



TEST REPORT

1 General Information:

- 1.1 Project Site: Technical Safety Services, Inc.
620 Hearst Avenue
Berkeley, CA 94710
1.800.877.7742
- 1.2 Project Contacts: Ghislain Beauregard
President
Arcoplast, Inc.
1873 Williamstown Drive
St. Peters, MO 63376
1.888.736.2726
- 1.3 Project Lead Tech: Allen Bier
Technical Specialist
Technical Safety Services, Inc.
- 1.4 Report Author: Raphael Dozzi
Technical Writer
Technical Safety Services, Inc.
rdozzi@techsafety.com
- 1.5 Documentation:

The final review and approval of this document before its release to the client are the joint responsibilities of the following personnel at Technical Safety Services. In signing this cover sheet, these individuals acknowledge the accuracy of the data and activities reported herein:

Raphael Dozzi Raphael Dozzi date: 11/11/10
Technical Writer

Martin Burke Martin Burke date: 11/11/2010
Engineering Services Manager

TEST REPORT

2 Product Under Test:

2.1 Arcoplast, Inc. provided Technical Safety Services, Inc. (TSS) with four (4), 24"x24", pre-assembled panels for pressure leak testing. As supplied to TSS, these Arcoplast composite (6mm) center core wall and ceiling liner panels with antimicrobial gel-coat finish were bonded to typical components; there were two (2) panels of each of these two (2) configurations:

- Two (2) panels with a panel seam in the middle typical of that use to join wall-panels in completed installations, and
- Two (2) panels with a sealed electrical box.

3 Test Criteria:

The Public Health Agency of Canada document, *Laboratory Biosafety Guidelines: 3rd Edition* (2004), requires that a Containment Level 4 room exhibit a maximum of 12.5 Pascal (Pa) per minute pressure drop at 500 Pascal over a twenty minute period.

4 Test Procedure:

- 4.1 The Arcoplast panels were each (one configuration at a time) mounted gel-side down to a qualified, leak-free enclosure.
- 4.2 Pressure within the enclosure was monitored using an NIST traceable, calibrated pressure transducer (MKS Baratron, TSS EQ206).
- 4.3 The output values were recorded manually by the user. The data was recorded on five (5) minute intervals for one (1) hour giving twenty (20) total points recorded for each trial. A control point was also taken. The valve was opened to the atmosphere to log a "zero" point for each trial.
- 4.4 Temperature and humidity readings were also recorded per data point using a NIST traceable, calibrated
- 4.5 The enclosure was pressurized to ~1,000 Pa with compressed air and the valve was closed.
- 4.6 The recorded data was copied into a spreadsheet. The Pressure (Pascal) vs. Time (minutes) was graphed with a criteria line specific to each panel configuration. Note: 1,000 Pa is approximately 4" water column (w.c.).

TEST REPORT

- 4.7 Panels A and C were retested twice giving three (3) total data sets. The subsequent testing was performed to ensure consistency between runs.
- 4.8 All panels met their respective criteria as found. The pressure dissipation for all panels were shown to be in compliance with The Public Health Agency of Canada's document, *The Laboratory Biosafety Guidelines: 3rd Edition 2004*, previously mentioned in section 3 page 2 of this report. The results of the experiment are summarized in the following table:

Pressure Dissipation Data Summary							
Plate	Description	Pressure Dissipation Rate, Pa/Min					Pass/ Fail
		Trial 1	Trial 2	Trial 3	Average	Criterion	
A	Panel Seam Sample 1	6.1	5.7	5.0	5.6	≤ 12.5	Pass
B	Electrical Box Sample 1	5.7	NA	NA	5.7	≤ 12.5	Pass
C	Panel Seal Sample 2	6.5	7.8	8.7	7.7	≤ 12.5	Pass
D	Electrical Box Sample 2	5.2	NA	NA	5.2	≤ 12.5	Pass

5 Conclusion:

- 5.1 Both panels with mounted, sealed panel seams PASSED according to Test Criteria 3.1.
- 5.2 Both panels with mounted, sealed electrical boxes PASSED according to Test Criteria 3.1.



TEST REPORT

6 List of Graphs and Figures:

<u>Items</u>	<u>Description</u>	<u>Page(s)</u>
Figure 1	Plate A (trial 1)	5
Figure 2	Plate A (trial 2)	6
Figure 3	Plate A (trial 3)	7
Figure 4	Plate B	8
Figure 5	Plate C (trial 1)	9
Figure 6	Plate C (trial 2)	10
Figure 7	Plate C (trial 3)	11
Figure 8	Plate D	12
Table 1	Plate A (trial 1)	5
Table 2	Plate A (trial 2)	6
Table 3	Plate A (trial 3)	7
Table 4	Plate B	8
Table 5	Plate C (trial 1)	9
Table 6	Plate C (trial 2)	10
Table 7	Plate C (trial 3)	11
Table 8	Plate D	12

TEST REPORT

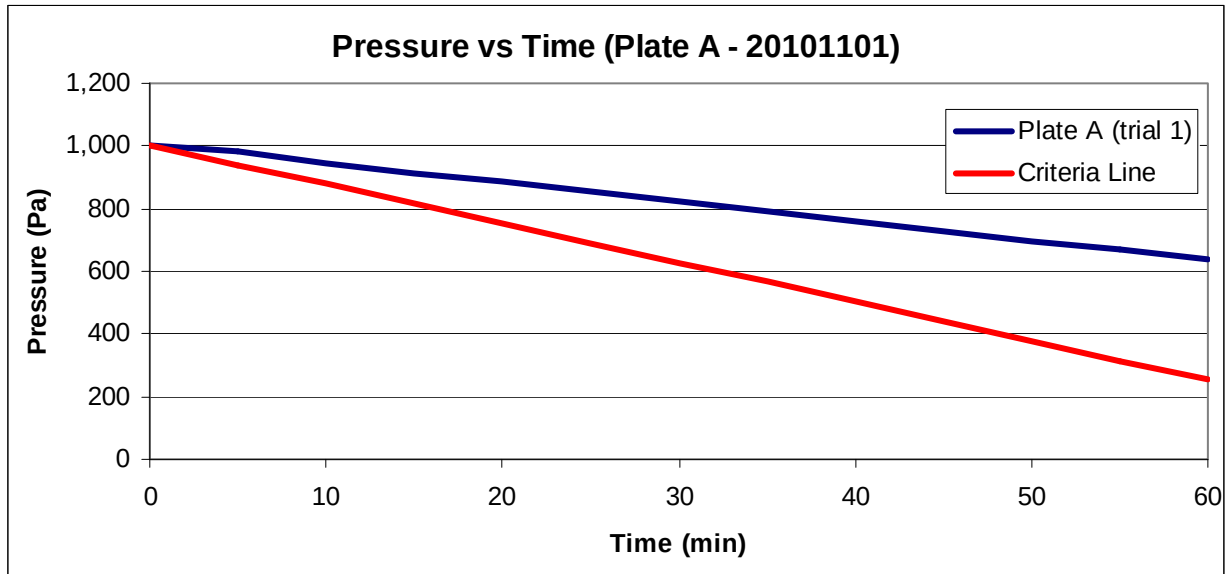


Table 1 - Pressure vs Time (Plate A - trial 1)	
Initial Pressure (Pa)	1002.9
Final Pressure (Pa)	635.5
Average Pressure Drop (Pa/min)	6.1
Test Criteria Result (≤ 12.5 Pa/min)	PASS

TEST REPORT

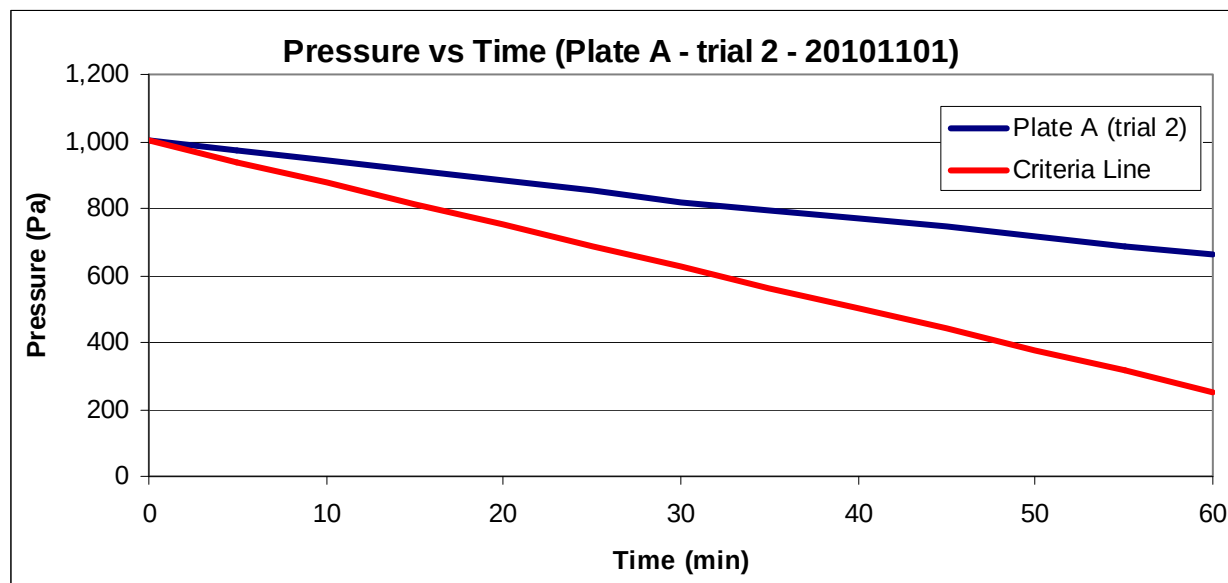


Table 2 - Pressure vs Time (Plate A - trial 2)	
Initial Pressure (Pa)	1001.5
Final Pressure (Pa)	662.4
Average Pressure Drop (Pa/min)	5.7
Test Criteria Result (≤12.5 Pa/min)	PASS

TEST REPORT

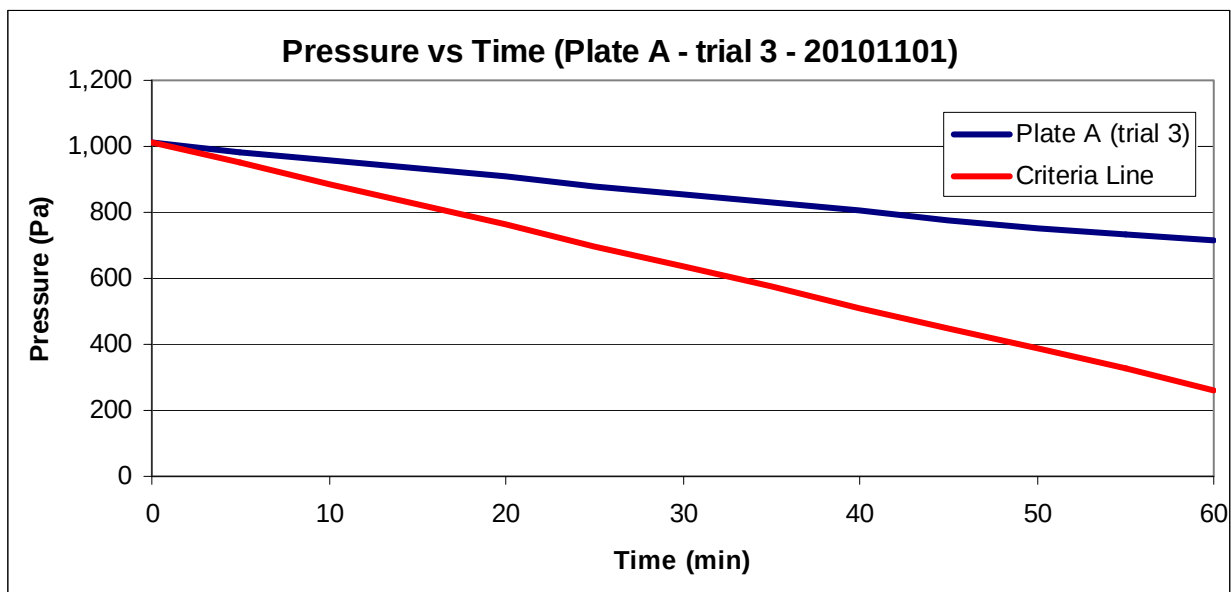


Table 3 - Pressure vs Time (Plate A - trial 3)	
Initial Pressure (Pa)	1012.1
Final Pressure (Pa)	712.8
Average Pressure Drop (Pa/min)	5.0
Test Criteria Result (≤12.5 Pa/min)	PASS

TEST REPORT

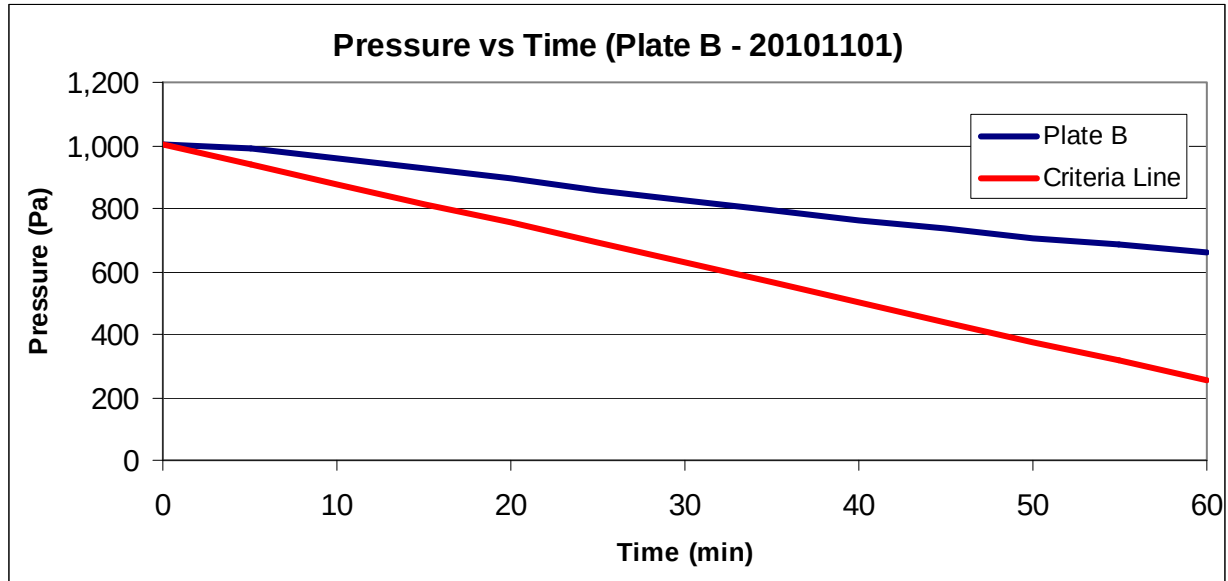


Table 4 - Pressure vs Time (Plate B)	
Initial Pressure (Pa)	1002.4
Final Pressure (Pa)	660.2
Average Pressure Drop (Pa/min)	5.7
Test Criteria Result (≤12.5 Pa/min)	PASS

TEST REPORT

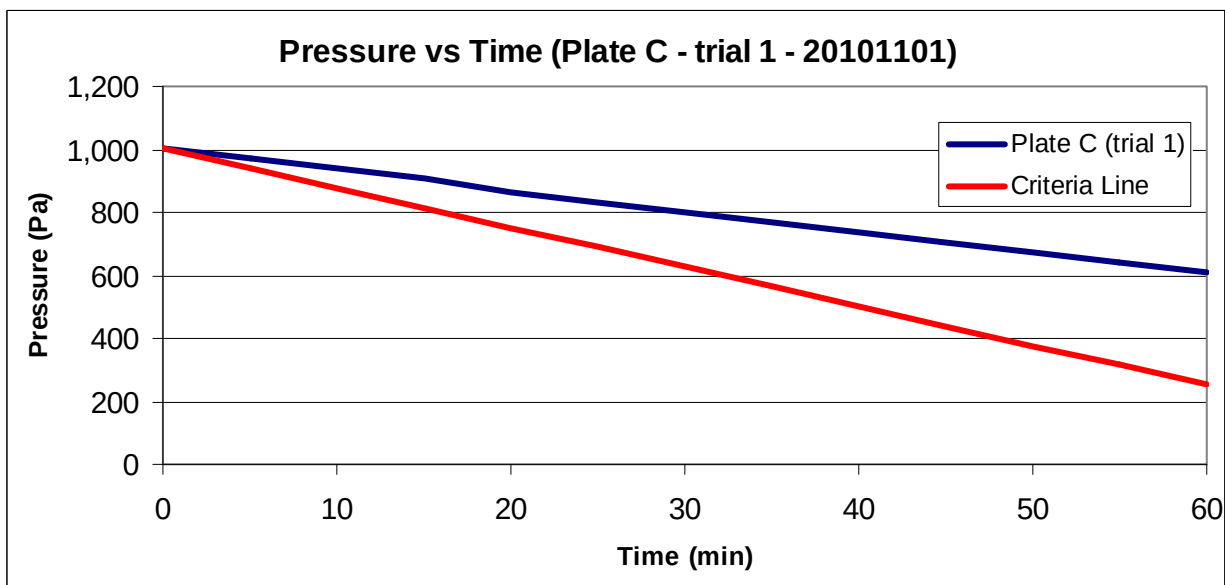


Table 5 - Pressure vs Time (Plate C - trial 1)	
Initial Pressure (Pa)	1002.1
Final Pressure (Pa)	611.1
Average Pressure Drop (Pa/min)	6.5
Test Criteria Result (≤ 12.5 Pa/min)	PASS

TEST REPORT

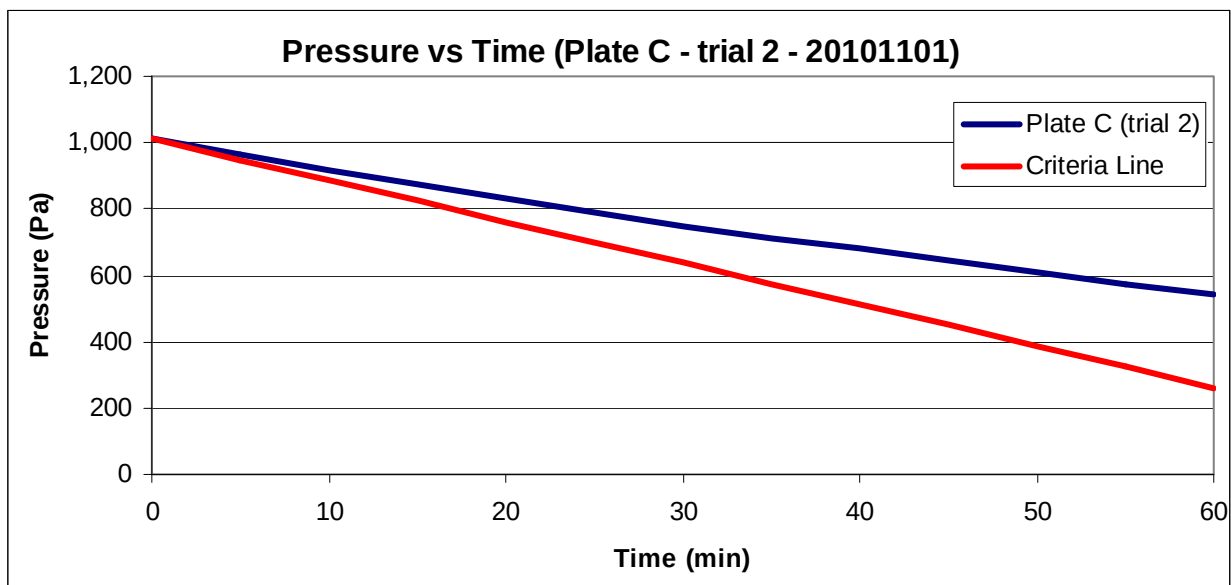


Table 6 - Pressure vs Time (Plate C - trial 2)

Initial Pressure (Pa)	1014.1
Final Pressure (Pa)	545.1
Average Pressure Drop (Pa/min)	7.8
Test Criteria Result (≤ 12.5 Pa/min)	PASS

TEST REPORT

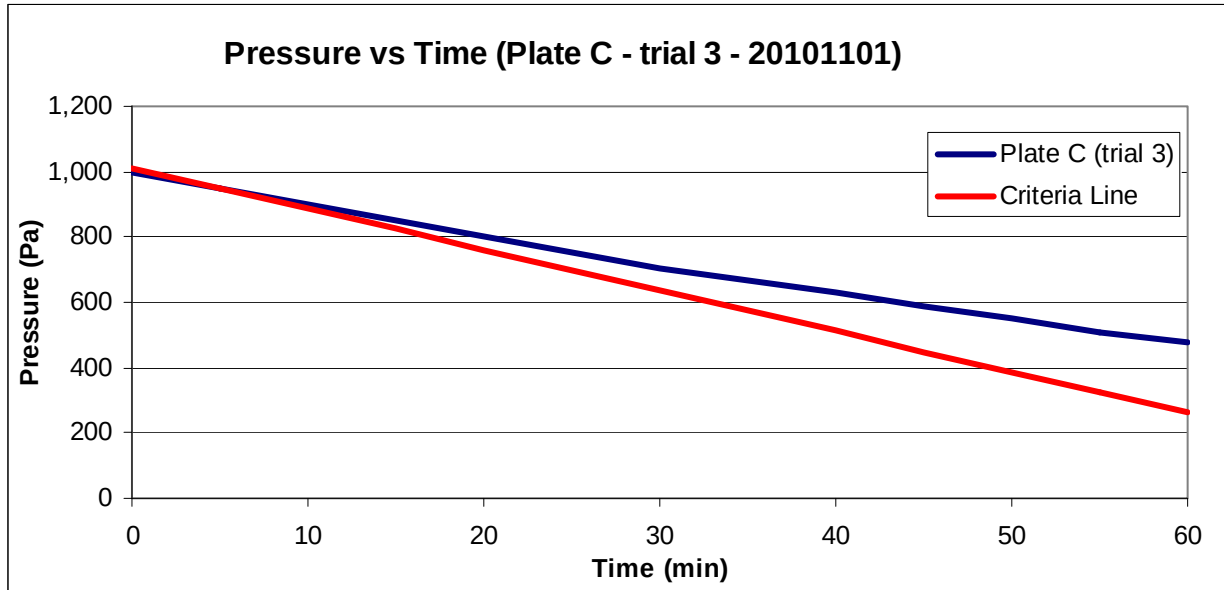


Table 7 - Pressure vs Time (Plate C - trial 3)

Initial Pressure (Pa)	999.9
Final Pressure (Pa)	478.9
Average Pressure Drop (Pa/min)	8.8
Test Criteria Result (<=12.5 Pa/min)	PASS

TEST REPORT

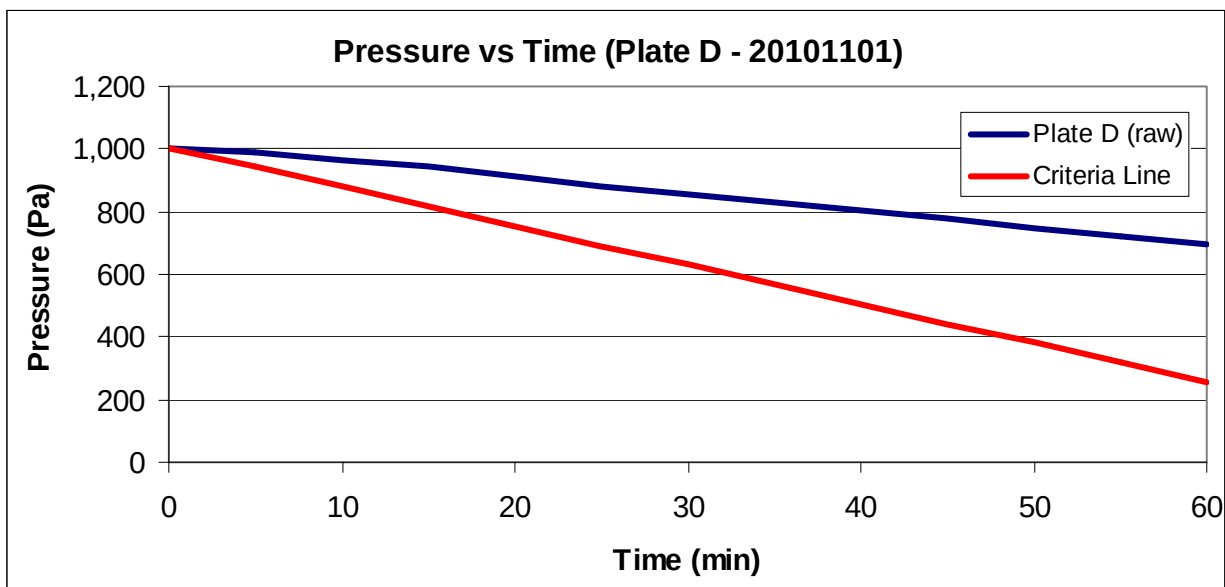


Table 8 - Pressure vs Time (Plate D)	
Initial Pressure (Pa)	1005.0
Final Pressure (Pa)	692.8
Average Pressure Drop (Pa/min)	5.2
Test Criteria Result (≤12.5 Pa/min)	PASS



TEST REPORT

7 Pertinent Additional Information

The following pages contain reproductions of documents pertinent to this report. Included are field data sheets and photographs of the panels and testing apparatus.

<u>Description</u>	<u>Pages</u>
Calibrated/Traceable Equipment	13
Calibrated/Traceable Equipment Certificates	14-16
Field Data Sheets	17-20
Photos of Panels and Panels with Apparatus	21-24

CALIBRATED/TRACEABLE EQUIPMENT:						
TSS EQ	Instrument Type	Make	Model	Serial Number	Cal. Date	Cal. Due
929	Manometer	Heise	PTE-1	7407	9/30/2010	9/30/2011
1981	Manometer	Ashcroft	HQS-1	36177	3/23/2010	3/23/2011
1624	Manometer	Dresser	HQS-2	17946	3/30/2010	3/30/2011



Title: Composite Panel Pressure Decay Test Report
Client: Arcoplast, Inc.
Project/Test Dates: NC-ARC10610A-1/November 1-2, 2010
Report Version: November 9, 2010
Page 14 of 24

TEST REPORT



Document Title: ICR-1
Document Number: ICR-1
Valid Date: 04 September 2000
Supersedes: 06 December 1999
Page 1 of 1

Instrument Calibration Record

Facility	Technical Safety Services, Inc.	Event #	NC102765
Address	620 Hearst Avenue	TSS DB ID	EQ 929
City, State ZIP	Berkeley, CA 94710	Manufacturer	Heise
Department	Calibration	Model	PTE-1
Contact	Dick Capell	Type	2H
Phone	(510) 845-5591	Serial Number	7407
Building/Rm.	620/ Calibration Lab	Cal Acc C	61411

APPROVED FOR CLIENT USE

SEP 30 2010

BY: [Signature] FOR TSS, INC.
www.techsafety.com

Calibrated By (Print)	Calibrated By (Sign)	Calibration Date	Calibration Due Date
Richard Capell	[Signature]	30 Sept 2010	30 Sept 2011

As Found Status	Reason For Service	Final Test Status
☒ In Tolerance	☒ Scheduled	☒ Calibrated
☐ Out Of Tolerance	☐ Unscheduled	☐ Out of Tolerance
☐ Inoperative	☐ New Unit	☐ Inoperative
		☐ Calibrated (Limited)

Test Point	Units	As Found Test Data				Final Test Data			
		Standard	Instrument	Tolerance (±)	In Tol.?	Standard	Instrument	Tolerance (±)	In Tol.?
Pres Mod	0 V	0.00000	0.00000	0.00005	Yes	0.00000	0.00000	0.00005	Yes
	0.5 V	0.50000	0.49997	0.00005	Yes	0.50000	0.49997	0.00005	Yes
	1 V	1.00000	0.99998	0.00005	Yes	1.00000	0.99998	0.00005	Yes
V input J	0 V	0.00000	0.000	0.0025	Yes	0.00000	0.000	0.0025	Yes
	5 V	5.00000	4.999	0.0025	Yes	5.00000	4.999	0.0025	Yes
	10 V	10.0008	9.999	0.0025	Yes	10.0008	9.999	0.0025	Yes
	30 V	30.0002	30.00	0.03	Yes	30.0002	30.00	0.03	Yes
C input J	4 mA	4.0003	4.001	0.006	Yes	4.0003	4.001	0.006	Yes
	12 mA	12.0001	12.002	0.006	Yes	12.0001	12.002	0.006	Yes
	20 mA	20.0001	20.004	0.006	Yes	20.0001	20.004	0.006	Yes

NIST Traceable Standards Used	Serial/TSS ID Number	Calibration Date	Calibration Due Date
Krohn-Kite Current Calibrator PCS-2B	EQ 1769	29 Apr 2010	29 Apr 2011
EDC Voltage Standard	EQ 819	29 Apr 2010	29 Apr 2011
Keithley 2001 Multimeter	EQ 2046	18 Dec 2009	18 Dec 2010
Dickson Temp/rH Chart Recorder	EQ 362	30 Apr 2010	30 Apr 2011
Omega DPI 740 Pressure Indicator	EQ 1975	8 Feb 2010	8 Feb 2011

Environmental Conditions		
Temperature: 25 °C	Relative Humidity: 41%	Pressure: 29.806 "Hg

This is a Confidential Document! - Do not copy or distribute - All rights reserved



Title: Composite Panel Pressure Decay Test Report
Client: Arcoplast, Inc.
Project/Test Dates: NC-ARC10610A-1/November 1-2, 2010
Report Version: November 9, 2010
Page 15 of 24

TEST REPORT

ASHCROFT INC.

250 East Main Street
Stratford, CT 06614 USA
Tel: 203-378-8281 Fax: 203-385-0408

EQ 1931

APPROVED FOR CLIENT USE

APR 15 2010

By: *[Signature]* FOR TSS, INC.
www.techsafety.com

Calibration Certification Report

Customer: TECHNICAL SAFETY SERVICES INC	Certification I.D. #: 36177 - 40275	Model: HQS-1
Customer PO#: NC1009373	Customer Control:	Accuracy: 0.06 %
House Order#: 1R508161	Pressure Range: 0 / 5	IN. WATER Serial #: 36177

Readings: ☐ Initial ☐ As Rec'd ☒ As Left	Temp. Comp: ☐ -10 to 70 C ☐ 45 to 95 F ☒ 20 to 120 F ☐ Enhanced	Comments:
--	---	-----------

*** NOTE *** Conversion Factor for IN. WATER @ 20 Degrees C.

% of Span	Applied Pressure	Target Reading	Upscale Reading	% of Span Error	Downscale Reading	% of Span Error
0	0	0.0000	-0.0004	-0.008	-0.0007	-0.014
10	0.5	0.5000	0.4996	-0.008	0.4992	-0.016
20	1	1.0000	0.9999	-0.002	0.9994	-0.012
30	1.5	1.5000	1.5000	0.000	1.4996	-0.008
40	2	2.0000	2.0001	0.002	1.9998	-0.004
50	2.5	2.5000	2.5002	0.004	2.4999	-0.002
60	3	3.0000	3.0001	0.002	2.9999	-0.002
70	3.5	3.5000	3.4999	-0.002	3.4998	-0.004
80	4	4.0000	3.9998	-0.004	3.9996	-0.008
90	4.5	4.5000	4.4995	-0.010	4.4995	-0.010
100	5	5.0000	4.9998	-0.004	4.9998	-0.004

Accuracy Tolerance: +/- 0.0030 IN. WATER

Calibrated by: Estime Dessejour	Accepted by: ROBIN H. NACHILO	Environmental Conditions: Temperature = 72 +/- 3 Degrees F Relative Humidity = 0 - 80%
Date: 03/23/2010	Date: 04/07/2010	Calibration Procedure: 822A133

Linear Error as a Percent of Full Scale

Applied Pressure

Legend: ☐ Upscale ☒ Downscale Upper Control Limit Lower Control Limit

This instrument has been calibrated with measurement standards whose accuracy is traceable to National Institute of Standards and Technology (N.I.S.T.):

Test #: 126100364

Calibration Standard I.D. #: ID-0364

Accuracy of standard is +/- 0.03% of reading* Last Calibrated: 01-26-2010 Calibration Due Date: 04/26/2010

* The stated accuracy is obtained at reference conditions.

All standards used in this calibration are maintained in accordance with the latest revisions of ANSI/NCSL Z540-1 and ISO-10012.

Form # MM-032



Title: Composite Panel Pressure Decay Test Report
Client: Arcoplast, Inc.
Project/Test Dates: NC-ARC10610A-1/November 1-2, 2010
Report Version: November 9, 2010
Page 16 of 24

TEST REPORT

ASHCROFT INC.

EQ1624

250 East Main Street
Stratford, CT 06614 USA
Tel: 203-378-8281 Fax: 203-385-0408

APPROVED FOR CLIENT USE

NC1009430
APR 06 2010

Calibration Certification Report

BY: RL FOR TSS, INC.
www.techsafety.com

Customer	TECHNICAL SAFETY SERVICES INC	Certification I.D. #	17946 - 40267.412025	Model:	HQS-2
Customer PO#	NC1009430	Customer Control		Accuracy	0.1 %
House Order#	1R508188	Pressure Range:	0 / 60 PSIA	Serial #	17946

Readings:	☐ Initial ☒ As Rec'd ☐ As Left	Temp. Comp:	☐ -10 to 70 C ☒ 45 to 95 F ☐ 20 to 120 F ☐ Enhanced	Comments:	
-----------	--	-------------	---	-----------	--

% of Span	Applied Pressure PSIA	Target Reading PSIA	Upscale Reading	% of Span Error	Downscale Reading	% of Span Error
0	0	0.000	0.000	0.000	0.000	0.000
20	12	12.000	11.999	-0.002	11.999	-0.002
40	24	24.000	23.999	-0.002	23.999	-0.002
60	36	36.000	36.001	0.002	36.000	0.000
80	48	48.000	48.001	0.002	48.001	0.002
100	60	60.000	60.000	0.000	60.000	0.000

Accuracy Tolerance: +/- 0.060 PSIA

Calibrated by:	Piotr Chak	Accepted by:	ROBIN H. NACHILO	Environmental Conditions:	Temperature = 72 +/- 3 Degrees F Relative Humidity = 0 - 80%
Date:	03/30/2010	Date:	03/30/2010	Calibration Procedure:	822A186/187

Pressure: This instrument has been calibrated with measurement standards whose accuracy is traceable to National Institute of Standards and Technology (N.I.S.T.):
Mass: 33830
Piston and Cylinder: TL-480R / C40 / V-1292

Calibration Standard I.D. #: QAID 1087 Accuracy of standard is +/- 50 PPM of reading* Last Calibrated: 08/04/2005 Calibration Due Date: 08/04/2010

* The stated accuracy is obtained at reference conditions.

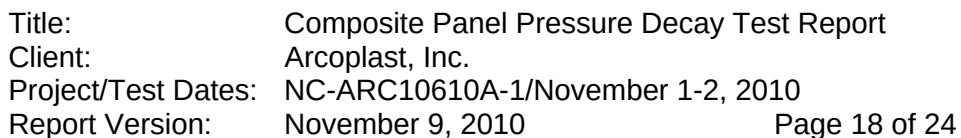
All standards used in this calibration are maintained in accordance with the latest revisions of ANSI/NCSL Z540-1 and ISO-10012.

Form # MM-032

TEST REPORT

11/11/10

AcroPlast Inc.						
Plate A						
time	P (kPa)	Patm (in Hg)	T (°C)			
10:08	1.0029	30.35	20.8			
10:13	0.9852	30.35	21.0			
10:18	0.9476	30.35	21.2			
10:23	0.9156	30.35	21.2			
10:28	0.8859	30.35	21.3			
10:33	0.8547	30.35	21.2			
10:38	0.8208	30.35	21.2			
10:43	0.7908	30.35	21.2			
10:48	0.7589	30.35	21.2			
10:53	0.7271	30.35	21.2			
10:58	0.6976	30.35	21.3			
11:03	0.6672	30.35	21.2			
11:08	0.6355	30.35	21.3			
* 10:00	0.0000	30.35	20.8			
Plate B						
11:32	0.0000	30.35	21.6			
13:37	1.0024	30.31	21.4			
13:42	0.9882	30.31	21.8			
13:47	0.9584	30.31	21.8			
13:52	0.9285	30.31	21.8			
13:57	0.8957	30.30	21.8			
14:02	0.8590	30.30	21.8			
14:07	0.8270	30.30	21.9			
14:12	0.7935	30.30	21.8			
14:17	0.7619	30.30	21.9			
14:22	0.7352	30.30	21.9			
14:27	0.7057	30.30	21.9			
14:32	0.6826	30.30	22.1			
14:37	0.6602	30.30	22.0			
Plate C						
15:00	0.0000	30.30	22.2			
15:11	1.0021	30.30	22.6			
15:16	0.9740	30.29	22.5			
15:21	0.9425	30.29	22.5			
15:26	0.9059	30.29	22.5			
15:31	0.8658	30.29	22.4			
15:36	0.8286	30.30	22.6			
15:41	0.7989	30.30	22.5			
15:46	0.7706	30.29	22.5			
15:51	0.7381	30.29	22.6			
15:56	0.7021	30.29	22.6			
16:01	0.6732	30.29	22.4			
16:06	0.6418	30.30	22.4			
16:11	0.6111	30.30	22.4			



11/11/10

[illegible]

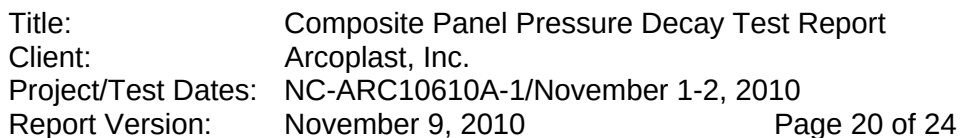
TEST REPORT

11/2/10

Plate A			
~~P(kPa)~~	~~P_{atm}(inHg)~~		
time	P(kPa)	P _{atm} (inHg)	T(°C)
08:58	0.0001	30.28	21.6
09:02	1.0125	30.28	21.5
09:07	0.9731	30.28	21.6
09:12	0.9399	30.28	21.6
09:17	0.9042	30.28	21.6
09:22	0.8744	30.28	21.6
09:27	0.8404	30.28	21.6
09:32	0.8122	30.28	21.7
09:37			
09:42			
09:47			
09:52			
09:57			
10:02			
Plate A ptr (1)			
time	P(kPa)	P _{atm} (inHg)	T(°C)
09:44	0.0009	30.28	22.1
09:52	1.0015	30.27	22.1
09:57	0.9723	30.27	22.1
10:02	0.9447	30.27	22.0
10:07	0.9117	30.27	22.0
10:12	0.8838	30.27	22.0
10:17	0.8514	30.27	22.0
10:22	0.8208	30.27	22.0
10:27	0.7925	30.27	22.3
10:32	0.7702	30.27	22.4
10:37	0.7444	30.26	22.3
10:42	0.7146	30.27	22.3
10:47	0.6899	30.26	22.2
10:52	0.6624	30.26	22.2
Plate A (2)			
time	P(kPa)	P _{atm} (inHg)	T(°C)
13:40	0.0009	30.18	22.1
13:48	1.0121	30.18	22.4
13:53	0.9805	30.19	22.3
13:58	0.9564	30.17	22.3
14:03	0.9381	30.17	22.4
14:08	0.9071	30.17	22.4
14:13	0.8758	30.17	22.4
14:18	0.8528	30.16	22.4
14:23	0.8299	30.16	22.5
14:28	0.8062	30.16	22.6
14:33	0.7767	30.16	22.6
14:38	0.7539	30.16	22.7
14:43	0.7328	30.16	22.7
14:48	0.7128	30.15	22.7

Batteries died on the Heise.
 11.2.10 RD

Batteries were changed and trial was re-done.
 11.2.10 RD



11/2/10

time	P (kPa)	P _{atm} (inHg)	T (°C)
15:13	0.0010	30.14	22.8
15:23	1.0141	30.14	23.2
15:28	0.9645	30.14	23.0
15:33	0.9174	30.14	23.0
15:38	0.8757	30.14	23.1
15:43	0.8283	30.13	23.1
15:48	0.7872	30.13	23.1
15:53	0.7454	30.13	23.1
15:58	0.7133	30.13	23.1
16:03	0.6784	30.13	23.2
16:08	0.6427	30.13	23.2
16:13	0.6067	30.13	23.2
16:18	0.5739	30.12	23.2
16:23	0.5451	30.12	23.2
Plate C (2)	P (kPa)	P _{atm} (inHg)	T (°C)
16:27	0.0010	30.12	23.3
16:32	0.9999	30.12	23.5
16:37	0.9486	30.12	23.2
16:42	0.9013	30.12	23.2
16:47	0.8484	30.12	23.3
16:52	0.7999	30.12	23.3
16:57	0.7510	30.12	23.4
17:02	0.7053	30.12	23.3
17:07	0.6655	30.11	23.4
17:12	0.6290	30.12	23.4
17:17	0.5903	30.11	23.4
17:22	0.5493	30.12	23.4
17:27	0.5109	30.12	23.4
17:32	0.4786	30.12	23.4

TEST REPORT

Panel A



TEST REPORT

Panel B



TEST REPORT

Panel C



TEST REPORT

Panel D

