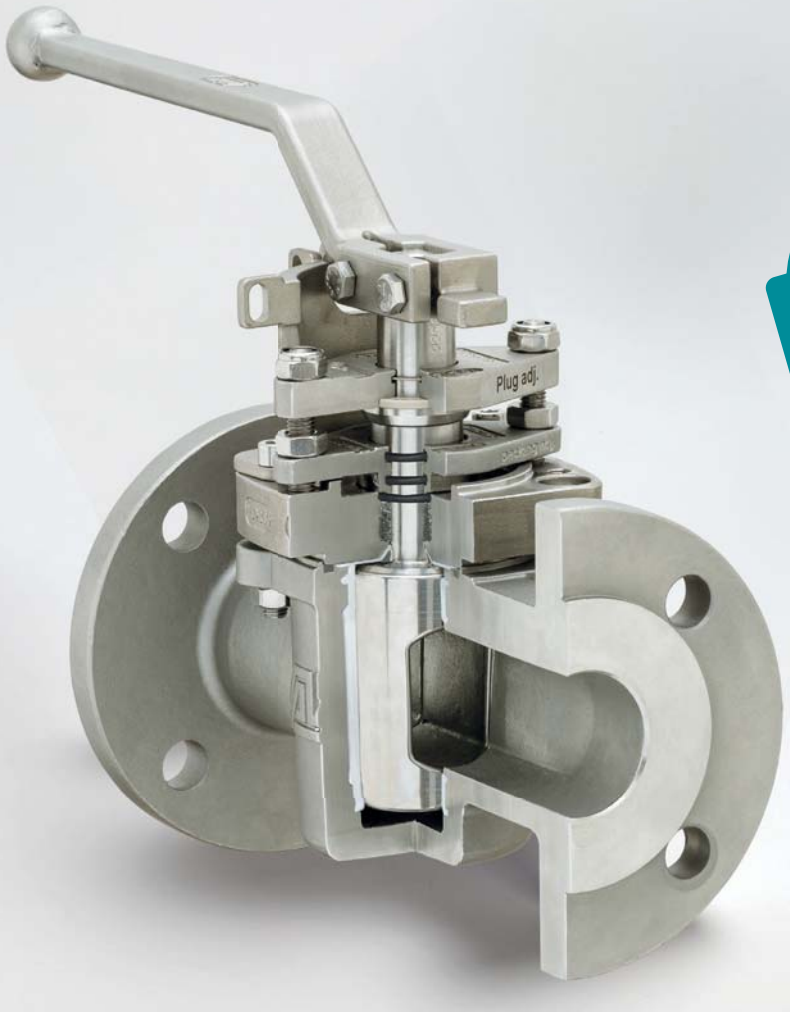
ARMATUREN
free of cavities & maintenance

engineered.
fast.
dynamic.

Low-Emission Plug Valves

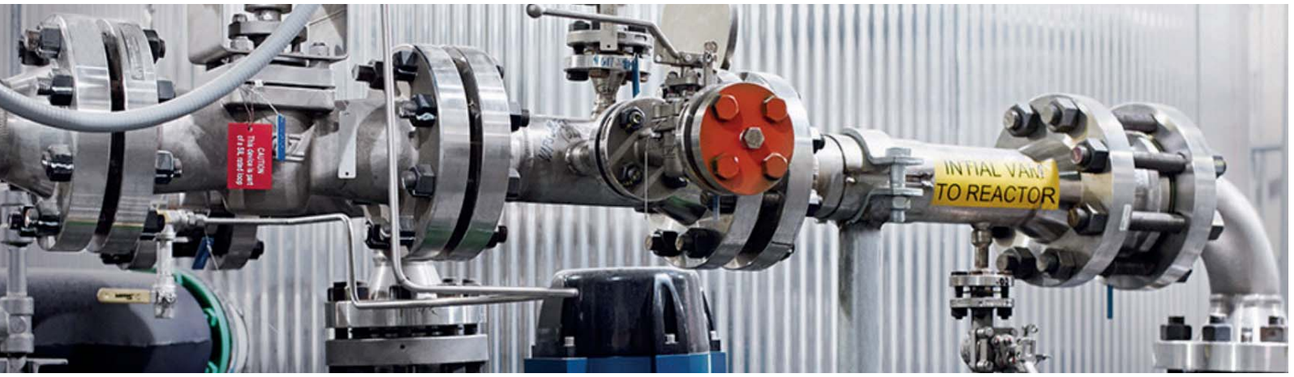
- **AZ Sealing System Solutions for a cleaner and safer environment**
- **According to ISO 15848, TA-Luft and API 641**



World´s First
Plug Valve
acc. to ISO 15848 / AH
Emission Free

FUGITIVE EMISSIONS

Fugitive Emissions

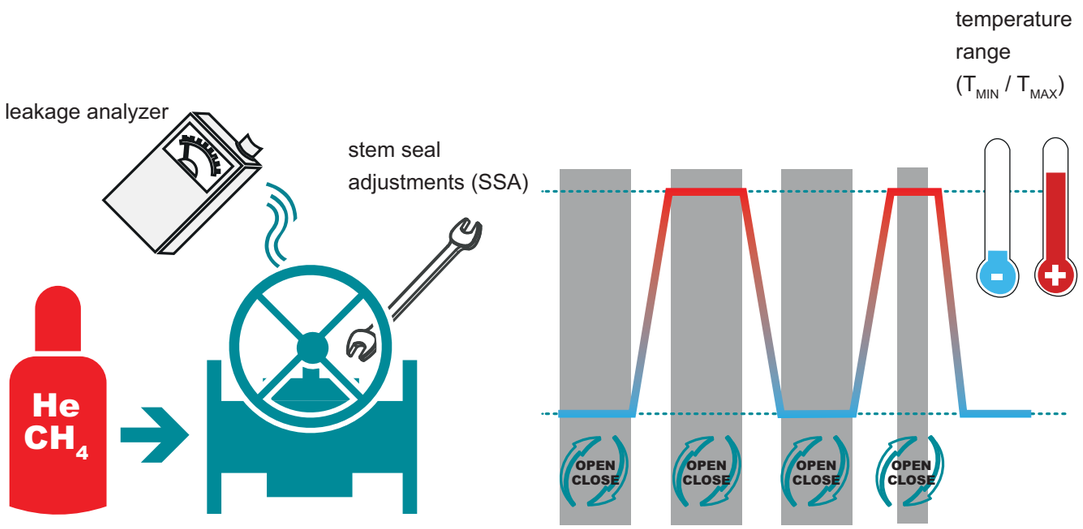


ISO 15848 and API 641 set highest standards in order to protect people and the environment against volatile emissions and to save valuable resources.

What are fugitive emissions?

- Fugitive emissions are uncontrolled emissions of media from process plants
- This applies in particular to volatile organic compounds (VOC), such as benzene, methane or ethanol as well as other harmful media
- At valves these emissions mainly occur at the stem

Test setup



test media
He: Helium
CH_4: Methane

mechanical cycles (OPEN / CLOSE)
thermal cycles (UP / DOWN)

ISO 15848

ISO 15848-1 is a **type test**. Its classification system makes valves and seal designs comparable. Qualified valves are provided with the label “ISO FE” (ISO **F**ugitive **E**mission) and achieved code.

Classification system

Code format: **ISO FE** | **B** | **H** | **CO3** | **SSA0** | **t200°C** | **PN16** | **ISO 15848-1**

TIGHTNESS CLASS
Stem leakage rates for Helium
A = ≤ 1,78 x 10^{-7} mbar · l/s · mm
B = ≤ 1,78 x 10^{-6} mbar · l/s · mm
C = ≤ 1,78 x 10^{-4} mbar · l/s · mm
Cover sealing ≤ 50 ppmv

Stem leakage rates for Methane
A = ≤ 50 ppmv
B = ≤ 100 ppmv
C = ≤ 500 ppmv
Cover sealing ≤ 50 ppmv

TEST MEDIA
H = Helium
M = Methane

ENDURANCE CLASS
Number of mechanical (ON / OFF) and thermal (UP / DOWN) cycles

On-Off valves	**CO1**	205x mechanical / 2x thermal
	CO2	1.500x mechanical / 3x thermal
	CO3	2.500x mechanical / 4x thermal
control valves	**CC1**	20.000x mechanical / 2x thermal
	CC2	60.000x mechanical / 3x thermal
	CC3	100.000x mechanical / 4x thermal

TEST PRESSURE
Acc. to valve pressure rating

TEMPERATURE CLASS
t-196°C = -196°C / 320°F to AT
t-46°C = -46°C / -51°F to AT
t-29°C = -29°C / -20°F to AT
tAT* = +5°C / 41°F to +40°C / 104°F
t200°C = AT to 200°C / 392°F
t400°C = AT to 400°C / 752°F
*) ambient temperature

STEM SEAL ADJUSTMENTS
SSA0 = none
SSA1 = 1 (only allowed for CO1/CC1 or better)
SSA2 = 2 (only allowed for ‘ CO2/CC2 or better)
SSA3 = 3 (only allowed for CO3/CC3)

ISO 15848-2 is a **production acceptance test** for a specific customer order.
Important: Valves need to be qualified acc. to part 1 (ISO 15848-1) in order to perform the ISO 15848-2 test.

Criteria	Requirements	
Leakage rate (stem)	Class A ≤ 50 ppmv Class B ≤ 100 ppmv Class C ≤ 200 ppmv	NOTE: Tightness classes A, B, C are not equal to part 1 (ISO 15848-1)
Leakage rate (cover sealing)	≤ 50 ppmv	
Test media	Helium (H)	
Mechanical cycles (ON/OFF)	5	
Thermal cycles (UP/DOWN)	0	
Test temperature	ambient	
Test pressure	6 bar or acc. to customer requirements	
Allowed adjustments	0	

API 641

API 641 is a standard for **type testing** of quarter-turn valves for fugitive emissions.
In contrast to the ISO 15848-1 this standard defines values, not classes

Criteria	Requirements
Leakage rate (stem)	≤ 100 ppmv
Leakage rate (cover sealing)	≤ 100 ppmv
Test media	Methane (M)
Mechanical cycles (ON/OFF)	610
Thermal cycles (UP/DOWN)	3
Test temperature	depending on valve group*
Test pressure	depending on valve group*
Allowed adjustments	0

*VALVE GROUPS

Temerature rating ≥ 260°C (500°F)

A = Valve pressure rating at 260 °C (500°F) is ≥ 41,1 barg (600 psig)

B = Valve pressure rating at 260 °C (500°F) is < 41.1 barg and ≥ 6.89 barg (100 psig)

C = Valve with a temperature rating ≥ 260 °C (500°F) and does not comply with the requirements of Group A or Group B

Temperature Rating < 260 °C (500°F)

D = Valve pressure rating at its maximum rated temperature is ≥ 41,1 barg (600 psig)

E = Valve pressure rating at its maximum rated temperature is < 41,1 barg (600 psig) and ≥ 6.89 barg (100 psig)

F = Valve with a temperature rating < 260 °C (500°F) and does not comply with the requirements of Group D or Group E

TA-Luft

TA Luft (Technical Instructions on Air Quality Control) is a German standard which applies to all technical plants that are subject to approval. Abstract 5.2.6.4 defines **minimum requirements** for isolation and control valves. In the past, this standard referred to VDI 2440, but is now based on ISO 15848-1.

Classification system

Code format: **ISO FE** | **B** | **H** | **CO3** | **SSAX** | **t-29°,200°C°** | **PN40** | **ISO 15848-1**

TIGHTNESS CLASS

	≤40 bar	>40 bar
≤200°C	BH	CH
>200°C	CH	CH

TEST MEDIA

H = Helium
M = Methane

ENDURANCE CLASS

C01 & C02 are also acceptable
if there is a maintenance concept

TEST PRESSURE

Acc. to valve pressure rating

TEMPERATURE CLASS

t-196°C = -196°C / 320°F to AT
t-46°C = -46°C / -51°F to AT
t-29°C = -29°C / -20°F to AT
tAT* = +5°C / 41°F to +40°C / 104°F
t200°C = AT to 200°C / 392°F
t400°C = AT to 400°C / 752°F
*) ambient temperature

STEM SEAL ADJUSTMENTS

max SSA as per endurance class
SSA0 = none
SSA1 = 1 (only allowed for CO1/CC1 or better)
SSA2 = 2 (only allowed for ‘ CO2/CC2 or better)
SSA3 = 3 (only allowed for CO3/CC3)

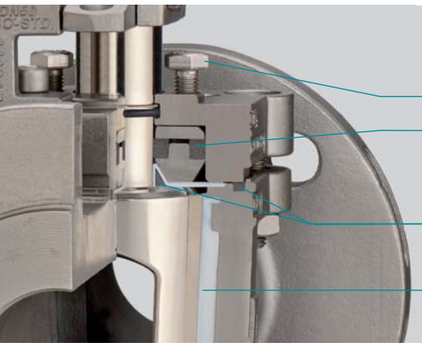
NOTE

TA LUFT	ISO 15848
LB	B
LC	C

AZ Fire-Safe sealing systems (API 607) certified acc. to ISO 15848-1 **BH** and API 641

Type FS

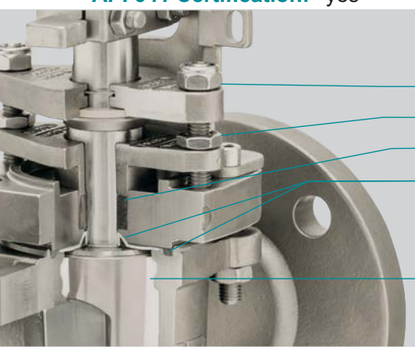
ISO 15848-1 Code: BH - CO3 SSA2-t(Rt-200°C) -PN40/CL300
API 641 Certification: no



- plug & packing adjustment
- **Tertiary sealing**: Packing to atmosphere (graphite)
- **Secondary sealing**: cover sealing + V-diaphragm (PTFE) + delta thrust collar (graphite) + stainless steel diaphragm
- **Primary sealing**: sleeve

Type FSN

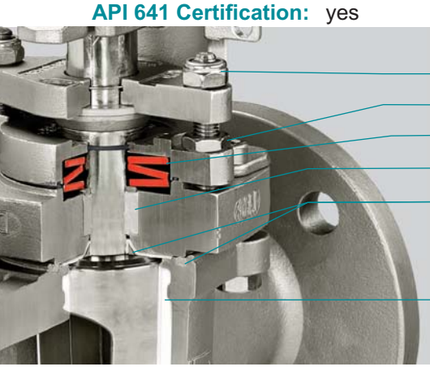
ISO 15848-1 Code: BH C03 SSA0 t(Rt-200°C) PN40/CL300
API 641 Certification: yes



- plug adjustment
- stuffing box adjustment
- **Tertiary sealing**: triple safety stem packing (graphite)
- **Secondary sealing**: V-diaphragm (PTFE) and delta thrust collar(graphite) cover sealing (graphite)
- **Primary sealing**: sleeve

Type FSN-SL

ISO 15848-1 Code: BH C03 SSA0 t(Rt-200°C) PN40/CL300
API 641 Certification: yes



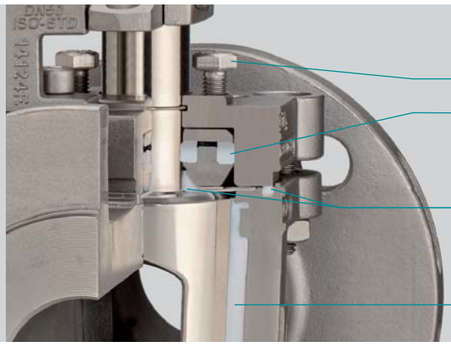
- plug adjustment
- stuffing box adjustment
- disk springs (optionally made of Inconel)
- **Tertiary sealing:** triple safety stem packing (graphite)
- **Secondary sealing**: cover sealing (graphite) + V-diaphragm (PTFE) and delta thrust collar (graphite)
- **Primary sealing:** sleeve

live-loaded

AZ Chemistry sealing systems certified acc. to ISO 15848-1 **BH**

Type CA

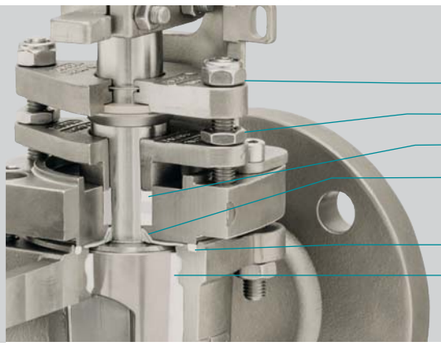
ISO 15848-1 Code: BH-PN40/CL300
API 641 Certification: no



- plug & packing adjustment
- **Tertiary sealing**: Packing to atmosphere (PTFE)
- **Secondary sealing**: cover sealing + V-diaphragm (PTFE) + delta thrust collar (graphite) + stainless steel diaphragm
- **Primary sealing**: sleeve

Type CASN

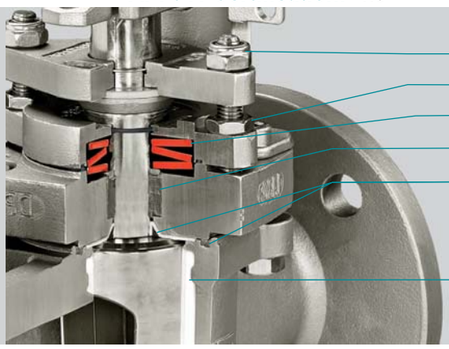
ISO 15848-1 Code: BH-PN40/CL300
API 641 Certification: no



- plug adjustment
- stuffing box adjustment
- **Tertiary sealing**: triple safety stem packing (PTFE)
- **Secondary sealing**: V-diaphragm (PTFE) and delta thrust collar(PTFE) cover sealing (PTFE)
- **Primary sealing**: sleeve

Type CASN-SL

ISO 15848-1 Code: BH-PN40/CL300
API 641 Certification: no



- plug adjustment
- stuffing box adjustment
- disk springs (optionally made of Inconel)
- **Tertiary sealing:** triple safety stem packing (PTFE)
- **Secondary sealing**: cover sealing (PTFE) + V-diaphragm (PTFE) and delta thrust collar (PTFE)
- **Primary sealing:** sleeve

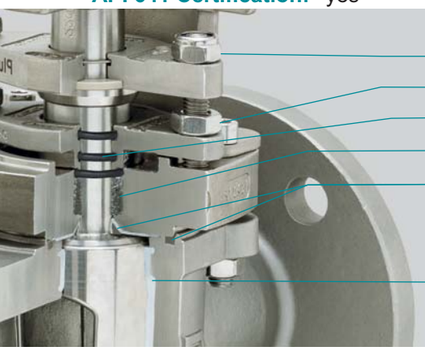
live-loaded

AZ Fire-Safe sealing systems (API 607) certified acc. to ISO 15848-1 **AH** and API 641

Type FSN-EF

ISO 15848-1 Code: AH-C01 SSA-0 (AT-200°C) PN40/CL300

API 641 Certification: yes



- plug adjustment
- stuffing box adjustment
- **Quaternary sealing:** three o-rings at the stem
- **Tertiary sealing:** triple safety stem packing (graphite)
- **Secondary sealing:** cover sealing (graphite)
  + V-diaphragm (PTFE) and delta thrust collar (graphite)
- **Primary sealing:** sleeve

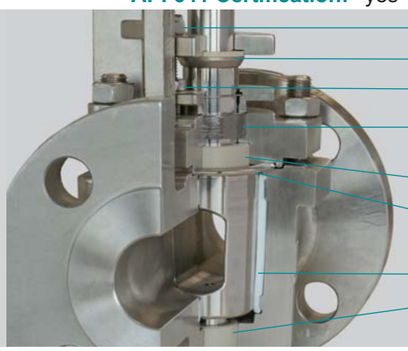
Emission Free

AZ High-Pressure sealing systems certified acc. to ISO 15848-1 **BH**

Type HDS-GL

ISO 15848-1 Code: BH CO2 SSA0 t200°C CL 600

API 641 Certification: yes



- plug adjustment
- thrust collar / PEEK bearing
- stuffing box adjustment
- **Tertiary sealing**: triple safety stem packing (graphite)
- PEEK bearing (top)
- **Secondary sealing**: spiral sealing (graphite)
- **Primary sealing:** sleeve
- trunnion mounted plug

Additional sealing systems certified acc. to ISO 15848-1 **BH**

Type FM124 / MGZ24

ISO 15848-1 Code: BH CO1 SSA1 t200°C PN 40

API 641 Certification: no

Type MGZ24

Type FM124

Product Range

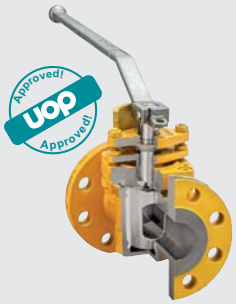
Safety first !

Plug Valves with PTFE-sleeve

- two-way and multi-way valves

HIGH PERFORMANCE valves

- for processes with demanding requirements



Valves with PFA/ FEP lining

- full safety for operator and environment

Sampling systems

- pressure-less, representative, specific, safe and reliable

Control plug valves

- precise equal percentage or linear control

Piping accessories

- metallic or with PFA / FEP lining

Actuation

- aligned, verified and tested components

Special solutions

- customized solutions

www.az-armaturen.com

10.2024 - 0,3 - GB - Subject to technical change without notice