BAM
Bundesanstalt für Materialforschung und -prüfung

Test Report

on Type Testing of Cylinder Valves Type IRPV-10 according to EN ISO 10297:2006 and EN ISO 15996:2008

Reference	2-2846/2013
DGA reference	DGA-13-095
Copy	1st copy of 2 copies
Customer	tekno valves Natun Rasta, Bilkanda 24 Parganas (North) Kolkata – 700 113 India
Order date	15 October 2013
Your Reference	Letter 103
Receipt of order	22 October 2013
Type of testing	Supplementary testing (implementation of new inline RPV)
Receipt of samples	7 samples TV/DR/CE-2640/2013 for testing the mechanical properties of the RPV on 22 October 2013
Test period	October 2013 to January 2014
Test location	Division 2.1 "Gases, Gas Plants" Working Group „Pressure Equipment - Accessories" Building 44 Working Group „Safe Handling of Oxygen" Building 41
Test procedure according to	EN ISO 10297:2006 EN ISO 15996:2008

The report consists of sheet 1 to 5 and the annexes to the procedure 2-2846/2013.
The pressures indicated in the report are over-pressures in bar.

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TEST REPORT

1 Description of valves and documentation

1.1 Description of valves

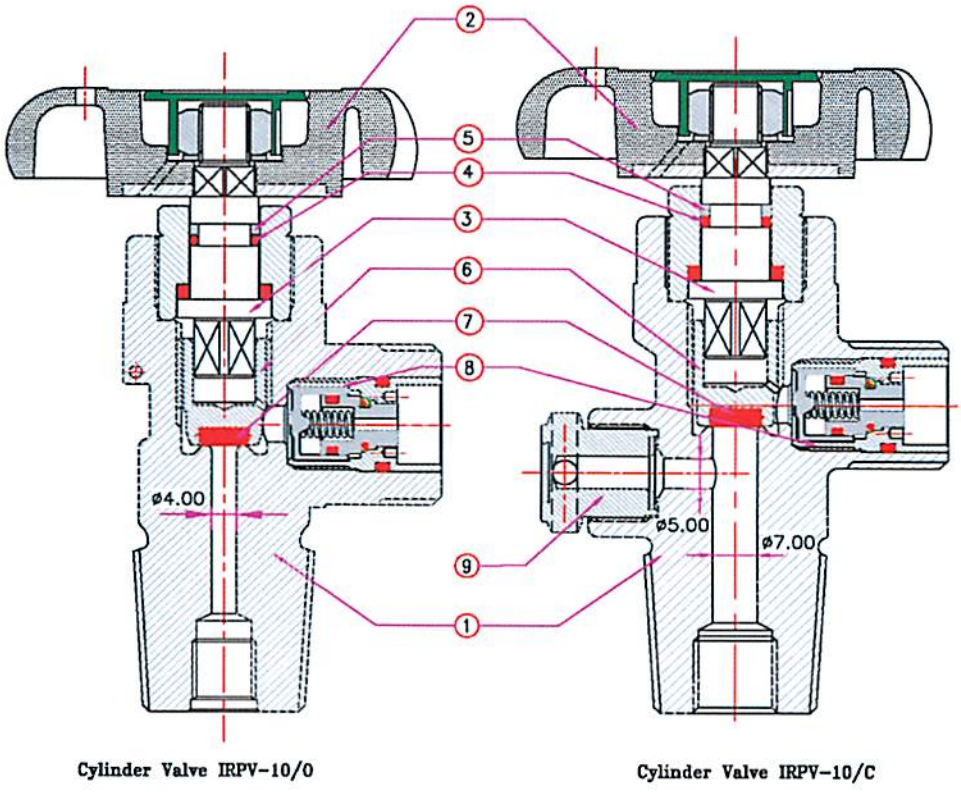

Figure 1: Cylinder valves IRPV-10/O and IRPV-10/C

The cylinder valves (see Figure 1) consist of a valve body (1) made of brass, an operating mechanism with a hand wheel (2) and a system for external and internal sealing [upper spindle (3) with EPDM o-ring (4) with backup ring (5) and a rotating lower spindle (6) and seal element made of PA (7)], a side connector for filling and distributing with an integrated residual pressure valve (8) (inline RPV) and a threaded stub for connection to the cylinder and are optionally equipped with a pressure relief device (9). The cylinder valves also exist in a top outlet version (IRPV-10/OV).

The valves having a maximum valve test pressure of 360 bar are intended for gas cylinders for technical and medical gases and have to be used with a valve protection according to 4.1.6.8 ADR for a total package mass of more than 100 kg.

1.2 Documentation

Drawings

IRPV-10/O With integrated part list	TV/DR/CE-2640/2013	2013-09-26
IRPV-10/OV With integrated part list	TV/DR/CE-2642/2013	2013-09-25
IRPV-10/C With integrated part list	TV/DR/CE-2641/2013	2013-09-20

Further documents

BAM test report	DG-07-127	2009-06-22
BAM test report	DG-09-102	2010-03-30
BAM test report	DGA-11-040	2012-01-16
BAM test report	DGA-11-021	2012-01-16
BAM test report	DGA-12-035	2013-06-08
Gas classification in BAM test report	DG-09-067 I Annexture R/A list of gases RPV	2011-01-20 2010-06-04

2 Performed/approved tests and test results

EN ISO 10297:2006

Because the cylinder valves described above in 1.2 Documentation (Drawings) use exactly the same components (with the exception of the RPV parts) as the earlier tested variants (see 1.2 Documents, Further Documents) all there cylinder valve related test results can be transferred.

EN ISO 15996:2008

Test (note)	**Test result (note)**
Valve outlet geometry according to EN ISO 15996:2008 No. 4.3	The requirement is fulfilled.
Documents according to EN ISO 15996:2008 No. 5.2	All requested documents have been provided.
Leak tightness test according to EN ISO 15996:2008 No. 5.4.2 (p = 0.5 bar in flow direction, p = 0.1 bar to 360 bar in filling direction, at -20 °C, +20 °C and +65 °C)	The requirements are fulfilled.
Cycle life test according to EN ISO 15996:2008 No. 5.4.3 (100.000 pressure cycles from closing-off pressure to 10 = bar)	The requirements are fulfilled. (Closing-off pressure between 2.1 bar and 3.0 bar and opening pressure between 4.3 and 5.9 bar **at the beginning** and closing-off pressure between 3.1 bar and 3.3 bar and opening pressure between 4.8 bar and 5.2 bar **after** the life cycle test.) (Carried out on samples with: Gleitmo 591, Gleitmo 599 and Krytox GPL 225 as lubricant for the RPV and EPDM as o-ring material and a spring made of CuBe.)

Test (note)	Test result (note)
Resistance test against reverse over-pressure according to EN ISO 15996:2008 No. 5.4.4 (p = 540 bar, t_{min} = 2 min)	The requirements are fulfilled.
Oxygen pressure surge test according to EN ISO 15996:2008 No. 5.4.5 (Type B, p = 276 bar, 50 pressure cycles)	The requirements are fulfilled. (Reference 176.12.11 in BAM - Working Group „Safe Handling of Oxygen") (The test has been carried out on sample TV/DR/CE -2315/2012 with G3/4", DIN 477-1 no. 9 outlet together with adaptor TV/DR/CE -2506/2013). The result is transferable to the here tested IRPV-10/O and IRPV-10/OV variant. (The test has been carried out with 50 pressure cycles in extension to the requirement of the standard.)

3 Summary

The cylinder valves type IRPV-10 manufactured by company tekno valves, India with the common features:

Type	IRPV-10
Gas classification	Annexture R/A list of gases RPV
Drawing number	see above
Design	manually operated handwheel valve with separated spindle and inline RPV
Inlet connection	25E, EN 629-1, 3/4"-14 NGT or 1" BS 341-3
Outlet connection	G 3/4" DIN 477-1 No. 9 or G5/8 BS 341-3 for oxygen and oxidizing gases and further national or international standards for non-oxidizing gases
Material of valve body	high (CW722R) and low tensile brass (CW617N), EN 12165
Sealing against atmosphere	O-ring EPDM
Sealing in the seat	PA 66
Lubricant (Main Valve)	see assembly drawing
Lubricant (RPV)	Gleitmo 591, Gleitmo 599 or Krytox GPL-225
Nominal diameter	4 mm or 7 mm
Handwheel diameter	65 mm
Oxygen pressure surge test with	50 cycles at 276 bar oxygen at 60 °C,

intended for gas cylinders to be used with a valve protection according to 4.1.6.8 ADR (for a total package mass of more than 100 kg) fulfil the requirements of EN ISO 10297:2006 and EN 15996:2008. The use of the valves is restricted to the above mentioned gases as well as inlet (for use without valve protection only) and outlet (only for oxygen and other oxidizing gases) connections.

BAM Federal Institute for Materials Research and Testing
12200 Berlin, 30 January 2014

Division 2.1 "Gases, Gas Plants"

by order

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Distribution list: 1st copy: tekno valves, India
2nd copy: BAM - Division 2.1 „Gases, Gas Plants"

Enclosures: Drawings and documents stamped with procedure number