wyle laboratories

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TEST REPORT
ENVIRONMENTAL TESTING
ON
ONE GVO LINEAR VALVE OPERATOR
FOR
EMERSON PROCESS MANAGEMENT
WYLE REPORT NO. T70487-01

Emerson Process Management
6005 Rogerdale Road
Houston, TX 77072

STATE OF ALABAMA
COUNTY OF MADISON }

Robert R. Bridges, 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.

Robert R. Bridges SEAL

SUBSCRIBED and sworn to before me this 5th day of Dec., 2012

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

My Commission expires Jan. 6, 2013

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: 12-4-12
Tory Jones, Project Engineer Date

APPROVED BY: 12/4/12
Anthony Murks, Engineering Supervisor Date

WYLE Q.A.: 12/5/12
Raul Terceno, Quality Manager Date

(pap)

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REVISIONS

REVISION A

REPORT NO. T70487-01

DATE January 2, 2013

REV.	DATE	PAGE OR PARAGRAPH AFFECTED	BY	APP'L	DESCRIPTION OF CHANGES
A	01/02/13	Cover	TJ 1-2-13	AM 1/3/13 RKB 1/3/13 BM 1/3/13	Added "Revision A" and date.
A	01/02/13	Page 1, Sections 1.1, 1.3, and 1.4	TJ 1-2-13	AM 1/3/13 RKB 1/3/13 BM 1/3/13	Revised in accordance with customer comments.

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1.0 INTRODUCTION

1.1 Scope

This report documents the test procedures followed to qualify GVO series actuator (2″ to 54″ pneumatic/hydraulic) with similar seals arrangement for IP66M and IP67M, and the results obtained during Environmental testing performed on one GVO Linear Valve Operator for Emerson Process Management. Testing was performed at Wyle Laboratories' Huntsville, Alabama, Test Facility from November 2 through November 24, 2012. **A**

1.2 References

- Emerson Purchase Order No. 4125051593
- Emerson Email dated October 30, 2012
- Wyle Laboratories' Quotation No. 542/055963-R1/MT, dated September 11, 2012
- Wyle Laboratories' Quality Manual, Latest Revision
- ANSI/NCSL Z540-1, "Calibration Laboratories and Measuring and Test Equipment, General Requirements"
- ISO 10012-1, "Quality Assurance Requirements for Measuring Equipment"
- IEC 60529, Edition 2.1, dated 2001-2002

1.3 Test Specimen Descriptions

The specimen tested was one GVO Linear Valve Operator [hereinafter referred to in this report as the UUT (unit under test)]. The receipt inspection revealed that the UUT arrived at Wyle Laboratories with no serial number identification. Wyle personnel assigned it Serial No. T70487-001 for traceability purposes only. The UUT measured approximately 28″ (length) by 15″ (diameter) and weighed approximately 248 pounds. **A**

1.4 Summary

The UUT, as identified in Section 1.3, was subjected to an Environmental Test Program that consisted of Protection Against Solid Foreign Objects (Dust-Tight) Test, Protection Against Ingress of Water (IP67M and IP66M) Test, and Protection Against Hazardous Parts Test in accordance with IEC 60529, Edition 2.1, dated 2001-2002. The UUT was received at Wyle Laboratories on November 2, 2012. The receipt inspection revealed the UUT was in good condition. The UUT was configured in its operational condition throughout testing. The operational condition is defined as being configured to have air pressure applied to the UUT to open and close the valve inside the UUT. Wyle personnel provided facility air (approximately 50 psi) to operate the UUT. The UUT was returned to Emerson Process Management at the completion of testing for the final post-test visual inspection and evaluation.

The test results contained herein apply only to the GVO series linear actuator (size 2″ to 54″ with similar seal arrangement to test unit in this report. **A**

2.0 TEST PROCEDURES AND RESULTS

2.1 Protection Against Solid Foreign Objects (Dust-Tight) Test

One GVO Linear Valve Operator, as identified in Section 1.3 of this report, was subjected to a Protection Against Solid Foreign Objects (Dust-Tight) Test in accordance IEC 60529, paragraphs 13.2 and 13.4, dated 2001-2002.

The UUT was placed inside an enclosed Dust Test Chamber that measured approximately 6′ (length) by 6′ (width) by 6′ (height) (216 cubic feet). The required talcum powder concentration was 2 kilograms per cubic meter of the test chamber volume (measuring 26.4 pounds). A circulating fan was used to hold the talcum powder in suspension. An electric blower was used to blow approximately three pounds of talcum powder into the enclosure every 60 minutes throughout the test to maintain the talcum powder concentration. A vacuum pump was attached to the UUT in order to maintain a maximum depression of 2 kPa (20 mbar) to maintain the pressure inside the UUT below the surrounding atmospheric pressure. The total duration of the test was eight hours.

A post-test visual inspection and an operational check were performed to verify satisfactory post-test conditions of the UUT. The UUT received approximately 50 psi of air pressure to move the UUT from its closed position to its open position. No damages were noted. No anomalies were recorded. The UUT successfully met the Protection Against Solid Foreign Objects (Dust-Tight) Test requirements.

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

2.2 Protection Against Ingress of Water (IP67M) Test

One GVO Linear Valve Operator, as identified in Section 1.3 of this report, was subjected to a Protection Against Ingress of Water (IP67M) Test in accordance with IEC 60529, paragraph 14.2.7, dated 2001-2002.

The UUT was configured in its operational configuration and immersed approximately 20 inches (0.5 meters) in water for 30 minutes. The UUT was operated at various times during the 30-minute exposure.

A post-test operational check was conducted on the UUT. No damages were noted. No anomalies were recorded. The UUT successfully met the Protection Against Ingress of Water (IP67M) Test requirements.

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

2.0 TEST PROCEDURES AND RESULTS (Continued)

2.3 Protection Against Ingress of Water (IP66M) Test

One GVO Linear Valve Operator, as identified in Section 1.3 of this report, was subjected to a Protection Against Ingress of Water (IP66M) Test in accordance with IEC 60529, paragraph 14.2.6, dated 2001-2002.

The UUT was placed on an outside test facility and subjected to a water spray from a 12.5 mm nozzle (IP6) at a rate of 100 liters/minute (211 pounds/minute) from a distance of at least 2.5 meters (8 feet), for a total duration of 3 minutes. The UUT was operated at various times during the 3-minute exposure.

A post-test visual inspection and an operational check were performed to verify satisfactory post-test conditions of the UUT. No damages were noted. No anomalies were recorded. The UUT successfully met the Protection Against Ingress of Water (IP66M) Test requirements.

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

2.4 Protection Against Hazardous Parts Test

One GVO Linear Valve Operator, as identified in Section 1.3 of this report, was subjected to a Protection Against Ingress of Hazardous Parts Test in accordance with IEC 60529, paragraph 15.2, dated 2001-2002. An Emerson Process Management email dated October 30, 2012, was used as a guide, detailing critical areas of test only. See Attachment C for a description of the email.

A 1.0 mm test wire was used to push against openings on the UUT that are specified in the above-referenced email. The stop face did not fully penetrate through any opening. No damages were noted. No anomalies were recorded. The UUT successfully met the Protection Against Ingress of Hazardous Parts Test requirements.

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

3.0 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 Program, which complies with the requirements of ANSI/NCSL Z540-1 and ISO 10012-1. 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.

4.0 QUALITY PROGRAM

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

The Wyle Laboratories, Huntsville Facility, Quality Management System is registered in compliance with the ISO-9001:2008 International Quality Standard. Registration has been completed by Quality Management Institute (QMI), a Division of Canadian Standards Association (CSA).

ATTACHMENT A

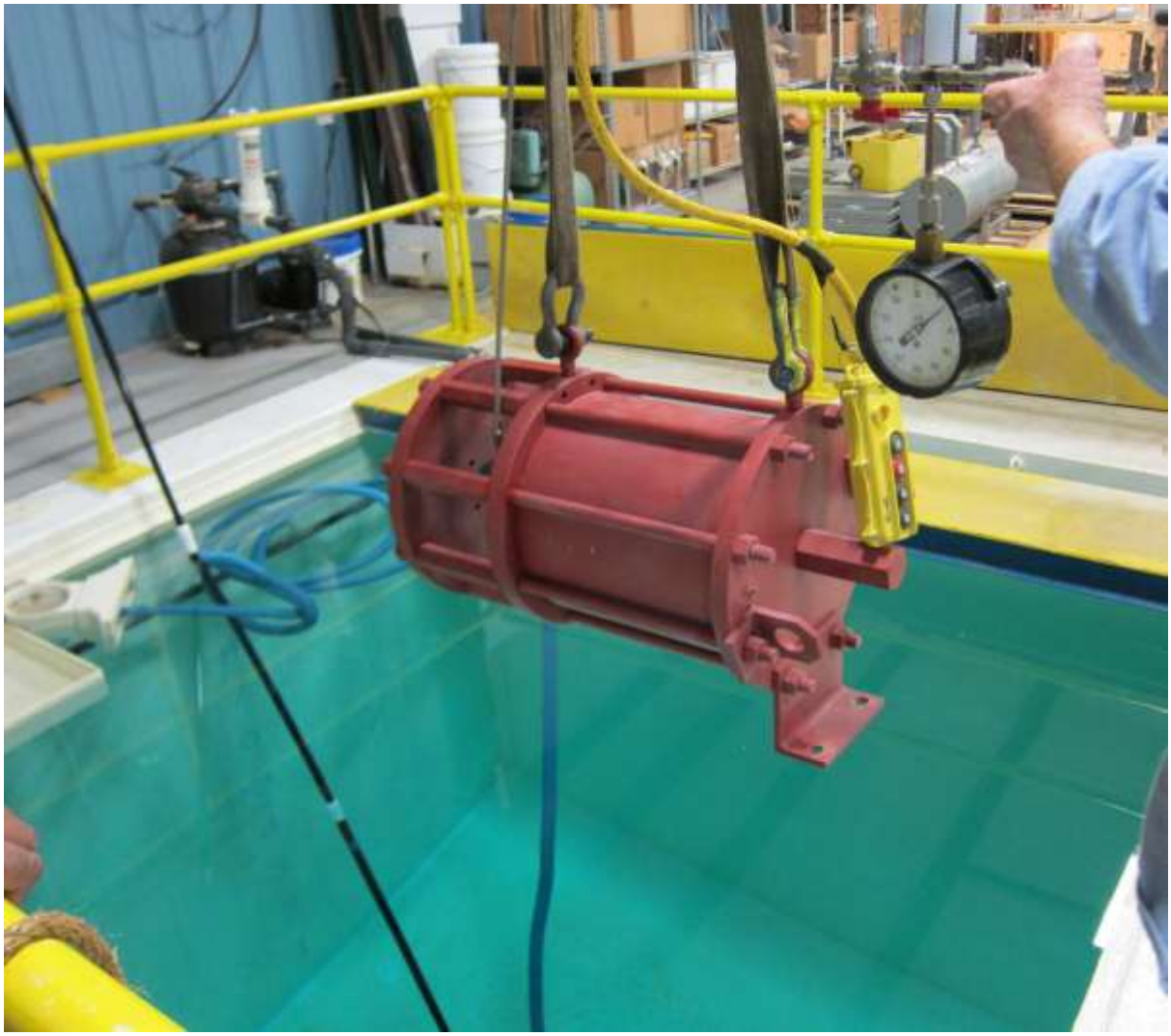
PHOTOGRAPHS

Photograph No. 1
Protection Against Solid Foreign Objects (Dust-Tight) Test Setup

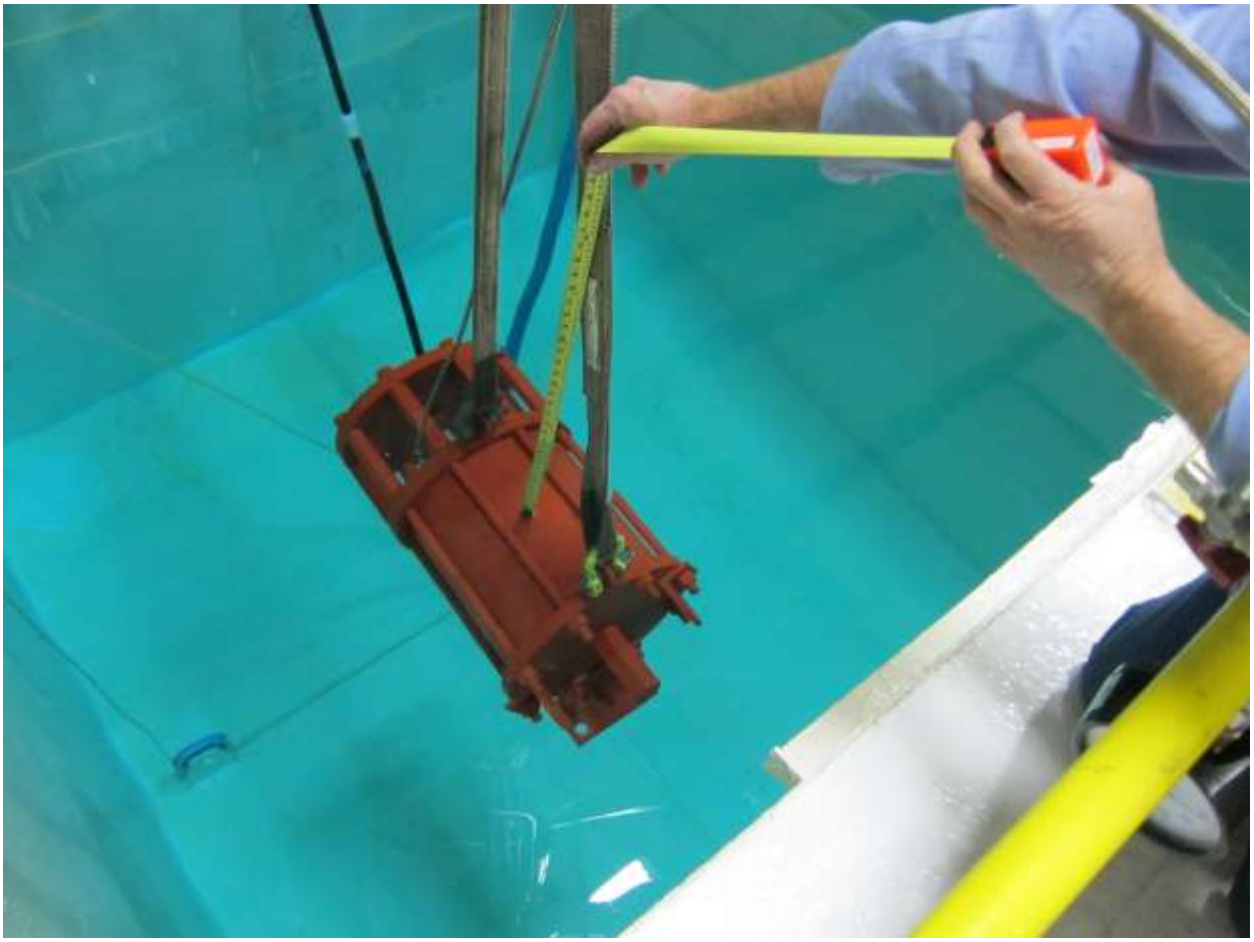
Photograph No. 2
Protection Against Solid Foreign Objects (Dust-Tight) Test Setup

Photograph No. 3
Protection Against Solid Foreign Objects (Dust-Tight) Test Setup
(Post-Test Appearance)

Photograph No. 4
Protection Against Solid Foreign Objects (Dust-Tight) Test Setup
(Post-Test Appearance)



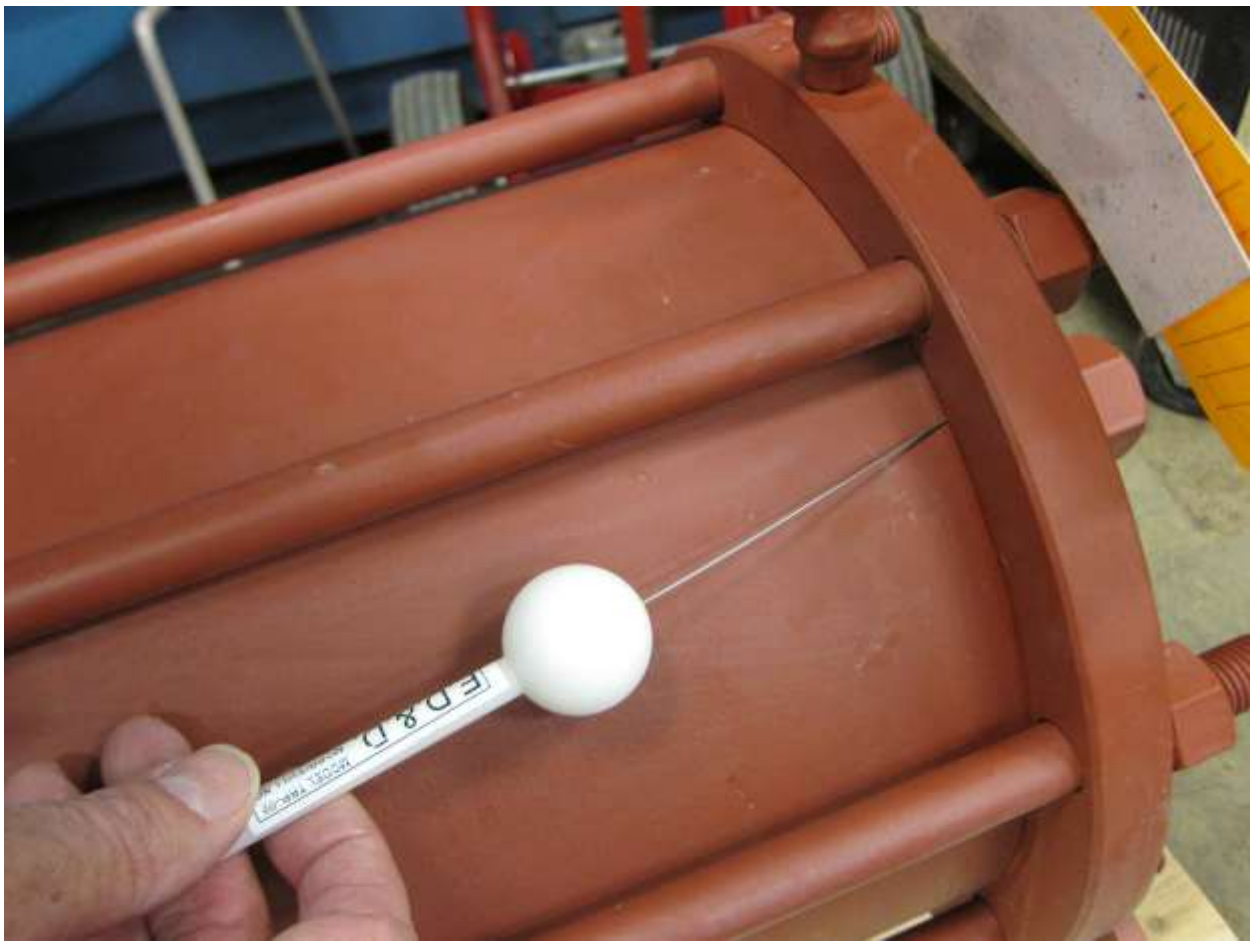
Photograph No. 5
Protection Against Ingress of Water (IP67M) Test Setup



Photograph No. 6
Protection Against Ingress of Water (IP67M) Test Setup

Photograph No. 7
Protection Against Ingress of Water (IP66M) Test Setup

Photograph No. 8
Protection Against Ingress of Water (IP66M) Test Setup



Photograph No. 9
Protection Against Hazardous Parts Test Setup

Photograph No. 10
Protection Against Hazardous Parts Test Setup

Photograph No. 11
Protection Against Hazardous Parts Test Setup

Photograph No. 12
Protection Against Hazardous Parts Test Setup

ATTACHMENT B

INSTRUMENTATION EQUIPMENT SHEETS

wyle laboratories

INSTRUMENTATION EQUIPMENT SHEET

DATE: 11/2/2012 JOB NUMBER: T70487 TYPE OF TEST ~~SETTLING~~ DUST TIGHT 11-2

TECHNICIAN: D. SLACK CUSTOMER: EMERSON TEST AREA: SITE G

No.	Description	Manufacturer	Model	Serial #	WYLE #	RANGE	ACCURACY	Cal Date	Cal Due
1	MANOMETER	DWYER	1221	1221-24	110720	12"H20	±1DIV	10/29/2012	4/29/2013
2	PRESSURE GAGE	USG	4.5"	NA	117607	200 PSI	±1%FS	5/11/2012	11/11/2012
3	SCALE	OHAUS	15S	21981	113832	100LB	.03%	6/4/2012	6/4/2013
4	STOP WATCH	EXTECH	365515	NSN	01256	MFG	5 sec/day	1/4/2012	1/4/2013

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: 11/2/12 CHECKED & RECEIVED BY: 11-2-12

Q.A.: 11-2-12

WH-1029A,REV,APR'99

Page 1 of 1

wyle laboratories

INSTRUMENTATION EQUIPMENT SHEET

DATE: 11/20/2012 JOB NUMBER: T70487 TYPE OF TEST IMMERSION

TECHNICIAN: T TURNER CUSTOMER: EMERSON TEST AREA: PACKAGING LAB

No.	Description	Manufacturer	Model	Serial #	WYLE #	RANGE	ACCURACY	Cal Date	Cal Due
1	PRESSURE GAGE	USG	4.5"	N/A	100839	400 PSI	1%FS	10/17/2012	4/17/2013
2	STOP WATCH	EXTECH	365510	NSN	02335	24 HR	5 sec/day	10/25/2012	10/25/2013
3	TAPE MEASURER	LUFKIN	HV1048CME	NSN	02242	26'/8m	MFG	8/21/2012	8/21/2013

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: Terrance Turner 11/20/12 CHECKED & RECEIVED BY: 11-20-12

Q.A.: Brenda Moss 11/20/12

WH-1029A,REV,APR'99

wyle laboratories

INSTRUMENTATION EQUIPMENT SHEET

DATE: 11/26/2012 JOB NUMBER: T70487.01 TYPE OF TEST WATER SPRAY

TECHNICIAN: T.J.PARCUS CUSTOMER: EMERSON TEST AREA: RAIN SITE

No.	Description	Manufacturer	Model	Serial #	WYLE #	RANGE	ACCURACY	Cal Date	Cal Due
1	FLOWMETER	POTTER/DMC	2-5440/431770	RAA-2-22	02534	0 TO 225 GPM	MFG	4/2/2012	4/2/2013
2	PRESSURE GAGE	USG	30V60	N/A	003181	30-0-60PSI	1%FS	7/10/2012	1/10/2013
3	PRESSURE GAGE	USG	4.5"	N/A	100839	400 PSI	1%FS	10/17/2012	4/17/2013
4	STOP WATCH	EXTECH	365515	NSN	01258	MFG	5 sec/day	1/4/2012	1/4/2013
5	TAPE MEASURER	LUFKIN	HV1048CME	NSN	02242	26'/8m	MFG	8/21/2012	8/21/2013

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: 11/26/12 CHECKED & RECEIVED BY: 11-26-12

Q.A.: 11/26/2012

WH-1029A,REV,APR'99

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INSTRUMENTATION EQUIPMENT SHEET

DATE: 11/29/2012 JOB NUMBER: T70487 TYPE OF TEST SAFETY PROBE

TECHNICIAN: J. SMITH CUSTOMER: EMERSON TEST AREA: ENVIRO LAB

No.	Description	Manufacturer	Model	Serial #	WYLE #	RANGE	ACCURACY	Cal Date	Cal Due
1	CALIPER	WESTWARD	6TFF9	NSN	01761	3"	±0.001"	11/28/2012	2/28/2013

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: J. Smith 11-29-12 CHECKED & RECEIVED BY: 11-29-12

Q.A.: 11-29-12

WH-1029A,REV,APR'99

ATTACHMENT C

CUSTOMER SUPPORT DOCUMENTS

Jones, Tory

From: Gagan.Perhar@emerson.com
Sent: Tuesday, October 30, 2012 3:49 PM
To: Jones, Tory
Cc: Mary.Smith@Emerson.com
Subject: RE: Wyle Testing (P.O.# 4125051593, T70487)
Attachments: 20121030163810313.pdf

Hello Tory

Hopefully the attached drawing helps
I have marked the drawing for visual understanding of what we discussed on the phone

If this is not the right information you are looking for, kindly let me know

Regards

Gagan

From: Jones, Tory [mailto:Tory.Jones@wyle.com]
Sent: Tuesday, October 30, 2012 9:00 AM
To: Perhar, Gagan [PROCESS/VA/MANS]; Smith, Mary [PROCESS/VA/MANS]
Subject: RE: Wyle Testing (P.O.# 4125051593, T70487)

The critical areas of the actuator is the information I am looking for. We can do the test, but I can only get this information from you, the customer. In the event that you do not know this information, you may want to contact your customer to verify this information. Feel free to call me if you need to.

Tory Jones
Wyle Laboratories
Project Engineer II
(Phone) 256-837-4411 ext 4295
(Fax) 256-721-0144
(email) Tory.Jones@Wyle.com

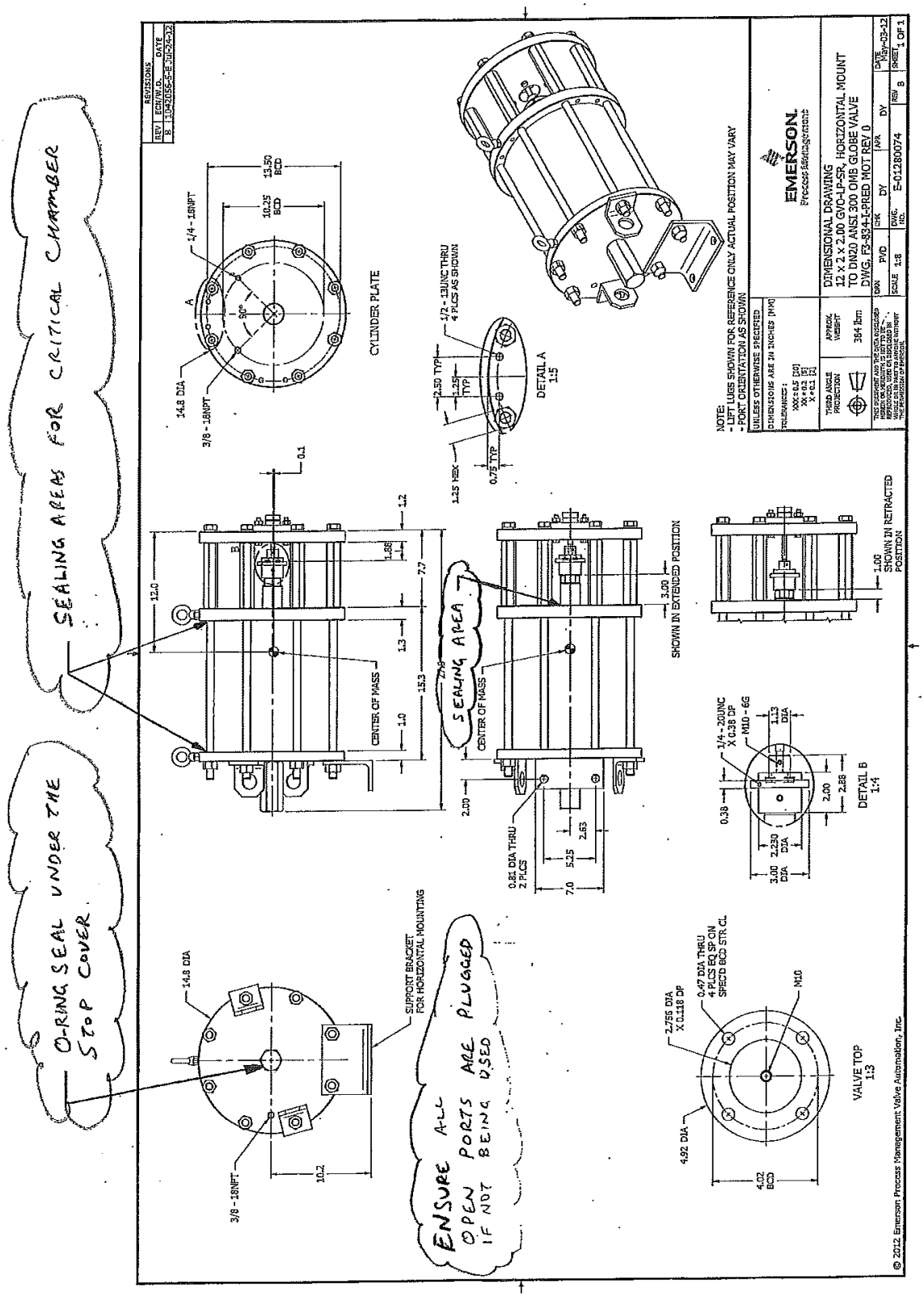
T70487
CONTROLLED DOCUMENT
Copy 2 Of 3

From: Gagan.Perhar@emerson.com [mailto:Gagan.Perhar@emerson.com]
Sent: Monday, October 29, 2012 7:10 PM
To: Jones, Tory; Mary.Smith@Emerson.com
Subject: RE: Wyle Testing (P.O.# 4125051593, T70487)

Hello Tory

I am not sure what do you mean below
the piston side on the actuator is critical as it is pressurized, the spring side is not pressurized

I thought you might be the right person to suggest how it should be done, I can only tell you the critical areas on the actuator


SEALING AREAS FOR CRITICAL CHAMBER
O-RING SEAL UNDER THE STOP COVER
ENSURE ALL OPEN PORTS ARE PLUGGED IF NOT BEING USED
EMERSON
Process Management
DIMENSIONAL DRAWING
12 x 2 x 2.00 GVO-LP-SR, HORIZONTAL MOUNT
TO DN20 ANSI 300 OMB GLOBE VALVE
DWG. F3-834-E-PRED MOT REV 0
E-01280074
CYLINDER PLATE
DETAIL A
1:5
DETAIL B
1:4
VALVE TOP
1:3
SEALING AREA
CENTER OF MASS
SHOWN IN EXTENDED POSITION
SHOWN IN RETRACTED POSITION
SUPPORT BRACKET FOR HORIZONTAL MOUNTING
NOTE:
- LIFT LUGS SHOWN FOR REFERENCE ONLY ACTUAL POSITION MAY VARY
- PORT ORIENTATION AS SHOWN
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