Clean Service

Safety Relief Valves
Series 48X

CATALOG

LESER

The-Safety-Valve.com

Valve finder

LESER

Product group

High operating to set pressure ratio, high backpressure or low total height?

Yes → **High Efficiency**

No

Clean Service application?

Yes → **Clean Service**

No

Critical Service / highly corrosive application?

Yes → **Critical Service**

No

API specified application?

Yes → **API**

No

Steam, gas and liquid application with low capacity in relation to valve size?

Yes → **Modulate Action**

No

Required Orifice letter?

Orifice ≥ F → **High Performance**

Orifice ≤ F → **Compact Performance**

Products other than safety valve

Yes → **Best Availability**

Medium-controlled

Spring loaded

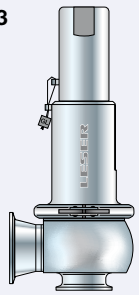
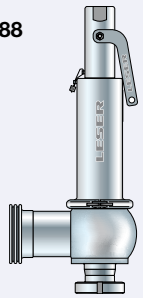
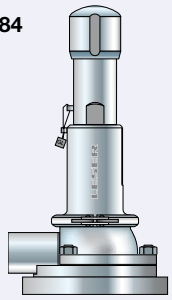
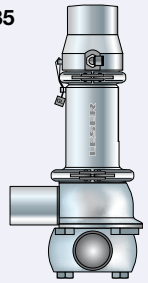
Safety Relief Valves

Change-over valve

Bursting disc

Valve finder

How to select the right Clean Service Safety Valve

	Type	Orifice	Features	Valve dead space ratio[1)]	Description
Standard	**481** 	0,5 x D	Cleanability Inlet ■□□ Cleanability Outlet □□□ Capacity ■□□	L/D < 1,5	Designed for small capacity; Type 481 offers protection for installations in which Clean Service properties are required only at the valve inlet, e. g. protection of gas systems for the bottling of beverages.
Standard	**483** 	D – F	Cleanability Inlet ■■□ Cleanability Outlet ■■■ Capacity ■■□	L/D < 1,5	Designed for small to medium capacity; Type 483 has optimized Clean Service properties for applications requiring clamp connections. Type 483 is applicable in all Clean Service areas (e. g. bottle filling machines, fermenters).
Standard	**488** 	G – P	Cleanability Inlet ■□□ Cleanability Outlet ■■□ Capacity ■■■	L/D < 1,5 – 3,0	Designed for high capacity; Type 488 provides Clean Service properties for applications requiring larger capacities. Type 488 is applicable in large plants, breweries and the beverage industry.
Superior	**484** 	D – F	Cleanability Inlet ■■■ Cleanability Outlet ■■■ Capacity ■■□	L/D < 0,33	Designed for small to medium capacity; Type 484 meets the highest sanitary requirements for high purity applications, e. g. fermentors. The design incorporates a dead space free vessel connection, which is directly welded into the vessel wall and allows maximum cleanability of the valve inlet.
Superior	**485** 	D – F	Cleanability Inlet ■■■ Cleanability Outlet ■■■ Capacity ■■□	L/D < 0,95	Designed for small to medium capacity; Type 485 meets the highest sanitary requirements for high purity applications, e. g. fermentors. The design incorporates a dead space free pipe connection, which is directly welded into the pipework and allows maximum cleanability of the valve inlet. Type 485 can be used in applications where a direct vessel connection used by the Type 484 is not possible, e. g. glass vessels.

[1)] Explanation of dead space ratio see page 14

LESER – Clean Service Safety Valves

The Clean Service product group represents:

- ☑ High aseptic properties
- ☑ Low dead space
- ☑ Best Cleanability (CIP, SIP or COP)

LESER´s Clean Service Safety Valves

- are designed and manufactured to highest standards and fulfil hygienic and sanitary requirements acc. to
  - DIN 11866 (European Hygienic Pipes Standard)
  - ASME BPE (Bioprocessing Equipment – 2002, a-2003, a-2004)
  - EN 1672-2
  - DIN ISO 14159
  - EHEDG and 3-A Sanitary standard
  - USP class VI and FDA 21 CFR
- serve for protection of processes and equipment in the foodstuff and pharmaceutical industry.
- have a dead space ratio L/D < 0,33 (Type 484) up to < 3 (Type 488)
- have a multiple choice of sanitary connections
- are developed in a close cooperation with plant engineers and service specialists.
- are approved by all important approval organisations worldwide which ensures the worldwide applicability e. g.:
  - European Community: CE-marking acc. to Pressure Equipment Directive (PED) 97/23/EC and EN ISO 4126-1
  - USA: UV-stamp acc. to ASME Section VIII Division 1, National Board certified capacities
  - Germany: VdTÜV approval acc. to PED, EN ISO 4126-1, TÜV SV 100 and AD 2000-Merkblatt A2
  - Canada: Canadian Registration Number acc. to the requirements of particular provinces
  - China: AQSIQ based on the approval acc. to ASMESection VIII Division 1 and AD 2000-Merkblatt A2

Furthermore, all LESER Clean Service safety valves are designed, marked, produced and approved acc. to the requirements of the following regulations (directives, codes, rules and standards).

EN ISO 4126-7, EN 12266-1/-2, ASME PTC 25, ASME-Code Sec. II, ASME B 16.34, API Std. 527, API RP 576, AD 2000-Merkblatt A4, AD 2000-Merkblatt HP0, TRD 110, TRD 421

General Information

Applications and References

LESER´s Clean Service Safety Valves
represent the ultimate solution
for all critical clean service areas of

- Food industry
- Breweries and beverage
- Pharmaceutical industry
- Cosmetic industry
- Chemical industry
- Special processes

LESER´ s Clean Service Safety Valves are in use at well-known companies worldwide. Subsequently an extract of our references

General Design Features

LESER´s Clean Service Safety Valves
offer a large variety of types, materials and
options to suit any application:

Scope of design
- Valve sizes d_0 10 mm / 0,394 inch through d_0 92 mm / 3,622 inch
- Nine orifice sizes from 0,5 x D through P
- Materials: 1.4404 / 316L, 1.4435 / 316L stainless steel as a standard
- Standard soft seat for superior tightness
- Packed knob, packed lifting lever, gastight cap or pneumatic lifting device

No bacteria traps or contamination due to
- Minimum dead space design and flushmounting capability
- Wetted-part surfaces in compliance with European Hygienic Pipes Standard DIN 11866 and ASME BPE 2002, part SD table SF-5 and SF-6
- Gap and crevice-free design of internals
- Standard elastomer bellows for protection of the hard to clean parts
- Self-draining body design, avoids residues and reduces corrosion
- Use of FDA and USP VI compliant elastomer

Automatic plant operation during production and cleaning
- Optional pneumatic lifting device for cleaning in place (CIP) or sterilizing in place (SIP)
- Optional proximity switch to indicate the operating condition of the valve
- Self-draining body design and aseptic O-ring disc with bellows (HyTight Assembly) assure a cleanable outlet of the valve

Ease of plant design, installation and operation
- Variety of capacities and versions to fit any application
- Multiple choice of sanitary connections
- Single trim for steam, gas and liquid for less spare parts and easier maintenance
- Outlet chamber sealed from bonnet by EPDM bellows
- Crevice-free fastening of all elastomer parts
- Exposed, rinsed o-rings
- No bacteria traps or contamination

LESER´s Clean Service Safety Valves
can be customized with a great variety of options, e. g.

- Special connections specified by the customer for optimised adaptation to the plant
- HyTight Assembly for superior tightness
- Every part can be replaced by other material acc. customer specification

HyTight Assembly

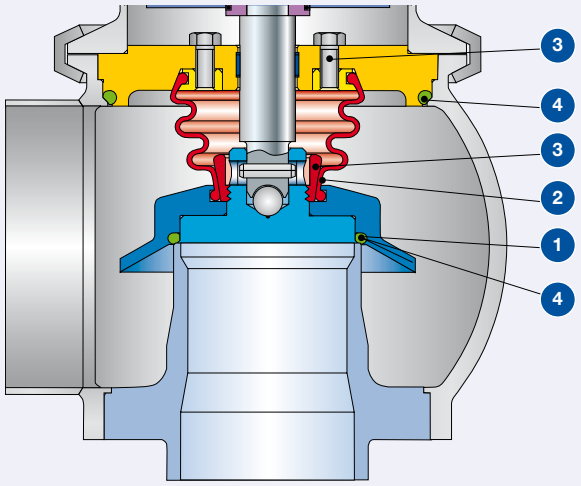
Cleanability first

Cleanability first – this is the guideline for the design of the LESER Clean Service Safety Valves. 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.

HyTight Assembly

The aseptic O-ring disc is the “heart” of the series 48X. This unique design provides for the first time a really cleanable in- and outlet of a safety valve:

1. The O-ring sealing provides superior tightness.
2. The elastomer bellows protects the hard-to-clean parts in the guiding and bonnet area against contamination. Please note: 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.



Availability

– Standard for Types 483, 484, 485, 488
– not available for Type 481

Surface Quality

The European Hygienic Engineering & Design Group (EHEDG) and the European Hygienic Pipes Standard DIN 11866 as well as the of 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.

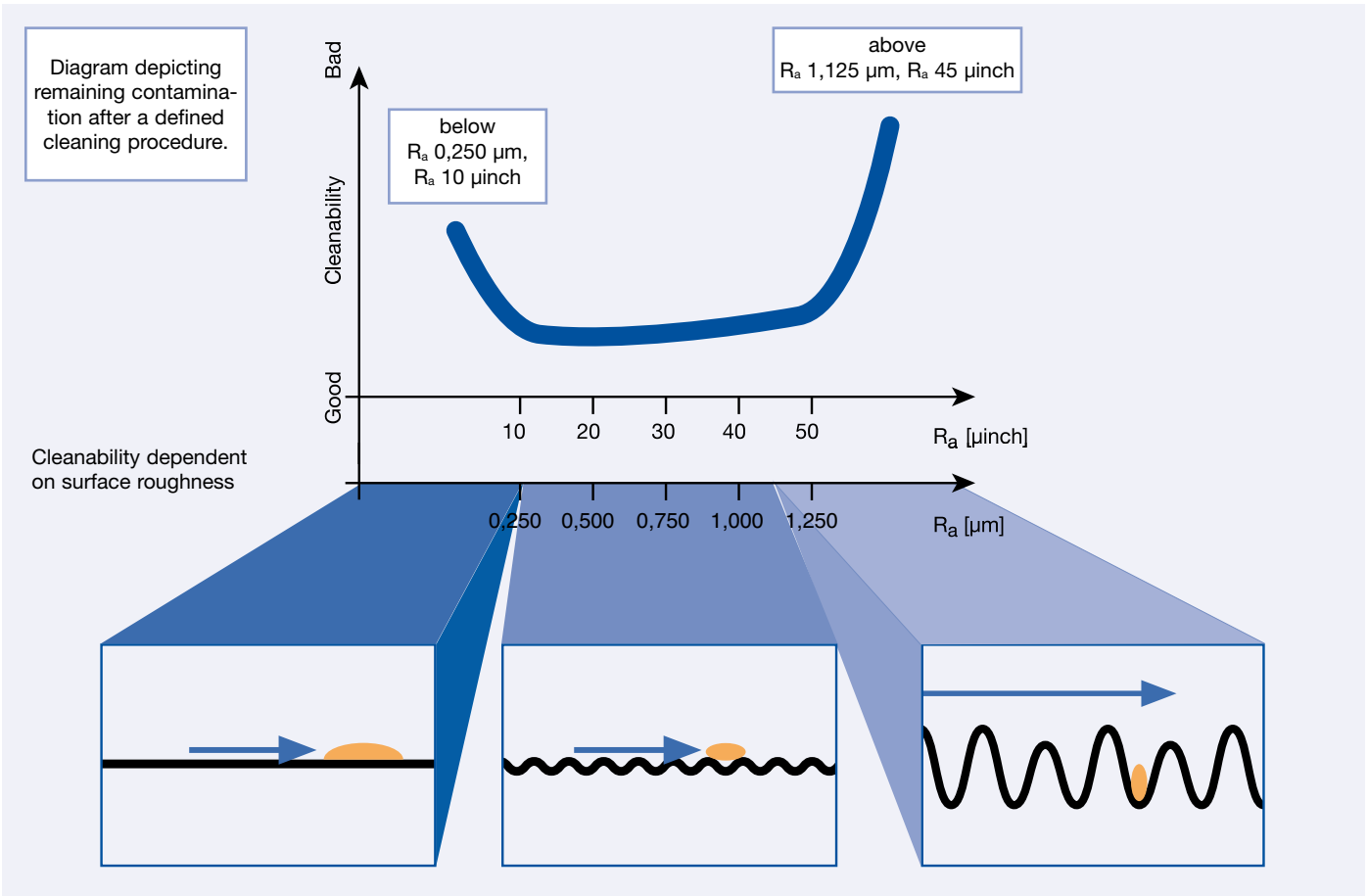
For instance the ASME BPE 2002, -a- 2003, -a- 2004 (Bioprocessing Equipment) states for cleanability:

SD-3.1.1:
– All surfaces shall be cleanable.
– Surface imperfections
(e. g., crevices, gouges, obvious pits, etc.)
shall be eliminated when ever feasible.

To ensure that the European as well as the ASME BPE requirements are fulfilled, no castings are used in the LESER Clean Service series. High surface quality is achieved by machining most valve bodies and all internal parts from high quality bar material.

Surface qualities

Type	Standard surface qualities product contact inlet	Surface qualities of
481, 483, 488	R_a < 0,750 µm R_a < 30 µinch SFV3	R_a < 0,500 µm R_a < 20 µinch for the product contact inlet are available on request, as well as electropolishing of the inside and outside of the valves
484, 485	R_a < 0,750 µm electropolished R_a < 30 µinch electropolished	



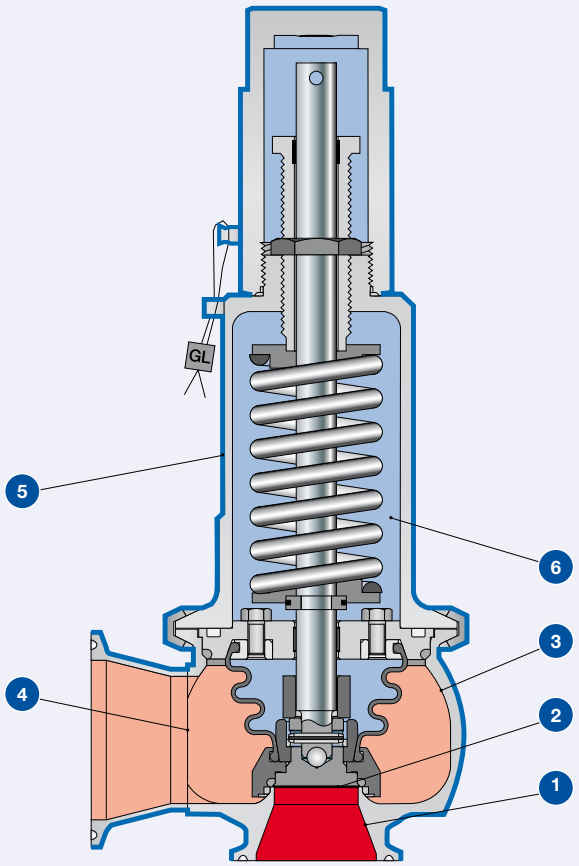
Below R_a 0,250 µm / 10 µinch bacteria or particles “stick” to the surface due to adhesive effects.

An optimized cleanability is reached with a surface roughness between R_a 0,250 µm / 10 µinch and R_a 1,125 µm / 45 µinch.

Above 1,125 µm / 45 µinch the bacteria and particles can “hide” in the corrugations or niches.

LESER Surface Definition

Clean Service Safety Valves



Surface definition

Area	Description	Surface definition acc. to ASME BPE 2002
Product contact surface · No. 1 Inlet area · No. 2 Bottom side of disc	· Surface permanently in contact with the product	· Design acc. to Part SD · Surface finish in compliance table SF-5 · Different surface designation level acc. to table SF-6 is available
Blow off surface · No. 3 Inside surface of outlet area · No. 4 Welding seam	· Surface not permanently in contact with the product · During blow off surface is wetted with the product · This product cannot flow back to the process, if the outlet is not connected with the production process	· Surface finish preponderant in compliance table SF-5 · Weldings are not grinded · Surface designation level acc. to LESER specification
Outer surface · No. 5 Outside surface of body and bonnet	· This surface has no contact to the product, but a shiny surface is expected	· ASME BPE is not applicable · Design acc. to Part SD · Surface finish preponderant in compliance table SF-5 · Weldings are not grinded
Shielded surface · No. 6	· Surface never in contact with the product because it is shielded by the bellows	· ASME BPE is not applicable

LESER Surface Packages

In order to cover international surface requirements like DIN 11866 as well as ASME BPE, LESER defines surface packages (Clean finish, HyClean finish, Sterile finish) and surface grades (M1 – M6 mechanically polished, ME1 – ME6 mechanically polished and electropolished).

LESER surface grade

Depending on the manufacturing technology the LESER surface grade differentiates between mechanically polished and mechanically polished and electropolished. Following tables show the comparison of LESER surface grade, hygiene class recording to DIN 11866 and surface designation according to ASME BPE.

LESER surface packages are:

– Clean finish LESER standard package mainly used in breweries
– HyClean finish Increased surface quality for e. g. dairys, cosmetics applications
– Sterile finish Increased surface quality for e. g. pharmaceutical applications

Option codes for available surface packages

Mechanically polished

LESER surface grade	Surface condition				DIN 11866	ASME BPE
	R_a max.		≅ R_z		Hygiene class	Surface designation
	[µm]	[µinch]	[µm]	[µinch]		
M1	0,375	15	2,5	64	H4	–
M2	0,500	20				SF1
M3	0,625	25				SF2
M4	0,750	30	4	102	H3	SF3
M5	1,500	60	10	254	H1	–
M6	3,000	120	16	406		–

Mechanically polished and electropolished

LESER surface grade	Surface condition				DIN 11866	ASME BPE
	R_a max.		≅ R_z		Hygiene class	Surface designation
	[µm]	[µinch]	[µm]	[µinch]		
ME1	0,375	15	2,5	64	HE4c	SF4
ME2	0,500	20				SF5
ME3	0,625	25				SF6
ME4	0,750	30	4	102	HE3c	–
ME5	1,500	60	10	254	HE1c	–
ME6	3,000	120	16	406		–

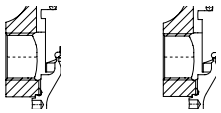
Overview option codes

Type	LESER Surface packages		
	Clean finish	HyClean finish	Sterile finish
481	B50	B51	B52
483	B53	B54	B55
488	B68	B69	B70
484	B56	B57	B58
5034 Vessel connection	B59	B60	B61
485	B62	B63	B64
5034 Integrated pipework connection	B65	B66	B67

Clamp and threaded connections

Overview

LESER is able to deliver a wide range of connections required for clean service applications. For ordering the right connection please specify inlet and outlet by LESER option code. If the option code is not stated in this table please refer to connection pages of each Type.

Overview								
	Connection		Clamp connection	Clamp connection	Clamp connection	Clamp connection	Threaded connection	Threaded connection
	Code		BO	SO	CO	DO	XG	XN
	According to		ASME BPE	DIN 32676	ISO 2852	ISO 2852	DIN ISO 228	ASME B 1.20.1
	Pipe standard		BS 4825-1	DIN 11850	ISO 2037	DIN EN ISO 1127	G 1/2 G 3/4 G 1	1/2" NPT 3/4" NPT 1" NPT
			Option code				Option code	
Type 481	d_0 10	Inlet	✓	✓	L96I79	✓	–	–
		Outlet	I76A79	L86A16	L97A79	I74A16	✓	✓
Type 483	d_0 13	Inlet	✓	✓	✓	✓	–	–
		Outlet	✓	✓	✓	✓	–	–
	d_0 25	Inlet	✓	✓	✓	✓	–	–
		Outlet	✓	✓	✓	✓	–	–
Type 488	d_0 23	Inlet	I75	L79	L96	I73	–	–
		Outlet	I76	L86	L97	I74	–	–
	d_0 37	Inlet	I75	L79	L96	I73	–	–
		Outlet	I76	L86	L97	I74	–	–
	d_0 46	Inlet	I75	L79	L96	I73	–	–
		Outlet	I76	L86	L97	I74	–	–
	d_0 60	Inlet	I75	L79	L96	I73	–	–
		Outlet	I76	L86	L97	I74	–	–
	d_0 74	Inlet	I75	L79	L96	I73	–	–
		Outlet	I76	L86	L97	I74	–	–
	d_0 92	Inlet	I75	L79	L96	I73	–	–
		Outlet	I76	L86	L97	I74	–	–
Type 484	d_0 13	Inlet	For inlet please select vessel connection Type 5034 as shown on page 56				–	–
		Outlet	I76A80	L86A16	L97A80	I74A16	–	–
	d_0 25	Inlet	For inlet please select vessel connection Type 5034 as shown on page 56				–	–
		Outlet	I76A81	L86A17	L97A81	I74A17	–	–
Type 485	d_0 13	Inlet	For inlet please select integrated pipework connection Type 5034 as shown on page 68				–	–
		Outlet	I76A80	L86A16	L97A80	I74A16	–	–
	d_0 25	Inlet	For inlet please select integrated pipework connection Type 5034 as shown on page 68				–	–
		Outlet	I76A81	L86A17	L97A81	I74A17	–	–

For better selection of the different clamp connecting dimensions please refer to page 12 and 13

Clamp connections

Connecting dimensions

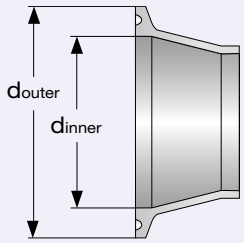
Most clamp connections can be delivered for different pipe standards, such as DIN 11850, ISO 2037, DIN EN ISO 1127 or special customer specifications e.g. NEUMO ...

The outer diameters generally the same so that there are no visual determinations between the clamps. Therefore the clamps are defined by inner and outer diameter (d_{inner} and d_{outer}). Additional indication of the pipe standard is not necessary.

For Type 481, 483 and 488 the clamps can be selected in different nominal diameters.Please state option code for clamp and for nominal diameter as shown on the connection pages of each Type.

SO – Clamp: DIN 32676			Pipe: DIN 11850 and DIN 11866 Range A							
Type			Inlet				Outlet			
Art.-No.		d_0 [mm]	DN	d_{inner} [mm]	d_{outer} [mm]	Option code	DN	d_{inner} [mm]	d_{outer} [mm]	Option code
4814.	768/769	10	15	16,0	34,0	L79I14	–	–	–	–
			25	26,0	50,5	L79I16	25	26,0	50,5	L86A16
4834.	770	13	25	26,0	50,5	L79I16	25	26,0	50,5	L86A16
	771	25	40	38,0	50,5	L79I17	40	38,0	50,5	L86A17
4884.	884	23	25	26,0	50,5	L79	40	38,0	50,5	L86
	885	37	40	38,0	50,5	L79	65	66,0	91,0	L86
	886	46	50	50,0	64,0	L79	80	81,0	106,0	L86
	887	60	65	66,0	91,0	L79	100	100,0	119,0	L86
	888	74	80	81,0	106,0	L79	125	125,0	155,0	–
	889	92	100	100,0	119,0	L79	150	150,0	183,0	–
DO – Clamp: ISO 2852			Pipe: DIN EN ISO 1127 and DIN 11866 Range B							
Art.-No.		d_0 [mm]	DN	d_{inner} [mm]	d_{outer} [mm]	Option code	DN	d_{inner} [mm]	d_{outer} [mm]	Option code
4814.	768/769	10	15	18,1	34,0	I73I14	–	–	–	–
			25	29,7	50,5	I73I16	25	29,7	50,5	I74A16
4834.	770	13	25	29,7	50,5	I73I16	25	29,7	50,5	I74A16
	771	25	40	44,3	64,0	I73I17	40	44,3	64,0	I74A17
4884.	884	23	25	29,7	50,5	I73	40	44,3	64,0	I74
	885	37	40	44,3	64,0	I73	65	72,1	91,0	I74
	886	46	50	56,3	77,5	I73	80	84,9	106,0	I74
	887	60	65	72,1	91,0	I73	100	110,3	130,0	I74
	888	74	80	84,9	106,0	I73	125	135,7	155,0	I74
	889	92	100	110,3	130,0	I73	150	163,1	183,0	I74

Clamp connections



BO – Clamp: ASME BPE			Pipe: BS 4825-1 and DIN 11866 Range C							
Type			Inlet				Outlet			
Art.-No.		d_0 [mm]	Size	d_{inner} [mm]	d_{outer} [mm]	Option code	Size	d_{inner} [mm]	d_{outer} [mm]	Option code
4814.	768/769	10	3/4"	15,7	25,0	I75I78	–	–	–	–
			1"	22,1	50,5	I75I79	–	–	–	–
4834.	770	13	1"	22,1	50,5	I75I79	1 1/2"	34,8	50,5	I76A80
			1 1/2"	34,8	50,5	I75I80	1 1/2"	34,8	50,5	I76A80
	771	25	1 1/2"	34,8	50,5	I75I80	2"	47,5	64,0	I76A81
			2"	47,5	64,0	I75I81	2"	47,5	64,0	I76A81
4884.	884	23	1 1/2"	34,8	50,5	I75	2"	47,5	64,0	I76
	885	37	2"	47,5	64,0	I75	3"	72,9	91,0	I76
	886	46	2 1/2"	60,2	77,5	I75	3 1/2"	97,4	119,0	I76
	887	60	3"	72,9	91,0	I75	4"	110,1	130,0	I76
	888	74	3 1/2"	97,4	119,0	I75	5"	135,7	155,0	I76
	889	92	4"	110,1	130,0	I75	6"	163,1	183,0	I76
CO – Clamp: ISO 2852			Pipe: ISO 2037							
Art.-No.		d_0 [mm]	Size	d_{inner} [mm]	d_{outer} [mm]	Option code	Size	d_{inner} [mm]	d_{outer} [mm]	Option code
4814.	768/769	10	1"	22,6	50,5	L96I79	1"	22,6	50,5	L97A79
4834.	770	13	1"	22,6	50,5	L96I79	1 1/2"	35,6	50,5	L97A80
			1 1/2"	35,6	50,5	L96I80	1 1/2"	35,6	50,5	L97A80
	771	25	1 1/2"	35,6	50,5	L96I80	2"	48,6	64,0	L97A81
			2"	48,6	64,0	L96I81	2"	48,6	64,0	L97A81
4884.	884	23	1 1/2"	35,6	50,5	L96	2"	48,6	64,0	L97
	885	37	2"	48,6	64,0	L96	3"	72,9	91,0	L97
	886	46	2 1/2"	60,3	77,5	L96	3 1/2"	97,6	119,0	L97
	887	60	3"	72,9	91,0	L96	4"	110,3	130,0	L97
	888	74	3 1/2"	97,6	119,0	L96	5"	135,7	155,0	L97
	889	92	4"	110,3	130,0	L96	6"	163,1	183,0	L97

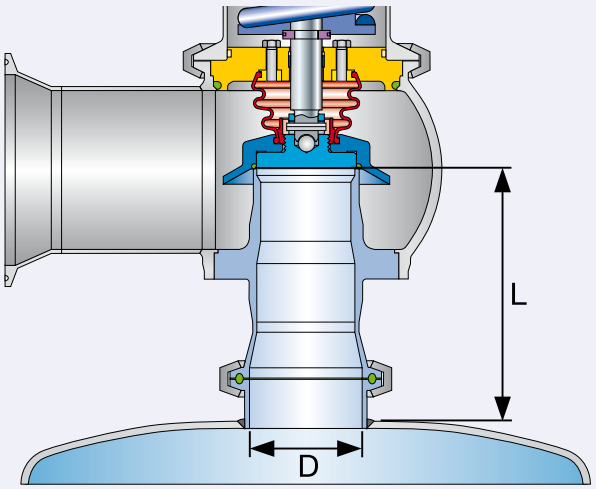
Low dead space

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.

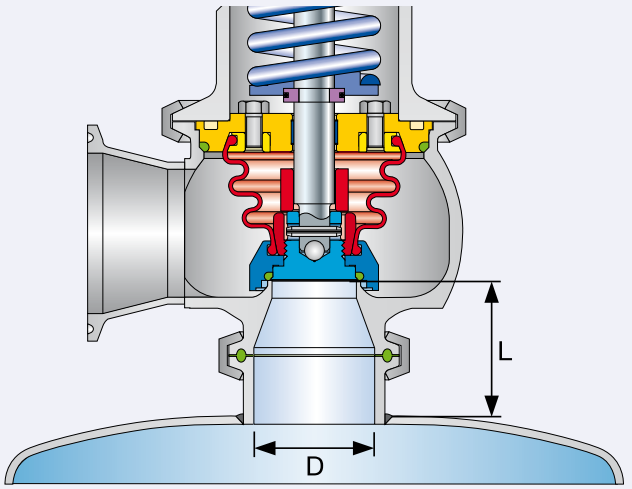
Types 481, 483 and 488 are improved solutions for safety valves with clamp connections, and have L/D ratios less than 1,5 and 2,0 (Type 488). The requirements of ASME BPE 2002 Part SD – 3.11.1 (L/D < 2,0) and FDA 21 CFR Part 177.2600 (L/D < 1,5) are fulfilled with these designs.

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 for Type 484 and < 0,95 for Type 485.

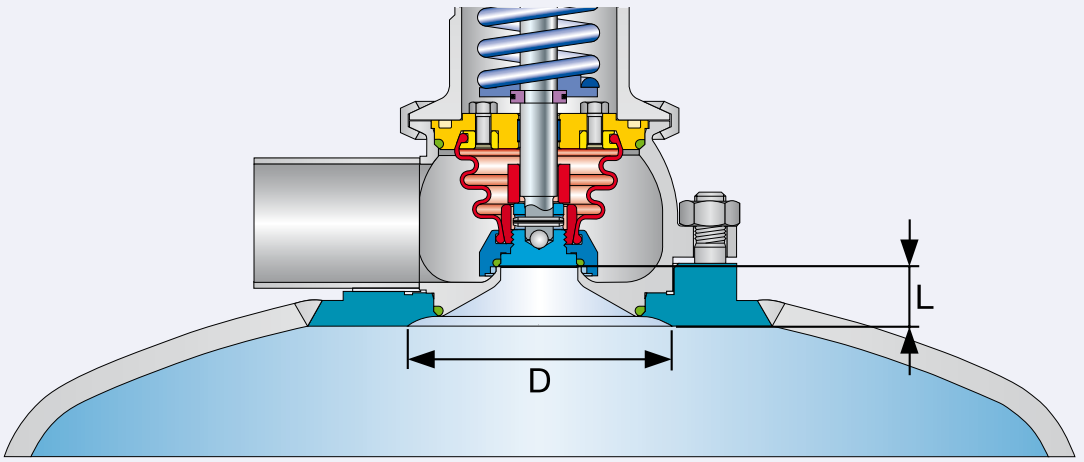
Dead space



Type 488
L/D ~ 2,0



Type 483
L/D ~ 1,5



L/D ~ 0,3

Type 481

Type 481
Cap H2
Inlet: Clamp connection
Outlet: Threaded connection

Safety Relief Valves – spring loaded

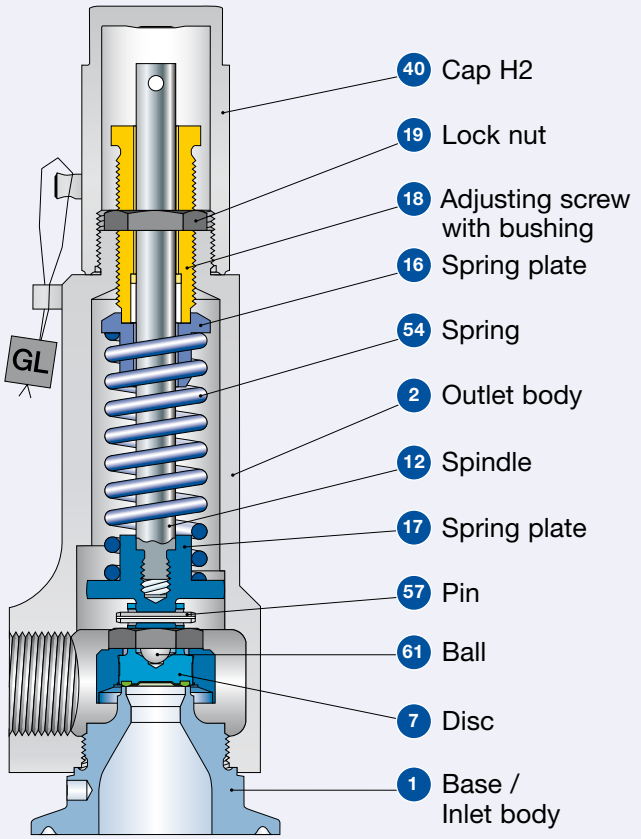
Type 481
Packed knob H4
Inlet: Aseptic clamp and nut
Outlet: Threaded connection

Contents

Type 481

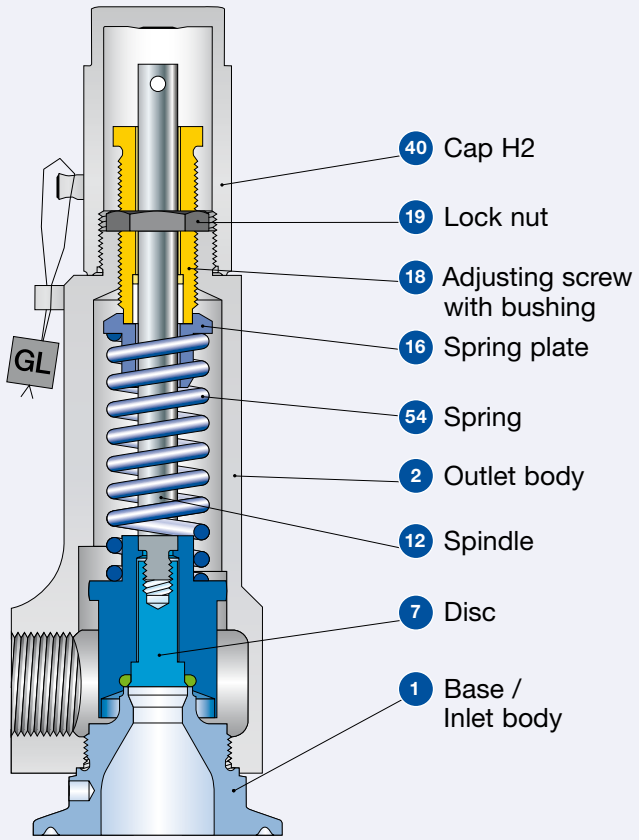
Conventional design

Low set pressure



Type 481
with vulcanized soft seal
Cap H2
Set pressure: 0,1 – 16 bar
1,5 – 232 psig
Inlet: Clamp connection
Outlet: Threaded connection

High set pressure



Type 481 with O-ring

Type 483
Pneumatic
lifting device H8
Inlet and outlet:
Clamp connection

Type 483

Safety Relief Valves – spring loaded

Type 483
Packed knob H4
Inlet and outlet:
Flange connection

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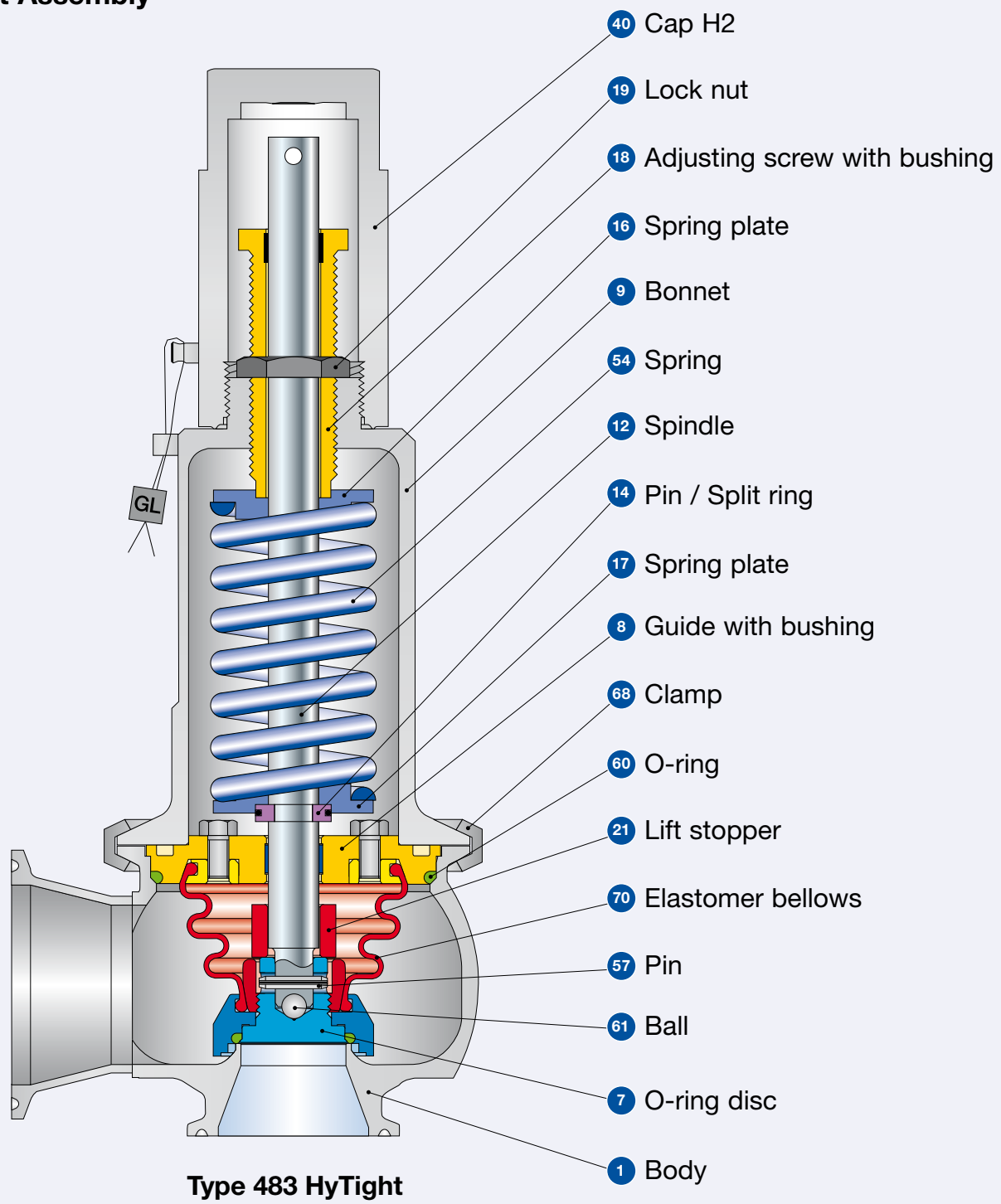
HyTight Assembly



Type 483 HyTight
Cap H2
Inlet and outlet:
Clamp connection

Type 488

Type 488
Cap H2
Inlet and outlet:
Clamp connection

Safety Relief Valves – spring loaded

Type 488
Packed knob H4
Inlet and outlet:
Flange connection

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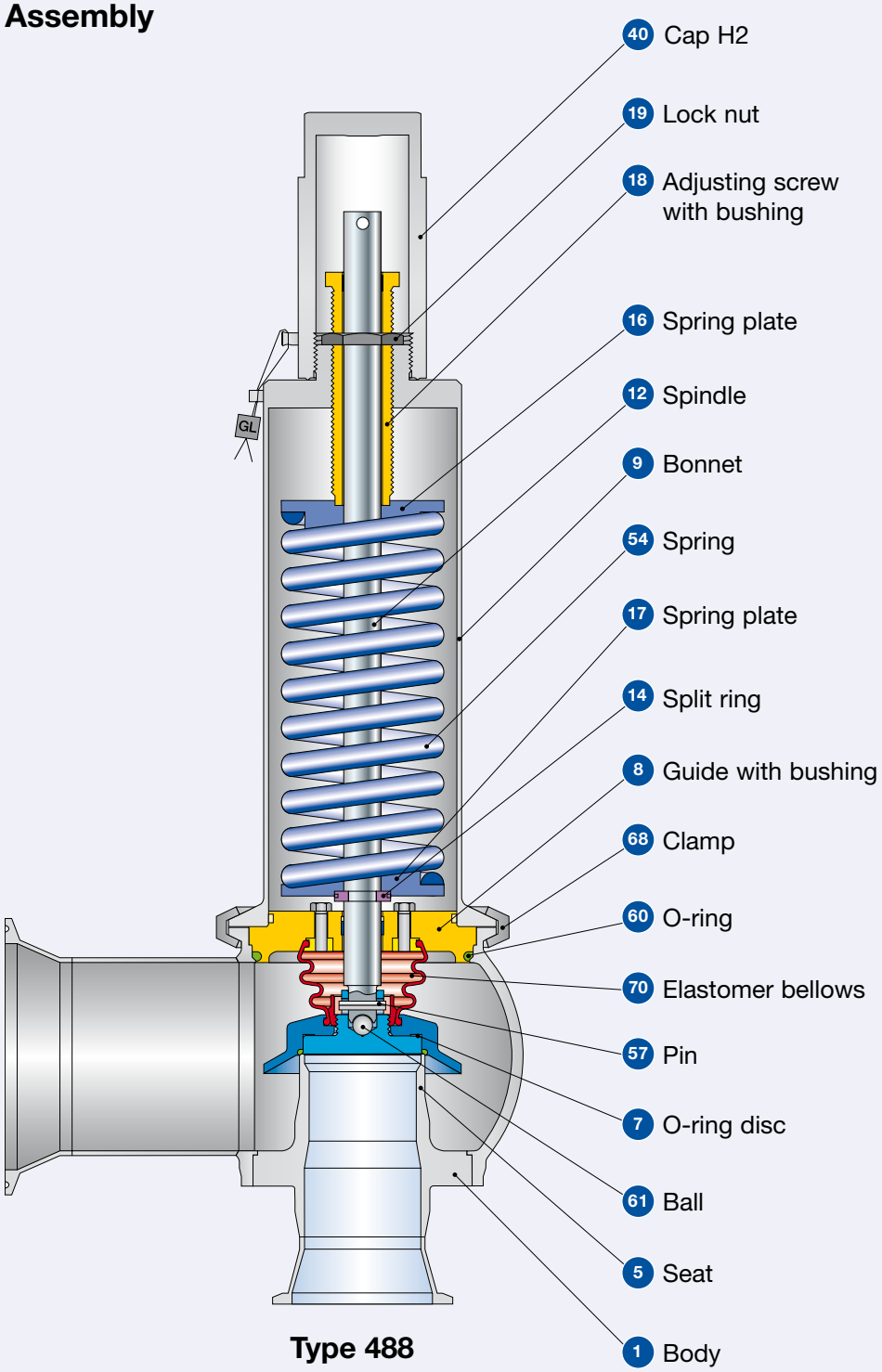
HyTight Assembly



Type 488
Cap H2
Inlet and outlet: Clamp connection

Type 484
Cap H2
Inlet: Vessel connection Type 5034
Outlet: Welded end connection

Type 484

Safety Relief Valves – spring loaded

Type 484
Packed knob H4
Inlet: Vessel connection Type 5034
Outlet: Welded end connection

Type 5034
Vessel connection

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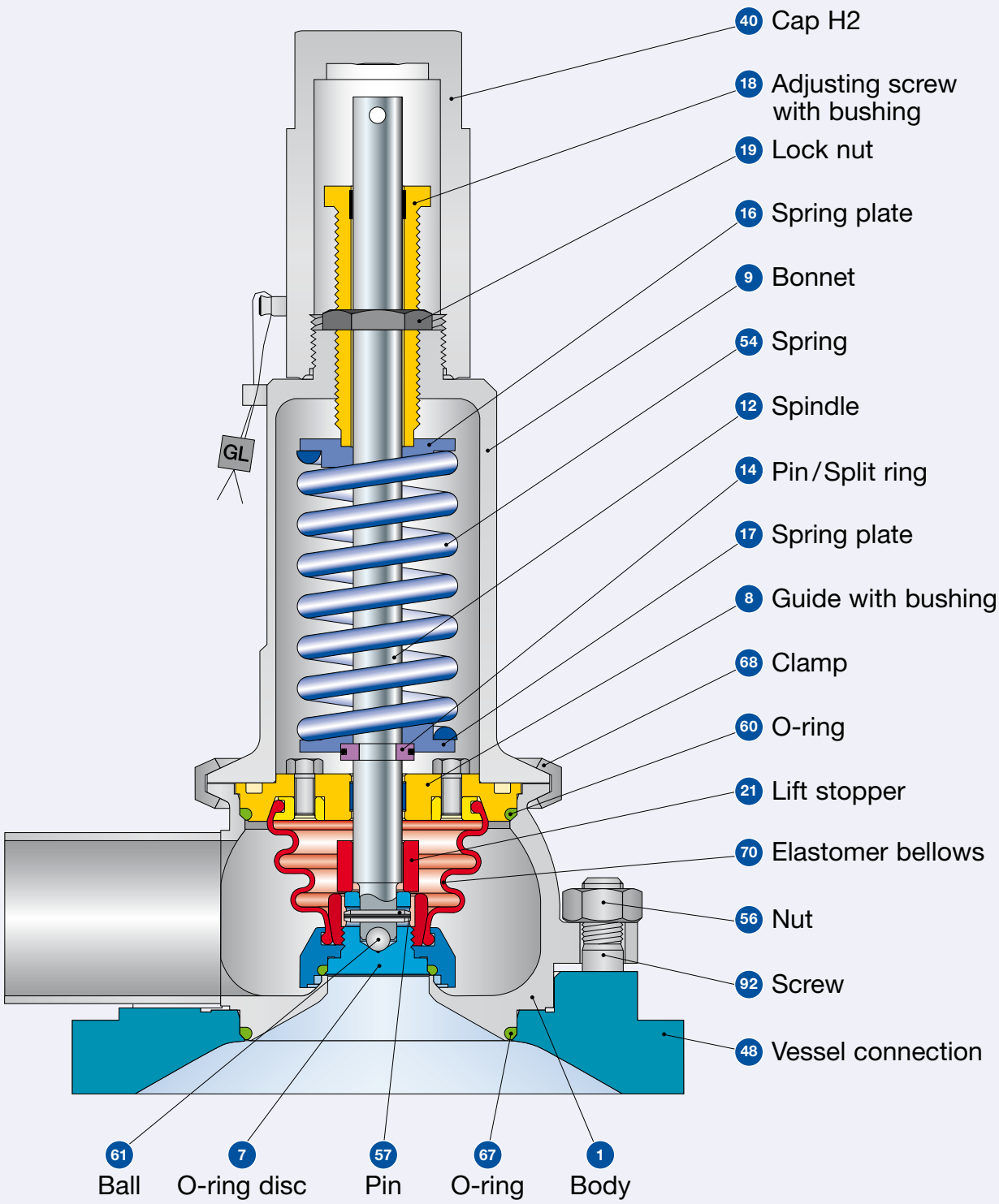
HyTight Assembly



Type 484 HyTight
Cap H2
Inlet: Vessel connection Type 5034
Outlet: Welded end connection

Type 485

Type 485
Pneumatic lifting device H8
Inlet: Integrated pipework connection Type 5034
Outlet: Flange connection

Safety Relief Valves – spring loaded

Type 485
Cap H2
Inlet: Integrated pipework connection Type 5034
Outlet: Welded end connection

Type 5034
Integrated pipework connection

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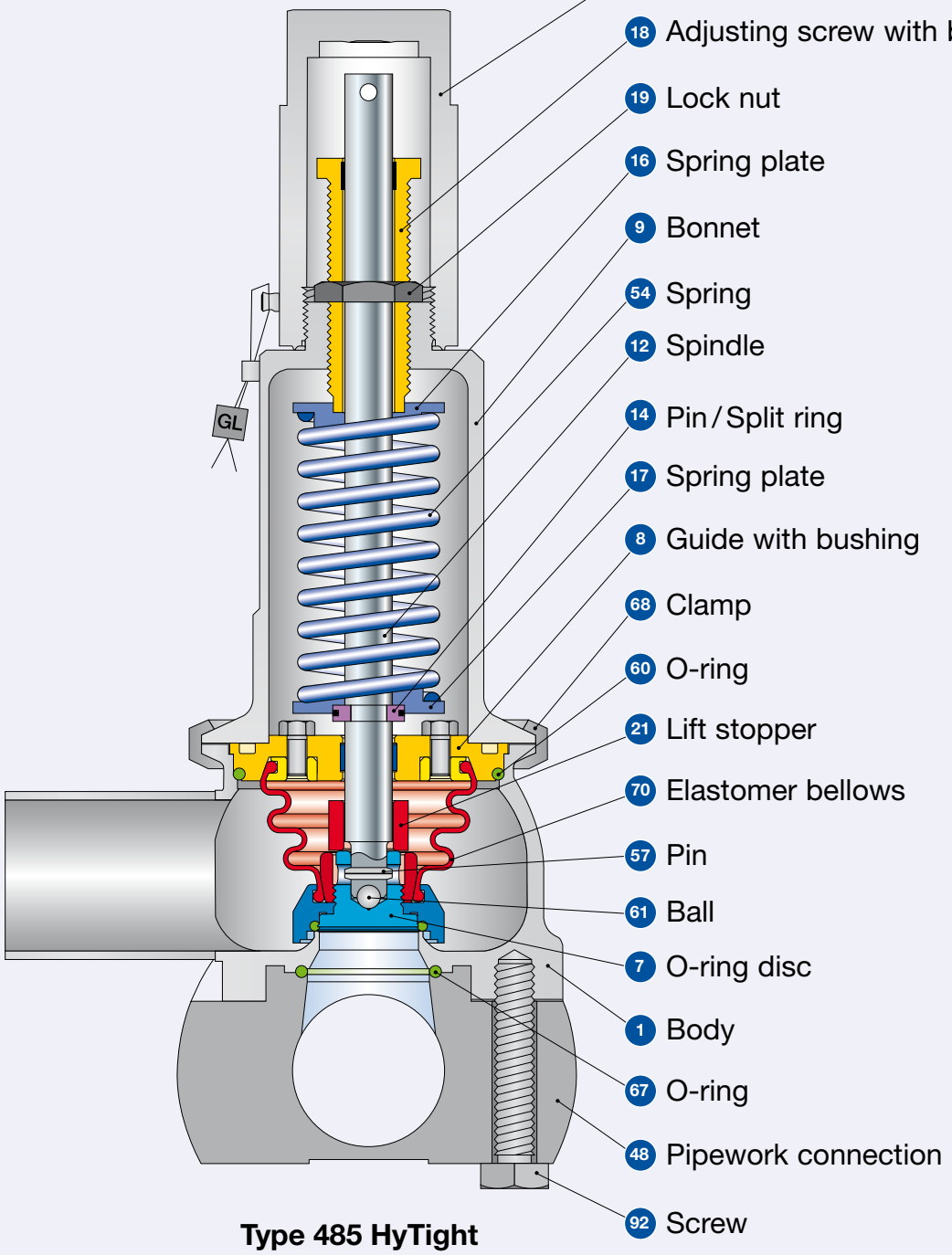
HyTight Assembly



Type 485 HyTight
Cap H2
Inlet: Integrated pipework connection Type 5034
Outlet: Welded end connection