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February 27, 2015

Heilux LLC

Walter Paciorek
10200 Valley View
Suite 100
Eden Prairie, MN 55344

Intertek Test Report: 102025677CRT-001T

Dear Mr. Paciorek,

Intertek has completed our testing of the Lumafilm Light Sheet Model LS1001S, to the indicated requirements of **IEC Standard for Luminaires – Part 1: General Requirements and Tests, IEC 60598-1 Edition 8, Issued May 2014.** The test sample was received on February 23, 2015 in good condition. The evaluation was performed at Intertek, Cortland, NY from February 25 through February 27, 2015. The results of these tests are indicated as follows:

Standard	Clause	Test Completed	Pass / Fail
IEC 60598-1	9.2.2	Protection against Solid Foreign Objects (IP6X)	Pass
IEC 60598-1	9.2.6	Powerful Water Jet-proof luminaires (IPX5)	Pass

The Lumafilm Light Sheet Model LS1001S, was found to be in compliance with the indicated requirements of **IEC Standard for Luminaires – Part 1: General Requirements and Tests, IEC 60598-1 Edition 8, Issued May 2014.** This Test Report concludes the work anticipated for this phase of your project under Intertek quote number 500581158. See attached data for testing details. If there are any questions regarding this report please contact Dana Magnuson at 607-758-6494, or Dana.Magnuson@intertek.com.

Reported by

Dana Magnuson

Associate Engineer

Reviewed by

Henriette Bullmer

Engineering Team Lead



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Intertek Testing Services NA, Inc.

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Test Data

Client: Heilux LLC Engineer: Dana Magnuson *DM* Date: 2/27/2015
 Job No.: G102025677 Tested By: Dana Magnuson *DM* Date: 2/27/2015
 Product: Lumafilm Light Sheet Reviewed By: Henriette Bullmer *HB* Date: 2/27/2015
 Model No.: LS1001S Standard(s): IEC 60598-1, 8th Ed., Issued May, 2014
 Sample Control Number(s): CRT1502230953-001 Report No.: 102025677CRT-001T

Contents				
Page	Standard	Clause	Test Description	Pass/Fail
1	NA	NA	Report	NA
2	NA	NA	Tests to be Performed	NA
2	NA	NA	Sample Description	NA
2	NA	NA	Equipment used	NA
3	NA	NA	Sample Photos	NA
4	IEC 60598-1	9.2.2	Protection against Solid Foreign Objects (IP6X)	Pass
5	IEC 60598-1	9.2.6	Powerful Water Jet-proof luminaries (IPX5)	Pass

Test sample numbers and descriptions				
Sample #	Intertek Id	Description	Manufacturer	Model #
1	CRT1502230953-001	Lumafilm Light Sheet	Heilux LLC	LS1001S

Test Equipment			
#	Intertek Id	Description	Cal. Due
1	T1417	Temperature/Humidity datalogger	8/5/2015
2	O747	Dielectric Tester	10/8/2015
3	W229	IP Test Fixture	1/30/2016
4	W229-1	Pressure Gauge	1/30/2016
5	W229-2	6.3 mm Nozzle	1/30/2016
6	N1341	Timer	8/6/2015
7	M211	Multimeter	9/2/2015

Test Data

Client:	<u>Heilux LLC</u>	Engineer:	<u>Dana Magnuson <i>DM</i></u>	Date:	<u>2/27/2015</u>
Job No.:	<u>G102025677</u>	Tested By:	<u>Dana Magnuson <i>DM</i></u>	Date:	<u>2/27/2015</u>
Product:	<u>Lumafilm Light Sheet</u>	Reviewed By:	<u>Henriette Bullmer <i>HB</i></u>	Date:	<u>2/27/2015</u>
Model No.:	<u>LS1001S</u>	Standard(s):	<u>IEC 60598-1, 8th Ed., Issued May, 2014</u>		
Sample Control Number(s):	<u>CRT1502230953-001</u>	Report No.:	<u>102025677CRT-001T</u>		

Photo 1-Model LS1001S

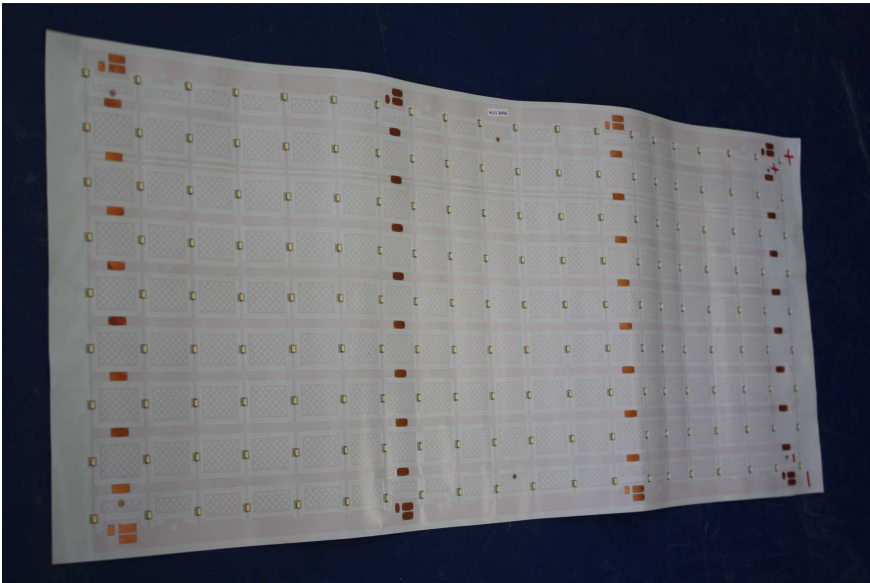
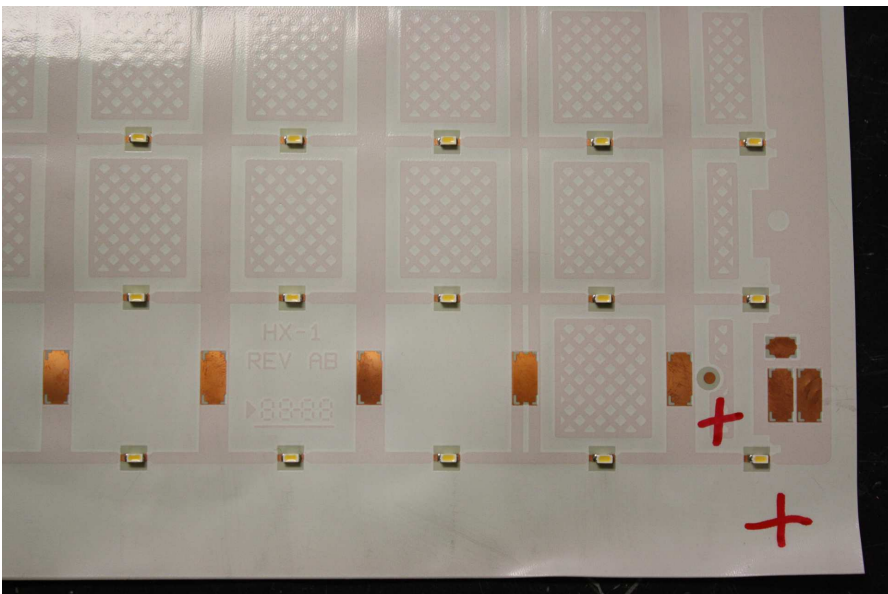


Photo 2 Model LS1001S





Test Data

Client: Heilux LLC Engineer: Dana Magnuson *DM* Date: 2/27/2015
 Job No.: G102025677 Tested By: Dana Magnuson *DM* Date: 2/27/2015
 Product: Lumafilm Light Sheet Reviewed By: Henriette Bullmer *HB* Date: 2/27/2015
 Model No.: LS1001S Standard(s): IEC 60598-1, 8th Ed., Issued May, 2014
 Sample Control Number(s): CRT1502230953-001 Report No.: 102025677CRT-001T

Protection against Solid Foreign Objects, IEC 60598-1: Section 9.2.2 (IP 6X)

Test Parameters:	
Sample Conditioning:	The luminaire is suspended outside the dust chamber and operated at rated supply voltage (120V) until operating temperature is achieved. Then, whilst still operating, the unit is placed with minimum disturbance into the dust chamber and the door of the dust chamber is closed. The chamber is turned on, and then after 1 minute the luminaire is switched off and allowed to cool for 3 hours whilst the talcum powder remains in suspension.
Test Duration :	3 hours
Dielectric Potential:	500 VDC
Dielectric Potential duration	60 seconds.
Location	Live leads to foil

Test Results: Dust Exposure				
Sample	Test Duration (hrs.)	Any Dust?	Results	Pass/Fail
1	3	No	No dust entry	Pass

Test Results: Electric Strength				
Sample	Test voltage (VDC)	Duration (seconds)	Results	Pass/Fail
1	500	60	No Breakdown	Pass

To Comply:	
IP 6X	The protection is satisfactory if no deposit of dust is observed inside the enclosure at the end of the test.

Intertek Comments:	
<input checked="" type="checkbox"/>	The product complies with all applicable requirements of this test.
<input type="checkbox"/>	The product does not comply with the requirements of this test.
Test Date:	2/25/14 Tested By: D. Magnuson

Environmental Conditions During Testing: Humidity: 19.9%RH Pressure: N/A Ambient: 24.3°C

Equipment Used (See page 2 for details):	<u>1</u>	<u>2</u>	<u>6</u>						
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Test Data

Client: Heilux LLC Engineer: Dana Magnuson *DM* Date: 2/27/2015
 Job No.: G102025677 Tested By: Eric Youngs *Ey* Date: 2/27/2015
 Product: Lumafilm Light Sheet Reviewed By: Henriette Bullmer *HB* Date: 2/27/2015
 Model No.: LS1001S Standard(s): IEC 60598-1, 8th Ed., Issued May 2014
 Sample Control Number(s): CRT1502230953-001 Report No.: 102025677CRT-001T

Powerful Water Jet-proof luminaries IEC 60598-1, Section 9.2.6(IPX5)

Test Parameters:	
Sample conditioning	The luminaire complete with lamp(s) shall be switched on and brought to a stable operating temperature at rated voltage.
Water temperature	15°C ± 10°C
Nozzle Size:	6.3mm inside diameter
Water Delivery Rate:	12.5 liters / min ± 5%
Spray Distance from Sample:	3 meters
Test Duration:	15 minutes
Dielectric Potential:	500 VDC
Dielectric Potential duration	60 seconds.
Location	Live leads to foil

Test Results: Water Temperature: 18.5°C					
Test Sample	Measured Spray Distance (m)	Recorded Test Duration (min)	Measured Water Delivery Rate (L/min)	Any water inside enclosure? (Yes/No)	Pass/ Fail
1	3	15	12.5 L/min	No	Pass

Test Results: Electric Strength				
Sample	Test voltage (VDC)	Duration (seconds)	Results	Pass/Fail
1	500	60	No Breakdown	Pass

To Comply:
 There shall be no water inside of the enclosure after the test, and sample must pass electric strength test specified in section 10.

Intertek Comments:	
<input checked="" type="checkbox"/>	The product complies with all applicable requirements of this test.
<input type="checkbox"/>	The product does not comply with the requirements of this test.
Test Date:	2/27/2015 Tested By: E. Youngs

Environmental Conditions During Testing: Humidity: 13.3%RH Pressure: N/A Ambient: 23.9°C

Equipment Used (See page 2 for details):

1	2	3	4	5	6	7			
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