wyle laboratories

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REPORT NO.: T55363-01

WYLE JOB NO.: T55363

CLIENT P.O. NO.: 03-11584

CONTRACT: N/A

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DATE: May 7, 2008

TEST REPORT
ENVIRONMENTAL TESTING
OF A
FH-SPRING RETURN ACTUATOR
FOR
EMERSON PROCESS
WYLE REPORT NO. T55363-01

Emerson Process
18703 GH Circle
P.O. Box 508
Waller, TX 77484

STATE OF ALABAMA
COUNTY OF MADISON }

David R. Bailey, Department Manager, being duly sworn, deposes and says: The information contained in this report is the result of complete and carefully conducted testing and is to the best of his knowledge true and correct in all respects.

David Bailey

SUBSCRIBED and sworn to before me this 7th day of May, 2008

Patricia Phillips
Notary Public in and for the State of Alabama at Large

My Commission expires Jan. 7, 2009

SEAL

Wyle shall have no liability for damages of any kind to person or property, including special or consequential damages, resulting from Wyle's providing the services covered by this report.

TEST BY: Randy J Cooper 5/7/08
Randy Cooper, Sr. Project Engineer Date

APPROVED BY: Al Moore 5/8/08
Al Moore, Engineering Supervisor Date

WYLE Q.A.: Brenda Moore 5/8/08
For Raul Terceno, Quality Assurance Manager Date

(pap)

ACCREDITED
Cert No. 845.02

QMI REGISTERED
ISO 9001:2000

TABLE OF CONTENTS

ATTACHMENTS

1.0 INTRODUCTION

1.1 Scope

This report documents the test procedures followed and the results obtained during Degree of Protection Testing performed on one Actuator for Emerson Process, Waller, Texas. The Actuator was received at Wyle Laboratories on February 13, 2008, and was subjected to an inspection upon receipt. The receiving inspection revealed the Actuator was in good condition. Testing was performed at Wyle Laboratories' Huntsville, Alabama, Test Facility from February 13 through March 13, 2008.

1.2 References

- Emerson Process Purchase Order No. 03-11584
- Wyle Laboratories' Quotation No. 542/044247/DB, dated October 4, 2007
- Wyle Laboratories' Quality Assurance Program Manual, Revision 2
- IEC 60529, Classification IP66, Edition 2.1, dated 2001-2002.
- ANSI/NCSL Z540-1, "Calibration Laboratories and Measuring and Test Equipment, General Requirements"
- ISO 10012-1, "Quality Assurance Requirements for Measuring Equipment"
- MIL-STD-45662A, "Calibration System Requirements"

1.3 Test Specimen Description

The item submitted for testing and shown in the photographs in Attachment A is an Actuator, identified with Model No. FH5016-SR2CW and Serial No. T207042. The Actuator measured approximately 91 inches x 23 inches x 18.25 inches and weighed approximately 1,000 pounds.

Emerson Process provided all ancillary support equipment used for the required functional tests.

1.4 Summary

The Actuator was subjected to Degree of Protection Testing in accordance with IEC 60529, Classification IP66, Paragraphs 13.4 & 14.2.6, and Emerson Process requirements. The test program included Dust Tight and Water Penetration – Powerful Jetting Tests. The Actuator was functionally operated by Wyle Laboratories personnel under the direction of Emerson Process. No anomalies were noted. The Actuator was returned to Emerson Process for post-test inspection and evaluation.

The test results contained herein apply only to the Actuator identified in this report.

2.0 TEST PROCEDURES AND RESULTS

2.1 Dust Tight Test

The Actuator was subjected to Dust Testing in accordance with IEC 60529, Classification IP66, Paragraph 13.4, Edition 2.1, dated 2001-2002, and Emerson Process requirements. Dust Tight Testing began on February 13, 2008.

The Actuator was placed inside an enclosed test chamber that measured 12 feet long x 6 feet wide x 6 feet high (432 cubic feet). The talcum powder concentration was 2 kg per cubic meter of the chamber volume (measuring 54 pounds) and was held in suspension by the use of circulating fans. A vacuum pump was used to extract air from the inlet area of the piston to maintain a maximum decompression rate of 8 inches of water column (0.20 mbar) throughout testing. The volume of the piston wherein air was extracted was approximately 870 cubic inches. During testing, 1.7 pounds of talcum powder was blown into the enclosure every 15 minutes using a blower throughout the test to maintain the talcum powder concentration. The total duration of the test was 8 hours.

Upon completion, Wyle Laboratories' personnel performed a visual inspection to verify that no damage, deformation, or major pressure drop under vacuum occurred as a result of the imposed environment. No anomalies were noted.

Photographs of the Actuator and test setup are presented in Attachment A. The Instrumentation Equipment Sheet for the test setup is presented in Attachment B.

2.2 Water Penetration – Powerful Jetting Test

The Actuator was subjected to Water Penetration – Power Jetting Testing in accordance with IEC 60529, Classification IP66, Paragraph 14.2.6, Edition 2.1, dated 2001-2002, and Emerson Process requirements. Water Penetration Testing began on March 12, 2008.

The Actuator was subjected to water spray from a 12.5-mm nozzle (IP6) at a rate of 100 liters/minute, ± 5%, from a distance between 2.5 and 3.0 meters, for a minimum duration of 3 minutes.

Upon completion, Wyle Laboratories' personnel performed a visual inspection to verify that no damage, deformation, or water intrusion occurred as a result of the imposed environment. No anomalies were noted.

Photographs of the Actuator and test setup are presented in Attachment A. The Instrumentation Equipment Sheet for the test setup is presented in Attachment B.

3.0 QUALITY ASSURANCE PROGRAM

All work performed on this test program was completed in accordance with Wyle Laboratories' Quality Assurance Program.

The Wyle Laboratories, Huntsville Facility, Quality Management System is registered in compliance with the ISO-9001:2000 International Quality Standard. Registration has been completed by Quality Management Institute (QMI), a Division of Canadian Standards Association (CSA).

Wyle Laboratories is accredited (Certificate No.: 845.02) by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with Wyle's scope of accreditation unless otherwise stated in this report.

4.0 TEST EQUIPMENT AND INSTRUMENTATION

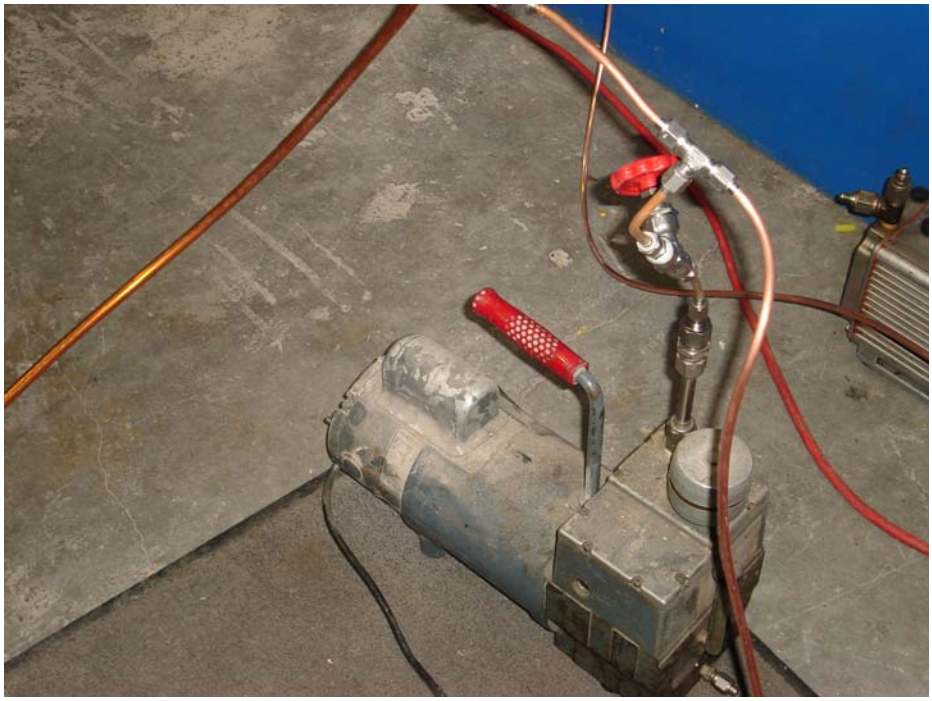
All instrumentation, measuring, and test equipment used in the performance of this test program were calibrated in accordance with Wyle Laboratories' Quality Assurance Program, which complies with the requirements of ANSI/NCSL Z540-1, ISO 10012-1, and Military Specification MIL-STD-45662A. Standards used in performing all calibrations are traceable to the National Institute of Standards and Technology (NIST) by report number and date. When no national standards exist, the standards are traceable to international standards or the basis for calibration is otherwise documented.

ATTACHMENT A

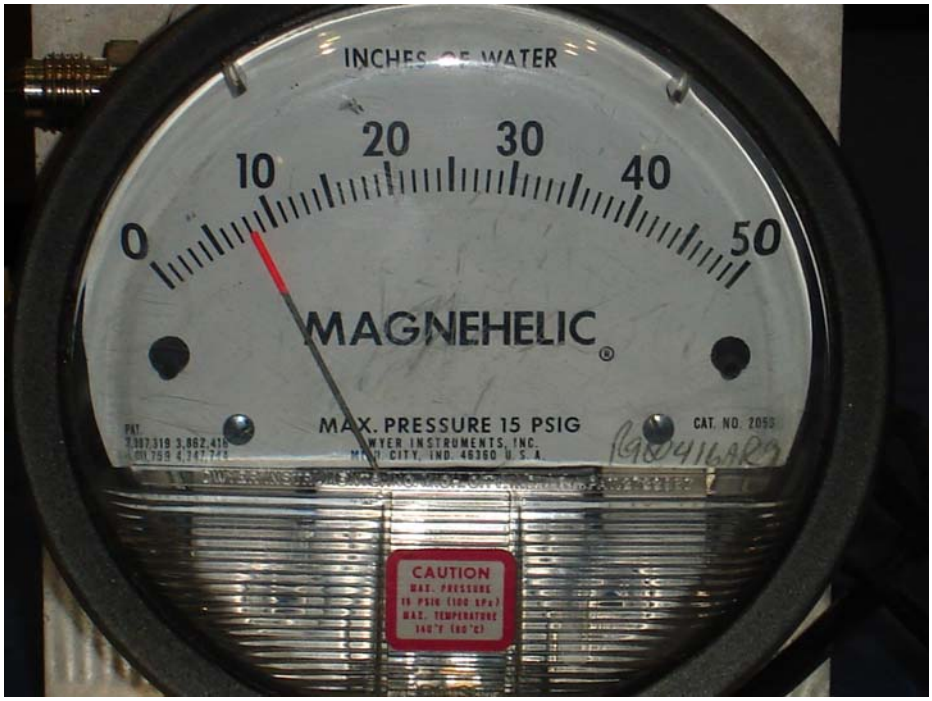
PHOTOGRAPHS

Photograph No. 1
View of the Dust Test Chamber

Photograph No. 2
View of the Actuator inside Dust Test Chamber



Photograph No. 3
View of Vacuum Pump for Dust Testing



Photograph No. 4
View of Vacuum Gauge During Dust Testing

Photograph No. 5
View of Scales Used to Weigh Talcum Powder

Photograph No. 6
Water Penetration – Powerful Jetting

Photograph No. 7
Water Penetration – Powerful Jetting

ATTACHMENT B

INSTRUMENTATION EQUIPMENT SHEETS

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INSTRUMENTATION EQUIPMENT SHEET

DATE: 2/13/2008 JOB NUMBER: T55363 TYPE OF TEST: DUST

TECHNICIAN: LARRY IVEY CUSTOMER: EMMERSON TEST AREA: FIRE LAB

No.	Description	Manufacturer	Model	Serial #	WYLE #	RANGE	ACCURACY	Cal Date	Cal Due
1	MAGNEHELIC	DWYER INSTRUM	MAGNEHELIC	NSN	114691	0-50H2o	±4%FS	2/12/2008	5/12/2008
2	SCALE	OHAUS	I5S	16898	113777	100LB	±.05%	10/29/2007	10/29/2008
3	STOP WATCH	CONTROL COMPA	1030	51225634	110944	10 HOURS	.13SEC/24HRS	2/11/2008	2/11/2009

This is to certify that the above instruments were calibrated using state-of-the-art techniques with standards whose calibration is traceable to the National Institute of Standards and Technology.

INSTRUMENTATION: 2-13-08 CHECKED & RECEIVED BY: 2/13/08

Q.A.: 2/13/08

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INSTRUMENTATION EQUIPMENT SHEET

DATE: 3/12/2008 JOB NUMBER: T55363 TYPE OF TEST: H.P. SPRAY

TECHNICIAN: N.HOUSE CUSTOMER: EMERSON TEST AREA: RAIN SITE

No.	Description	Manufacturer	Model	Serial #	WYLE #	RANGE	ACCURACY	Cal Date	Cal Due
1	FLOW METER	POTTER & DMC	7/8 35-3	428421	04591	5-60 GPM	±.5% rdg	2/22/2008	2/22/2009
2	STOP WATCH	EXTECH	365510	NSN	04956	MFG	±3 SEC PER D/	1/25/2008	1/25/2009

This is to certify that the above instruments were calibrated using state-of-the-art techniques with standards whose calibration is traceable to the National Institute of Standards and Technology.

INSTRUMENTATION: 3-12-08 CHECKED & RECEIVED BY: Randy J Cooper 3/12/08

Q.A.: 3-12-08

WH-1029A.REV.APR'99

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