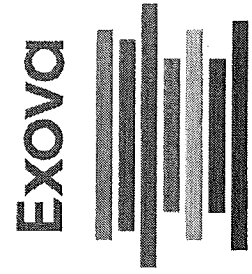


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Testing. Advising. Assuring.

**Physical Testing on Hot Tub Cover Sample
ASTM F 1346 – 91 (Reapproved 2010)**

A Report to:	PSP Fabricating 11 Morrow Road Barrie, Ontario L4N 3V7
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Report No.:	15-06-C0107 6 Pages, 9 Figures
Proposal No.:	15-006-345292
Date:	July 14, 2015

1.0 INTRODUCTION

At the request of PSP Fabricating, Exova performed Physical Testing on a Hot Tub Cover sample, in accordance with ASTM F 1346 – 91 (Reapproved 2010), Standard Performance Specification for Safety Covers and Labelling Requirements for All Covers for Swimming Pools.

PSP Fabricating submitted one (1) hot tub cover sample for testing. The as received sample was allocated with the Exova Sample Number below.

<u>Exova Sample #</u>	<u>Pool Cover Taper</u>	<u>Material</u>	<u>Pool Cover Size</u>
15-06-C0107-1	4 in to 3 in	Foam 1.5 lbs/sq-ft	75 in x 80 in

2.0 OBJECTIVES

The objective of the proposed work was to provide information needed to evaluate the compliance of the hot tub cover sample with ASTM F 1346 -91 (Reapproved 2010) requirements.

3.0 INSTRUMENTATION

The following instruments were used to conduct all the tests performed:

Weight scale	MII # A04941
Measuring tape	MII # B10834
SHIMPO force gage	MII # B07149

4.0 TEST PROCEDURE

4.1 Strength, Deflection, Drainage and Safety Tests

All required tests were performed in accordance with ASTM F 1346 – 91 (Reapproved 2010), Sections 7.1, 7.2, 7.3, 7.4, 9.1, 9.2, 9.3, 9.4 and their subsections. The photo of the sample installed on a hot tub before testing is presented in Figure 1. The detailed testing procedures are described below:

4.1.1 Static Load Test (Sections 7.1.1 and 9.1)

The sample was tested installed on a 75 in x 80 in rectangular hot tub (fitted to its waterline). Two weights of 225 lbs and 50 lbs distributed on 1 sq-ft each, all weights within 3 feet radius, simulating a rescue operation, were placed at the centre location (2 positions). The weights were allowed to remain at the test position for 5 minutes.

The hot tub cover sample shall not exhibit any damage or failure as a result of the load application.

The photos of the test set-up are presented in Figures 2 and 3.

4.1.2 Perimeter Deflection Test (Sections 7.2 and 9.2)

A weight of 50 lbs was placed on the hot tub cover sample at centre-span. The ellipsoidal test object (Figure 2 from ASTM F 1346-91) shall not pass through any openings, gain access to the water or be subject to entrapment between the cover and the side of the pool.

The photos of the test set-up are presented in Figures 4 and 5.

4.1.3 Surface Drainage Test (Sections 7.3 and 9.3)

The Timmy manikin was placed at 2.5 feet from the edge on hot tub cover sample and the amount of water after three minutes at manikin location was evaluated. The test was continued by spraying water for 30 minutes on the hot tub cover at an approximate rate of 0.41 gal/min (corresponding to requirement of 10 gal/min/1000 sq-ft and based on hot tub cover size of 41 sq-ft) and the amount of water at manikin location was evaluated after 30 minutes.

The photos of the test set-up are presented in Figures 6 and 7.

4.1.4 Openings Test (Sections 7.4 and 9.4)

The opening test object (as described in section 9.4.2) shall not pass through any openings when a force of 40 lbs is applied. All openings shall be tested.

The photo with example of the test set-up is presented in Figure 8.

4.2 Labeling and Identification Tests

All required tests were visually performed in accordance with ASTM F 1346 – 91, Sections 5.1, 5.2, 5.3, 6.1, 6.2, 6.3, 6.4, 6.5, 8.1, 8.2, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9, 8.10, 8.11, 8.13 and their subsections.

5.0 RESULTS

The tests results are presented below.

5.1 Strength, Deflection, Drainage and Safety Tests

5.1.1 Static Load Test (Sections 7.1 and 9.1)

The hot tub cover sample was inspected at the completion of the static load test (performed at the described location) and no failure was observed. The sample passed the test requirement.

5.1.2 Perimeter Deflection Test (Sections 7.2 and 9.2)

When the required 50 lbs load was applied there were no openings on the hot tub cover or between the hot tub cover and hot tub edges. The perimeter test object cannot pass through, gain access to the water or be entrapped between the cover and the side of the hot tub. The sample passed the test requirement.

5.1.3 Surface Drainage Test (Sections 7.3 and 9.3)

After three minutes with the manikin placed on the hot tub cover sample, there was no water at manikin location. When the water was sprayed on hot tub cover, there was no water at manikin location. The sample passed the test requirements.

5.1.4 Openings Test (Sections 7.4 and 9.4)

There were no openings on the hot tub cover or between the hot tub cover and hot tub edges. The sample passed the test requirement.

5.2 Labeling and Identification Tests

The results for the visual inspection of labeling and identification are presented in Table 1 below.

Table 1: Labeling and Identification Results

Section	Requirement Description	Observations	Results
5	Materials and Manufacture		
5.1	Only materials not known to be harmful to health, within the intended application, shall be used.	- non-reactive polyester material label	Complies
5.2	All materials and components shall be durable and satisfactory for the intended purpose under the conditions normally prevailing at the site.	- not performed, new test sample provided	N/A
5.3	The cover shall be manufactured in accordance with generally accepted, good manufacturing practices.	- not performed	N/A
6	General Requirements for Safety Covers		
6.1	Installation/Use of safety covers – detailed instructions for installation shall be given in a form included in the packaging or a label, or both, attached to the cover.	- safety cover is provided installed	Complies
6.2	Labels attached to the cover shall meet the general requirements described in 8.5.1 and 8.8 – 8.8.2.	- see Sections 8.5.1 and 8.8 to 8.8.2 - see Figure 8	Complies
6.3	Markings shall include: - manufacturer's name - date manufactured - instructions to inspect the cover for premature wear or deterioration	- all required instructions provided - manufacturer name on label - manufacturing year on cover label - inspection recommendations on label	Complies

Table 1: Labeling and Identification Results - Continuation

Section	Requirement Description	Observations	Results
6	General Requirements for Safety Covers		
6.4	Fastening mechanisms and devices shall include special tools to inhibit children under five years of age from removing or operating the cover. When subjected to the tests described in 9.1 and 9.2 fastening devices shall remain in their intended, secured position. The intended performance of the device shall not be impaired after the tests described in 9.1 and 9.2.	<ul style="list-style-type: none"> - fastening devices include proprietary keys to inhibit children from removing the cover - when subjected to the tests described in 9.1 and 9.2, the fastening devices remained in their intended position and their performance was not impaired as a result of tests performed 	Complies
8	Minimum Label Requirements		
8.1	Product label – All covers shall be labelled to identify manufacturer or other responsible parties Labels attached to covers shall meet the requirements described in 8.5.1 and 8.8 – 8.8.2.	<ul style="list-style-type: none"> - cover labelled with manufacturer's name (see Figure 9) 	Complies
8.2	Warning labels should contain: <ul style="list-style-type: none"> - signal word: WARNING - safety alert symbol - word message: AVOID DROWNING RISK - additional word message statement 	<ul style="list-style-type: none"> - labels contain all required specifications (see Figure 9) 	Complies
8.4	Colour – Safety cover warning label – Panel colours contrast with the lettering of the label.	<ul style="list-style-type: none"> - the colour used is black letters on white overall background and orange background for WARNING 	Complies
8.5	Warning label shall be: <ul style="list-style-type: none"> - of a size that enables a person to read the safety sign - signal word shall be at least 50% greater than the message panel wording. - safety alert symbol shall precede the signal word. - word message letter height shall be as defined in Table 1. 	<ul style="list-style-type: none"> - safety sign easy readable - signal word 50% greater than message panel wording - safety alert precede the signal word - letter height as defined in Table 1, for safe viewing distance greater than 96 in 	Complies
8.6	Letter style: <ul style="list-style-type: none"> - signal word in sans serif letters in upper case only. - message panel in sans serif letters. - acceptable lettering style: medium or bold helvetica, or news gothic bold. 	<ul style="list-style-type: none"> - signal word in sans serif letter in upper case only - message panel in sans serif letters - letters bold Arial 	Complies

Table 1: Labeling and Identification Results - Continuation

Section	Requirement Description	Observations	Results
8.7	Placement – Location should be that the message will: - be readily visible for the intended viewer - alert the viewer to the potential hazard - label located so as not to be removed in the fitting process	- label visible for the intended viewer - alerts the viewer to the potential hazard - label not removed in the fitting process	Complies
8.8	Life expectancy – Shall have a reasonable life expectancy with good colour stability.	- not tested, new sample provided	N/A
8.9	Replacement – Shall be replaced by the product user when they no longer meet legibility requirements.	- product price list includes replacement labels at no charge to client	Complies
8.10	Instruction/Use Label – Any product instructions not attached to the product shall contain on its items the same applicable warning label as set forth in 8.2 – 8.3.6.	- no installation guide; product is delivered pre-installed	N/A
8.11	Packaging label – If packaging is intended for product display to the consumer, applicable warning label as described in 8.2 – 8.6.3 shall be placed on the printed side of the package intended for display.	- packaging not intended for product display	N/A
8.12	Compliance labelling – All labels shall note the specific cover classification.	- labels identify the specific cover classification of manual safety cover (see Figure 9)	N/A

The physical testing and evaluation were performed at Hydropool in Mississauga, Ontario on June 18, 2015.

The tested sample was returned to the client for further assessment.

Reported by:



Daniel Dubecky
Inside Sales Representative
Products Testing Group

Reviewed by:



Daniel Chira, P.Eng., C.E.T.
Project Manager, Component Testing
Products Testing Group

Figures

(5 Pages)



Figure 1: Sample before testing installed on a hot tub

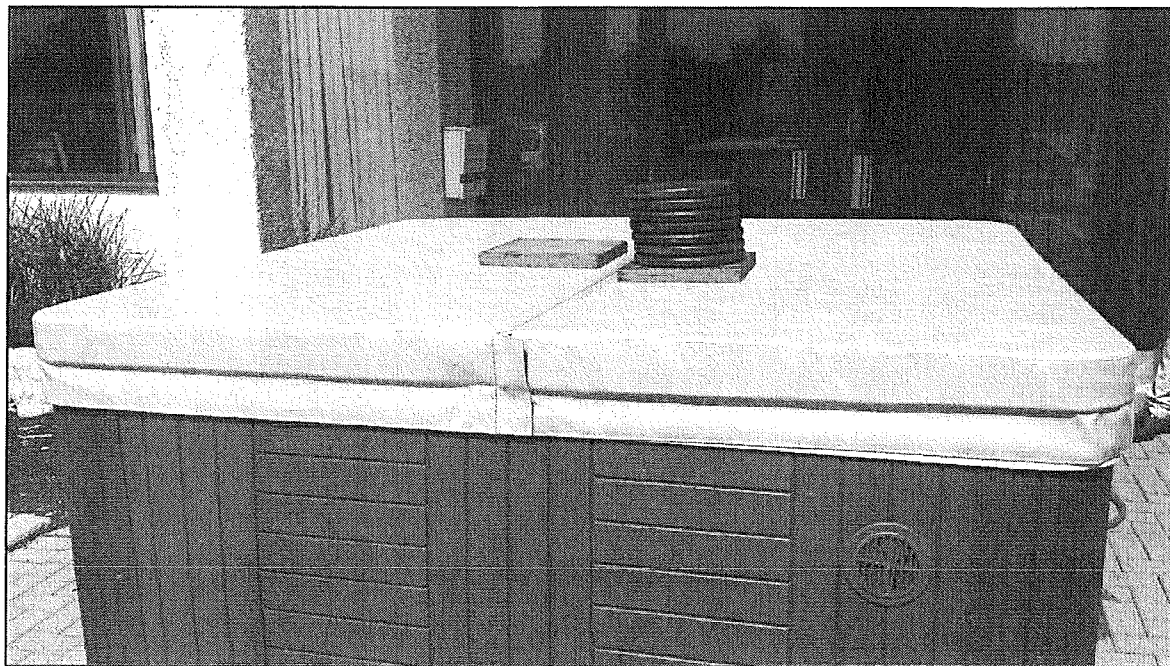


Figure 2: Static load test set-up – Centre location – Weight position # 1

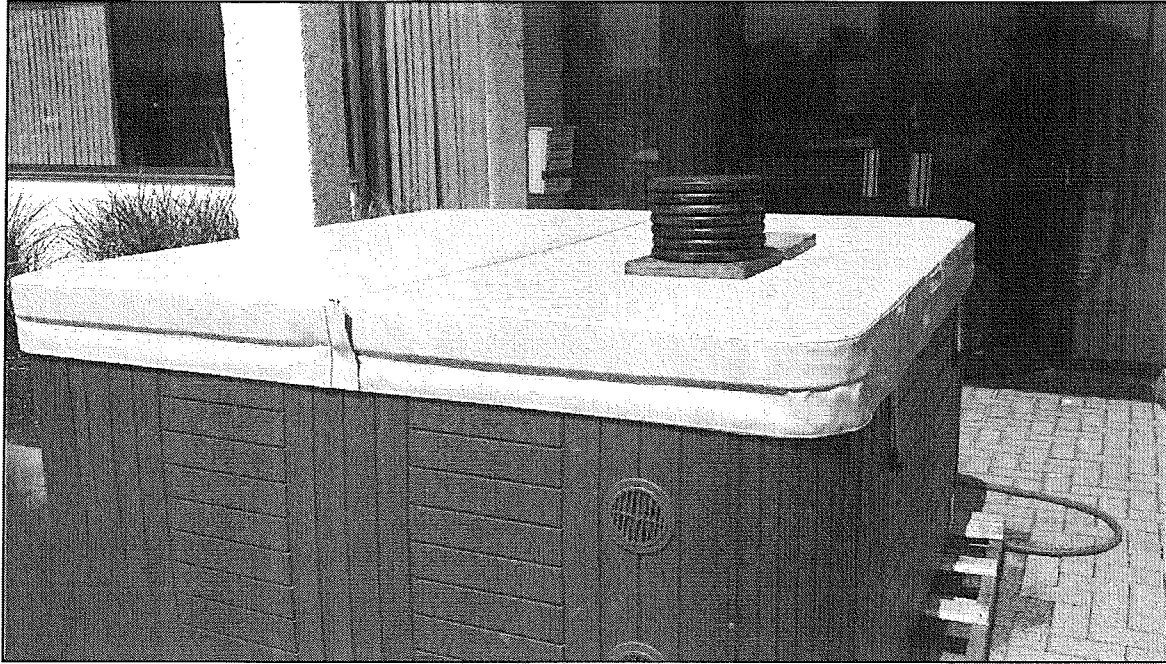


Figure 3: Static load test set-up – Centre location – Weight position # 2

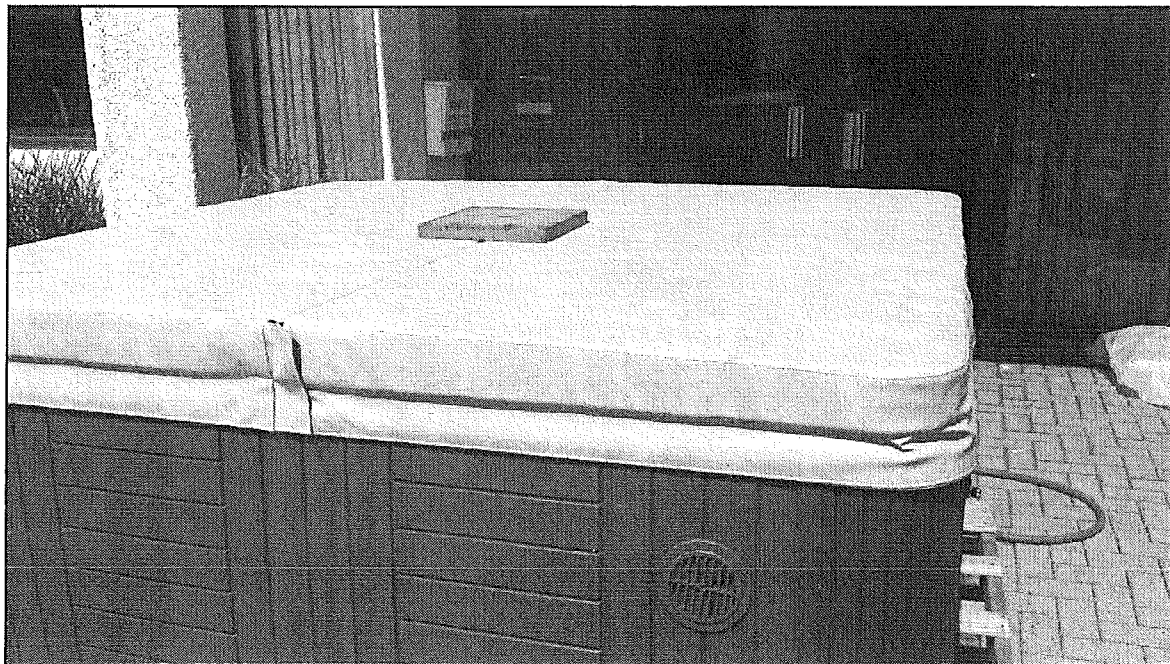


Figure 4: Perimeter deflection test set-up – Weight at centre span

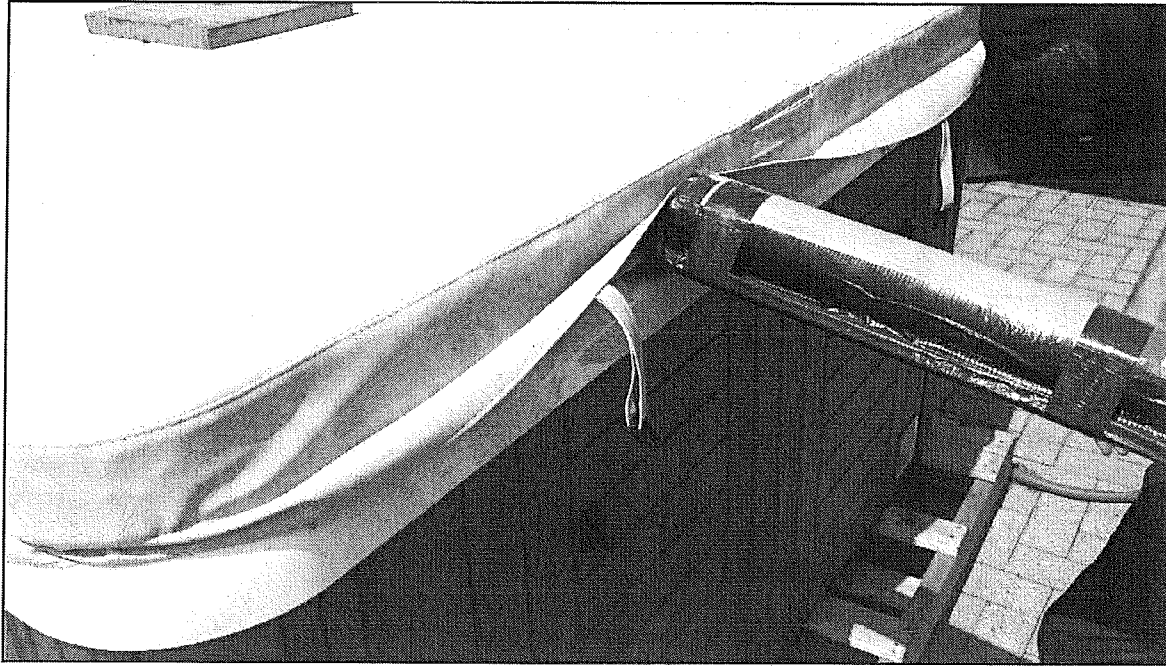


Figure 5: Perimeter deflection test set-up – Ellipsoidal test object placed against opening

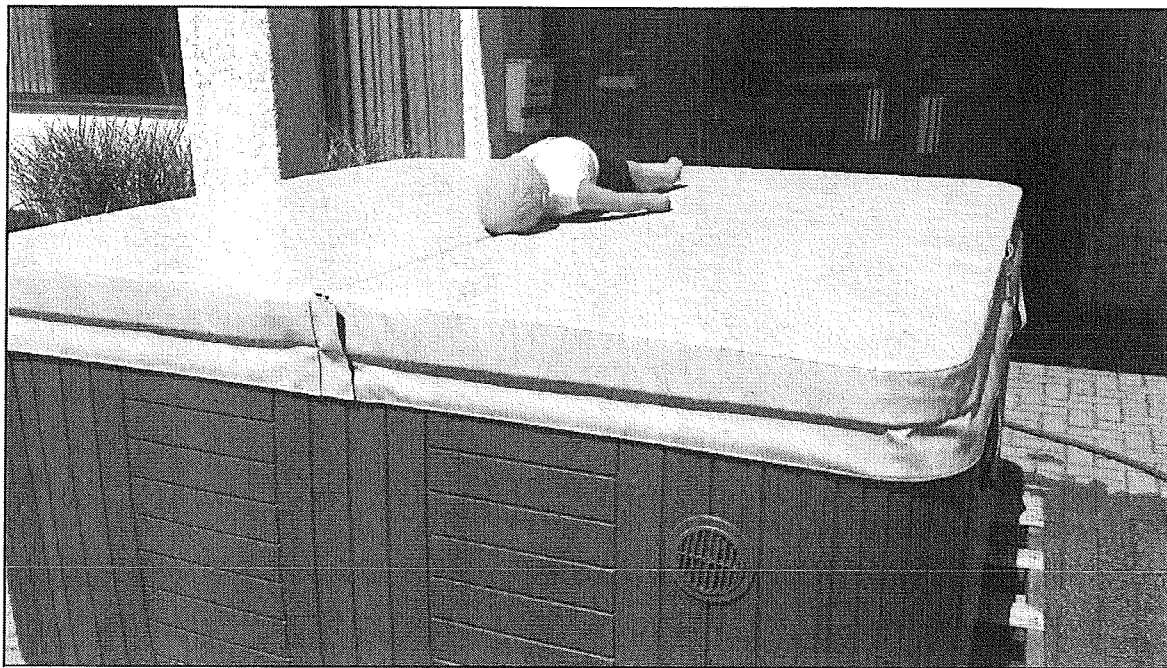


Figure 6: Surface drainage test set-up – Manikin after 3 minutes

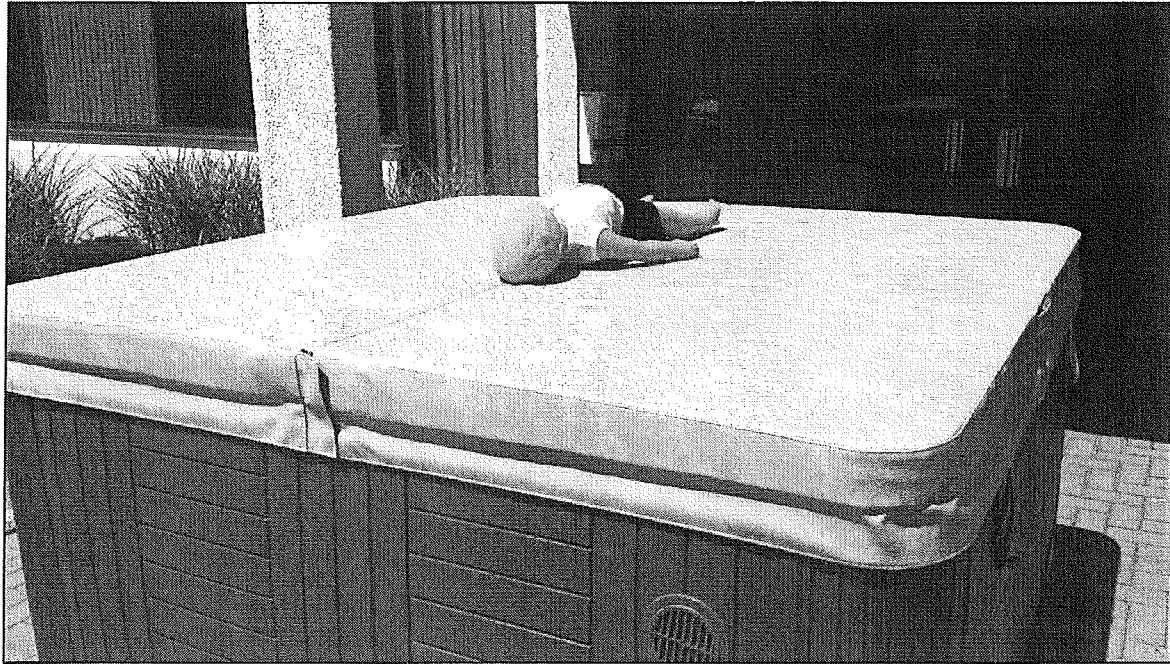


Figure 7: Surface drainage test set-up– Manikin after 30 minutes water spray

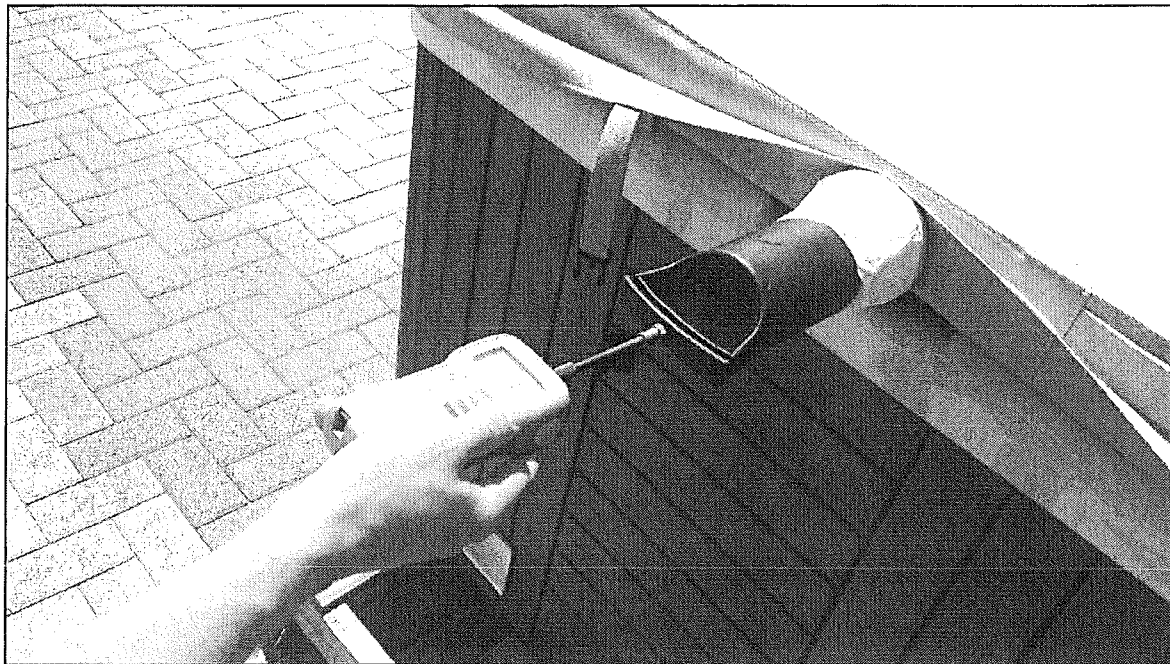


Figure 8: Example of opening test set-up

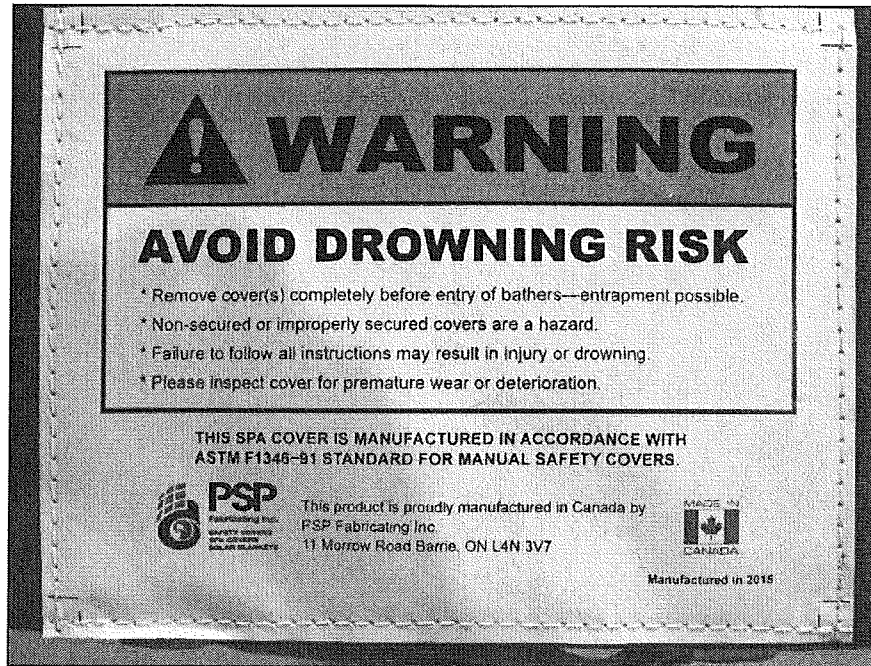


Figure 9: Label attached to hot tub cover