



3933 US Route 11
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July 24, 2016

Letter Report No. 102626093CRT-001
Project No. G102626093

Mr. Sean Moloney
Federal Signal Corporation
2645 Federal Sign Dr.
University Park, IL 60484-3167
USA

Phone Number: (708) 587-3324
email: smoloney@fedsig.com

Subject: ETL Findings Evaluation of the Model Global Series, Audible Signal Enclosure in Construction Type A and Construction Type B, which are made from Glass Reinforced Polyester and include two gaskets of Silicone material, Type AS568-157,50 Durometer and silicone material, Type 1/8 S40, 40 Durometer.

Dear Mr. Moloney,

This Findings Letter represents the results of the tests of the above referenced product to the requirements of testing contained in the following standard:

UL Standard for Safety for Enclosures for Electrical Equipment, Environmental Considerations, UL 50E Second Edition, Dated October 16, 2015

This investigation was authorized by quote number Qu-00701771, dated 06/08/2016. Samples selected by and sent from Federal Sign Corporation. Test sample(s) were received on 06/22/2016, evaluated from 07/12/2016 to 07/22/2016 and tested at the Cortland NY, Intertek Location.

The following tests have been completed.

Test	Standard	Test Section
Misalignment test	UL 50E	8.15
External icing test	UL 50E	8.5
Hosedown	UL 50E	8.6
Gasket	UL 50E	8.13

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See test data sheet attached for test information.

If there are any questions regarding the results contained in this report, or any of the other services offered by Intertek, please do not hesitate to contact the undersigned.

Please note this Findings Report does not represent authorization for the use of any Intertek certification marks.

Completed by:	Russell Mantey
Title:	Technician Team Lead
Signature:	

Reviewed by:	Jeff Edwards
Title:	Sales Engineer
Signature	

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Transcribed Test Data

Client: Federal Signal Corporation

Engineer: Russell Mantey *RM*

Date: July 23, 2016

Job No.: G102626093

Tested By: Russell Mantey *RM*

Date: July 23, 2016

Product: Audible Signal

Reviewed By: Jeff Edwards *JED*

Date: 24-July-2016

Model No.: Construction Type A, Construction Type B

UL Standard for Safety for Enclosures for Electrical Equipment, Environmental Considerations, UL 50E Second Edition, Dated October 16, 2015

Sample Control Number: CRT1606221117-001

Standard:

Tests to be Performed					
Required	Page	Standard	Section	Test Description	Pass/Fail
NA	1-2	NA	NA	Findings Report	NA
NA	3	NA	NA	Tests to be Performed	NA
NA	4	NA	NA	Sample List	NA
NA	5	NA	NA	Test Equipment	NA
NA	6	NA	NA	Product Photographs	NA
(X)	7	UL 50E	8.15	Misalignment test	Pass
(X)	8-9	UL 50E	8.6	Hosedown	Pass
(X)	10-11	UL 50E	8.5	External icing test	Pass
(X)	12-23	UL 50E	8.13	Gaskets	Pass

NA – Not Applicable

Test Purpose:
To verify the product meets the requirements set forth as noted to the Standards listed above.



Intertek Test Data Sheets

Transcribed Test Data

Client: Federal Signal Corporation

Engineer: Russell Mantey *RM*

Date: July 23, 2016

Job No.: G102626093

Tested By: Russell Mantey *RM*

Date: July 23, 2016

Product: Audible Signal

Reviewed By: Jeff Edwards *JED*

Date: 24-July-2016

Model No.: Construction Type A, Construction Type B

UL Standard for Safety for Enclosures for Electrical Equipment, Environmental Considerations, UL 50E Second Edition, Dated October 16, 2015

Sample Control Number: CRT1606221117-001 Standard:

Test Sample Numbers and Descriptions				
Sample #	Intertek Id	Description	Manufacturer	Model #
1	CRT1606221117-001-1	Audible Signal	Federal Signal Corporation	Type A Construction
2	CRT1606221117-001-2	Audible Signal	Federal Signal Corporation	Type A Construction
3	CRT1606221117-001-3	Audible Signal	Federal Signal Corporation	Type B Construction
4	CRT1606221117-001-4	Audible Signal	Federal Signal Corporation	Type B Construction
5	CRT1606221117-001-5	Flat Gasket	NA	Type AS568-157
6	CRT1606221117-001-6	Flat Gasket	NA	Type AS568-157
7	CRT1606221117-001-7	Flat Gasket	NA	Type AS568-157
8	CRT1606221117-001-8	Flat Gasket	NA	Type AS568-157
9	CRT1606221117-001-9	Flat Gasket	NA	Type AS568-157
10	CRT1606221117-001-10	Flat Gasket	NA	Type AS568-157
11	CRT1606221117-001-11	Flat Gasket	NA	Type AS568-157
12	CRT1606221117-001-12	Flat Gasket	NA	Type AS568-157
13	CRT1606221117-001-13	Flat Gasket	NA	Type AS568-157
14	CRT1606221117-001-14	O-ring gasket	NA	Type 1/8 S40
15	CRT1606221117-001-15	O-ring gasket	NA	Type 1/8 S40
16	CRT1606221117-001-16	O-ring gasket	NA	Type 1/8 S40
17	CRT1606221117-001-17	O-ring gasket	NA	Type 1/8 S40
18	CRT1606221117-001-18	O-ring gasket	NA	Type 1/8 S40
19	CRT1606221117-001-19	O-ring gasket	NA	Type 1/8 S40
20	CRT1606221117-001-20	O-ring gasket	NA	Type 1/8 S40
21	CRT1606221117-001-21	O-ring gasket	NA	Type 1/8 S40
22	CRT1606221117-001-22	O-ring gasket	NA	Type 1/8 S40
23	CRT1606221117-001-23	O-ring gasket	NA	Type 1/8 S40



Intertek Test Data Sheets

Transcribed Test Data

Client: Federal Signal Corporation

Engineer: Russell Mantey *RM*

Date: July 23, 2016

Job No.: G102626093

Tested By: Russell Mantey *RM*

Date: July 23, 2016

Product: Audible Signal

Reviewed By: Jeff Edwards *JED*

Date: 24-July-2016

Model No.: Construction Type A, Construction Type B

UL Standard for Safety for Enclosures for Electrical Equipment, Environmental Considerations, UL 50E Second Edition, Dated October 16, 2015

Sample Control Number: CRT1606221117-001

Standard:

Test Equipment

#	Intertek #	Description	Calibration Due Date
1	H273	Data Logger	06-10-2017
2	H273-1	Temp./ Humidity Sensor	06-10-2017
3	T1560	Stopwatch	04-22-2017
4	N1281	Digital Caliper	05-09-2017
5	G021s	Micrometer	03-18-2017
6	R203	25 ft. tape measure	11-12-2016
7	W230	IP test fixture UL 50E	02-26-2017
8	W230-1	0-5 PSI gage on IP test fixture W230	02-26-2017
9	T1556	Stopwatch	04-22-2017
10	T825s	Data Logger Hydra	08-28-2016
11	N885	LEVEL, ELECTRONIC	05-04-2017
12	T1527	USB Temperature Recording "Stick"	04-08-2017
13	L076	Extensometer Instron	07-23-2016
14	L065	LOAD Cell	07-23-2016
15	S222s	Scale	03-31-2017
16	T1541	Temperature Data logger	10-20-2016



Transcribed Test Data

Client: Federal Signal Corporation

Engineer: Russell Mantey *RM*

Date: July 23, 2016

Job No.: G102626093

Tested By: Russell Mantey *RM*

Date: July 23, 2016

Product: Audible Signal

Reviewed By: Jeff Edwards *JED*

Date: 24-July-2016

Model No.: Construction Type A, Construction Type B

UL Standard for Safety for Enclosures for Electrical Equipment, Environmental Considerations, UL 50E Second Edition, Dated October 16, 2015

Sample Control Number: CRT1606221117-001

Standard:

Product Photos:



Type A construction

Type B Construction



Type AS568-157

Type 1/8 S40



Transcribed Test Data

Client:	Federal Signal Corporation	Engineer:	Russell Mantey <i>RM</i>	Date:	July 23, 2016
Job No.:	G102626093	Tested By:	Russell Mantey <i>RM</i>	Date:	July 23, 2016
Product:	Audible Signal	Reviewed By:	Jeff Edwards <i>JED</i>	Date:	24-July-2016
Model No.:	Construction Type A, Construction Type B	Standard:	UL Standard for Safety for Enclosures for Electrical Equipment, Environmental Considerations, UL 50E Second Edition, Dated October 16, 2015		
Sample Control Number:	CRT1606221117-001	Standard:	Edition, Dated October 16, 2015		

MISALIGNMENT TEST: UL 50E, Section 8.15

Test Purpose:
To determine the enclosures ability to withstand damage from a conduit being flexed while installed on the enclosure.

Test Parameters:	
Sample Tested :	Audible Signal
Test Conduit Length :	3 meters (10 foot)
Test Conduit size :	Trade size 3
Test	A 3 m (10 foot) length of steel conduit, trade size 3, shall be tightly threaded into a detachable threaded conduit hub, and the hub shall be installed in one or more of the conduit locations in the enclosure to be tested. A conduit of smaller size shall be used if the maximum size of conduit the enclosure is designed to accept is smaller than trade size 3. The opposite end of the conduit from the enclosure shall be displaced from its axis in all directions by a distance of 75 mm (3 inches), except that the displacement shall be reduced if necessary to avoid exceeding the bending moment value specified in Table 5.

Test Results:					
Sample	Trade size Conduit used	Displacement Applied	Damage to Enclosure	Did sample comply with ingress test?	Pass/ Fail
CRT1606221117-001-1	1/2"	75mm	No	Yes	Pass
CRT1606221117-001-2	1/2"	75mm	No	Yes	Pass
CRT1606221117-001-3	1/2"	75mm	No	Yes	Pass
CRT1606221117-001-4	1/2"	75mm	No	Yes	Pass

To Comply:
The enclosure is acceptable if, at the conclusion of the test, the non-metallic enclosure shall not crack or break and the enclosure shall meet the applicable environmental tests of 8.2, 8.3, 8.4, 8.6, or 8.11.

ITS Comments:
<input checked="" type="checkbox"/> The product complies with all applicable requirements of this test.
<input type="checkbox"/> The product does not comply with the requirements of this test.
Test Date: 7-18-2016 Tested By: Russell Mantey

Environmental Conditions During Testing: Date: 7-18-2016 Humidity: 66 %rh Ambient: 21.5°C

Equipment Used (See page 3 for details): 1 2 6 | | | | | | | | | |



Transcribed Test Data

Client:	Federal Signal Corporation	Engineer:	Russell Mantey <i>RM</i>	Date:	July 23, 2016
Job No.:	G102626093	Tested By:	Russell Mantey <i>RM</i>	Date:	July 23, 2016
Product:	Audible Signal	Reviewed By:	Jeff Edwards <i>JED</i>	Date:	24-July-2016
Model No.:	Construction Type A, Construction Type B	Standard:	UL Standard for Safety for Enclosures for Electrical Equipment, Environmental Considerations, UL 50E Second Edition, Dated October 16, 2015		
Sample Control Number:	CRT1606221117-001	Standard:	Edition, Dated October 16, 2015		

Hosedown test: UL 50E, Section 8.6

Test Purpose:
To test the enclosure's ability to keep particles from entering the enclosure

Test Parameters:	
Test Sample:	Audible Signal
Test Description	The enclosure is sprayed with a stream of water from a 1 inch nozzle at a rate of at least 240L/min. (65 gallons per min.) being moved over the seams and joints of the enclosure at a rate of ¼ inch per second.
Contaminant:	Water
Nozzle	1" inside diameter/ 25mm
Flow rate	65 gallons per min./ 240L/min.
Distance from enclosure	10 to 12 feet/ 3.0 to 3.5 meters
Rate of travel over enclosure	¼ inch per second, directed at the seams and joints of the enclosure/ 6 mm/sec.
Conditioning	Prior to this test the samples were subjected to Misalignment Test of UL 50E, Section 8.15

Water Flow Verification:		
Liters per minute	Minimum Required Gage Pressure	Actual Gage Reading
65 Gal./min.	2.9 PSI	3.0 PSI

Test Results:		
Sample	CRT1606221117-001-1	
Water Flow Rate (l/min) (Gage Pressure)	240 L/min.	Gage Pressure: 3.0 PSI
Test Time	72 seconds	
Test Device Used	1" Spray Nozzle	
Distance nozzle located from Enclosure	12 ft.	
Angle of Spray nozzle from sample	90°	
Did Water Enter the Enclosure?	No	
Pass / Fail	Pass	

Test Results:		
Sample	CRT1606221117-001-3	
Water Flow Rate (l/min) (Gage Pressure)	240 L/min.	Gage Pressure: 3.0 PSI
Test Time	72 seconds	
Test Device Used	1" Spray Nozzle	
Distance nozzle located from Enclosure	12 ft.	
Angle of Spray nozzle from sample	90°	
Did Water Enter the Enclosure?	No	
Pass / Fail	Pass	

Environmental Conditions During Testing: Date: 7-18-2016 Humidity: 77 %rh Ambient: 25°C

Equipment Used (See page 3 for details):

1	2	3	6	7	8				
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Transcribed Test Data

Client:	Federal Signal Corporation	Engineer:	Russell Mantey <i>RM</i>	Date:	July 23, 2016
Job No.:	G102626093	Tested By:	Russell Mantey <i>RM</i>	Date:	July 23, 2016
Product:	Audible Signal	Reviewed By:	Jeff Edwards <i>JED</i>	Date:	24-July-2016
Model No.:	Construction Type A, Construction Type B	Standard:	UL Standard for Safety for Enclosures for Electrical Equipment, Environmental Considerations, UL 50E Second Edition, Dated October 16, 2015		
Sample Control Number:	CRT1606221117-001				

To Comply:
The protection is satisfactory if at the conclusion of the test there is no water inside the enclosure.

Intertek Comments:
<input checked="" type="checkbox"/> The product complies with all applicable requirements of this test.
<input type="checkbox"/> The product does not comply with the requirements of this test.
Test Date: 7-18-2016 Tested By: Russell Mantey

Environmental Conditions During Testing: Date: 7-18-2016 Humidity: 77 %rh Ambient: 25°C

Equipment Used (See page 3 for details):

1	2	3	6	7	8				
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Intertek Test Data Sheets

Transcribed Test Data

Client: Federal Signal Corporation Engineer: Russell Mantey *RM* Date: July 23, 2016
 Job No.: G102626093 Tested By: Russell Mantey *RM* Date: July 23, 2016
 Product: Audible Signal Reviewed By: Jeff Edwards *JED* Date: 24-July-2016
 Model No.: Construction Type A, Construction Type B UL Standard for Safety for Enclosures for Electrical Equipment, Environmental Considerations, UL 50E Second Edition, Dated October 16, 2015
 Sample Control Number: CRT1606221117-001 Standard:

GASKETS TEST – TENSILE & ELONGATION: UL 50E, Section 8.13.2

Test Purpose:
 To determine tensile strength and elongation of the gasket material used in an enclosure

Test Parameters:	
Test Sample:	Type AS568-157
Conditioning Time:	168 hrs.
Conditioning Temperature:	69-70°C
Pulling Speed:	20 in./min.
Number of Samples:	3 aged, 3 unaged

Test Results: Aging		
Test Sample:	Type AS568-157	
Conditioning Time:	168 hrs.	
Aging Temp.	70°C	
Visual Inspection	After aging was there any visible deterioration, deformation, melting or cracking of the samples?	
Sample 1	Sample 2	Sample 3
No	No	No

Test Results:					
1.	Before Conditioning Tensile Strength (lbs.)	After Conditioning Tensile Strength (lbs.)	Before Conditioning Elongation (in.)	After Conditioning Elongation (in.)	PASS / FAIL
Sample #1	11.44	13.54	2.94	5.53	NA
Sample #2	9.95	13.26	4.16	5.22	
Sample #3	13.31	11.85	5.47	4.58	
Average:	11.57	12.88	4.19	5.11	NA
Tensile Strength:	111%		N / A		Pass
Elongation:	N / A		122%		Pass

To Comply:

- At the conclusion of the tests, there shall be no visible deterioration, deformation, melting, or cracking of the material.
- The tensile strength of the gasket material shall not be less than 75 percent and an elongation of not less than 60 percent of values determined for unaged samples

Intertek Comments:

The product Type AS568-157 gasket complies with all applicable requirements of this test.

The product Type AS568-157 gasket does not comply with the requirements of this test.

Test Date: 7-12-2016 through 7-19-2016, 7-21-2016 Tested By: Russell Mantey

Environmental Conditions During Testing: Date: 7-12-2016 through 7-19-2016 Humidity: NA %rh Ambient: 70 °C
 Environmental Conditions During Testing: Date: 7-21-2016 Humidity: 49%rh Ambient: 22.5°C

Equipment Used:

1	2	4	12	13	14						
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Intertek Test Data Sheets

Transcribed Test Data

Client: Federal Signal Corporation Engineer: Russell Mantey *RM* Date: July 23, 2016
 Job No.: G102626093 Tested By: Russell Mantey *RM* Date: July 23, 2016
 Product: Audible Signal Reviewed By: Jeff Edwards *JE* Date: 24-July-2016
 Model No.: Construction Type A, Construction Type B UL Standard for Safety for Enclosures for Electrical Equipment, Environmental Considerations, UL 50E Second Edition, Dated October 16, 2015
 Sample Control Number: CRT1606221117-001 Standard:

DEFORMATION AT ROOM TEMPERATURE TEST: UL 50E, Section 8.13.3.2**Test Purpose:**

To determine the compression set of the gasket material used in a enclosure

Test Parameters:

Test Sample:	Type AS568-157
Conditioning:	A circular weight shall be placed on the middle of each specimen
Conditioning Time:	2 hours
Weight Applied:	10 Lbs. per sq. inch
After Weight Applied:	Allow to rest at room temperature for 30 min.

Test Results:**1. Deformation Test Clause 8.13.3.2**

Sample	Initial Measurement (mm)	Average (mm)	Final Measurement (mm)	Average	Compression Set (%)	Pass/Fail
#1	3.388	3.342	3.371	3.337	-0.15%	Pass
	3.329		3.314			
	3.309		3.326			
#2	3.326	3.325	3.281	3.294	-0.93%	Pass
	3.320		3.275			
	3.330		3.327			
#3	3.327	3.327	3.321	3.321	-0.18%	Pass
	3.326		3.323			
	3.329		3.320			

2. Any sign of deterioration or cracks visible in the sample?

Sample	Cracking or other adverse effects?	Pass / Fail
#1	No	Pass
#2	No	Pass
#3	No	Pass

To Comply:

- The compression set shall not exceed 50% of the initial thickness of the specimen
- On the completion of each test the specimen shall not show signs of deterioration or cracks that can be seen with normal or corrected vision

Intertek Comments:

The product Type AS568-157 gasket complies with all applicable requirements of this test.

The product Type AS568-157 gasket does not comply with the requirements of this test.

Test Date: 7-12-2016 Tested By: Russell Mantey

Environmental Conditions During Testing: Date: 7-12-2016 Humidity: 55%rh Ambient: 21.5°C

Equipment Used:

1	2	3	4	5	15						
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Intertek Test Data Sheets

Transcribed Test Data

Client: Federal Signal Corporation Engineer: Russell Mantey *RM* Date: July 23, 2016
 Job No.: G102626093 Tested By: Russell Mantey *RM* Date: July 23, 2016
 Product: Audible Signal Reviewed By: Jeff Edwards *JED* Date: 24-July-2016
 Model No.: Construction Type A, Construction Type B UL Standard for Safety for Enclosures for Electrical Equipment, Environmental Considerations, UL 50E Second Edition, Dated October 16, 2015
 Sample Control Number: CRT1606221117-001 Standard:

DEFORMATION AFTER AGING IN AN OVEN TEST: UL 50E, Section 8.13.3.3

Test Purpose:
 To determine the compression set of the gasket material used in a enclosure

Test Parameters:
 Test Sample: Type AS568-157
 Conditioning Time: 5 days
 Conditioning Temperature: 70°C
 The samples shall then be tested for compliance with Clause 8.13.3.2, approx. 24 hrs. after removal from the oven.

Test Results:

1. Deformation Test Clause 8.13.3.2, approximately 24 hours after removal from the conditioning chamber.

Sample	Initial Measurement (mm)	Average (mm)	Final Measurement (mm)	Average	Compression Set (%)	Pass/Fail
#1	3.380	3.349	3.374	3.34	-0.26%	Pass
	3.301		3.324			
	3.335		3.322			
#2	3.370	3.353	3.364	3.344	-0.26%	Pass
	3.379		3.331			
	3.311		3.337			
#3	3.336	3.331	3.324	3.323	-0.24%	Pass
	3.332		3.321			
	3.325		3.326			

2. Any sign of deterioration or cracks visible in the sample?

Sample	Cracking or other adverse effects?	Pass / Fail
#1	No	Pass
#2	No	Pass
#3	No	Pass

To Comply:
 1. The compression set shall not exceed 50% of the initial thickness of the specimen
 2. On the completion of each test the specimen shall not show signs of deterioration or cracks that can be seen with normal or corrected vision

Intertek Comments:
 The product Type AS568-157 gasket complies with all applicable requirements of this test.
 The product Type AS568-157 gasket does not comply with the requirements of this test.
 Test Date: 7-12-2016 through 7-18-2016 Tested By: Russell Mantey

Environmental Conditions During Testing: Date: 7-12-2016 to 7-17-2016 Humidity: NA %rh Ambient: 70°C
 Environmental Conditions During Testing: Date: 7-18-2016 Humidity: 66 %rh Ambient: 21.5°C

Equipment Used:

1	2	3	4	5	12	15						
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Intertek Test Data Sheets



Transcribed Test Data

Client: Federal Signal Corporation Engineer: Russell Mantey *RM* Date: July 23, 2016
 Job No.: G102626093 Tested By: Russell Mantey *RM* Date: July 23, 2016
 Product: Audible Signal Reviewed By: Jeff Edwards *JE* Date: 24-July-2016
 Model No.: Construction Type A, Construction Type B UL Standard for Safety for Enclosures for Electrical Equipment, Environmental Considerations, UL 50E Second Edition, Dated October 16, 2015
 Sample Control Number: CRT1606221117-001 Standard:

GASKETS TEST – TENSILE & ELONGATION: UL 50E, Section 8.13.2

Test Purpose:
 To determine tensile strength and elongation of the gasket material used in an enclosure

Test Parameters:	
Test Sample:	Type 1/8 S40
Conditioning Time:	168 hrs.
Conditioning Temperature:	69-70°C
Pulling Speed:	20 in./min.
Number of Samples:	3 aged, 3 unaged

Test Results: Aging		
Test Sample:	Type 1/8 S40	
Conditioning Time:	168 hrs.	
Aging Temp.	70°C	
Visual Inspection	After aging was there any visible deterioration, deformation, melting or cracking of the samples?	
Sample 1	Sample 2	Sample 3
No	No	No

Test Results:					
1.	Before Conditioning Tensile Strength (lbs.)	After Conditioning Tensile Strength (lbs.)	Before Conditioning Elongation (in.)	After Conditioning Elongation (in.)	PASS / FAIL
Sample #1	9.353	8.934	3.149	3.162	NA
Sample #2	8.354	8.236	2.942	2.702	
Sample #3	8.676	4.972	2.992	1.834	
Average:	8.794	7.381	3.028	2.532	NA
Tensile Strength:	84%		N / A		Pass
Elongation:	N / A		84%		Pass

To Comply:

- At the conclusion of the tests, there shall be no visible deterioration, deformation, melting, or cracking of the material.
- The tensile strength of the gasket material shall not be less than 75 percent and an elongation of not less than 60 percent of values determined for unaged samples

Intertek Comments:

X The product Type 1/8 S40 gasket complies with all applicable requirements of this test.

_____ The product Type 1/8 S40 gasket does not comply with the requirements of this test.

Test Date: 7-12-2016 through 7-19-2016, 7-21-2016 Tested By: Russell Mantey

Environmental Conditions During Testing: Date: 7-12-2016 through 7-19-2016 Humidity: NA %rh Ambient: 70 °C
 Environmental Conditions During Testing: Date: 7-21-2016 Humidity: 49%rh Ambient: 22.5°C

Equipment Used:

1	2	4	12	13	14					
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Intertek Test Data Sheets

Transcribed Test Data

Client: Federal Signal Corporation Engineer: Russell Mantey *RM* Date: July 23, 2016
 Job No.: G102626093 Tested By: Russell Mantey *RM* Date: July 23, 2016
 Product: Audible Signal Reviewed By: Jeff Edwards *JED* Date: 24-July-2016
 Model No.: Construction Type A, Construction Type B UL Standard for Safety for Enclosures for Electrical Equipment, Environmental Considerations, UL 50E Second Edition, Dated October 16, 2015
 Sample Control Number: CRT1606221117-001 Standard:

DEFORMATION AT ROOM TEMPERATURE TEST: UL 50E, Section 8.13.3.2

Test Purpose:
 To determine the compression set of the gasket material used in a enclosure

Test Parameters:

Test Sample:	Type 1/8 S40
Conditioning:	A circular weight shall be placed on the middle of each specimen
Conditioning Time:	2 hours
Weight Applied:	10 Lbs. per sq. inch
After Weight Applied:	Allow to rest at room temperature for 30 min.

Test Results:

1. Deformation Test Clause 8.13.3.2

Sample	Initial Measurement (mm)	Average (mm)	Final Measurement (mm)	Average (mm)	Compression Set (%)	Pass/Fail
#1	2.61	2.62	2.58	2.58	-1.52%	Pass
	2.63		2.58			
	2.63		2.57			
#2	2.65	2.64	2.59	2.59	-1.89%	Pass
	2.63		2.60			
	2.65		2.59			
#3	2.66	2.64	2.57	2.56	-3.03%	Pass
	2.64		2.55			
	2.63		2.57			

2. Any sign of deterioration or cracks visible in the sample?

Sample	Cracking or other adverse effects?	Pass / Fail
#1	No	Pass
#2	No	Pass
#3	No	Pass

To Comply:

- The compression set shall not exceed 50% of the initial thickness of the specimen
- On the completion of each test the specimen shall not show signs of deterioration or cracks that can be seen with normal or corrected vision

Intertek Comments:

The product Type 1/8 S40 gasket complies with all applicable requirements of this test.

The product Type 1/8 S40 gasket does not comply with the requirements of this test.

Test Date: 7-12-2016 Tested By: Russell Mantey

Environmental Conditions During Testing: Date: 7-12-2016 Humidity: 55%rh Ambient: 21.5°C

Equipment Used:

1	2	3	4	5	15						
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Transcribed Test Data

Client: Federal Signal Corporation Engineer: Russell Mantey *RM* Date: July 23, 2016
 Job No.: G102626093 Tested By: Russell Mantey *RM* Date: July 23, 2016
 Product: Audible Signal Reviewed By: Jeff Edwards *JED* Date: 24-July-2016
 Model No.: Construction Type A, Construction Type B UL Standard for Safety for Enclosures for Electrical Equipment, Environmental Considerations, UL 50E Second Edition, Dated October 16, 2015
 Sample Control Number: CRT1606221117-001 Standard:

DEFORMATION AFTER AGING IN AN OVEN TEST: UL 50E, Section 8.13.3.3

Test Purpose:
 To determine the compression set of the gasket material used in a enclosure

Test Parameters:
 Test Sample: Type 1/8 S40
 Conditioning Time: 5 days
 Conditioning Temperature: 70°C
 The samples shall then be tested for compliance with Clause 8.13.3.2, approx. 24 hrs. after removal from the oven.

Test Results:

1. Deformation Test Clause 8.13.3.2, approximately 24 hours after removal from the conditioning chamber.

Sample	Initial Measurement (mm)	Average (mm)	Final Measurement (mm)	Average (mm)	Compression Set (%)	Pass/Fail
#1	2.56	2.57	2.53	2.54	-1.17%	Pass
	2.58		2.55			
	2.57		2.54			
#2	2.57	2.57	2.57	2.56	-0.39%	Pass
	2.58		2.57			
	2.59		2.54			
#3	2.56	2.56	2.55	2.54	-0.78%	Pass
	2.55		2.54			
	2.57		2.53			

2. Any sign of deterioration or cracks visible in the sample?

Sample	Cracking or other adverse effects?	Pass / Fail
#1	No	Pass
#2	No	Pass
#3	No	Pass

To Comply:
 1. The compression set shall not exceed 50% of the initial thickness of the specimen
 2. On the completion of each test the specimen shall not show signs of deterioration or cracks that can be seen with normal or corrected vision

Intertek Comments:
 X The product Type 1/8 S40 gasket complies with all applicable requirements of this test.
 The product Type 1/8 S40 gasket does not comply with the requirements of this test.
 Test Date: 7-12-2016 through 7-18-2016 Tested By: Russell Mantey

Environmental Conditions During Testing: Date: 7-12-2016 to 7-17-2016 Humidity: NA %rh Ambient: 70°C
 Environmental Conditions During Testing: Date: 7-18-2016 Humidity: 66 %rh Ambient: 21.5°C

Equipment Used:

1	2	3	4	5	12	15						
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Transcribed Test Data

Client: Federal Signal Corporation	Engineer: Russell Mantey <i>RM</i>	Date: July 23, 2016
Job No.: G102626093	Tested By: Russell Mantey <i>RM</i>	Date: July 23, 2016
Product: Audible Signal	Reviewed By: Jeff Edwards <i>JED</i>	Date: 24-July-2016
Model No.: Construction Type A, Construction Type B	UL Standard for Safety for Enclosures for Electrical Equipment, Environmental Considerations, UL 50E Second Edition, Dated October 16, 2015	
Sample Control Number: CRT1606221117-001	Standard:	

IMPACT AND DEFORMATION TEST: UL 50E, Section 8.13.3.4

Test Purpose:
To determine gasket's resistance to damage from impact and deformation test

Test Parameters:	
Test Sample:	Type 1/8 S40
Conditioning Time:	24 hours, for 3 consecutive days
Conditioning Temperature:	-35°C (+5°C)
Impact Weight:	1.35 kg
Impact Height:	150mm
The samples shall then be tested for compliance with Clause 8.13.3.2, approx. 24 hrs. after removal from the oven...	

Test Results:

1. Deformation Test 8.13.3.2, approximately 24 hours after removal from the conditioning chamber.

Sample	Initial Measurement (mm)	Average (mm)	Final Measurement (mm)	Average (mm)	Compression Set (%)	PASS / FAIL
#1	2.57	2.55	2.55	2.53	-0.78%	Pass
	2.53		2.52			
	2.55		2.53			
#2	2.60	2.58	2.58	2.57	-0.39%	Pass
	2.57		2.58			
	2.57		2.56			
#3	2.55	2.54	2.55	2.53	-0.39%	Pass
	2.54		2.53			
	2.54		2.53			

2. Impact Test 8.13.3.4

Sample	Impact 1 (24 hrs.) Cracking or other adverse effects?	Impact 2 (48 hrs.) Cracking or other adverse effects?	Impact 3 (72 hrs.) Cracking or other adverse effects?	Pass / Fail
#1	No	No	No	Pass
#2	No	No	No	Pass
#3	No	No	No	Pass

To Comply:
1. The compression set shall not exceed 50% of the initial thickness of the specimen
2. Upon completion of each test, specimens shall not show signs of deterioration or cracks that can be seen with normal vision

Intertek Comments:
<input checked="" type="checkbox"/> The product Type 1/8 S40 gasket complies with all applicable requirements of this test.
<input type="checkbox"/> The product Type 1/8 S40 gasket does not comply with the requirements of this test.
Test Date: 7-18-2016 through 7-22-2016 Tested By: Russell Mantey

Environmental Conditions During Testing:	Date: <u>7-18-2016 to 7-21-2016</u>	Humidity: <u>NA %rh</u>	Ambient: <u>-30°C</u>
Environmental Conditions During Testing:	Date: <u>7-22-2016</u>	Humidity: <u>68%rh</u>	Ambient: <u>21.5°C</u>

Equipment Used:	1	2	3	4	5	12	15	16				
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