Type 447 IC

Safety Relief Valves

CATALOG

LESER

The-Safety-Valve.com

LESER – Critical Service Safety Valves

The Critical Service product group represents

- ☑ Standardised solutions for special applications such as those involving critical and toxic media
- ☑ Optimal and permanent corrosion protection for chemical applications
- ☑ Technologically-sound and inexpensive alternative to nickel-based alloys (such as Hastelloy®)

The protection of valves against corrosion has a significant impact on the total cost of ownership (TCO) and plays a key role in system safety. Polytetrafluorethylene (PTFE) is a high-performance plastic which has become widely accepted in the chemical industry due to its unique properties.

LESER Critical Service Safety Valves …

… combine safety valve know-how with a level-based PTFE/PFA equipment and lining concept.

All components of Critical Service safety valves are made with PTFE/PFA-lined materials, including the permanently medium wetted inlet area composed of a nozzle and a disc, the additional protection of the bonnet area by means of a bellows and all components of the inlet and outlet areas.

- Designed and manufactured according to the highest standards
- Reach their full lift within a pressure increase of 10% above the set pressure
- Are characterised by longstanding proof in service.
- Are developed and optimised in close cooperation with plant engineers and service specialists to protect processes with highly corrosive and toxic media.
- Meet the highest requirements of end customers, OEMs and planners.
- Are approved by all important classification societies worldwide. This ensures the worldwide applicability of LESER Critical Service safety valves.
- Designed in accordance with numerous regulations, labelled, produced and approved in accordance with:
  UV stamp as per ASME Section VIII Division 1

ASME UV

Applications

LESER – Critical Service Safety Valves

provide solutions for protection against highly corrosive and toxic media in all industrial applications with vapours, gases and fluids.
Lined LESER safety valves are used primarily in chemical, pharmaceutical, petrochemical and industrial process engineering.

Typical applications for LESER Critical Service safety valves are:

- Chlorine production and processing
- Chemical systems and pipelines
- Reducing media such as acids (e.g. hydrochloric acid, acetic acid, etc.)
- Alkaline solutions (like sodium hydroxide applications)
- All intermediate products such as amines, diols and polyalcohol. They are used as raw materials for coatings, plastics, pharmaceuticals, textile fibres, detergents and pesticides, among other things.
- Electronic chemicals and other pure media
- All types of chemicals and media that are classified as being corrosive, highly corrosive, toxic or hazardous

The following circumstances require the use of a Critical Service safety valve:
– if metal-free surfaces are needed, e.g. fluids reactive to metal
– if stainless steel, Hastelloy® etc. is not adequately chemically resistant to the fluids
– if the fluids require the use of exotic metals, which would result in very high investment costs
– if anti-adhesive surfaces are needed

General Design Features

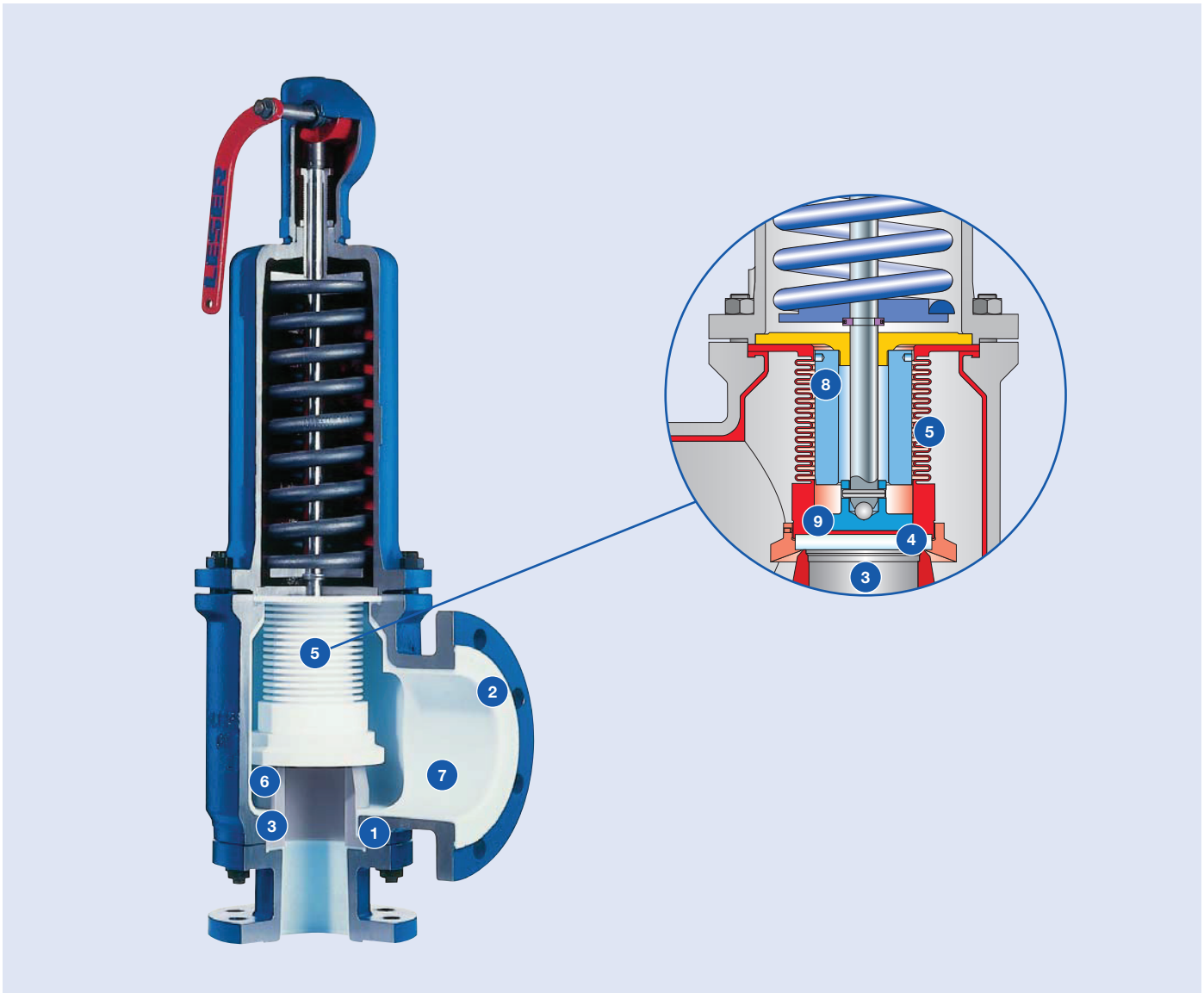
LESER – Critical Service Safety Valves

offer a large variety of types, materials, and options for adaptation to the respective system conditions:

- Valve sizes from DN 25 to DN 100, 1" to 4"
- All media-wetted parts are made with PTFE and PFA lining
- PTFE can also be used in EX areas, due to the antistatic and electrically conductive PTFE compound
- Identical design for steam, gases and fluids (single trim) reduces the number of required spare parts and facilitates cost-effective maintenance
- The one-part spindle reduces friction, guarantees optimal guidance and reliable operation under all operating conditions
- The self-draining body avoids media residue
- Lift indicator for detection of opening operations of the safety valve and forwarding the signal to a control room.
- Each part can be produced in other materials such as Hastelloy® according to customer specifications

Configuration features

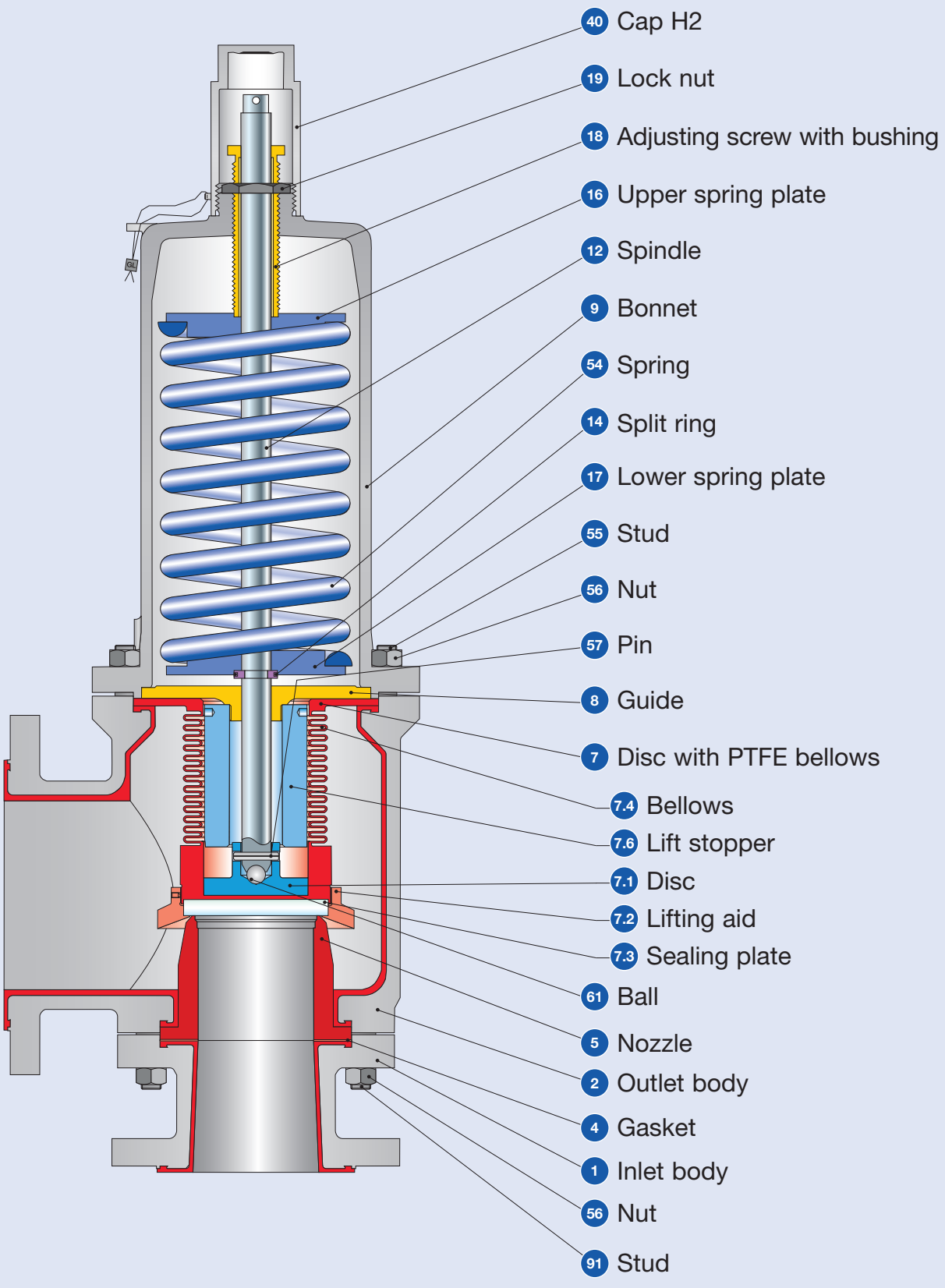
Design features – Type 447 IC



Design features		
Item	**Component**	**Information**
1	Inlet body + outlet body	Inlet body of material carbon steel to SA 105 and outlet body of material SA 216 WCB with PFA lining for highest corrosion resistance
2	PFA lining	Full lining of the body components of PFA with a minimum thickness of ≥ 3 mm. All lined surfaces are mechanically processed and have a smooth surface (R_a = 1,6 µm). This prevents build-ups of the medium
3	Nozzle	Nozzle of high-quality, inert gas sintered PTFE with 25% glass for high strength
4	Sealing plate	Sealing plate of BOROFLOAT glass for maximum chemical resistance
5	PTFE bellows	PTFE-TFM bellows protect the bonnet space against corrosive and aggressive media
6	Inlet body, nozzle and sealing plate	To fulfil individual material requests, the following components are exchangeable: inlet body (Item 1), nozzle (Item 5), and sealing plate (Item 7.3)
7	Outlet body	Self-emptying outlet body prevents collection of the medium in the blow-off chamber
8	Bellows support	Interior bellows support reduces flow loads resulting in a longer service life
9	Disc insert	Completely metallic support of the sealing plate with disc insert of 1.4404 (316L)

Type 447 IC

Conventional design



Conventional design

Materials		
Item	**Components**	**Type 447 IC**
1	**Inlet body**	CS to SA 105 + PFA lining
2	**Outlet body**	SA 216 WCB + PFA lining
4	Gasket	PTFE
5	**Nozzle**	PTFE-TFM + 25 % glass
7	Disc with PTFE bellows	316L + PTFE
7.1	Disc	316L
7.2	Lifting aid	PTFE-TFM + 25 % glass
7.3	Sealing plate	BOROFLOAT glass
7.4	Bellows	PTFE-TFM
7.6	Lift stopper	316L
8	Guide	316L
9	**Bonnet**	SA 216 WCB
12	Spindle	316L
14	Split ring	316
16/17	Spring plate	Carbon Steel
18	Adjusting screw with bushing	316 + PTFE
19	Lock nut	316
40	**Cap H2**	A 216 WCB
54	Spring, standard	1.1200, 1.8159 / 1.7102 Carbon Steel, Alloy Steel
	Spring, optional	1.4310 Stainless steel
55	Stud	SA 193 B7
56	Nut	SA 194 2H
57	Pin	Stainless steel
61	Ball	Stainless steel
91	Stud	SA 193 B7

Please observe:

- LESER reserves the right to make changes.
- LESER may use higher quality materials without giving prior notice.
- Each component can be replaced by another material according to the customer's specification.
- All components exposed to pressure are highlighted in bold.

Article numbers

Type 447 IC					
	DN_I	25	50	80	100
	DN_O	50	80	100	150
	Valve size	1" x 2"	2" x 3"	3" x 4"	4" x 6"
	Actual Orifice diameter d_0 [mm]	23	46	60	92
	Actual Orifice area A_0 [mm²]	415	1662	2827	6648
	Inlet/Outlet flange (ASME B16.5)	150# x 150#	150# x 150#	150# x 150#	150# x 150#
Body material: SA 216 WCB + PFA lining					
PFA fully lined					
Bonnet closed	**H2 cap, Lifting device H4** **Art. No. 4470**	**0011**	**0021**	**0031**	**0041**

Type 447
Cap H2
Closed bonnet
Conventional design

Type 447
Packed lever H4
Closed bonnet
Conventional design

Dimensions and weights

Metric units

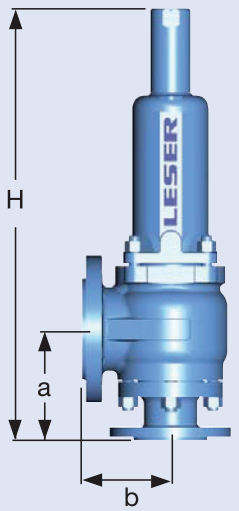
	DN_I	25	50	80	100
	DN_O	50	80	100	150
	Valve size	1" x 2"	2" x 3"	3" x 4"	4" x 6"
	Actual Orifice diameter d_0 [mm]	23	46	60	92
	Actual Orifice area A_0 [mm^2]	416	1662	2827	6648
Weight [kg]		15	29	50	105
Centre to face [mm]	Inlet a	105	152	155	220
	Outlet b	100	120	155	200
Height (H4) [mm]		468	604	786	943
Body material: SA 216 WCB + PFA lining					
ASME Flange[1)]	Inlet	Class 150			
	Outlet	Class 150			

US units

	DN_E	25	50	80	100
	DN_A	50	80	100	150
	Valve size	1" x 2"	2" x 3"	3" x 4"	4" x 6"
	Actual Orifice diameter d_0 [inch]	0,91	1,81	2,36	3,62
	Actual Orifice area A_0 [$inch^2$]	0,645	2,576	4,382	10,304
Weight [lbs]		33	64	110	231
Centre to face [inch]	Inlet a	$4^1/_4$	6	$6^1/_8$	$8^3/_4$
	Outlet b	$3^7/_8$	$4^3/_4$	$6^1/_8$	$7^7/_8$
Height (H4) [inch]		$18^1/_4$	$23^3/_4$	$30^{15}/_{16}$	$37^1/_8$
Body material: SA 216 WCB + PFA lining					
ASME Flange[1)]	Inlet	Class 150			
	Outlet	Class 150			

[1)] Standard flange class. For other flange drillings, please consult LESER

Conventional design



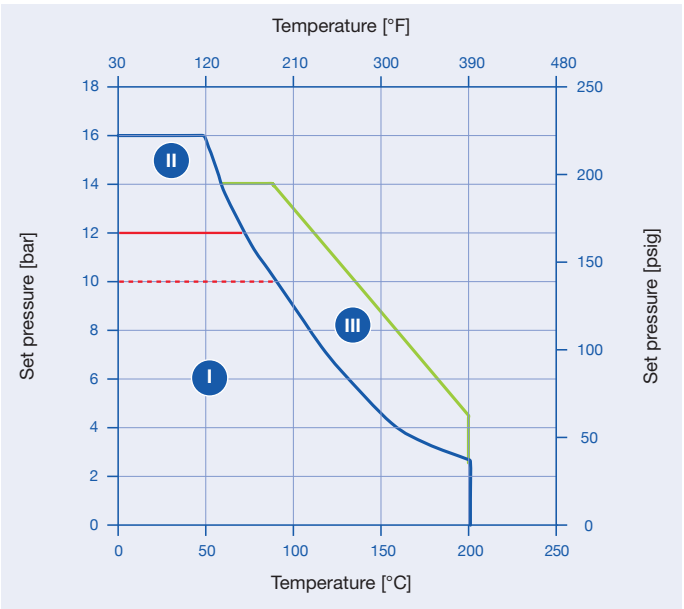
Pressure temperature ratings

Metric units

	DN_I	25	50	80	100
	DN_O	50	80	100	150
	Valve size	1" x 2"	2" x 3"	3" x 4"	4" x 6"
	Actual Orifice diameter d_0 [mm]	23	46	60	92
	Actual Orifice area A_0 [mm²]	416	1662	2827	6648
Body material: SA 216 WCB + PFA lining					
ASME Flange	Inlet	**Class 150**			
	Outlet	**Class 150**			
Min. set pressure	p [bar_g] S/G/L	0,1			
Max. set pressure with special spring[1)]	p [bar_g] S/G/L	16	10	10	10
		16	16	16	16
Temperature[1)] acc. to DIN EN	min. [°C]	-85			
	max. [°C]	+200			

US units

	DN_I	25	50	80	100
	DN_O	50	80	100	150
	Valve size	1" x 2"	2" x 3"	3" x 4"	4" x 6"
	Actual Orifice diameter d_0 [inch]	0,91	1,81	2,36	3,62
	Actual Orifice area A_0 [inch²]	0,645	2,576	4,382	10,304
Body material: SA 216 WCB + PFA lining					
ASME Flange	Inlet	**Class 150**			
	Outlet	**Class 150**			
Min. set pressure	p [psig] S/G/L	1,45			
Max. set pressure with special spring[1)]	p [psig] S/G/L	232	145	145	145
		232	232	232	232
Temperature[1)] acc. to DIN EN	min. [°F]	-121			
	max. [°F]	+392			



Pressure temperature ratings

[1)] The pressure / temperature functional ranges of Type 447 IC are dependent on the PTFE components in the safety valve. The chart shows the application ranges for:

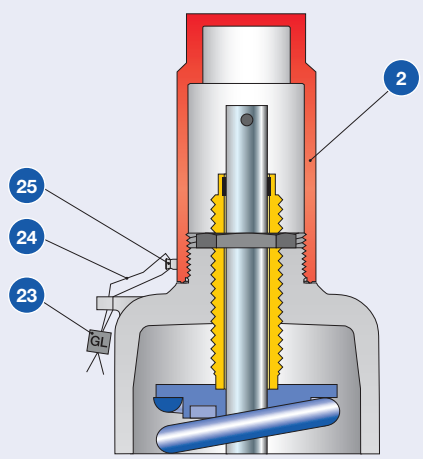
- **I** Standard safety valve with PTFE nozzle and sealing plate made of BOROFLOAT glass
- **II** Design for pressures above 10 bar or 12 bar: Safety valve with metallic nozzle and sealing plate of Hastelloy®, nickel-base alloys, etc.
- **III** Safety valve with metallic nozzle, sealing plate and lifting aid of Hastelloy®, nickel-base alloys, etc.

Additional order codes are required for ordering

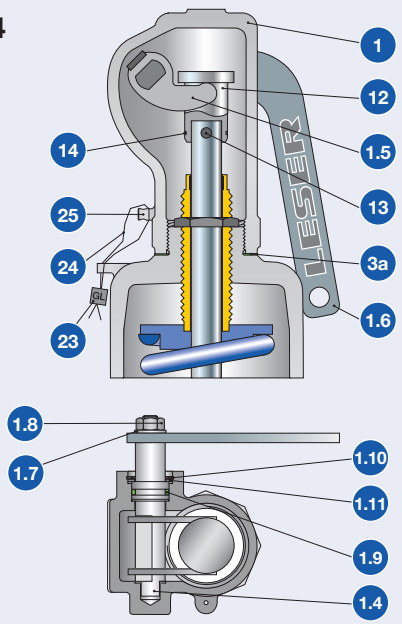
Nominal diameter	Set pressure [bar]	Option code
DN 25	12,01 – 16	S05 + S07
DN 50	10,01 – 16	S05 + S07 + S54
DN 80	10,01 – 16	S05 + S07 + S54
DN 100	10,01 – 16	S05 + S07 + S54

Available options

Cap H2

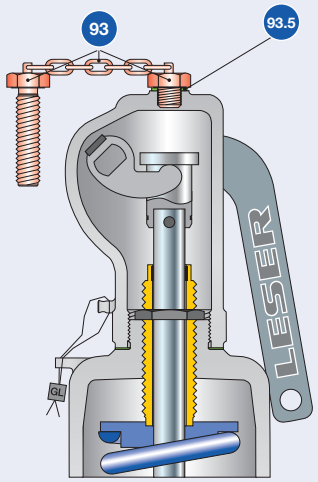


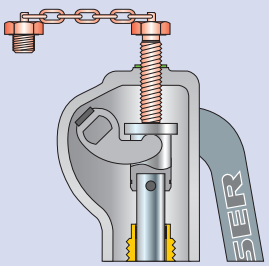
Packed lever H4



Test gag

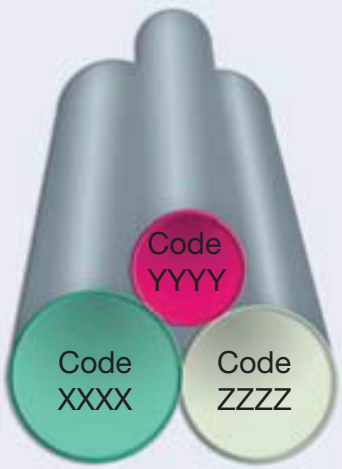
Cap H2: J70
Packed lever H4: J69





Special materials

2.4610 Hastelloy® C4
2.4360 Monel® 400
1.4462 Duplex



Test gag

The test gag presses on the spindle and keeps the safety valve closed, even if the system pressure exceeds the set pressure of the valve.

The test gag is used to:
– perform the pressure test in a system without disassembling the safety valve.
– be able to make an adjustment to each individual valve in systems with multiple safety valves The test gag must be removed after testing, otherwise the safety valve will not protect the system against impermissible overpressure.

Other Products

Type 441 IC

Flanged standard pressure series suitable for steam, gas and liquid service. They have proven temselves as a universal safety valve for many applications. IBR & CCoE approved.

Type 237 IC

For all smaller capacity application of steam, gases and liquids. Available with “UV” stamp, IBR & CCoE approved.

Type 526 IC

Flanged safety relief valves with “UV” stamp, Designed as per API 526 and ASME Sec. VIII. Also availble with IBR & CCoE certificate.

Type 459 IC

Safety valve for gas, liquid or steam, Also for thermal relief application. Available in screwed and flanged connection for all utility applications. Can be supplied with “UV” stamp. IBR & CCoE approved.

How to contact LESER India

Head office in Mumbai

136/137, Sanjay Bldg. No. 3, Mittal Estate
Marol, Andheri Kurla Road,
Andheri (E), Mumbai – 400 059
India
Telephone: +91 22 68933800
E-mail: info@leser.co.in
www.leser.co.in

LESER India factory in Paithan

Manufacturing facility in Paithan

D-3, M.I.D.C. Paithan,
Dist. Aurangabad,
Maharashtra – 431 148
India Telephone: +91 2431 661100
E-mail: sales@leser.co.in
www.leser.co.in

Assembly of safety valves

Type 447 IC
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