBS/SQ IN
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	1	310	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	3	260	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
	Heating Rate	2	.5	
	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL:	2977.556		
USING 95% CONFIDENCE:	2821.492	TO	3133.620
USING 99% CONFIDENCE:	2764.595	TO	3190.517

```
*************************************************************************
*                                                                       *
*     TABLE OF AVERAGES                          Date: 01-15-1992       *
*     AMFUEL                                                            *
*                                                                       *
*************************************************************************
```

EXPERIMENT ID: TENSILE #4 TC
DEPARTMENT: AMFUEL
SET UP BY: C. MARSHALL
RECORDED BY: W. COLEN

RESPONSE: TENSILE
UNITS OF MEAS.: LBS/SQ IN
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 2

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES: LBS/SQ IN

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	2687.889	2286.944		
2	Vulc Time	2619.000	2376.333	2466.917	
3	Flow Temp	2511.917	2364.000	2586.333	
4	Flow Time	2526.083	2520.417	2415.750	
5	Vacuum Level	2498.917	2558.833	2404.500	
6	Pressure	2428.833	2541.583	2491.833	
7	Heating Rate	2412.750	2565.583	2483.917	
	Queue Humidity	2574.333	2452.917	2435.000	

****

* ANALYSIS OF VARIANCE (ANOVA) Date: 01-15-1992 *

* AMFUEL *

****

EXPERIMENT ID: TENSILE #4 TC
DEPARTMENT: AMFUEL
SET UP BY: C. MARSHALL
RECORDED BY: W. COLEN

RESPONSE: TENSILE
UNITS OF MEAS.: LBS/SQ IN
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 2

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	1446800	1	1446800	20.75	0.1%	33.56
2	Vulc Time	360880.0	2	180440.0	2.59	25%	5.40
3	Flow Temp	307392.0	2	153696.0	2.20	25%	4.09
4	Flow Time	92640.00	2	46320.00	0.66	> 25%	0.00
5	Vacuum Level	145296.0	2	72648.00	1.04	> 25%	0.14
6	Pressure	76624.00	2	38312.00	0.55	> 25%	0.00
7	Heating Rate	140368.0	2	70184.00	1.01	> 25%	0.02
8	Queue Humidity	137904.0	2	68952.00	0.99	> 25%	0.00
	ERROR	1394832	20	69741.60			56.78
	TOTAL	4102736	35				

OPTIMAL COMBINATION
AMFUEL

Date: 01-15-1992

EXPERIMENT ID: TENSILE #4 TC
DEPARTMENT: AMFUEL
SET UP BY: C. MARSHALL
RECORDED BY: W. COLEN

RESPONSE: TENSILE
UNITS OF MEAS.: LBS/SQ IN
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 2

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES: LBS/SQ IN
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	1	310	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	-	NOT CRITICAL	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
	Heating Rate	-	NOT CRITICAL	
[illegible]	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL:	2687.889		
USING 95% CONFIDENCE:	2558.065	TO	2817.713
USING 99% CONFIDENCE:	2510.734	TO	2865.043

TABLE OF AVERAGES Date: 01-15-1992
AMFUEL

EXPERIMENT ID: TENSILE #5 TC
DEPARTMENT: AMFUEL
SET UP BY: C. MARSHALL
RECORDED BY: W. COLEN

RESPONSE: TENSILE
UNITS OF MEAS.: LBS/SQ IN
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 2

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES: LBS/SQ IN

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	2429.944	2165.444		
2	Vulc Time	2333.333	2309.250	2250.500	
3	Flow Temp	2244.917	2311.250	2336.917	
4	Flow Time	2283.000	2369.417	2240.667	
5	Vacuum Level	2245.000	2500.417	2147.667	
6	Pressure	2304.333	2291.667	2297.083	
7	Heating Rate	2357.833	2308.333	2226.917	
[illegible]	Queue Humidity	2376.417	2353.917	2162.750	

OPTIMAL COMBINATION Date: 12-05-1991
AMFUEL

EXPERIMENT ID:	Shore A - Pt 10	RESPONSE:	Shore Scale
DEPARTMENT:	Amfuel	UNITS OF MEAS.:	
SET UP BY:	C. Marshall	SAMPLING METHOD:	
RECORDED BY:	crm	NO. OF SAMPLES TO TEST:	1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	-	NOT CRITICAL	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
7	Heating Rate	-	NOT CRITICAL	
8	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL:	79.77778		
USING 95% CONFIDENCE:	78.91108	TO	80.64448
USING 99% CONFIDENCE:	77.77846	TO	81.77710

ANALYSIS OF VARIANCE (ANOVA) Date: 12-05-1991
AMFUEL

EXPERIMENT ID:	Shore A - Pt 10	RESPONSE:	Shore Scale
DEPARTMENT:	Amfuel	UNITS OF MEAS.:	
SET UP BY:	[illegible]	SAMPLING METHOD:	
RECORDED BY:	crm	NO. OF SAMPLES TO TEST:	1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	0.218750	1	0.218750	0.30	> 25%	0.00
2	Vulc Time	1.445313	2	0.722656	0.99	> 25%	0.00
3	Flow Temp	2.773438	2	1.386719	1.90	> 25%	8.69
4	Flow Time	0.773438	2	0.386719	0.53	> 25%	0.00
5	Vacuum Level	3.445313	2	1.722656	2.36	> 25%	13.13
6	Pressure	0.781250	2	0.390625	0.53	> 25%	0.00
7	Heating Rate	2.773438	2	1.386719	1.90	> 25%	8.69
8	Queue Humidity	1.437500	2	0.718750	0.98	> 25%	0.00
	ERROR	1.460938	2	0.730469			69.49
	TOTAL	15.10938	17				

TABLE OF AVERAGES
AMFUEL

Date: 12-05-1991

EXPERIMENT ID: Shore A - Pt 10
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: Shore Scale
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	79.66666	79.88889		
2	Vulc Time	79.66666	80.16666	79.50000	
3	Flow Temp	80.33334	79.50000	79.50000	
4	Flow Time	80.00000	79.50000	79.83334	
5	Vacuum Level	80.16666	80.00000	79.16666	
6	Pressure	79.83334	80.00000	79.50000	
7	Heating Rate	79.50000	79.50000	80.33334	
8	Queue Humidity	80.16666	79.50000	79.66666	

OPTIMAL COMBINATION
AMFUEL

Date: 12-05-1991

EXPERIMENT ID: Shore A - Pt 9
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: Shore Scale
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	-	NOT CRITICAL	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
7	Heating Rate	-	NOT CRITICAL	
8	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL:	79.50000		
USING 95% CONFIDENCE:	79.08440	TO	79.91560
USING 99% CONFIDENCE:	78.54127	TO	80.45873

ANALYSIS OF VARIANCE (ANOVA)

AMFUEL

Date: 12-05-1991

EXPERIMENT ID: Shore A - Pt 9
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: Shore Scale
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	0.500000	1	0.500000	2.98	25%	2.01
2	Vulc Time	2.335938	2	1.167969	6.95	25%	12.12
3	Flow Temp	1.335938	2	0.667969	3.98	25%	6.06
4	Flow Time	1.000000	2	0.500000	2.98	> 25%	4.02
5	Vacuum Level	4.328125	2	2.164063	12.88	10%	24.20
6	Pressure	1.335938	2	0.667969	3.98	25%	6.06
7	Heating Rate	3.000000	2	1.500000	8.93	25%	16.15
8	Queue Humidity	2.328125	2	1.164063	6.93	25%	12.07
	ERROR	0.335938	2	0.167969			17.31
	TOTAL	16.50000	17				

TABLE OF AVERAGES
AMFUEL

Date: 12-05-1991

EXPERIMENT ID: Shore A - Pt 9
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: Shore Scale
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	79.33334	79.66666		
2	Vulc Time	79.66666	79.83334	79.00000	
3	Flow Temp	79.83334	79.16666	79.50000	
4	Flow Time	79.33334	79.33334	79.83334	
5	Vacuum Level	79.00000	80.16666	79.33334	
6	Pressure	79.16666	79.83334	79.50000	
7	Heating Rate	79.00000	79.50000	80.00000	
8	Queue Humidity	80.00000	79.33334	79.16666	

OPTIMAL COMBINATION
AMFUEL

Date: 12-05-1991

EXPERIMENT ID: Shore A - Pt 8
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: Shore Scale
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	-	NOT CRITICAL	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
7	Heating Rate	-	NOT CRITICAL	
8	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL: 79.66666
USING 95% CONFIDENCE: 78.94682 TO 80.38651
USING 99% CONFIDENCE: 78.00610 TO 81.32723

ANALYSIS OF VARIANCE (ANOVA)
AMFUEL

Date: 12-05-1991

EXPERIMENT ID: Shore A - Pt 8
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: Shore Scale
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	0.000000	1	0.000000	0.00	> 25%	0.00
2	Vulc Time	0.335938	2	0.167969	0.33	> 25%	0.00
3	Flow Temp	0.328125	2	0.164063	0.33	> 25%	0.00
4	Flow Time	0.335938	2	0.167969	0.33	> 25%	0.00
5	Vacuum Level	0.328125	2	0.164063	0.33	> 25%	0.00
6	Pressure	0.328125	2	0.164063	0.33	> 25%	0.00
7	Heating Rate	1.335938	2	0.667969	1.33	> 25%	4.10
8	Queue Humidity	4.000000	2	2.000000	3.97	25%	37.40
	ERROR	1.007813	2	0.503906			58.50
	TOTAL	8.000000	17				

TABLE OF AVERAGES
AMFUEL

Date: 12-05-1991

EXPERIMENT ID: Shore A - Pt 8
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: Shore Scale
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	79.66666	79.66666		
2	Vulc Time	79.66666	79.83334	79.50000	
3	Flow Temp	79.66666	79.50000	79.83334	
4	Flow Time	79.66666	79.83334	79.50000	
5	Vacuum Level	79.50000	79.83334	79.66666	
6	Pressure	79.50000	79.83334	79.66666	
7	Heating Rate	79.66666	80.00000	79.33334	
8	Queue Humidity	80.00000	79.00000	80.00000	

OPTIMAL COMBINATION Date: 12-05-1991
AMFUEL

EXPERIMENT ID: Shore A - Pt 7
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: Shore Scale
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	-	NOT CRITICAL	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
7	Heating Rate	-	NOT CRITICAL	
8	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL:	79.83334		
USING 95% CONFIDENCE:	79.42259	TO	80.24408
USING 99% CONFIDENCE:	78.88582	TO	80.78085

ANALYSIS OF VARIANCE (ANOVA) Date: 12-05-1991
AMFUEL

EXPERIMENT ID: Shore A - Pt 7
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: Shore Scale
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	0.500000	1	0.500000	3.05	25%	3.20
2	Vulc Time	0.335938	2	0.167969	1.02	> 25%	0.07
3	Flow Temp	1.335938	2	0.667969	4.07	25%	9.60
4	Flow Time	3.000000	2	1.500000	9.14	10%	25.45
5	Vacuum Level	0.335938	2	0.167969	1.02	> 25%	0.07
6	Pressure	1.328125	2	0.664063	4.05	25%	9.52
7	Heating Rate	1.000000	2	0.500000	3.05	25%	6.40
8	Queue Humidity	2.335938	2	1.167969	7.12	25%	19.12
	ERROR	0.328125	2	0.164063			26.56
	TOTAL	10.50000	17				

TABLE OF AVERAGES
AMFUEL

Date: 12-05-1991

EXPERIMENT ID:	Shore A - Pt 7	RESPONSE:	Shore Scale
DEPARTMENT:	Amfuel	UNITS OF MEAS.:	
SET UP BY:	C. Marshall	SAMPLING METHOD:	
RECORDED BY:	crm	NO. OF SAMPLES TO TEST:	1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	80.00000	79.66666		
2	Vulc Time	79.83334	79.66666	80.00000	
3	Flow Temp	79.83334	80.16666	79.50000	
4	Flow Time	79.83334	80.33334	79.33334	
5	Vacuum Level	79.66666	80.00000	79.83334	
6	Pressure	79.83334	79.50000	80.16666	
7	Heating Rate	79.66666	79.66666	80.16666	
8	Queue Humidity	80.16666	79.33334	80.00000	

OPTIMAL COMBINATION — Date: 12-05-1991

AMFUEL

EXPERIMENT ID:	Shore A - Pt 6	RESPONSE:	Shore Scale
DEPARTMENT:	Amfuel	UNITS OF MEAS.:	
SET UP BY:	C. Marshall	SAMPLING METHOD:	
RECORDED BY:	crm	NO. OF SAMPLES TO TEST:	1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	-	NOT CRITICAL	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
7	Heating Rate	-	NOT CRITICAL	
8	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL:	79.44444		
USING 95% CONFIDENCE:	78.81065	TO	80.07823
USING 99% CONFIDENCE:	77.98239	TO	80.90649

ANALYSIS OF VARIANCE (ANOVA)
AMFUEL

EXPERIMENT ID:	Shore A - Pt 6	RESPONSE:	Shore Scale
DEPARTMENT:	Amfuel	UNITS OF MEAS.:	
SET UP BY:	C. Marshall	SAMPLING METHOD:	
RECORDED BY:	crm	NO. OF SAMPLES TO TEST:	

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	0.226563	1	0.226563	0.58	> 25%	0.00
2	Vulc Time	0.109375	2	0.054688	0.14	> 25%	0.00
3	Flow Temp	1.445313	2	0.722656	1.85	> 25%	6.36
4	Flow Time	2.109375	2	1.054688	2.70	> 25%	[illegible]
5	Vacuum Level	0.109375	2	0.054688	0.14	> 25%	0.00
6	Pressure	0.109375	2	0.054688	0.14	> 25%	0.00
7	Heating Rate	0.109375	2	0.054688	0.14	> 25%	0.00
8	Queue Humidity	5.445313	2	2.722656	6.97	25%	44.65
	ERROR	0.781250	2	0.390625			36.[illegible]
	TOTAL	10.44531	17				

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TABLE OF AVERAGES
AMFUEL

Date: [illegible]

EXPERIMENT ID: Shore A - Pt 5
COMPONENT: AMFUEL
SET UP BY: C. Marshall
RECORDED BY: [illegible]

RESPONSE: Shore Scale
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	79.55556	79.33334		
2	Vulc Time	79.33334	79.50000	79.50000	
3	Flow Temp	79.33334	79.16666	79.83334	
4	Flow Time	79.50000	79.83334	79.[illegible]	
5	Vacuum Level	79.50000	79.33334	79.50000	
6	Pressure	79.50000	79.50000	79.33334	
7	Heating Rate	79.33334	79.50000	79.50000	
8	Queue Humidity	79.83334	73.66666	79.83334	

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OPTIMAL COMBINATION
AMFUEL

Date: 12-05-19[illegible]

EXPERIMENT ID:	Shore A - Pt 5	RESPONSE:	Shore Scale
DEPARTMENT:	Amfuel	UNITS OF MEAS.:	
SET UP BY:	C. Marshall	SAMPLING METHOD:	
RECORDED BY:	ccm	NO. OF SAMPLES TO TEST:	1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	-	NOT CRITICAL	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
7	Heating Rate	-	NOT CRITICAL	
8	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL:	79.38839		
USING 95% CONFIDENCE:	78.92314	TO	79.85463
USING 99% CONFIDENCE:	78.31451	TO	80.46326

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ANALYSIS OF VARIANCE (ANOVA) Date: [illegible]
AMFUEL

EXPERIMENT ID: Shore A - Pt 5
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: cmm

RESPONSE: Shore Scale
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	0.062500	1	0.062500	0.30	> 25%	0.00
2	Vulc Time	0.445313	2	0.222656	1.06	> 25%	0.13
3	Flow Temp	0.117188	2	0.058594	0.28	> 25%	0.[illegible]
4	Flow Time	2.731250	2	1.390625	6.59	25%	28.[illegible]
5	Vacuum Level	0.781250	2	0.390625	1.85	> 25%	4.[illegible]
6	Pressure	3.109375	2	1.554688	7.37	25%	32.[illegible]5
7	Heating Rate	0.445313	2	0.222656	1.06	> 25%	0.[illegible]
8	Queue Humidity	0.117188	2	0.058594	0.28	> 25%	0.[illegible]
	ERROR	0.421875	2	0.210938			34.15
	TOTAL	8.281250	17				

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TABLE OF AVERAGES   Date: 12-05-1991
AMFUEL

EXPERIMENT ID: Shore A - Pr 5
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: Shore Scale
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	79.44444	79.33334		
2	Vulc Time	79.50000	79.16666	79.50000	
3	Flow Temp	79.33334	79.33334	79.50000	
4	Flow Time	78.83334	79.66666	79.66666	
5	Vacuum Level	79.16666	79.33334	79.66666	
6	Pressure	79.83334	79.50000	78.83334	
7	Heating Rate	79.16666	79.50000	79.50000	
8	Queue [illegible]	79.33334	79.33334	79.50000	

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OPTIMAL COMBINATION   Date: [illegible]

AMFUEL

EXPERIMENT ID:	Shore A - Pt 4	RESPONSE:	Shore Scale
DEPARTMENT:	Amfuel	UNITS OF MEAS.:	
SET UP BY:	C. Marshall	SAMPLING METHOD:	
RECORDED BY:	cmm	NO. OF SAMPLES TO TEST:	1

FIXED SETUP:

SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	-	NOT CRITICAL	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	[illegible]	-	NOT CRITICAL	
7	Heating Rate	-	NOT CRITICAL	
8	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL:	79.38889		
USING 95% CONFIDENCE:	78.67464	TO	80.10313
USING 99% CONFIDENCE:	77.74124	TO	81.03653

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ANALYSIS OF VARIANCE (ANOVA) Date: 12-05-1991
AMFUEL

EXPERIMENT ID:	Shore A - Pt 4	RESPONSE:	Shore Scale
DEPARTMENT:	Amfuel	UNITS OF MEAS.:	
SET UP BY:	C. Marshall	SAMPLING METHOD:	
RECORDED BY:	crm	NO. OF SAMPLES TO TEST:	1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	0.507813	1	0.507813	1.02	> 25%	[illegible]
2	Vulc Time	1.445313	2	0.722656	1.46	> 25%	3.17
3	Flow Temp	1.445313	2	0.722656	1.46	> 25%	3.17
4	Flow Time	3.109375	2	1.554688	3.13	25%	[illegible]
5	Vacuum Level	1.445313	2	0.722656	1.46	> 25%	3.17
6	Pressure	2.109375	2	1.054688	2.13	> 25%	7.82
7	Heating Rate	0.109375	2	0.054688	0.11	> 25%	0.00
8	Queue Humidity	3.117188	2	1.558594	3.14	25%	14.88
	ERROR	0.992188	2	0.496094			[illegible]
	TOTAL	14.28125	17				

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TABLE OF AVERAGES
AMFUEL

Date: 12-05-1991

EXPERIMENT ID: Shore A - Pt 4
DEPARTMENT: Amfuel
SET UP BY: J. Marshall
RECORDED BY: cam

RESPONSE: Shore Scale
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	79.22222	79.55556		
2	Vulc Time	79.00000	79.66666	79.50000	
3	Flow Temp	79.50000	79.00000	79.66666	
4	Flow Time	78.83334	79.50000	79.83334	
5	Vacuum Level	79.00000	79.50000	79.66666	
6	Pressure	79.83334	79.00000	79.33334	
7	Heating Rate	79.33334	79.50000	79.33334	
8	Queue Humidity	79.83334	78.83334	79.50000	

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OPTIMAL COMBINATION
AMFUEL

Date: 12-03-1991

EXPERIMENT ID: Shore A - Pt 3
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: Shore Scale
UNITS OF MEAS.:
SAMPLING METHOD
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	-	NOT CRITICAL	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
7	Heating Rate	-	NOT CRITICAL	
8	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL:	78.88889		
USING 95% CONFIDENCE:	77.43530	TO	80.34247
USING 99% CONFIDENCE:	75.53572	TO	82.24205

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ANALYSIS OF VARIANCE (ANOVA) Date: 12-05-19[illegible]

AMFUEL

EXPERIMENT ID:	Shore A - Pt 3	RESPONSE:	Shore Scale
DEPARTMENT:	Amfuel	UNITS OF MEAS.:	
SET UP BY:	C. Marshall	SAMPLING METHOD:	
RECORDED BY:	crm	NO. OF SAMPLES TO TEST:	1

FIXED SETUP:

SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	[illegible]	1	0.890625	0.43	> 25%	0.00
2	Vulc Time	0.109375	2	0.054688	0.03	> 25%	0.00
3	Flow Temp	0.445313	2	0.222656	0.11	> 25%	0.00
4	Flow Time	2.109375	2	1.054688	0.51	> 25%	0.[illegible]
5	Vacuum Level	10.10938	2	5.054688	2.46	> 25%	27.55
6	Pressure	1.445313	2	0.722656	0.35	> 25%	0.00
7	Heating Rate	0.781250	2	0.390625	0.19	> 25%	0.00
8	Queue Humidity	1.781250	2	0.890625	0.43	> 25%	0.00
	ERROR	4.109375	2	2.054688			72.[illegible]
	TOTAL	21.78125	17				

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TABLE OF AVERAGES
AMFUEL

Date: 12-05-[illegible]

EXPERIMENT ID:	Shore A - Pt 3		RESPONSE:	Shore Scale
DEPARTMENT:	Amfuel		UNITS OF MEAS.:	
SET UP BY:	C. Marshall		SAMPLING METHOD:	
RECORDED BY:	cmm		NO. OF SAMPLES TO TEST:	1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	78.66666	79.11111		
2	Vulc Time	78.83334	79.00000	78.83334	
3	Flow Temp	79.00000	78.66666	79.00000	
4	Flow Time	78.50000	78.83334	79.33334	
5	Vacuum Level	77.83334	79.50000	79.33334	
6	Pressure	79.00000	78.50000	79.16666	
7	Heating Rate	78.66666	79.16666	78.83334	
[illegible]	[illegible]ue Humidity	79.33334	78.66666	[illegible]	

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OPTIMAL COMBINATION
AMFUEL

Date: 12-05-19[illegible]

EXPERIMENT ID:	Shore A - Pt 2	RESPONSE:	Shore Scale
DEPARTMENT:	Amfuel	UNITS OF MEAS.:	
SET UP BY:	C. Marshall	SAMPLING METHOD:	
RECORDED BY:	crm	NO. OF SAMPLES TO TEST:	1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	________________
2	Vulc Time	-	NOT CRITICAL	________________
3	Flow Temp	-	NOT CRITICAL	________________
4	Flow Time	-	NOT CRITICAL	________________
5	Vacuum Level	-	NOT CRITICAL	________________
6	Pressure	-	NOT CRITICAL	________________
7	[illegible]sting [illegible]	-	NOT CRITICAL	________________
8	Queue Humidity	-	NOT CRITICAL	________________

OPTIMAL RESPONSE:

OPTIMAL:	78.72222		
USING 95% CONFIDENCE:	77.52470	TO	79.91974
USING 99% CONFIDENCE:	75.95976	TO	81.43468

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ANALYSIS OF VARIANCE (ANOVA) Date: 12-03-1991
AMFUEL

EXPERIMENT ID:	Shore A - Pt 2	RESPONSE:	Shore Scale
DEPARTMENT:	Amfuel	UNITS OF MEAS.:	
SET UP BY:	C. Marshall	SAMPLING METHOD:	
[illegible]	[illegible]	[illegible]	

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	0.054688	1	0.054688	0.04	> 25%	0.00
2	Vulc Time	2.109375	2	1.054688	0.76	> 25%	0.00
3	Flow Temp	4.109375	2	2.054688	1.47	> 25%	[illegible]
4	Flow Time	2.109375	2	1.054688	0.76	> 25%	0.00
5	Vacuum Level	4.109375	2	2.054688	1.47	> 25%	6.11
6	Pressure	0.445313	2	0.222656	0.16	> 25%	0.00
7	Heating Rate	0.109375	2	0.054688	0.04	> 25%	0.00
8	Queue Humidity	5.773438	2	2.886719	2.07	> 25%	10.31
	ERROR	2.789063	2	1.394531			[illegible]
	TOTAL	21.60938	17				

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TABLE OF AVERAGES Date: 12-05-1991
AMFUEL

EXPERIMENT ID: Shore A - Pt 2
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: cmm

RESPONSE: Shore Scale
UNITS OF MEAS.:
SAMPLING METHOD:

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	78.66666	78.77778		
2	Vulc Time	78.66666	78.33334	79.16666	
3	Flow Temp	78.16666	78.66666	79.33334	
4	Flow Time	78.66666	78.33334	79.16666	
5	Vacuum Level	78.16666	78.66666	79.33334	
6	Pressure	78.83334	78.50000	78.83334	
7	Heating Rate	78.66666	78.66666	78.83334	
	Queue Humidity	79.50000	78.16666	78.50000	

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OPTIMAL COMBINATION
AMFUEL

Date: 12-05-1???

EXPERIMENT ID: Shore A - Pt 1
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: Shore Scale
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	-	NOT CRITICAL	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
7	Heating Rate	-	NOT CRITICAL	
8	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL:	78.22222		
USING 95% CONFIDENCE:	76.54656	TO	79.89788
USING 99% CONFIDENCE:	74.35677	TO	82.08768

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* ANALYSIS OF VARIANCE (ANOVA) Date: 12-05-19[illegible]

* AMFUEL

*

EXPERIMENT ID: Shore A - Pt 1	RESPONSE: Shore Scale
DEPARTMENT: Amfuel	UNITS OF MEAS.:
SET UP BY: C. Marshall	SAMPLING METHOD:
RECORDED BY: [illegible]	NO. OF SAMPLES: [illegible]

FIXED SETUP:

SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	0.890625	1	0.890625	0.33	> 25%	0.[illegible]
2	Vulc Time	0.109375	2	0.054688	0.02	> 25%	0.[illegible]
3	Flow Temp	0.437500	2	0.218750	0.08	> 25%	0.[illegible]
4	Flow Time	1.445313	2	0.722656	0.26	> 25%	0.[illegible]
5	Vacuum Level	0.773438	2	0.386719	0.14	> 25%	0.[illegible]
6	Pressure	0.109375	2	0.054688	0.02	> 25%	0.[illegible]
7	Heating Rate	3.109375	2	1.554688	0.57	> 25%	0.[illegible]
8	Queue Humidity	6.773438	2	3.386719	[illegible].24	> 25%	6.[illegible]
	ERROR	5.460938	2	2.730469			93.[illegible]
	TOTAL	19.10938	17				

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TABLE OF AVERAGES
AMFUEL

[illegible]

EXPERIMENT ID: Shore A - Pt 1
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
[illegible]

RESPONSE: Shore Scale
UNITS OF MEAS -
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: [illegible]

[illegible]
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	78.00000	78.44444		
2	Vulc Time	78.33334	78.16666	78.16666	
3	Flow Temp	78.00000	78.33334	78.33334	
4	Flow Time	77.83334	78.50000	78.33334	
5	Vacuum Level	78.00000	78.16666	78.50000	
6	Pressure	78.16666	78.16666	78.33334	
7	Heating Rate	78.33334	77.66666	78.66666	
8	Queue Humidity	79.00000	77.50000	78.16666	

OPTIMAL COMBINATION
AMFUEL

Date: 01-15-1992

EXPERIMENT ID: TENSILE #5 TC
DEPARTMENT: AMFUEL
SET UP BY: C. MARSHALL
RECORDED BY: W. COLEN

RESPONSE: TENSILE
UNITS OF MEAS.: LBS/SQ IN
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 2

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES: LBS/SQ IN
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	-	NOT CRITICAL	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
	Heating Rate	-	NOT CRITICAL	
	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL:	2297.694		
USING 95% CONFIDENCE:	2150.642	TO	2444.747
USING 99% CONFIDENCE:	2097.030	TO	2498.359

ANALYSIS OF VARIANCE (ANOVA)

AMFUEL

Date: 01-15-1992

EXPERIMENT ID:	TENSILE #5 TC	RESPONSE:	TENSILE
DEPARTMENT:	AMFUEL	UNITS OF MEAS.:	LBS/SQ IN
SET UP BY:	C. MARSHALL	SAMPLING METHOD:	
RECORDED BY:	W. COLEN	NO. OF SAMPLES TO TEST:	2

FIXED SETUP:

SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	629648.0	1	629648.0	3.52	10%	7.99
2	Vulc Time	43584.00	2	21792.00	0.12	> 25%	0.00
3	Flow Temp	54096.00	2	27048.00	0.15	> 25%	0.00
4	Flow Time	103360.0	2	51680.00	0.29	> 25%	0.00
5	Vacuum Level	796576.0	2	398288.0	2.23	25%	7.77
6	Pressure	976.0000	2	488.0000	0.00	> 25%	0.00
7	Heating Rate	104880.0	2	52440.00	0.29	> 25%	0.00
8	Queue Humidity	330832.0	2	165416.0	0.92	> 25%	0.00
	ERROR	3579216	20	178960.8			84.24
	TOTAL	5643168	35				

TABLE OF AVERAGES Date: 12-05-1991
AMFUEL

EXPERIMENT ID: Shore A - Pt 11
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: Shore Scale
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	79.88889	79.66666		
2	Vulc Time	79.16666	80.50000	79.66666	
3	Flow Temp	79.83334	79.50000	80.00000	
4	Flow Time	80.00000	79.66666	79.66666	
5	Vacuum Level	79.83334	79.66666	79.83334	
6	Pressure	79.66666	80.00000	79.66666	
7	Heating Rate	79.83334	79.83334	79.66666	
8	Queue Humidity	79.83334	79.33334	80.16666	

```
************************************************************************
*                                                                      *
*     ANALYSIS OF VARIANCE (ANOVA)                  Date: 12-05-1991  *
*     AMFUEL                                                           *
*                                                                      *
************************************************************************
```

EXPERIMENT ID: Shore A - Pt 11
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: Shore Scale
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	0.218750	1	0.218750	0.30	> 25%	0.00
2	Vulc Time	5.437500	2	2.718750	3.70	25%	35.72
3	Flow Temp	0.773438	2	0.386719	0.53	> 25%	0.00
4	Flow Time	0.437500	2	0.218750	0.30	> 25%	0.00
5	Vacuum Level	0.109375	2	0.054688	0.07	> 25%	0.00
6	Pressure	0.445313	2	0.222656	0.30	> 25%	0.00
7	Heating Rate	0.109375	2	0.054688	0.07	> 25%	0.00
8	Queue Humidity	2.109375	2	1.054688	1.44	> 25%	5.77
	ERROR	1.468750	2	0.734375			58.51
	TOTAL	11.10938	17				

****

OPTIMAL COMBINATION
AMFUEL

Date: 12-05-1991

****

EXPERIMENT ID: Shore A - Pt 11
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: Shore Scale
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	-	NOT CRITICAL	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
7	Heating Rate	-	NOT CRITICAL	
8	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL:	79.77778		
USING 95% CONFIDENCE:	78.90877	TO	80.64679
USING 99% CONFIDENCE:	77.77312	TO	81.78244

TABLE OF AVERAGES
AMFUEL

Date: 12-05-1991

EXPERIMENT ID: Shore A - Pt 12
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: Shore Scale
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	79.88889	80.11111		
2	Vulc Time	79.83334	80.33334	79.83334	
3	Flow Temp	80.33334	79.50000	80.16666	
4	Flow Time	80.16666	79.83334	80.00000	
5	Vacuum Level	79.83334	80.00000	80.16666	
6	Pressure	79.83334	80.16666	80.00000	
7	Heating Rate	80.00000	80.16666	79.83334	
8	Queue Humidity	80.16666	79.66666	80.16666	

ANALYSIS OF VARIANCE (ANOVA) Date: 12-05-1991

AMFUEL

EXPERIMENT ID: Shore A - Pt 12
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: Shore Scale
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	0.218750	1	0.218750	3.73	25%	2.67
2	Vulc Time	1.000000	2	0.500000	8.53	25%	14.71
3	Flow Temp	2.328125	2	1.164063	19.87	5.0%	36.85
4	Flow Time	0.335938	2	0.167969	2.87	> 25%	3.65
5	Vacuum Level	0.335938	2	0.167969	2.87	> 25%	3.65
6	Pressure	0.335938	2	0.167969	2.87	> 25%	3.65
7	Heating Rate	0.328125	2	0.164063	2.80	> 25%	3.52
8	Queue Humidity	1.000000	2	0.500000	8.53	25%	14.71
	ERROR	0.117188	2	0.058594			16.60
	TOTAL	6.000000	17				

OPTIMAL COMBINATION
AMFUEL

Date: 12-05-1991

EXPERIMENT ID: Shore A - Pt 12
DEPARTMENT: Amfuel
SET UP BY: C. Marshall
RECORDED BY: crm

RESPONSE: Shore Scale
UNITS OF MEAS.:
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES:
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	
2	Vulc Time	-	NOT CRITICAL	
3	Flow Temp	1	200	
4	Flow Time	-	NOT CRITICAL	
5	Vacuum Level	-	NOT CRITICAL	
6	Pressure	-	NOT CRITICAL	
7	Heating Rate	-	NOT CRITICAL	
8	Queue Humidity	-	NOT CRITICAL	

OPTIMAL RESPONSE:

OPTIMAL: 80.33334
SING 95% CONFIDENCE: 79.90817 TO 80.75850
SING 99% CONFIDENCE: 79.35256 TO 81.31411

TABLE OF AVERAGES
AMFUEL

Date: 01-13-1992

EXPERIMENT ID: DSC TESTS
DEPARTMENT: AMFUEL
SET UP BY: C. MARSHALL
RECORDED BY: MATECH

RESPONSE: GLASS TRANS
UNITS OF MEAS.: DEG C
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES: DEG C

##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	-43.54000	-43.83223		
2	Vulc Time	-43.96334	-43.70667	-43.38833	
3	Flow Temp	-43.46667	-43.99333	-43.59834	
4	Flow Time	-43.47000	-43.92000	-43.66833	
5	Vacuum Level	-43.41167	-43.91333	-43.73334	
6	Pressure	-44.64167	-43.54667	-42.87001	
7	Heating Rate	-43.82333	-43.37500	-43.86000	
8	Queue Humidity	-43.58667	-44.20167	-43.27000	

RESPONSE PLOTS
AMFUEL

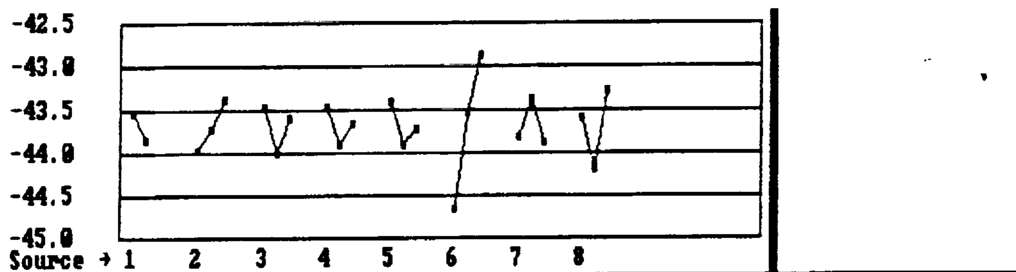
Date: 01-13-1992

EXPERIMENT ID: DSC TESTS
DEPARTMENT: AMFUEL
SET UP BY: C. MARSHALL
RECORDED BY: MATECH

RESPONSE: GLASS TRANS
UNITS OF MEAS.: DEG C
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES: DEG C



##	SOURCE	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
1	Vulc Temp	310	350		
2	Vulc Time	1	3	6	
3	Flow Temp	200	230	260	
4	Flow Time	1	3	5	
5	Vacuum Level	28.5	26	20	
6	Pressure	50	100	135	
7	Heating Rate	1	.5	2	
8	Queue Humidity	4	8	12	

```
***********************************************************************
*                                                                     *
*      ANALYSIS OF VARIANCE (ANOVA)                 Date: 01-13-1992  *
*      AMFUEL                                                         *
*                                                                     *
***********************************************************************
```

EXPERIMENT ID: DSC TESTS
DEPARTMENT: AMFUEL
SET UP BY: C. MARSHALL
RECORDED BY: MATECH

RESPONSE: GLASS TRANS
UNITS OF MEAS.: DEG C
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

##	Source	SS	d.f	MS	F	% Alpha	% Contrib
1	Vulc Temp	0.382813	1	0.382813	0.24	> 25%	0.00
2	Vulc Time	0.992188	2	0.496094	0.31	> 25%	0.00
3	Flow Temp	0.898438	2	0.449219	0.28	> 25%	0.00
4	Flow Time	0.609375	2	0.304688	0.19	> 25%	0.00
5	Vacuum Level	0.773438	2	0.386719	0.24	> 25%	0.00
6	Pressure	9.589844	2	4.794922	3.01	25%	32.04
7	Heating Rate	0.871094	2	0.435547	0.27	> 25%	0.00
8	Queue Humidity	2.691406	2	1.345703	0.85	> 25%	0.00
	ERROR	3.183594	2	1.591797			67.96
	TOTAL	19.99219	17				

****

OPTIMAL COMBINATION
AMFUEL

Date: 01-13-1992

****

EXPERIMENT ID: DSC TESTS
DEPARTMENT: AMFUEL
SET UP BY: C. MARSHALL
RECORDED BY: MATECH

RESPONSE: GLASS TRANS
UNITS OF MEAS.: DEG C
SAMPLING METHOD:
NO. OF SAMPLES TO TEST: 1

FIXED SETUP:
SPECIAL INSTRUCTIONS:

UNITS OF AVERAGES: DEG C
CRITERIA: MAXIMIZE RESPONSE

##	FACTOR	LEVEL	SETUP	COMMENT
1	Vulc Temp	-	NOT CRITICAL	____________
2	Vulc Time	-	NOT CRITICAL	____________
3	Flow Temp	-	NOT CRITICAL	____________
4	Flow Time	-	NOT CRITICAL	____________
5	Vacuum Level	-	NOT CRITICAL	____________
6	Pressure	-	NOT CRITICAL	____________
7	Heating Rate	-	NOT CRITICAL	____________
8	Queue Humidity	-	NOT CRITICAL	____________

OPTIMAL RESPONSE:

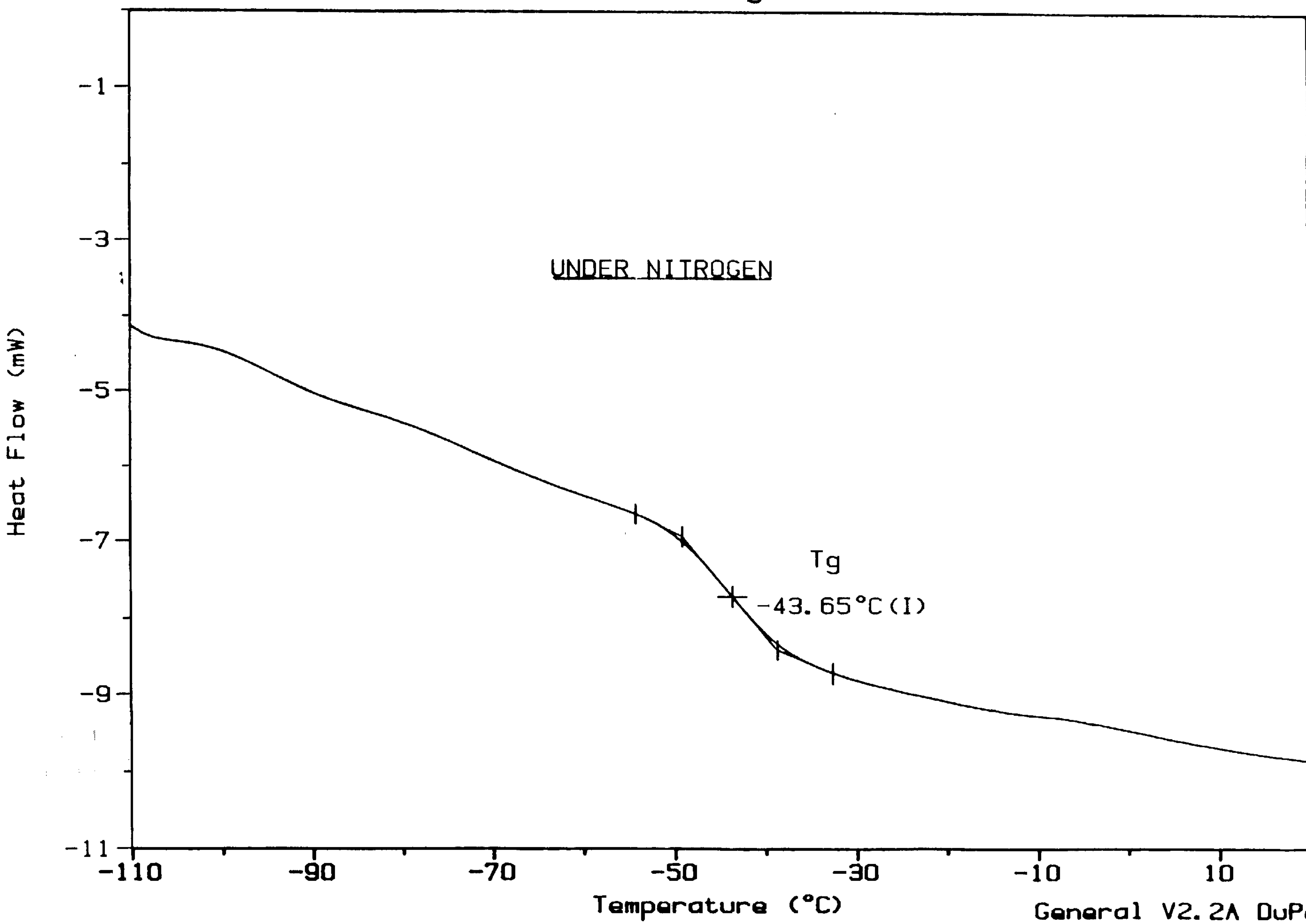
OPTIMAL: -43.68611
USING 95% CONFIDENCE: -44.96552 TO -42.40670
USING 99% CONFIDENCE: -46.63750 TO -40.73473

MATECH ASSOCIATES   Scranton, P. 18510   Tel/Fax (717) 344-4067

Sample: KEVLAR-FILLED EPDM; SAMPLE #1
Size: 29.4800 mg
Method: DSC Tg/CURE ANALYSIS
Comment: DEGREE OF CURE STUDY, VARIATION OF Tg

DSC

File: A:AFC91DSC01.02
Operator: BC
Run Date: 27-Dec-91 14:00



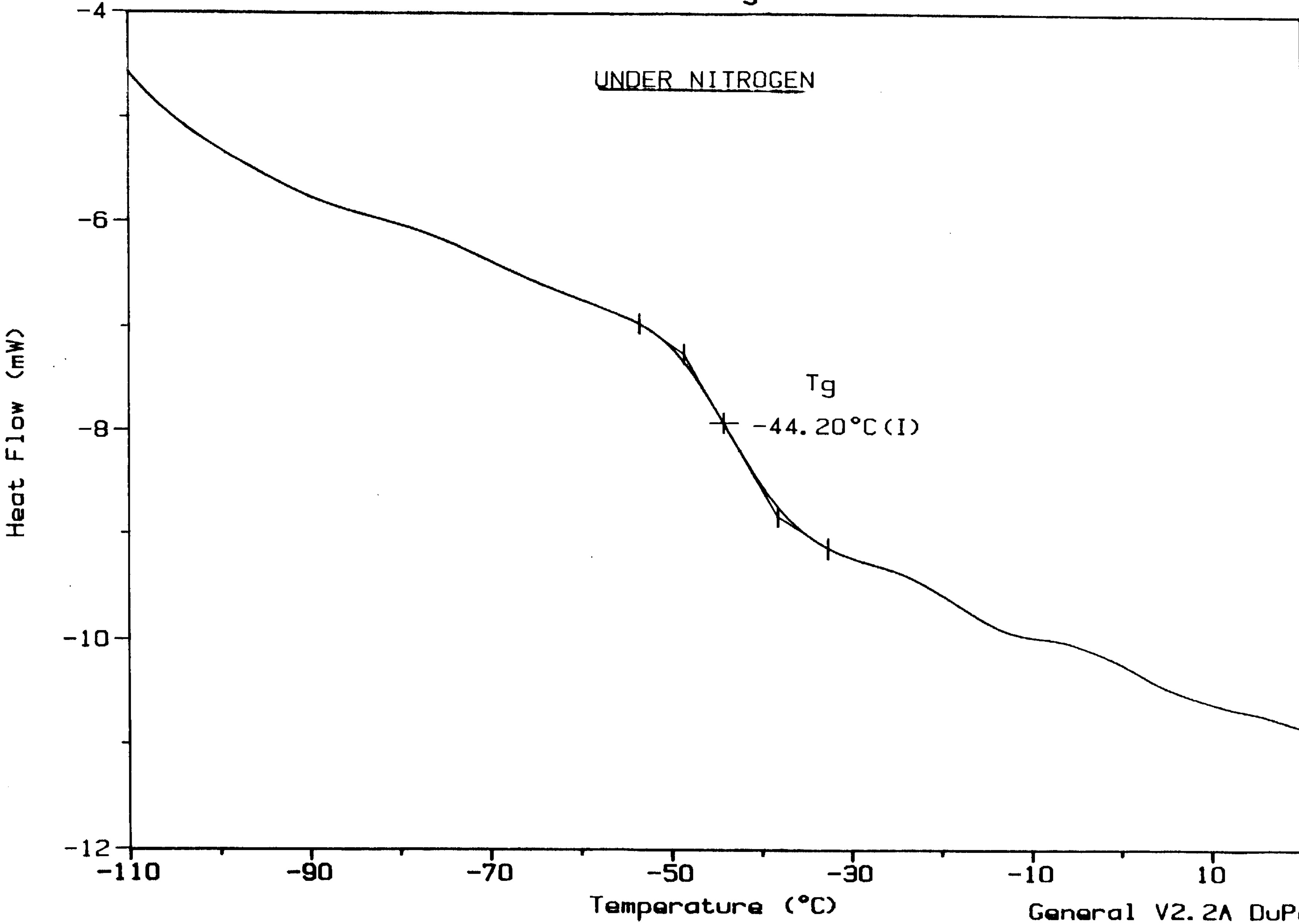
General V2.2A DuPont 9900

MATECH ASSOCIATES   Scranton, P. 18510   Tel/Fax (717) 344-4067

Sample: KEVLAR-FILLED EPDM, SAMPLE #2
Size: 38.1800 mg
Method: DSC Tg/CURE ANALYSIS
Comment: DEGREE OF CURE STUDY, VARIATION OF Tg

DSC

File: A:AFC91DSC01.03
Operator: BC
Run Date: 27-Dec-91 14:50



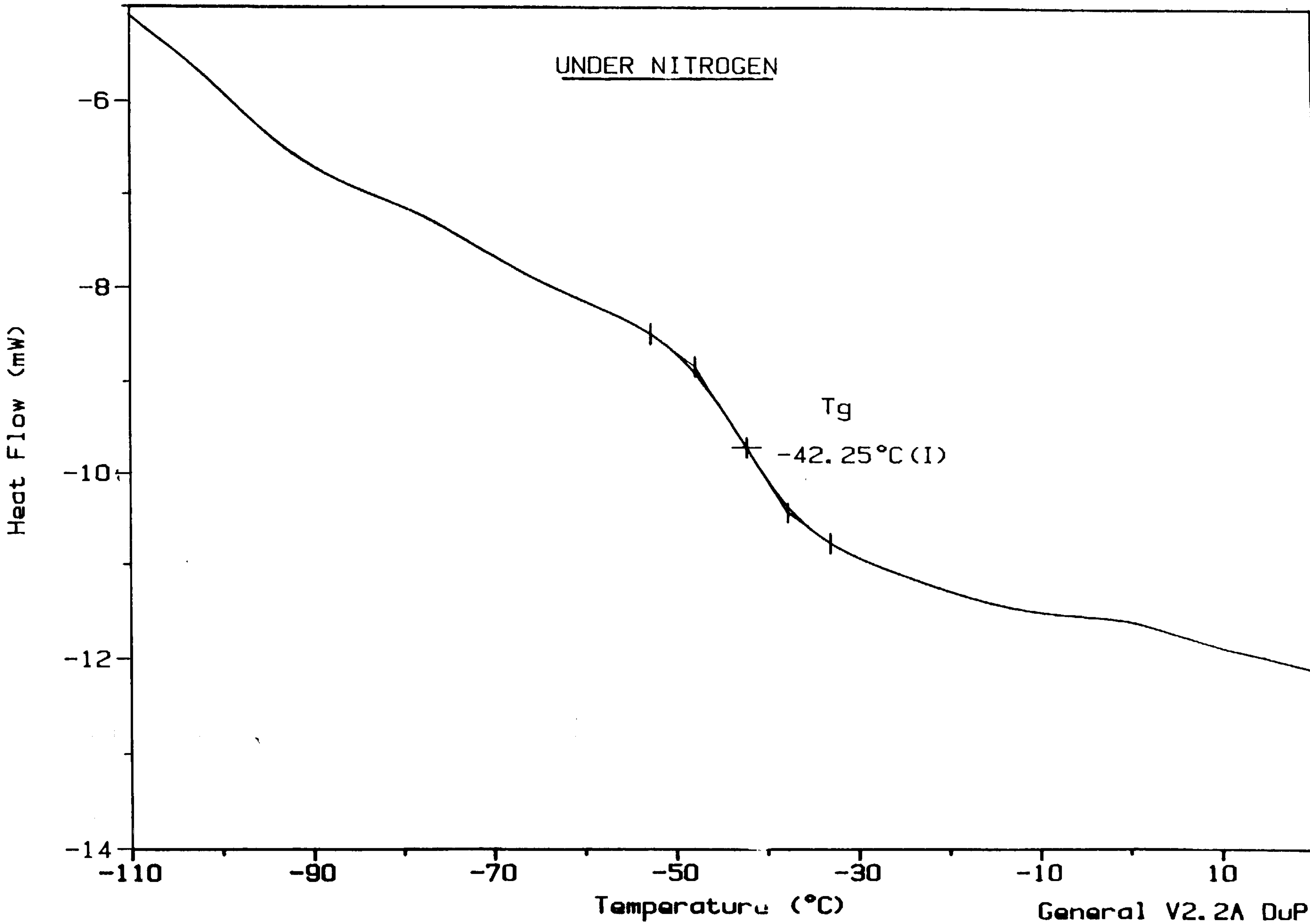
General V2.2A DuPont 9900

MATECH ASSOCIATES   Scranton, I 18510   Tel/Fax (717) 344-4067

Sample: KEVLAR-FILLED EPDM; SAMPLE #3
Size: 0.0000 mg
Method: DSC Tg/CURE ANALYSIS
Comment: DEGREE OF CURE STUDY, VARIATION OF Tg

DSC

File: A:AFC91DSC01.04
Operator: BC
Run Date: 27-Dec-91 15:08



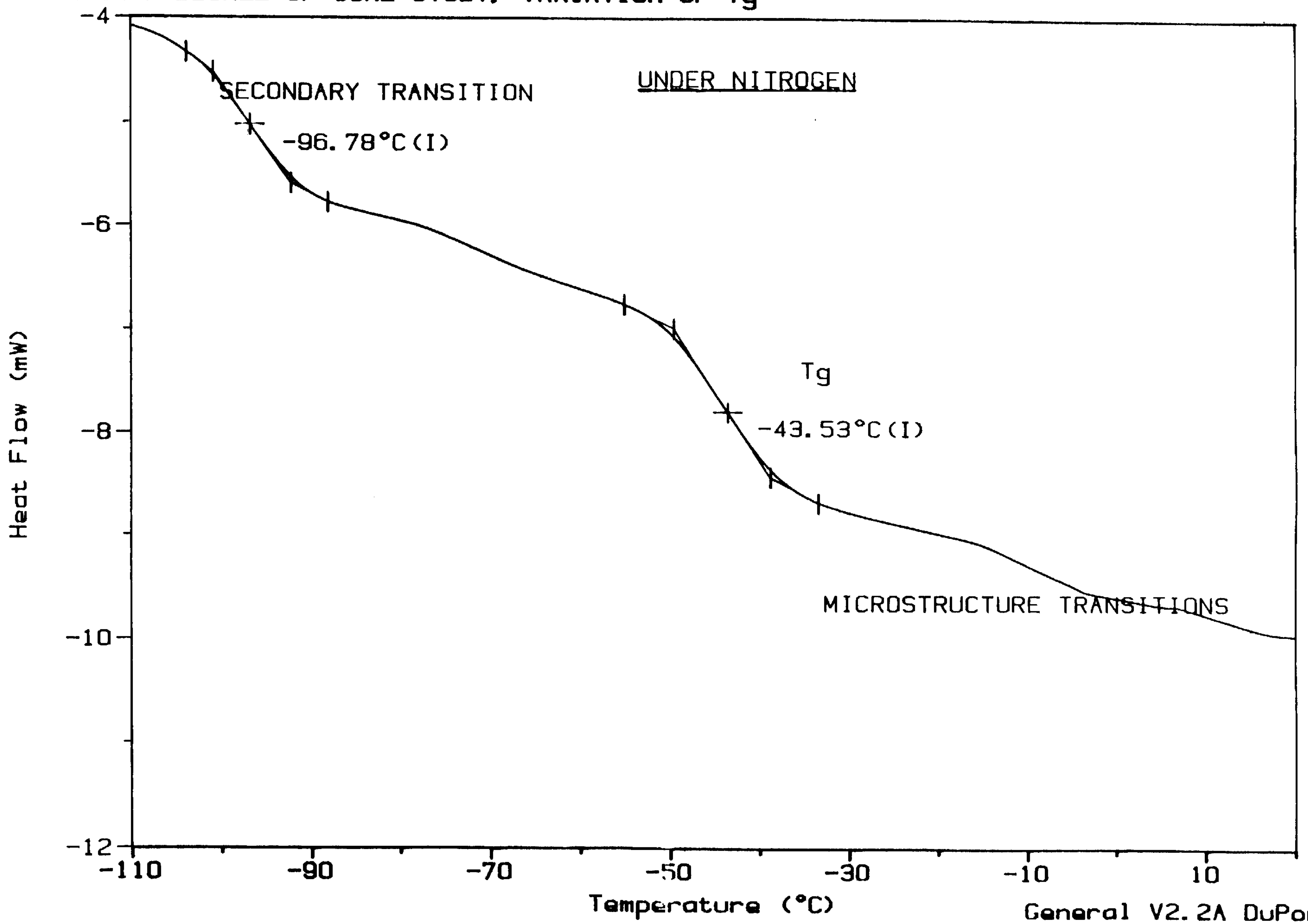
General V2.2A DuPont 9900

MATECH ASSOCIATES Scranton, P. 18510 Tel/Fax (717) 344-4067

Sample: KEVLAR-FILLED EPDM, SAMPLE #4
Size: 0.0000 mg
Method: DSC Tg/CURE ANALYSIS
Comment: DEGREE OF CURE STUDY, VARIATION OF Tg

DSC

File: A:AFC91DSC01.05
Operator: BC
Run Date: 27-Dec-91 15:27



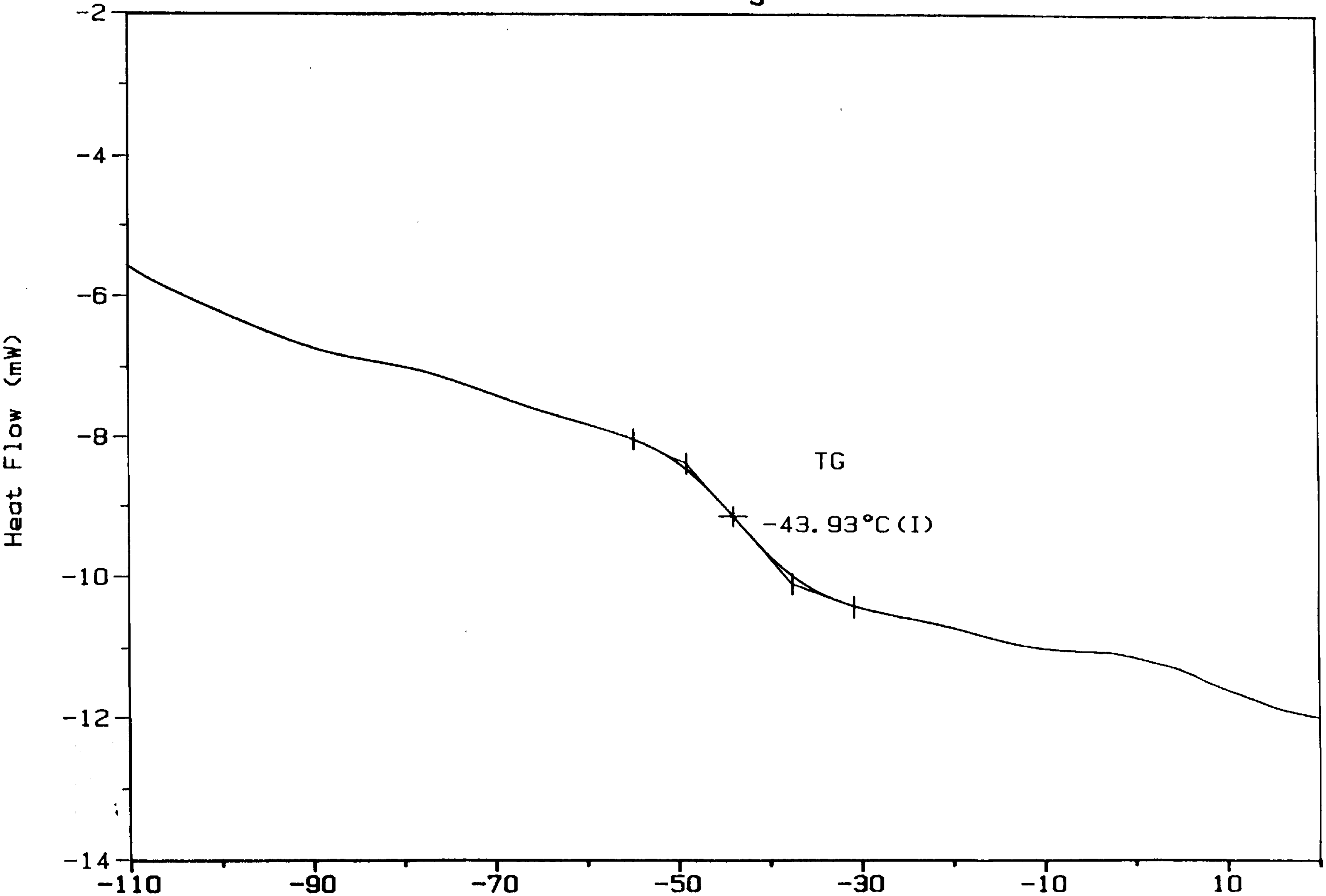
General V2.2A DuPont 9900

MATECH ASSOCIATES Scranton, I 18510 Tel/Fax (717) 344-4067

Sample: KEVLAR-FILLED EPDM; SAMPLE #5
Size: 0.0000 mg
Method: DSC Tg/CURE ANALYSIS
Comment: DEGREE OF CURE STUDY, VARIATION OF Tg

DSC

File: A:AFC91DSC01.06
Operator: BC
Run Date: 27-Dec-91 15:44



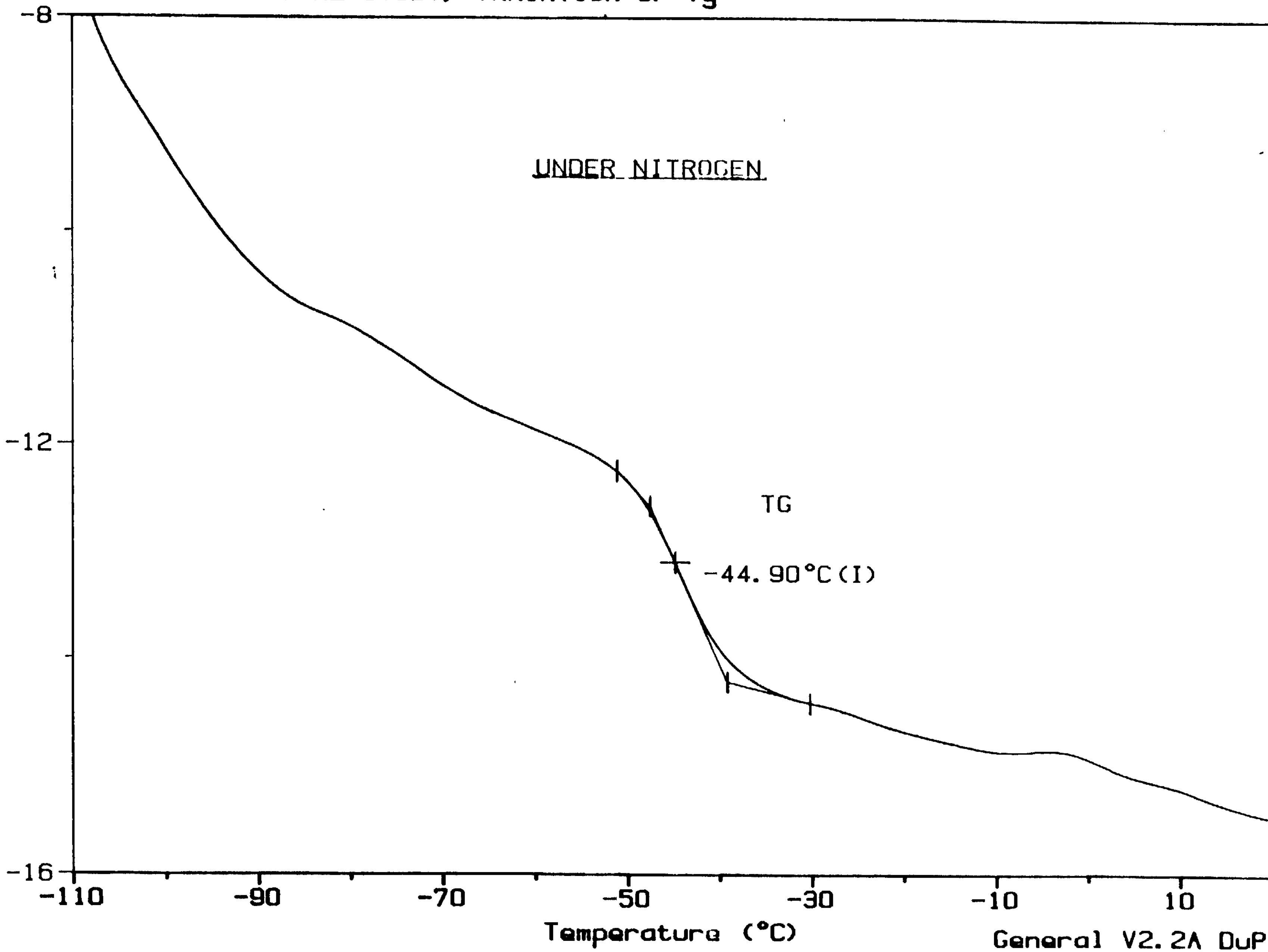
General V2.2A DuPont 9900

MATECH ASSOCIATES   Scranton, I 18510   Tel/Fax (717) 344-4067

Sample: KEVLAR-FILLED EPDM, SAMPLE #6
Size: 0.0000 mg
Method: DSC Tg/CURE ANALYSIS
Comment: DEGREE OF CURE STUDY, VARIATION OF Tg

DSC

File: A:AFC91DSC01.07
Operator: BC
Run Date: 3-Jan-92 08:18



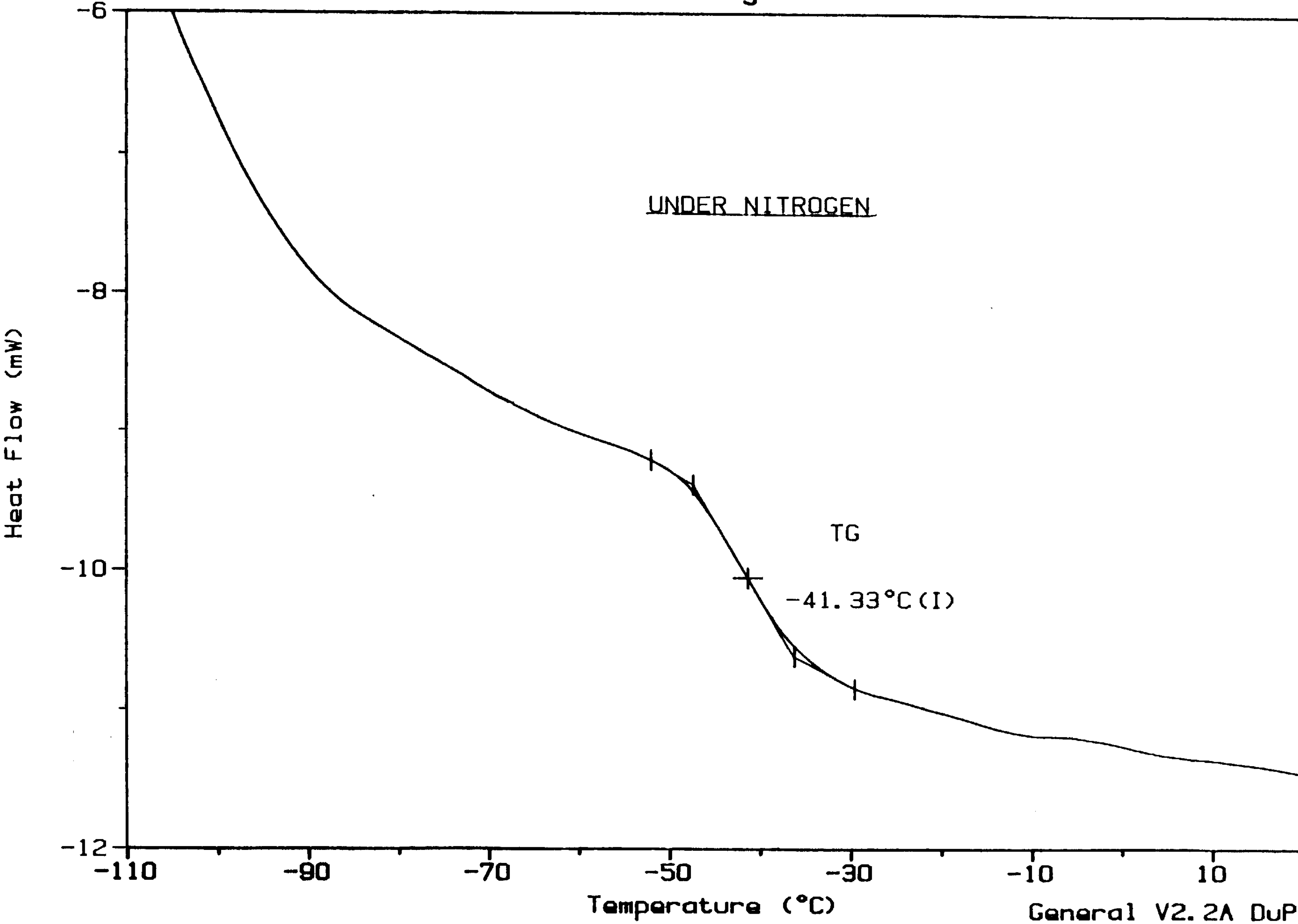
General V2.2A DuPont 9900

MATECH ASSOCIATES   Scranton, I. 18510   Tel/Fax (717) 344-4067

Sample: KEVLAR-FILLED EPDM; SAMPLE #7
Size: 0.0000 mg
Method: DSC Tg/CURE ANALYSIS
Comment: DEGREE OF CURE STUDY, VARIATION OF Tg

DSC

File: A:AFC91DSC01.08
Operator: BC
Run Date: 3-Jan-92 08:40



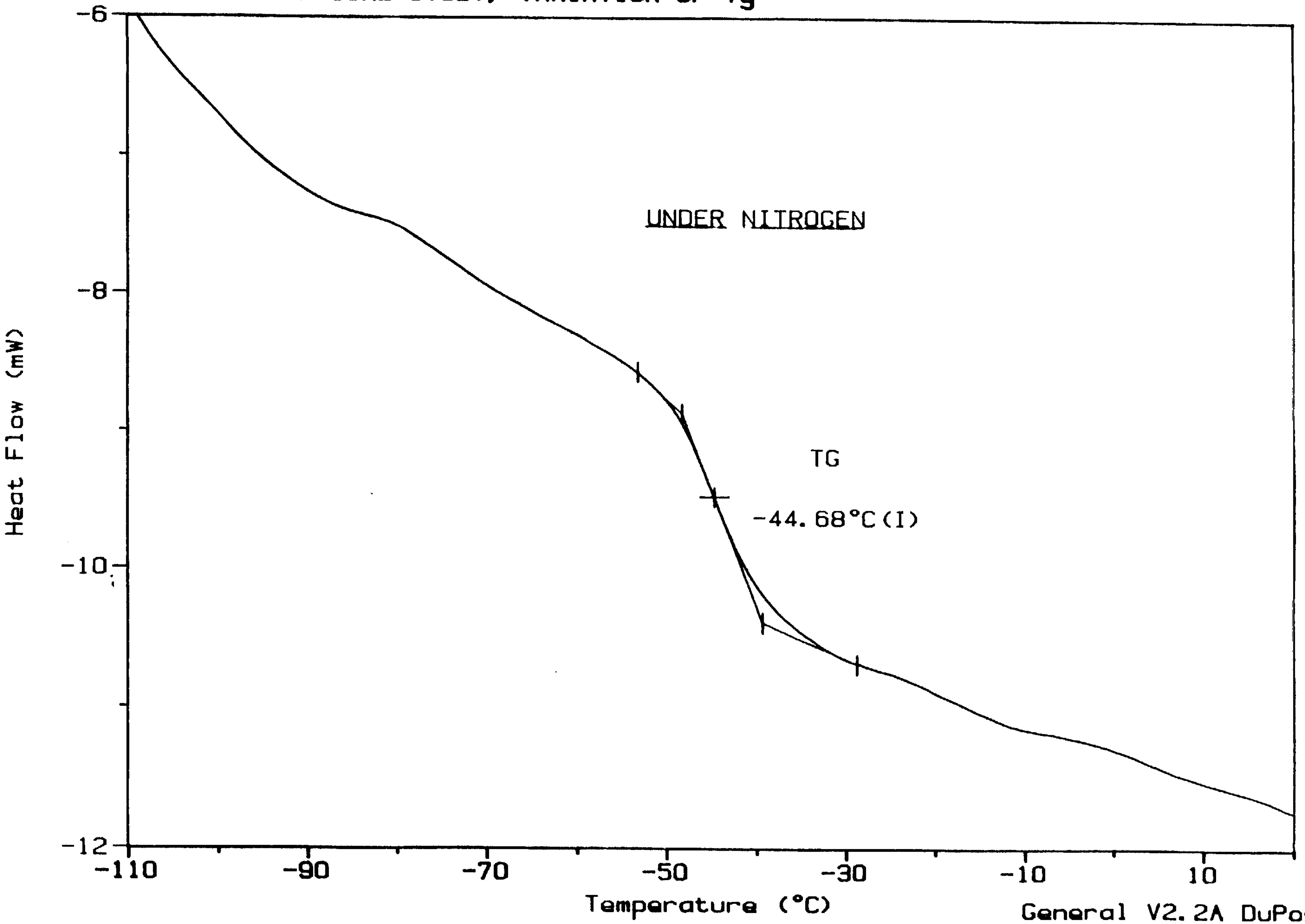
General V2.2A DuPont 9900

MATECH ASSOCIATES Scranton PA 18510 Tel/Fax (717) 344-4067

Sample: KEVLAR-FILLED EPDM; SAMPLE #8
Size: 0.0000 mg
Method: DSC Tg/CURE ANALYSIS
Comment: DEGREE OF CURE STUDY, VARIATION OF Tg

DSC

File: A:AFC91DSC01.09
Operator: BC
Run Date: 3-Jan-92 09:02



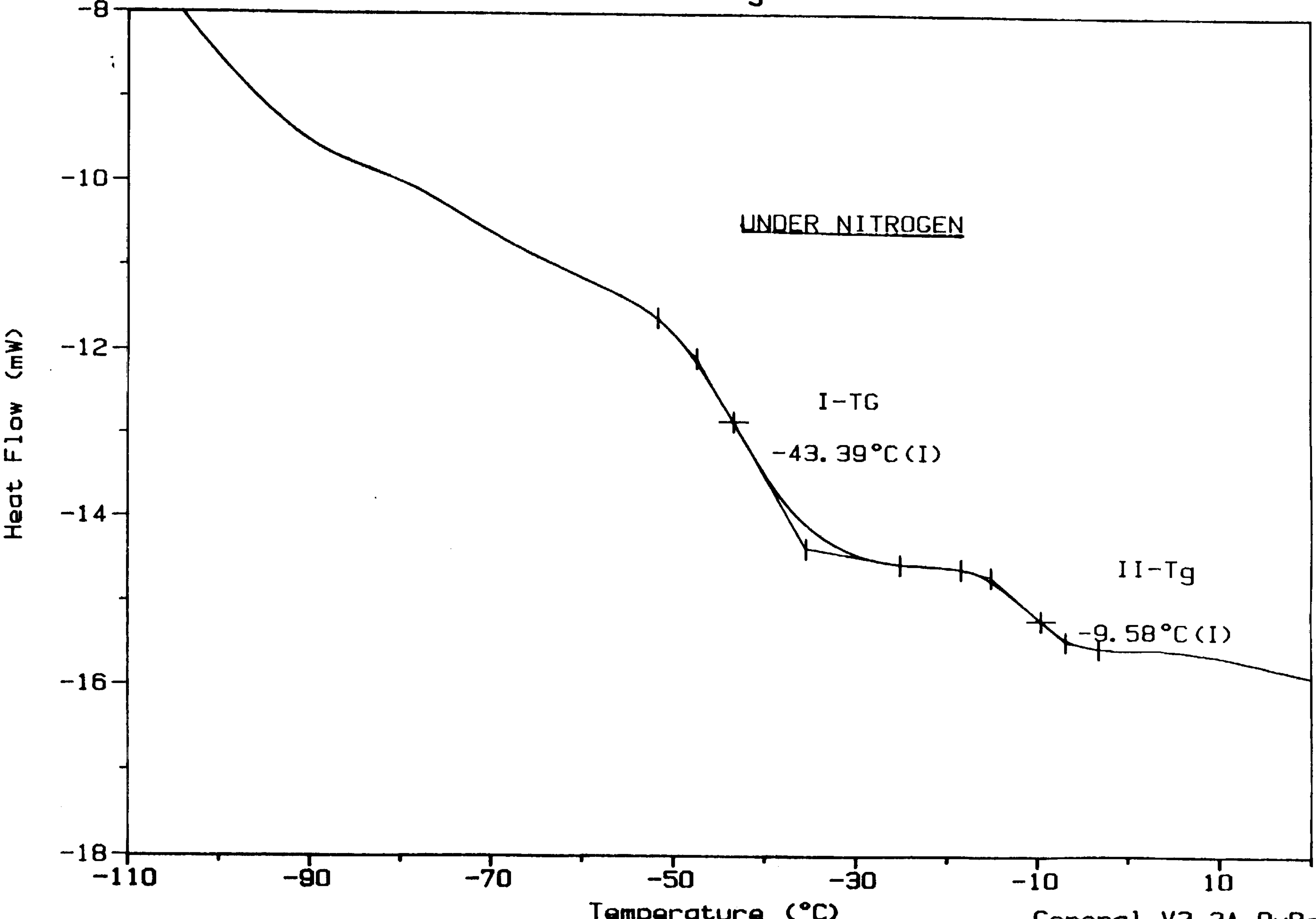
General V2.2A DuPont 9900

MATECH ASSOCIATES Scranton, I 18510 Tel/Fax (717) 344-4067

Sample: KEVLAR-FILLED EPDM; SAMPLE #9
Size: 0.0000 mg
Method: DSC Tg/CURE ANALYSIS
Comment: DEGREE OF CURE STUDY, VARIATION OF Tg

DSC

File: A:AFC91DSC01.10
Operator: BC
Run Date: 3-Jan-92 09:20



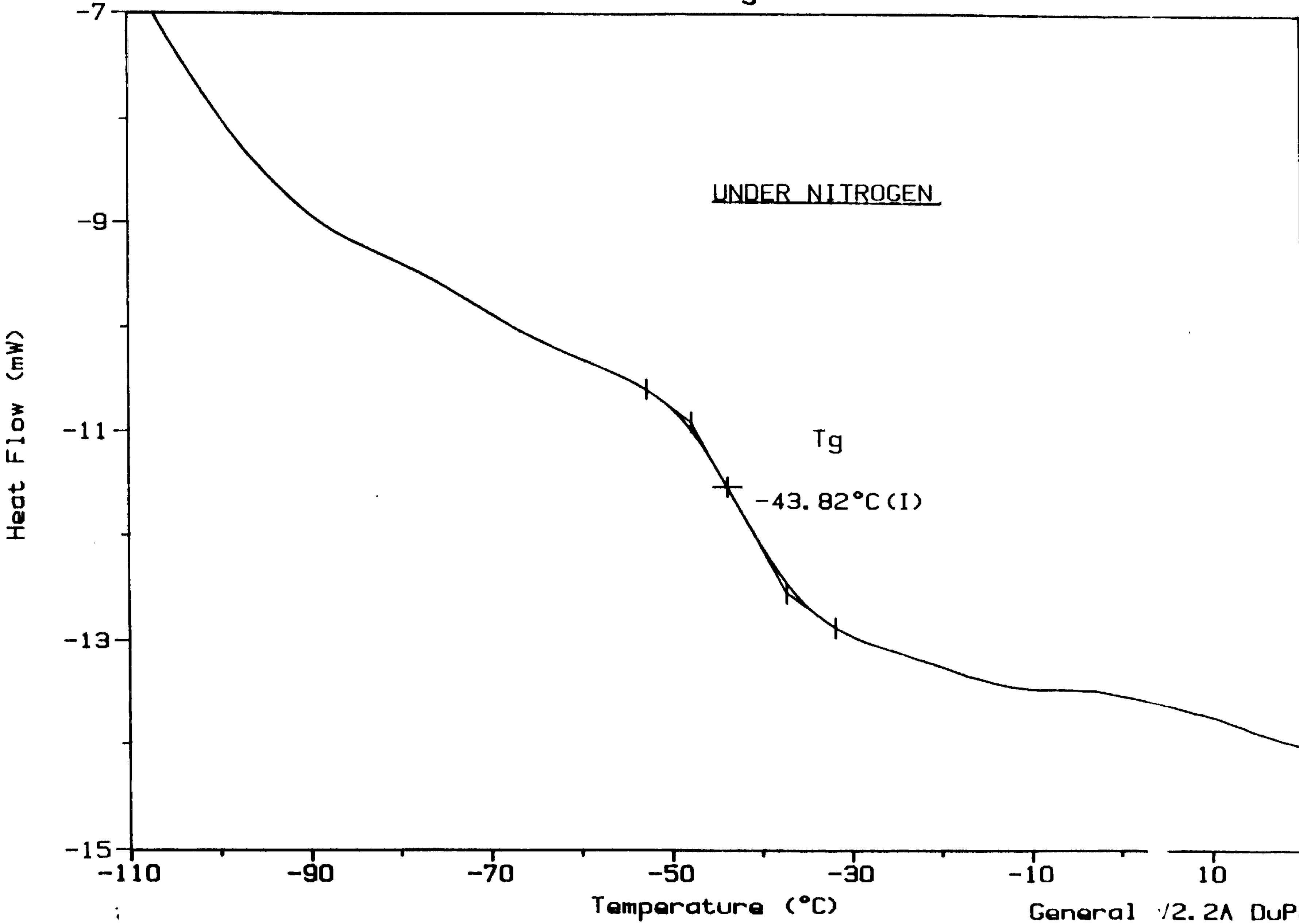
General V2.2A DuPont 9900

MATECH ASSOCIATES   Scranton, P. 18510   Tel/Fax (717) 344-4067

Sample: KEVLAR-FILLED EPDM, SAMPLE #10
Size: 0.0000 mg
Method: DSC Tg/CURE ANALYSIS
Comment: DEGREE OF CURE STUDY, VARIATION OF Tg

DSC

File: A:AFC91DSC01.11
Operator: BC
Run Date: 3-Jan-92 09:36



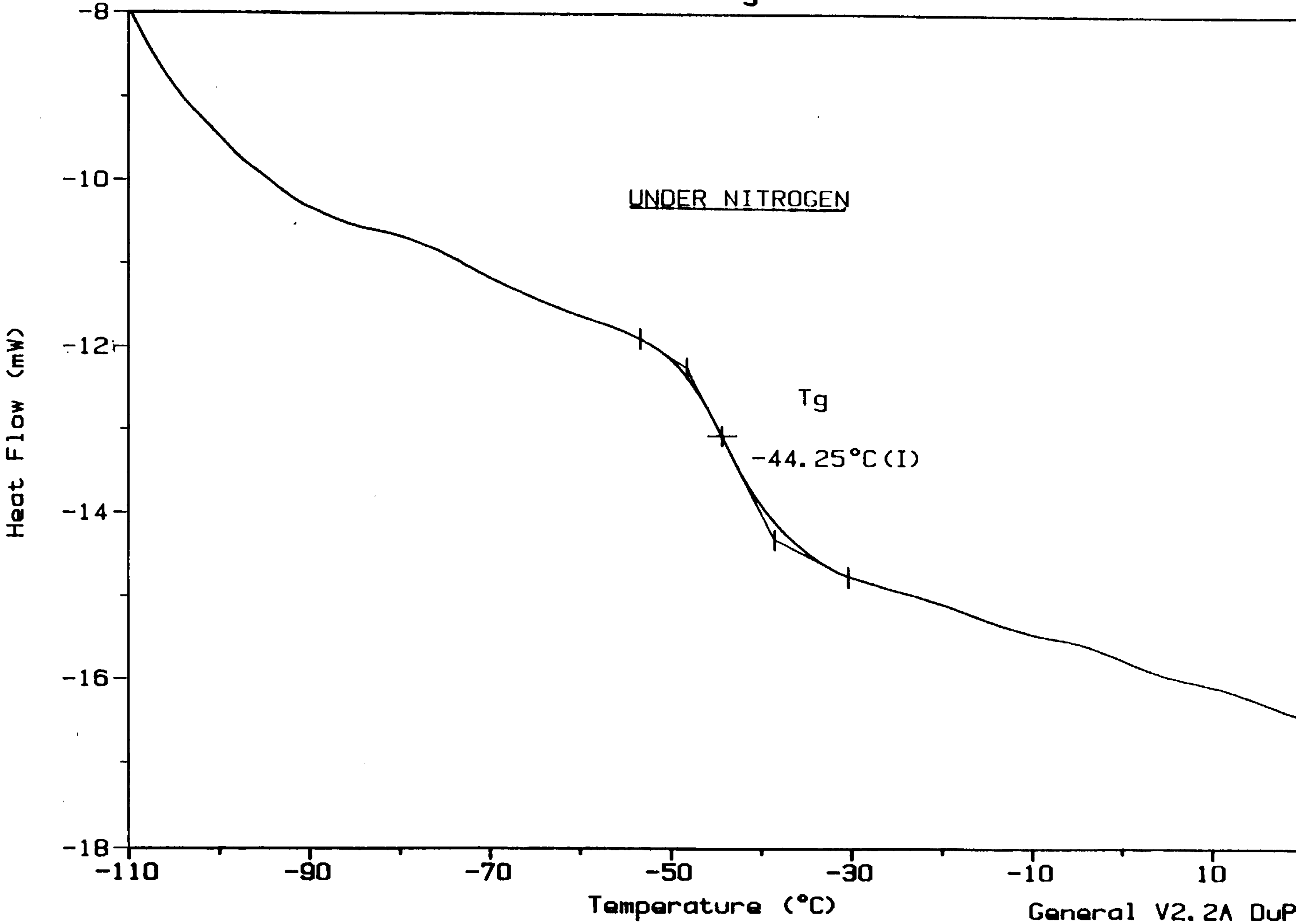
General V2.2A DuPont 990

MATECH ASSOCIATES Scranton, P. 18510 Tel/Fax (717) 344-4067

Sample: KEVLAR-FILLED EPDM; SAMPLE #11
Size: 0.0000 mg
Method: DSC Tg/CURE ANALYSIS
Comment: DEGREE OF CURE STUDY. VARIATION OF Tg

DSC

File: A:AFC91DSC01.12
Operator: BC
Run Date: 3-Jan-92 09:58



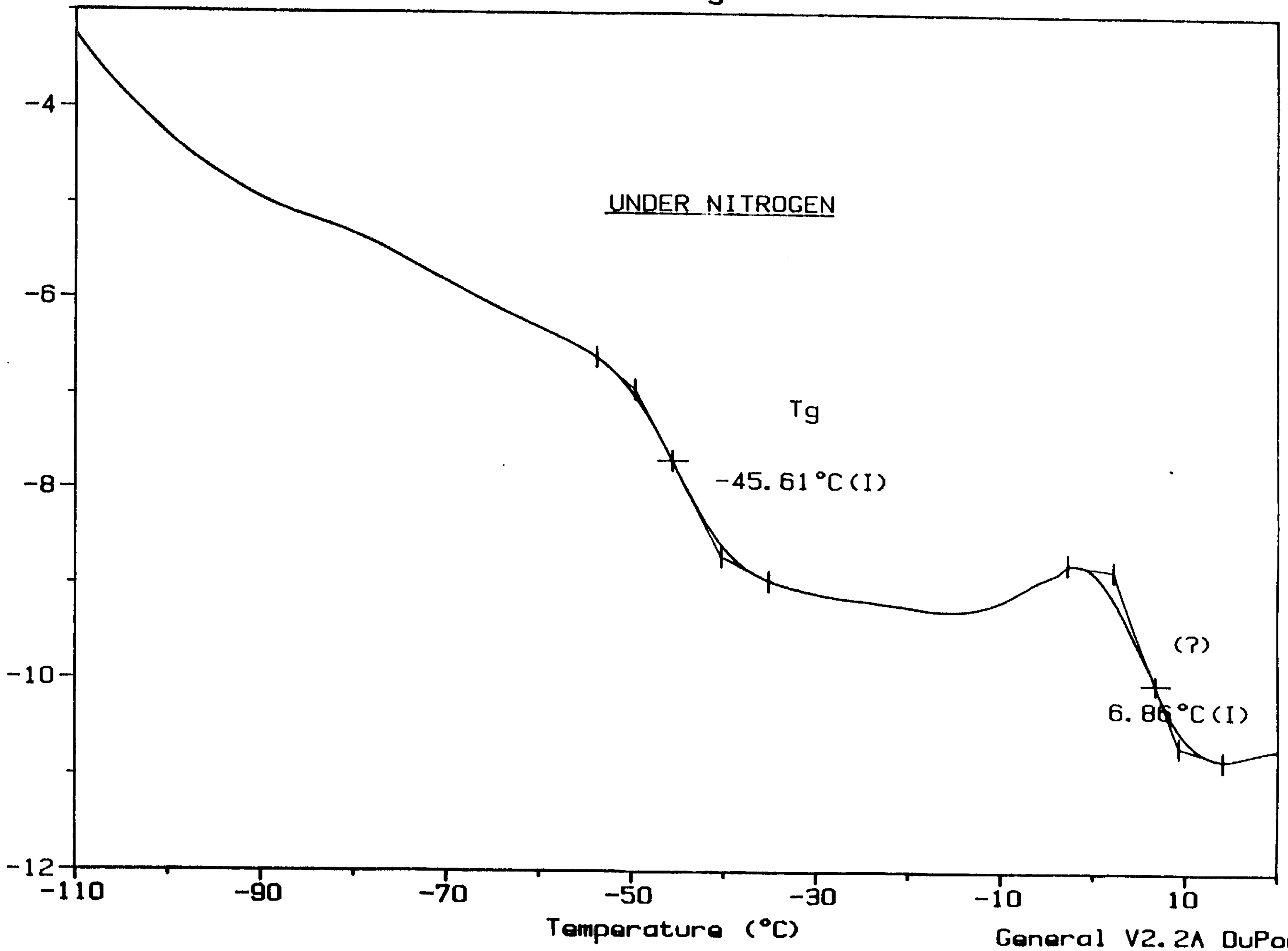
General V2.2A DuPont 9900

MATECH ASSOCIATES Scranton, PA 18510 Tel/Fax (717) 344-4067

Sample: KEVLAR-FILLED EPDM; SAMPLE #12
Size: 0.0000 mg
Method: DSC Tg/CURE ANALYSIS
Comment: DEGREE OF CURE STUDY. VARIATION OF Tg

DSC

File: A:AFC91DSC01.13
Operator: BC
Run Date: 3-Jan-92 02:54



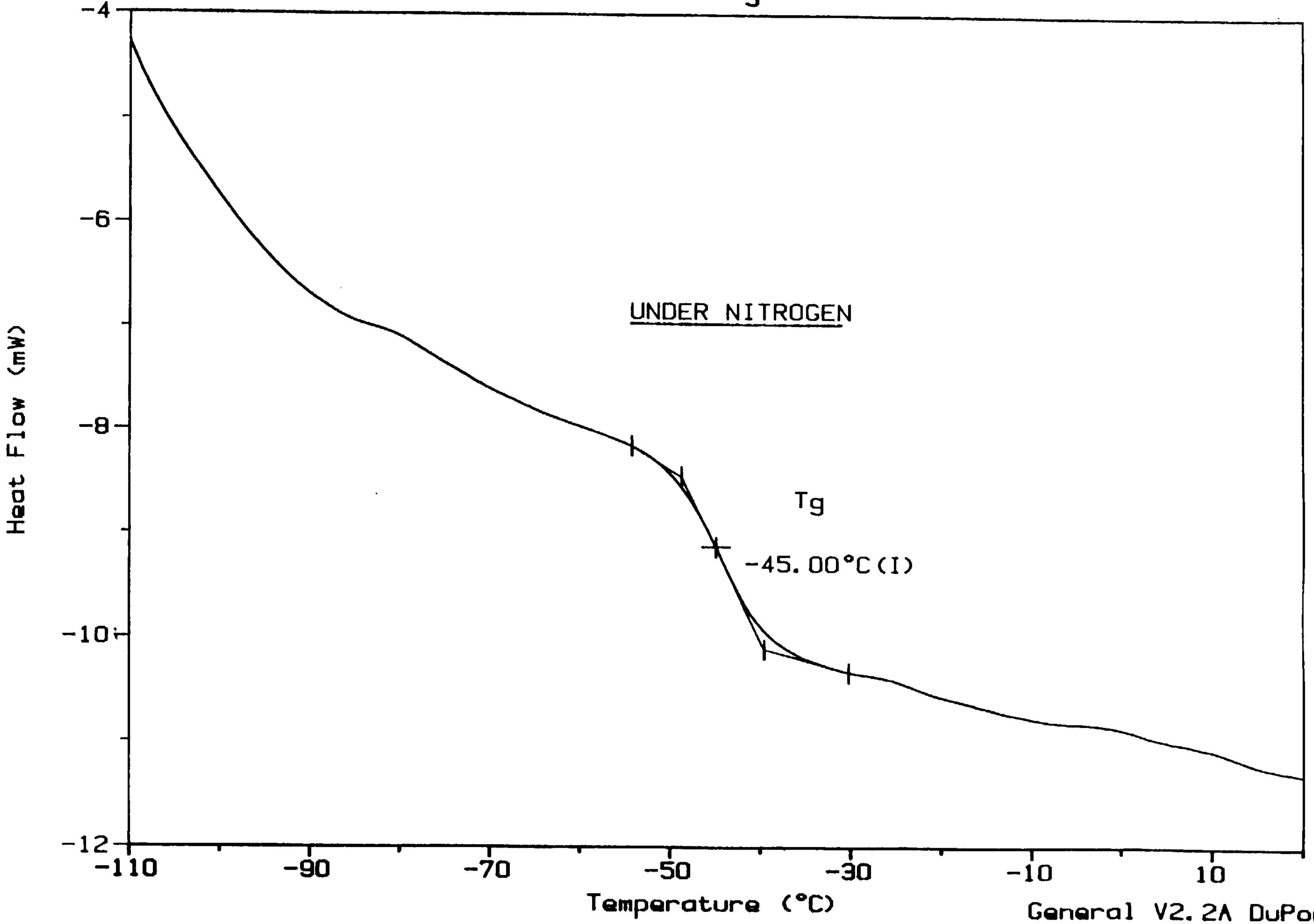
General V2.2A DuPont 9900

MATECH ASSOCIATES Scranton, P.. 18510 Tel/Fax (717) 344-4067

Sample: KEVLAR-FILLED EPDM; SAMPLE #13
Size: 0.0000 mg
Method: DSC Tg/CURE ANALYSIS
Comment: DEGREE OF CURE STUDY. VARIATION OF Tg

DSC

File: A:AFC91DSC01.14
Operator: BC
Run Date: 3-Jan-92 03:46



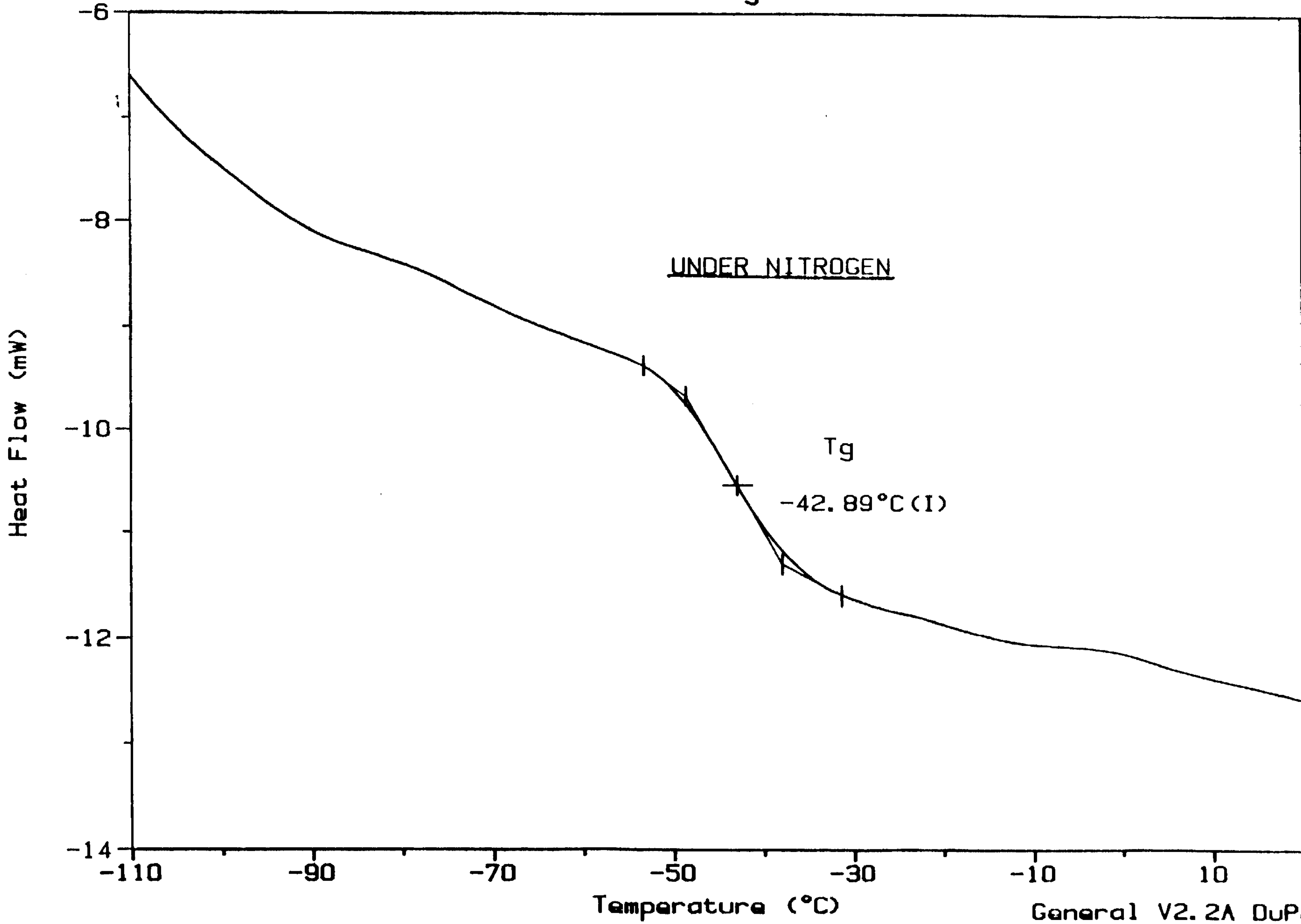
General V2.2A DuPont 9900

MATECH ASSOCIATES Scranton, I 18510 Tel/Fax (717) 344-4067

Sample: KEVLAR-FILLED EPDM; SAMPLE #14
Size: 0.0000 mg
Method: DSC Tg/CURE ANALYSIS
Comment: DEGREE OF CURE STUDY. VARIATION OF Tg

DSC

File: A:AFC91DSC01.15
Operator: BC
Run Date: 6-Jan-92 09:45



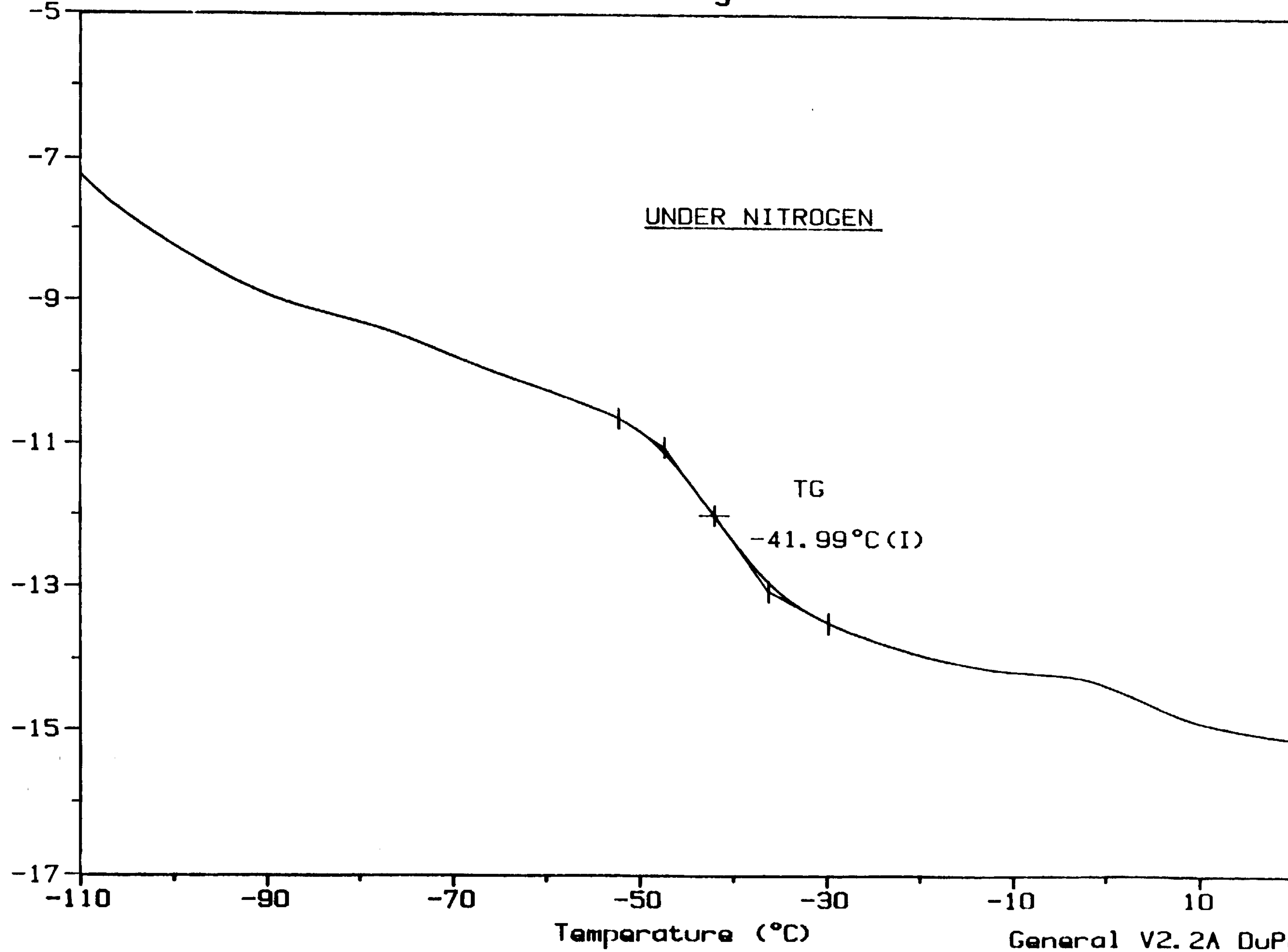
General V2.2A DuPont 9900

MATECH ASSOCIATES Scranton, PA 18510 Tel/Fax (717) 344-4067

Sample: KEVLAR-FILLED EPDM; SAMPLE #15
Size: 0.0000 mg
Method: DSC Tg/CURE ANALYSIS
Comment: DEGREE OF CURE STUDY, VARIATION OF Tg

DSC

File: A:AFC91DSC01.16
Operator: BC
Run Date: 6-Jan-92 11:05



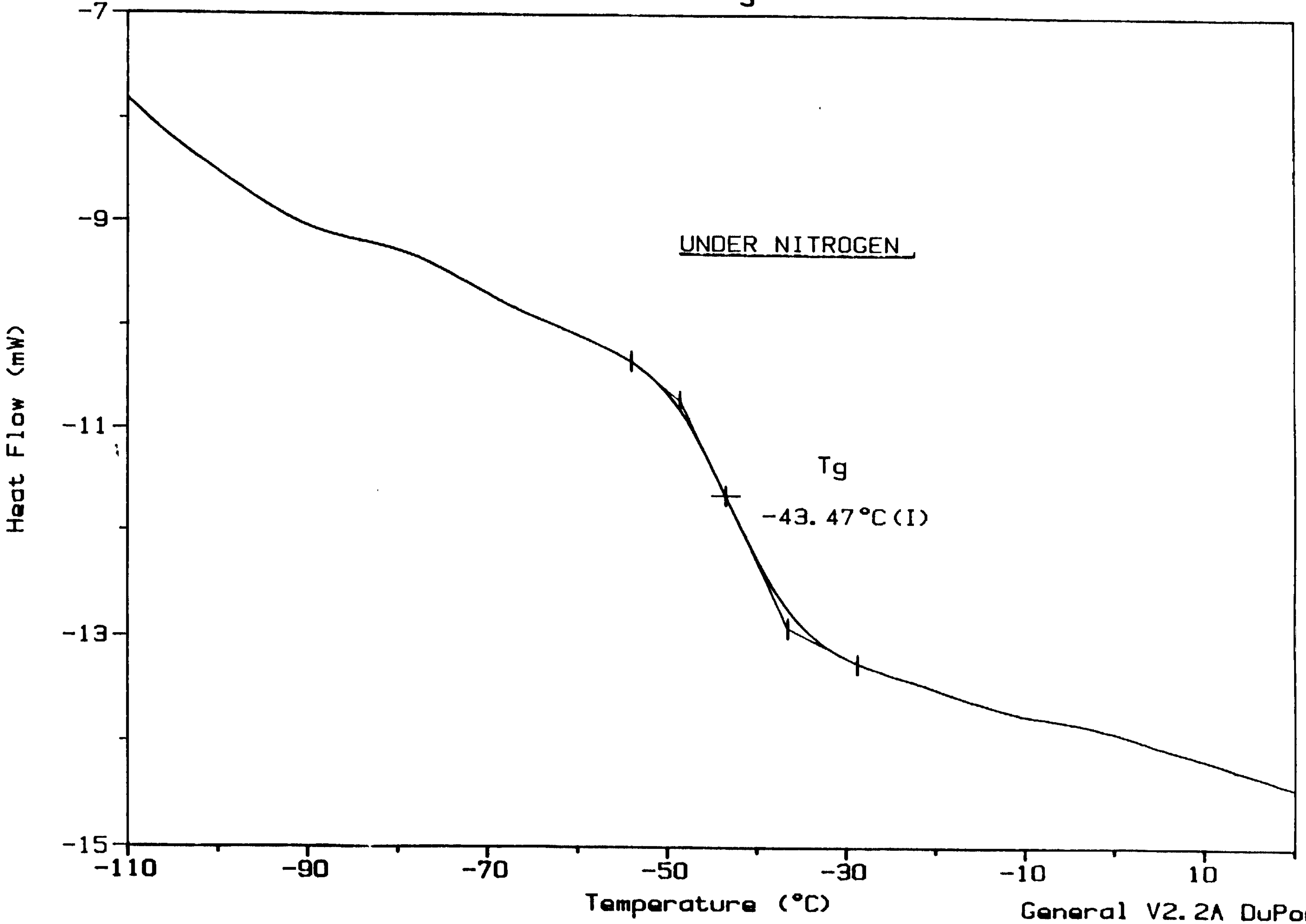
General V2.2A DuPont 9900

MATECH ASSOCIATES Scranton, Pa 18510 Tel/Fax (717) 344-4067

Sample: KEVLAR-FILLED EPDM; SAMPLE #16
Size: 0.0000 mg
Method: DSC Tg/CURE ANALYSIS
Comment: DEGREE OF CURE STUDY, VARIATION OF Tg

DSC

File: A:AFC91DSC01.17
Operator: BC
Run Date: 6-Jan-92 11:25



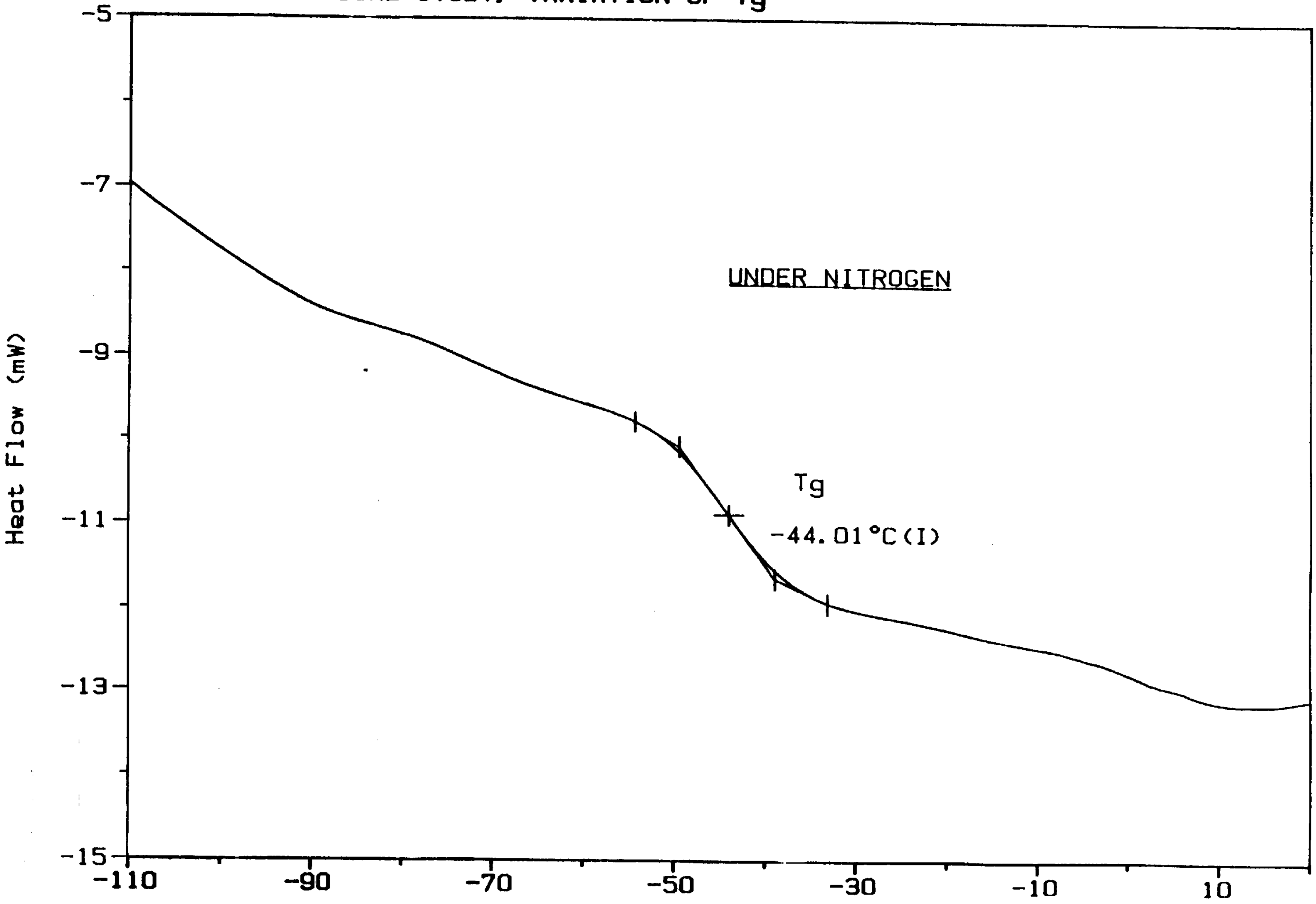
General V2.2A DuPont 990

MATECH ASSOCIATES Scranton, PA 18510 Tel/Fax (717) 344-4067

DSC

Sample: KEVLAR-FILLED EPDM, SAMPLE #17
Size: 0.0000 mg
Method: DSC Tg/CURE ANALYSIS
Comment: DEGREE OF CURE STUDY. VARIATION OF Tg

File: A:AFC91DSC01.18
Operator: BC
Run Date: 6-Jan-92 11:43



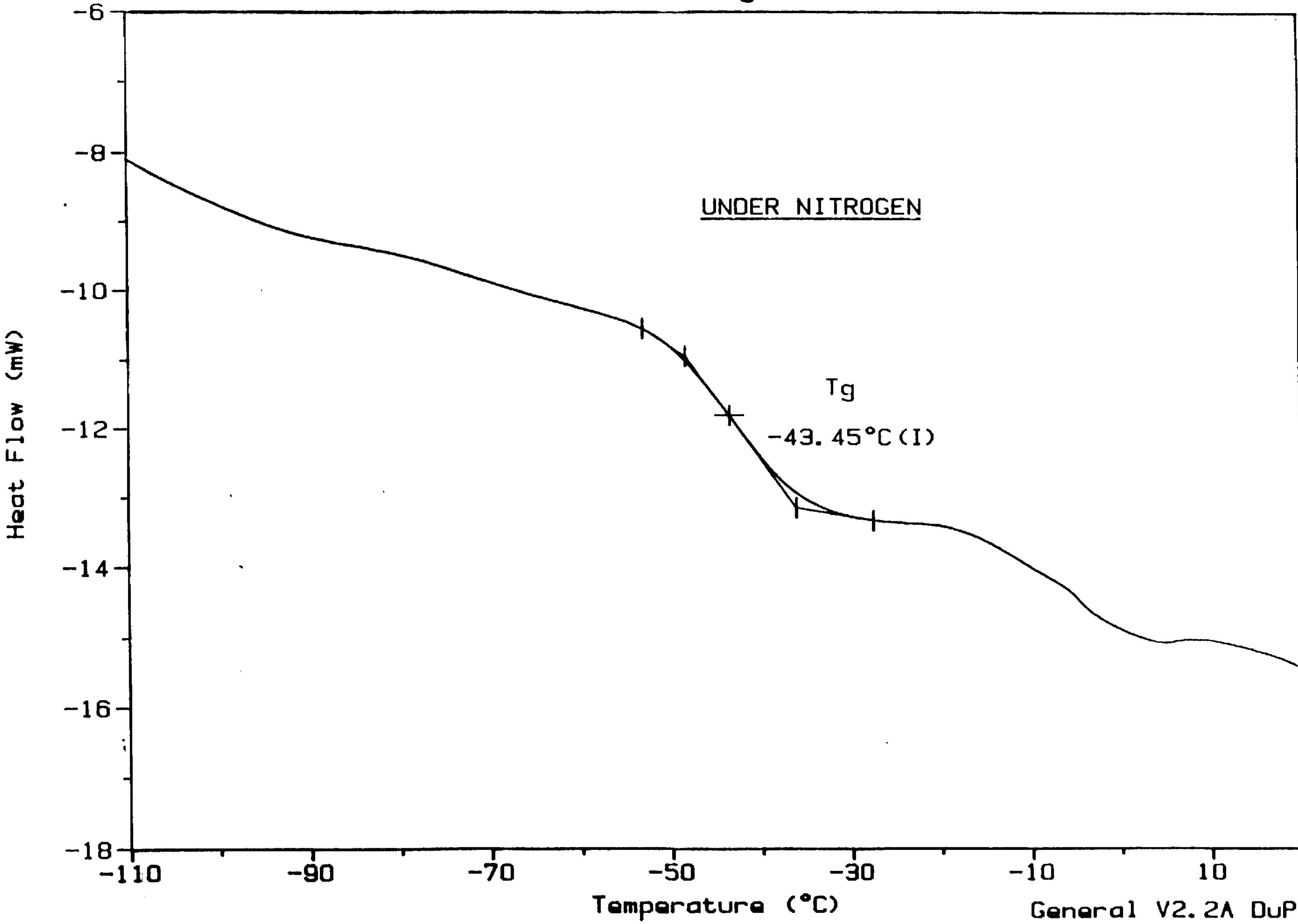
General V2.2A DuPont 9900

MATECH ASSOCIATES Scranton, F 18510 Tel/Fax (717) 344-4067

Sample: KEVLAR-FILLED EPDM; SAMPLE #18
Size: 0.0000 mg
Method: DSC Tg/CURE ANALYSIS
Comment: DEGREE OF CURE STUDY, VARIATION OF Tg

DSC

File: A:AFC91DSC01.19
Operator: BC
Run Date: 6-Jan-92 12:05



General V2.2A DuPont 9900

ATTACHMENT 5

Analysis of Variance of Amfuel Test Data

Tensile

2 A

Temp @ Vulcanization	41.16
Temp @ Flowout	36.54

2 B

Temp @ Vulcanization	42.29

4 A

Temp @ Flowout	9.15
Heating Rate	8.38
Temp @ Vul x Time @ Vul	7.07

4 B

Temp @ Flowout	8.40
Vacuum	12.35
Queue Humidity	12.92
Temp @ Vul x Time @ Vul	32.08

5 A

Vacuum	16.62
Queue Humidity	16.32
Temp @ Vul x Time @ Vul	43.51

5 B

Temp @ Vulcanization	40.57

Tuesday February 4, 1992 10:51 am File: TENSILE2.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	1032484.5	1032484.5	131.75888	1024648.3	41.16
B	[Y]	2	15672.333	7836.1665			
C	[N]	2	925472.33	462736.16	59.05134	909800.00	36.54
D	[N]	2	43016.333	21508.166	2.74473	27344.000	1.10
E	[N]	2	94563.000	47281.500	6.03375	78890.667	3.17
F	[N]	2	94096.333	47048.166	6.00398	78424.000	3.15
G	[N]	2	154128.00	77064.000	9.83440	138455.67	5.56
H	[N]	2	71169.333	35584.666	4.54108	55497.000	2.23
AxB	[N]	2	58982.333	29491.166	3.76347	43310.000	1.74
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		2	15672.333	7836.1665		133214.83	5.35
Total (Raw)	[-]	17	2489584.5	146446.15			

Tuesday February 4, 1992 10:51 am File: TENSILE2.ANV

ANOVA Level Average Table - Raw Data

A	1	2761.6667
	2	2282.6667
B	1	2495.6667
	2	2507.5000
	3	2563.3333
C	1	2673.3333
	2	2201.6667
	3	2691.5000
D	1	2453.3333
	2	2551.0000
	3	2562.1667
E	1	2426.6667
	2	2602.1667
	3	2537.6667
F	1	2483.3333
	2	2623.5000
	3	2459.6667
G	1	2542.1667
	2	2624.1667
	3	2400.1667
H	1	2607.5000
	2	2457.8333
	3	2501.1667

B

1 2 3

Tuesday February 4, 1992 10:45 am File: TENSIL2B.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	823900.06	823900.06	34.32822	799899.39	42.29
B	[N]	2	186601.33	93300.665	3.88742	138600.00	7.33
C	[N]	2	152785.33	76392.665	3.18294	104784.00	5.54
D	[Y]	2	48001.333	24000.666			
E	[N]	2	156821.33	78410.665	3.26702	108820.00	5.75
F	[N]	2	54772.000	27386.000	1.14105	6770.6680	0.36
G	[N]	2	226901.33	113450.66	4.72698	178900.00	9.46
H	[N]	2	139665.33	69832.665	2.90961	91663.998	4.85
AxB	[N]	2	101792.44	50896.220	2.12062	53791.108	2.84
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		2	48001.333	24000.666		408011.32	21.57
Total (Raw)	[-]	17	1891240.5	111249.44			

Tuesday February 4, 1992 10:45 am File: TENSIL2B.ANV

ANOVA Level Average Table - Raw Data

A	1	2668.4444
	2	2240.5556
B	1	2451.1667
	2	2331.5000
	3	2580.8333
C	1	2455.5000
	2	2341.1667
	3	2566.8333
D	1	2406.5000
	2	2430.8333
	3	2526.1667
E	1	2387.8333
	2	2586.5000
	3	2389.1667
F	1	2471.1667
	2	2512.1667
	3	2380.1667
G	1	2321.1667
	2	2595.8333
	3	2446.5000
H	1	2526.8333
	2	2330.5000
	3	2506.1667

		B		
		1	2	3
A	1	2712.0000	2604.6667	2688.6667
	2	2190.3333	2058.3333	2473.0000

Tuesday February 4, 1992 10:46 am File: TENSIL4A.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	1116516.1	1116516.1	346.24234	1113291.4	48.15
B	[N]	2	494482.33	247241.16	76.67185	488033.00	21.11
C	[N]	2	217924.00	108962.00	33.79016	211474.67	9.15
D	[N]	2	19506.333	9753.1665	3.02455	13057.000	0.56
E	[N]	2	22292.333	11146.166	3.45653	15843.000	0.69
F	[N]	2	64897.000	32448.500	10.06259	58447.667	2.53
G	[N]	2	200160.33	100080.16	31.03582	193711.00	8.38
H	[Y]	2	6449.3333	3224.6666			
AxB	[N]	2	169800.78	84900.390	26.32842	163351.45	7.07
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		2	6449.3333	3224.6666		54819.332	2.37
Total (Raw)	[-]	17	2312028.5	136001.68			

ANOVA Level Average Table - Raw Data

A	1	2764.8889
	2	2266.7778
B	1	2739.0000
	2	2342.1667
	3	2466.3333
C	1	2484.5000
	2	2399.5000
	3	2663.5000
D	1	2524.1667
	2	2551.3333
	3	2472.0000
E	1	2477.8333
	2	2562.6667
	3	2507.0000
F	1	2456.6667
	2	2598.1667
	3	2492.6667
G	1	2384.3333
	2	2642.5000
	3	2520.6667
H	1	2533.1667
	2	2489.5000
	3	2524.8333

		B		
		1	2	3
A	1	2851.3333	2671.0000	2772.3333
	2	2626.6667	2013.3333	2160.3333

Tuesday February 4, 1992 10:47 am File: TENSIL4B.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	415264.22	415264.22	103.44108	411249.72	23.34
B	[N]	2	24147.000	12073.500	3.00747	16118.000	0.91
C	[N]	2	156002.33	78001.165	19.42986	147973.33	8.40
D	[N]	2	93549.000	46774.500	11.65139	85520.000	4.85
E	[N]	2	225516.00	112758.00	28.08768	217487.00	12.35
F	[N]	2	30384.000	15192.000	3.78428	22355.000	1.27
G	[Y]	2	8029.0000	4014.5000			
H	[N]	2	235624.33	117812.16	29.34666	227595.33	12.92
AxB	[N]	2	573134.11	286567.05	71.38300	565105.11	32.08
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		2	8029.0000	4014.5000		68246.500	3.87
Total (Raw)	[-]	17	1761650.0	103626.47			

Tuesday February 4, 1992 10:47 am File: TENSIL4B.ANV

ANOVA Level Average Table - Raw Data

A	1	2610.8889
	2	2307.1111
B	1	2499.0000
	2	2410.5000
	3	2467.5000
C	1	2539.3333
	2	2328.5000
	3	2509.1667
D	1	2528.0000
	2	2489.5000
	3	2359.5000
E	1	2520.0000
	2	2555.0000
	3	2302.0000
F	1	2401.0000
	2	2485.0000
	3	2491.0000
G	1	2441.1667
	2	2488.6667
	3	2447.1667
H	1	2615.5000
	2	2416.3333
	3	2345.1667

		B		
		1	2	3
A	1	2400.0000	2711.3333	2721.3333
	2	2598.0000	2109.6667	2213.6667

Tuesday February 4, 1992 10:49 am File: TENSIL5A.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	32853.389	32853.389	2.61224	20276.667	0.58
B	[N]	2	211518.11	105759.05	8.40911	186364.67	5.35
C	[N]	2	157121.78	78560.890	6.24653	131968.34	3.79
D	[N]	2	196140.11	98070.055	7.79774	170986.67	4.91
E	[N]	2	603498.78	301749.39	23.99269	578345.34	16.62
F	[N]	2	121692.44	60846.220	4.83800	96538.996	2.77
G	[Y]	2	25153.444	12576.722			
H	[N]	2	593043.44	296521.72	23.57703	567890.00	16.32
AxB	[N]	2	1539244.1	769622.05	61.19417	1514090.7	43.51
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		2	25153.444	12576.722		213804.27	6.14
Total (Raw)	[-]	17	3480265.6	204721.51			

ANOVA Level Average Table - Raw Data

A	1	2311.4444
	2	2226.0000
B	1	2201.3333
	2	2421.6667
	3	2183.1667
C	1	2164.5000
	2	2391.1667
	3	2250.5000
D	1	2306.1667
	2	2373.6667
	3	2126.3333
E	1	2221.0000
	2	2513.0000
	3	2072.1667
F	1	2287.8333
	2	2358.5000
	3	2159.8333
G	1	2320.3333
	2	2233.0000
	3	2252.8333
H	1	2361.8333
	2	2429.3333
	3	2015.0000

		B		
		1	2	3
A	1	1875.6667	2811.3333	2247.3333
	2	2527.0000	2032.0000	2119.0000

Tuesday February 4, 1992 10:50 am File: TENSIL5B.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	885336.89	885336.89	43.91443	865176.39	40.57
B	[N]	2	216979.00	108489.50	5.38129	176658.00	8.28
C	[N]	2	110608.00	55304.000	2.74319	70287.000	3.30
D	[N]	2	40510.333	20255.166	1.00470	189.33300	0.01
E	[N]	2	240074.33	120037.16	5.95408	199753.33	9.37
F	[N]	2	131977.00	65988.500	3.27316	91656.000	4.30
G	[N]	2	142537.33	71268.665	3.53506	102216.33	4.79
H	[Y]	2	40321.000	20160.500			
AxB	[N]	2	324288.11	162144.05	8.04266	283967.11	13.32
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		2	40321.000	20160.500		342728.50	16.07
Total (Raw)	[-]	17	2132632.0	125448.94			

ANOVA Level Average Table - Raw Data

A	1	2548.4444
	2	2104.8889
B	1	2465.3333
	2	2196.8333
	3	2317.8333
C	1	2325.3333
	2	2231.3333
	3	2423.3333
D	1	2259.8333
	2	2365.1667
	3	2355.0000
E	1	2269.0000
	2	2487.8333
	3	2223.1667
F	1	2320.8333
	2	2224.8333
	3	2434.3333
G	1	2395.3333
	2	2383.6667
	3	2201.0000
H	1	2391.0000
	2	2278.5000
	3	2310.5000

		B		
		1	2	3
A	1	2817.6667	2472.6667	2355.0000
	2	2113.0000	1921.0000	2280.6667

Shore A Hardness:

Pt-1:

Factor	% Contribution
Time @ Flowout	6.98
Vacuum	3.49
Heating Rate	15.70
Queue Humidity	34.88
Temp @ Vul. x Time @ Vul.	27.91

Pt-2:

Temp @ Flowout	18.51
Time @ Flowout	9.25
Vacuum	18.51
Queue Humidity	26.22
Temp @ Vul. x Time @ Vul.	12.34

Pt-3:

Time @ Flowout	9.18
Vacuum	45.92
Temp @ Vul. x Time @ Vul.	18.37

Pt-4:

Time @ Flowout	21.01
Pressure	14.01
Queue Humidity	21.01

Pt-5:

Time @ Flowout	32.21
Vacuum	18.05
Pressure	36.24

Pt-6:

Temp @ Flowout	12.77
Time @ Flowout	19.15
Queue Humidity	51.06
Temp @ Vul. x Time @ Vul.	6.38

Pt-7:

Time @ Flowout	25.40
Queue Humidity	19.05

Pt-8:

Queue Humidity	47.22

Shore A Hardness Continued

Pt-9:

No Significant Factors

Pt-10:

No Significant Factors

Pt-11:

Temp @ Flowout	6.00
Queue Humidity	18.00
Temp @ Vul. x Time @ Vul.	12.00

Pt-12:

Temp @ Flowout	35.19

The following is a pictorial of the 12 points and the optimum level for that point for each of the significant factors. The dots indicate not significant at that point and the numbers indicate the optimum level for that point.

For example:

Factor				
	Pt-9	Pt-10	Pt-11	Pt-12
	Pt-5	Pt-6	Pt-7	Pt-8
	Pt-1	Pt-2	Pt-3	Pt-4
Temp @ Flowout	•	•	3	1
	•	3	•	•
	•	3	•	•
Time @ Flowout	•	•	•	•
	2,3	2	2	•
	2	3	3	3
Vacuum	•	•	•	•
	3	•	•	•
	3	3	2,3	•
Pressure	•	•	•	•
	1	•	•	•
	•	•	•	1
Heating Rate	•	•	•	•
	•	•	•	•
	3	•	•	•
Queue Humidity	•	•	3	•
	•	1,3	1	1,3
	1	1	•	1

Tuesday February 4, 1992 10:07 am File: SHOREA1.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	0.88889	0.88889	16.00162	0.83334	4.36
B	[Y]	2	0.11111	0.05555			
C	[N]	2	0.44444	0.22222	4.00036	0.33334	1.74
D	[N]	2	1.44444	0.72222	13.00126	1.33334	6.98
E	[N]	2	0.77778	0.38889	7.00072	0.66668	3.49
F	[Y]	2	0.11111	0.05555			
G	[N]	2	3.11111	1.55555	28.00270	3.00001	15.70
H	[N]	2	6.77778	3.38889	61.00612	6.66668	34.88
AxB	[N]	2	5.44444	2.72222	49.00486	5.33334	27.91
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		4	0.22222	0.05555		0.94437	4.94
Total (Raw)	[-]	17	19.11111	1.12418			

Tuesday February 4, 1992 10:07 am File: SHOREA1.ANV

ANOVA Level Average Table - Raw Data

A	1	78.00000
	2	78.44444
B	1	78.33333
	2	78.16667
	3	78.16667
C	1	78.00000
	2	78.33333
	3	78.33333
D	1	77.83333
	2	78.50000
	3	78.33333
E	1	78.00000
	2	78.16667
	3	78.50000
F	1	78.16667
	2	78.16667
	3	78.33333
G	1	78.33333
	2	77.66667
	3	78.66667
H	1	79.00000
	2	77.50000
	3	78.16667

		B		
		1	2	3
A	1	78.00000	77.33333	78.66667
	2	78.66667	79.00000	77.66667

Tuesday February 4, 1992 10:12 am File: SHOREA2.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[Y]	1	0.05556	0.05556			
B	[N]	2	2.11111	1.05555	18.99838	1.99999	9.25
C	[N]	2	4.11111	2.05555	36.99694	3.99999	18.51
D	[N]	2	2.11111	1.05555	18.99838	1.99999	9.25
E	[N]	2	4.11111	2.05555	36.99694	3.99999	18.51
F	[N]	2	0.44444	0.22222	3.99964	0.33332	1.54
G	[Y]	2	0.11111	0.05555			
H	[N]	2	5.77778	2.88889	51.99586	5.66666	26.22
AxB	[N]	2	2.77778	1.38889	24.99802	2.66666	12.34
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		3	0.16667	0.05556		0.94451	4.37
Total (Raw)	[-]	17	21.61111	1.27124			

ANOVA Level Average Table - Raw Data

A	1	78.66667
	2	78.77778
B	1	78.66667
	2	78.33333
	3	79.16667
C	1	78.16667
	2	78.66667
	3	79.33333
D	1	78.66667
	2	78.33333
	3	79.16667
E	1	78.16667
	2	78.66667
	3	79.33333
F	1	78.83333
	2	78.50000
	3	78.83333
G	1	78.66667
	2	78.66667
	3	78.83333
H	1	79.50000
	2	78.16667
	3	78.50000

		B		
		1	2	3
A	1	78.33333	78.00000	79.66667
	2	79.00000	78.66667	78.66667

Tuesday February 4, 1992 10:13 am File: SHOREA3.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	0.88889	0.88889	16.00162	0.83334	3.83
B	[Y]	2	0.11111	0.05555			
C	[N]	2	0.44444	0.22222	4.00036	0.33334	1.53
D	[N]	2	2.11111	1.05555	19.00180	2.00001	9.18
E	[N]	2	10.11111	5.05555	91.00900	10.00001	45.92
F	[N]	2	1.44444	0.72222	13.00126	1.33334	6.12
G	[N]	2	0.77778	0.38889	7.00072	0.66668	3.06
H	[N]	2	1.77778	0.88889	16.00162	1.66668	7.65
AxB	[N]	2	4.11111	2.05555	37.00360	4.00001	18.37
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		2	0.11111	0.05555		0.94436	4.34
Total (Raw)	[-]	17	21.77778	1.28105			

Tuesday February 4, 1992 10:13 am File: SHOREA3.ANV

ANOVA Level Average Table - Raw Data

A	1	78.66667
	2	79.11111
B	1	78.83333
	2	79.00000
	3	78.83333
C	1	79.00000
	2	78.66667
	3	79.00000
D	1	78.50000
	2	78.83333
	3	79.33333
E	1	77.83333
	2	79.50000
	3	79.33333
F	1	79.00000
	2	78.50000
	3	79.16667
G	1	78.66667
	2	79.16667
	3	78.83333
H	1	79.33333
	2	78.66667
	3	78.66667

		B		
		1	2	3
A	1	78.00000	79.33333	78.66667
	2	79.66667	78.66667	79.00000

Tuesday February 4, 1992 10:14 am File: SHOREA4.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	0.50000	0.50000	9.00090	0.44445	3.11
B	[N]	2	1.44444	0.72222	13.00126	1.33334	9.34
C	[N]	2	1.44444	0.72222	13.00126	1.33334	9.34
D	[N]	2	3.11111	1.55555	28.00270	3.00001	21.01
E	[N]	2	1.44444	0.72222	13.00126	1.33334	9.34
F	[N]	2	2.11111	1.05555	19.00180	2.00001	14.01
G	[Y]	2	0.11111	0.05555			
H	[N]	2	3.11111	1.55555	28.00270	3.00001	21.01
AxB	[N]	2	1.00000	0.50000	9.00090	0.88890	6.23
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		2	0.11111	0.05555		0.94436	6.61
Total (Raw)	[-]	17	14.27778	0.83987			

Tuesday February 4, 1992 10:14 am File: SHOREA4.ANV

ANOVA Level Average Table - Raw Data

A	1	79.22222
	2	79.55556
B	1	79.00000
	2	79.66667
	3	79.50000
C	1	79.50000
	2	79.00000
	3	79.66667
D	1	78.83333
	2	79.50000
	3	79.83333
E	1	79.00000
	2	79.50000
	3	79.66667
F	1	79.83333
	2	79.00000
	3	79.33333
G	1	79.33333
	2	79.50000
	3	79.33333
H	1	79.83333
	2	78.83333
	3	79.50000

		B		
		1	2	3
A	1	79.00000	79.66667	79.00000
	2	79.00000	79.66667	80.00000

Tuesday February 4, 1992 10:15 am File: SHOREA5.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S′	rho%
A	[Y]	1	0.05556	0.05556			
B	[N]	2	0.44444	0.22222	3.99964	0.33332	4.03
C	[Y]	2	0.11111	0.05555			
D	[N]	2	2.77778	1.38889	24.99802	2.66666	32.21
E	[N]	2	0.77778	0.38889	6.99946	0.66666	8.05
F	[N]	2	3.11111	1.55555	27.99766	2.99999	36.24
G	[N]	2	0.44444	0.22222	3.99964	0.33332	4.03
H	[Y]	2	0.11111	0.05555			
AxB	[N]	2	0.44444	0.22222	3.99964	0.33332	4.03
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		5	0.27778	0.05556		0.94450	11.41
Total (Raw)	[-]	17	8.27778	0.48693			

ANOVA Level Average Table - Raw Data

A	1	79.44444
	2	79.33333
B	1	79.50000
	2	79.16667
	3	79.50000
C	1	79.33333
	2	79.33333
	3	79.50000
D	1	78.83333
	2	79.66667
	3	79.66667
E	1	79.16667
	2	79.33333
	3	79.66667
F	1	79.83333
	2	79.50000
	3	78.83333
G	1	79.16667
	2	79.50000
	3	79.50000
H	1	79.33333
	2	79.33333
	3	79.50000

		B		
		1	2	3
A	1	79.66667	79.33333	79.33333
	2	79.33333	79.00000	79.66667

Tuesday February 4, 1992 10:16 am File: SHOREA6.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	0.22222	0.22222	4.00036	0.16667	1.60
B	[Y]	2	0.11111	0.05555			
C	[N]	2	1.44444	0.72222	13.00126	1.33334	12.77
D	[N]	2	2.11111	1.05555	19.00180	2.00001	19.15
E	[Y]	2	0.11111	0.05555			
F	[Y]	2	0.11111	0.05555			
G	[Y]	2	0.11111	0.05555			
H	[N]	2	5.44444	2.72222	49.00486	5.33334	51.06
AxB	[N]	2	0.77778	0.38889	7.00072	0.66668	6.38
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		8	0.44444	0.05555		0.94439	9.04
Total (Raw)	[-]	17	10.44444	0.61438			

ANOVA Level Average Table - Raw Data

A	1	79.55556
	2	79.33333
B	1	79.33333
	2	79.50000
	3	79.50000
C	1	79.33333
	2	79.16667
	3	79.83333
D	1	79.50000
	2	79.83333
	3	79.00000
E	1	79.50000
	2	79.33333
	3	79.50000
F	1	79.50000
	2	79.50000
	3	79.33333
G	1	79.33333
	2	79.50000
	3	79.50000
H	1	79.83333
	2	78.66667
	3	79.83333

		B		
		1	2	3
A	1	79.66667	79.66667	79.33333
	2	79.00000	79.33333	79.66667

Tuesday February 4, 1992 10:17 am File: SHOREA7.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	0.50000	0.50000	3.00012	0.33334	3.17
B	[Y]	2	0.33333	0.16666			
C	[N]	2	1.33333	0.66666	4.00012	1.00001	9.52
D	[N]	2	3.00000	1.50000	9.00036	2.66668	25.40
E	[Y]	2	0.33333	0.16666			
F	[N]	2	1.33333	0.66666	4.00012	1.00001	9.52
G	[N]	2	1.00000	0.50000	3.00012	0.66668	6.35
H	[N]	2	2.33333	1.16666	7.00024	2.00001	19.05
AxB	[Y]	2	0.33333	0.16666			
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		6	0.99999	0.16666		2.83325	26.98
Total (Raw)	[-]	17	10.50000	0.61765			

Tuesday February 4, 1992 10:17 am File: SHOREA7.ANV

ANOVA Level Average Table - Raw Data

A	1	80.00000
	2	79.66667
B	1	79.83333
	2	79.66667
	3	80.00000
C	1	79.83333
	2	80.16667
	3	79.50000
D	1	79.83333
	2	80.33333
	3	79.33333
E	1	79.66667
	2	80.00000
	3	79.83333
F	1	79.83333
	2	79.50000
	3	80.16667
G	1	79.66667
	2	79.66667
	3	80.16667
H	1	80.16667
	2	79.33333
	3	80.00000

		B		
		1	2	3
A	1	80.00000	79.66667	80.33333
	2	79.66667	79.66667	79.66667

Tuesday February 4, 1992 10:18 am File: SHOREA8.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[Y]	1	0.00000	0.00000			
B	[N]	2	0.33333	0.16666	1.49995	0.11111	1.39
C	[Y]	2	0.33333	0.16666			
D	[N]	2	0.33333	0.16666	1.49995	0.11111	1.39
E	[N]	2	0.33333	0.16666	1.49995	0.11111	1.39
F	[N]	2	0.33333	0.16666	1.49995	0.11111	1.39
G	[N]	2	1.33333	0.66666	6.00000	1.11111	13.89
H	[N]	2	4.00000	2.00000	18.00018	3.77778	47.22
AxB	[N]	2	1.00000	0.50000	4.50005	0.77778	9.72
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		3	0.33333	0.11111		1.88887	23.61
Total (Raw)	[-]	17	8.00000	0.47059			

Tuesday February 4, 1992 10:19 am File: SHOREA8.ANV

ANOVA Level Average Table - Raw Data

A	1	79.66667
	2	79.66667
B	1	79.66667
	2	79.83333
	3	79.50000
C	1	79.66667
	2	79.50000
	3	79.83333
D	1	79.66667
	2	79.83333
	3	79.50000
E	1	79.50000
	2	79.83333
	3	79.66667
F	1	79.50000
	2	79.83333
	3	79.66667
G	1	79.66667
	2	80.00000
	3	79.33333
H	1	80.00000
	2	79.00000
	3	80.00000

		B		
		1	2	3
A	1	80.00000	79.66667	79.33333
	2	79.33333	80.00000	79.66667

Tuesday February 4, 1992 10:19 am File: SHOREA9.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	0.50000	0.50000	3.00012	0.33334	2.02
B	[N]	2	2.33333	1.16666	7.00024	2.00001	12.12
C	[N]	2	1.33333	0.66666	4.00012	1.00001	6.06
D	[N]	2	1.00000	0.50000	3.00012	0.66668	4.04
E	[N]	2	4.33333	2.16666	13.00048	4.00001	24.24
F	[N]	2	1.33333	0.66666	4.00012	1.00001	6.06
G	[N]	2	3.00000	1.50000	9.00036	2.66668	16.16
H	[N]	2	2.33333	1.16666	7.00024	2.00001	12.12
AxB	[Y]	2	0.33333	0.16666			
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		2	0.33333	0.16666		2.83323	17.17
Total (Raw)	[-]	17	16.50000	0.97059			

Tuesday February 4, 1992 10:20 am File: SHOREA9.ANV

ANOVA Level Average Table - Raw Data

A	1	79.33333
	2	79.66667
B	1	79.66667
	2	79.83333
	3	79.00000
C	1	79.83333
	2	79.16667
	3	79.50000
D	1	79.33333
	2	79.33333
	3	79.83333
E	1	79.00000
	2	80.16667
	3	79.33333
F	1	79.16667
	2	79.83333
	3	79.50000
G	1	79.00000
	2	79.50000
	3	80.00000
H	1	80.00000
	2	79.33333
	3	79.16667

		B		
		1	2	3
A	1	79.66667	79.66667	78.66667
	2	79.66667	80.00000	79.33333

Tuesday February 4, 1992 10:08 am File: SHOREA10.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[Y]	1	0.22222	0.22222			
B	[N]	2	1.44444	0.72222	3.25002	1.00000	6.62
C	[N]	2	2.77778	1.38889	6.25007	2.33334	15.44
D	[N]	2	0.77778	0.38889	1.75002	0.33334	2.21
E	[N]	2	3.44444	1.72222	7.75007	3.00000	19.85
F	[N]	2	0.77778	0.38889	1.75002	0.33334	2.21
G	[N]	2	2.77778	1.38889	6.25007	2.33334	15.44
H	[N]	2	1.44444	0.72222	3.25002	1.00000	6.62
AxB	[N]	2	1.44444	0.72222	3.25002	1.00000	6.62
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		1	0.22222	0.22222		3.77774	25.00
Total (Raw)	[-]	17	15.11111	0.88889			

Tuesday February 4, 1992 10:08 am File: SHOREA10.ANV

ANOVA Level Average Table - Raw Data

A	1	79.66667
	2	79.88889
B	1	79.66667
	2	80.16667
	3	79.50000
C	1	80.33333
	2	79.50000
	3	79.50000
D	1	80.00000
	2	79.50000
	3	79.83333
E	1	80.16667
	2	80.00000
	3	79.16667
F	1	79.83333
	2	80.00000
	3	79.50000
G	1	79.50000
	2	79.50000
	3	80.33333
H	1	80.16667
	2	79.50000
	3	79.66667

		B		
		1	2	3
A	1	79.66667	80.33333	79.00000
	2	79.66667	80.00000	80.00000

Tuesday February 4, 1992 10:09 am File: SHOREA11.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	0.22222	0.22222	4.00036	0.16667	1.50
B	[N]	2	5.44444	2.72222	49.00486	5.33334	48.00
C	[N]	2	0.77778	0.38889	7.00072	0.66668	6.00
D	[N]	2	0.44444	0.22222	4.00036	0.33334	3.00
E	[Y]	2	0.11111	0.05555			
F	[N]	2	0.44444	0.22222	4.00036	0.33334	3.00
G	[Y]	2	0.11111	0.05555			
H	[N]	2	2.11111	1.05555	19.00180	2.00001	18.00
AxB	[N]	2	1.44444	0.72222	13.00126	1.33334	12.00
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		4	0.22222	0.05555		0.94437	8.50
Total (Raw)	[-]	17	11.11111	0.65359			

Tuesday February 4, 1992 10:09 am File: SHOREA11.ANV

ANOVA Level Average Table - Raw Data

A	1	79.88889
	2	79.66667
B	1	79.16667
	2	80.50000
	3	79.66667
C	1	79.83333
	2	79.50000
	3	80.00000
D	1	80.00000
	2	79.66667
	3	79.66667
E	1	79.83333
	2	79.66667
	3	79.83333
F	1	79.66667
	2	80.00000
	3	79.66667
G	1	79.83333
	2	79.83333
	3	79.66667
H	1	79.83333
	2	79.33333
	3	80.16667

		B		
		1	2	3
A	1	79.66667	80.33333	79.66667
	2	78.66667	80.66667	79.66667

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[Y]	1	0.22222	0.22222			
B	[N]	2	1.00000	0.50000	4.50005	0.77778	12.96
C	[N]	2	2.33333	1.16666	10.50005	2.11111	35.19
D	[N]	2	0.33333	0.16666	1.49995	0.11111	1.85
E	[N]	2	0.33333	0.16666	1.49995	0.11111	1.85
F	[N]	2	0.33333	0.16666	1.49995	0.11111	1.85
G	[N]	2	0.33333	0.16666	1.49995	0.11111	1.85
H	[N]	2	1.00000	0.50000	4.50005	0.77778	12.96
AxB	[Y]	2	0.11111	0.05555			
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		3	0.33333	0.11111		1.88887	31.48
Total (Raw)	[-]	17	6.00000	0.35294			

ANOVA Level Average Table - Raw Data

A	1	79.88889
	2	80.11111
B	1	79.83333
	2	80.33333
	3	79.83333
C	1	80.33333
	2	79.50000
	3	80.16667
D	1	80.16667
	2	79.83333
	3	80.00000
E	1	79.83333
	2	80.00000
	3	80.16667
F	1	79.83333
	2	80.16667
	3	80.00000
G	1	80.00000
	2	80.16667
	3	79.83333
H	1	80.16667
	2	79.66667
	3	80.16667

		B		
		1	2	3
A	1	79.66667	80.33333	79.66667
	2	80.00000	80.33333	80.00000

Differential Scanning Calorimetry

Each cure study insulation panel was checked for the glass transition temperature (Tg). It is an indication of the degree of cure.

S/N of Panels	Tg	S/N of Panels	Tg
1	-43.65	10	-43.82
2	-44.20	11	-44.25
3	-42.25	12	-45.61
4	-43.53	13	-45.00
5	-43.93	14	-42.89
6	-44.90	15	-41.99
7	-41.33	16	-43.47
8	-44.68	17	-44.01
9	-43.39	18	-43.45

Tuesday February 4, 1992 9:43 am File: DSC.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[Y]	1	0.38427	0.38427			
B	[N]	2	0.99568	0.49784	1.50160	0.33260	1.66
C	[N]	2	0.90148	0.45074	1.35953	0.23840	1.19
D	[Y]	2	0.61035	0.30517			
E	[N]	2	0.77508	0.38754	1.16891	0.11200	0.56
F	[N]	2	9.59141	4.79570	14.46492	8.92833	44.66
G	[N]	2	0.87514	0.43757	1.31981	0.21206	1.06
H	[N]	2	2.69301	1.34650	4.06135	2.02993	10.15
AxB	[N]	2	3.16701	1.58350	4.77620	2.50393	12.52
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		3	0.99462	0.33154		5.63618	28.19
Total (Raw)	[-]	17	19.99342	1.17608			

Tuesday February 4, 1992 9:44 am File: DSC.ANV

ANOVA Level Average Table - Raw Data

A	1	-43.54000
	2	-43.83222
B	1	-43.96333
	2	-43.70667
	3	-43.38833
C	1	-43.46667
	2	-43.99333
	3	-43.59833
D	1	-43.47000
	2	-43.92000
	3	-43.66833
E	1	-43.41167
	2	-43.91333
	3	-43.73333
F	1	-44.64167
	2	-43.54667
	3	-42.87000
G	1	-43.82333
	2	-43.37500
	3	-43.86000
H	1	-43.58667
	2	-44.20167
	3	-43.27000

		B 1	B 2	B 3
A	1	-43.36667	-44.12000	-43.13333
	2	-44.56000	-43.29333	-43.64333

Shrinkage

Pt 1-2:

1 Day

Pressure	12.86
Temp @ Vul x Time @ Vul	20.10

2 Days

Temp @ Flowout	14.91
Pressure	13.27
Queue Humidity	4.04
Temp @ Vul x Time @ Vul	18.56

7 Days

Temp @ Flowout	29.76
Vacuum	4.98
Pressure	7.09
Heating Rate	5.83
Queue Humidity	11.20
Temp @ Vul x Time @ Vul	5.62

14 Days

Temp @ Vulcanization	12.43
Time @ Vulcanization	21.48

Pt 3-4:

1 Day

Heating Rate	44.85

2 Days

No Significant Factors

7 Days

No Significant Factors

14 Days

Temp @ Vulcanization	13.57
Time @ Vulcanization	26.69

Shrinkage Continued

Pt 5-6:

1 Day

Time @ Flowout	2.71
Vacuum	23.44
Pressure	7.4
Heating Rate	8.74
Queue Humidity	12.76
Temp @ Vul x Time @ Vul	26.57

2 Days

No Significant Factors

7 Days

No Significant Factors

14 Days

No Significant Factors

Tuesday February 4, 1992 10:24 am File: SHRIN11D.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	0.00347	0.00347	29.98617	0.00335	13.46
B	[N]	2	0.00633	0.00316	27.30729	0.00610	24.52
C	[N]	2	1.3168E-3	6.5840E-4	5.68960	1.0854E-3	4.36
D	[N]	2	0.00169	8.4500E-4	7.30211	1.4586E-3	5.86
E	[N]	2	0.00159	7.9500E-4	6.87003	1.3586E-3	5.46
F	[N]	2	0.00343	0.00171	14.77705	0.00320	12.86
G	[N]	2	0.00159	7.9500E-4	6.87003	1.3586E-3	5.46
H	[Y]	2	2.3144E-4	1.1572E-4			
AxB	[N]	2	0.00523	0.00261	22.55444	0.00500	20.10
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		2	2.3144E-4	1.1572E-4		0.00197	7.92
Total (Raw)	[-]	17	0.02488	1.4635E-3			

ANOVA Level Average Table - Raw Data

A	1	0.06133
	2	0.03356
B	1	0.02317
	2	0.05033
	3	0.06883
C	1	0.03767
	2	0.04617
	3	0.05850
D	1	0.04400
	2	0.03767
	3	0.06067
E	1	0.04200
	2	0.06067
	3	0.03967
F	1	0.06283
	2	0.05017
	3	0.02933
G	1	0.04183
	2	0.03983
	3	0.06067
H	1	0.05233
	2	0.04617
	3	0.04383

		B		
		1	2	3
A	1	0.01700	0.06267	0.10433
	2	0.02933	0.03800	0.03333

Tuesday February 4, 1992 10:31 am File: SHRIN31D.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	0.02457	0.02457	7.67812	0.02137	6.90
B	[N]	2	0.03746	0.01873	5.85312	0.03106	10.03
C	[Y]	2	0.00640	0.00320			
D	[N]	2	0.01383	0.00691	2.15937	0.00743	2.40
E	[N]	2	0.02420	0.01210	3.78125	0.01780	5.75
F	[N]	2	0.01830	0.00915	2.85937	0.01190	3.84
G	[N]	2	0.14408	0.07204	22.51250	0.13768	44.45
H	[N]	2	0.03306	0.01653	5.16563	0.02666	8.61
AxB	[N]	2	0.00786	0.00393	1.22812	1.4600E-3	0.47
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		2	0.00640	0.00320		0.05440	17.56
Total (Raw)	[-]	17	0.30976	0.01822			

ANOVA Level Average Table - Raw Data

A	1	0.17789
	2	0.10400
B	1	0.08917
	2	0.13350
	3	0.20017
C	1	0.12250
	2	0.16683
	3	0.13350
D	1	0.11133
	2	0.13350
	3	0.17800
E	1	0.10033
	2	0.18917
	3	0.13333
F	1	0.17800
	2	0.14467
	3	0.10017
G	1	0.08900
	2	0.06700
	3	0.26683
H	1	0.20017
	2	0.10017
	3	0.12250

		B		
		1	2	3
A	1	0.11133	0.15567	0.26667
	2	0.06700	0.11133	0.13367

Tuesday February 4, 1992 10:39 am File: SHRIN51D.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	0.02108	0.02108	379443.79	0.02108	17.29
B	[N]	2	1.3414E-3	6.7070E-4	12072.721	1.3413E-3	1.10
C	[Y]	2	1.1111E-7	5.5555E-8			
D	[N]	2	0.00330	0.00165	29700.297	0.00330	2.71
E	[N]	2	0.02857	0.01428	257042.57	0.02857	23.44
F	[N]	2	0.00902	0.00451	81180.812	0.00902	7.40
G	[N]	2	0.01066	0.00533	95940.959	0.01066	8.74
H	[N]	2	0.01556	0.00778	140041.40	0.01556	12.76
AxB	[N]	2	0.03239	0.01619	291422.91	0.03239	26.57
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		2	1.1111E-7	5.5555E-8		9.4444E-7	0.00
Total (Raw)	[-]	17	0.12191	0.00717			

Tuesday February 4, 1992 10:39 am File: SHRIN51D.ANV

ANOVA Level Average Table - Raw Data

A	1	0.17478
	2	0.10633
B	1	0.13317
	2	0.13583
	3	0.15267
C	1	0.14050
	2	0.14050
	3	0.14067
D	1	0.15717
	2	0.12400
	3	0.14050
E	1	0.18817
	2	0.14283
	3	0.09067
F	1	0.14300
	2	0.16667
	3	0.11200
G	1	0.10717
	2	0.15000
	3	0.16450
H	1	0.11200
	2	0.18100
	3	0.12867

		B		
		1	2	3
A	1	0.10933	0.18600	0.22900
	2	0.15700	0.08567	0.07633

Tuesday February 4, 1992 10:26 am File: SHRIN12D.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	0.01462	0.01462	389.29570	0.01458	20.11
B	[N]	2	0.01898	0.00949	252.69605	0.01890	26.07
C	[N]	2	0.01089	0.00544	144.85421	0.01081	14.91
D	[Y]	2	7.5111E-5	3.7555E-5			
E	[N]	2	6.3544E-4	3.1772E-4	8.46013	5.6033E-4	0.77
F	[N]	2	0.00970	0.00485	129.14392	0.00962	13.27
G	[N]	2	1.0688E-3	5.3440E-4	14.22980	0.9937E-3	1.37
H	[N]	2	0.00301	0.00150	39.94142	0.00293	4.04
AxB	[N]	2	0.01354	0.00677	180.26894	0.01346	18.56
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		2	7.5111E-5	3.7555E-5		6.3844E-4	0.88
Total (Raw)	[-]	17	0.07251	0.00427			

Tuesday February 4, 1992 10:26 am File: SHRIN12D.ANV

ANOVA Level Average Table - Raw Data

A	1	0.14189
	2	0.08489
B	1	0.07300
	2	0.11467
	3	0.15250
C	1	0.09600
	2	0.09600
	3	0.14817
D	1	0.11483
	2	0.11050
	3	0.11483
E	1	0.10650
	2	0.12100
	3	0.11267
F	1	0.10033
	2	0.14600
	3	0.09383
G	1	0.12317
	2	0.10433
	3	0.11267
H	1	0.10650
	2	0.13150
	3	0.10217

		B 1	2	3
A	1	0.07100	0.13767	0.21700
	2	0.07500	0.09167	0.08800

Tuesday February 4, 1992 10:32 am File: SHRIN32D.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	0.11972	0.11972	3.29989	0.08344	4.54
B	[N]	2	0.09047	0.04523	1.24669	0.01791	0.97
C	[Y]	2	0.07256	0.03628			
D	[N]	2	0.14363	0.07181	1.97933	0.07107	3.86
E	[N]	2	0.28590	0.14295	3.94019	0.21334	11.60
F	[N]	2	0.27947	0.13973	3.85143	0.20691	11.25
G	[N]	2	0.49883	0.24941	6.87459	0.42627	23.18
H	[N]	2	0.13483	0.06741	1.85805	0.06227	3.39
AxB	[N]	2	0.21383	0.10691	2.94680	0.14127	7.68
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		2	0.07256	0.03628		0.61676	33.53
Total (Raw)	[-]	17	1.83925	0.10819			

Tuesday February 4, 1992 10:33 am File: SHRIN32D.ANV

ANOVA Level Average Table - Raw Data

A	1	0.50367
	2	0.34056
B	1	0.36650
	2	0.37767
	3	0.52217
C	1	0.51100
	2	0.36667
	3	0.38867
D	1	0.38867
	2	0.33333
	3	0.54433
E	1	0.24433
	2	0.50000
	3	0.52200
F	1	0.38867
	2	0.58867
	3	0.28900
G	1	0.27767
	2	0.33333
	3	0.65533
H	1	0.54433
	2	0.36667
	3	0.35533

		B		
		1	2	3
A	1	0.31100	0.46667	0.73333
	2	0.42200	0.28867	0.31100

ANOVA Level Average Table - Raw Data

A	1	0.50367
	2	0.34056
B	1	0.36650
	2	0.37767
	3	0.52217
C	1	0.51100
	2	0.36667
	3	0.38867
D	1	0.38867
	2	0.33333
	3	0.54433
E	1	0.24433
	2	0.50000
	3	0.52200
F	1	0.38867
	2	0.58867
	3	0.28900
G	1	0.27767
	2	0.33333
	3	0.65533
H	1	0.54433
	2	0.36667
	3	0.35533

		B		
		1	2	3
A	1	0.31100	0.46667	0.73333
	2	0.42200	0.28867	0.31100

Tuesday February 4, 1992 10:40 am File: SHRIN52D.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	0.09374	0.09374	9.48785	0.08386	17.11
B	[N]	2	0.02179	0.01089	1.10223	0.00203	0.41
C	[N]	2	0.06502	0.03251	3.29049	0.04526	9.24
D	[Y]	2	0.01977	0.00988			
E	[N]	2	0.07583	0.03791	3.83704	0.05607	11.44
F	[N]	2	0.03127	0.01563	1.58198	0.01151	2.35
G	[N]	2	0.07362	0.03681	3.72571	0.05386	10.99
H	[N]	2	0.04149	0.02074	2.09919	0.02173	4.43
AxB	[N]	2	0.06749	0.03374	3.41498	0.04773	9.74
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		2	0.01977	0.00988		0.16797	34.28
Total (Raw)	[-]	17	0.49004	0.02883			

Tuesday February 4, 1992 10:40 am   File: SHRIN52D.ANV

ANOVA Level Average Table - Raw Data

A	1	0.35878
	2	0.21444
B	1	0.23833
	2	0.31900
	3	0.30250
C	1	0.37150
	2	0.24783
	3	0.24050
D	1	0.32867
	2	0.28350
	3	0.24767
E	1	0.32383
	2	0.34067
	3	0.19533
F	1	0.27383
	2	0.34283
	3	0.24317
G	1	0.21683
	2	0.27167
	3	0.37133
H	1	0.22400
	2	0.29517
	3	0.34067

		B		
		1	2	3
A	1	0.22400	0.43800	0.41433
	2	0.25267	0.20000	0.19067

Tuesday February 4, 1992 10:27 am File: SHRIN17D.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	0.01323	0.01323	214.92974	0.01317	14.94
B	[N]	2	0.01724	0.00862	140.03736	0.01712	19.42
C	[N]	2	0.02635	0.01317	213.95500	0.02623	29.76
D	[Y]	2	1.2311E-4	6.1555E-5			
E	[N]	2	0.00451	0.00225	36.55268	0.00439	4.98
F	[N]	2	0.00637	0.00318	51.66112	0.00625	7.09
G	[N]	2	0.00526	0.00263	42.72602	0.00514	5.83
H	[N]	2	0.00999	0.00499	81.06571	0.00987	11.20
AxB	[N]	2	0.00507	0.00253	41.10145	0.00495	5.62
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		2	1.2311E-4	6.1555E-5		1.0464E-3	1.19
Total (Raw)	[-]	17	0.08814	0.00518			

ANOVA Level Average Table - Raw Data

A	1	0.22800
	2	0.17378
B	1	0.15850
	2	0.21267
	3	0.23150
C	1	0.16683
	2	0.18150
	3	0.25433
D	1	0.19800
	2	0.20033
	3	0.20433
E	1	0.19167
	2	0.18783
	3	0.22317
F	1	0.19817
	2	0.22517
	3	0.17933
G	1	0.20867
	2	0.17717
	3	0.21683
H	1	0.17933
	2	0.23367
	3	0.18967

		B		
		1	2	3
A	1	0.16267	0.24600	0.27533
	2	0.15433	0.17933	0.18767

Tuesday February 4, 1992 10:36 am File: SHRIN37D.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	0.14222	0.14222	3.49607	0.10154	3.79
B	[N]	2	0.58753	0.29376	7.22124	0.50617	18.88
C	[N]	2	0.23681	0.11840	2.91052	0.15545	5.80
D	[N]	2	0.13262	0.06631	1.63004	0.05126	1.91
E	[N]	2	0.12769	0.06384	1.56932	0.04633	1.73
F	[Y]	2	0.08136	0.04068			
G	[N]	2	0.94071	0.47035	11.56219	0.85935	32.05
H	[N]	2	0.32433	0.16216	3.98623	0.24297	9.06
AxB	[N]	2	0.10790	0.05395	1.32620	0.02654	0.99
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		2	0.08136	0.04068		0.69156	25.79
Total (Raw)	[-]	17	2.68116	0.15772			

Tuesday February 4, 1992 10:36 am File: SHRIN37D.ANV

ANOVA Level Average Table - Raw Data

A	1	0.90400
	2	0.72622
B	1	0.65533
	2	0.72233
	3	1.06767
C	1	0.92200
	2	0.86733
	3	0.65600
D	1	0.77767
	2	0.73383
	3	0.93383
E	1	0.70050
	2	0.90050
	3	0.84433
F	1	0.87833
	2	0.84500
	3	0.72200
G	1	0.69983
	2	0.61117
	3	1.13433
H	1	1.00100
	2	0.75550
	3	0.68883

		B 1	2	3
A	1	0.64433	0.82233	1.24533
	2	0.66633	0.62233	0.89000

Tuesday February 4, 1992 10:42 am File: SHRIN57D.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	0.12202	0.12202	4.14470	0.09258	8.51
B	[N]	2	0.06098	0.03049	1.03567	0.00210	0.19
C	[N]	2	0.20887	0.10443	3.54721	0.14999	13.79
D	[N]	2	0.10829	0.05414	1.83899	0.04941	4.54
E	[Y]	2	0.05889	0.02944			
F	[N]	2	0.16647	0.08323	2.82711	0.10759	9.89
G	[N]	2	0.10572	0.05286	1.79552	0.04684	4.31
H	[N]	2	0.10548	0.05274	1.79144	0.04660	4.29
AxB	[N]	2	0.15077	0.07538	2.56046	0.09189	8.45
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		2	0.05889	0.02944		0.50049	46.02
Total (Raw)	[-]	17	1.08749	0.06397			

Tuesday February 4, 1992 10:42 am File: SHRIN57D.ANV

ANOVA Level Average Table - Raw Data

A	1	0.55678
	2	0.39211
B	1	0.41683
	2	0.55417
	3	0.45233
C	1	0.62317
	2	0.42867
	3	0.37150
D	1	0.58267
	2	0.43583
	3	0.40483
E	1	0.50017
	2	0.52800
	3	0.39517
F	1	0.42633
	2	0.60867
	3	0.38833
G	1	0.38333
	2	0.46917
	3	0.57083
H	1	0.45000
	2	0.39533
	3	0.57800

		B		
		1	2	3
A	1	0.42400	0.76533	0.48100
	2	0.40967	0.34300	0.42367

Tuesday February 4, 1992 10:21 am File: SHRIN114.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	0.03133	0.03133	8.97708	0.02784	12.43
B	[N]	2	0.05507	0.02753	7.88825	0.04809	21.48
C	[N]	2	0.02933	0.01466	4.20057	0.02235	9.98
D	[Y]	2	0.00692	0.00346			
E	[Y]	2	0.00703	0.00351			
F	[N]	2	0.02507	0.01253	3.59026	0.01809	8.08
G	[N]	2	0.01049	0.00524	1.50143	0.00351	1.57
H	[N]	2	0.01689	0.00844	2.41834	0.00991	4.43
AxB	[N]	2	0.04178	0.02089	5.98567	0.03480	15.54
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		4	0.01395	0.00349		0.05932	26.49
Total (Raw)	[-]	17	0.22390	0.01317			

ANOVA Level Average Table - Raw Data

A	1	0.30300
	2	0.21956
B	1	0.18767
	2	0.27517
	3	0.32100
C	1	0.20850
	2	0.26883
	3	0.30650
D	1	0.26050
	2	0.23767
	3	0.28567
E	1	0.23550
	2	0.28350
	3	0.26483
F	1	0.28767
	2	0.28767
	3	0.20850
G	1	0.26683
	2	0.22933
	3	0.28767
H	1	0.27500
	2	0.29000
	3	0.21883

		B		
		1	2	3
A	1	0.18367	0.29600	0.42933
	2	0.19167	0.25433	0.21267

Tuesday February 4, 1992 10:29 am File: SHRIN314.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	1.17658	1.17658	9.12927	1.04770	13.57
B	[N]	2	2.31848	1.15924	8.99472	2.06072	26.69
C	[Y]	2	0.00662	0.00331			
D	[N]	2	0.82928	0.41464	3.21726	0.57152	7.40
E	[N]	2	0.55055	0.27527	2.13586	0.29279	3.79
F	[N]	2	0.83148	0.41574	3.22579	0.57372	7.43
G	[Y]	2	0.50891	0.25445			
H	[N]	2	0.75795	0.37897	2.94049	0.50019	6.48
AxB	[N]	2	0.73977	0.36988	2.86996	0.48201	6.24
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		4	0.51553	0.12888		2.19097	28.38
Total (Raw)	[-]	17	7.71962	0.45410			

Tuesday February 4, 1992 10:29 am File: SHRIN314.ANV

ANOVA Level Average Table - Raw Data

A	1	1.54844
	2	1.03711
B	1	1.05500
	2	1.02333
	3	1.80000
C	1	1.26667
	2	1.31217
	3	1.29950
D	1	1.51117
	2	1.00100
	3	1.36617
E	1	1.05450
	2	1.35450
	3	1.46933
F	1	1.36667
	2	1.51117
	3	1.00050
G	1	1.31217
	2	1.07783
	3	1.48833
H	1	1.33550
	2	1.52000
	3	1.02283

		B		
		1	2	3
A	1	1.11000	1.20200	2.33333
	2	1.00000	0.84467	1.26667

Tuesday February 4, 1992 10:37 am File: SHRIN514.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	0.29645	0.29645	14.21823	0.27560	13.26
B	[N]	2	0.43311	0.21655	10.38609	0.39141	18.83
C	[N]	2	0.15693	0.07846	3.76307	0.11523	5.54
D	[N]	2	0.16019	0.08009	3.84125	0.11849	5.70
E	[N]	2	0.18405	0.09202	4.41343	0.14235	6.85
F	[N]	2	0.18918	0.09459	4.53669	0.14748	7.10
G	[N]	2	0.23224	0.11612	5.56930	0.19054	9.17
H	[Y]	2	0.04171	0.02085			
AxB	[N]	2	0.38442	0.19221	9.21871	0.34272	16.49
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		2	0.04171	0.02085		0.35446	17.06
Total (Raw)	[-]	17	2.07827	0.12225			

Tuesday February 4, 1992 10:37 am File: SHRIN514.ANV

ANOVA Level Average Table - Raw Data

A	1	0.76767
	2	0.51100
B	1	0.52617
	2	0.85867
	3	0.53317
C	1	0.75233
	2	0.52367
	3	0.64200
D	1	0.73083
	2	0.50950
	3	0.67767
E	1	0.75617
	2	0.65233
	3	0.50950
F	1	0.68500
	2	0.73567
	3	0.49733
G	1	0.48783
	2	0.76133
	3	0.66883
H	1	0.58550
	2	0.63017
	3	0.70233

		B		
		1	2	3
A	1	0.55233	1.19367	0.55700
	2	0.50000	0.52367	0.50933

Elongation

2 A

No Significant Factors

2 B

No Significant Factors

4 A

No Significant Factors

4 B

No Significant Factors

5 A

Time @ Vulcanization	12.24
Temp @ Flowout	12.24
Vacuum	12.24
Pressure	22.96
Queue Humidity	22.96

5 B

No Significant Factors

Tuesday February 4, 1992 9:53 am File: ELONG2A.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[Y]	1	5.55556	5.55556			
B	[N]	2	86.11111	43.05555	7.74999	74.99999	14.21
C	[N]	2	36.11111	18.05555	3.25000	24.99999	4.74
D	[N]	2	144.44444	72.22222	12.99999	133.33332	25.26
E	[N]	2	86.11111	43.05555	7.74999	74.99999	14.21
F	[N]	2	19.44444	9.72222	1.75000	8.33332	1.58
G	[N]	2	36.11111	18.05555	3.25000	24.99999	4.74
H	[N]	2	77.77778	38.88889	6.99999	66.66666	12.63
AxB	[N]	2	36.11111	18.05555	3.25000	24.99999	4.74
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		1	5.55556	5.55556		94.44452	17.89
Total (Raw)	[-]	17	527.77778	31.04575			

ANOVA Level Average Table - Raw Data

A	1	20.55556
	2	21.66667
B	1	19.16667
	2	20.00000
	3	24.16667
C	1	21.66667
	2	19.16667
	3	22.50000
D	1	18.33333
	2	25.00000
	3	20.00000
E	1	24.16667
	2	20.00000
	3	19.16667
F	1	20.00000
	2	22.50000
	3	20.83333
G	1	19.16667
	2	21.66667
	3	22.50000
H	1	23.33333
	2	18.33333
	3	21.66667

		B 1	2	3
A	1	20.00000	20.00000	21.66667
	2	18.33333	20.00000	26.66667

Tuesday February 4, 1992 9:55 am File: ELONG2B.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	5.55556	5.55556	1.00000	1.0000E-5	0.00
B	[N]	2	11.11111	5.55555	1.00000	1.0000E-5	0.00
C	[N]	2	11.11111	5.55555	1.00000	1.0000E-5	0.00
D	[N]	2	11.11111	5.55555	1.00000	1.0000E-5	0.00
E	[N]	2	11.11111	5.55555	1.00000	1.0000E-5	0.00
F	[N]	2	11.11111	5.55555	1.00000	1.0000E-5	0.00
G	[N]	2	11.11111	5.55555	1.00000	1.0000E-5	0.00
H	[N]	2	11.11111	5.55555	1.00000	1.0000E-5	0.00
AxB	[Y]	2	11.11111	5.55555			
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		2	11.11111	5.55555		94.44436	100.0
Total (Raw)	[-]	17	94.44444	5.55556			

ANOVA Level Average Table - Raw Data

A	1	20.00000
	2	21.11111
B	1	21.66667
	2	20.00000
	3	20.00000
C	1	20.00000
	2	21.66667
	3	20.00000
D	1	21.66667
	2	20.00000
	3	20.00000
E	1	21.66667
	2	20.00000
	3	20.00000
F	1	20.00000
	2	20.00000
	3	21.66667
G	1	20.00000
	2	20.00000
	3	21.66667
H	1	20.00000
	2	21.66667
	3	20.00000

		B 1	2	3
A	1	20.00000	20.00000	20.00000
	2	23.33333	20.00000	20.00000

Tuesday February 4, 1992 9:56 am File: ELONG4A.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[Y]	1	1.38889	1.38889			
B	[N]	2	19.44444	9.72222	6.99999	16.66666	9.60
C	[N]	2	36.11111	18.05555	12.99999	33.33333	19.20
D	[N]	2	36.11111	18.05555	12.99999	33.33333	19.20
E	[N]	2	19.44444	9.72222	6.99999	16.66666	9.60
F	[N]	2	11.11111	5.55555	3.99999	8.33333	4.80
G	[N]	2	19.44444	9.72222	6.99999	16.66666	9.60
H	[N]	2	11.11111	5.55555	3.99999	8.33333	4.80
AxB	[N]	2	19.44444	9.72222	6.99999	16.66666	9.60
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		1	1.38889	1.38889		23.61113	13.60
Total (Raw)	[-]	17	173.61111	10.21242			

Tuesday February 4, 1992 9:56 am File: ELONG4A.ANV

ANOVA Level Average Table - Raw Data

A	1	20.00000
	2	19.44444
B	1	18.33333
	2	20.00000
	3	20.83333
C	1	19.16667
	2	18.33333
	3	21.66667
D	1	18.33333
	2	21.66667
	3	19.16667
E	1	20.83333
	2	20.00000
	3	18.33333
F	1	19.16667
	2	20.83333
	3	19.16667
G	1	20.00000
	2	18.33333
	3	20.83333
H	1	20.83333
	2	19.16667
	3	19.16667

		B		
		1	2	3
A	1	20.00000	20.00000	20.00000
	2	16.66667	20.00000	21.66667

Tuesday February 4, 1992 9:59 am File: ELONG4B.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[N]	1	5.55556	5.55556	4.00000	4.16667	2.78
B	[N]	2	8.33333	4.16666	2.99999	5.55555	3.70
C	[N]	2	8.33333	4.16666	2.99999	5.55555	3.70
D	[N]	2	33.33333	16.66666	11.99999	30.55555	20.37
E	[N]	2	25.00000	12.50000	8.99999	22.22222	14.81
F	[N]	2	33.33333	16.66666	11.99999	30.55555	20.37
G	[N]	2	8.33333	4.16666	2.99999	5.55555	3.70
H	[N]	2	25.00000	12.50000	8.99999	22.22222	14.81
AxB	[Y]	2	2.77778	1.38889			
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		2	2.77778	1.38889		23.61113	15.74
Total (Raw)	[-]	17	150.00000	8.82353			

Tuesday February 4, 1992 9:59 am File: ELONG4B.ANV

ANOVA Level Average Table - Raw Data

A	1	19.44444
	2	20.55556
B	1	19.16667
	2	20.00000
	3	20.83333
C	1	19.16667
	2	20.00000
	3	20.83333
D	1	20.00000
	2	21.66667
	3	18.33333
E	1	21.66667
	2	19.16667
	3	19.16667
F	1	20.00000
	2	21.66667
	3	18.33333
G	1	19.16667
	2	20.00000
	3	20.83333
H	1	21.66667
	2	19.16667
	3	19.16667

		B		
		1	2	3
A	1	18.33333	20.00000	20.00000
	2	20.00000	20.00000	21.66667

Tuesday February 4, 1992 10:02 am File: ELONG5A.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[Y]	1	0.00000	0.00000			
B	[N]	2	11.11111	5.55555	7.00000	9.52381	12.24
C	[N]	2	11.11111	5.55555	7.00000	9.52381	12.24
D	[Y]	2	2.77778	1.38889			
E	[N]	2	11.11111	5.55555	7.00000	9.52381	12.24
F	[N]	2	19.44444	9.72222	12.25001	17.85714	22.96
G	[Y]	2	2.77778	1.38889			
H	[N]	2	19.44444	9.72222	12.25001	17.85714	22.96
AxB	[Y]	2	-9.09E-13	-4.54E-13			
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		7	5.55556	0.79365		13.49206	17.35
Total (Raw)	[-]	17	77.77778	4.57516			

Tuesday February 4, 1992 10:02 am File: ELONG5A.ANV

ANOVA Level Average Table - Raw Data

A	1	18.88889
	2	18.88889
B	1	18.33333
	2	20.00000
	3	18.33333
C	1	18.33333
	2	20.00000
	3	18.33333
D	1	18.33333
	2	19.16667
	3	19.16667
E	1	18.33333
	2	20.00000
	3	18.33333
F	1	19.16667
	2	17.50000
	3	20.00000
G	1	18.33333
	2	19.16667
	3	19.16667
H	1	17.50000
	2	19.16667
	3	20.00000

		B		
		1	2	3
A	1	18.33333	20.00000	18.33333
	2	18.33333	20.00000	18.33333

Tuesday February 4, 1992 10:04 am File: ELONG5B.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[Y]	1	0.00000	0.00000			
B	[N]	2	2.77778	1.38889	1.49999	0.92592	2.08
C	[N]	2	2.77778	1.38889	1.49999	0.92592	2.08
D	[N]	2	11.11111	5.55555	5.99997	9.25925	20.83
E	[Y]	2	2.77778	1.38889			
F	[N]	2	2.77778	1.38889	1.49999	0.92592	2.08
G	[N]	2	2.77778	1.38889	1.49999	0.92592	2.08
H	[N]	2	11.11111	5.55555	5.99997	9.25925	20.83
AxB	[N]	2	8.33333	4.16666	4.49997	6.48147	14.58
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		3	2.77778	0.92593		15.74080	35.42
Total (Raw)	[-]	17	44.44444	2.61438			

Tuesday February 4, 1992 10:04 am File: ELONG5B.ANV

ANOVA Table - Raw Data

Source	Pool	Df	S	V	F	S'	rho%
A	[Y]	1	0.00000	0.00000			
B	[Y]	2	2.77778	1.38889			
C	[Y]	2	2.77778	1.38889			
D	[N]	2	11.11111	5.55555	4.39998	8.58585	19.32
E	[Y]	2	2.77778	1.38889			
F	[Y]	2	2.77778	1.38889			
G	[Y]	2	2.77778	1.38889			
H	[N]	2	11.11111	5.55555	4.39998	8.58585	19.32
AxB	[N]	2	8.33333	4.16666	3.29998	5.80807	13.07
e1	[N]	0	0.00000				
e2	[N]	0	0.00000				
(e)		11	13.88890	1.26263		21.46468	48.30
Total (Raw)	[-]	17	44.44444	2.61438			

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Tuesday February 4, 1992 10:05 am File: ELONG5B.ANV

ANOVA Level Average Table - Raw Data

A	1	19.44444
	2	19.44444
B	1	20.00000
	2	19.16667
	3	19.16667
C	1	20.00000
	2	19.16667
	3	19.16667
D	1	20.00000
	2	18.33333
	3	20.00000
E	1	19.16667
	2	20.00000
	3	19.16667
F	1	20.00000
	2	19.16667
	3	19.16667
G	1	19.16667
	2	20.00000
	3	19.16667
H	1	18.33333
	2	20.00000
	3	20.00000

		B		
		1	2	3
A	1	20.00000	18.33333	20.00000
	2	20.00000	20.00000	18.33333