



**Direction Industrielle – Clients Industriels
Centre de Technologie et d'Expertises**

180 Avenue Charles Floquet
93155 LE BLANC MESNIL Cedex (France)

☎ (33) 01.48.14.71.00

☎ (33) 01.48.14.71.34

TEST REPORT N° 2001/OL 267

October 25, 2001

**Pressure regulator manufactured by Apeks
Type NP0528 Nitrox DS4 : Ignition tests
with oxygen according to Pr EN 13949**

Test Order n° O0785

Applicant : Apeks

Head of Center

Daniel ROY

Technical Manager : Jean-Paul Schaaff

A handwritten signature in black ink, appearing to be 'D. Roy'.

Assistant (s) : Olivier Longuet

Distribution : Apeks M. Davis

This report may not be reproduced other than in full



RÉSUMÉ

At the request of Apeks, we have carried out ignition tests (Adiabatic compression) of the standard Pr EN 13949 (Respiratory equipment, pressure regulators for use with compressed Nitrox and oxygen - Requirements, testing, marking), on oxygen pressure regulator, type NP0528 Nitrox DS4, manufactured by Apeks.

This pressure regulator withstands to ignition test of the standard Pr EN 13949 (§ 5.2) of June 2001, for a working pressure of 300 bar.

NOTA BENE : *This report concerns only the samples that have been submitted to tests.*

**CONTENTS**

1. INTRODUCTION.....	4
2. DESCRIPTION OF EQUIPMENT TESTED	4
3. IGNITION TESTS.....	5
3.1. DESCRIPTION OF THE TEST.....	5
3.2. TEST CARRIED OUT	6
4. CONCLUSION	8
APPENDIX 1.....	9
APPENDIX 2.....	11



1. INTRODUCTION

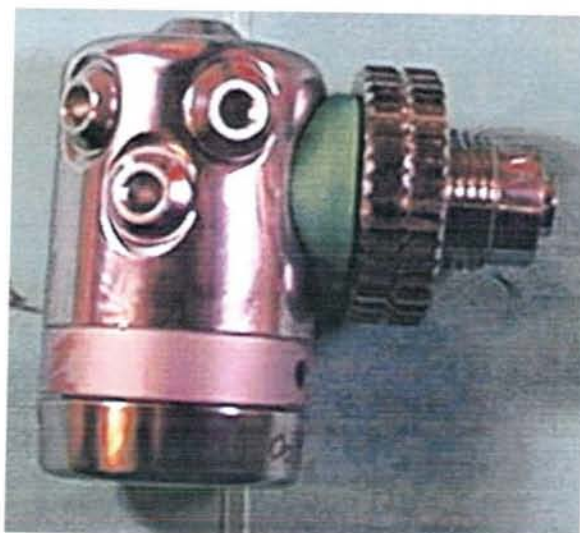
At the request of Apeks, we have carried out ignition tests (Adiabatic compression) of the standard Pr EN 13949 (Respiratory equipment, pressure regulators for use with compressed Nitrox and oxygen - Requirements, testing, marking), on oxygen pressure regulator, type NP0528 Nitrox DS4, manufactured by Apeks.

The working pressure of the pressure regulator is 300 bar.

The samples were received the October 18th, 2001

2. DESCRIPTION OF EQUIPMENT TESTED

The picture hereafter shows the pressure regulator





Picture hereafter shows the pressure regulator dismantled



Drawing and parts list are reproduced in appendix 1.

3. IGNITION TESTS

3.1. DESCRIPTION OF THE TEST

Tests have been carried out according to Pr EN 13949 (§ 5.2) of June 2001. It's checked whether the pressure regulator safely withstands an oxygen pressure surge.

- The pressure test is 360 bar of oxygen at 60°C.
- The number of cycles compression / decompression is 20.
- The connection tube measures 1 m in length and has an internal diameter of 5 mm.



Static pressure uncertainty ± 2.5 bar.
Dynamic pressure uncertainty ± 3 bar.
Time increase uncertainty ± 0.2 ms.
Oxygen temperature uncertainty $\pm 0.5^{\circ}\text{C}$.

Three samples must be submitted to 20 cycles of compression/decompression (see data sheet # 2309 in appendix 2) following the configuration :

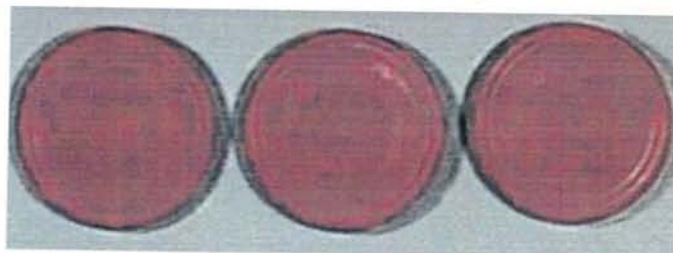
① By inlet.

3.2. TESTS CARRIED OUT

The samples have been tested as received without degreasing.

After the tests on the three samples, following the configuration, the apparatus have been dismantled, we have not observed any ignition (see pictures hereafter).

Diaphragms (n° 9 on drawing) after tests



O-Rings (n° 15 on drawing) after tests

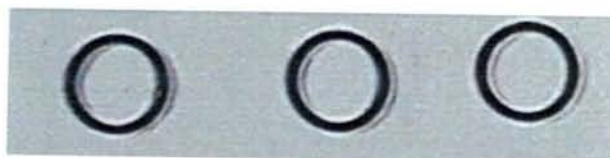




Conical Filters after tests



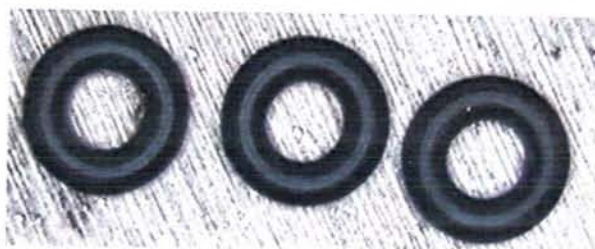
O-Rings (n° 16 on drawing) after tests



O-Rings of the Handwheel connector after tests



O-Rings (n° 14 on drawing) after tests

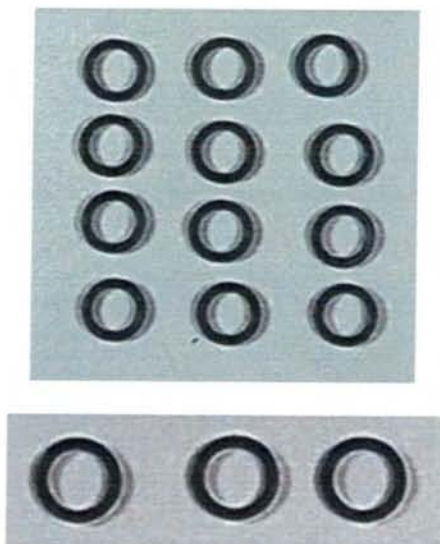


High pressure valves (n° 12 on drawing) after tests





O-Rings (n° 19 and 21 on drawing) after tests



4. CONCLUSION

The pressure regulator, type NP0528 Nitrox DS4, manufactured by Apeks, for using with oxygen, withstands to ignition tests of the standard Pr EN 13949 (§ 5.2), for a working pressure of 300 bar

Technical Manager
Jean-Paul Schaaff

Author
Olivier Longuet



AIR LIQUIDE

C.T.E.

Test report
N° 2001/OL 267

Pressure regulator manufactured by Apeks
Type NP0528 Nitrox DS4 : Ignition tests with oxygen
According to Pr EN 13949

Date : Oct. 25, 2001

Page : 9 / 12

A P P E N D I X 1

Age (DIN)



AIR LIQUIDE

C.T.E.

Test report
N° 2001/OL 267

Pressure regulator manufactured by Apeks
Type NP0528 Nitrox DS4 : Ignition tests with oxygen
According to Pr EN 13949

Date : Oct. 25, 2001

Page : 11 / 12

A P P E N D I X 2



IGNITION TEST (pressure surge)

According to standard : Pr EN 13949

Data sheet #	2309
Test date :	23-oct-01
Request #	00785

Request by :	Apeks / M. Davis
Country :	England

Device tested :	Pressure regulator
Type :	NP0528 Nitrox DS4
Manufacturer :	Apeks

Working conditions

temperature	Room
pressure	300 bar

Test conditions

standard applied :	Pr EN 13949
gas :	O ₂
pressure :	360 bar
gas temperature :	60°C
connection tube :	Diamètre = 5 mm ; L = 1 m
number of cycles :	20

Test sequence 1 :	By inlet.
Test sequence 2 :	
Test sequence 3 :	
Test sequence 4 :	

RESULTSSample # 1

test seq.1	After 20 cycles, no ignition.
test seq.2	
test seq.3	
test seq.4	

Sample # 2

test seq.1	After 20 cycles, no ignition.
test seq.2	
test seq.3	
test seq.4	

Sample # 3

test seq.1	After 20 cycles, no ignition.
test seq.2	
test seq.3	
test seq.4	

CONCLUSIONS

Good behaviour of the three tested samples

Operator
O. Longuet

Authorized Manager
JP Schaaff