



TEST REPORT

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Report Number: 2505-21009

Project No.: 35896

Report Issued: April 27, 2021

Client: Daldorado, LLC
4327 Arnold Avenue
Naples, Florida 34104

Contact: Jeff Berger

Source of Samples: The samples were shipped to IAPMO R&T Lab by Daldorado and were received in good condition on April 5, 2021 and April 20, 2021.

Date of Testing: April 7, 2021 through April 22, 2021.

Sample Description: Suction Fitting Outlet Assembly (SOFA) for use in swimming pools
See page no. 2 for complete SOFA series list.

Refer to figures for test configurations.

SOFA insulating material is Aurora Type AP4006AQWH1257 (NSF 50 Listed material)

Scope of Testing: The purpose of the testing was to determine if the SOFA samples molded from the alternate material from Aurora noted above met the requirements of section 4 of ANSI/APSP/ICC-16-2017 entitled, "Suction Outlet Fitting Assemblies (SOFA) for use in Pools, Spas, and Hot Tubs."

CONCLUSION: The samples tested of the SOFA models with alternate material from Aurora noted above from Daldorado, LLC COMPLIED with section 4 of ANSI/APSP/ICC-16-2017 entitled, "Suction Outlet Fitting Assemblies (SOFA) for use in Pools, Spas, and Hot Tubs."

Tested By,

Joseph Lee, Engineering Associate

Reviewed By,

Tony Zhou, VP-Electrical Engineering

All testing and sample preparation for this report was performed under the continuous, direct supervision of IAPMO R&T Lab, unless otherwise stated. The statement of compliance is based on the test results compared to the standard specifications without considering measurement uncertainty. The observations, test results and conclusions in this report apply only to the specific samples tested and are not indicative of the quality or performance of similar or identical products. Only the Client shown above is authorized to copy or distribute the report, and then only in its entirety. If presented with a copy of a Test Report without the IAPMO R&T Lab watermark background, contact IAPMO R&T Lab for verification. Any use of the IAPMO R&T Lab name for the sale or advertisement of the tested material, product or service is prohibited absent the advance written consent of IAPMO R&T Lab.

Model Number	Description
DalMAX-SG-183624	Manufactured sump DalMAX-SO-183624, two (2) DalMAX-GO-1818 grate model with DFS-DalMAX-SG fasteners, Floor: 1984GPM, Wall: 1440 GPM, Max Port Size = 8"
DalMAX-SG-183625	Manufactured sump DalMAX-SO-183625, two (2) DalMAX-GO-1818 grate model with DFS-DalMAX-SG fasteners, Floor: 1984GPM, Wall: 1440 GPM, Max Port Size = 8"
DalMAX-SG-183628	Manufactured sump DalMAX-SO-183628, two (2) DalMAX-GO-1818 grate model with DFS-DalMAX-SG fasteners, Floor: 2480GPM, Wall: 1909 GPM, Max Port Size = 10"
DalMAX-SG-183634	Manufactured sump DalMAX-SO-183634, two (2) DalMAX-GO-1818 grate model with DFS-DalMAX-SG fasteners, Floor: 2869GPM, Wall: 2080 GPM, Max Port Size = 12"
DalMAX-SG-185424	Manufactured sump DalMAX-SO-185424, three (3) DalMAX-GO-1818 grate model with DFS-DalMAX-SG fasteners, Floor: 2872GPM, Wall: 2872 GPM, Max Port Size = 10"
DalMAX-SG-185427	Manufactured sump DalMAX-SO-185427, three (3) DalMAX-GO-1818 grate model with DFS-DalMAX-SG fasteners, Floor: 2872GPM, Wall: 2872 GPM, Max Port Size = 10"
DalMAX-SG-185428	Manufactured sump DalMAX-SO-185428, three (3) DalMAX-GO-1818 grate model with DFS-DalMAX-SG fasteners, Floor: 2944GPM, Wall: 2872 GPM, Max Port Size = 12"
DalMAX-SG-185429	Manufactured sump DalMAX-SO-185429, three (3) DalMAX-GO-1818 grate model with DFS-DalMAX-SG fasteners, Floor: 2944GPM, Wall: 2872 GPM, Max Port Size = 12"
DalMAX-SG-185434	Manufactured sump DalMAX-SO-185434, three (3) DalMAX-GO-1818 grate model with DFS-DalMAX-SG fasteners, Floor: 4412GPM, Wall: N/A, Max Port Size = 14"
DalMAX-SG-242430*	Manufactured sump DalMAX-SO-242430, one (1) DalMAX-GO-2424 grate model with DFS-DalMAX-SG fasteners, Floor: 1734GPM, Wall: 1600 GPM, Max Port Size = 10"
DalMAX-SG-242412-03	Manufactured sump DalMAX-SO-242412, one (1) DalMAX-GO-2424 grate model with DFS-DalMAX-SG fasteners, Floor: 408GPM, Wall: N/A, Max Port Size = 3"
DalMAX-SG-242412-04	Manufactured sump DalMAX-SO-242412, one (1) DalMAX-GO-2424 grate model with DFS-DalMAX-SG fasteners, Floor: 712GPM, Wall: N/A, Max Port Size = 4"
DalMAX-SG-242412-06	Manufactured sump DalMAX-SO-242412, one (1) DalMAX-GO-2424 grate model with DFS-DalMAX-SG fasteners, Floor: 1664GPM, Wall: N/A, Max Port Size = 6"
DalMAX-FG-183624	Retrofit frame DalMAX-FO-1836, two (2) DalMAX-GO-1818 grate model with DFS-DalMAX-FG fasteners, Floor: 1984 GPM, Wall:1440 GPM, Max Port Size = 8"
DalMAX-FG-183625	Retrofit frame DalMAX-FO-1836, two (2) DalMAX-GO-1818 grate model with DFS-DalMAX-FG fasteners, Floor: 1984 GPM, Wall:1440 GPM, Max Port Size = 8"
DalMAX-FG-183628	Retrofit frame DalMAX-FO-1836, two (2) DalMAX-GO-1818 grate model with DFS-DalMAX-FG fasteners, Floor: 2480, Wall: 1909,Max Port Size = 10"
DalMAX-FG-183634	Retrofit frame DalMAX-FO-1836, two (2) DalMAX-GO-1818 grate model with DFS-DalMAX-FG fasteners, Floor: 2869 GPM, Wall:2080 GPM, Max Port Size = 12"
DalMAX-FG-185424	Retrofit frame DalMAX-FO-1854, three (3) DalMAX-GO-1818 grate model with DFS-DalMAX-FG fasteners, Floor: 2872 GPM,Wall: 2872 GPM, Max Port Size = 10"
DalMAX-FG-185427	Retrofit frame DalMAX-FO-1854, three (3) DalMAX-GO-1818 grate model with DFS-DalMAX-FG fasteners, Floor: 2872 GPM,Wall: 2872 GPM, Max Port Size = 10"
DalMAX-FG-185428	Retrofit frame DalMAX-FO-1854, three (3) DalMAX-GO-1818 grate model with DFS-DalMAX-FG fasteners, Floor: 2944 GPM,Wall: 2872 GPM, Max Port Size = 12"
DalMAX-FG-185429	Retrofit frame DalMAX-FO-1854, three (3) DalMAX-GO-1818 grate model with DFS-DalMAX-FG fasteners, Floor: 2944 GPM,Wall: 2872 GPM, Max Port Size = 12"
DalMAX-FG-185434	Retrofit frame DalMAX-FO-1854, three (3) DalMAX-GO-1818 grate model with DFS-DalMAX-FG fasteners, Floor: 4412 GPM,Wall: N/A, Max Port Size = 14"
DalMAX-FG-242430	Retrofit frame DalMAX-FO-2424, one (1) DalMAX-GO-2424 grate model with DFS-DalMAX-FG fasteners, Floor: 1734 GPM, Wall:1600 GPM, Max Port Size = 10"
DMD-FG-2424*	Retrofit frame DalMAX-FO-2424, one (1) DMD-GO-2424 grate model with DFS-FASTSET-MD-CU fasteners, Floor: 825 GPM,Wall: 825 GPM, Max Port Size = 8"

*Test models as representative for entire SOFA series.

Primary Standard: APSP 16-2017

Sections tested/evaluated:

- 3 Design, Materials, and Installation Requirements
- 4 Physical Testing

Test Results: All tests and evaluations were conducted per the written procedures in the specified standard.

APSP 16-2017

4 PHYSICAL TESTING

4.1 General – FOLLOWED/COMPLIED

4.1.1 Test Conditions. – FOLLOWED

All tests shall be conducted at an air and water temperature of $73.4^{\circ}\text{F} \pm 3^{\circ}\text{F}$ ($23^{\circ}\text{C} \pm 2^{\circ}\text{C}$).

Finding: All tests were conducted as noted above.

4.1.2 Test Procedure. – FOLLOWED

For the tests covered in this section a minimum of six cover/grates shall be tested in each test condition, unless otherwise stated. If the parts are made in different mold cavities, representative samples shall be taken from different mold cavities.

Finding: Six samples of each model, made from the same mold cavity were tested as noted above.

4.1.3 Test fixture. – FOLLOWED

The SOFA shall be installed in a rigid fixture that can support the cover/grate in a manner simulating the actual installation.

Finding: SOFAs were installed in a rigid wood frame as noted above.

4.1.4 Conditioning. – FOLLOWED

All specimens shall be kept at a temperature of $73.4^{\circ}\text{F} \pm 3^{\circ}\text{F}$ ($23^{\circ}\text{C} \pm 2^{\circ}\text{C}$) for at least 24 hours before testing.

Finding: All specimens were conditioned as noted above.

4.1.5 Crack detection. – FOLLOWED

After each physical test, the cover/grate shall be washed, rinsed with potable water, and dried prior to application of ink. After inking, the cover/grate shall be visually inspected in accordance with paragraph 4.1.7.

Finding: Crack detection was conducted as noted above.

4.1.6 Inking procedure. – FOLLOWED

The exposed surfaces of the cover/grate, as if installed in a pool, shall be rubbed with a sponge and a 50% solution of potable water and water-soluble contrasting color ink after the unit has been washed and dried. The ink shall be rinsed from the surface with potable water, and the cover/grate allowed to air dry before inspection.

Finding: Inking was conducted as noted above.

4.1.7 Inspection method. – FOLLOWED

The exposed surfaces of the cover/grate, as if installed in a pool, shall be inspected for defects without the use of visual aids, except for corrective lenses, from between 1 ft. and 2 ft. (305 mm and 610 mm). The light source shall be equivalent to an illuminance near the surface to be inspected of 150 fc $\pm$ 50 fc (1615 lx $\pm$ 540 lx).

Finding: All inspections were conducted as noted above.

4.1.8 Performance requirement. – COMPLIED

The fitting shall be free from cracks as determined by inspection in accordance with paragraph 4.1.7. The presence of seams, flow lines, and knit lines shall be permitted and shall not be considered to be cracks.

Finding: All test specimens were reviewed for cracks as noted above.

4.2 Ultraviolet Light Exposure Test – COMPLIED

Polymeric materials, including fiberglass reinforced plastics, used for the manufacture of cover/grates and other SOFA components that may be exposed to direct sunlight when installed in a pool shall meet the requirements of this section.

Either of two test methods shall be utilized to test for ultraviolet light degradation testing. Test Method 1 is suited for products small enough to fit into an ultraviolet (UV) test chamber, while Test Method 2 is suitable for all products.

If Test Method 1 is used, then the ultraviolet test and the structural tests are performed on fully assembled SOFAs.

If Test Method 2 is used, then the ultraviolet test is performed on two sets of “dog bone” samples molded per ASTM D638 from the same resin as the cover/grate. Set A is not exposed to UV light. Set B is exposed to UV light. In addition, all the applicable structural tests described in sections 4.3 through 4.8 are also performed on the as-sold samples. The performance requirement for those tests, however, shall be adjusted per paragraph 4.2.2.3.

Sumps and other SOFA components that are not exposed to direct sunlight when fully assembled and installed, per the cover/grate manufacturer’s installation instructions, shall not be required to meet the requirements of this section.

4.2.1 Test method 1. – NOT APPLICABLE

Twelve new cover/grates shall be exposed to ultraviolet light and water spray in accordance with 4.2.1.1, 4.2.1.2, 4.2.1.3, 4.2.1.4, 4.2.1.5 through 4.2.1.7:

4.2.1.1 720 hr. of twin enclosed carbon-arc (ASTM G153, Table X1.1 Cycle 1 except the Black Panel Temperature shall be 50 °C), or;

4.2.1.2 720 hr. of twin enclosed carbon-arc (ASTM G153, a programmed cycle of 20 minutes consisting of a 17-minute light exposure and a 3-minute exposure to water spray with light shall be used with a black-panel temperature of 63 $\pm$ 3 °C), or;

4.2.1.3 1,000 hr. of xenon-arc (ASTM G155, Table X3.1 Cycle 1 except the Black Panel Temperature should be 50 °C), or;

4.2.1.4 750 hr. of fluorescent (ASTM G154, Table X 2.1 Cycle 1 except the 8-hour UV shall be at a Black Panel Temperature of 50 °C and the 4 hour condensation Black Panel Temperature shall be 40 °C)

4.2.1.5 Cover/grates shall be mounted inside the test apparatus, with surfaces of the cover/grate that will be exposed after installation in a pool facing the UV lamps, and positioned so they receive exposure approximating a fully assembled SOFA. After the exposure test, the cover/grates shall be removed from the test apparatus and rejected if signs of deterioration such as cracking or crazing appear. Discoloration shall not be cause for rejection. The UV exposed samples shall then be retained under ambient temperature

of 73.4 ± 3 °F (23 ± 2 °C) for not less than 16 hours, and not more than 96 hours, before being subjected to the following tests:

- Floor-Mounted Fitting Load and Deformation Test
- Wall-Mounted Fitting Load and Deformation Test
- Point Load to Excess Test
- Shear Load Test
- Pressure Differential and Point Impact Test
- Pull Load Test

4.2.1.6 The intensification factor K shall be 1.0 for UV Test Method 1.

4.2.1.7 Performance requirement. Cover/grates that were subject to the UV Test Method 1 shall comply with all applicable performance requirements of the structural integrity tests in sections 4.3 through 4.8.

Finding: Test method 1 not followed. See test method 2.

4.2.2 Test method 2. – FOLLOWED

Specimens of the component polymeric materials shall be exposed to ultraviolet light in accordance with the options specified in paragraphs 4.2.1.1, 4.2.1.2, 4.2.1.3, or 4.2.1.4, and then to the tests specified in paragraphs 4.2.2.1 and 4.2.2.2. For Test Method 2, K is derived from paragraph 4.2.2.3.

4.2.2.1 Tensile strength. Specimens of non-exposed material (A) and UV-exposed material (B) shall be evaluated for tensile strength as described in the Standard Test Method for Tensile Properties of Plastics, ANSI/ASTM D638 (ISO 527-2) using Type 1 specimens of 0.125 in. $\pm$ 0.02 in. (3.2 mm $\pm$ 0.4 mm) thickness and testing speed of 0.2 in./min $\pm$ 0.05 in./min (5.1mm/min $\pm$ 1.3 mm/min.). The tensile strength is to be that value recorded at the yield point, if the material yields, or the value at the break point if the material breaks.

4.2.2.2 Impact. Specimens of non-exposed material (A) and UV-exposed material (B) shall be evaluated for impact strength as described in Method A of the Standard Test Methods for Impact Resistance of Plastics and Electrical Insulating Materials, ASTM D256 or ISO 180, using a 0.125-in (3.2-mm) thick specimen.

4.2.2.3 Performance requirement. Samples of the material shall retain at least 70% of the non-exposed value when the tests indicated in 4.2.2.1 and 4.2.2.2 are performed. An intensification factor K shall be defined as the inverse of the lowest retained proportion of the non-exposed value when the tests in paragraphs 4.2.2.1 and 4.2.2.2 are performed. The structural integrity tests described in sections 4.3 through 4.8 shall be conducted using non-UV exposed cover/grates attached to a SOFA at loadings equal to the base values multiplied by the intensification factor, K. For example, if 80 % of the tensile strength is retained in paragraph 4.2.2.1, and 85% of the Izod unit energy measured in paragraph 4.2.2.2 is retained, then $K = 1/0.80 = 1.25$.

Finding: The K factor of 1.36 was extended from NSF listing for Aurora Type AP4006AQWH1257.

4.3 Floor-Mounted SOFA Load and Deformation Test – COMPLIED

This test applies only to SOFAs intended for installation on the floor. Six cover/grates attached to a SOFA shall be tested at four locations. A point load machine readable to, at a minimum, 5 lbf (22 N) increments, and that is equipped with a steel tup of 2 in. (51 mm) minimum diameter, with a 2 in. $\pm$ 0.5 in (51 mm $\pm$ 13 mm) radius nose. A skin pad consisting of a 0.25 in. (6.35 mm) thick buna-n rubber pad of Shore A durometer 60 ± 5 hardness shall be placed between the tup and the cover/grate being tested.

4.3.1 Test method. – FOLLOWED

Cover/grates shall be from section 4.2.1 or new covers if Test method 2 from section 4.2.2 are used and tested as described in 4.3.1.1 through 4.3.1.3.

4.3.1.1 Each SOFA shall be mounted on a horizontal plane.

4.3.1.2 The steel tup and pad shall apply a vertical load at a total of four different locations on the cover/grate; two points midway between stiffeners, if any, and at two points furthest from any support element.

4.3.1.3 Using the tup and a 2 in. (5 mm) diameter skin pad on the face of the tup, and a tup speed of 0.20 in./min to 0.25 in./min (5.1 mm/min to 6.4 mm/min), apply a load at each of the above locations until 300 lbf x K $\pm$ 10 lbf (1334 N x K $\pm$ 44N) is reached.

4.3.2 Performance requirement – COMPLIED

Cover/grates and their SOFA support components shall not crack, or lose any material from the fitting, exclusive of plating or finish coatings.

Finding: Six SOFA samples of each model were tested to section 4.3.1, except a force of 408 lbf was applied for the K factor of 1.36. The samples did not deform, crack, or lose any material after the Floor Mounted SOFA Load and Deformation test was performed.

4.4 Wall-Mounted SOFA Load and Deformation Test – COMPLIED

This test applies to cover/grates intended for installation on a wall. Six covers/grates shall be tested and they shall be those from section 4.2.1 or new covers if Test method 2 from section 4.2.2 are used.

4.4.1 Test method. - FOLLOWED

The tests described in section 4.3.1 shall be performed with a load of 150 lbf. x K $\pm$ 5 lbf (667 N x K $\pm$ 22 N).

4.4.2 Performance requirement. – COMPLIED

The test specimens shall meet the performance requirements of section 4.3.2.

Finding: Test results were extended from section 4.3, where the SOFA samples were subjected to a force of 408 lbf.

4.5 Point Load to Excess Test – COMPLIED

The covers/grates to be tested shall be the six previously tested in sections 4.3 or 4.4, as applicable, with loads applied in accordance with section 4.3.

4.5.1 Test method. – FOLLOWED

The test equipment set-up and cover/grate mounting shall be as described in section 4.3. The SOFA shall be subjected to loading at a tup speed of 0.20 in./min to 0.25 in./min. (5.1 mm/min to 6.4 mm/min) until the tup protrudes through the cover/grate, or until a value of 600 lbf x K $\pm$ 10 lbf (2669 N x K $\pm$ 44 N) is reached.

4.5.2 Performance requirement – COMPLIED

Cover/grates shall not sustain loss of any material from the fitting, exclusive of plating or finish. Permanent deformation shall not be considered a failure.

Finding: The SOFA samples of both tested models did not sustain any loss of any material when subjected to a force of 816 lbf.

4.6 Shear Load Test on the Horizontal Edge of Wall Mounted Cover/Grate – NOT APPLICABLE

This test shall be applied to any cover/grate that protrudes 0.5 inch (13 mm) or more from the finished surface of the pool wall when installed per the manufacturer's installation instructions.

The six cover/grates to be tested shall be from section 4.2.1 or new covers if Test method 2 from section 4.2.2 are used.

4.6.1 Test method.

Each cover/grate shall be attached to a SOFA that is mounted in a manner simulating an actual installation as closely as possible. The loads transferred from the cover/grate to the rest of the SOFA and thence to the foundation shall represent the load paths of an actual installation.

4.6.1.1 The cover/grates shall be tested by the application of a 150 lbf x 5 lbf (667 N x 22 N) test load applied 30 degrees from the mounting plane.

4.6.1.2 The test load shall be applied by a steel plate that is ½ in. x 2 in. x 2 in. (12 mm x 51 mm x 51 mm), that is covered on its face with a 2 in. x 2 in. (51 mm x 51 mm) skin pad, as defined in section 4.3.

4.6.1.3 The six cover/grates shall be tested using the point load apparatus described in section 4.3.

4.6.1.4 Three cover/grates shall be tested with the load placed directly in line with the fasteners.

4.6.1.5 Three cover/grates shall be tested with the load midway between fasteners, when used.

Finding: Cover/grate is not intended to protrude more than 0.5 inch from the finished surface of the pool.

4.6.2 Performance requirement. – NOT APPLICABLE

The cover/grate shall not remain in place and not crack, or loose any material exclusive of plating or finish.

Finding: Cover/grate is not intended to protrude more than 0.5 inch from the finished surface of the pool.

4.7 Pressure Differential and Point Impact Test –COMPLIED

The cover/grates to be tested in this section shall be the six previously tested in section 4.6.

4.7.1 Test method. – FOLLOWED

Each cover/grate shall be mounted in a manner simulating an actual installation as closely as possible. The loads transferred from the cover/grate to the rest of the SOFA and thence to the foundation shall represent the load paths of an actual installation. Pressure or vacuum may be used to develop the differential pressure that is required, the magnitude of which is determined by the value of K.

4.7.1.1 The cover/grate shall be covered with a 20-mil (0.5 mm) plastic material or other suitable material.

4.7.1.2 The cover/grate shall be subjected to an external differential pressure of 28.5 inHg x K ± 1 inHg (724 mmHg x K ± 25 mmHg) differential pressure within 60 s ± 5s.

4.7.1.3 The differential pressure shall be sustained for 5 min ± 10 s.

4.7.1.4 The vacuum or pressure shall be removed from the system, the plastic film shall be removed, and the cover/grate shall be impacted at 15 ft-lbf x K (20.3 J x K) using the test method in ASTM D2444, with a 5 lbm. (2.3 kg) steel tup, 2 in. (51 mm) minimum diameter with a 2 in. ± ½ in. (51 mm ± 13 mm) radius nose.

4.7.1.5 The tup shall be dropped onto the center of the fitting from 3 ft. x K (914 mm x K).

4.7.1.6 The cover/grate shall again be subjected to the 28.5 inHg x K ± 1 inHg (724 mmHg x K ± 25 mmHg) differential pressure within 60s ± 5s.

4.7.1.7 The differential pressure shall be sustained for an additional 5 min ± 10 s).

4.7.1.8 Remove the sample from the test fixture, and then apply water-soluble contrasting ink in accordance with paragraphs 4.1.5 through 4.1.8.

4.7.1.9 The components shall then be inspected for cracks, breaks, or fractures in accordance with paragraph 4.1.7.

Finding: Sections 4.7.1.1 to 4.7.1.9 were followed except a vacuum of 26.5 inHg plus a weight of 3470 lbs was applied to achieve a K factor of 1.36. A 2.3 kg steel tup was dropped from a height of 4.08 ft to impact the cover/grates at 20.4 ft-lbf for the K factor of 1.36.

4.7.2 Performance requirement. –COMPLIED

4.7.2.1 The cover/grate shall remain in place after the test procedures in paragraphs 4.7.1.1 through 4.7.1.7.

4.7.2.2 The components shall not permanently deform, crack or lose any material from the fitting, exclusive of plating or finish.

Finding: The cover/grate samples remained in place and the components did not permanently deform, crack, or lose any material.

4.8 Pull Load Test – COMPLIED

Pull Load Testing shall be required of all cover/grates with openings with at least two dimensions of 0.375 in. (9.53 mm) or greater. The cover/grates to be tested shall be the six previously tested in section 4.7.

4.8.1 Test method. – FOLLOWED

The cover/grate shall be installed on a SOFA per the manufacturer's installation instructions. A total force of 150 lbf x K $\pm$ 5 lbf (667 N x K $\pm$ 22 N) shall be applied to the underside of the cover/grate, and perpendicular to the mounting surface, in locations that will approximate the load bearing points available to a bather's finger(s). The test shall be conducted once adjacent to fasteners, and conducted once midway between adjacent fasteners. The test apparatus used shall apply an equal load to each bearing location.

Finding: SOFA covers were tested to a force of 204 lbf at the locations noted above.

4.8.2 Performance requirement – COMPLIED

4.8.2.1 The cover/grate shall withstand a 150 lbf x K (667 N x K) pulling force.

4.8.2.2 Distortion under load shall not compromise the fastener(s), loosen the cover/grate, or cause permanent deformation exceeding 0.03 in. (0.76 mm). Metal cover/grates are exempt from the deformation requirements.

4.8.2.3 The cover/grate shall be free from cracks as determined by inspection in accordance with paragraph 4.1.7.

Finding: The SOFAs remained in place and did not permanently deform, crack, or lose any material.

4.9 Mold Stress Relief Distortion – NOT APPLICABLE

4.9.1 High ambient temperatures.

One sample, non-UV exposed cover/grate, assembled with any other SOFA component(s) as intended for shipping and distribution, shall be placed in a full draft circulating air oven for 7 hours, and then be allowed to return to room temperature before being assembled and installed in the SOFA mounting surface.

4.9.2 Test sample.

This sample shall be used for the Hair Entrapment Tests, section 5, and Body Entrapment Tests, section 6.

Finding: The samples are only intended for testing to section 4.

4.10 Threaded Fastener Test – COMPLIED

4.10.1 Female receptacle. – FOLLOWED

Each female thread or thread receptacle shall be tested to the maximum torque specified by the manufacturer.

4.10.1.1 The test shall be performed 15 times.

4.10.1.2 A torque-limiting driver shall be used.

4.10.1.3 The test shall be performed on the SOFA assembled per the manufacturer's instructions.

4.10.1.4 The screws shall be removed manually and started manually each time.

4.10.1.5 The screws and receptacles shall be at a temperature of $73.4^{\circ} \pm 3^{\circ}\text{F}$ ($23^{\circ}\text{C} \pm 2^{\circ}\text{C}$).

4.10.1.6 The use of multiple screws shall be permitted to complete this test.

Finding: Tests extended from test report no. 21008-004. The fasteners and threaded inserts are identical. Only changes to the cover material. The procedure noted above was followed except that a representative sample of 2 out of 4 threaded inserts were tested because they are identical. In addition, 2 out of 4 concrete anchors were tested.

4.10.2 Performance Requirement. – COMPLIED

The female receptacle shall not strip or crack, and the fastener head shall not cause cracking of the cover/grate. Threaded inserts shall not strip, twist, or pull out of the SOFA component.

Finding: Tests extended from test report no. 21008-004. The fasteners and threaded inserts are identical. Only changes to the cover material. The threaded inserts and anchors did not strip or crack and the cover/grate did not crack.

Photograph of tested sample:



Fig. 1 – SOFA model DalMAX-GO-2424 model DMD-GO-2424



Fig. 2 – SOFA model DMD-GO-2424