Architectural Testing

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 06/08/16

PERFORMANCE EVALUATION TEST REPORT

Rendered to:

HANOVER ARCHITECTURAL PRODUCTS

SERIES/MODEL: Elevator Pedestal Assembly, Hi-Tab Pedestal Supports and Flexible EPDM Pedestals
PRODUCT: Mineral Filled High Impact Copolymer Polypropylene and EPDM Products

Report No: 84373.01-106-31
Report Date: 10/10/08
Expiration Date: 09/26/12
Revision 1: 11/11/08

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PERFORMANCE EVALUATION TEST REPORT

Rendered to:

HANOVER ARCHITECTURAL PRODUCTS
240 Bender Road
Hanover, Pennsylvania 17331

Report No:	84373.01-106-31
Test Dates:	08/07/08
Through:	09/26/08
Report Date:	10/10/08
Expiration Date:	09/26/12
Revision 1:	11/11/08

Series/Model: Elevator Pedestal Assembly, Hi-Tab Pedestal Supports, and Flexible EPDM Pedestals

Product: Mineral Filled High Impact Copolymer Polypropylene and EPDM Products

Project Summary: Architectural Testing, Inc. was contracted by Hanover Architectural Products to perform Load Bearing Capacity, Brittleness Temperature, Softening Temperature and Shore Hardness Evaluations on their Elevator Pedestal Assemblies and Hi-Tab Pedestals as well as Tensile Strength and Tear Resistance Evaluations on their Flexible EPDM Pedestals. Peak bearing load values for the Elevator Pedestal assemblies were 3554 lb_f for full face loading at 16 inch height and 7148 lb_f at 2.5 inch height. Quarter face peak load values were 2268 lb_f at 16 inch height and 1703 lb_f at 2.5 inch height. The Hi-Tab Pedestal support peak bearing load values were 9308 lb_f for full face and 6048 lb_f at quarter face. The mean brittleness temperature was -60.6°C for the Elevator Pedestals and -49.8°C for the Hi-Tab Pedestal. The mean softening temperature was 153°C for the Elevator Pedestals and 145°C for the Hi-Tab Pedestals. The mean Shore "D" hardness was 78 for the Elevator Pedestals and 71 for the Hi-Tab Pedestals. The mean tensile strength of the EPDM Pedestals was 1009 lb_f/in^2 and the mean tear strength was 231 lb_f/in.

Test Methods: The test specimens were evaluated in accordance with the following standards:

ASTM D 746-07, *Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact.*

ASTM D 1525-07, *Standard Test Method for Vicat Softening Temperature of Plastics.*

ASTM D 2240-05, *Standard Test Method for Rubber Property-Durometer Hardness.*

ASTM D 412-06a, *Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.*

ASTM D 624-00 (Reapproved 2007), *Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.*

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Test Procedures: Testing was performed on material which was manufactured by Hanover Architectural Products and sized or machined to proper dimensions by Architectural Testing personnel as required for testing.

Load Bearing Capacity

Load bearing capacity testing was performed on a SATEC Unidrive, Model MII 50 UD Universal Testing Machine (ICN: Y002011) at a crosshead speed of 0.1in/min. Two samples were prepared and tested for each Elevator Pedestal assembly configuration (maximum height and minimum height) for both full face and quarter face loading areas. The maximum height assembly consisted of a high top plate, two couplers and a high base, with the top plate and couplers each seated 3.5 threads into the unit below for a total height of 16 inches. The minimum height assembly consisted of a short top plate seated 3.5 threads into a short base for a total height of 2.5 inches. For the Hi-Tab Pedestal supports, two samples were tested for full face loading and six samples were tested for the quarter face loading. Compressive load was applied until failure was observed.

ASTM D 746 - Brittleness Temperature

Testing was conducted on materials from both the Elevator Pedestal assemblies and the Hi-Tab Pedestal samples. Forty samples were prepared in accordance with ASTM D 746 specimen Type II. Nominal dimensions of the shaft portion were 2.5mm width, 25.4mm length and 2.98mm depth for the Elevator Pedestal assemblies and 2.5mm width, 25.4mm length and 3.45mm depth for the Hi-Tab Pedestals. Testing was conducted on an apparatus as detailed in ASTM D 746 (S/N 85207, Calibration 07/31/08) with 2.5 minutes allowed for each 10 piece sample set to reach thermal equilibrium after submersion in the transfer medium. Results were determined in accordance with Section 11.2, *Alternative Graphic Method*. Graphs used to determine the 50% best fit failure point can be found in Appendix A.

ASTM D 1525 - Softening Temperature

Two samples were tested in accordance with ASTM D 1525 for both the Elevator Pedestal assemblies and the Hi-Tab Pedestals (nominal dimensions 12.7mm x 12.7mm by 2.9mm for the Elevator Pedestal assemblies and 12.7mm x 12.7 x 3.1mm for the Hi-Tab Pedestals). All specimens were conditioned for >40 hours at 23 ±2°C, 50 ±5% RH prior to testing. Load was applied in accordance with ASTM D 1525 Section 4.1: Loading 1 (10N). The silicone oil heat transfer medium began at a temperature of 30°C and was increased in accordance with ASTM D 1525 Section 4.1: Rate A (50°C per hour) until the loaded flat ended needle ($1mm^2$ circular cross section) had penetrated the test specimen to a depth of 1.0mm.

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Test Procedures: (Continued)

ASTM D 2240 - Durometer Hardness

Durometer hardness was determined for both the Elevator Pedestal assemblies and the Hi-Tab Pedestal samples. Mean durometer hardness was determined for each sample series in accordance with ASTM D 2240 specifications on a Shore D durometer (ICN Y000093). Four separate readings from six samples for each test series (24 total readings) were averaged to determine final mean hardness values.

ASTM D 412 - Tensile Strength

Five samples were prepared from EPDM Pedestal materials in accordance with ASTM D 412 Die C (mean cross sectional area 0.042 in^2). The samples were mounted on a SATEC Unidrive, Model MII 50 UD Universal Testing Machine (ICN Y002011) and tension was applied at a crosshead speed of 20 ±2 in/min until separation.

ASTM D 624 - Tear Strength

Five samples were prepared from EPDM Pedestal materials in accordance with ASTM D 624 Type C (mean median thickness of 0.191 in). The samples were mounted on a SATEC Unidrive, Model MII 50 UD Universal Testing Machine (ICN Y002011) and tension was applied at a crosshead speed of 20 ±2 in/min until separation.

Test Results Summary: The results are summarized in the following tables. A detailed accounting of results is located in Appendix A.

Load Bearing Capacity

Test Series	Sample Details		Loading Area	Average Peak Load (lb_f)
	Height	Components		
Elevator Pedestal	16 inch - Maximum Height without Bracing (Top Seated 3.5 Threads in Base)	High Top Plate, 2 Couplers, High Base	Full Face	3554
			1/4 Face Corner	2268
	2.5 inch - Minimum Height (Seated 3.5 Threads in Base)	Short Top Plate, Short Base	Full Face	7141
			1/4 Face Corner	1703
Hi-Tab Pedestal	Standard	Single Layer Hi-Tab Support	Full Face	9308
			1/4 Face Corner	6048

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Test Results Summary: (Continued)

ASTM D 746 - Brittleness Temperature

Product	Brittleness Temperature [1] (°C)
Elevator Pedestal	-60.6 (-77.1 °F)
Hi-Tab Pedestal	-49.8 (-57.6 °F)

[1] *Brittleness Temperature was graphically determined in accordance with ASTM D 746-07, Section 11.2, Alternate Graphic Method.*

ASTM D 1525 - Softening Temperature

Product	Mean Softening Temperature (°C)
Elevator Pedestal	153 (307 °F)
Hi-Tab Pedestal	145 (293 °F)

ASTM D 2240 - Shore Hardness

Product	Mean Hardness (Shore "D")
Elevator Pedestal	78
Hi-Tab Pedestal	71

ASTM D 412 - Tensile Strength

Test Series	Mean Values						
	Specimen Dimensions			Peak Load (lb_f)	Yield Stress (lb_f/in^2)	Tensile Strength (lb_f/in^2)	% Elongation
	Area (in^2)	Gage Length (in)					
		Initial	Post-Test				
EPDM Pedestals	0.0420	2.0	2.16	42.39	123.38	1008.73	5.8

ASTM D 624 - Tear Strength

Test Series	Mean Values			
	Specimen Dimensions		Peak Load (lb_f)	Tear Strength (lb_f/in)
	Configuration	Median Thickness (in)		
EPDM Pedestals	Type C	0.191	43.96	230.55

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Data sheets, representative samples of test specimens, a copy of this test report will be retained by Architectural Testing, Inc. for a period of four years from the original test date. At the end of this retention period such materials shall be discarded without notice and the service life of this report by Architectural Testing will expire. 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 Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.:

Digitally Signed by: Scott Scallorn

Scott D. Scallorn, Technician I
Components/Materials Testing

Digitally Signed by: Todd D. Burroughs

Todd D. Burroughs, Senior Project Engineer
Components/Materials Testing

SDS:sds/nlb

Attachments (pages) This report is complete only when all attachments listed are included.
Appendix A - Data Sheets (5)
Appendix B - Photographs (14)