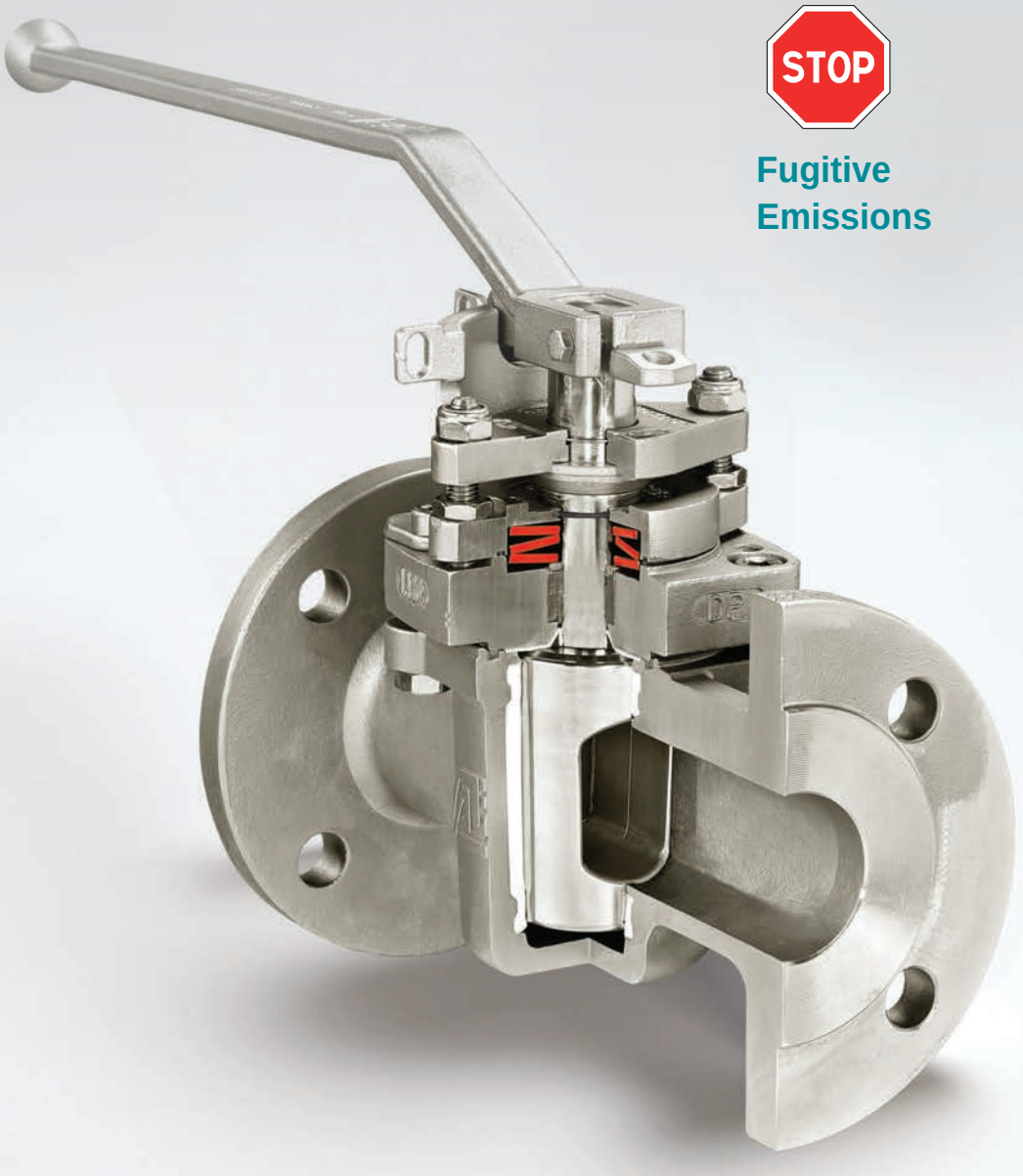
ARMATUREN

free of cavities & maintenance

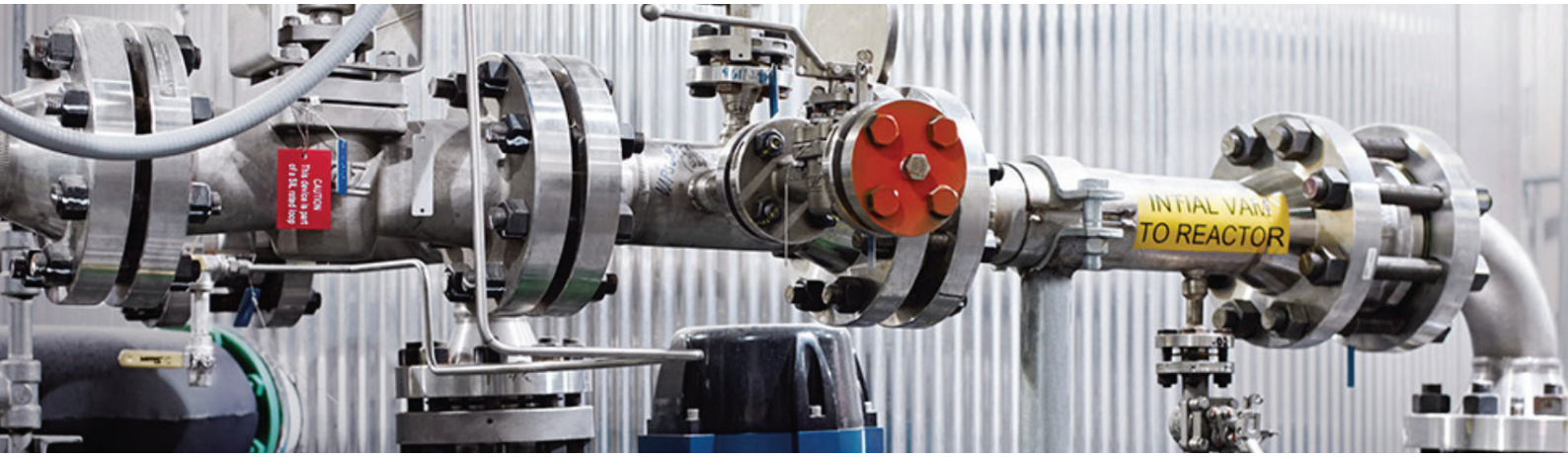
Low-Emission Plug Valves

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



Fugitive Emissions

Fugitive Emissions

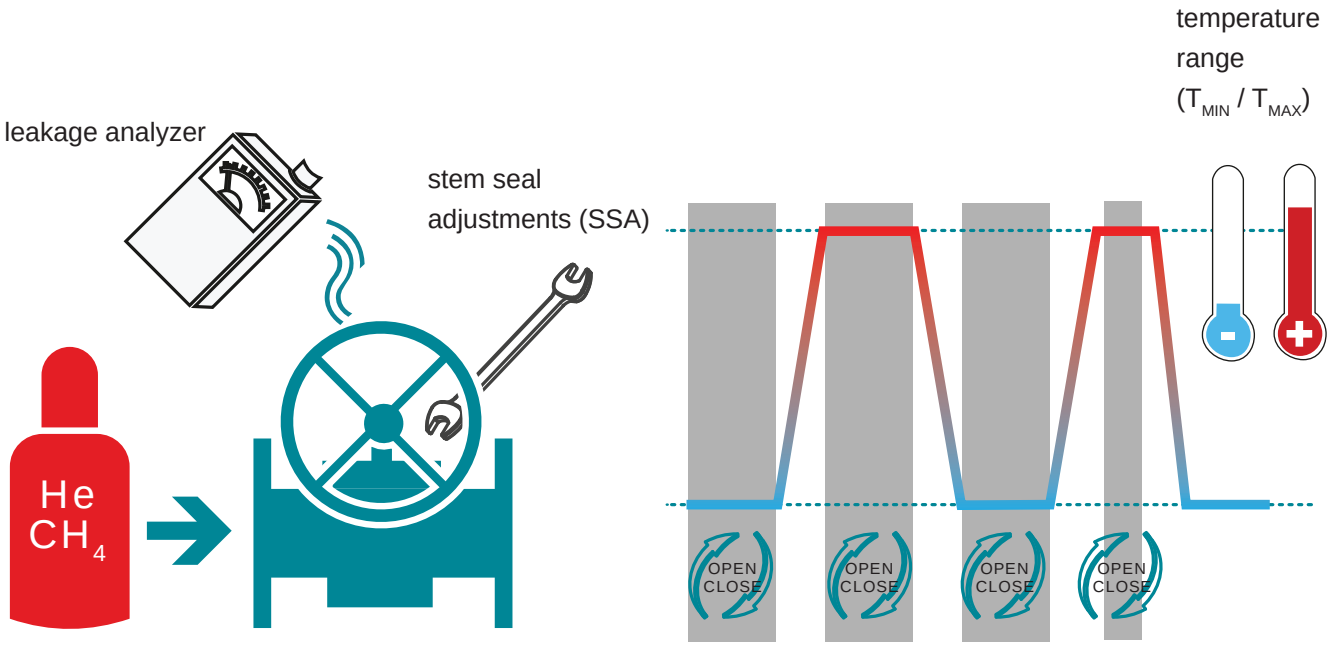


ISO 15848 and API 641 set highest standards in order to protect people and the environment against volatile emissions and to save valuable resources.

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 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

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

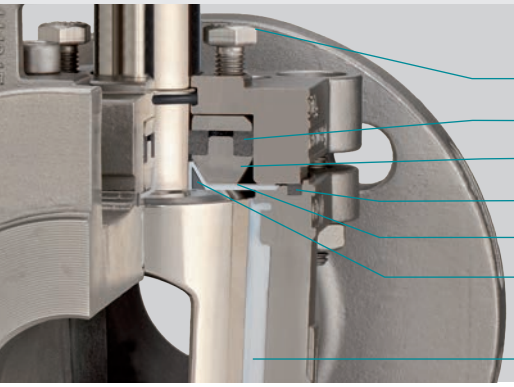
STEM SEAL ADJUSTMENTS

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)

AZ sealing system solutions certified acc. to ISO 15848-1 and API 641

Type FS Fire-Safe-sealing (API 607) with additional graphite packing

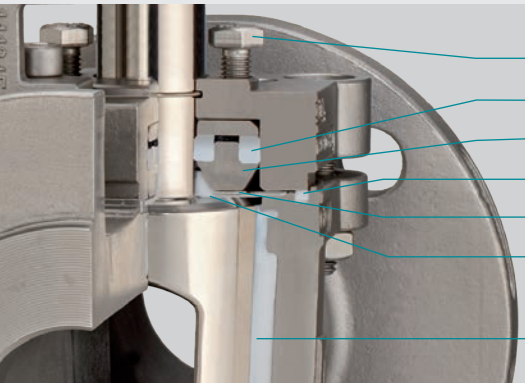
ISO 15848-1 Code: ISO-FS BH-C03 SSA-2 (AT-200°C) PN16/CL150 **API 641 Certification*:** yes



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

Type CA chemistry sealing with additional PTFE packing

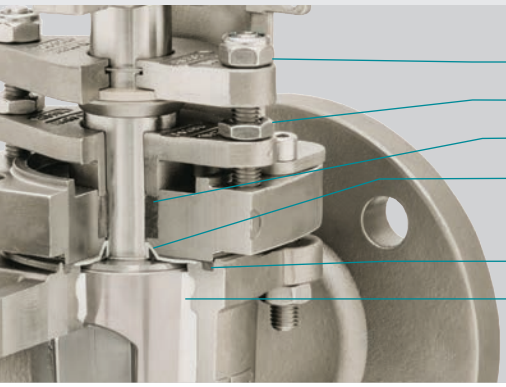
ISO 15848-1 Code: ISO-CA BH-C03 SSA-2 (AT-200°C) PN16/CL150 **API 641 Certification:** no



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

Type FSN Fire-Safe-sealing with safety stem packing for fluctuating temperatures

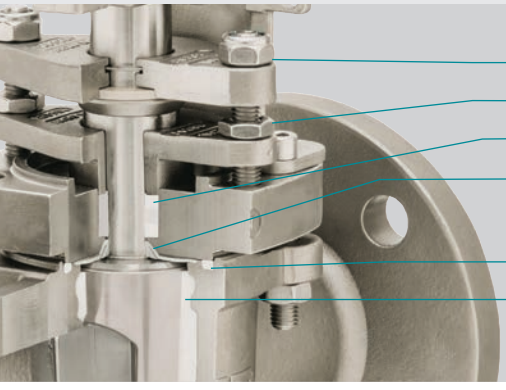
ISO 15848-1 Code: ISO-FSN BH - C03 SSA-0 t (AT-200°C) PN40/CL300 **API 641 Certification*:** yes



- 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 CASN chemistry sealing with safety stem packing for fluctuating temperatures

ISO 15848-1 Code: ISO-CASN BH - C03 SSA-0 t (AT-200°C) PN40/CL300 **API 641 Certification:** no



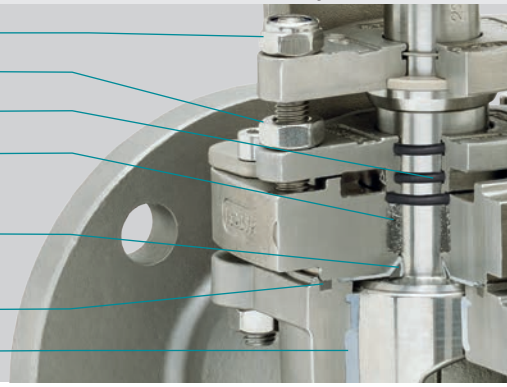
- plug adjustment
- stuffing box adjustment
- **Tertiary sealing**: triple safety stem packing (PTFE)
- **Secondary sealing**:
  V-diaphragm (PTFE) and delta thrust collar(PTFE)
- cover sealing (PTFE)
- **Primary sealing**: sleeve

Type FSN-EF with three o-rings at the stem and safety stem packing

ISO 15848-1 Code: ISO-FSN-EF AH-C01 SSA-0 (AT-200°C) PN40/CL300 **API 641 Certification*:** yes

Emission Free

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

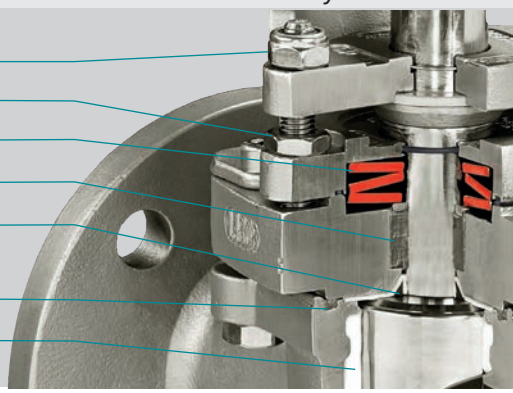


Type FSN-SL Fire-Safe-sealing with disk springs for self-adjustment of packing

ISO 15848-1 Code: ISO-FSN-SL BH-C03 SSA-0 (AT-200°C) PN40CL300 **API 641 Certification*:** yes

live-loaded

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

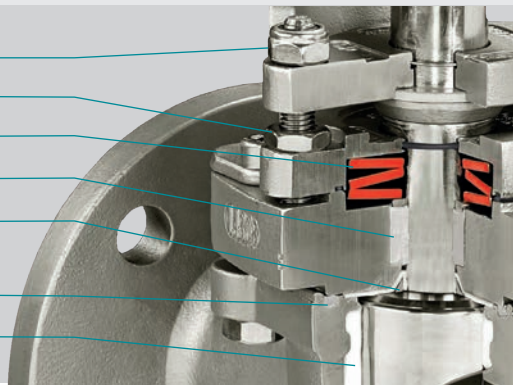


Type CASN-SL chemistry sealing with disk springs for self-adjustment of packing

ISO 15848-1 Code: ISO-CASN-SL BH-C03 SSA-0 (AT-200°C) PN40CL300 **API 641 Certification:** no

live-loaded

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



Product range

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
- safe, representative, 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 plug valves made of cast and forged special materials

engineered.
fast.
dynamic.

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