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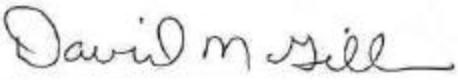
9725 GIRARD AVENUE SOUTH  
MINNEAPOLIS, MINNESOTA 55431-2621

## ENGINEERING REPORT NO. 29448-2

### “WATER INTRUSION TEST”

for

**MECHATRONICS, INC.**  
**8152 - 304<sup>th</sup> AVENUE S.E.**  
**PRESTON, WA 98050**

<b>PREPARED BY:</b>	 Daniel J. Larson Senior Test Technician
<b>APPROVED BY:</b>	 David M. Gillen Vice President

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## REVISION HISTORY

Revision	Total Number of Pages	Date	Description
-	5	28 Mar 2003	Original

<b>PREPARED FOR:</b>  MECHATRONICS, INC. 8152 - 304 <sup>th</sup> AVENUE S.E. PRESTON, WA 98050  ATTN: Mr. David Hazlett	<b>TEST DATES:</b> <b>Start:</b> 3/13/2003 <b>Completion:</b> 3/13/2003
	<b>ENVIRON TEST NO.:</b> 29448-2
	<b>PURCHASE ORDER NO.:</b> 6947
	<b>PURCHASE DATE:</b> 3/7/2003

## WATER INTRUSION TEST

### 1.0 ABSTRACT

#### 1.1 Object

Subject two (2) Fans to a Water Intrusion Test per Mechatronics, Inc. Purchase Order No. 6947, dated March 7, 2003, in accordance with IEC 60529, IPX5 Requirements.

#### 1.2 Conclusions

Both test units remained operational throughout the test. A visual inspection conducted upon completion of the exposure period found no visible evidence of damage or degradation. The test units met the passing requirements for IEC 60529, IPX5.

### 2.0 UNIT(S) TESTED

<b>MANUFACTURER:</b>	MECHATRONICS, INC.	
<b>DEVICE:</b>	Fans	
<b>MODEL/PART NO.:</b>	UF15P23	UF12A23
<b>SERIAL NO.:</b>	-----	

*The results of this test apply only to the units identified in this Engineering Report by device identifier and model / part number, or serial number.*

### 3.0 TEST REQUESTED

Subject the test units to a Water Intrusion Test per IEC 60529 for second characteristic numeral 5 as described in Paragraph 14.2.5. The test is to be made by spraying the enclosure from all practicable directions with a stream of water from a standard test nozzle such that the following conditions are met:

1. The internal diameter of the nozzle is to be 6.3mm.
2. The delivery rate is to be 12.5 liters/min  $\pm 5\%$  at whatever water pressure is necessary to achieve this flow.
3. The core of the substantial stream is to be a circle of approximately 40mm diameter at a distance of 2.5m from the nozzle.
4. Test duration per square meter of the enclosure surface likely to be sprayed is to be 1 minute.
5. The minimum duration is 3 minutes.
6. The distance from the nozzle to the enclosure surface is to be  $2.75 \pm .25$ m.

### 4.0 INSTRUMENTATION, PROCEDURE AND RESULTS

#### 4.1 Instrumentation

All instrumentation is calibrated regularly by instruments directly traceable to the National Institute of Standards and Technology, and in accordance with MIL -I-45208A, ANSI/NCSL Z540-1-1994 and ISO/IEC 17025:1999.

<b>Equipment Number</b>	<b>Description</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Last Calibration</b>	<b>Due Calibration</b>	<b>Range</b>
400-030	Stopwatch	Radio Shack	63-5014	3/29/2002	3/29/2003	0 to 10 Hours
717-053	Flowmeter	Omega Instruments	FL-75B	1/21/2003	1/21/2004	1 to 10.3 GPM

## 4.2 Procedure

The test units were placed onto the test stand and connected to the appropriate voltage source. Each test unit was sprayed with a stream of water from a 6.3mm diameter nozzle for a period of 1 minute and 30 seconds. The test units were then rotated 180° and opposite face of the test units were sprayed for an additional 1 minute and 30 seconds for a total of 3 minutes of exposure.

## 4.3 Results

Both test units remained operational throughout the test. A visual inspection conducted upon completion of the exposure period found no visible evidence of damage or degradation. The test units met the passing requirements for IEC 60529, IPX5.