



---

# DET NORSKE VERITAS

---

## Energy Report

### Oxygen shock testing of three off oxygen Solenoid Valves, O<sub>2</sub> injection valves, 0.8mm orifice for oxygen use.

Fathom Systems Ltd.

Report no/DNV Reg No.: 2008-3513/ 1-23QMUX  
Rev 01, 2008-10-14



Oxygen shock testing of three off oxygen Solenoid Valves, O2 injection valves, 0.8mm orifice for oxygen use. For: Fathom Systems Ltd. Premesis 2, Spurryhillock Industrial Estate, Stonehaven, Kincardineshire. AB39 2NH Aberdeen Scotland Account Ref.: Hugh Williams	DET NORSKE VERITAS AS Veritasveien 1 1322 Høvik, Norway Tel: +47 67 57 99 00 Fax: +47 67 57 99 11 http://www.dnv.com Org. No: NO 945 748 931 MVA
--	--


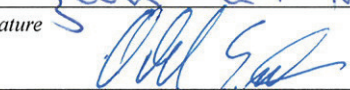

Date of First Issue:	2008-10-14	Project No.	71523201
Report No.:	2008-3513	Organisation Unit:	Structural Integrity & Laboratories
Revision No.:	01	Subject Group:	E9

Summary:

Oxygen shock testing of three off oxygen Solenoid Valves, O2 Inj. Valves 0.8 mm orifice for oxygen use has been carried out. The Solenoid valves were tested according to DNV's Standard OS – E402 – sec. 8 A402. This standard makes reference to several EN and ISO standards. ISO 10297: 2006, Clause 6.14. Oxygen pressure surge test was selected.

After the test the solenoid valves were dismantled and visually checked. No visible damage or sign of burning were observed as a result of the testing, and all three Solenoid Valves passed the test.

The test was carried out in the Det Norske Veritas Laboratory at Høvik, Norway, 2008-09-24.

Prepared by:	<i>Name and Position</i> Jan Lasse Moe Laboratory Technician	<i>Signature</i> 
Verified by	<i>Name and Position</i> Odd Sund Senior	<i>Signature</i> 
Approved by:	<i>Name and Position</i> Stein Fredheim Head of Section	<i>Signature</i> 

<input checked="" type="checkbox"/>	No distribution without permission from the client or responsible organisational unit (however, free distribution for internal use within DNV after 3 years)	<b>Indexing Terms</b>
<input type="checkbox"/>	No distribution without permission from the client or responsible organisational unit	Key Words
<input type="checkbox"/>	Strictly confidential	Service Area
<input type="checkbox"/>	Unrestricted distribution	Market Segment

Rev. No. / Date:	Reason for Issue:	Prepared by:	Approved by:	Verified by:

© 2008 Det Norske Veritas AS  
 All rights reserved. This publication or parts thereof may not be reproduced or transmitted in any form or by any means, including photocopying or recording, without the prior written consent of Det Norske Veritas AS.



---

## Table of Contents

<b>1</b>	<b>INTRODUCTION .....</b>	<b>1</b>
<b>2</b>	<b>TEST SPECIFICATION AND TEST PROCEDURE .....</b>	<b>1</b>
<b>3</b>	<b>TEST RESULT .....</b>	<b>1</b>

## 1 INTRODUCTION

Oxygen shock testing of three off oxygen Solenoid Valves, O2 Inj. Valves 0.8 mm orifice for oxygen use has been carried out.

Drawing and diagrams are shown in pages 2-8.

The valves were received in a cardboard box and plastics and DNV did not carry out any cleaning or degreasing prior to the test.

The Solenoid Valves were marked as follows:

### **Fathom Systems**

O2 Inj. Valves 0.8 mm orifice

12VDC (6W)

Pt.No: SP-022-104-010-01

Ser.No: 011-07/08

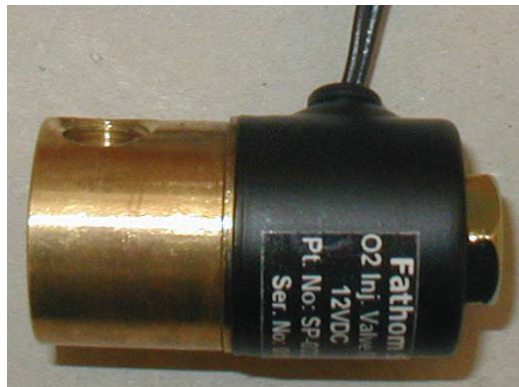
12VDC (6W)

Pt.No: SP-022-104-010-01

Ser.No: 011-07/08

012-07/08

013-07/08



## 2 TEST SPECIFICATION AND TEST PROCEDURE

The valves were tested according to ISO 10297: 2006, Clause 6.14 Oxygen pressure surge test.

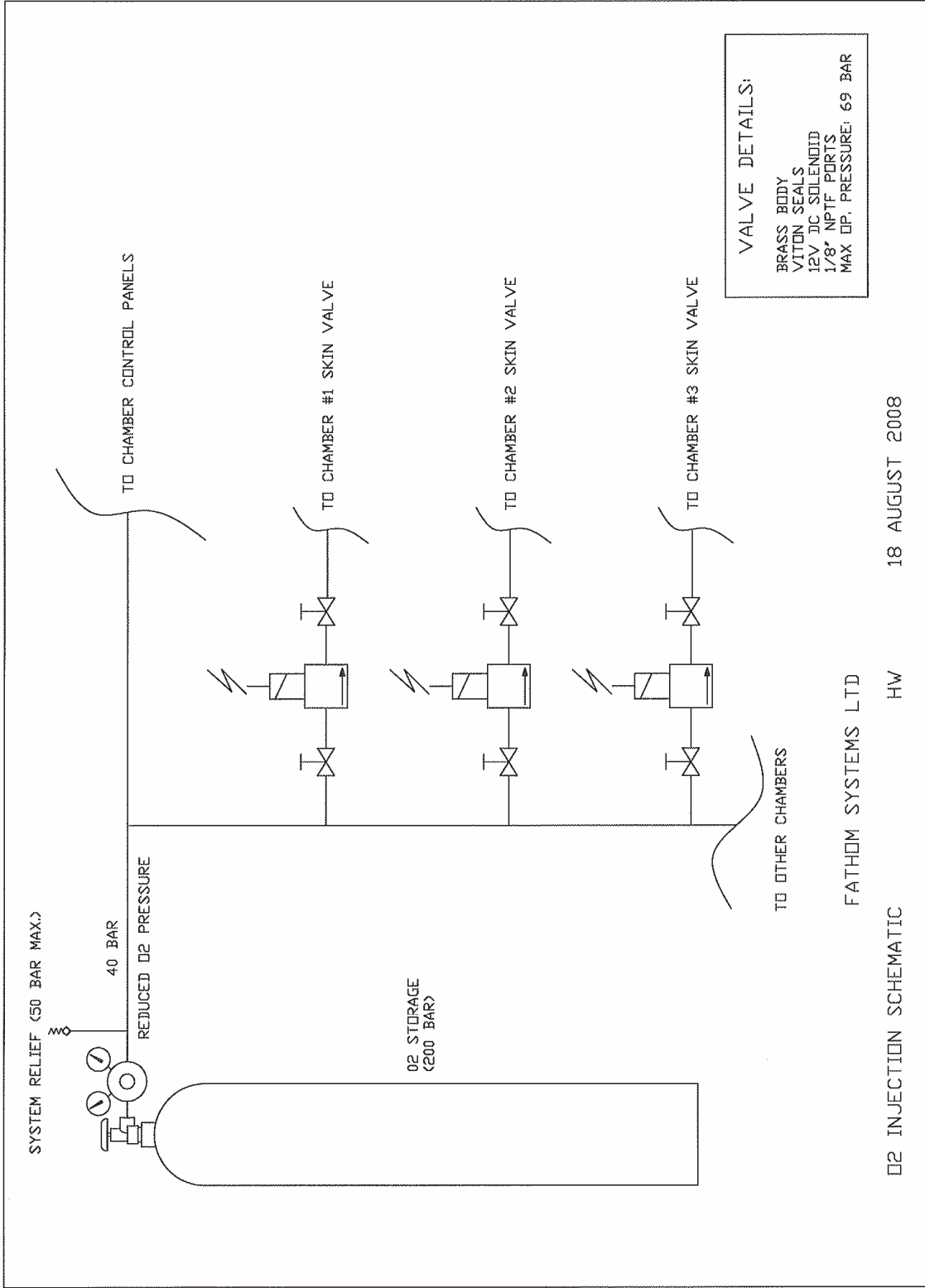
**Test pressure was 60 bar.**

The valves were tested to the specification above as follows:

1. Valve operating system closed and connection to the cylinder open.
2. Valve operating system open and connection to the cylinder sealed with a screwed metallic plug.

## 3 TEST RESULT

After the test the Solenoid Valves were function tested, dismantled and visually checked. No visible damage or sign of burning were observed as a result of the testing, and all three valves passed the test.



18 AUGUST 2008

FATHOM SYSTEMS LTD

HW

O2 INJECTION SCHEMATIC

# DNV Energy

DNV Energy is a leading professional service provider in safeguarding and improving business performance, assisting energy companies along the entire value chain from concept selection through exploration, production, transportation, refining and distribution. Our broad expertise covers Asset Risk & Operations Management, Enterprise Risk Management; IT Risk Management; Offshore Classification; Safety, Health and Environmental Risk Management; Technology Qualification; and Verification.

## DNV Energy Regional Offices:

### Americas and West Africa

Det Norske Veritas Ltda  
Rua Sete de Setembro  
111/12 Floor  
20050006 Rio de Janeiro Brazil  
Phone: +55 21 2517 7232

### Nordic and Eurasia

Det Norske Veritas AS  
Veritasveien 1  
N-1322 Hovik  
Norway  
Phone: +47 67 57 99 00

### Asia and Middle East

Det Norske Veritas Sdn Bhd  
24th Floor, Menara Weld  
Jalan Raja Chulan  
50200 Kuala Lumpur  
Phone: +603 2050 2888

### Offshore Class and Inspection

Det Norske Veritas AS  
Veritasveien 1  
N-1322 Hovik  
Norway  
Phone: +47 67 57 99 00

### Europe and North Africa

Det Norske Veritas Ltd  
Palace House  
3 Cathedral Street  
London SE1 9DE  
United Kingdom  
Phone: +44 20 7357 6080

### Cleaner Energy & Utilities

Det Norske Veritas AS  
Veritasveien 1  
N-1322 Hovik  
Norway  
Phone: +47 67 57 99 00