

Clean Service Product Profile, Features and Options



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Objectives of this Presentation. Knowledge to learn.

1. [Objectives](#) | 2. [Remarks](#) | 3. [Application & Product](#) | 4. [Design & Features](#) | 5. [Differentiation](#) | 6. [Materials](#) | 7. [Tightness & Cleaning](#) | 8. [Connections](#) | 9. [Options](#) | 10. [Approvals](#)

The aim of this presentation is to provide an overview of **LESER Clean Service Safety Valves**.



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General Remarks. Introduction of Clean Service Safety Valve.

1. Objectives | 2. Remarks | 3. Application & Product | 4. Design & Features | 5. Differentiation | 6. Materials | 7. Tightness & Cleaning | 8. Connections | 9. Options | 10. Approvals

LESER Clean Service Safety Valves

are a specialty and designed and manufactured to highest standards. Herewith will be fulfilled the most common sanitary requirements, like:

- suitable for sterilisation and cleaning
- special lifting device for lavation
- easy integration into the process
- high tightness
- approvals



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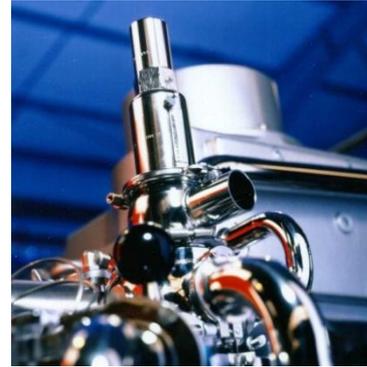
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Application Area. Applications and References.

1. Objectives | 2. Remarks | 3. Application & Product | 4. Design & Features | 5. Differentiation | 6. Materials | 7. Tightness & Cleaning | 8. Connections | 9. Options | 10. Approvals

LESER Clean Service safety valves are developed for **the protection of systems with special cleanliness requirements**, like:

- Food Industry
- Breweries and Beverage
- Pharmaceutical Industry
- Cosmetic Industry
- Chemical Industry
- Special Processes



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Product Overview. Clean Service Product Range.

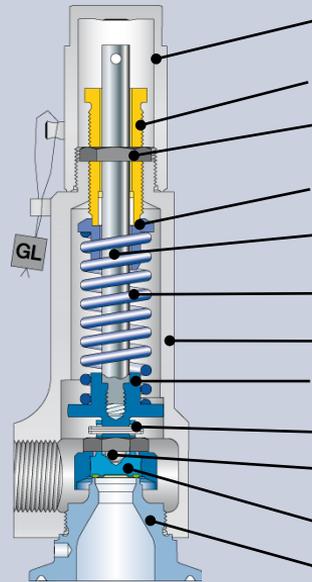
1. Objectives | 2. Remarks | 3. Application & Product | 4. Design & Features | 5. Differentiation | 6. Materials | 7. Tightness & Cleaning | 8. Connections | 9. Options | 10. Approvals

Clean Service Product Range				
Type 481	Type 483	Type 483	Type 484	Type 485
				

Design.

1. Objectives | 2. Remarks | 3. Application & Product | 4. Design & Features | 5. Differentiation | 6. Materials | 7. Tightness & Cleaning | 8. Connections | 9. Options | 10. Approvals

Sectional Drawing Series 481



Conventional Design

Cap H2
Adjusting screw
with bushing
Lock nut
Spring plate
Spindle
Spring
Outlet body
Spring plate
Pin
Ball
Disc
Body / Inlet body

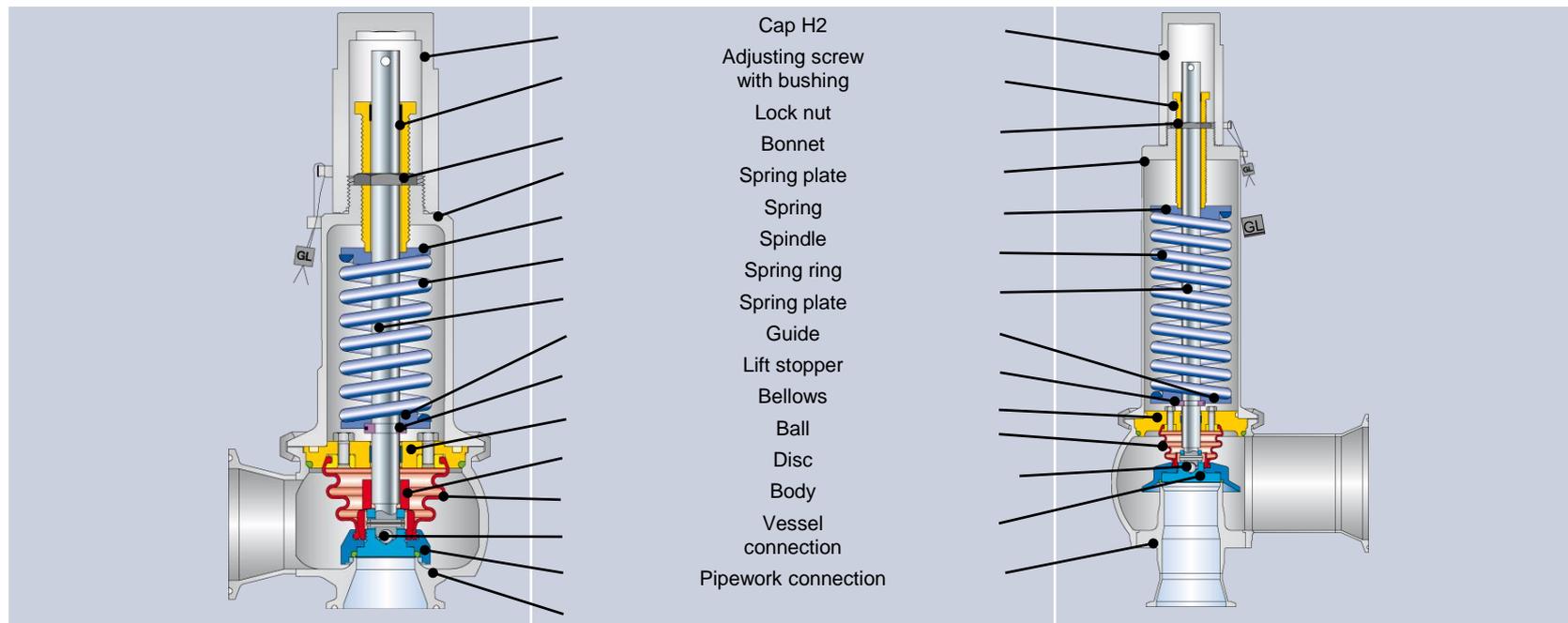
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Design.

1. Objectives | 2. Remarks | 3. Application & Product | 4. Design & Features | 5. Differentiation | 6. Materials | 7. Tightness & Cleaning | 8. Connections | 9. Options | 10. Approvals

Sectional Drawing Type 484 and Type 485



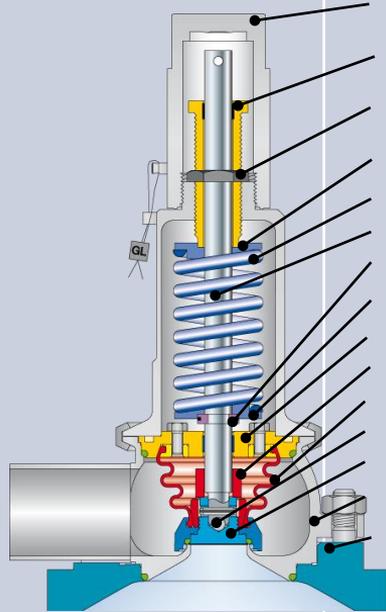
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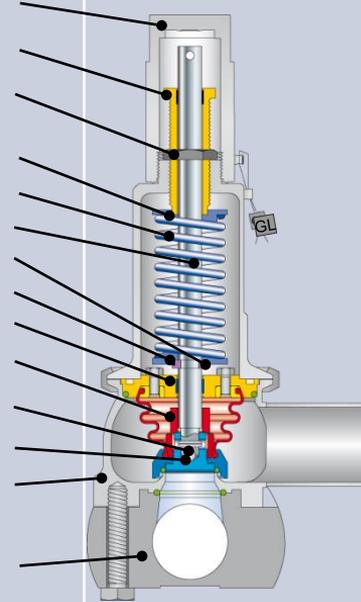
Design.

1. Objectives | 2. Remarks | 3. Application & Product | 4. Design & Features | 5. Differentiation | 6. Materials | 7. Tightness & Cleaning | 8. Connections | 9. Options | 10. Approvals

Sectional Drawing Type 484 and Type 485



Cap H2
Adjusting screw
with bushing
Lock nut
Bonnet
Spring plate
Spring
Spindle
Spring ring
Spring plate
Guide
Lift stopper
Bellows
Ball
Disc
Body
Vessel
connection
Pipework connection



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Main Features. Key Figures in Metric Units.

1. Objectives | 2. Remarks | 3. Application & Product | 4. Design & Features | 5. Differentiation | 6. Materials | 7. Tightness & Cleaning | 8. Connections | 9. Options | 10. Approvals

	Type 481	Type 483 Type 484 ¹ Type 485 ²	Type 488
Size (d₀)	10 mm	13 mm ... 25 mm	23 mm ... 92 mm
Orifice	0,46 x D	D ... 1,4 x E	1,55 x G ... 1,2 x P
Set pressure range	0,1 bar ... 68 bar	0,1 bar ... 16 bar	0,1 bar ... 16 bar
Temperature (EPDM)	- 45° C ... + 150° C	- 45° C ... + 150° C	- 45° C ... + 150° C
Dead space ratio (L/D)	< 1,5	< 1,5 < 0,3 ¹ < 0,95 ²	< 1,5 ... 3

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Main Features. Key Figures in US Units.

1. Objectives | 2. Remarks | 3. Application & Product | 4. Design & Features | 5. Differentiation | 6. Materials | 7. Tightness & Cleaning | 8. Connections | 9. Options | 10. Approvals

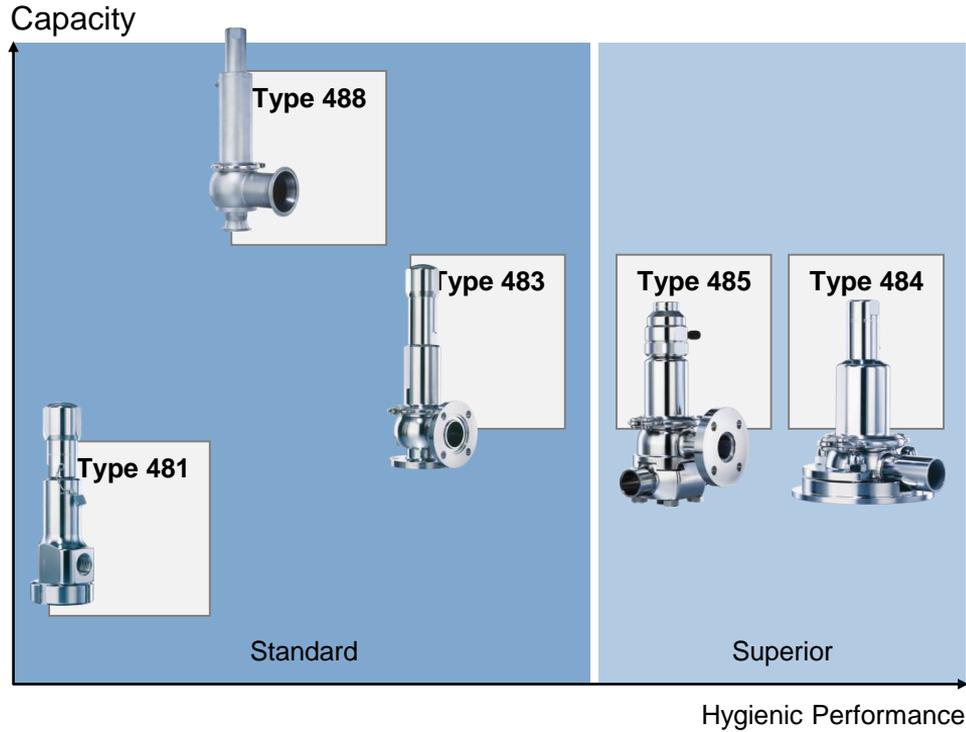
	Type 481	Type 483 Type 484 ¹ Type 485 ²	Type 488
Size (d₀)	0.394 inch	0.512 inch ... 0.985 inch	0.906 inch ... 3.622 inch
Orifice	0,46 x D	D ... 1,4 x E	1,55 x G ... 1,2 x P
Set pressure range	1.5 psig ... 986 psig	1.5 psig ... 232 psig	1.5 psig ... 232 psig
Temperature (EPDM)	- 45° C ... + 150° C	- 45° C ... + 150° C	- 45° C ... + 150° C
Dead space ratio (L/D)	< 1,5	< 1,5 < 0,3 ¹ < 0,95 ²	< 1,5 ... 3

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Differentiation. Capacity and Cleanability.

1. Objectives | 2. Remarks | 3. Application & Product | 4. Design & Features | 5. Differentiation | 6. Materials | 7. Tightness & Cleaning | 8. Connections | 9. Options | 10. Approvals



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Benefit.

1. Objectives | 2. Remarks | 3. Application & Product | 4. Design & Features | 5. **Differentiation** | 6. Materials | 7. Tightness & Cleaning | 8. Connections | 9. Options | 10. Approvals

- **HyTight Assembly** for Type 483, 488, 484 and 485
- Series 48x is **fully made of stainless steel, no casting parts**
- CIP (cleaning in place) and SIP (sterilizing in place) **with pneumatic lifting device H8 possible**
- International surface definition according to **ASME BPE and DIN 11866**
- **High cleanability** due to high surface qualities up to $R_a \text{ max} = 0,375 \mu\text{m} / 15 \mu\text{inch}$
- **Large variety of sanitary connections**
- **Vessel connection and integrated pipework connection** are a LESER USP
- **One design and spring** for steam, gas, liquid and multi-phase (single trim)
- **One-piece spindle** for optimized setting accuracy and less friction
- **Few spare parts** minimized product life cycle costs

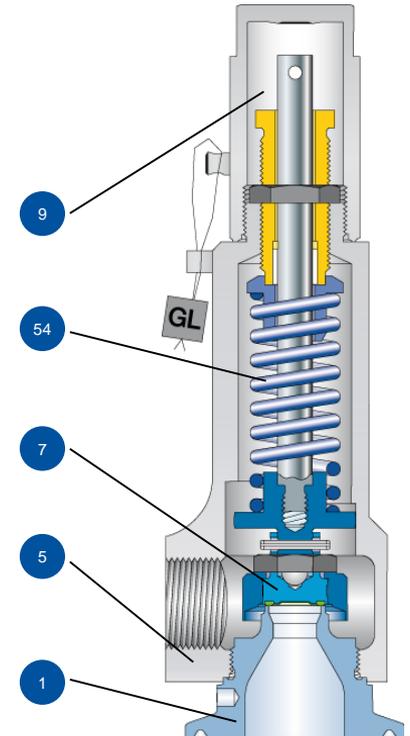
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Materials. According to DIN EN Standards.

1. Objectives | 2. Remarks | 3. Application & Product | 4. Design & Features | 5. Differentiation | 6. **Materials** | 7. Tightness & Cleaning | 8. Connections | 9. Options | 10. Approvals

Material				
Item	Component	Type 481	Type 483 Type 484 Type 485	Type 488
9	Bonnet	–	1.4404	1.4404
54	Spring	1.4310	1.4310	1.4310
7	Disc	1.4404	1.4435	1.4404
5	Body / Outlet body	1.4404	1.4435 (BN2)*	1.4404
1				
	Base / Inlet body	1.4404	–	–



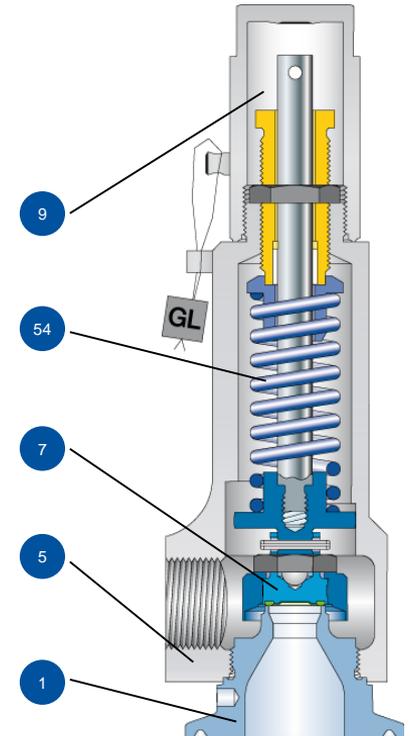
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Materials. According to DIN EN Standards.

1. Objectives | 2. Remarks | 3. Application & Product | 4. Design & Features | 5. Differentiation | 6. **Materials** | 7. Tightness & Cleaning | 8. Connections | 9. Options | 10. Approvals

Material				
Item	Component	Type 481	Type 483 Type 484 Type 485	Type 488
9	Bonnet	–	SA479 316L	SA479 316L
54	Spring	Stainless Steel	Stainless Steel	Stainless Steel
7	Disc	SA479 316L	SA479 316L	SA479 316L
5	Body / Outlet body	SA479 316L	SA479 316L	SA479 316L
1	Base / Inlet body	SA479 316L	–	–



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Materials. Soft Seal and Bellows.

1. Objectives | 2. Remarks | 3. Application & Product | 4. Design & Features | 5. Differentiation | 6. **Materials** | 7. Tightness & Cleaning | 8. Connections | 9. Options | 10. Approvals

Material			
Component	Type 481	Type 483 Type 484 Type 485	Type 488
O-ring	EPDM ^{1,2} CR* FKM* ¹ NBR* FFKM* ^{1,2}		EPDM ^{1,2} CR* FKM* ¹ FFKM* ^{1,2}
Vulcanized soft seal	EPDM ^{1,2} CR* FKM* ¹ NBR* FFKM* ^{1,2}	–	–
Bellows	–	EPDM ^{1,2}	EPDM ^{1,2}

* = option, 1 = , 2 = 

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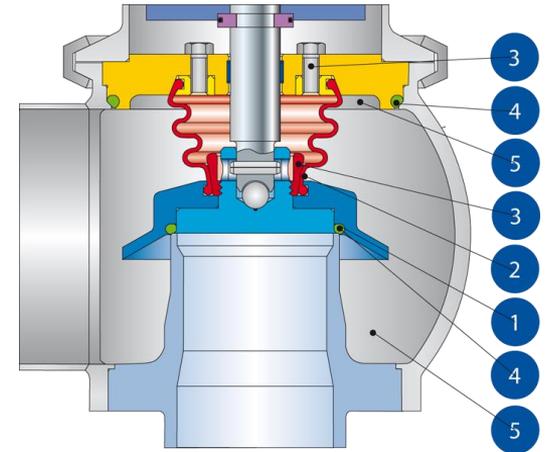
Tightness and Cleaning. HyTight Assembly.

1. Objectives | 2. Remarks | 3. Application & Product | 4. Design & Features | 5. Differentiation | 6. Materials | 7. Tightness & Cleaning | 8. Connections | 9. Options | 10. Approvals

Series 48X provides an optimum of cleanability. The following design features represent the **ultimate solution for all critical clean service applications**. HyTight stands for **Hygienic and Tightness**.

This unique design provides for the first time a really cleanable in- and outlet of a safety valve:

- 1 The aseptic O-ring sealing provides superior tightness.
- 2 The elastomer bellows protects the hard-to-clean parts in the guiding and bonnet area against contamination.
Attention: An elastomer bellows is not back pressure compensating like a stainless steel bellows.
- 3 All fixing elements like screws and nuts are placed inside of the bellows.
- 4 Crevice free internals, rinsed O-rings and FDA compliant elastomers insure there are no bacteria traps.
- 5 Self-draining and domeless body design, avoids residues and reduces corrosion



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Tightness and Cleaning. Surface Quality.

1. Objectives | 2. Remarks | 3. Application & Product | 4. Design & Features | 5. Differentiation | 6. Materials | 7. Tightness & Cleaning | 8. Connections | 9. Options | 10. Approvals

The **European Hygienic Engineering & Design Group (EHEDG)** and the **European Hygienic Pipes Standard DIN 11866** as well as the **ASME BPE 2002, -a- 2003, -a- 2004** provide guidances on the hygienic engineering aspects of manufacturing of safe and wholesome food.

The surface quality, especially area in contact with product, greatly influences the cleanability of the safety valve.

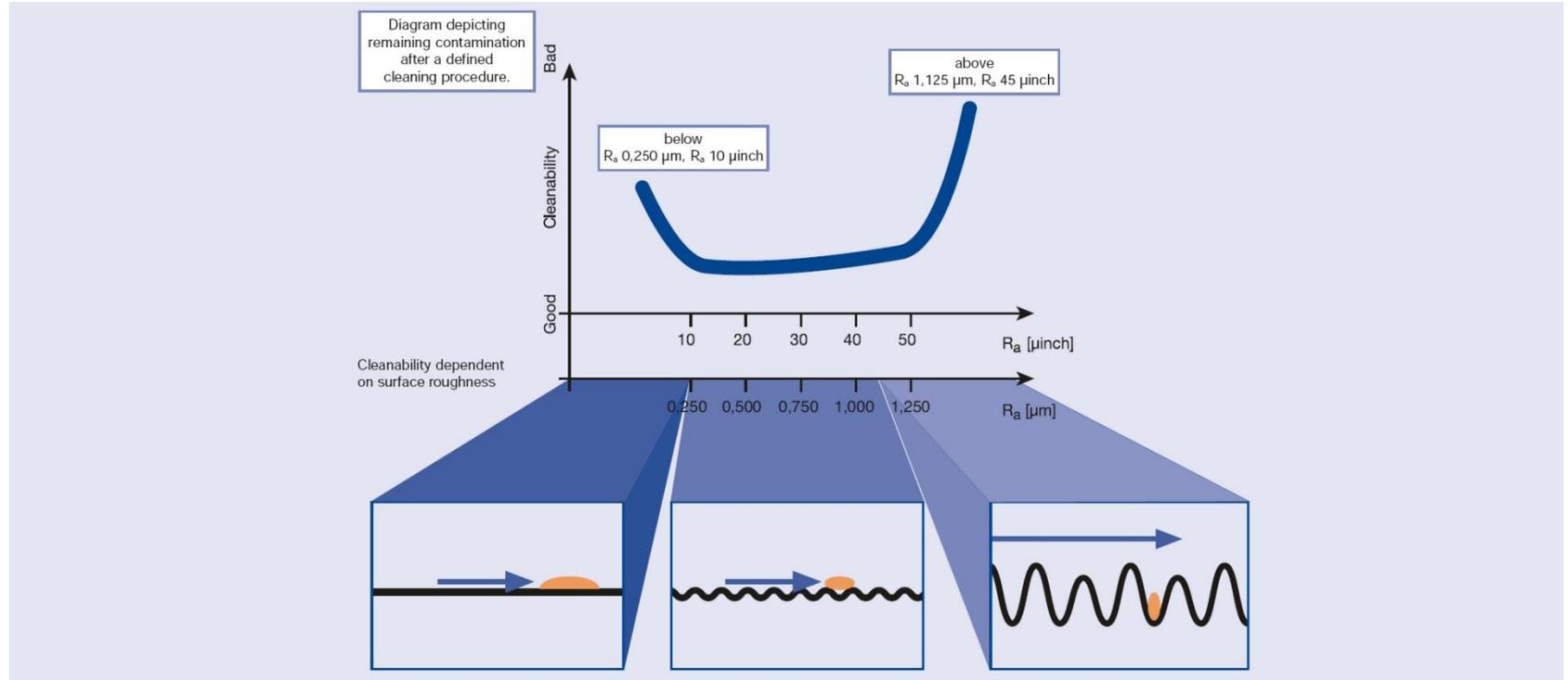
Surface Quality		
Type	Type 481 Type 483 Type 488	Type 484 Type 485
Standard Surface Qualities Product Contact Inlet	$R_a < 0,750 \mu\text{m}$ $R_a < 30 \mu\text{inch}$ SFV3	$R_a < 0,500 \mu\text{m}$ $R_a < 20 \mu\text{inch}$
Surface Qualities of	$R_a < 0,750 \mu\text{m}$ electropolished $R_a < 30 \mu\text{inch}$ electropolished	for the product contact inlet are available on request, as well as electropolished of the inside and outside of the valves

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Tightness and Cleaning. Surface Quality.

1. Objectives | 2. Remarks | 3. Application & Product | 4. Design & Features | 5. Differentiation | 6. Materials | 7. Tightness & Cleaning | 8. Connections | 9. Options | 10. Approvals



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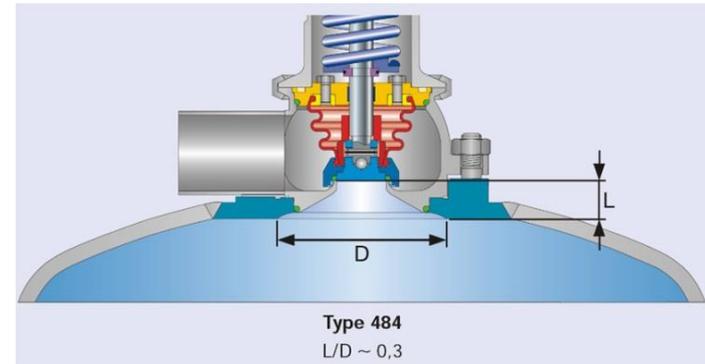
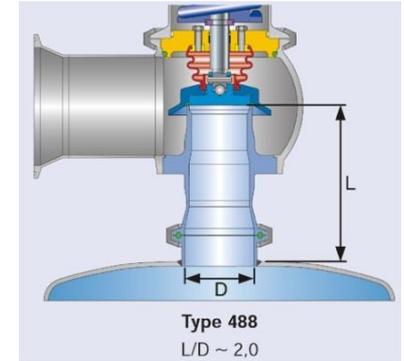
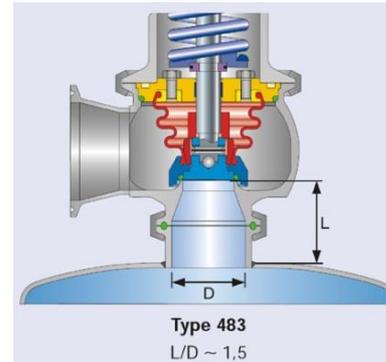
Tightness and Cleaning. Surface Quality.

1. Objectives | 2. Remarks | 3. Application & Product | 4. Design & Features | 5. Differentiation | 6. Materials | 7. Tightness & Cleaning | 8. Connections | 9. Options | 10. Approvals

The **dead space ratio** is defined by **ratio of the length of the inlet (L)** to the diameter of the inlet pipe (D). The cleanability is improved as this **ratio is reduced**.

Types 481, 483 and 488 are improved solutions for safety valves with clamp connections, and **have L/D ratios less than 1,5 and 2,0** (Type 488). The requirements of ASME BPE 2002 Part SD – 3.11.1 ($L/D < 2,0$) and FDA 21 CFR Part 177.2600 ($L/D < 1,5$) are fulfilled with these designs.

For some applications especially in the **pharmaceutical industry** the requirements are even higher. The solution for these **particularly high purity requirements** is **Type 484 or Type 485** with special connections to the vessel or the piping, providing L/D ratios as low as 0,3.

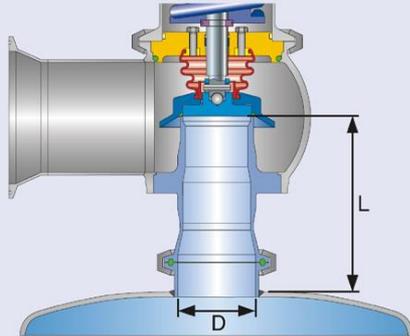


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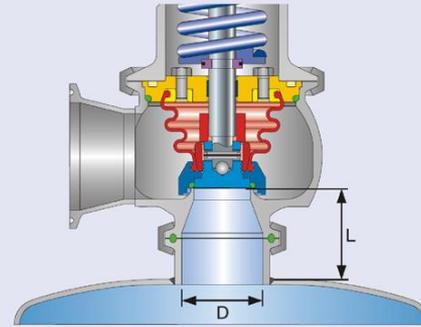
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Tightness and Cleaning. Dead Space.

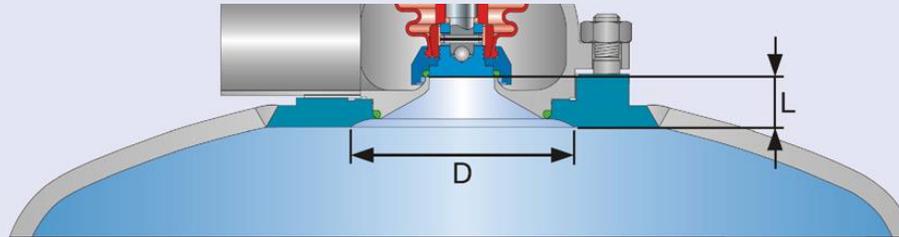
1. Objectives | 2. Remarks | 3. Application & Product | 4. Design & Features | 5. Differentiation | 6. Materials | 7. **Tightness & Cleaning** | 8. Connections | 9. Options | 10. Approvals



Type 488
L/D ~ 2,0



Type 483
L/D ~ 1,5



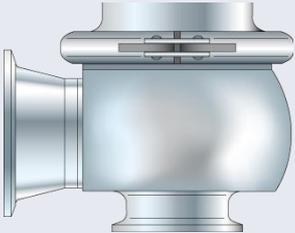
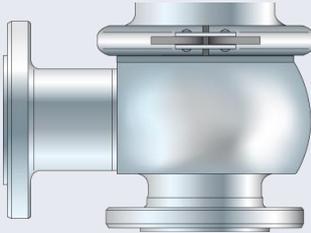
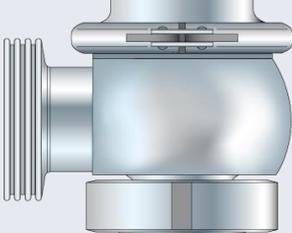
Type 484
L/D ~ 0,3

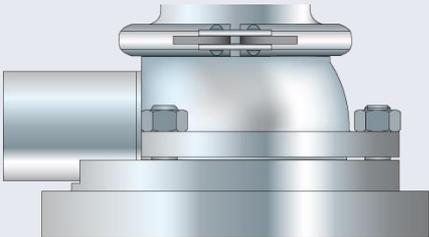
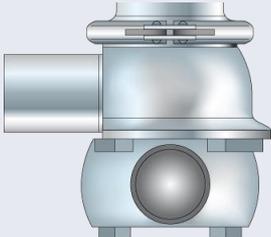
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Connections. Integration into the Process.

1. Objectives | 2. Remarks | 3. Application & Product | 4. Design & Features | 5. Differentiation | 6. Materials | 7. Tightness & Cleaning | 8. **Connections** | 9. Options | 10. Approvals

Standard		
Clamp	Small Flange	Sterile Screw Coupling
		

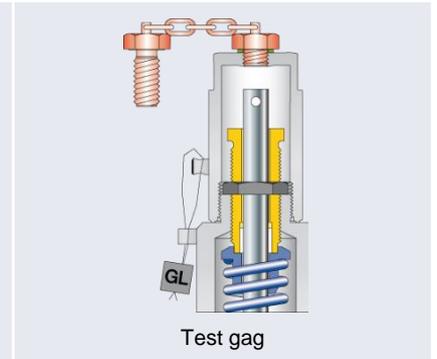
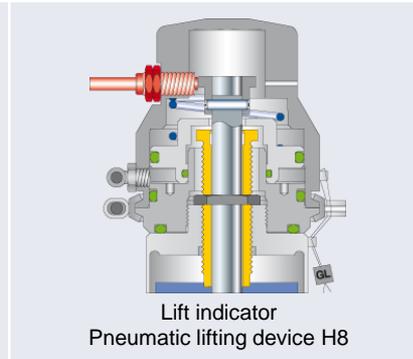
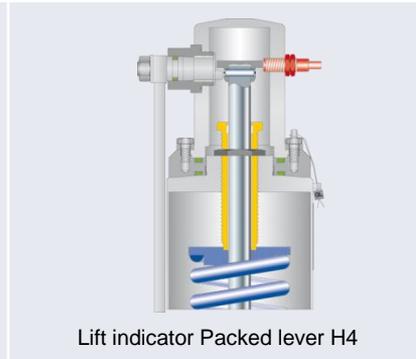
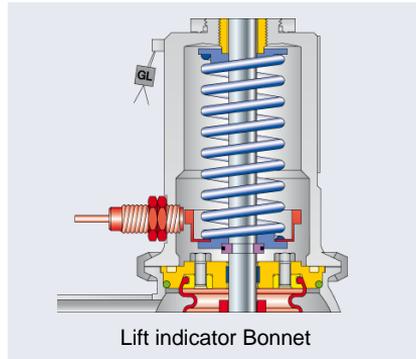
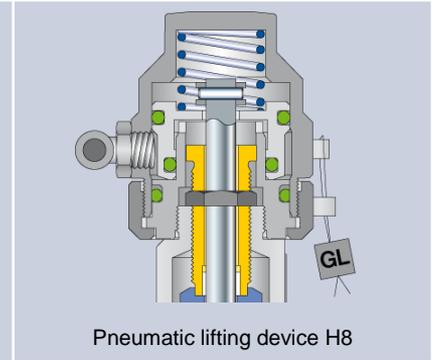
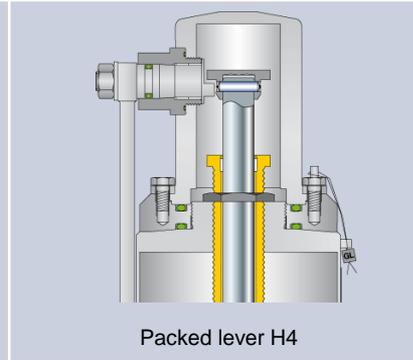
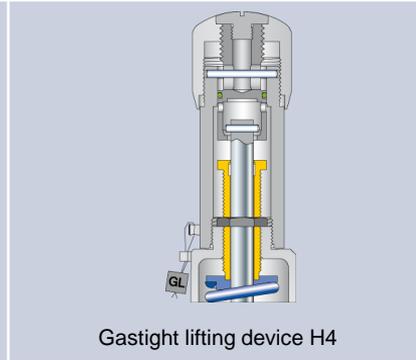
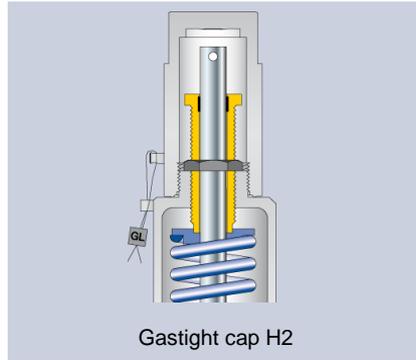
Superior	
Vessel Connection	Integrated Pipework Connection
	

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Options.

1. Objectives | 2. Remarks | 3. Application & Product | 4. Design & Features | 5. Differentiation | 6. Materials | 7. Tightness & Cleaning | 8. Connections | 9. Options | 10. Approvals



Approvals.

1. Objectives | 2. Remarks | 3. Application & Product | 4. Design & Features | 5. Differentiation | 6. Materials | 7. Tightness & Cleaning | 8. Connections | 9. Options | 10. Approvals

Worldwide approvals with one design.

Europe	DIN EN ISO 4126-1
Germany	AD 2000-Merkblatt A2
United States	ASME Sec. VIII Div. 1
Canada	CRN
China	AQSIQ
Eurasian Custom Union	EAC



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Thank you for your attention.



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