



TEST REPORT

Type Testing of Cylinder Valves Type SWN-12/O
according to EN ISO 10297:2014

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Reference	15037042
Procedure	DGA-15-046
Copy	1 st copy of 2 copies
Customer	tekno valves Natun Rasta, Bilkanda, 24 Parganas (N) Kolkata - 700 113 India
Order date	June 12, 2015
Receipt of order	June 12, 2015 (e-mail)
Type of testing	Initial testing
Receipt of samples	6 x SWN-12/O (TV/DR-2268) January 4, 2015 25 x SWN-12/O (TV/DR-2268 and TV/DR-2238) June 10, 2016 2 x SWN-12/O (TV/DR-2268 and TV/DR-2238) September 2, 2016 5 x SWN-12/O (TV/DR-3804) October 24, 2016 3 x SWN -12/O (TV/DR-2238) October 12, 2016 7 x SWN-12/O (TV/DR-2238) March 2, 2017, for testing the mechanical properties 3 x SWN-12/O (TV/DR-2238) June 10, 2016 for the oxygen pressure surge test
Test period	January 2015 to March 2017
Test location	Division 2.1 "Gases, Gas Plants" Building 44 and Building 40/41
Test procedure according to	EN ISO 10297:2014

This test report consists of page 1 to 7 and enclosures to procedure 15037042.
The pressures indicated in the test report are over-pressures in bar.

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1 Description of valves and documentation

1.1 Description of valves

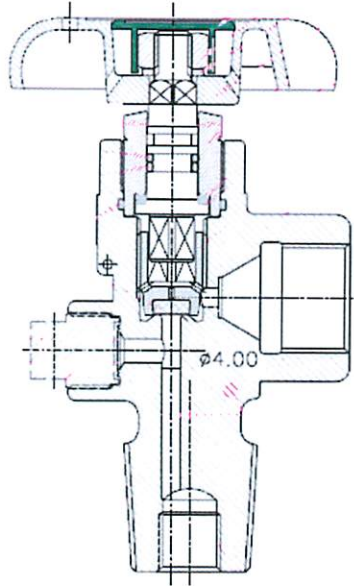


Figure 1: SWN-12/O with schematic PRD (optionally)

The valves (handwheel operated valves of the o-ring type with non-metallic seal) (see Figure 1) consist of a brass valve body with a free passage of 4 mm and one inlet connection and one outlet connection and an operating mechanism (separated brass upper spindle with o-ring secured by a gland nut and brass lower spindle with PA 66/PEEK soft seat). The valves are optionally fitted with a pressure relief device (bursting disc).

The valves having a maximum valve test pressure of 540 bar are intended for refillable gas cylinders for technical gases and for a total package mass of more than (83/100/111) kg (depending on the valve body material and inlet connection) have to be used with a valve protection according to 4.1.6.8 ADR.

1.2 Documentation

Drawings

Assembly drawing SWN-12/O with integrated parts list	TV/DR-2238/2015 rev. 03	2016-09-14
Assembly drawing SWN-12/O with integrated parts list	TV/DR-2268/2015 rev. 03	2016-09-14
Assembly drawing SWN-12/O with integrated parts list	TV/DR-3804/2016	2016-09-14
Assembly drawing SWN-12/O with integrated parts list	TV/DR-3849/2016	2017-03-27

Assembly drawing SWN-12/0 with integrated parts list	TV/DR-3850/2016	2017-03-27
Assembly drawing SWN-12/0 with integrated parts list	TV/DR-3887/2016	2016-09-14
Assembly drawing SWN-12/0 with integrated parts list	TV/DR-3889/2016	2016-09-14

Further documents

Material compatibility list	Annex S/I (non-oxygen variant)	2017-03-20
Material compatibility list	Annex S/O (oxygen variant)	2017-03-20
Impact chart	Annex IA (impact values for SWN-12/0)	2017-03-27

2 Performed tests and test results

Requirement/Test (note)	Result (note)
General according to EN ISO 10297 no. 5.1	The requirements are fulfilled.
Materials according to EN ISO 10297 no. 5.2	The requirements are fulfilled. (Valve body material according to 5.2, a.) (Lubricant according to 5.2, 1.)
Dimensions according to EN ISO 10297 no. 5.3	The requirements are fulfilled/partly not applicable. (The valves are not of the pin-index type for medical gas service.)
Valve connections according to EN ISO 10297 no. 5.4	The requirements are fulfilled. (The valves do not have a separate filling connection.) (Specification of valve connections: see 3 Summary.)
Mechanical strength according to EN ISO 10297 no. 5.5	The requirements are fulfilled. (See tests no. 6.9 and Annex A.)
Valve operating mechanism according to EN ISO 10297 no. 5.6	The requirements are fulfilled/partly not applicable. (The valves are not intended to be used for acetylene.) (See tests no. 6.11, 6.12, 6.13, 6.14 and Annex B.)
Valve operating device according to EN ISO 10297 no. 5.7	The requirements are fulfilled. (The valves are operated with a handwheel.) (See test no. 6.10.)

Requirement/Test (note)	Result (note)
Leakage according to EN ISO 10297 no. 5.8	The requirements are fulfilled. (See test no. 6.12.)
Resistance to ignition according to EN ISO 10297 no. 5.9	The requirements are fulfilled. (See test Annex C.)
Documents according to EN ISO 10297 no. 6.2	All requested documents have been provided.
Hydraulic burst pressure test according to EN ISO 10297 no. 6.9 ($p_{vbt} = 1013 \text{ bar}$, $t > 2 \text{ min}$) carried out on drawing nos. TV/DR-2238/2015 and TV/DR-2268/2015	The requirements are fulfilled. (Variants with a valve body consisting of high tensile/low tensile brass CW722R/CW617N)
Flame impingement test according to EN ISO 10297 no. 6.10 ($t = 1 \text{ min}$, $\theta = 800 \text{ °C} - 1000 \text{ °C}$) carried out on aluminium handwheel (TV/DR-3182/2015) and PA 6 handwheel (TV/DR-3191/2015)	The requirements are fulfilled.
Excessive torque tests according to EN ISO 10297 no. 6.11 ($T_o = 20 \text{ Nm}$, $T_f = 39 \text{ Nm}$ according to the handwheel diameter of 65 mm) carried out on drawing nos. TV/DR-2238/2015 and TV/DR-2268/2015	The requirements are fulfilled. (Variants with a valve body consisting of high tensile/low tensile brass CW722R/CW617N and equipped with a handwheel made of aluminium or PA 6)
Tightness tests according to EN ISO 10297 no. 6.12 ($p = 0.5 \text{ bar}$, 10 bar and 540 bar at $\theta = -46 \text{ °C}$, -20 °C , RT and $+85 \text{ °C}$ with helium) carried out on drawing no. TV/DR-2238/2015 (540 bar) TV/DR-2268/2015 (360 bar)	The requirements are fulfilled. (T_c determined = 3 Nm.) (In addition to the requirements the valves were also tested for internal and external tightness at $+85 \text{ °C}$ and for external tightness at -46 °C .)

Requirement/Test (note)	Result (note)
<p>Endurance test according to EN ISO 10297 no. 6.13 ($p_{vt} = 360$ bar or 540 bar, 2000 cycles with $T_{e,start} = 7$ Nm; $T_{e,end} = 7$ Nm with air/nitrogen) carried out on drawing no. TV/DR-2238/2015 (540 bar, nitrogen) TV/DR-2268/2015 (360 bar, air)</p>	<p>The requirements are fulfilled.</p>
<p>Visual examination according to EN ISO 10297 no. 6.14 carried out on drawing no. TV/DR-2238/2015 (540 bar) TV/DR-2268/2015 (360 bar)</p>	<p>The requirements are fulfilled.</p>
<p>Marking according to EN ISO 10297 no. 7</p>	<p>All required markings are existent either on the test samples or in the drawings. (The identification of further inlet and outlet connections in addition to the ones given in 3 Summary has to be marked.)</p>
<p>Impact test according to EN ISO 10297 Annex A ($E = 300$ J, 360 J or 400 J, valving torque = 200 Nm) subsequent hydraulic burst pressure test ($p_{vt} = 540$ bar, $t > 2$ min) subsequent internal tightness test ($p_{vt} = 540$ bar, $\theta = RT$ with air) carried out on valves according to drawing no. TV/DR-2238/2015, TV/DR-2268/2015 and TV/DR-3850/2016 in different configurations (variants are identified by the valve body material CW617N/CW722R, and implementing or excluding a large undercut on the valve inlet connection).</p>	<p>The requirements are fulfilled. (All impact tests were carried out with inlet connection 25E or 1"BS either with or without large undercut on the inlet connection) (No leakage was observed through the threaded joint between the valve and the test fixture.) (Number of protruding threads after valving procedure: 4-5 (25 E) and 2-3 (1" BS).) (Valves intended for a total package mass of more than 83 kg, 100 kg or 111 kg (see annex IA - Impact values for SWN-12/O under 1.2 Documents) require a valve protection according to 4.1.6.8 ADR.) (The test results are transferrable to inlet connection $\frac{3}{4}$ - 14 NGT with large undercut and $\frac{3}{4}$ - 14 NGT and 1"BS for the version without large undercut on the valve inlet connection.) (The test results are transferable to all other valve types given in annex IA - Impact values for SWN-12/O, see 1.2 Documents.)</p>

Requirement/Test (note)	Result (note)
Oxygen pressure surge test according to EN ISO 10297 Annex C ($p_{vt} = 360$ bar, 50 pressure cycles) carried out on TV/DR-2238/2015	<p>The requirements are fulfilled.</p> <p>(The test has been carried out with a pressure rise time of 16 ms determined with 2 cycles for its calibration.)</p> <p>(The test on request of the manufacturer in addition to the requirements has been carried out with 50 pressure cycles.)</p> <p>(Procedure no. 176.15.15 in BAM Working Group "Safe Handling of Oxygen".)</p> <p>(The test results are transferable to all other valve types given in 1.2 Documentation if equipped with PA66 seat insert, EPDM o-ring and Gleitmo 599/Klüberalfa YV 93-302 lubricant.)</p>

The test results are transferable to all other valve types given in 1.2 Documentation taking their specific configuration (o-ring, lubricant, seat material and test pressure) into account.

3 Summary

The cylinder valves SWN-12/O manufactured by company tekno valves, India with the common features

Type	SWN-12/O
Gas classification	Annex S/I (non-oxygen variant) Annex S/O (oxygen variant)
Drawing number(s)	See 1.2 Documentation
Design	O-ring gland sealed, with separated spindle and non-metallic seal
Inlet connection	25 E, ISO 11363-1 or as per any other regional/national/international standards (if used with valve protection)
Outlet connection	G 5/8, no. 3 BS-341 or as per any other regional/national/international standards (for non-oxidizing gases only)
Material of valve body	High tensile/low tensile brass CW722R/CW617N
Sealing against atmosphere	EPDM o-ring
Sealing in the seat	PA 66 or PEEK
Lubricant	Klübertemp GR M30, Klüberalfa YV 93-302 or Gleitmo 599
Nominal diameter	4 mm
Handwheel material	Aluminium or PA 6

Handwheel diameter	65 mm
Tightness tested with	p = 0.5 bar, 10 bar and up to 540 bar at $\theta = -46\text{ °C}$ (also external), -20 °C , RT and $+85\text{ °C}$ with helium
Strength test with	1013 bar
Oxygen pressure surge with	50 cycles at 360 bar oxygen at 60 °C
Total package mass	83 kg, 100 kg or 111 kg
Impact test with	300 Joule, 360 Joule or 400 Joule

intended for refillable gas cylinders to be used with a valve protection according to 4.1.6.8 ADR (for a total package mass of more than 83 kg, 100 kg or 111 kg, depending on the valve inlet connection) fulfil the requirements of EN ISO 10297:2014.

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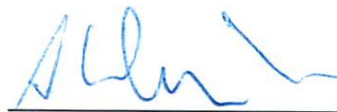
April 7, 2017

Division 2.1 "Gases, Gas Plants"

By order



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Study Director

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

Enclosures: Drawings and documents stamped with procedure number