

APPENDIX A
PHOTOGRAPHIC DOCUMENTATION
(Consisting of 17 Pages)

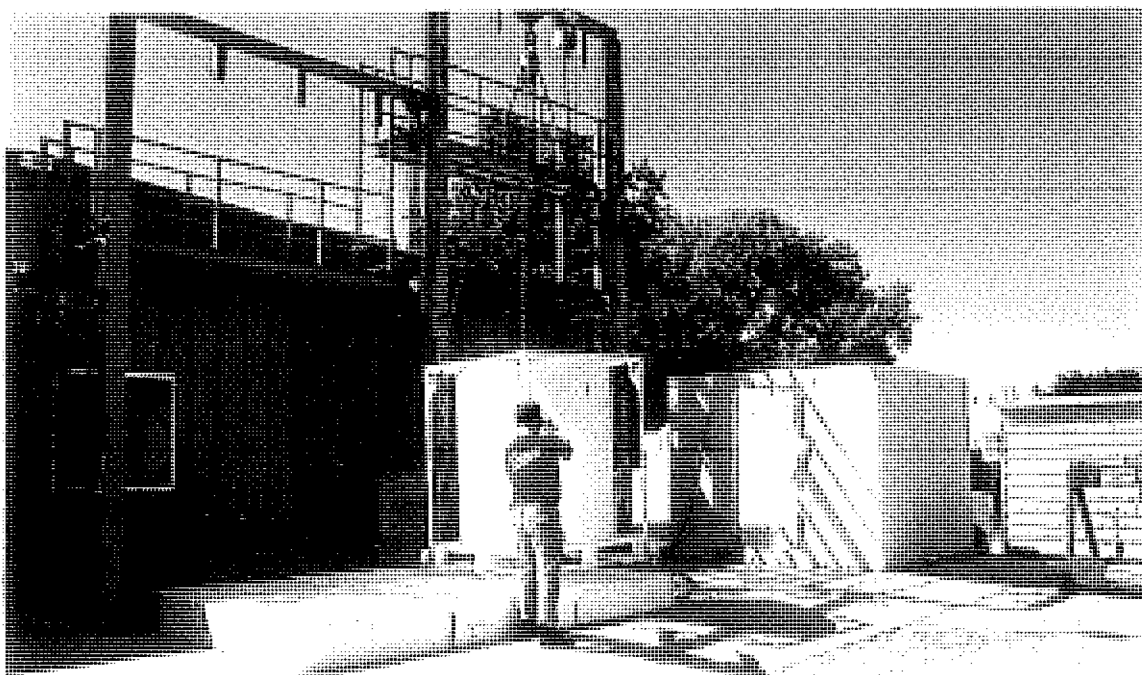


Figure A-1. Eco-Pak Liqui-Rad-250[®] Removed from Conditioning Chamber.

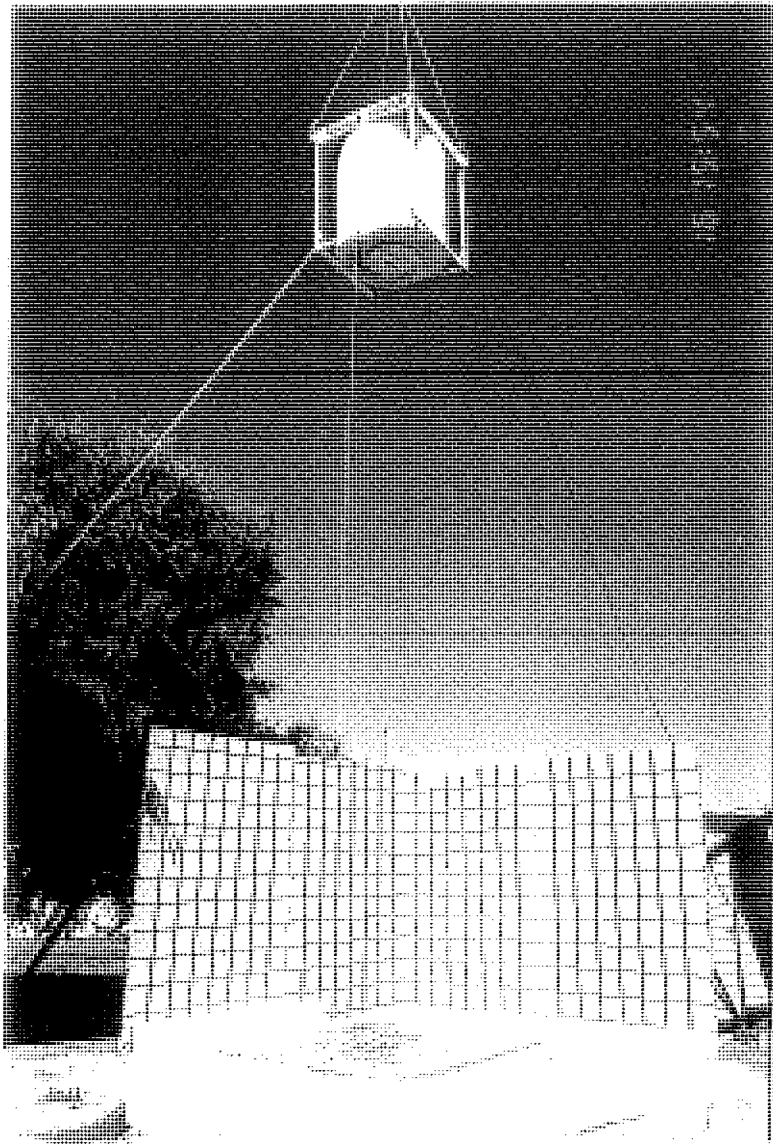


Figure A-2. Initial Drop Test, 30-ft Inverted Orientation.

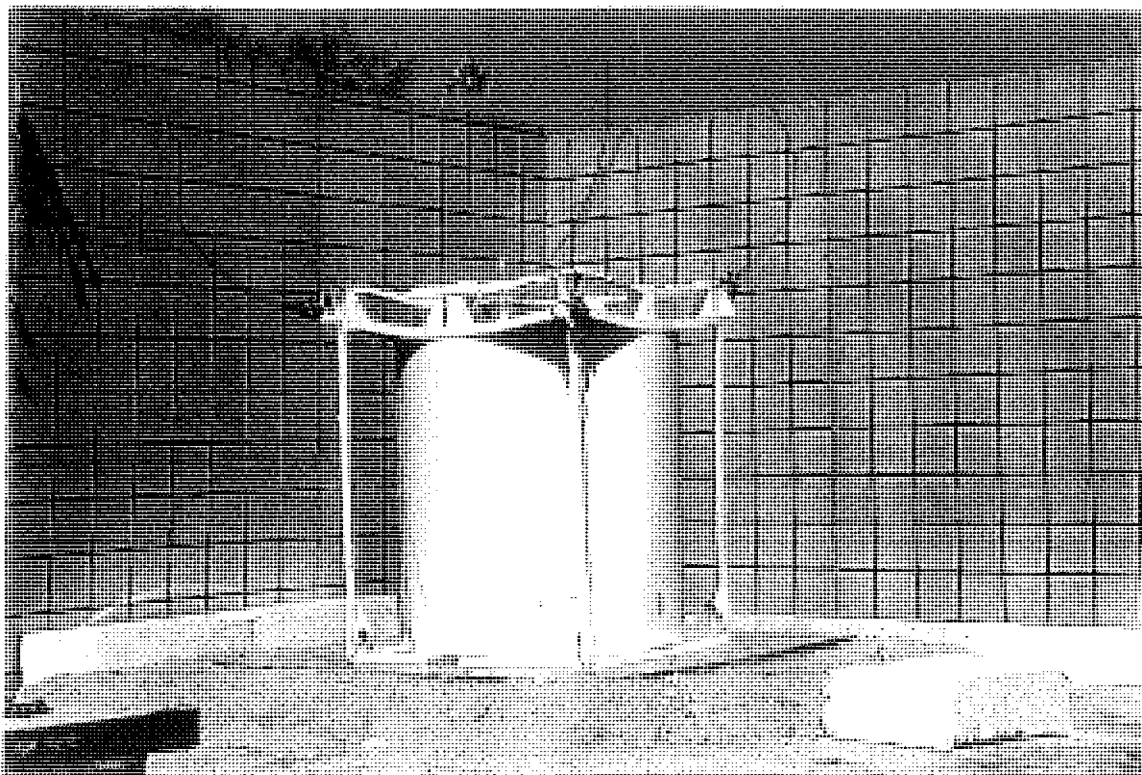


Figure A-3. Impact After 30-ft Drop-Inverted Orientation.

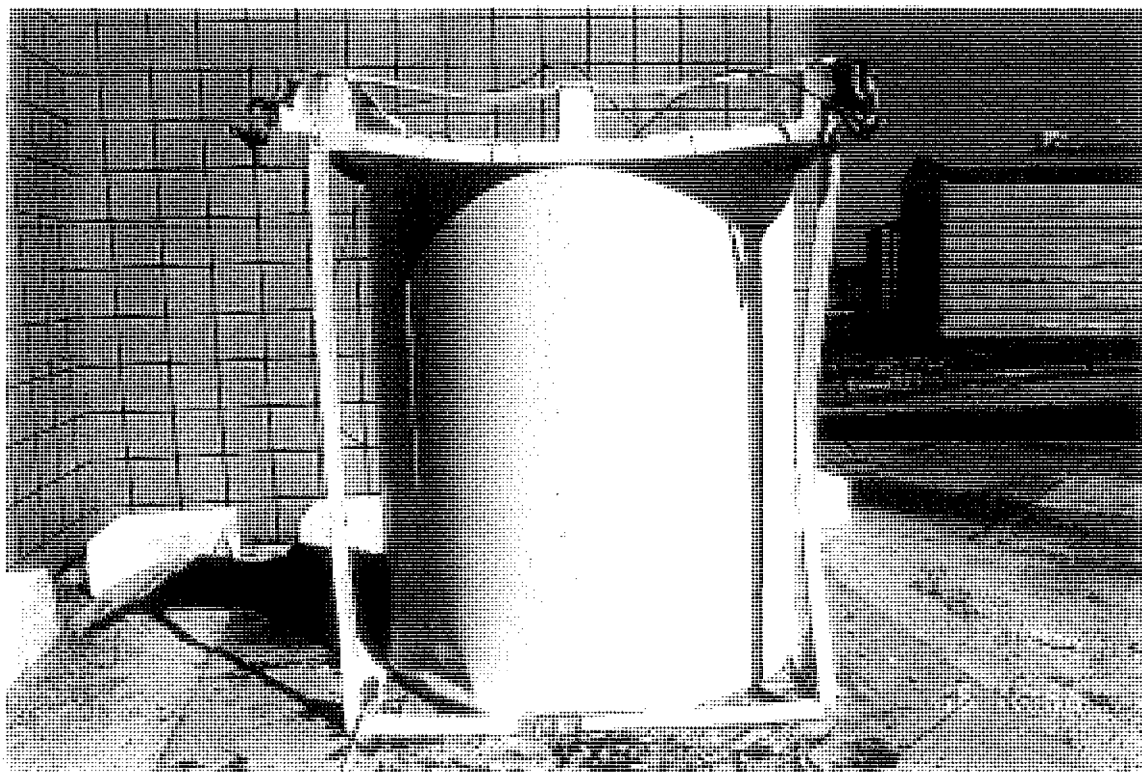


Figure A-4. Post Drop Inspection of Test Item.

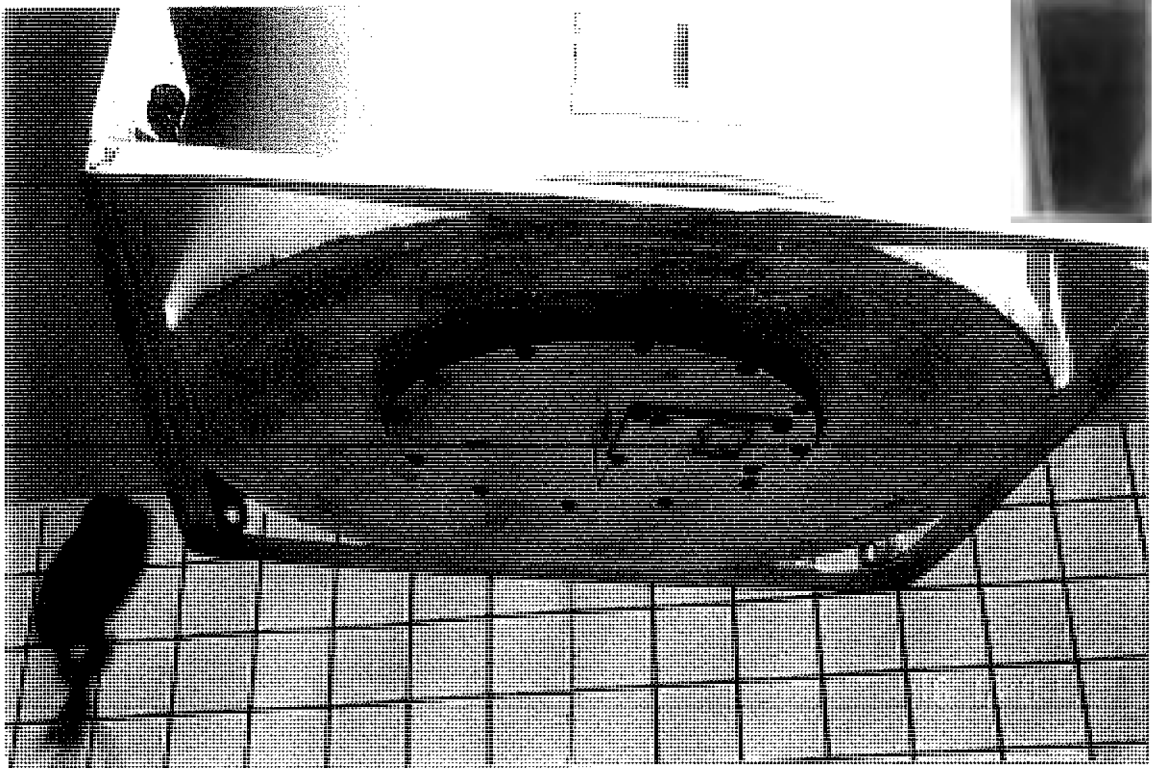


Figure A-5. Post Drop Inspection of Lid.

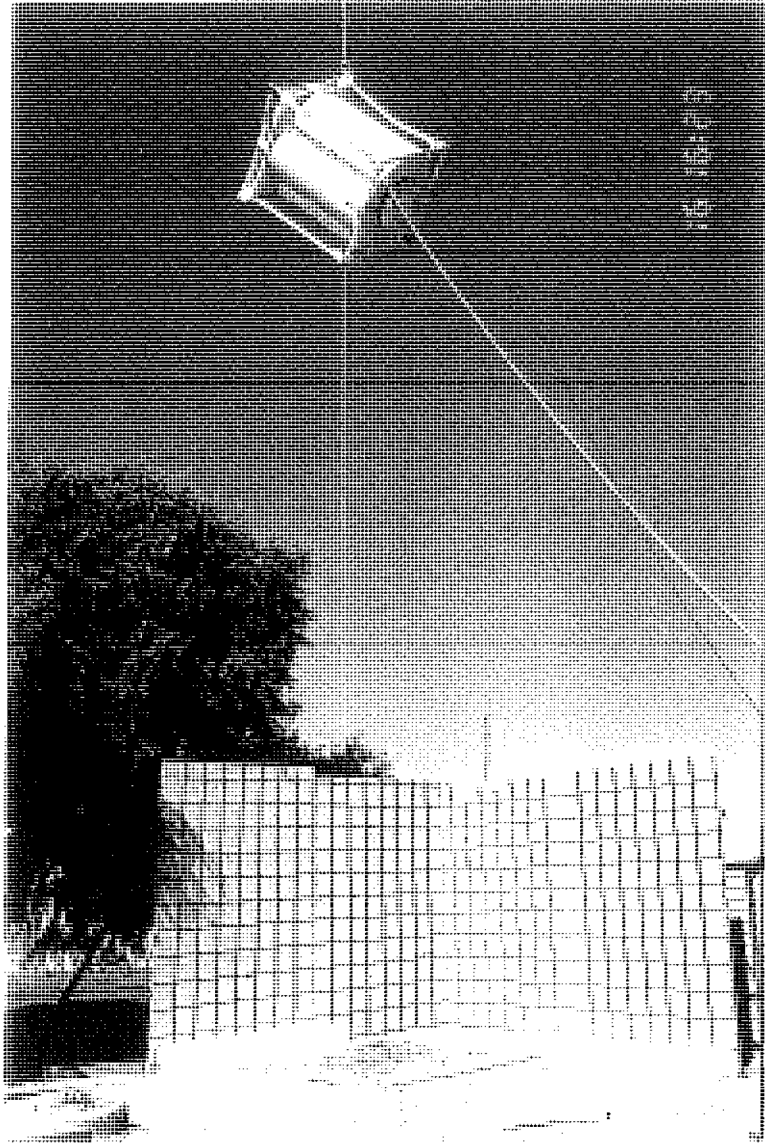


Figure A-6. Second-Drop Test, 30-ft Inverted Corner Drop.

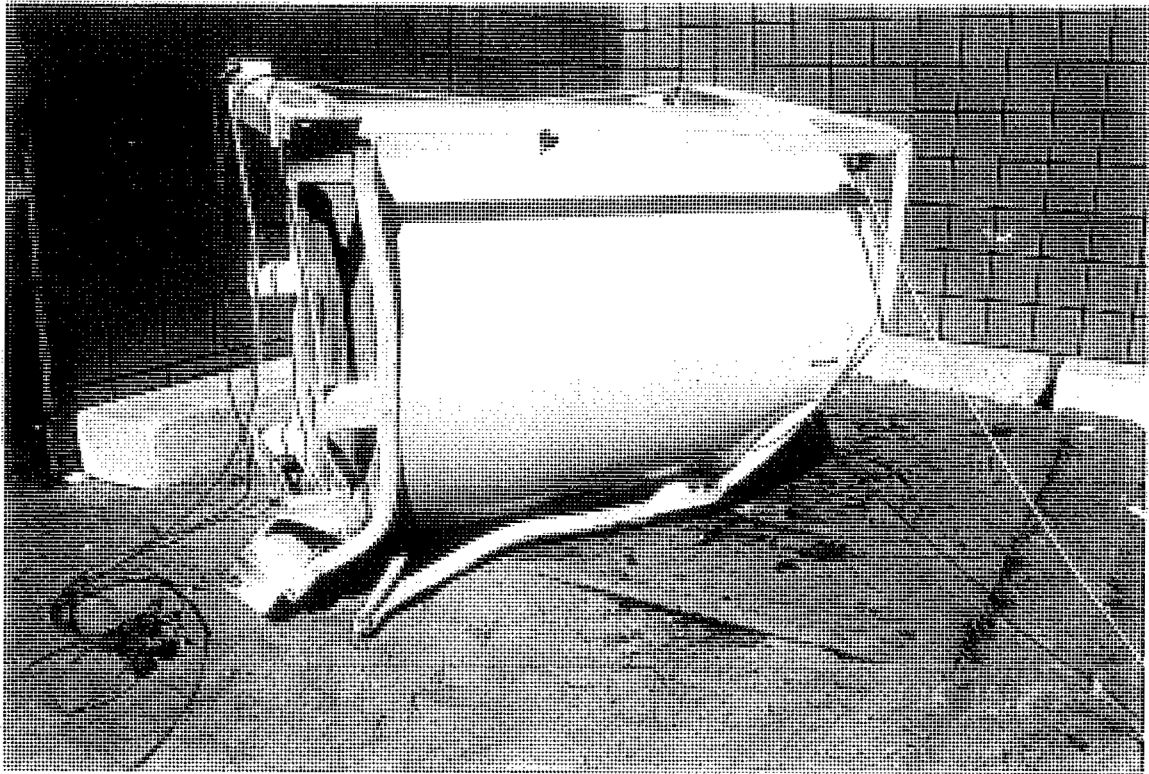


Figure A-7. Post Drop Inspection of Test Item.

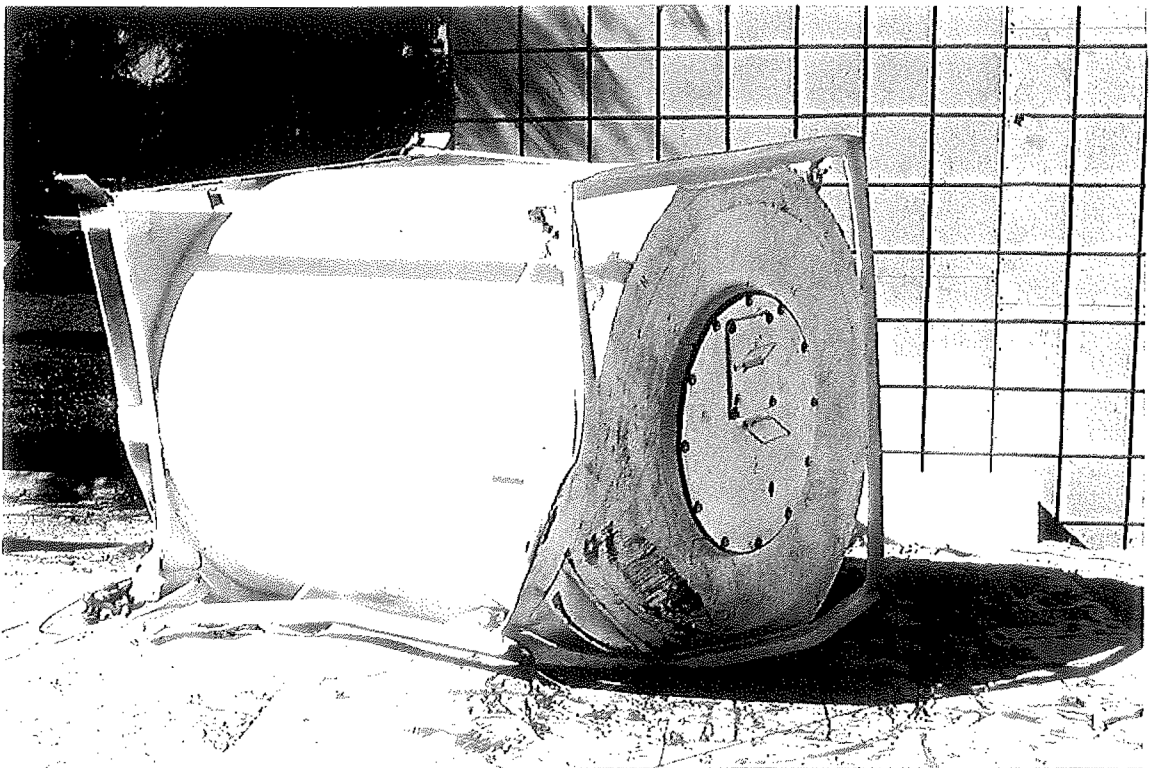


Figure A-8. Post Drop Inspection of Test Item.

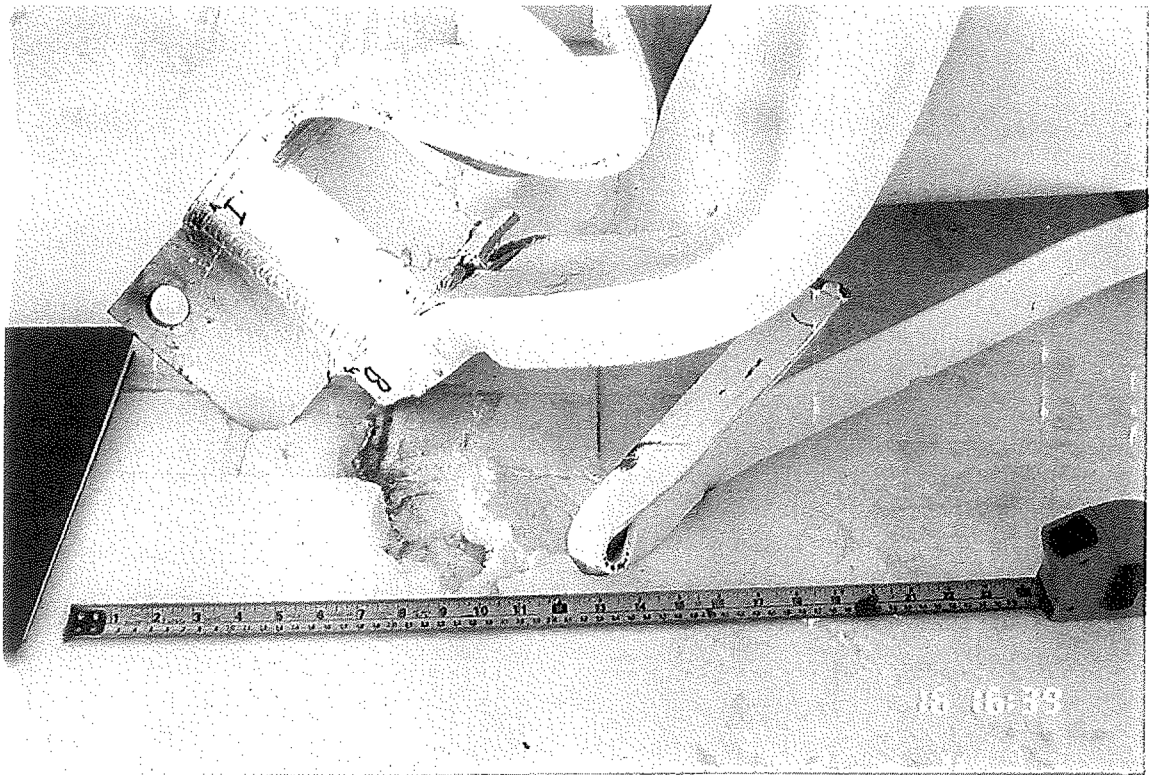


Figure A-9. Close-up of Damage to Support Pad.

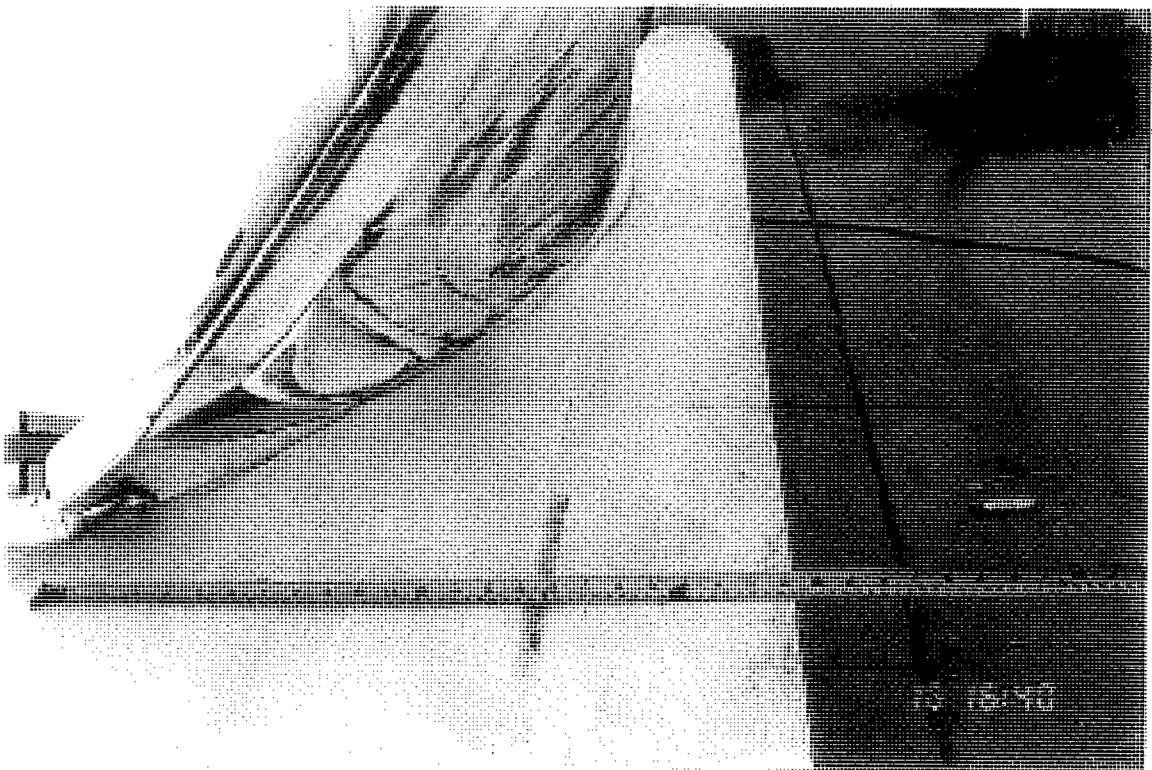


Figure A-10. Close-up of Damage to Corner of Test Article.

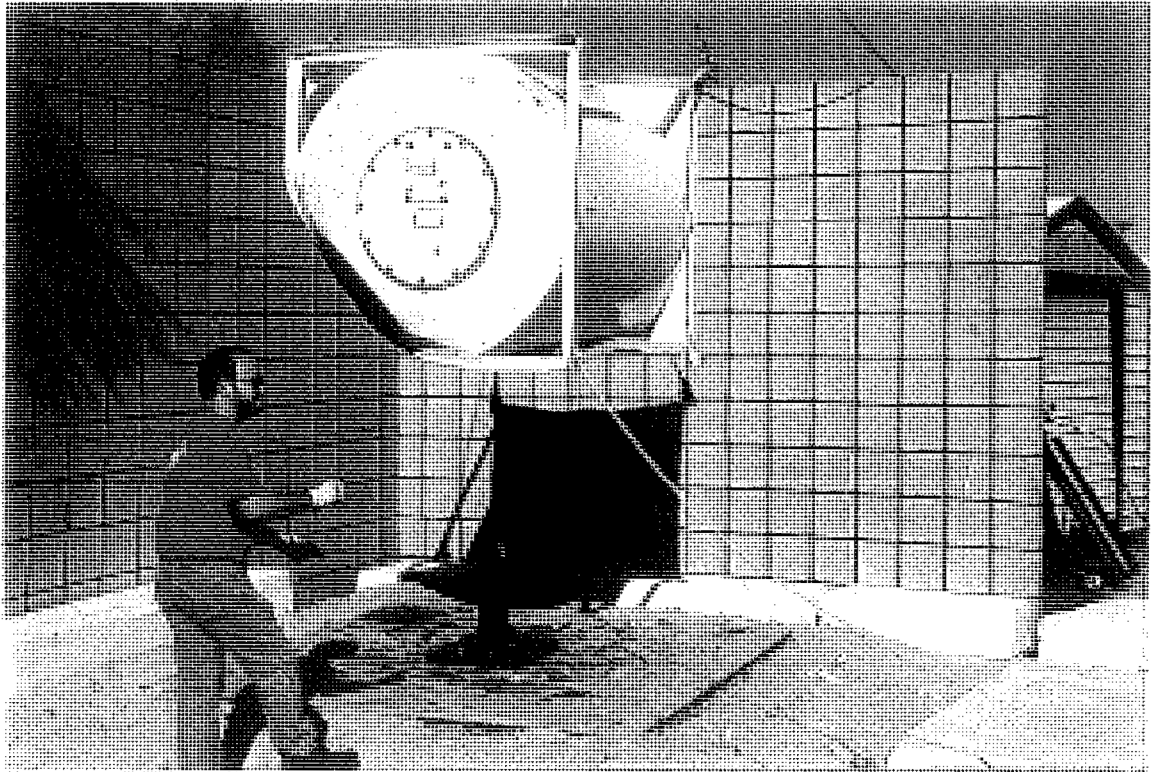


Figure A-11. Final Drop Test, 40-in. Puncture Drop on Side of Test Item.

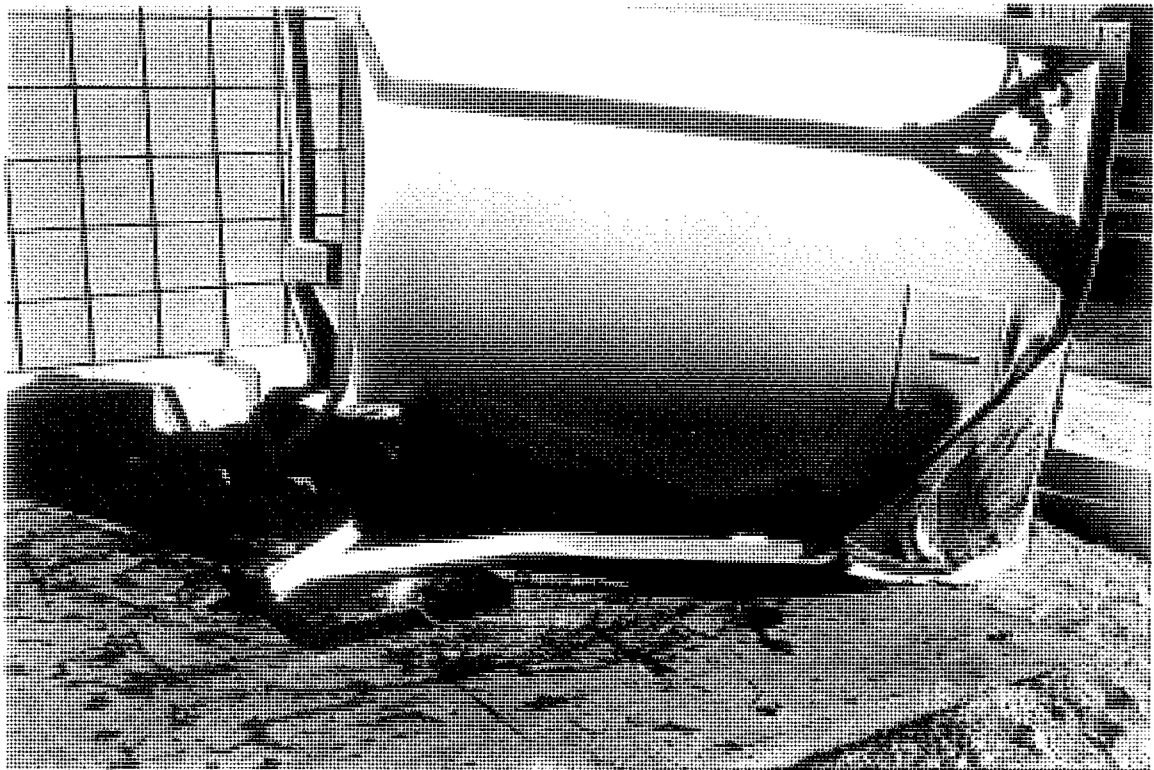


Figure A-12. Post Drop Inspection of Puncture Site.

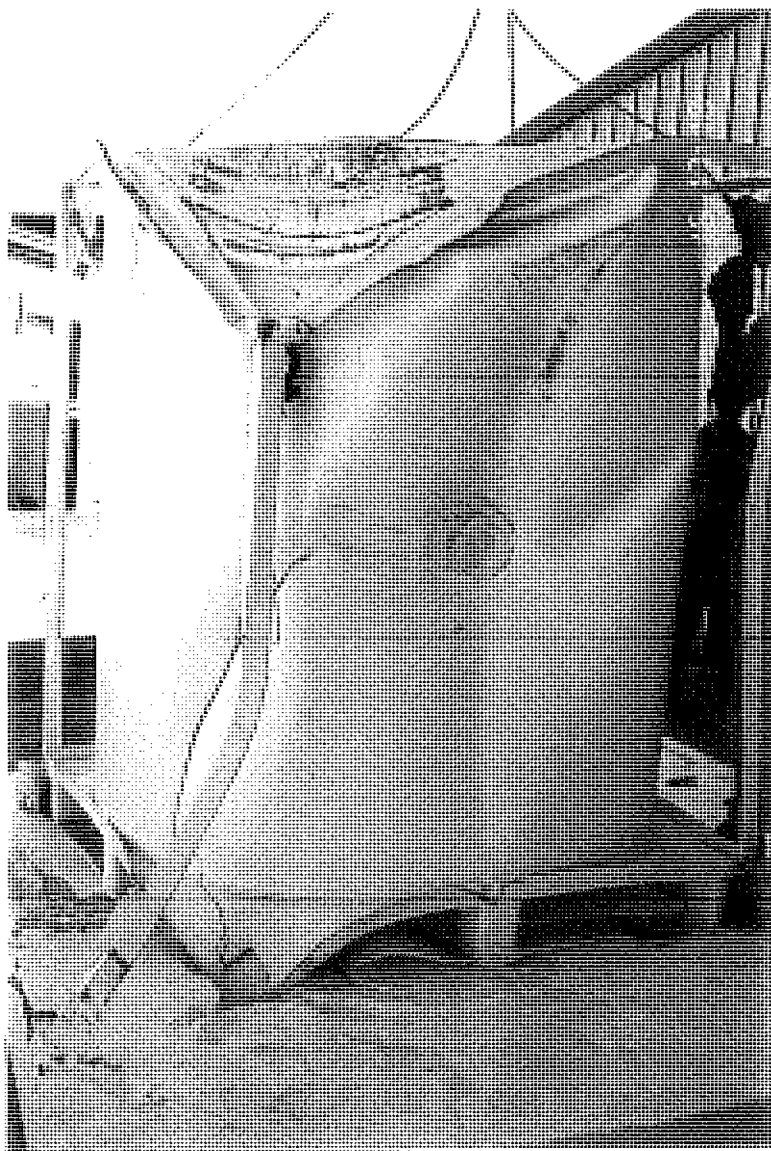


Figure A-13. Post Drop Inspection of Puncture Site.



Figure A-14. Installation of Thermal Indicator Tapes Within the Lid Opening.

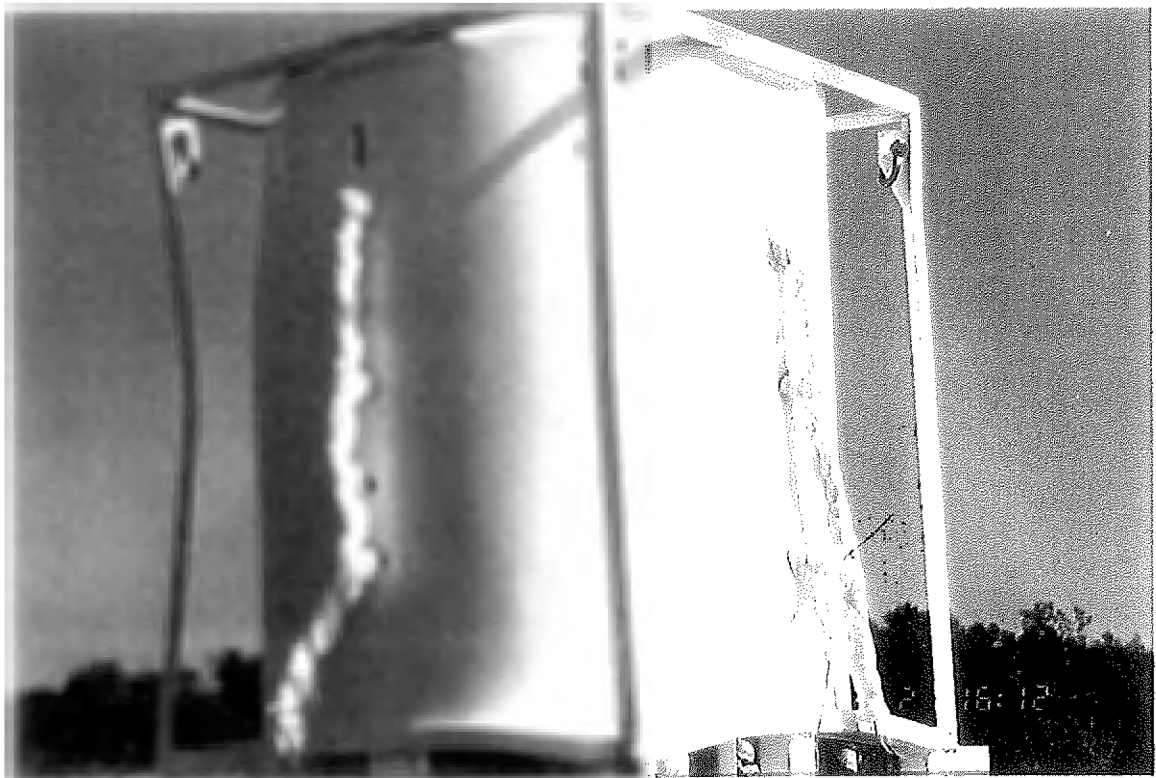


Figure A-15. TC's Penetrating Outer Shell and in Contact with Vessel Wall. TC Leads Protected with Ceramic Fiber Blanket.

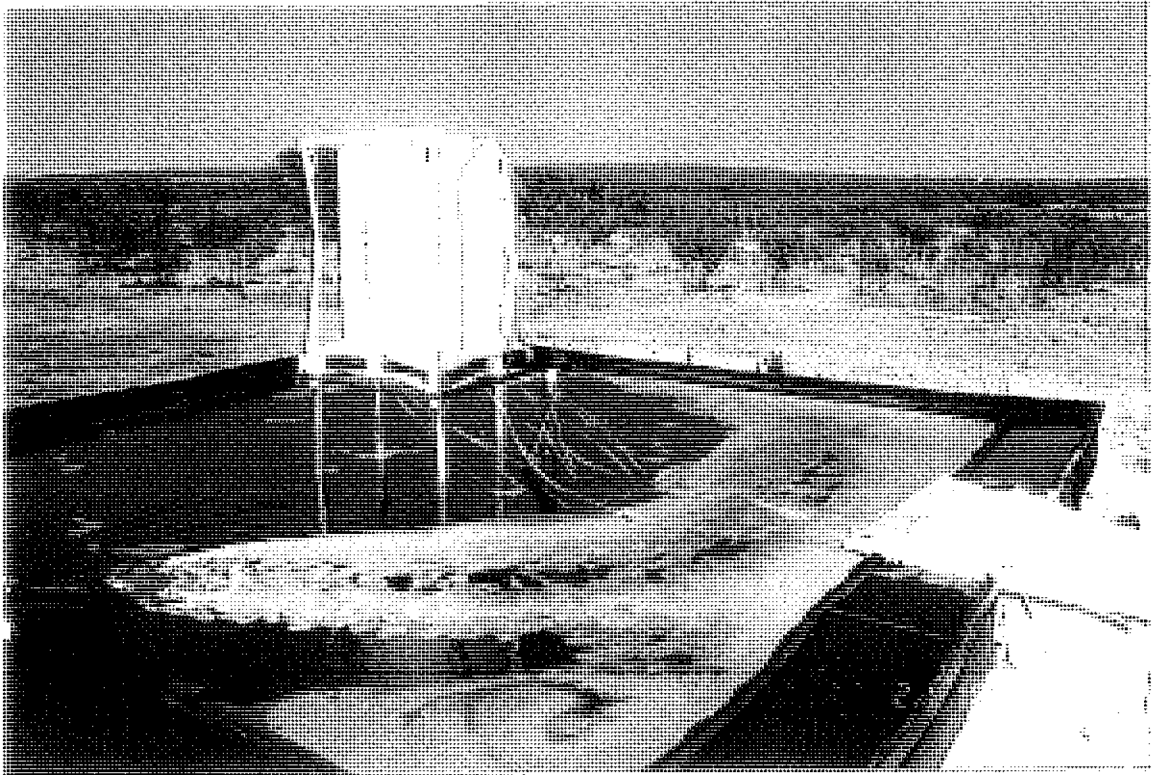


Figure A-16. Eco-Pak Liqui-Rad 250® Prior to Pool-Fire Exposure.



Figure A-17. Photo Taken During First Burn Test.



Figure A-18. Test Item After First Burn Test.



Figure A-19. Test Item After First Burn Test.



Figure A-20. Second Burn Test in Progress.

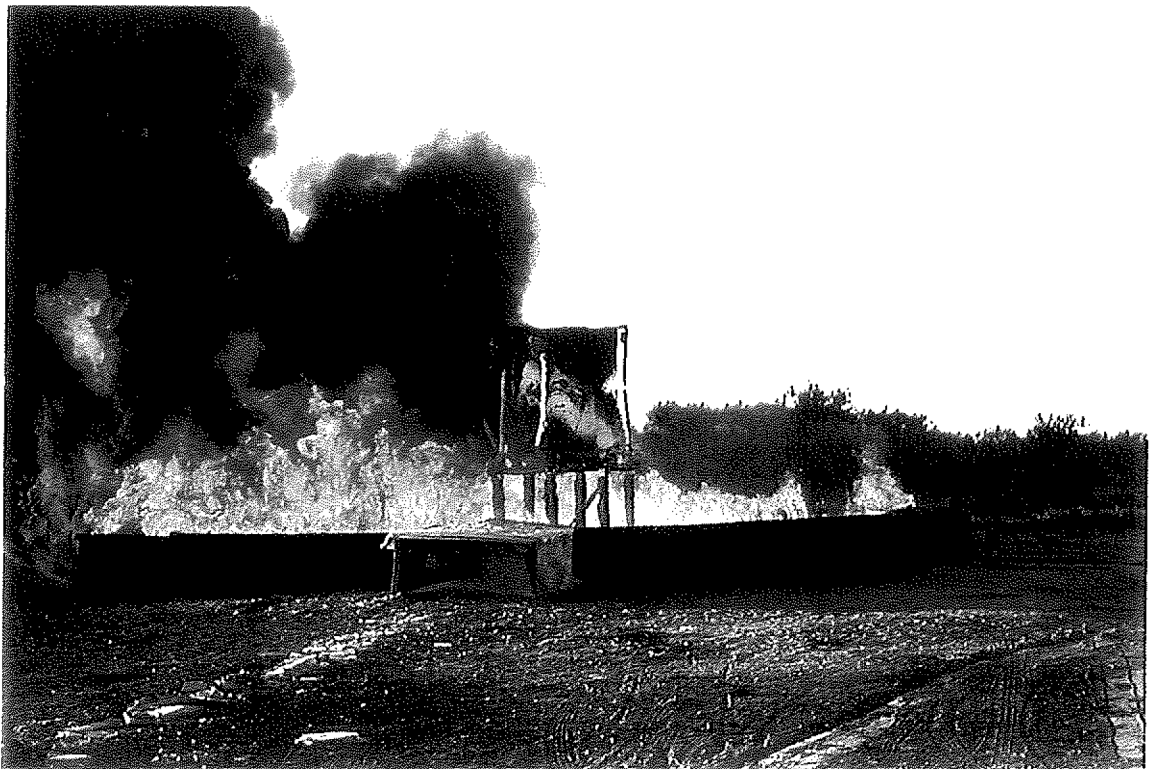


Figure A-21. Test Item After 30-Min Pool Fire Exposure.

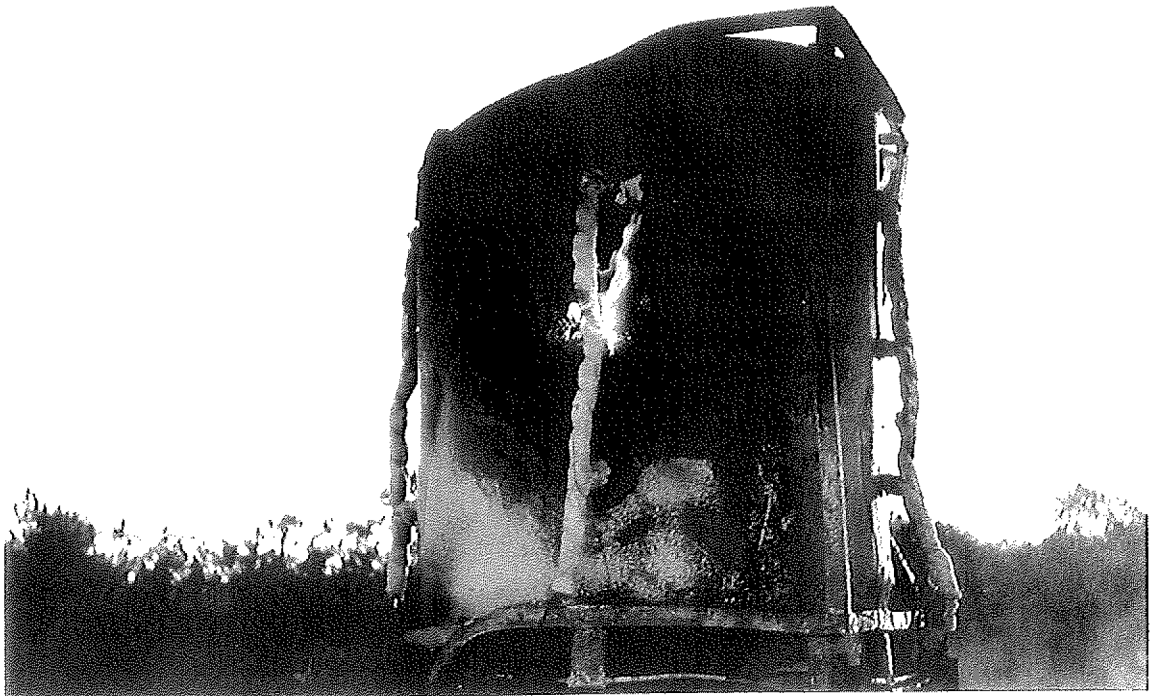


Figure A-22. Test Item After 30-Min Pool Exposure.



Figure A-23. Test Item After 30-Min Pool Fire Exposure.

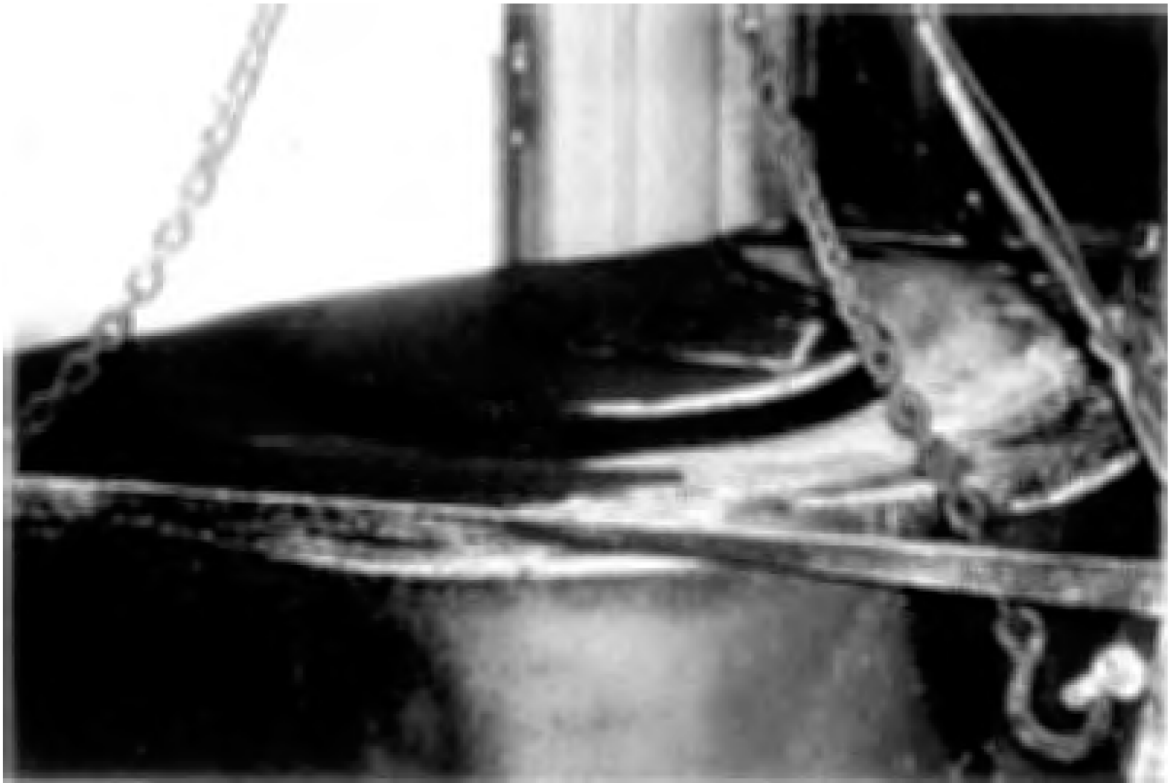


Figure A-24. Outer Cover Section Prior to Disassembly.

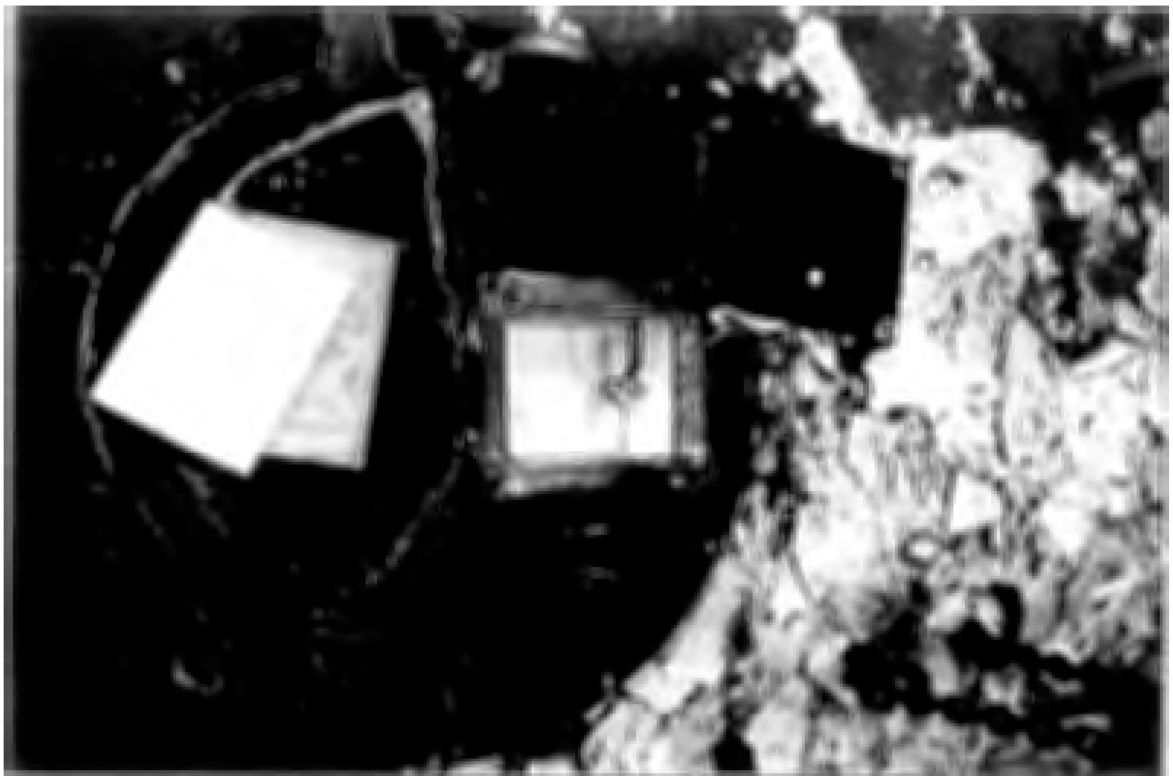


Figure A-25. Valve Access Cover Removed. Removal of Outer Cover Section Required Use of Plasma Cutter.



Figure A-26. Underside of Cover Section. Note: Bolt Indentations.

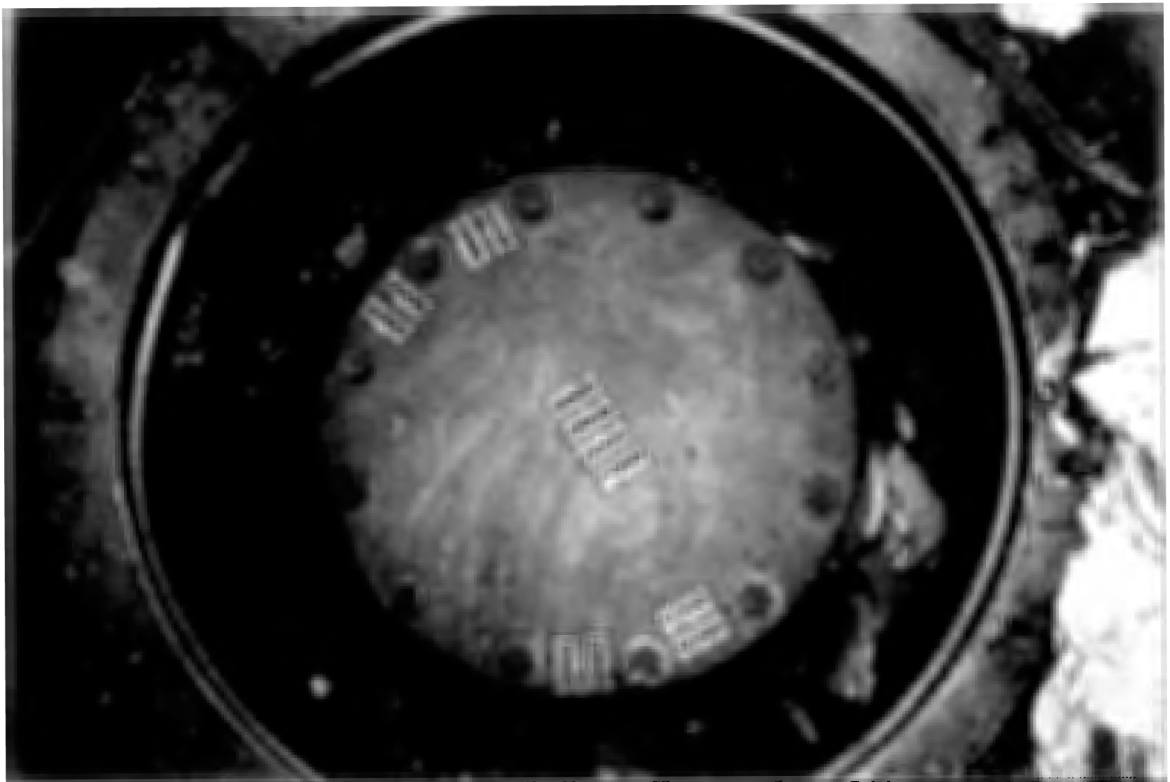


Figure A-27. Thermal Indicator Tapes on Inner Lid.

APPENDIX B
TEST AND MEASURING EQUIPMENT CALIBRATION CERTIFICATES
(Consisting of 15 Pages)



Certificate of Calibration

DATE TESTED: 17 Aug 1999

MODEL: 34970A

CALIBRATION REF. NUMBER: CRN0017381

US37003830

At the time of manufacture, this certifies that the above product was calibrated in accordance with applicable Hewlett-Packard procedures which are in compliance with relevant clauses of ISO 9001/2.

At planned intervals, Hewlett-Packard measurement standards are calibrated by comparison to or measurement against national standards, natural physical constants, consensus standards, or by ratio type measurements using self-calibrating techniques.

National Standards are administered by NIST (National Institute of Standards and Technology) or other recognized national standards laboratories.

At the time of shipment, your instrument met its published operating specifications.

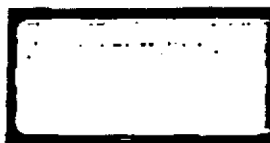
The environment in which this instrument was calibrated is maintained within the operating specifications of the instrument and the standards.

Supporting documentation relative to traceability is on file and is available for examination upon request.

MANUFACTURING MANAGER



5959-4635





Southwest Research Institute
6220 Culebra Road
San Antonio, TX 78238
(210) 522-5215
Department of Quality Assurance
Calibration Laboratory

Certificate of Calibration

19 February 1999

Issued to: TOM HOLLINGSWORTH DIV01 B143
Manufacturer/Model: QUALIMETRICS 1005
Description: WEATHER STATION
Serial Number: 492
Asset Number: 005072

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NC SL Z540-1-1994. Standards used in this calibration, described in the referenced calibration procedure with associated uncertainties or tolerances, are traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and is available for examination upon request. This certificate is not to be reproduced, except in full, without the written approval of the Southwest Research Institute Department of Quality Assurance Calibration Laboratory.

The uncertainty of the calibration was sufficient to determine that the item met the manufacturer's published specifications unless stated otherwise below.

Ambient Conditions: Temperature: 0.0 Degrees Fahrenheit Humidity: 0 % RH

Calibration Date: 5 Jan 99 Calibration Procedure: MFG

Condition as Received: IN TOLERANCE

Condition as Released: IN TOLERANCE

Vendor/Calibration Location: QUALIMETRICS, SACRAMENTO, CA

Remarks: CAL'D W/ #2020 SENSOR S/N 1203 AND #2030 SENSOR S/N 795.
NOT ON A.S.L. CALIBRATION DEVIATION/EXCEPTION 97-CD-44


Mark Romero / Clerk



Southwest Research Institute
6220 Culebra Road
San Antonio, TX 78238
(210) 522-5215
Department of Quality Assurance
Calibration Laboratory

Certificate of Calibration

25 June 1999

Issued to: TOM HOLLINGSWORTH DIV01 B143
Manufacturer/Model: FLUKE 2289A
Description: HELIOS I COMPUTER FRONT END
Serial Number: 4752005
Asset Number: 000248

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NCSL Z540-1-1994. Standards used in this calibration, described in the referenced calibration procedure with associated uncertainties or tolerances, are traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and is available for examination upon request. This certificate is not to be reproduced, except in full, without the written approval of the Southwest Research Institute Department of Quality Assurance Calibration Laboratory.

The uncertainty of the calibration was sufficient to determine that the item met the manufacturer's published specifications unless stated otherwise below.

Ambient Conditions: Temperature: 74.0 Degrees Fahrenheit Humidity: 42 % RH

Calibration Date: 25 Jun 99

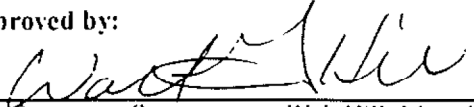
Calibration Procedure: CL-27, MAY 99

Condition as Received: IN TOLERANCE

Condition as Released: LIMITED CALIBRATION

Remarks: LIMITED: 2280A-169 NOT CAL

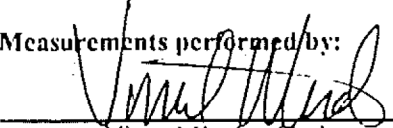
Approved by:


Jim Patterson, Supervisor or Walt Hill, Metrologist

Certificate # 34896

m:\nona2la.rpt Rev date 13 Apr 99

Measurements performed by:


Vince Morales, Technician

Page 1 of 1



DURO-SENSE CORPORATION
20801 Higgins Court, Torrance, CA 90501
Phone: (310) 533-6877 Fax: (310) 533-0330

TO: Southwest Research Institute
6220 Culebra Rd.
San Antonio, TX 78238

Date: July 14, 1999
Calib No.: 48282
Cust. P.O.: 993132W
Calibration Cycle: 6 Months

CALIBRATION CERTIFICATE

This will certify that your Type 'K' T/C's #MTC-B-1252-G-GDW was/were calibrated I.A.W. calibration procedure 26.00 Rev. A on July 14, 1999 against our standard, which is traceable to the National Institute of Standards Technology. Re-Calibration should occur no later than January 14, 2000.

Ambient Temperature: 71.90°F
Furnace Atmosphere: Air
Humidity: 49.00%
Temperature Points: 300°F, 600°F, 900°F
Lot #: M482380

CALIBRATION RESULTS ARE AS FOLLOWS:

Standard	Corrections		
S/N	300°F	600°F	900°F
168	+0.2°F	+0.5°F	+0.8°F
169	+0.3°F	+0.6°F	+0.8°F
170	+0.3°F	+0.6°F	+0.9°F
171	+0.2°F	+0.6°F	+0.9°F
172	+0.4°F	+0.7°F	+1.0°F
173	+0.3°F	+0.6°F	+0.9°F
174	+0.4°F	+0.7°F	+1.0°F
175	+0.4°F	+0.7°F	+1.0°F
176	+0.3°F	+0.7°F	+0.9°F
177	+0.2°F	+0.5°F	+0.8°F
178	+0.2°F	+0.6°F	+0.8°F
179	+0.2°F	+0.5°F	+0.8°F

Calibration procedure I A W ISO 10012-1 1992(E), ANSI/NCSL 2540-1-1994, AMS 2750C, ASTM E 220-96, ASTM E 230-96, ASTM E 207-96
The calibration of thermocouples is subject to change during use. The amount of change depends on factors such as temperature, time, and condition of use.
Total uncertainty of readings is less than 0.1% Accuracy I A W industry standards noted in calibration procedure 26.8
This certificate shall not be reproduced except in full, without the written approval of the laboratory

N.I.S.T. Recertification Date: February 1, 2000	We hereby certify that the above is a true copy of our records. DURO-SENSE CORPORATION Quality Control Department
Leeds and Northrup K-5: Model 7555	
Precision Potentiometer S/N: 1752900	
Eppley Standard Cell: Model 100 - S/N 700851	
Cage Code: 58042	
Master Std. Thermocouple: Type 'S'	
N.I.S.T. Test Numbers: 261236	



DURO-SENSE CORPORATION
20801 Higgins Court, Torrance, CA 90501
Phone: (310) 533-6877 Fax: (310) 533-0330

RECEIVED

APR 01 1999

DEPT. FIRE TECHNOLOGY

TO: Southwest Research Institute
6220 Culebra Rd.
San Antonio, TX 78238-5165

Date: March 31, 1999
Calib No.: 47586
Cust. P.O.: 992603W
Calibration Cycle: 6 Months

CALIBRATION CERTIFICATE

This will certify that your Type 'K' T/C Assy # MTC-B-1252-G-GDW was/were calibrated on March 31, 1999 against our standard, which is traceable to the National Institute of Standards Technology. Re-Calibration should occur no later than September 30, 1999.

Ambient Temperature: 77.40°F
Furnace Atmosphere: Air
Humidity: 37.00%
Temperature Points: 300°F, 600°F, 900°F
Lot #: M055992

CALIBRATION RESULTS ARE AS FOLLOWS:

Standard S/N	300°F	600°F	900°F
91	+0.2°F	+0.5°F	+0.8°F
92	+0.4°F	+0.8°F	+0.9°F
93	+0.3°F	+0.6°F	+0.9°F
94	+0.4°F	+0.5°F	+1.0°F
95	+0.2°F	+0.7°F	+0.9°F
→ 96	+0.3°F	+0.6°F	+0.8°F
→ 97	+0.3°F	+0.7°F	+1.0°F
→ 98	+0.4°F	+0.6°F	+0.9°F
→ 99	+0.3°F	+0.7°F	+1.0°F
100	+0.4°F	+0.7°F	+1.0°F

Calibration procedure 1 A W ISO 10012-1 1992(E), ANSI/NCSL Z540-1-1994, AMS 2750C

The calibration of thermocouples is subject to change during use. The amount of change depends on factors such as temperature, time, and condition of use.
Total Uncertainty of Readings is Less Than .01%

N.I.S.T. Recertification Date: February 1, 2000

Leeds and Northrup K-5: Model 7555

Precision Potentiometer S/N: 1752900

Epplcy Standard Cell: Model 100 - S/N 700851

Cage Code: 58042

Master Std. Thermocouple: Type 'S'

N.I.S.T. Test Numbers: 261236

We hereby certify that the above
is a true copy of our records.
DURO-SENSE CORPORATION

Quality Control Department



Southwest Research Institute
6220 Culebra Road
San Antonio, TX 78238
(210) 522-5215
Department of Quality Assurance
Calibration Laboratory

Certificate of Calibration

18 August 1999

Issued to: TOM HOLLINGSWORTH DIV01 B143
Manufacturer/Model: OMEGA HH-30
Description: PORTABLE AIR VELOCITY METER KIT
Serial Number: 4000-90-102276
Asset Number: 002240

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NCSL Z540-1-1994. Standards used in this calibration, described in the referenced calibration procedure with associated uncertainties or tolerances, are traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and is available for examination upon request. This certificate is not to be reproduced, except in full, without the written approval of the Southwest Research Institute Department of Quality Assurance Calibration Laboratory.

The uncertainty of the calibration was sufficient to determine that the item met the manufacturer's published specifications unless stated otherwise below.

Ambient Conditions: Temperature: 72.1 Degrees Fahrenheit Humidity: 64 % RH

Calibration Date: 30 Jul 99 Calibration Procedure: QAP-2100

Condition as Received: IN TOLERANCE

Condition as Released: IN TOLERANCE

Calibration Measurements by: OMEGA ENGINEERING, STAMFORD, CT.

Remarks: OMEGA REPORT NO.: 991561.

Approved by:

Jim Patterson, Supervisor or Walt Hill, Metrologist

Certificate # 35210

m:\nona2lav.rpt Rev-date 10 Mar 99

Page 1 of 1



Certificate Of Calibration

for

SOUTHWEST RESEARCH INSTITUTE

Cust. P.O. #:	979706R	Model #:	HH-30
Omega W.O. #:	907973043	Serial #:	4000-90-102276 w/4207
Report #:	991561	Recal Date:	30-JUL-00

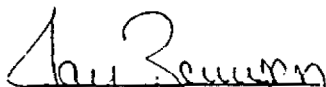
CAL-3

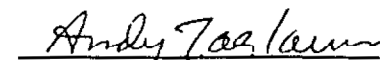
Omega Engineering, Inc. certifies that the above instrumentation has been calibrated and tested to meet or exceed the published specifications. This calibration and testing was performed using instrumentation and standards that are traceable to the National Institute of Standards and Technology. Omega Engineering, Inc. is in compliance with ISO 10012-1, ISO 9001 Section 4.11 and ANSI/NCSL Z540-1-1994. This Certificate/Report shall not be reproduced, except in full, without written consent of Omega Engineering, Inc.

Test Conditions: 22.3 C

Relative Humidity: 63.6%

NIST Traceable Test Numbers: 836/258536-97


Metrology Technician


Quality Assurance Inspector

Calibration Date: 30-JUL-99

OMEGA Engineering, Inc., One Omega Drive, Box 4047, Stamford, CT 06907 Telephone (203) 359-1660 • FAX: (203) 359-7811

<http://www.omega.com> e-mail: info@omega.com

WCS, 0033



Calibration Worksheet per ISO 10012-1

A R No: 907-7433

Model No: HH-30

Serial No: 4000-90-102276 w/4207

Report No: 991561

Maximum Calibration System Uncertainty: 1%

Procedure: QAP-2100

Standard	As Received
Input	
197 fpm	207 fpm
242 fpm	251 fpm
305 fpm	319 fpm

Standard	As Left
Input	
As Found	As Found

Test Equipment

Calibration Due

Dantec 54N60/54R20 S/N 458 & 337 Asset# 01033 22-Sept-99



Southwest Research Institute
6220 Culebra Road
San Antonio, TX 78238
(210) 522-5215
Department of Quality Assurance
Calibration Laboratory

Certificate of Calibration

29 July 1999

Issued to: TOM HOLLINGSWORTH DIV01 B143
Manufacturer/Model: BENDIX 566
Description: PSYCHROMETER
Serial Number: J82244-1
Asset Number: 000232

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NCSL Z540-1-1994. Standards used in this calibration, described in the referenced calibration procedure with associated uncertainties or tolerances, are traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and is available for examination upon request. This certificate is not to be reproduced, except in full, without the written approval of the Southwest Research Institute Department of Quality Assurance Calibration Laboratory.

The uncertainty of the calibration was sufficient to determine that the item met the manufacturer's published specifications unless stated otherwise below.

Ambient Conditions: Temperature: 73.0 Degrees Fahrenheit Humidity: 52 % RH

Calibration Date: 29 Jul 99

Calibration Procedure: CL 9 MAY 99

Condition as Received: IN TOLERANCE

Condition as Released: IN TOLERANCE

Remarks:

Approved by:


Jim Patterson, Supervisor or Walt Hill, Metrologist

Certificate # 35433

m:\nona21a.rpt Rev date 13 Apr 99

Measurements performed by:


Jerry White, Technician

Page 1 of 1



105 Comac Street • Ronkonkoma, NY 11779 • Phone (516) 738-9300 • Fax (516) 738-9329 • Internet www.veeco.com

CALIBRATION CERTIFICATE

incompliance with
ANSI/NCSL Z540-1-1994
ISO-10012-1:1992E

Veeco Instruments Inc. certifies the calibrated leak referenced below is accurate in accordance with measurement technique that compares, through the use of a Veeco Mass Spectrometer Leak Detector, each unit against a primary standard, serial number 0001^a and / or 0003^b. These standards are certified and calibrated by the National Institute of Standards and Technology (NIST). The reference Mass Spectrometer Leak Detector is continuously calibrated and becomes the instrument used to certify the Calibrated Leak. This instrument is maintained and calibrated in accordance with Veeco Standard Calibration Procedure for Helium Calibrators CP001-MS Rev. A.

*We recommend the Calibrated Leak be returned to Veeco Instruments Inc.
for recalibration annually.*

NOTE: Calibrated Leaks should be stored and shipped with valve open.

MODEL: 7MS40

SERIAL NO: 0972

CAL DATE: 11/21/1998

CERTIFICATION NO: LB68027

The above sensitivity calibrator has been calibrated as of this date with the following results:

Helium Leak Rate:

0.0043 ± 10% Micron cu.ft/hr.
 4.3×10^{-8} ± 10% Std. cc./sec.

Air Leak Rate Through Equivalent Leak:

0.0016 = 10% Micron cu.ft/hr.
 1.6×10^{-6} = 10% Std. cc./sec.

Calibration Temperature: 21 °C

Temperature Coefficient = ± 3% per degree C Leak rate decreases less than 5% per year

Final Inspection By:

Ellen Gangi
(Calibration Laboratory Technician)

This certificate shall not be reproduced except in full, without the written approval of Veeco Instruments Inc.

a- NIST Test Number: 255729-96R T144

b- NIST Test Number: 258587-97 T160

INSTRUMENT

Process Equipment

Process Metrology

Industrial Measurement

powering your process.



Southwest Research Institute
6220 Culebra Road
San Antonio, TX 78238
(210) 522-5215
Department of Quality Assurance
Calibration Laboratory

Certificate of Calibration

23 June 1999

Issued to: TOM HOLLINGSWORTH DIV01 B143
Manufacturer/Model: FLUKE 8060A
Description: TRUE RMS MULTIMETER
Serial Number: 5210280
Asset Number: 001558

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NCSL Z540-1-1994. Standards used in this calibration, described in the referenced calibration procedure with associated uncertainties or tolerances, are traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and is available for examination upon request. This certificate is not to be reproduced, except in full, without the written approval of the Southwest Research Institute Department of Quality Assurance Calibration Laboratory.

The uncertainty of the calibration was sufficient to determine that the item met the manufacturer's published specifications unless stated otherwise below.

Ambient Conditions: Temperature: 75.0 Degrees Fahrenheit Humidity: 42 % RH

Calibration Date: 23 Jun 99 Calibration Procedure: FLUKE 8060A: (1 YEAR) CAL VER

Condition as Received: IN TOLERANCE

Condition as Released: IN TOLERANCE

Remarks:

Approved by:

Jim Patterson, Supervisor or Walt Hill, Metrologist

Certificate # 34902

m:\nona21a.rpt Rev date 13 Apr 99

Measurements performed by:

Vince Morales, Technician

Page 1 of 1



INSTITUTE QUALITY ASSURANCE
SURVEILLANCE REPORT

PROJECT NO.: 01-2759-001

REPORT NO.: 1999-SR-0159

Page 1 of 2 -

SURVEILLANCE SCOPE: Monitor Helium Leak Test, Drop Test, and Pool Burn Test of Columbiana ECO-PAK 250 Gallon Container Serial No. 1

REFERENCE DOCUMENTS: NPQP 99-01-2759 and Division 01 Proposal No. 01-23375 Test Plan.

STARTING DATE: September 15, 1999

ENDING DATE: September 21, 1999

QA REPRESENTATIVE: Thomas A. Mayces *pm*

PERSON(S) CONTACTED:

James Griffith (01), Dan Pomerening (18), Lee Ries (18), Mike Arnold and Rick McVey (Columbiana)

SATISFACTORY FINDINGS: See Page 2 of 2

UNSATISFACTORY FINDINGS: None

NONCONFORMANCE REPORT NO.: N/A

CAR/SCAR NO.: N/A

ATTACHMENTS: None

RECOMMENDATIONS/ACTIONS:

Have a copy of the approved test procedure available at each of the test locations for review if necessary and to verify compliance. The test plan should include wind speed acceptance and rejection values instead of just record the wind speed if wind speed affects the test results.

EQUIPMENT CALIBRATION:

Torque Wrench S/N AB54875, cal. Due 12/28/00. VeeCo Helium Leak Detector standardized before use.

APPROVED:

B. Pomerening
INSTITUTE QUALITY ASSURANCE

DATE:

9/23/99

DISTRIBUTION: ORIGINAL: SCD

CC: Originator – TAM

PM – J. Griffith

TM – D. Pomerening (18),

SATISFACTORY FINDINGS:

verified calibrated test and measuring equipment was within their calibration interval. Witnessed the last of 400 pounds of No. 71 2 lead shot added to the container to give it extra weight at the request of the client. Also witnessed the hatch cover put back in place and the bolting torqued to 90 foot-pounds. The first helium leak test rate failed. The hatch cover was removed and cleaned and re-tested with satisfactory results. The "O" ring seal surface apparently was contaminated with salt residue that was removed and resulted in passing the helium leak test. The container was then placed in an area prepared to chill the Eco-Pak container to -21 degrees F prior to the drop test. Witness the unit placed in the insulated shed upside down and four thermocouples place on the bottom and along the side of the ECO-PAK container on September 15, 1999. The thermocouples were connected to a HP Model 34970A Data Acquisition/Switch Unit, S/N US3700380, A/N No. 006082, calibration due 8/17/00. The drop test was started September 16, 1999 at 1540 hours. Witnessed the container level checked and lifted up vertical 30 feet and dropped. The Eco Pak container was lifted and held by one corner so that it was at an angle of 31.5 degrees and then raised to 30 feet and dropped at the client's request. Witnessed the container placed on its side and raised approximately 40 inches above the required steel projection rod and dropped at 1701 hours. The last drop caused a small puncture tear in the side of the container. It was noted that an approved written procedure describing in detail the test methods was not available at the drop test location for review. Verbal instructions from the client were used until the test procedure could be revised. Videos and still photos were taken of each drop and the damage caused.

On September 21, 1999 witnessed the Eco-Pak container mounted on a stand inside a pool of approximately 2,230 gallons of diesel fuel on top of about two feet of water. At around 1959 hours the diesel fuel was lit and the burn was videotaped from two locations. The client and a representative from Nuclear Regulatory Commission (David J. Tinsky) and Savannah River Project (Dick Gromada) also witnessed the pool burn test. The wind speed, air temperature, and thermocouple results were recorded by the data acquisition system.

SOUTHWEST RESEARCH INSTITUTE
DEPARTMENT OF FIRE TECHNOLOGY
INSTRUMENTATION RECORD SHEET

Client: ECW-PAK
Test Date: 22 Sep 99
Project No.: 01 02759-001
Test ID: _____

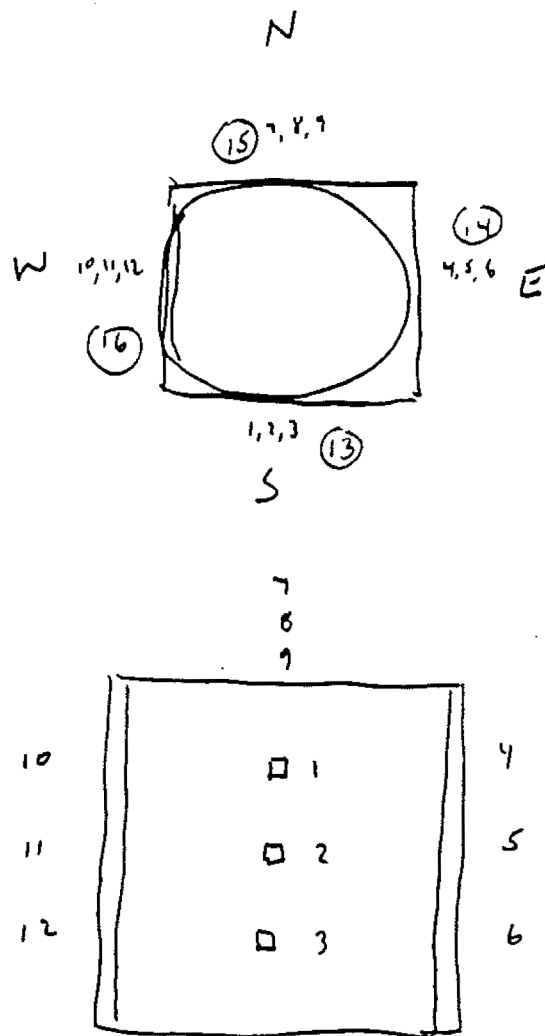
Critical Test Equipment Materials	Serial No./ID No.	Calibration
		Expiration Date
<u>Fluke Helios</u>	<u>4752005</u>	<u>25 Dec 99</u>
<u>Fluke Dmm 8060A</u>	<u>5210280</u>	<u>23 JUN 00</u>
<u>QunLimetrics weather station</u>	<u>492</u>	<u>5 JAN 00</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Personnel List:

Jim Lupe
B. H.
Tom
ASCL

Eco-Pak
01-2759-001
22-SEPT-99

Page 2/2



TC 1-3 SOUTH SIDE

TC 4-6 EAST SIDE

TC 7-9 NORTH SIDE

TC 10-12 WEST SIDE

TC 13 Plane SOUTH

TC 14 Plane EAST

TC 15 Plane NORTH

TC 16 Plane WEST

APPENDIX C
DATA LOG SHEETS FOR DROP AND LEAKAGE TESTS
(Consisting of 7 Pages)

SOUTHWEST RESEARCH INSTITUTE
STRUCTURAL DYNAMICS AND
ENVIRONMENTAL TESTING

TEST ITEM IDEN. Eco-Pak Specialty Packaging PAGE 1 OF 5

TEST PROCEDURE REF. _____ PROJECT NO.: 01-2759-301

TEST NAME LOW TEMPERATURE COOLING

Date	Time	Observations																		
9/15 1999		CHAMBER CONTROLLER WATLOW SERIAL 942 CONTROL VALVE FOR LIQUID NITROGEN. THERMAL MONITOR HP 34970A Data Acquisition/Switch Unit PN 006082 SN U537003830 CAL 08/17/99 CAL DUE 08/17/00 MONITOR 4 CHANNELS OF DATA @ 1 MINUTE INTERVALS																		
	3:30pm	RECEIPT OF TEST ITEM S/N 1 CONFIGURED FOR TESTING BY FIRE TECHNOLOGY DIVISION 01 INVERTED TEST ITEM (TOP DOWN) TO EASE ACCESS FOR DROP TESTING.																		
	4:00pm	PLACED TEST ITEM IN THERMAL CHAMBER INSTALLED THERMOCOUPLES <table> <tr> <th>THERMOCOUPLE NO</th><th>HP CHANNEL NO</th><th>LOCATION</th></tr> <tr> <td>1</td><td>101</td><td>CENTER ON BOTTOM OF TEST ITEM</td></tr> <tr> <td>2</td><td>102</td><td>SIDE OF TEST ITEM DST TOP BOTTOM</td></tr> <tr> <td>3</td><td>103</td><td>SIDE OF TEST ITEM MID LOCATION</td></tr> <tr> <td>4</td><td>104</td><td>SIDE OF TEST ITEM TOP LOCATION</td></tr> <tr> <td>5</td><td></td><td>AIR - MID LOCATION CORNER</td></tr> </table>	THERMOCOUPLE NO	HP CHANNEL NO	LOCATION	1	101	CENTER ON BOTTOM OF TEST ITEM	2	102	SIDE OF TEST ITEM DST TOP BOTTOM	3	103	SIDE OF TEST ITEM MID LOCATION	4	104	SIDE OF TEST ITEM TOP LOCATION	5		AIR - MID LOCATION CORNER
THERMOCOUPLE NO	HP CHANNEL NO	LOCATION																		
1	101	CENTER ON BOTTOM OF TEST ITEM																		
2	102	SIDE OF TEST ITEM DST TOP BOTTOM																		
3	103	SIDE OF TEST ITEM MID LOCATION																		
4	104	SIDE OF TEST ITEM TOP LOCATION																		
5		AIR - MID LOCATION CORNER																		

Test Conducted by: D Pomeroy

SOUTHWEST RESEARCH INSTITUTE
STRUCTURAL DYNAMICS AND
ENVIRONMENTAL TESTING

TEST ITEM IDEN. ECO-PAK SPECIALTY PACKAGING PAGE 2 OF 5
TEST PROCEDURE REF. _____ PROJECT NO.: 01-2759-301
TEST NAME LOW TEMPERATURE COOLING

Date	Time	Observations
9/15 1999		NOTE BOTTOM OF TEST ITEM IS HIGHEST IN CHAMBER
	4:40 JDP	TC NO 5 TO WATLOW CONTROLLER BEGIN COOLING WATLOW SET @ -40°C AIR TEMPERATURE
	5:35pm	CHECKED COOLING TC 3 AND TC 4 WERE BELOW -40°F EVEN THOUGH AIR TEMP WAS ABOVE 40°F, TURNED OFF SUPPLY OF LIQUID NITROGEN
	7:10pm	TC STILL BELOW -40°F EVEN WITH NO COOLING TO CHAMBER SWITCHED TC 4 TO WATLOW AS CONTROL SINCE THIS IS LOWER VALUE PUT TC 5 (AIR) INTO CHANNEL 104 ON HP
	8:10pm	TC 1 55°F TC 2 40°F TC 3 -9°F TC 5 29°F (AIR) TC 4 -51°C (ON WATLOW) CONTROL SET @ -40°C CONTINUE MONITORING TO SEE IF CONTROL IS ESTABLISHED HP DATALOGGER NOTE TIME ON A COMPUTER IS 1 HOUR SLOW
	8:30pm	TC 4 HAS FINALLY REACHED -40°C DIFFERENTIALS IN CHAMBER ARE BEGINNING TO COLLAPSE.

Test Conducted by: D. POMERENNE

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STRUCTURAL DYNAMICS AND
ENVIRONMENTAL TESTING

TEST ITEM IDEN. Eco-Pak Specialty Packaging PAGE 3 OF 5
TEST PROCEDURE REF. _____ PROJECT NO.: 01-2757-301
TEST NAME LOW TEMPERATURE COOLING

Date	Time	Observations
7/15/ 1997	8:35pm	APPEARS TO BE CONTROLLING PROPERLY @ -40°C @ TC 4 SIDE OF TEST ITEM @ TOP (ie on FLOOR OF CHAMBER) TC1 52°F TC2 37°F TC3 20°F TC4 -38°C TC5 30°F
	1:05pm	Based on rate @ in the morning for TC 3 & TC4 SHOULD BE BELOW -30°F TC2 SHOULD BE CLOSE AND TC1 WILL BE ABOVE. NOTE THAT RATE OF CHANGE WILL GO DOWN AS ΔT BECOMES SMALL. MAINTAIN CONTROL @ -40°C AT TC 4 (TEST ITEM SIDE TOP)
9/16/ 1997	6:03	TC1 34°F TC2 23°F TC3 -6°F TC4 -37°C TC5 16°F APPEARS OVER LAST 1 1/2 HRS TO BE NO SIGNIFICANT CHANGE IN TEMPERATURES. RESET SET POINT TO -50°C TO SEE IF WE GET ANY CHANGE
	6:46	CHANGE IN SETPOINT HAD SOME EFFECT BUT WILL NOT GET US THERE. NEED TO RETHINK TEST SETUP
		TC1 TC2 TC3 TC4 TC5
		33°F 21°F -12°F -49°C 140°F
	7:05	32°F 20°F -14°F -50°C 10°F
	7:15	32°F 20°F -14°F -49°C 12°F
	7:32	32°F 20°F -12°F -46°C 11°F
	7:45	31°F 19°F -15°F -51°C 9°F
	8:05	32°F 20°F -12°F -45°C 12°F

Test Conducted by: D POMERENE

SOUTHWEST RESEARCH INSTITUTE
STRUCTURAL DYNAMICS AND
ENVIRONMENTAL TESTING

TEST ITEM IDEN. ECO-PAK SPECIALTY PACKAGING PAGE 4 OF 5

TEST PROCEDURE REF. _____ PROJECT NO.: 01-2759-301

TEST NAME Low TEMPERATURE COOLING

Date	Time	Observations
9/16/99		MODE TO TEST - SETUP INSERT FAN REDIRECT NOZZLE
	0834	Swapped Air temp to Watlow Control and Side bottom to ch. 104
	0924	RESET CONTROLLER TO -300 ^{DTP} -350°C
	1015	RESET CONTROLLER TO -200°C APPEAR TO BE PROBLEMS WITH FAN INSTALLED EXTERNAL MORA FAN
	1030	DECISION MADE, WITH SOMEER INPUT, TO REMOVE TEST ITEM & MAKE TEMPERATURE MEASUREMENTS TO DETERMINE HOW TEMP IS DISTRIBUTED IN UNIT. Top PLATE 61 Mid POINT SIDE WALL 44 Bottom Flange 70 1" Down From Top Flange 14
	12:20	PLACED TEST ITEM BACK IN CHAMBER RIGHTSIDE UP
	12:25	RESUME CONDITIONING @ -40°C
	12:45	RESET CONTROLLER TO -50°C
	13:00	RESET CONTROLLER TO -40°C TEMP LOOKS GOOD

Test Conducted by: D. POMERAN

SOUTHWEST RESEARCH INSTITUTE
STRUCTURAL DYNAMICS AND
ENVIRONMENTAL TESTING

TEST ITEM IDEN. Eco-Pak Specialty Packaging PAGE 5 OF 5
TEST PROCEDURE REF. _____ PROJECT NO.: 01-2759-001
TEST NAME DROP TESTING

Date	Time	Observations
4/16/94	15:21	TC0 -37.5 °F TC2 -38.1 °F TC3 -34.8 °F TC4 -32.6 °F TC5 -36 °F FINAL READING @ TAKEOFF CONFIGURE FOR DROP ONTO TOP 30 FT FLAT DROP, FLIP ITEM ON TOP
	15:46	TEST OF QUICK RELEASE 150 PSI GOOD RELEASE FINAL TEST SETUP
	15:57	GOOD DROP FLAT ON TOP FROM 30 FT 145 ft/sec velocity CONFIGURE FOR DROP ON CORNER A
	16:26	31.50 ORIENTATION 30 FT DROP GOOD DROP 327 ft/sec wind speed
	17:01	PUNCTURE ON SIDE IMPERFECT DROP TOP 1.5° LOW GOOD DROP NOTE DAMAGE TO TEST ITEM MEASURED & DOCUMENTED BY DUN 01 & ECO-PAK PERSONNEL

Test Conducted by: D. P. AMERENING

9-14-99

O-PAK

1-2759-001

Helium Leak Tests

Container I
Primary Seal

Initial Leak Rate Baseline = 0.9×10^{-9} std cc/sec LER 9-14-99
After He Flow/10 min = 3.5×10^{-6} std cc/sec LER 9-14-99

Post Test Leakage Checks - He Leak @ Test F.H./ins
Repairs

Container I

Primary Seal He Leak Test

Initial Leak Rate Baseline = 3.7×10^{-9} std cc/sec LER
After He Flow/10 min = 5.9×10^{-9} std cc/sec LER

9-15-99

O-PAK He Leak Tests

Secondary Seal Container I

Initial Leak Rate Baseline = 3.8×10^{-8} std cc/sec LER
After He Flow/10 min = 2.3×10^{-7} std cc/sec LER
Change/Replaced Seals

Initial Leak Rate Baseline = 1.7×10^{-7} std cc/sec LER
After He Flow/10 min = 2.5×10^{-8} std cc/sec LER

Gooding Oil Inc.
2230 gals of diesel

9/21/99 Remote Burn Test Area

() ml Fuel Pumped

Sturgeon River Dick Gro, M.A.D. 14
P.C.E. DAVID TIKHINSKY

Vee Co MS 40 SIN 00541X3

9-23-99

ECO PACK

Cyl 1. 250 CAL

1/2 Leak Test (Post Burn Test)

PRIMARY SEAL BASELINE LEAK RATE: 3.8×10^{-9} STD CC/SEC PER 9/23/99

115 START HE FLOW

PRIMARY SEAL LEAK RATE AFTER 10 MIN HE FLOW: 5.5×10^{-9} STD CC/SEC PER 9/23/99

SECONDARY SEAL (Post Burn Test)

SECONDARY SEAL BASELINE LEAK RATE: 3.2×10^{-8} STD CC/SEC PER 9/23/99

SECONDARY SEAL LEAK RATE AFTER 10 MIN HE FLOW: 4.9×10^{-8} STD CC/SEC PER 9/23/99

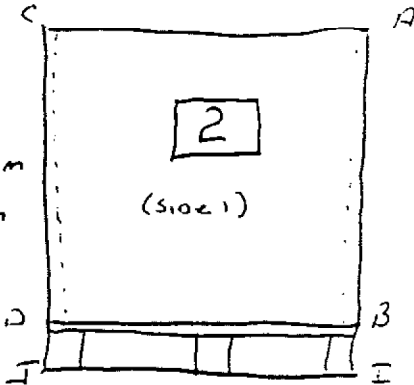
Witnessed D. J. J. 9/23/99

APPENDIX D
CONSTRUCTION DETAILS AND DIMENSIONAL MEASUREMENTS
(Consisting of 11 Pages)

ECO-PAK Sample 2

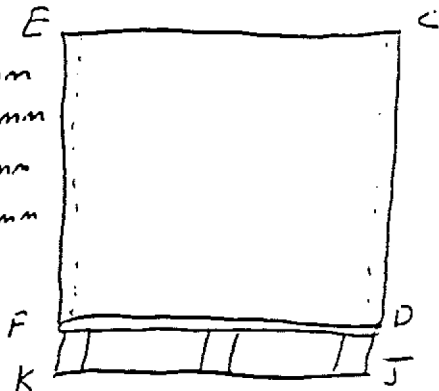
Side 1 View

- $\rightarrow C = 1417 \text{ mm}$
- $\rightarrow D = 1200 \text{ mm}$
- $\rightarrow J = 1858 \text{ mm}$
- $\rightarrow I = 1857 \text{ mm}$
- $\rightarrow B = 1696 \text{ mm}$
- $\rightarrow O = 1419 \text{ mm}$



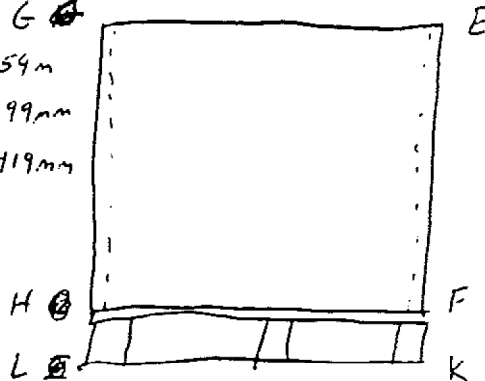
Side 2 View

- $\rightarrow E = 1421 \text{ mm}$
- $\rightarrow F = 1675 \text{ mm}$
- $\rightarrow C = 1856 \text{ mm}$
- $\rightarrow D = 1412 \text{ mm}$

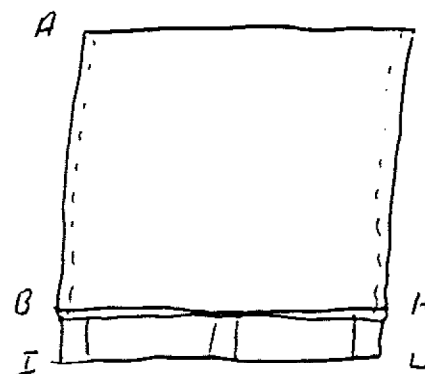


Side 3 View

- $\rightarrow G = 1420 \text{ mm}$
- $\rightarrow L = 1854 \text{ mm}$
- $\rightarrow H = 1699 \text{ mm}$
- $\rightarrow H = 1419 \text{ mm}$

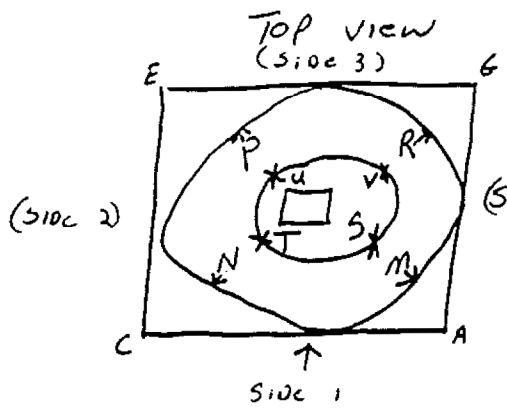
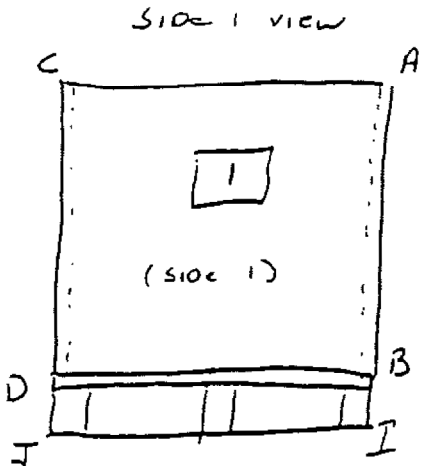


Side 4 View



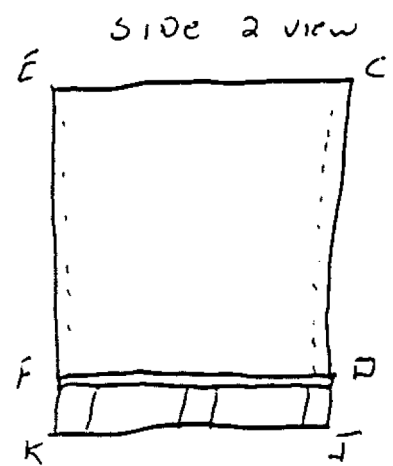
- $A \rightarrow E = 2006 \text{ mm}$
- $C \rightarrow G = 2005 \text{ mm}$
- $A \rightarrow M = 247 \text{ mm}$
- $M \rightarrow S = 346 \text{ mm}$
- $A \rightarrow S = 643 \text{ mm}$
- $C \rightarrow N = 298 \text{ mm}$
- $N \rightarrow T = 349 \text{ mm}$
- $C \rightarrow T = 647 \text{ mm}$
- $E \rightarrow P = 295 \text{ mm}$
- $U \rightarrow P = 352 \text{ mm}$
- $E \rightarrow U = 647 \text{ mm}$
- $G \rightarrow R = 298 \text{ mm}$
- $R \rightarrow V = 349 \text{ mm}$
- $G \rightarrow V = 647 \text{ mm}$

$\rightarrow C = 1699 \text{ mm}$
 $\rightarrow D = 1855 \text{ mm}$
 $\rightarrow E = 1857 \text{ mm}$
 $\rightarrow F = 1696 \text{ mm}$
 $\rightarrow G = 1421 \text{ mm}$

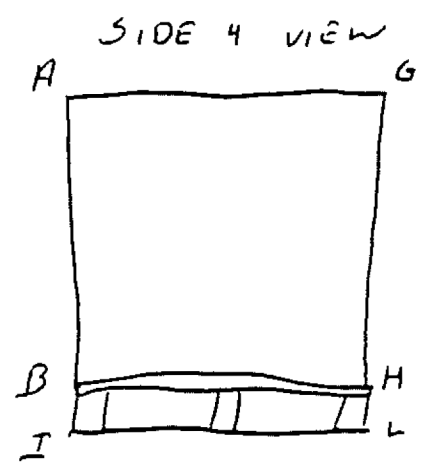
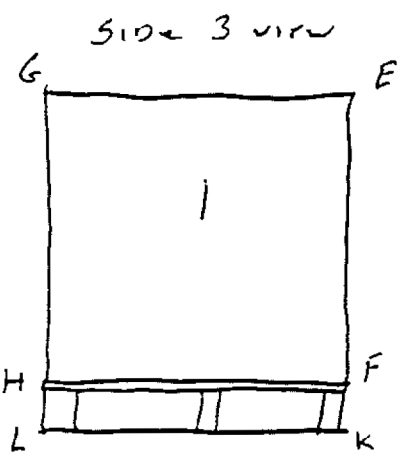


$F \rightarrow E = 200$
 $C \rightarrow G = 200$
 $F \rightarrow M = 298$
 $M \rightarrow S = 35$
 $A \rightarrow S = 645$
 $C \rightarrow N = 592$
 $N \rightarrow T = 342$
 $C \rightarrow T = 64$
 $T \rightarrow P = 295$
 $U \rightarrow P = 348$
 $E \rightarrow U = 352$
 $G \rightarrow R = 297$
 $R \rightarrow V = 348$
 $G \rightarrow V = 645$

$\rightarrow E = 1780 \text{ mm}$
 $\rightarrow F = 1855 \text{ mm}$
 $\rightarrow G = 1421 \text{ mm}$



$\rightarrow G = 1421 \text{ mm}$
 $\rightarrow H = 1855 \text{ mm}$
 $\rightarrow I = 1696 \text{ mm}$
 $\rightarrow J = 1421 \text{ mm}$

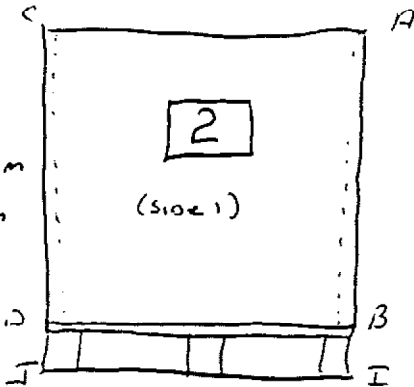


$G \rightarrow A = 35$
 $G \rightarrow H = 1421$

ECO-PAK Sample 2

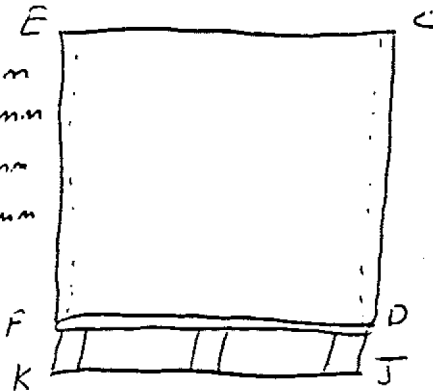
Side 1 View

$\rightarrow C = 1417 \text{ mm}$
 $\rightarrow D = 1200 \text{ mm}$
 $\rightarrow J = 1858 \text{ mm}$
 $\rightarrow I = 1857 \text{ mm}$
 $\rightarrow B = 1696 \text{ mm}$
 $\rightarrow O = 1414 \text{ mm}$



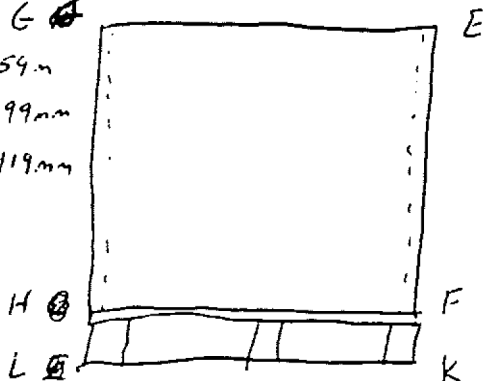
Side 2 View

$\rightarrow E = 1421 \text{ mm}$
 $\rightarrow F = 1675 \text{ mm}$
 $\rightarrow G = 1856 \text{ mm}$
 $\rightarrow H = 1412 \text{ mm}$



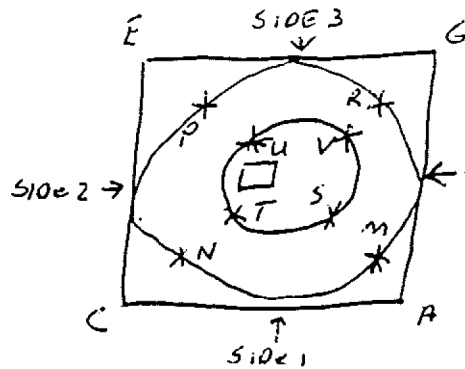
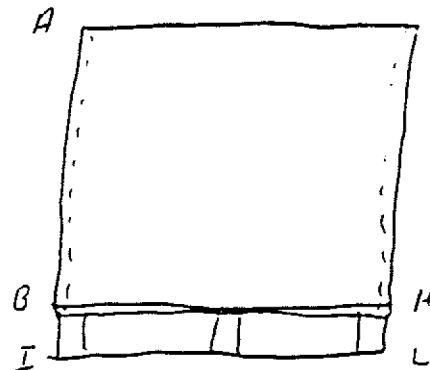
Side 3 View

$\rightarrow G = 1420 \text{ mm}$
 $\rightarrow L = 1859 \text{ mm}$
 $\rightarrow H = 1699 \text{ mm}$
 $\rightarrow I = 1419 \text{ mm}$



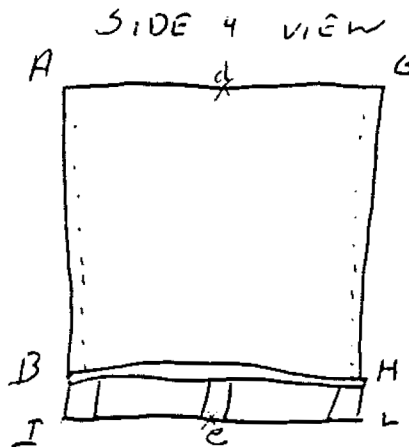
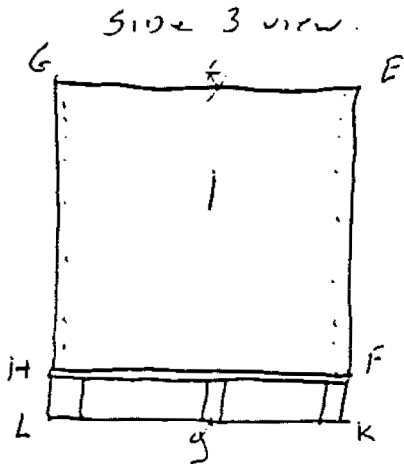
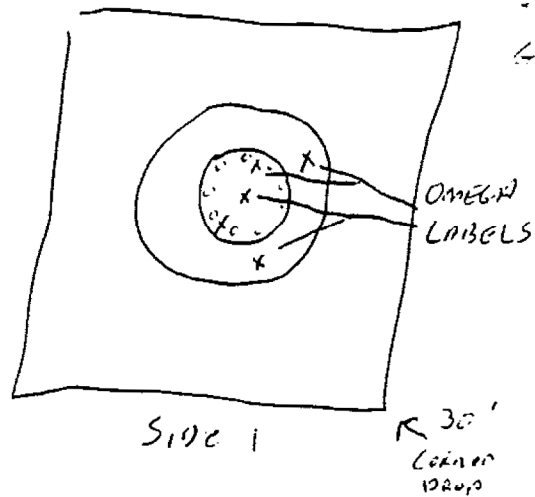
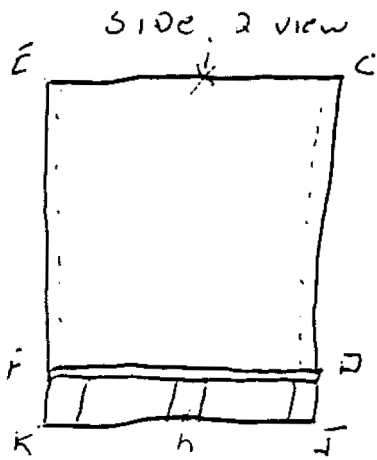
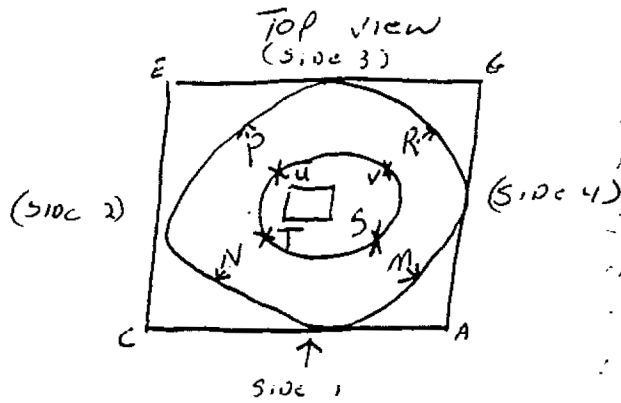
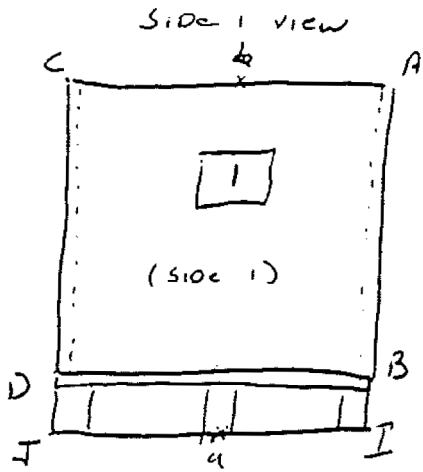
Side 4 View

$\rightarrow A = 1422 \text{ mm}$
 $\rightarrow B = 1414 \text{ mm}$



$A \rightarrow G = 2006 \text{ mm}$
 $C \rightarrow G = 2005 \text{ mm}$
 $A \rightarrow M = 297 \text{ mm}$
 $M \rightarrow S = 346 \text{ mm}$
 $A \rightarrow S = 643 \text{ mm}$
 $C \rightarrow N = 298 \text{ mm}$
 $N \rightarrow T = 349 \text{ mm}$
 $C \rightarrow T = 647 \text{ mm}$
 $E \rightarrow P = 295 \text{ mm}$
 $U \rightarrow P = 352 \text{ mm}$
 $E \rightarrow U = 647 \text{ mm}$
 $G \rightarrow R = 298 \text{ mm}$
 $R \rightarrow V = 349 \text{ mm}$
 $G \rightarrow V = 647 \text{ mm}$

ELO-PAK Sample 1



$\rightarrow L = 2700 \text{ mm}$
 $\rightarrow K = 2700 \text{ mm}$
 $\rightarrow M = 2780 \text{ mm}$
 $\rightarrow P = 2700 \text{ mm}$
 $\rightarrow S = 2700 \text{ mm}$
 6c 4) $\rightarrow A = 2720 \text{ mm}$
 $\rightarrow T = 2712 \text{ mm}$
 $\rightarrow T = 2700 \text{ mm}$
 $\rightarrow P = 2750 \text{ mm}$
 $\rightarrow D = 2748 \text{ mm}$
 $\rightarrow V = 2700 \text{ mm}$
 $\rightarrow R = 2770 \text{ mm}$
 $\rightarrow V = 2748 \text{ mm}$
 $\rightarrow V = 2745 \text{ mm}$

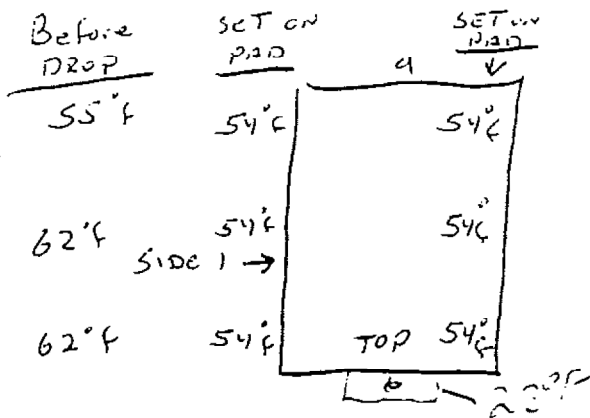
[illegible]

ECOPAK

16 SEP 19

30 LEVEL Drop.

145 FT PER MIN.



After 1st 30' DROP

C I

A → B = 1855

a → b = 1813

A → I = 1854

G → L = 1846

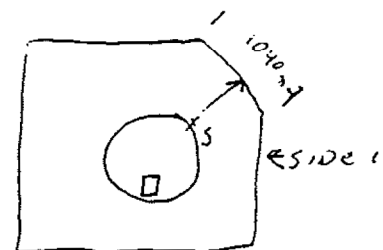
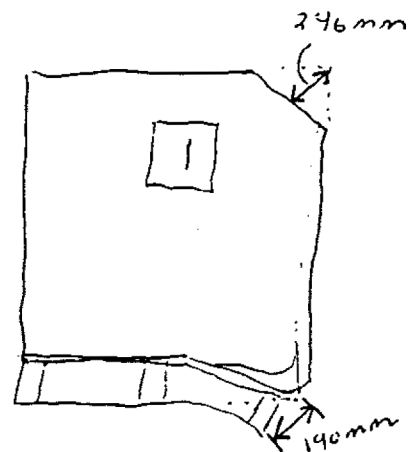
d → e = 1824

j → f = 1818

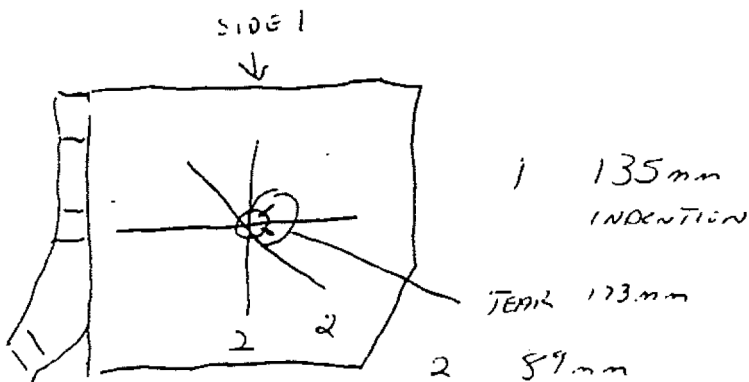
E → K = 1845

i → h = 1801

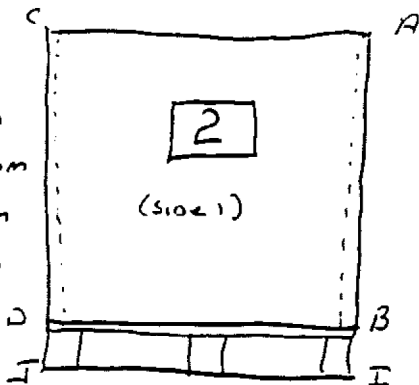
After 2nd 30' DROP



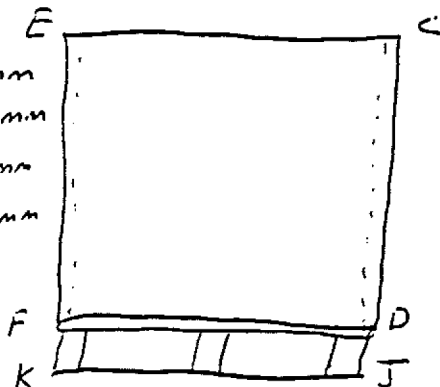
S → Bend 90mm



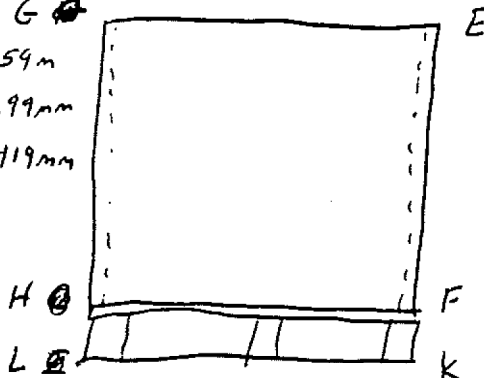
Side View



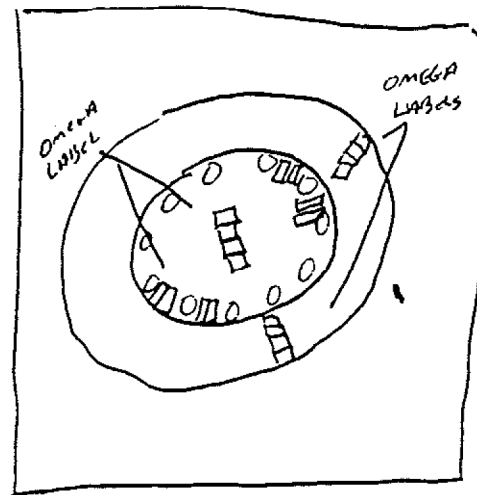
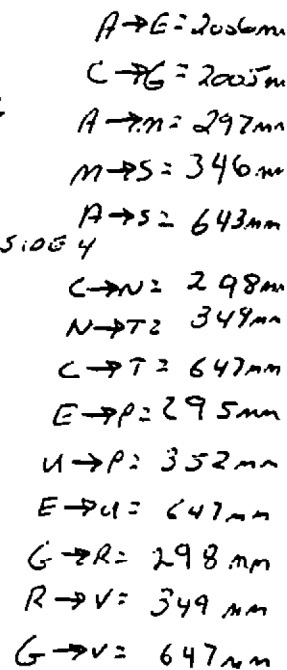
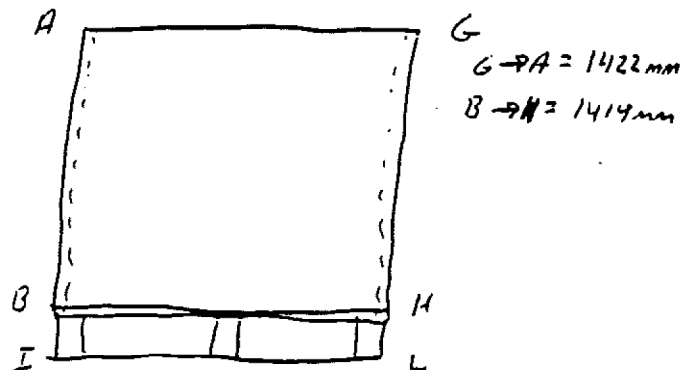
Side 2 view



Side 3 view



SIDE 4 VIEW



Pages D-7 through D-11 have been withheld as Sensitive
Unclassified Non-Safeguards Information pursuant to Title 10 of
the Code of Federal Regulations 2.390

SOUTHWEST RESEARCH INSTITUTE™

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CHEMISTRY AND CHEMICAL ENGINEERING DIVISION
DEPARTMENT OF FIRE TECHNOLOGY
FAX (210) 522-3377

January 12, 2000

Mr. Mike Arnold
Eco-Pak Specialty Packaging
Division of Columbiana Boiler Company
200 West Railroad Street
Columbiana, OH 44408
Fax No. 216/271-5403

Ref: SwRI Project No. 01-2759

Dear Mr. Arnold:

This information is provided in response to your request for clarification to Southwest Research Institute (SwRI) Final Report No. 01-2759-001 dated January 5, 2000.

A) The Omegalabel® thermal insulation labels ranges were the following:

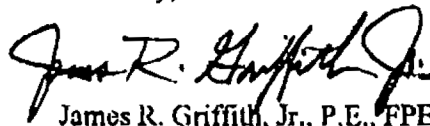
1. 110, 120, 130, 140°F
2. 150, 175, 200, 225°F
3. 250, 300, 350, 400°F
4. 400, 450, 500, 550°F

B) The tare weight of the Eco-Pak Liqui-Rad-250® package was 2559 lb. The container was filled with 250 gallons of water (2083 lb) and 650 lb of salt. The total weight was 5292, and the specific gravity of the solution in the container was 1.31.

In order to increase the specific gravity of the solution in the container, 400 lb of lead shot was added. This brought the total weight of the Eco-Pak Liqui-Rad-250® package to 5692 lb and a calculated specific gravity equivalent to 1.5.

Should you need further assistance, please do not hesitate to call me in the office 250/522-3716 or at home (210/828-3877). Thank you once again for the opportunity to work with you, and I look forward to your next project.

Sincerely,



James R. Griffith, Jr., P.E., FPE
Assistant Manager
Fire Resistance Section

JRG/jgm



HOUSTON, TEXAS • DETROIT, MICHIGAN • WASHINGTON, DC
(713) 977-1377 (248) 353-2550 (703) 416 9500

APPENDIX E
FIRE TEST DATA
(Consisting of 16 Pages)

ECO-PAK Specialty Packaging

Test 1

Date: 22 September 1999

File: 264ECOP1.DAT

SwRI Project No: 01.02759.001

Test Type: Title 10 CFR 71.73

Time mm:ss	TC 1 °F	TC 2 °F	TC 3 °F	TC 4 °F	TC 5 °F	TC 6 °F	TC 7 °F	TC 8 °F	TC 9 °F	TC 10 °F	TC 11 °F	TC 12 °F
0:00	85	82	82	82	80	80	82	81	80	81	81	81
1:00	89	84	80	84	86	81	83	84	82	82	80	81
2:00	89	81	79	87	113	81	81	82	80	81	79	78
3:00	93	82	80	90	152	86	81	82	80	81	78	78
4:00	95	82	79	92	177	94	81	81	78	79	77	76
5:00	87	80	79	90	220	107	80	81	76	81	76	77
6:00	85	81	80	91	254	129	81	83	77	84	78	78
7:00	91	82	79	99	287	156	80	82	77	81	77	81
8:00	103	87	83	112	470	187	82	85	80	83	77	86
9:00	92	87	84	107	536	216	81	84	82	87	79	93
10:00	81	86	87	109	561	245	80	85	85	91	84	104
11:00	88	89	91	119	577	272	82	85	89	88	82	110
12:00	88	94	97	116	592	298	85	90	98	99	95	126
13:00	100	101	109	125	622	328	88	94	107	108	103	140
14:00	120	108	121	136	658	358	90	98	117	110	108	153
15:00	137	117	136	146	667	389	92	102	125	116	118	174
16:00	128	116	148	147	685	416	94	104	132	114	120	186
17:00	141	123	166	156	695	445	96	107	139	118	127	203
18:00	168	140	192	168	697	471	101	114	148	140	146	228
19:00	157	139	210	171	703	495	102	114	154	121	143	242
20:00	185	157	238	186	724	521	105	118	162	130	156	262
21:00	174	161	264	184	730	542	107	122	170	138	167	281
22:00	180	166	284	189	747	563	110	127	178	142	179	302
23:00	182	174	308	193	747	584	113	133	187	153	192	320
24:00	181	171	322	197	749	597	116	138	197	159	206	341
25:00	198	187	340	211	755	616	119	140	204	166	218	358
26:00	206	213	378	215	758	628	122	144	213	176	233	376
27:00	235	234	407	224	761	639	129	154	226	188	245	389
28:00	235	234	424	233	760	650	130	156	234	192	255	400
29:00	229	229	430	236	768	658	132	160	242	197	266	413
30:00	244	253	452	238	767	664	135	168	254	212	280	426
31:00	270	267	472	248	766	670	139	174	264	223	295	431
32:00	262	289	497	253	774	680	142	178	270	228	302	440
33:00	277	307	517	261	770	687	147	186	281	231	310	448

ECO-PAK Specialty Packaging

Test 1

Date: 22 September 1999

File: 264ECOP1.DAT

SwRI Project No: 01.02759.001

Test Type: Title 10 CFR 71.73

Time	TC 1	TC 2	TC 3	TC 4	TC 5	TC 6	TC 7	TC 8	TC 9	TC 10	TC 11	TC 12
mm:ss	°F	°F	°F	°F	°F	°F	°F	°F	°F	°F	°F	°F
34:00	253	280	496	251	743	688	144	185	285	234	318	451
35:00	261	271	434	251	730	699	147	189	283	238	317	455
36:00	270	282	405	252	730	701	151	195	278	244	307	442
37:00	276	250	411	253	720	698	155	200	275	255	302	424
38:00	282	239	391	252	699	688	158	203	270	265	305	398
39:00	286	238	349	252	675	673	161	206	259	274	310	347
40:00	288	240	333	252	650	655	163	208	235	283	313	282
41:00	286	241	325	252	633	635	165	211	205	290	316	262
42:00	280	242	315	253	601	613	167	213	187	296	317	238
43:00	251	242	309	253	560	591	169	214	180	300	313	219
44:00	214	241	302	253	510	570	170	216	176	303	311	213
45:00	211	240	295	253	461	548	171	217	174	304	303	207
46:00	212	238	288	253	416	527	171	217	173	303	295	202
47:00	214	235	281	253	378	507	172	216	171	302	285	194
48:00	217	232	274	252	345	488	172	215	169	300	277	190
49:00	219	229	267	251	316	470	172	214	167	298	269	187
50:00	222	226	260	250	290	452	172	213	165	295	260	184

ECO-PAK Specialty Packaging

Test 1

Date: 22 September 1999
File: 264ECOP1.DAT

SwRI Project No: 01.02759.001
Test Type: Title 10 CFR 71.73

Time	Flame TC 1	Flame TC 2	Flame TC 3	Flame TC 4	Flame Avg.	Wind Speed	Wind Direction
mm:ss	°F	°F	°F	°F	°F	mph	Degrees
0:00	242	245	309	186	246	6	14
1:00	1679	1242	1141	1215	1319	7	14
2:00	1598	1253	1134	1091	1269	6	23
3:00	1588	1225	1191	1081	1271	6	14
4:00	1768	1267	1091	1133	1315	4	358
5:00	1803	1262	1063	1118	1311	6	17
6:00	1651	1093	1430	1374	1387	5	14
7:00	1849	1295	1052	1090	1321	6	8
8:00	1592	1275	979	850	1174	6	14
9:00	1687	1242	1253	1255	1359	7	358
10:00	1598	1043	1224	1207	1268	8	24
11:00	1721	1211	995	1010	1234	8	25
12:00	1771	1181	1227	1520	1425	5	25
13:00	1679	1056	1154	1293	1295	6	4
14:00	1787	1221	1117	1373	1374	7	18
15:00	1828	1234	1137	1324	1381	7	340
16:00	1589	1122	1124	1097	1233	6	9
17:00	1642	1216	1172	1300	1332	5	18
18:00	1886	1218	1232	1373	1427	6	20
19:00	1649	1186	1053	1132	1255	5	14
20:00	1976	1295	1023	1048	1335	4	35
21:00	1668	1149	1208	1183	1302	6	15
22:00	1601	1234	1252	1527	1404	5	357
23:00	1604	1143	1173	1216	1284	5	360
24:00	1411	1105	1197	1465	1294	7	1
25:00	1584	1131	1206	1406	1332	8	10
26:00	1741	1233	1266	1290	1382	5	19
27:00	1789	1275	1302	1424	1448	5	11
28:00	1892	1242	1131	1201	1366	4	31
29:00	1697	1153	1215	1089	1288	6	36
30:00	1790	1251	1286	1565	1473	7	2
31:00	2002	1372	1259	1514	1537	6	32
32:00	1883	1361	1179	1462	1471	8	13
33:00	1909	1428	1421	1503	1566	5	29

ECO-PAK Specialty Packaging

Test 1

Date: 22 September 1999
File: 264ECOP1.DAT

SwRI Project No: 01.02759.001
Test Type: Title 10 CFR 71.73

Time mm:ss	Flame TC 1 °F	Flame TC 2 °F	Flame TC 3 °F	Flame TC 4 °F	Flame Avg. °F	Wind Speed mph	Wind Direction Degrees
34:00	848	476	441	607	593	7	0
35:00	606	210	157	353	331	7	360
36:00	425	142	117	238	230	5	24
37:00	281	106	102	149	159	5	16
38:00	230	94	95	125	136	4	34
39:00	200	90	91	114	124	4	-12
40:00	176	88	88	109	115	4	29
41:00	172	85	86	105	112	4	360
42:00	160	84	85	104	108	5	13
43:00	151	83	84	102	105	7	8
44:00	145	82	83	102	103	4	312
45:00	139	81	82	102	101	4	4
46:00	119	81	82	96	95	5	7
47:00	123	81	81	96	95	7	16
48:00	122	80	80	90	93	5	359
49:00	118	80	80	90	92	3	360
50:00	117	79	80	94	92	7	5

ECO-PAK Specialty Packaging

Test 2

Date: 22 September 1999

File: 265ECOP2.DAT

ECPOCD.DAT

SwRI Project No: 01.02759.001

Test Type: Title 10 CFR 71.73

Time mm:ss	TC 1 °F	TC 2 °F	TC 3 °F	TC 4 °F	TC 5 °F	TC 6 °F	TC 7 °F	TC 8 °F	TC 9 °F	TC 10 °F	TC 11 °F	TC 12 °F
0:00	97	87	87	91	86	86	92	87	86	108	97	89
1:00	99	92	88	91	87	84	92	86	85	106	95	89
2:00	100	94	90	91	97	84	91	86	86	109	97	91
3:00	102	94	90	91	114	86	90	86	86	110	99	93
4:00	99	93	90	91	139	91	90	86	86	111	101	96
5:00	98	91	89	90	178	99	88	85	86	109	99	97
6:00	98	90	89	90	238	111	88	85	88	108	99	99
7:00	101	91	89	93	303	131	89	87	93	112	102	104
8:00	100	91	88	95	362	150	93	95	104	112	105	113
9:00	103	91	89	98	411	171	89	90	108	117	113	121
10:00	101	91	92	100	444	195	91	92	117	136	138	127
11:00	100	92	93	104	461	221	94	98	130	151	166	138
12:00	103	94	96	108	480	245	94	100	137	168	202	182
13:00	99	94	98	111	481	270	96	106	150	182	248	245
14:00	99	97	102	114	482	294	98	112	162	202	289	238
15:00	101	100	107	119	483	320	102	119	176	234	335	331
16:00	103	104	112	123	481	343	105	125	189	279	392	432
17:00	106	106	117	126	483	371	109	135	205	338	452	515
18:00	105	109	123	125	485	407	110	142	222	417	544	599
19:00	106	114	131	126	470	447	113	152	242	490	613	647
20:00	109	120	140	127	448	485	116	164	263	546	658	684
21:00	112	127	150	130	443	518	119	176	284	613	722	741
22:00	115	134	161	134	431	547	122	189	305	696	822	824
23:00	127	143	169	137	461	579	135	216	330	774	903	865
24:00	148	160	178	139	519	628	134	222	350	851	967	881
25:00	125	155	184	136	598	671	141	237	362	920	1045	936
26:00	142	168	194	137	560	702	150	264	371	976	1096	978
27:00	174	187	226	141	548	729	158	288	404	1038	1128	1004
28:00	205	209	250	148	559	747	168	310	447	1082	1142	1018
29:00	223	226	269	155	575	759	178	328	489	1113	1161	1045
30:00	237	244	286	164	586	770	191	347	516	1142	1176	1070
31:00	249	259	301	171	594	775	202	361	531	1145	1167	1075
32:00	264	276	317	181	605	779	215	380	545	1146	1160	1078

ECO-PAK Specialty Packaging

Test 2

Date: 22 September 1999

File: 265ECOP2.DAT

ECPOCD.DAT

SwRI Project No: 01.02759.001

Test Type: Title 10 CFR 71.73

Time mm:ss	TC 1 °F	TC 2 °F	TC 3 °F	TC 4 °F	TC 5 °F	TC 6 °F	TC 7 °F	TC 8 °F	TC 9 °F	TC 10 °F	TC 11 °F	TC 12 °F
33:00	271	286	328	186	605	777	225	391	549	1107	1091	1032
34:00	288	299	344	189	545	777	236	402	564	1047	1011	963
35:00	298	306	176	195	502	778	247	408	553	997	949	894
36:00	299	308	153	203	371	775	257	411	503	999	945	902
37:00	297	306	150	214	330	767	266	415	449	1002	942	922
38:00	296	305	150	224	311	754	276	420	249	994	924	925
39:00	295	303	133	234	300	737	284	424	242	980	902	913
40:00	294	302	127	243	292	718	290	427	238	962	877	890
41:00	294	236	123	251	283	697	296	429	238	942	851	861
42:00	294	211	121	257	273	676	301	430	235	922	826	829
43:00	295	208	120	263	263	655	305	430	233	901	802	800
44:00	296	207	120	267	253	633	308	428	231	881	780	768
45:00	296	206	120	270	257	612	311	426	230	861	759	364
46:00	297	206	121	272	258	592	312	423	228	842	739	235
47:00	297	205	121	274	249	572	313	419	224	822	719	233
48:00	296	205	121	276	247	553	314	415	218	802	698	233
49:00	296	204	122	277	234	535	314	410	217	783	677	230
50:00	296	203	122	277	224	518	313	405	215	764	657	227
51:00	295	202	122	277	215	502	312	399	214	746	637	225
52:00	294	201	122	276	205	486	311	394	212	728	618	224
53:00	293	200	123	276	197	472	309	388	210	711	599	226
54:00	292	198	123	275	189	458	308	382	210	695	581	228
55:00	290	197	123	274	186	445	306	376	210	680	561	229
56:00	289	196	123	272	181	432	304	370	209	665	542	227
57:00	288	194	122	271	175	420	302	364	207	650	523	228
58:00	286	193	123	269	169	409	300	358	205	636	506	228
59:00	284	191	123	268	162	398	298	352	204	623	489	226
60:00	282	190	123	266	156	388	295	346	202	610	474	227
61:00	281	188	123	264	150	378	293	341	201	598	460	226
62:00	279	187	123	262	146	368	291	335	198	586	447	226
63:00	233	207	196	242	198	374	169	201	154	277	217	172
64:00	235	203	191	240	186	361	168	198	152	272	209	170
65:00	236	200	188	238	175	348	166	194	150	268	202	168

ECO-PAK Specialty Packaging

Test 2

Date: 22 September 1999

File: 265ECOP2.DAT

ECPOCD.DAT

SwRI Project No: 01.02759.001

Test Type: Title 10 CFR 71.73

Time mm:ss	TC 1 °F	TC 2 °F	TC 3 °F	TC 4 °F	TC 5 °F	TC 6 °F	TC 7 °F	TC 8 °F	TC 9 °F	TC 10 °F	TC 11 °F	TC 12 °F
66:00	237	197	184	235	166	336	165	191	148	264	195	166
67:00	238	193	181	233	158	325	164	188	146	260	188	164
68:00	239	190	179	231	151	314	163	184	145	256	183	163
69:00	240	187	178	229	145	304	162	181	143	252	178	161
70:00	241	184	176	227	140	295	161	178	142	248	174	160
71:00	242	181	175	225	135	286	160	175	141	245	171	158
72:00	243	178	169	222	131	277	159	172	140	241	167	157
73:00	244	175	158	220	126	268	157	168	139	237	163	155
74:00	244	173	156	218	123	260	156	166	137	233	159	151
75:00	244	170	154	216	119	252	155	163	136	229	155	150
76:00	244	168	150	214	116	245	155	160	135	225	152	148
77:00	244	165	148	211	113	238	154	157	133	221	147	147
78:00	243	163	146	209	111	231	153	155	132	218	144	146
79:00	243	161	145	207	108	225	152	152	131	214	142	144
80:00	243	158	143	205	106	219	151	150	129	211	139	143
81:00	242	156	142	203	104	213	150	148	128	208	137	142
82:00	241	154	140	201	102	207	150	146	127	205	134	141
83:00	241	152	139	199	100	202	149	144	126	202	133	140
84:00	240	150	138	197	99	197	148	142	125	199	131	139
85:00	239	148	136	195	97	192	148	140	123	197	129	137
86:00	238	146	135	193	96	188	147	138	122	194	127	136
87:00	237	145	134	191	95	183	147	137	121	192	126	133
88:00	236	143	132	189	94	179	146	135	120	190	124	131
89:00	235	141	131	188	93	175	146	134	119	187	123	130
90:00	234	140	130	186	92	171	145	133	118	185	121	130
91:00	234	138	129	185	91	168	145	131	117	183	120	129
92:00	233	137	127	183	90	164	144	130	116	181	119	128
93:00	232	135	126	182	90	161	143	129	115	179	118	126
94:00	231	134	125	180	89	158	143	127	114	177	116	125
95:00	230	132	124	179	89	155	142	126	113	176	115	124
96:00	229	131	123	177	88	152	142	125	113	174	114	123
97:00	228	130	122	176	87	149	141	124	112	172	113	122
98:00	227	129	121	175	87	147	141	123	111	170	112	121

ECO-PAK Specialty Packaging

Test 2

Date: 22 September 1999

File: 265ECOP2.DAT

ECPOCD.DAT

SwRI Project No: 01.02759.001

Test Type: Title 10 CFR 71.73

Time mm:ss	TC 1 °F	TC 2 °F	TC 3 °F	TC 4 °F	TC 5 °F	TC 6 °F	TC 7 °F	TC 8 °F	TC 9 °F	TC 10 °F	TC 11 °F	TC 12 °F
99:00	226	127	120	173	87	144	140	122	110	169	111	121
100:00	225	126	119	172	86	142	140	121	110	167	110	120
101:00	224	125	118	171	86	139	139	120	109	166	110	119
102:00	223	124	117	170	85	137	139	119	108	164	109	119
103:00	222	123	116	168	85	135	138	118	108	163	108	118
104:00	221	122	115	167	85	133	138	117	107	161	107	117
105:00	220	121	115	166	85	131	138	116	106	160	106	116
106:00	219	120	114	165	84	129	137	115	106	158	106	116
107:00	218	119	113	164	84	128	137	114	105	157	105	115
108:00	217	118	113	163	84	126	136	114	105	156	104	115
109:00	216	117	112	162	83	125	136	113	104	155	104	114
110:00	215	116	111	161	83	123	136	112	104	153	103	114
111:00	214	115	111	160	83	122	135	111	103	152	103	113
112:00	213	115	110	159	83	120	135	111	103	151	102	113
113:00	213	114	110	158	83	119	135	110	102	150	101	112
114:00	212	113	109	157	83	118	134	109	102	149	101	112
115:00	211	112	109	156	83	116	134	109	101	148	100	111
116:00	210	112	108	155	82	115	134	108	101	147	100	111
117:00	209	111	108	154	82	114	133	107	101	146	99	110
118:00	208	110	107	153	82	113	133	107	100	145	99	110
119:00	207	110	107	152	82	112	133	106	100	144	98	109
120:00	206	109	106	151	82	111	132	106	99	143	98	109
121:00	205	108	106	151	82	110	132	105	99	142	98	109
122:00	204	108	106	150	82	109	132	105	99	141	97	108
123:00	203	108	105	149	82	108	131	104	98	140	97	108
124:00	202	107	105	148	82	107	131	104	98	139	96	107
125:00	202	107	104	147	81	107	131	103	98	139	96	107
126:00	201	106	104	147	81	106	130	103	97	138	96	107
127:00	200	106	104	146	81	105	130	102	97	137	95	106
128:00	199	105	103	145	81	104	130	102	97	136	95	106
129:00	198	105	103	144	81	104	129	101	97	135	95	106
130:00	197	104	103	144	81	103	129	101	96	135	94	105
131:00	196	104	102	143	81	102	129	100	96	134	94	105

ECO-PAK Specialty Packaging

Test 2

Date: 22 September 1999
File: 265ECOP2.DAT
ECPOCD.DAT

SwRI Project No: 01.02759.001
Test Type: Title 10 CFR 71.73

Time mm:ss	TC 1 °F	TC 2 °F	TC 3 °F	TC 4 °F	TC 5 °F	TC 6 °F	TC 7 °F	TC 8 °F	TC 9 °F	TC 10 °F	TC 11 °F	TC 12 °F
132:00	196	103	102	142	81	102	128	100	96	133	94	105
133:00	195	103	102	142	81	101	128	100	96	132	94	104
134:00	194	102	101	141	81	101	128	99	95	132	93	104
135:00	193	102	101	140	81	100	128	99	95	131	93	104
136:00	192	102	101	140	81	100	127	98	95	130	93	103
137:00	191	101	101	139	81	99	127	98	94	130	93	103
138:00	191	101	100	139	81	99	127	98	94	129	92	103
139:00	190	100	100	138	81	98	126	97	94	128	92	102
140:00	189	100	100	137	81	98	126	97	94	128	92	102
141:00	188	100	100	137	81	97	126	97	94	127	92	102
142:00	188	99	99	136	81	97	126	96	94	127	91	101
143:00	187	99	99	136	81	96	125	96	93	126	91	101
144:00	186	99	99	135	81	96	125	96	93	125	91	101
145:00	185	98	99	134	81	96	125	95	93	125	91	101
146:00	185	98	98	134	81	95	124	95	93	124	91	101
147:00	184	98	98	133	81	95	124	95	93	124	90	100
148:00	183	97	98	133	81	95	124	95	92	123	90	100
149:00	182	97	98	132	81	94	124	94	92	123	90	100
150:00	181	97	98	132	81	94	123	94	92	122	90	100
151:00	181	96	97	131	81	94	123	94	92	122	90	99
152:00	180	96	97	131	81	93	123	94	92	121	90	99
153:00	179	96	97	130	81	93	123	93	92	121	89	99
154:00	179	96	97	130	81	93	122	93	91	120	89	99
155:00	178	95	97	129	81	92	122	93	91	120	89	98
156:00	177	95	96	129	81	92	122	93	91	119	89	98
157:00	177	95	96	129	81	92	121	93	91	119	89	98
158:00	176	95	96	128	81	92	121	92	91	118	89	98
159:00	175	94	96	128	81	91	121	92	91	118	89	98
160:00	174	94	96	127	81	91	121	92	91	118	88	98
161:00	174	94	95	127	82	91	120	92	91	117	88	97
162:00	173	94	95	126	81	91	120	92	90	117	88	97
163:00	172	93	95	126	82	91	120	91	90	116	88	97
164:00	172	93	95	126	82	90	120	91	90	116	88	97

ECO-PAK Specialty Packaging
Test 2

Date: 22 September 1999
File: 265ECOP2.DAT
ECPOCD.DAT

SwRI Project No: 01.02759.001
Test Type: Title 10 CFR 71.73

Time	TC 1	TC 2	TC 3	TC 4	TC 5	TC 6	TC 7	TC 8	TC 9	TC 10	TC 11	TC 12
mm:ss	°F	°F	°F	°F	°F	°F	°F	°F	°F	°F	°F	°F
165:00	171	93	95	125	82	90	119	91	90	116	88	97
166:00	171	93	95	125	82	90	119	91	90	115	88	96
167:00	170	93	95	124	82	90	119	91	90	115	88	96
168:00	169	92	94	124	82	90	119	91	90	115	88	96
169:00	169	92	94	124	82	89	119	90	90	114	88	96
170:00	168	92	94	123	82	89	118	90	90	114	87	96
171:00	167	92	94	123	82	89	118	90	89	114	87	96
172:00	167	92	94	123	82	89	118	90	89	113	87	95
173:00	166	92	94	122	82	89	118	90	89	113	87	95
174:00	165	91	94	122	82	89	117	90	89	113	87	95
175:00	165	91	94	121	82	88	117	90	89	112	87	95
176:00	164	91	93	121	82	88	117	89	89	112	87	95

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Test 2

Date: 22 September 1999

File: 265ECOP2.DAT
ECPOCD.DAT

SwRI Project No: 01.02759.001

Test Type: Title 10 CFR 71.73

Time mm:ss	Flame TC 1 °F	Flame TC 2 °F	Flame TC 3 °F	Flame TC 4 °F	Flame Avg. °F	Wind Speed mph	Wind Direction Degrees
0:00	96	124	373	160	94	4	52
1:00	867	745	893	1001	350	4	57
2:00	1231	849	1230	1874	473	2	115
3:00	1313	940	1251	2056	502	3	105
4:00	1129	901	1246	2001	442	5	100
5:00	1194	876	1051	1525	464	4	76
6:00	1005	795	1057	1298	401	3	82
7:00	1364	950	1456	2163	523	4	109
8:00	1581	1216	1789	2272	600	3	84
9:00	1655	1058	1377	2331	630	3	101
10:00	1159	959	1218	1846	475	2	54
11:00	1209	1006	1193	1933	504	4	64
12:00	1545	922	1282	2035	643	5	95
13:00	1091	821	952	1482	528	4	95
14:00	1054	835	1045	1491	527	5	88
15:00	1097	858	1065	1536	588	5	80
16:00	1326	869	1110	1691	717	6	124
17:00	1458	1198	1578	2044	808	4	118
18:00	1440	952	1180	2018	861	3	93
19:00	1164	996	1224	1910	808	4	117
20:00	1159	936	1143	1967	833	2	99
21:00	1289	969	1239	2080	917	2	107
22:00	1588	951	1369	2364	1078	2	106
23:00	1857	1505	2063	2390	1208	2	98
24:00	2050	1294	1598	2404	1299	2	112
25:00	1211	1027	1313	2008	1064	2	91
26:00	1013	960	1244	1725	1029	3	86
27:00	1174	929	1209	1663	1102	2	126
28:00	1191	919	1158	1815	1117	3	107
29:00	1226	982	1298	1877	1144	3	99
30:00	1359	963	1348	2142	1202	2	86
31:00	1237	932	1417	1881	1160	3	112
32:00	1753	1286	1522	2279	1330	2	90

ECO-PAK Specialty Packaging

Test 2

Date: 22 September 1999
 File: 265ECOP2.DAT
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 Test Type: Title 10 CFR 71.73

Time mm:ss	Flame TC 1 °F	Flame TC 2 °F	Flame TC 3 °F	Flame TC 4 °F	Flame Avg. °F	Wind Speed mph	Wind Direction Degrees
33:00	545	462	579	1047	890	2	117
34:00	392	214	383	842	789	2	111
35:00	330	142	298	700	724	2	100
36:00	190	120	189	469	679	1	53
37:00	138	108	156	337	667	1	44
38:00	122	101	141	277	657	1	46
39:00	113	98	139	246	643	1	44
40:00	107	94	122	224	625	1	72
41:00	106	95	124	200	606	2	72
42:00	102	92	118	182	586	1	63
43:00	99	90	113	178	567	0	41
44:00	98	90	111	165	548	0	38
45:00	94	88	103	157	406	1	71
46:00	93	87	99	155	356	2	74
47:00	92	86	106	153	348	1	41
48:00	91	85	105	144	341	1	79
49:00	90	85	99	135	332	1	49
50:00	89	85	94	127	324	1	57
51:00	89	85	93	125	317	1	60
52:00	87	84	90	127	310	1	64
53:00	87	85	91	122	304	1	51
54:00	86	84	93	117	298	0	40
55:00	87	84	93	116	292	1	50
56:00	85	84	88	114	285	1	50
57:00	84	83	87	113	278	1	44
58:00	84	83	90	108	272	1	41
59:00	84	82	88	108	266	0	40
60:00	84	83	88	108	261	1	60
61:00	83	83	88	105	256	1	59
62:00	83	82	88	103	252	0	45
63:00	106	79	79	85	165	8	353
64:00	105	78	79	86	161	7	2
65:00	104	78	79	86	158	7	16

ECO-PAK Specialty Packaging

Test 2

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ECPOCD.DAT

SwRI Project No: 01.02759.001

Test Type: Title 10 CFR 71.73

Time mm:ss	Flame TC 1 °F	Flame TC 2 °F	Flame TC 3 °F	Flame TC 4 °F	Flame Avg. °F	Wind Speed mph	Wind Direction Degrees
66:00	100	78	78	84	154	5	20
67:00	96	78	78	86	150	5	360
68:00	97	78	78	85	147	6	4
69:00	94	78	78	83	144	8	356
70:00	94	78	78	85	143	4	279
71:00	95	78	78	85	141	5	360
72:00	97	78	78	82	140	3	13
73:00	94	78	78	81	137	4	17
74:00	93	78	78	82	134	5	21
75:00	91	78	78	83	132	6	349
76:00	92	78	78	81	131	4	350
77:00	93	78	78	80	129	8	352
78:00	90	78	78	81	127	4	2
79:00	89	78	78	81	125	7	344
80:00	88	78	78	82	123	7	12
81:00	89	78	78	79	123	5	28
82:00	87	78	78	79	121	3	360
83:00	86	78	78	81	119	8	4
84:00	87	77	77	79	119	6	355
85:00	86	77	77	79	118	7	200
86:00	85	77	77	80	116	8	-2
87:00	85	77	77	80	115	5	356
88:00	86	77	77	80	114	7	12
89:00	85	77	77	79	113	4	352
90:00	84	77	77	79	112	5	349
91:00	84	77	77	79	111	5	7
92:00	84	77	77	78	110	6	15
93:00	85	77	77	78	110	8	8
94:00	84	77	77	80	108	6	359
95:00	84	77	77	78	108	3	10
96:00	83	77	77	78	107	7	7
97:00	84	77	77	78	106	5	360
98:00	83	77	77	78	105	3	1

ECO-PAK Specialty Packaging

Test 2

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 File: 265ECOP2.DAT
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SwRI Project No: 01.02759.001
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Time mm:ss	Flame TC 1 °F	Flame TC 2 °F	Flame TC 3 °F	Flame TC 4 °F	Flame Avg. °F	Wind Speed mph	Wind Direction Degrees
99:00	83	77	77	79	105	5	348
100:00	82	76	77	78	104	6	17
101:00	81	76	76	78	103	5	357
102:00	82	76	76	78	103	4	5
103:00	82	76	76	78	103	4	38
104:00	82	76	76	78	102	4	22
105:00	82	76	76	78	101	6	15
106:00	81	76	76	78	101	5	3
107:00	81	76	76	77	101	3	146
108:00	81	76	76	78	100	4	358
109:00	81	76	76	77	100	4	355
110:00	80	76	76	77	99	4	10
111:00	80	76	76	78	99	6	8
112:00	79	76	76	78	98	5	359
113:00	80	76	76	77	98	4	18
114:00	80	76	76	77	98	5	5
115:00	79	76	76	78	97	3	10
116:00	79	76	76	77	97	3	3
117:00	79	76	76	77	96	6	351
118:00	78	76	76	78	96	5	1
119:00	79	76	76	77	95	3	1
120:00	78	76	76	78	95	4	3
121:00	78	76	76	77	95	5	14
122:00	78	76	76	77	94	4	2
123:00	78	76	76	77	94	6	9
124:00	78	75	76	76	94	3	23
125:00	78	75	75	76	94	6	4
126:00	77	75	75	77	93	4	341
127:00	77	75	75	76	93	6	351
128:00	78	75	75	76	93	5	0
129:00	77	75	75	76	93	3	6
130:00	77	75	75	76	92	4	11
131:00	77	75	75	76	92	5	359

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Test 2

Date: 22 September 1999

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SwRI Project No: 01.02759.001

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Time mm:ss	Flame TC 1 °F	Flame TC 2 °F	Flame TC 3 °F	Flame TC 4 °F	Flame Avg. °F	Wind Speed mph	Wind Direction Degrees
132:00	77	75	75	76	92	5	3
133:00	77	75	75	76	92	3	359
134:00	77	75	75	76	91	7	4
135:00	76	75	75	76	91	4	10
136:00	77	75	75	76	91	5	360
137:00	76	75	75	76	91	6	6
138:00	76	75	75	75	90	7	2
139:00	76	75	75	75	90	5	8
140:00	76	75	75	76	90	5	34
141:00	76	74	75	75	90	5	17
142:00	76	74	75	75	89	5	358
143:00	76	74	74	75	89	4	357
144:00	76	74	75	75	89	5	359
145:00	76	74	74	75	89	5	7
146:00	76	74	74	75	89	3	3
147:00	76	74	74	75	89	6	357
148:00	76	74	74	75	89	4	4
149:00	76	74	74	74	88	4	7
150:00	76	74	74	75	88	4	351
151:00	75	74	74	75	88	4	0
152:00	75	74	74	75	88	7	359
153:00	75	74	74	75	88	6	3
154:00	75	74	74	75	88	4	7
155:00	75	74	74	75	88	4	38
156:00	75	74	74	75	87	4	340
157:00	75	74	74	75	87	7	15
158:00	75	74	74	74	87	3	13
159:00	75	74	74	74	87	5	21
160:00	75	74	74	75	87	5	44
161:00	75	74	74	75	87	5	0
162:00	75	74	74	74	87	4	31
163:00	75	74	74	74	87	4	340
164:00	75	74	74	74	86	4	360

ECO-PAK Specialty Packaging
Test 2

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Time mm:ss	Flame TC 1 °F	Flame TC 2 °F	Flame TC 3 °F	Flame TC 4 °F	Flame Avg. °F	Wind Speed mph	Wind Direction Degrees
165:00	75	74	74	74	86	2	28
166:00	75	74	74	74	86	3	346
167:00	75	74	74	74	86	3	13
168:00	75	74	74	74	86	5	356
169:00	75	74	74	74	86	2	355
170:00	74	74	74	74	86	4	360
171:00	74	74	74	74	86	5	1
172:00	74	74	74	74	86	4	4
173:00	75	74	74	74	86	2	32
174:00	75	74	74	74	86	4	1
175:00	74	74	74	74	85	4	16
176:00	74	74	74	74	85	4	16