Intertek | Architectural Testing

PERFORMANCE TEST REPORT

Rendered to:

DOW SILICONES COROPORATION

PRODUCT: DOWSIL™ 995 Silicone Structural Sealant

SUBSTRATE: Glass

Report No.: G2555.02-106-31
Report Date: 04/09/18
Test Record Retention Date: 03/29/22

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PERFORMANCE TEST REPORT

Rendered to:

DOW SILICONES CORPORATION
2200 West Salzburg Road P.O. Box 994
Auburn, Michigan 48611

Report No.: G2555.02-106-31
Test Start Date: 10/27/16
Test Completion Date: 03/29/18
Report Date: 04/09/18
Test Record Retention Date: 03/29/22

Product: DOWSIL™ 995 Silicone Structural Sealant

Substrate: Glass

Project Summary: Architectural Testing, Inc., an Intertek company ("Intertek-ATI"), was contracted by Dow Silicones Corporation to evaluate the materials properties of their DOWSIL™ 995 Silicone Structural Sealant, when applied to a glass substrate. A summary of test results are reported in the table below.

ASTM C1184 - 14, Standard Specifications for Structural Silicone Sealant - Summary

DOWSIL™ 995 Silicone Structural Sealant

Test	Result	Requirement
Rheological Property (Vertical)	0"	3/16"
Rheological Property (Horizontal)	No Deformation	No Deformation
Extrudability	31 seconds	10 seconds max
Hardness	32	20-60
Heat Aging	0 % No cracking or chalking	10% max weight loss No cracking or chalking
Tack-Free Time	180 min.	No Transfer in 3 hours
Tensile Strength (Standard Conditions)	192 psi	50 psi min
Tensile Strength (190°F)	165 psi	
Tensile Strength (-20°F)	224 psi	
Tensile Strength (Water Immersion)	51 psi	
Tensile Strength (5,000 h Weathering)	160 psi	

Product Descriptions: The materials were shipped to Intertek-ATI from Dow Silicones Corporation facility in Auburn, Michigan and consisted of one box of 12 tubes of the DOWSIL™ 995 Silicone Structural Sealant batch number was 0008874472 and had an expiration date of March 6, 2017.

Test Methods: The test specimens were evaluated in accordance with the following methods for compliance to ASTM C1184 - 14, *Standard Specifications for Structural Silicone Sealants:*

ASTM C639 - 15, *Standard Test Method for Rheological (Flow) Properties of Elastomeric Sealants*

ASTM C603-14, *Standard Test Method for Extrusion Rate and Application Life of Elastomeric Sealants*

ASTM C661-15, *Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer*

ASTM C792-15, *Standard Test Method for Effects of Heat Aging on Weight Loss, Cracking, and Chalking of Elastomeric Sealants*

ASTM C679-15, *Standard Test Method for Tack-Free Time of Elastomeric Sealants*

ASTM C1135-15, *Standard Test Method for Determining for Tensile Adhesion Properties of Structural Sealants*

Test Procedures and Test Results: The results are reported in the following tables.

Section 8.1 - ASTM C639 - Rheological (Flow) Properties

The rheological testing consisted of evaluating the DOWSIL™ 995 Silicone Structural Sealant as Type II-sealant single component nonsag (See sec. 1.3.2), Stainless steel channels measuring 3/4" x 1/2"x 6" with both ends open and the back surface extended 2", were used in accordance with section 6.4. The sealants were tested for vertical slump and horizontal slump. After the conditioning period of 16 hours at standard laboratory nominal conditions of 70°F (21°C) and 50% relative humidity of the sealant, two channels were placed in a refrigerator and conditioned at 40°F for 2 hrs., and two channels were placed in an oven conditioned at 122°F for 2 hrs. The channels were then removed from the respective chambers and filled with the DOWSIL™ 995 Silicone Structural Sealant. The vertical slump (sec. 8.2.1) was tested followed by horizontal slump (Sec. 8.2.2) tests in the above conditions. The amount of sag was measured to nearest (1/16")

Sag Test Results

Specimen ID	Temp. (40°F)
1 - Horizontal	No Change
2 - Vertical	No Change

Specimen ID	Temp. (120°F)
1 - Horizontal	No Change
2 - Vertical	No Change

Section 8.2 - ASTM C603 - Extrusion Rate

One tube of the DOWSIL™ 995 Structural Sealant each was secured to the SATEC Model 50 UD (ICN: Y002011). See Photo No. 2 in Appendix A. A test pressure of 345 kPa (50 psi) was applied with the sealant being extruded and material was extruded into a 1-pt. container until completely emptied.

Specimen ID	Time in seconds required to empty cartridge (Extrusion Rate)
DOWSIL™ 995 Structural Sealant	32

Test Procedures and Test Results: (Continued)

Section 8.3 - ASTM C661 - Hardness

Three test specimens were prepared with a tube of the DOWSIL™ 995 Silicone Structural Sealant that was conditioned 24 hrs. at standard conditions before starting the test. Samples were prepared centering a brass frame on Glass, and filling the brass frame with sealant. The samples were then cured for 21 days as follows: 7 days at standard conditions, 7 days in a chamber controlled at 100°F and 95% relative humidity, and 7 days at standard conditions. Upon completion of this curing process, three hardness readings were taken with a Shore A Durometer (ICN: Y000092).

Hardness Measurement

Specimen No.	1	2
Measurement 1	31	32
Measurement 2	32	32
Measurement 3	32	32
Average	**32**	

Section 8.4 - ASTM C792 - Effects of Heat Aging

Three test specimens of the DOWSIL™ 995 Silicone Structural Sealant were prepared after conditioning 24 hrs. at standard conditions before starting the test. Samples were prepared centering a brass frame on an aluminum plate, and filling the brass frame with sealant. The samples were then cured for 28 days at standard conditions. At the end of the 28-day curing period the specimens were weighed to the nearest 0.1g using an analytical balance (ICN: 65216). Two specimens were placed in a forced draft oven at 158°F for 21 days, and the control specimen remained in standard conditions for the same period. At the conclusion of the 21-day heat-aging period the specimens were removed from the oven and allowed to cool for 1hr. Each was then weighed and the percentage of weight loss was calculated.

Effects of Heat Aging

Specimen No.	Weight @ 28-day Standard Cure (g)	Weight @ 21 days Heat-Aging (g)	Weight Loss (%)	Cracking or Chalking
1	96.8	96.8	0.00	None
2	96.6	96.6	0.00	None
(Control)	95.3	95.3	0.00	None

Test Procedures and Test Results: (Continued)

Section 8.5 - ASTM C679 - Tack-Free Time

One tube of the DOWSIL™ 995 Silicone Structural Sealant was conditioned at standard laboratory conditions (73°F and 50% R.H.) for at least 24 hours. In accordance with Section 8.3, pads of sealant were made by filling a 1/8" thick form having dimensions of 1-1/2" wide x 5" long. At the first 30-minute interval an aluminum weight was placed on a polyethylene strip widthwise for 30 seconds and the polyethylene was then peeled away from the sealant at a 90° angle. If sealant adhered to the strip the test was continued for another 30 minutes and for each 30-minute interval after until a polyethylene strip was removed cleanly. This occurred when checked at 3 hrs. (180 min.)

Tack-Free Time
180 min.

Section 8.6 - ASTM C1135 - Tensile Adhesion

DOWSIL™ 995 Silicone Structural Sealant was applied to glass measuring (0.25" x 1" x 3.0"). The specimens were then cured for 21 days at (73 ±3.6°F). At the conclusion of 21 days the specimens were tested in the specified five conditions in accordance with the test method (Room temp, Oven exposure, Freezer exposure, Water immersion, and QUV exposure (5,000 hrs.), using an Instron Universal Test Machine (ICN: 005740) equipped with a 2kN load cell (ICN: 005742) operating at a separation rate of 0.5 in. /min. for 1 min. (See photographs in Appendix A).

Tensile Adhesion - Room Temperature

Specimen No.	Ultimate Tensile Stress (psi)
1	185
2	191
3	197
4	195
5	191
Average	**192**

Test Procedures and Test Results: (Continued)

ASTM C1135 - Tensile Adhesion (Continued)

Tensile Adhesion - Oven Exposure 190°F

Specimen No.	Ultimate Tensile Stress (psi)
1	171
2	152
3	183
4	159
5	160
Average	**165**

Tensile Adhesion - Freezer Exposure -20°F

Specimen No.	Ultimate Tensile Stress (psi)
1	227
2	223
3	233
4	215
5	220
Average	**224**

Test Procedures and Test Results: (Continued)

ASTM C1135 - Tensile Adhesion (Continued)

Tensile Adhesion - Water Exposure

Specimen No.	Ultimate Tensile Stress (psi)
1	34.6
2	58.1
3	85.2
4	4.96
5	74.3
Average	**51**

Tensile Adhesion - 5000 hr Accelerated Weathering

Specimen No.	Ultimate Tensile Stress (psi)
1	153
2	160
3	162
4	163
5	160
Average	**160**

Intertek-ATI will service this report for the entire test record retention period. Test records that are retained such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by Intertek-ATI for the entire test record retention period.

Results obtained are tested values and were secured using the designated test methods. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimens tested. This report may not be reproduced, except in full, without the written approval of Intertek-ATI.

For INTERTEK-ATI:

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REH:jmb/kf

Attachments (pages) This report is complete only when all attachments listed are included.
Appendix A - Photographs (2)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	04/09/18	N/A	Original report issue

APPENDIX A

Photographs

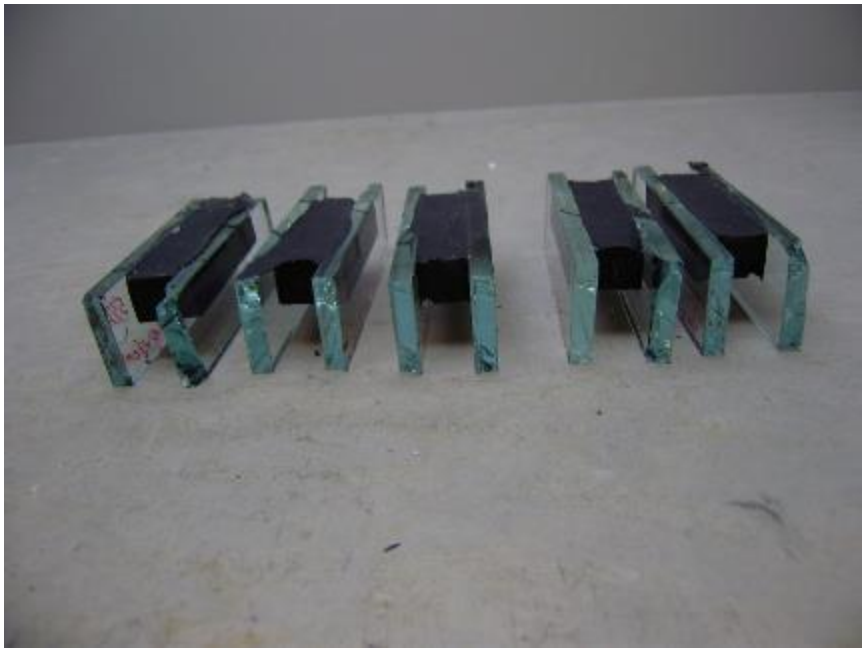

Photo No. 1
DOWSIL™ 995 Silicone Structural Sealant Tensile Adhesion - Pre-Test

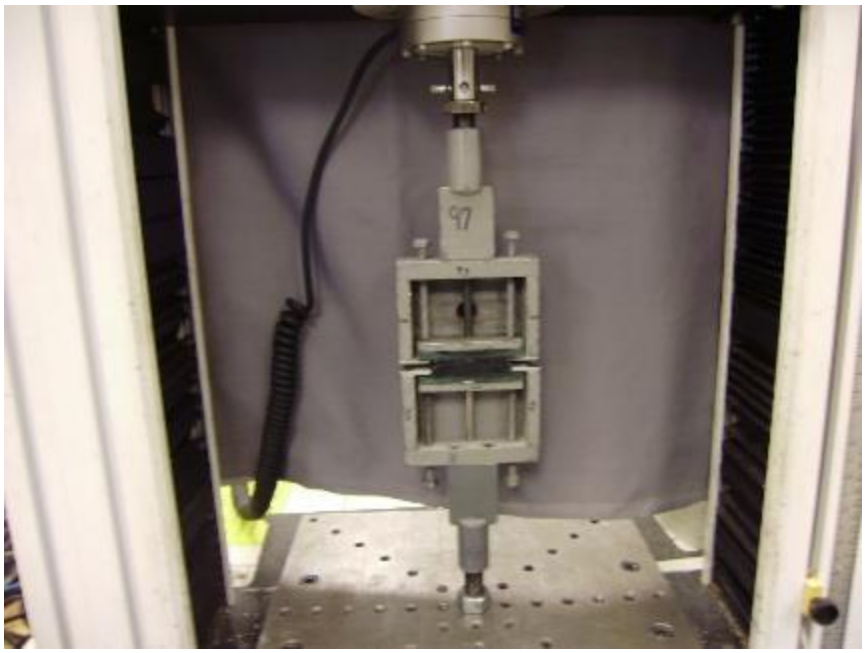

Photo No. 2
Tensile Adhesion - Test Setup

Photo No. 3
Tensile Adhesion - Testing

Photo No. 4
DOWSIL™ 995 Silicone Structural Sealant
Tensile Adhesion - Post Test