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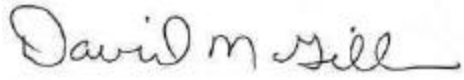
9725 GIRARD AVENUE SOUTH  
MINNEAPOLIS, MINNESOTA 55431-2621

## ENGINEERING REPORT NO. 29448-1

### “DUST 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
-	6	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>	<b>29448-1</b>
	<b>PURCHASE ORDER NO.:</b>	<b>6947</b>
	<b>PURCHASE DATE:</b>	3/7/2003

## DUST TEST

### 1.0 ABSTRACT

#### 1.1 Object

Subject two (2) Fans to a Dust Test per Mechatronics, Inc. Purchase Order No. 6947, dated March 7, 2003, in accordance with IEC 60529, IP5X, Paragraph 13.4, Category 2 Requirements.

#### 1.2 Conclusions

Both test units remained operational throughout the test. A visual inspection conducted upon completion of the exposure period showed no visible evidence of damage or degradation. The test units met the passing requirements for IEC 60529, IP5X, Category 2.

### 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**

The test shall be conducted in a dust chamber that is capable of maintaining the talcum powder in suspension. The talcum powder used shall be able to pass through a square-meshed sieve having a nominal wire diameter of 50µm and a nominal width of a gap between the wires of 75µm. The amount of talcum powder used shall be 2 kilograms per cubic meter of test chamber volume. The talcum powder shall not have been used for more than 20 tests.

The enclosures shall be supported in their normal operating position within the dust chamber. Any drain hole normally opened shall be left opened for the test. The test duration shall be 8 hours.

The protection shall be deemed satisfactory if, on inspection, talcum powder has not accumulated in a quantity or location that could interfere with proper operation of the equipment or impair safety. No dust shall deposit where it could lead to tracking along the creepage distances.

### 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.

Equipment Number	Description	Manufacturer	Model No.	Last Calibration	Due Calibration	Range
400-030	Stopwatch	Radio Shack	63-5014	3/29/2002	3/29/2003	0 to 10 Hours
730-015	Digital Single Pan Balance	Ohaus	G 4000 D0	4/29/2002	4/29/2003	1 to 4000 grams
504-038	Dust Chamber	TRW	D-6	N/A	N/A	N/A

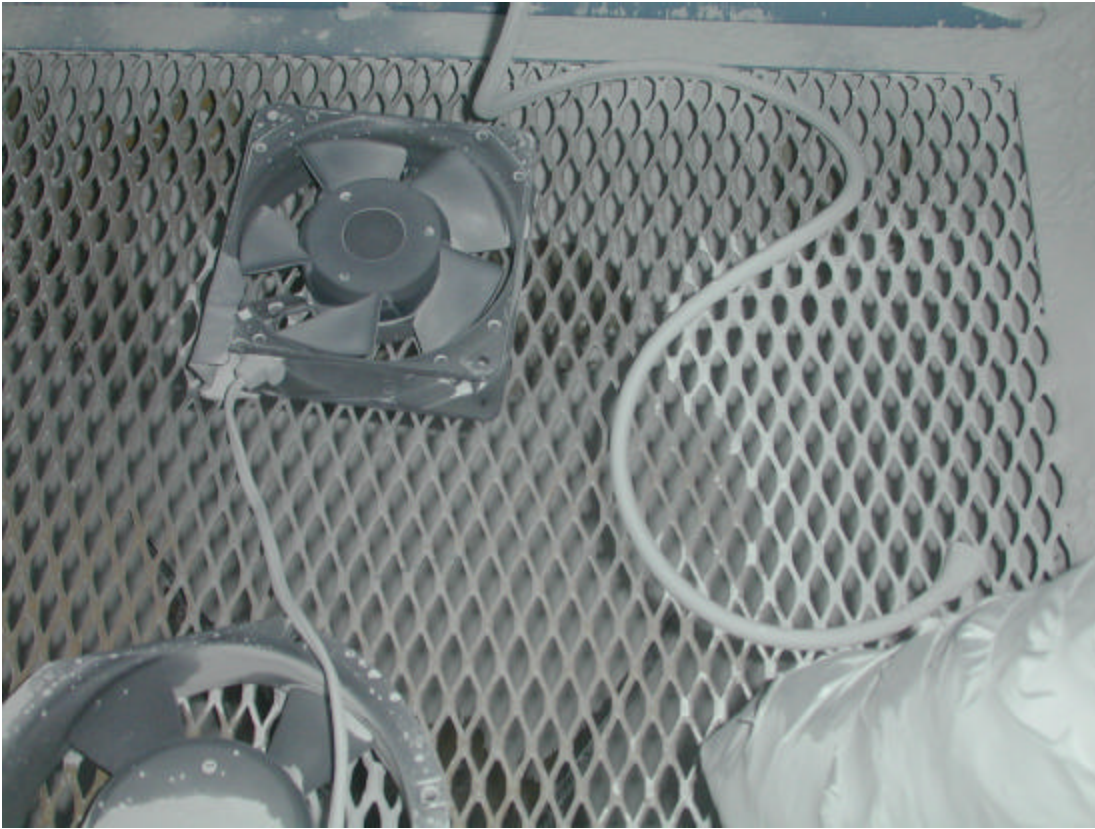
## 4.2 Procedure

The talcum powder used in the test met the requirements stated in Section 3.0 of this report. The test units were placed in the dust chamber in their normal operating position and connected to the appropriate voltage. Chamber volume was 1.0 cubic meter. Two kilograms of new talcum powder was added to the chamber and the chamber sealed. The dust suspension system was started and the test units were exposed to the dust laden air for 8 hours.

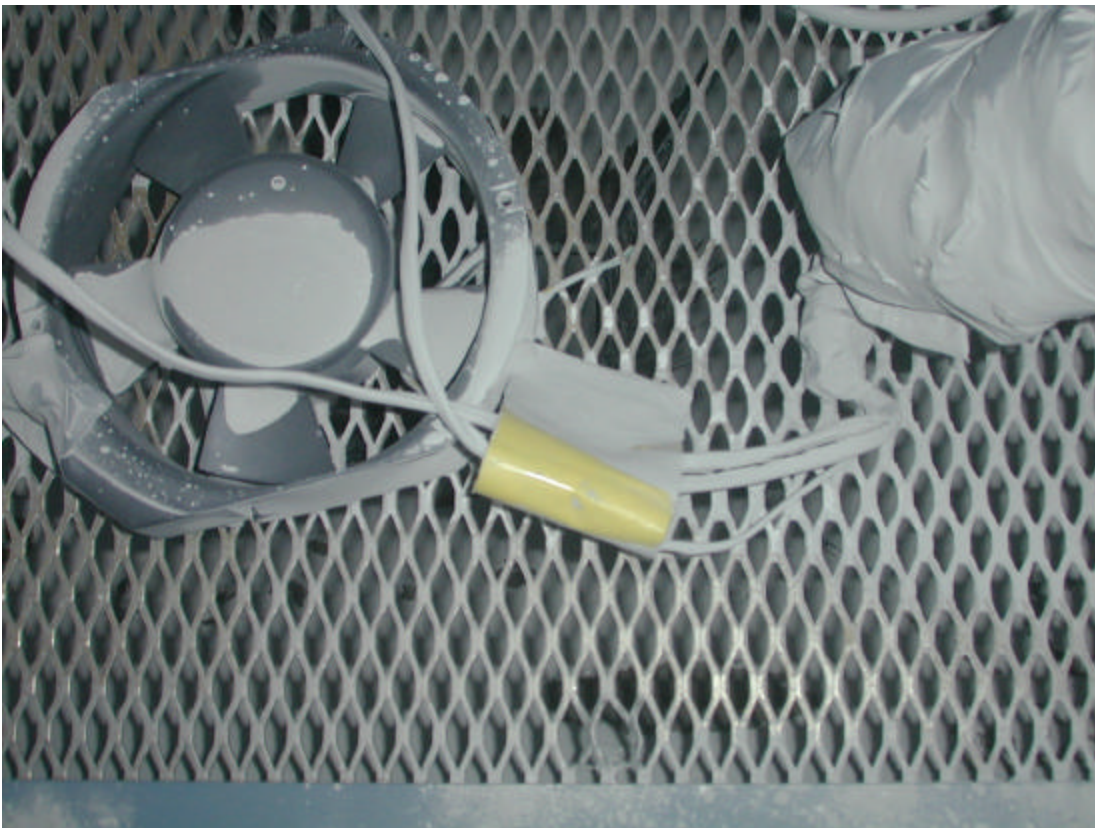
Upon completion of the exposure the fans were removed from the chamber and accumulated dust removed using a soft bristled brush.

## 4.3 Results

Both test units remained operational throughout the test. A visual inspection conducted upon completion of the exposure period showed no visible evidence of damage or degradation. The test units met the passing requirements for IEC 60529, IP5X, Category 2.



Photograph No. 1 - Small fan mounted in dust chamber



Photograph No. 2 - Large fan mounted in dust chamber