



ENGINEERING LABORATORY TEST REPORT

Location of testing: NSF International
789 Dixboro Road
Ann Arbor, MI 48105

NSF Job Number(s): J-00086807

Client: Mr. Robert Lawson
Lawson Aquatics, Inc.
Shenzhen Xin Mao Industry, Co., Ltd.
Huanghuai Road, B/C 3F Futian
Shenzhen, Guangdong 518038
China

Description of Test Sample: 24" x 24" Submerged Suction Outlet Cover

Date(s) of Test: March 31 – April 6, 2010

Test Standard: ASME A112.19.8b-2009 "Suction Fittings for Use in
Swimming Pools, Wading Pools, Spas, and Hot Tubs".

Conclusion: The samples successfully completed a Vertical Load and
Deformation Test, and a Point Load to Excess Test.

Report Date: April 14, 2010

Report Status: **Pass**

Technical Responsibility Sal Aridi
Sal Aridi, P.E., Manager, Engineering Lab

Digitally signed by Sal Aridi
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Date: 2010.04.14 16:12:46 -0400

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Scope of Test Report

This report consists of an evaluation of a 24-inch by 24-inch square Lawson submerged suction fitting to the Vertical Load and Deformation Test, and a Point Load to Excess Test per the client's request.

1 General

1.1.2 – Definition

The suction fitting is defined as all components, including the body cover/grate, and hardware. The information and test results contained in this report apply only to the components and assembly listed below:

Suction Fitting:	24" x 24" Square Main Drain Cover, Model MD-GO-CU
Fastener Clip:	Stainless Steel fastener clip, Model MD-FAST-CLIP
Support Ring:	24" x 24" with dimensions shown below in Figure 3



Figure 1 –Suction Fitting



Figure 2 - Fastener and Clip

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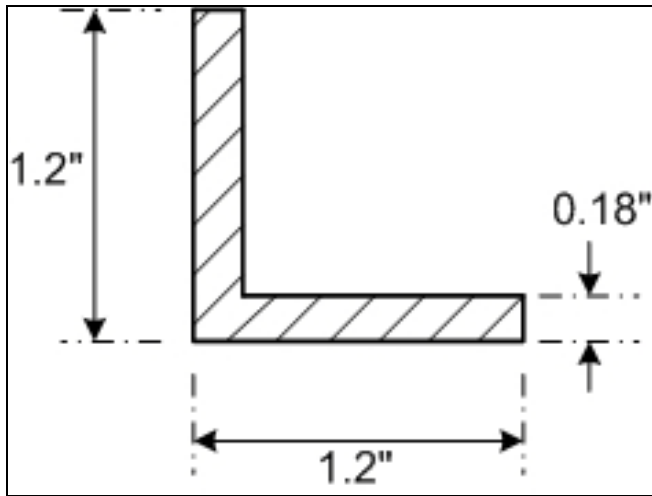


Figure 3 - Cross Section of Support Ring



Figure 4 - Data Plate

1.1.6 – Types of Suction Fittings

The sample tested is a Submerged Suction Outlet, as defined in section 1.1.6.5 of the referenced standard.

1.1.7 – Single or Multiple Usage

The sample was permanently marked as the following (per the manufacture's option):

Table 1 - Single or Multiple Usage

For Single or Multiple Drain Use	X
For Single Drain Use	
For Multiple Drain Use Only	

3 Physical Testing

3.2 Ultraviolet Light Exposure Test (Completed Under NSF PSF J-00078228)

3.2.2 Test Method 2

The tensile strength and Izod impact toughness of the sample material was measured using specimens molded from the same material as the sample under test. Additional tensile strength and Izod impact toughness samples of the same material were then exposed to ultraviolet light according to the conditions listed below in Table 2. The tensile strength and Izod impact toughness of the UV exposed samples were

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measured per the requirements of the referenced standard. The tensile strength and Izod impact toughness for the virgin and UV exposed material samples are shown below in Table 3.

Table 2 - UV Exposure Conditions

Exposure Cycle	8 hours UVA-340 @ 60°C, 4 hours Condensation @ 50°C
UV Irradiance	0.89 W/m ² /nm
Exposure Duration	750 hours

Table 3 - Average Tensile and Izod Data

Property	Virgin Material	UV Exposed Material	% Retained
Izod Impact Toughness (ft.-lbs./in)	42.8	41.2	96.3
Tensile Strength (psi)	30185	30933	102.5

3.2.2.3 Performance Requirement

The material samples are required to retain at least 70% of the tensile strength and Izod impact toughness. An Intensification Factor, K, is defined as the inverse of the lowest retained proportion. The base loading values in the applicable structural integrity tests of the referenced standard are then multiplied by the Intensification Factor. The structural integrity tests, with intensified loads, are then performed on non-UV exposed samples.

Degradation was noted in the Izod impact toughness as a result of ultraviolet light exposure. For all applicable structural integrity tests, a K value of 1.04 was used, which was calculated using the equation below.

Intensification Factor, $K = 1 / \text{Percent Izod Impact Toughness Retained}$

Intensification Factor, $K = 1 / 0.963$

Intensification Factor, $K = 1.04$

3.3 Vertical Load and Deformation Test

A load of 312 pounds was applied to multiple locations of six non-UV exposed suction fitting samples using the procedure and equipment defined in section 3.3.1 of ASME A112.19.8b-2009.

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3.2.2 Performance Requirement

The acceptance criterion of this test requires that the suction fittings shall not permanently deform, crack, or lose any material. The results of this test are located below in Table 4.

Table 4 - Vertical Load and Deformation Test

Sample	Permanent Deformation, Cracking, or Material Loss
1	No
2	No
3	No
4	No
5	No
6	No

3.5 Point Load to Excess Test

A load of 624 pounds was applied to the six suction fitting samples from the Vertical Load and Deformation Test using the procedure and equipment outlined in 3.5.1 of ASME A112.19.8b-2009.

3.5.2 Performance Requirement

The acceptance criterion of this test requires that the suction fittings shall not sustain any loss of material; however, permanent deformation is not considered a failure. The results of this test are located below in Table 5.

Table 5 - Point Load to Excess Test

Sample	Cracking or Permanent Deformation (Y/N)	Loss of Material (Y/N)
1	No	No
2	No	No
3	No	No
4	No	No
5	No	No
6	No	No

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3.6 Shear Load Test

The sample did not project from the mounting plane when installed according to the manufacturer's instructions. The shear load test was not performed on the sample in accordance with 3.6.1 of ASME A112.19.8b-2009.

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