

REAL TEST PRESENTATION



ISO 15848

TESTING LABORATORY

SPETECH[®]



Industrial valves - measurement test and qualification
procedures for fugitive emissions

Part 1: Classification system & qualification procedures
for type testing of valves

- Fugitive emissions are defined as the unintentional and undesirable emission, leakage, or discharge of gases or vapors from pressure-containing equipment or facilities, and from components inside an industrial plant such as valves, piping flanges, pumps, storage tanks, compressors, etc.





API

American Petroleum Institute

ISO 15848

TA-Luft

Shell MESOC

Material and Equipment Standards and Code

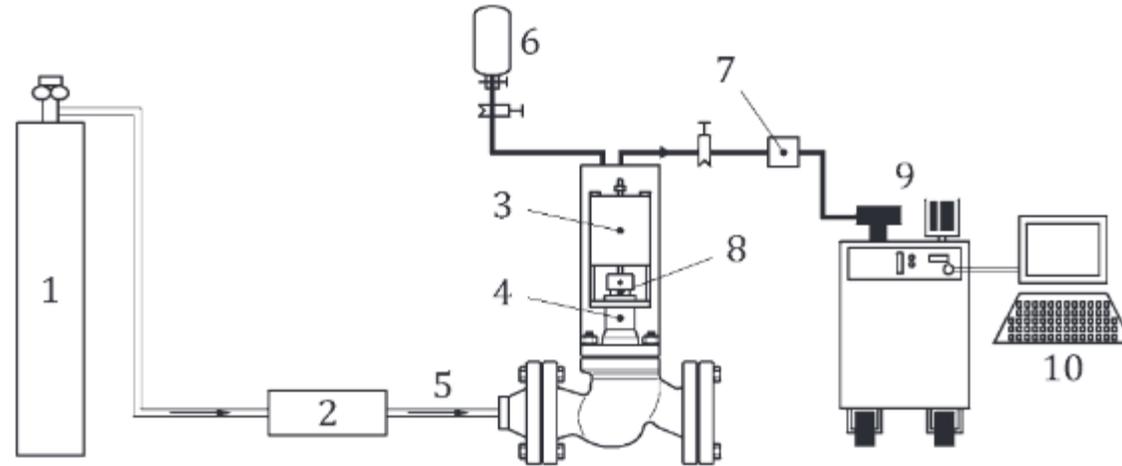
MSS

Manufacturers Standardization Society

- Objective of part 1 of ISO 15848 is to enable classification of performance of different designs and constructions of valves to reduce fugitive emissions.
- It defines type test for evaluation and qualification of valves where fugitive emissions standards are specified.
- ISO 15848-1 specifies testing procedures for evaluation of external leakage of valve stem seals (or shaft) and body joints of isolating valves and control valves intended for application in volatile air pollutants and hazardous fluids. End connection joints, vacuum application, effects of corrosion, and radiation are excluded from this part of ISO 15848.



Testing rig and equipment



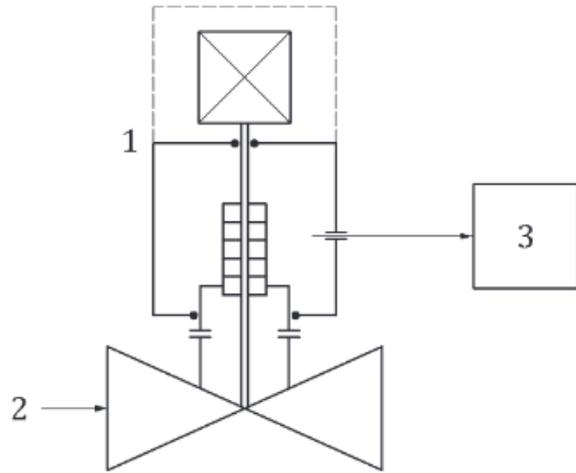
Key

- 1 helium at 97 % purity
- 2 pressure control
- 3 actuator
- 4 vacuum
- 5 helium

- 6 standard calibrated leak
- 7 vacuum breaker (optional)
- 8 tested stem sealing
- 9 helium mass spectrometer
- 10 data acquisition

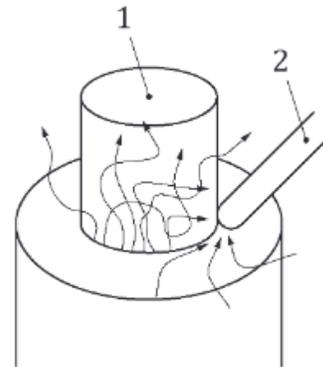


Leak rate measurement methods



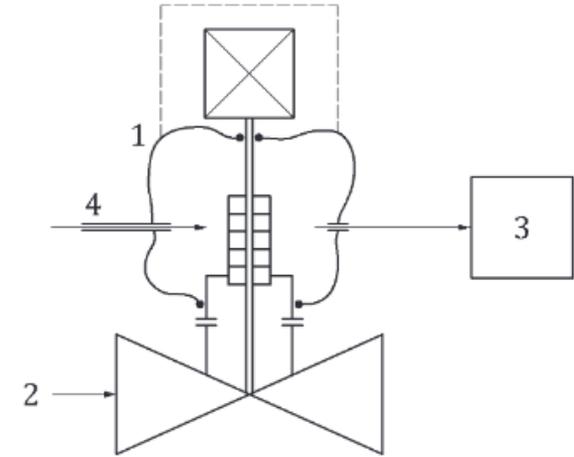
- Key**
- 1 vacuum chamber
 - 2 pressurized helium
 - 3 vacuum helium detector

Vacuum method (helium only)



- Key**
- 1 valve stem
 - 2 probe

Sniffing method



- Key**
- 1 bagged volume
 - 2 pressurized helium
 - 3 helium detector
 - 4 balancing tube

Bagging (Suck Through method)



Endurance classes, leakage limits and temperature classes

Isolating valves [COx]			
Class	CO1	CO2	CO3
Mechanical cycles	205	1500	2500

Control valves [CCx]			
Class	CC1	CC2	CC3
Mechanical cycles	20 000	60 000	100 000

Class (methane)	Measured stem leakage (sniffing method)
	<i>ppmv</i>
AM	≤ 50
BM	≤ 100
CM	≤ 500

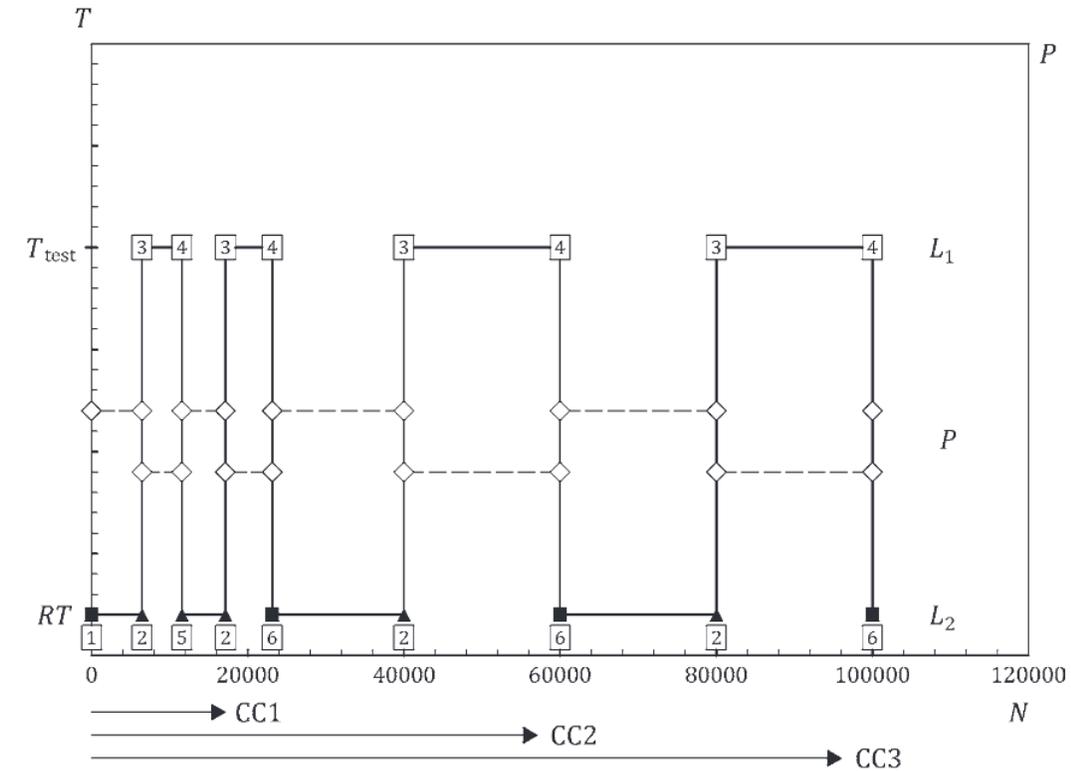
Class (helium)	Measured leak rate (mass flow)	Measured leak rate (mass flow)	Measured leak rate (volumic flow)
	$mg * s^{-1} * m^{-1}$ stem perimeter (for information)	$mg * s^{-1} * mm^{-1}$ stem diameter through stem seal system	$mbar * l * s^{-1}$ per mm stem diameter through stem seal system
AH	≤ 10^{-5}	≤ $3,14 * 10^{-8}$	≤ $1,78 * 10^{-7}$
BH	≤ 10^{-4}	≤ $3,14 * 10^{-7}$	≤ $1,78 * 10^{-6}$
CH	≤ 10^{-2}	≤ $3,14 * 10^{-5}$	≤ $1,78 * 10^{-4}$

Measured body leakage
<i>ppmv</i>
≤ 50

Temperature classes						
Test temperature	-196°C	-46°C	-29°C	RT	200°C	400°C
Test coverage	-196°C to RT	-46°C to RT	-29°C to RT	+5°C to +40°C	RT to 200°C	RT to 400°C

The course of the testing of control valves

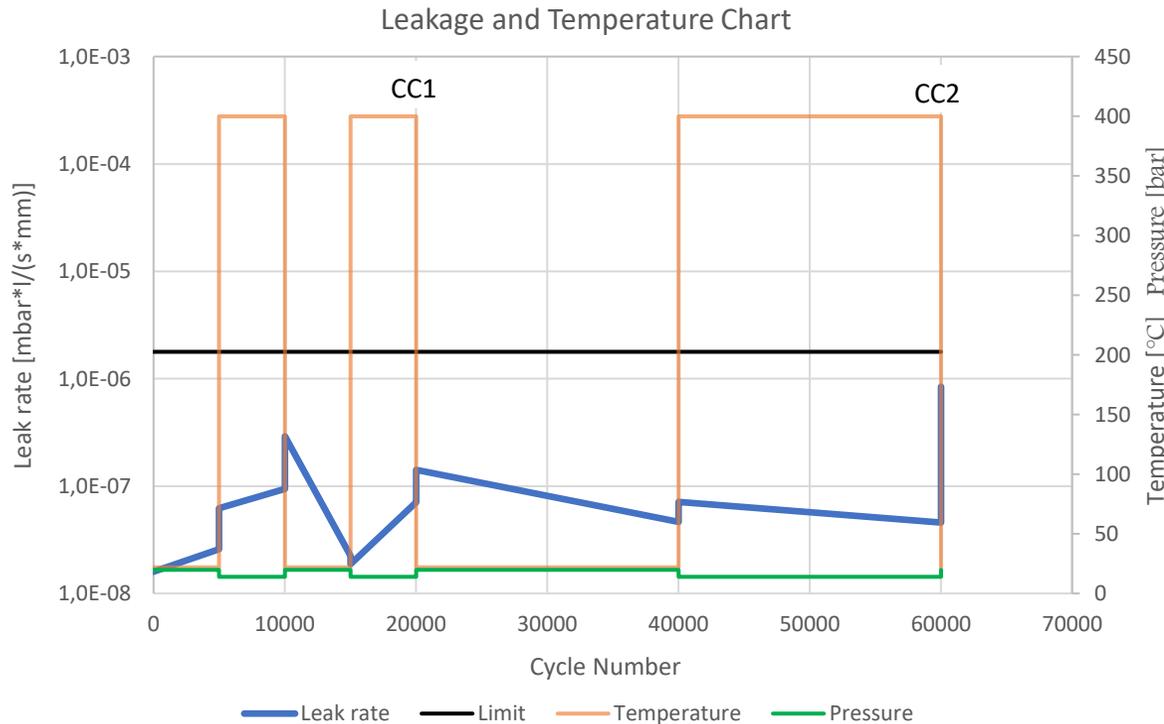
- Preliminary tests at the room temperature (test 1)
- Mechanical cycle test at the room temperature (test 2)
- Static test at the selected test temperature (test 3)
- Mechanical cycle test at the selected test temperature (test 4)
- Intermediate static test at the room temperature (test 5)
- Final test at the room temperature (test 6)



Key

- T_{test} test temperature, °C
- L_1 measurement of leakage of stem seal
- L_2 measurement of leakage of body seal
- N number of mechanical cycles
- P test fluid pressure

**Certificate of valve classification according to standard
PN-EN ISO 15848-1:2015**



Manufacturer:	CSUT SPETECH
Location of performed test:	SPETECH Testing Laboratory
Test Date:	29.11.2022 to 01.12.2022
Object of testing:	Control Valve: SPETOVALVE® 4S DN 25 CL 150
Serial number:	2205-309
Stem packing type:	SPETECH SPETOPAK® WGR TA10 60x40x50
Leakage measurement:	Vacuum method acc. to PN-EN ISO 15848-1:2015
Leakage detector:	Helium leakage detector PfeiferVacuum HLT 500
Certification requirements:	Testing acc. to PN-EN ISO 15848-1:2015/A1: 60000 mechanical cycles, 200°C, testing fluid - helium, tightness class BH,
Test results:	- stem leak rate 8,46*10⁻⁷ mbar*/(s*mm), - body leak rate 9,7 ppmv.
	Valve meets requirements of the standard PN-EN ISO 15848-1 in tightness class BH marked as: ISO FE BH – CC2 – SSA 1 – t200°C – CL 150 - ISO 15848-1.
	As stated in testing report No. 01/01/29.11.2022/R
Classification coverage:	Certificate covers all valves with the same body design and (acc. to sect. 8 said standard) stem made with the same materials while meeting requirements of: <ul style="list-style-type: none"> • stem diameter from 20 mm to 80 mm • pressure acc. to CL 150

Purpose of this certificate is to confirm results of valve testing, it shall not be considered as opinion of said valve.

Bielsko-Biała, 29 November 2022

eng. Mateusz Romański

Valve meets requirements of the standard PN-EN ISO 15848-1 in tightness class BH marked as:

ISO FE BH – CC2 – SSA 1 – t200°C – CL 150 – ISO 15848-1.

ISO Fugitive Emissions

Tightness class:
 $\leq 1,78 * 10^{-6} \text{ mbar} * l * (s * mm)^{-1}$

Endurance class:
60 000 mechanical cycles

Temperature class:
RT-200°C

Test acc. to:
ISO 15848-1

Nominal pressure:
Class 150

Number of **Steam Seal Adjustments**:
1

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**THANK YOU!
QUESTIONS?**

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