

Type 459

Safety Relief Valves – spring loaded

Type 459
Plain lever H3



Type 459
Cap H2



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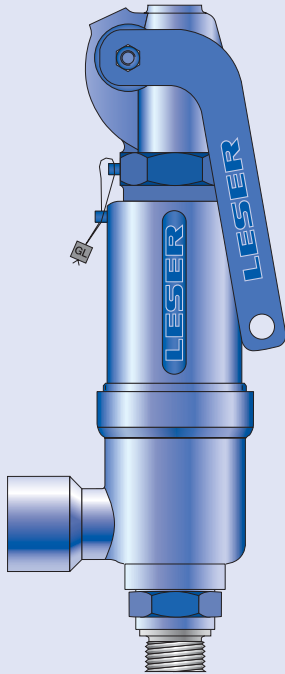
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Capacities

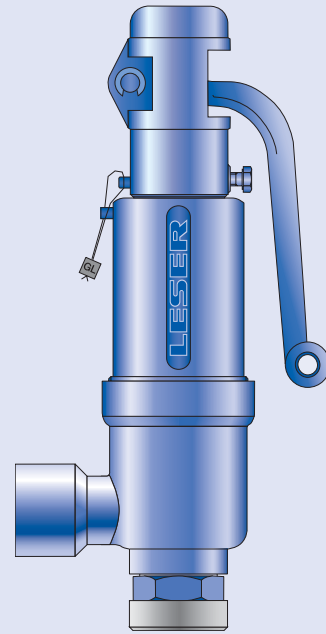
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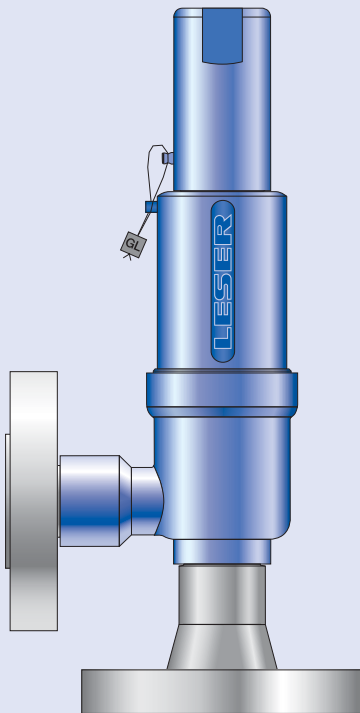
How to order – Article numbers



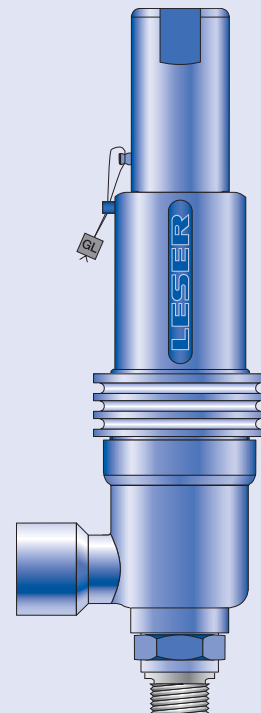
Type 459 Male
Packed lever H4
Conventional design



Type 459 Female
Plain lever H3
Conventional design



Type 459
Cap H2
Conventional design
Flanged connection



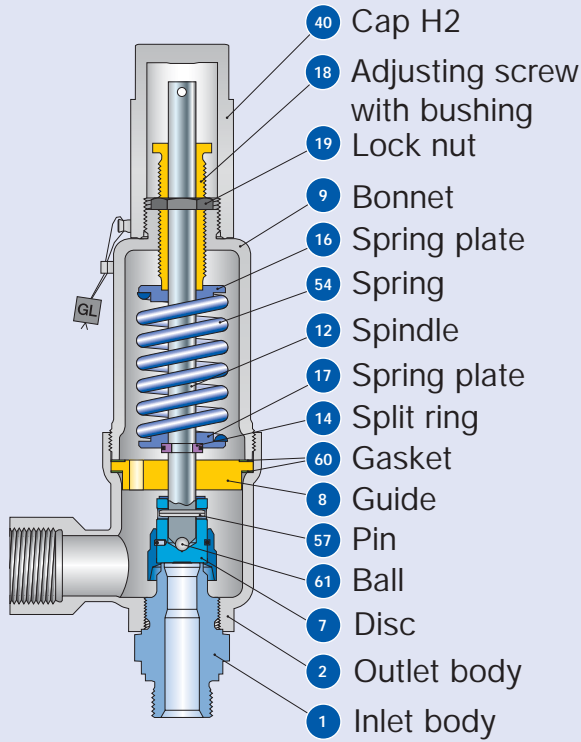
Type 459
Cap H2
Balanced bellows

How to order – Article numbers

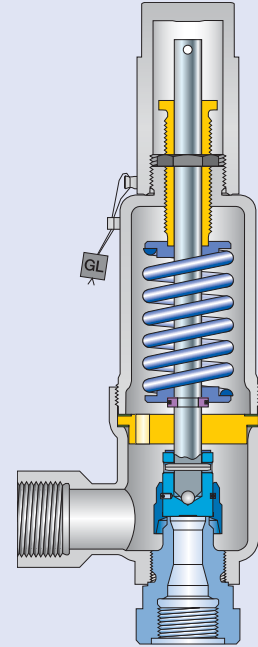
Article numbers						
	Actual Orifice diameter d_0 [mm]			9	13	17,5
	Actual Orifice area A_0 [mm ²]			63,9	133	241
	Actual Orifice diameter d_0 [inch]			0,354	0,512	0,689
	Actual Orifice area A_0 [inch ²]			0,099	0,206	0,374
Outlet chamber casted						
Inlet body	1.4104	H2	Art.-No. 4593.	2502	2512	2522
Outlet body	0.7043	H3	Art.-No. 4593.	2503	2513	2523
Bonnet	0.7043	H4	Art.-No. 4593.	2504	2514	2524
	p [bar _g]		S/G/L	1,5 – 250	0,2 – 200	0,2 – 100
	p [psig]			21,7 – 3626	2,9 – 2901	2,9 – 1450
Outlet chamber deep-drawn						
Inlet body	1.4404	H2	Art.-No. 4592.	2472	2992	2492
Outlet body	1.4404	H3	Art.-No. 4592.	2473	2994	2493
Bonnet	1.0460	H4	Art.-No. 4592.	2474	68 – 180	2494
	p [bar _g]		S/G/L	1,5 – 250	0,2 – 200	0,2 – 100
	p [psig]			21,7 – 3626	986 – 2611	2,9 – 1450
Outlet chamber deep-drawn						
All body and trim parts	1.4404	H2	Art.-No. 4594.	2552	2562	2572
		H4	Art.-No. 4594.	2554	2564	2574
	p [bar _g]		S/G/L	1,5 – 250	0,2 – 200	0,2 – 100
	p [psig]			21,7 – 3626	2,9 – 2901	2,9 – 1450

For selection of inlet and outlet connection please refer to page 09/06 – 09/07.

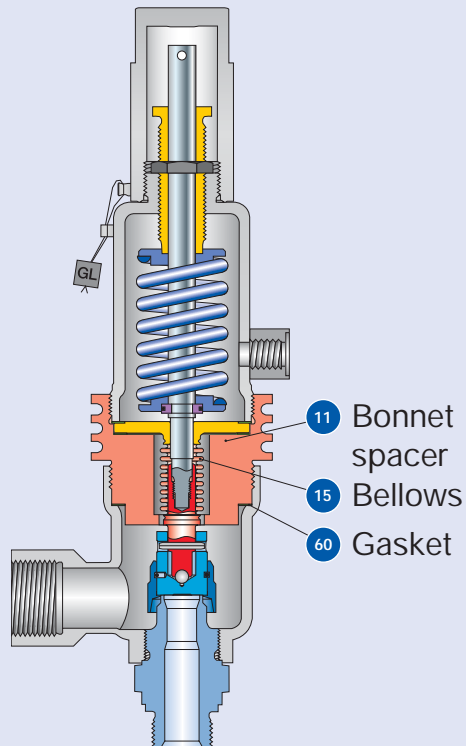
Available designs



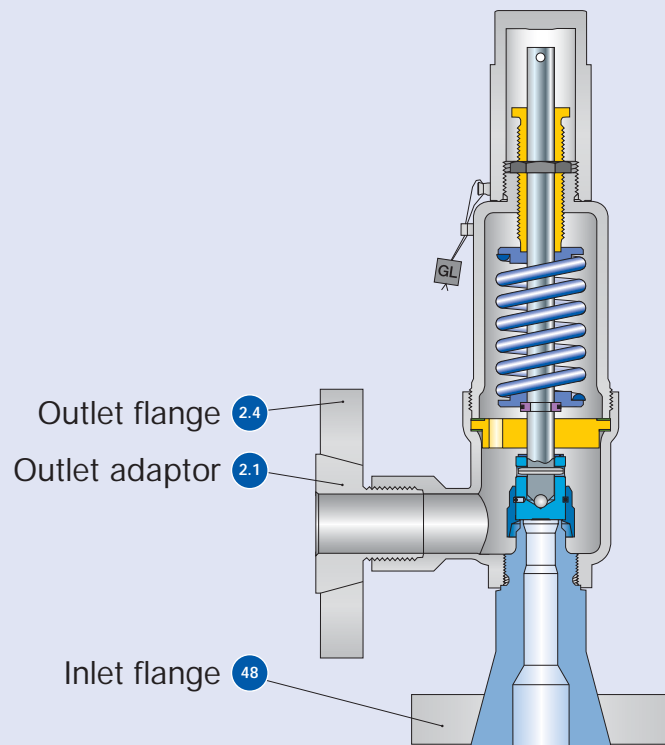
Conventional design
Threaded connection



Conventional design
Threaded connection



Balanced bellows
Threaded connection



Conventional design
Flange connection

Available designs – materials

Materials					
Item	Component	Remarks	Type 4593	Type 4592	Type 4594
1	Base / Inlet body	Threaded connection	1.4104 SA 479 430	1.4404 SA 479 316L	1.4404 SA 479 316L
		Flange connection	1.4404 SA 479 316L	1.4404 SA 479 316L	1.4404 SA 479 316L
2	Outlet body		0.7043 Ductile Gr. 60-40-18	1.4404 SA 479 316L	1.4404 SA 479 316L
2.1	Outlet adaptor	Flange connection	1.4404 316L	1.4404 316L	1.4404 316L
2.4	Outlet flange	Flange connection	1.4404 316L	1.4404 316L	1.4404 316L
7	Disc	Metal seat	1.4122 Hardened stainless steel	1.4122 Hardened stainless steel	1.4404 316L
8	Guide		1.4104 tenifer Chrome steel tenifer	1.4104 tenifer Chrome steel tenifer	1.4404 316L
		Balanced bellows design	1.4404 / SA 316L Upper conn. part of balanced bellows	1.4404 / SA 316L Upper conn. part of balanced bellows	1.4404 / SA 316L Upper conn. part of balanced bellows
9	Bonnet		0.7043 Ductile Gr. 60-40-18	1.0460 105	1.4404 316L
		Balanced bellows design	1.4404 316L	1.4404 316L	1.4404 316L
11	Bonnet spacer	Balanced bellows design	1.0460 Carbon steel	1.0460 Carbon steel	1.4404 316L
12	Spindle		1.4021 420	1.4404 316L	1.4404 316L
		Balanced bellows design	1.4404 316L	1.4404 316L	1.4404 316L
14	Split ring		1.4104 Chrome steel	1.4104 Chrome steel	1.4404 316L
15	Bellows	Balanced bellows design	1.4571 SA 316Ti	1.4571 316Ti	1.4571 316Ti
16/17	Spring plate		1.0718 Steel	1.0718 Steel	1.4404 316L
			1.4104 / PTFE Chrome steel / PTFE	1.4104 / PTFE Chrome steel / PTFE	1.4404 / PTFE 316L / PTFE
19	Lock nut		1.4104 Chrome steel	1.4104 Chrome steel	1.4404 316L
40	Cap H2		1.0718 Steel	1.0718 Steel	1.4404 316L
48	Inlet flange	Flange connection	1.4404 316L	1.4404 316L	1.4404 316L
54	Spring	Standard	1.1200 / 1.8159 / 1.7107 Carbon steel	1.1200 / 1.8159 / 1.7107 Carbon steel	1.4310 Stainless steel
		Optional	1.4310 Stainless steel	1.4310 Stainless steel	- -
57	Pin		1.4310 Stainless steel	1.4310 Stainless steel	1.4310 Stainless steel
60	Gasket		Graphite / 1.4401 Graphite / 316	Graphite / 1.4401 Graphite / 316	Graphite / 1.4401 Graphite / 316
			1.3541 Hardened stainless steel	1.3541 Hardened stainless steel	1.4401 316

Please notice:

- Modifications reserved by LESER.
- LESER can upgrade materials without notice.
- Every part can be replaced by other material acc. to customer specification.

Dimensions and weights – Metric Units

Threaded connections

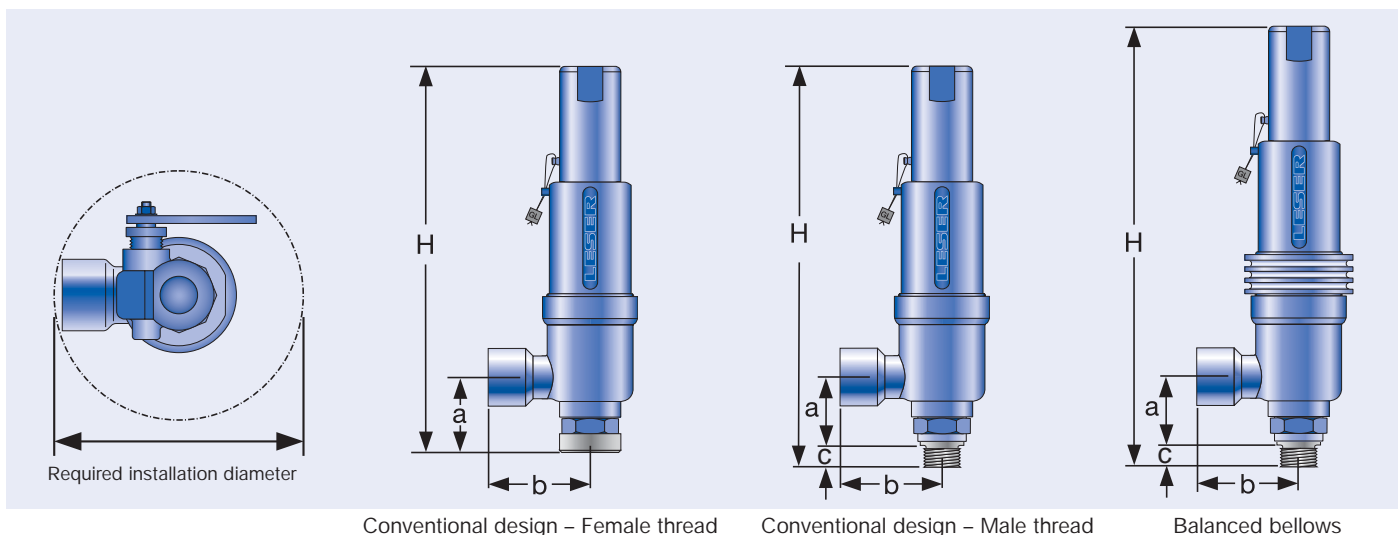
Size Outlet body		1"	1"	1"	1"	1"	1"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	
Actual Orifice diameter d ₀ [mm]		9	9	9	13	13	13	17,5	17,5	17,5	17,5	17,5	
Actual Orifice area A ₀ [mm ²]		63,6	63,6	63,6	133	133	133	241	241	241	241	241	
Weight	Standard	[kg]	2,6	2,6	2,6	2,6	2,6	2,6	3,0	3,0	3,0	3,0	3,0
	Balanced bellows		3,4	3,4	3,4	3,4	3,4	3,4	3,8	3,8	3,8	3,8	3,8
Required installation diameter		[mm]	165	165	165	165	165	165	165	165	165	165	165
Inlet thread "Male"													
DIN ISO 228-1	G	Inlet a	-	55,5	55,5	-	55,5	55,5	55,5	55,5	55,5	55,5	-
		Center to face [mm]	Outlet b	-	75	75	-	75	75	75	75	75	75
ISO 7-1/BS 21	R	Inlet a	-	52,5	52,5	-	52,5	52,5	-	52,5	-	52,5	-
		Center to face [mm]	Outlet b	-	75	75	-	75	75	-	75	-	75
ANSI/ASME B1.20.1	NPT	Inlet a	-	52,5	52,5	-	52,5	52,5	-	52,5	52,5	52,5	53
		Center to face [mm]	Outlet b	-	75	75	-	75	75	-	75	75	75
Inlet thread "Female"													
DIN ISO 228-1	G	Inlet a	60,5	65,5	70	60,5	65,5	70,5	65,5	70,5	75,5	80,5	-
		Center to face [mm]	Outlet b	75	75	75	75	75	75	75	75	75	75
Height	[mm]	H max.	290,5	295,5	300,5	290,5	295,5	300,5	292,5	297,5	302,5	307,5	-
ISO 7-1/BS 21	Rc	Inlet a	60,5	70,5	70,5	60,5	70,5	70,5	70,5	70,5	-	-	-
		Center to face [mm]	Outlet b	75	75	75	75	75	75	75	75	-	-
Height	[mm]	H max.	290,5	300,5	300,5	290,5	300,5	300,5	297,5	297,5	-	-	-
ANSI/ASME B1.20.1	NPT	Inlet a	60,5	70,5	70,5	60,5	70,5	70,5	70,5	70,5	75,5	80,5	-
		Center to face [mm]	Outlet b	75	75	75	75	75	75	75	75	75	75
Height	[mm]	H max.	290,5	300,5	300,5	290,5	300,5	300,5	297,5	297,5	302,5	307,5	-

Height inlet thread "Male"

Inlet thread		Size		Conventional design						Balanced bellows					
				1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
DIN ISO 228-1	[mm]	G	H max.	-	301,5	303,5	302,5	304,5	-	-	346,5	348,5	347,5	349,5	-
ISO 7-1/BS 21	[mm]	R	H max.	-	302,5	305,5	-	307,5	-	-	347,5	350,5	-	352,5	-
ASME B1.20.1	[mm]	NPT	H max.	-	304,5	309,5	307,5	307,5	308	-	349,5	354,5	352,5	352,5	353

Length of screwed end "c" inlet thread "Male"

Inlet thread		Size	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
DIN ISO 228-1	[mm]	G	14	16	18	20	22	-
ISO 7-1/BS 21	[mm]	R	19	20	23	-	28	-
ASME B1.20.1	[mm]	NPT	22	22	27	28	28	28



Dimensions and weights – Metric Units

Flanged connection

	Conventional design			Balanced bellows		
Actual Orifice diameter d_0 [mm]	9	13	17,5	9	13	17,5
Actual Orifice area A_0 [mm ²]	63,6	133	241	63,6	133	241

DIN ISO 1092-1 (Available flange sizes refer to page 09/07)

Flange rating PN 40 – PN 400

Center to face [mm]	Inlet a	100	100	105	100	100	105
	Outlet b	100	100	100	100	100	100
Height [H4] [mm]	H max.	330	330	333	375	375	378

ASME B 16.5 (Available flange sizes refer to page 09/07)

Flange rating class 150 – 2500

Center to face [mm]	Inlet a	100	100	105	100	100	105
	Outlet b	100	100	100	100	100	100
Height [H4] [mm]	H max.	330	330	333	375	375	378

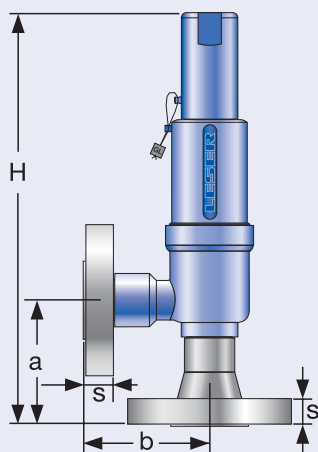
Weight

For the calculation of the total weight please use the Formular: $W_T = W_N + W_F$ (Inlet) + W_F (Outlet)

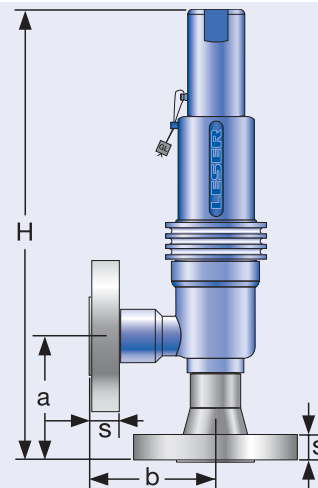
Weight net [kg]	W_N	2,6	2,6	3	3,8	3,8	4,2
(without inlet and outlet flange)							

Flange dimensions and availability

		DIN ISO 1092-1 / Flange rating PN					ASME B16.5 / Flange rating class						
Size		40	160	250	320	400	Size	150	300	600	900	1500	2500
DN 15							NPS 1/2"						
Flange thickness [mm]	s	18	22	26	26	30	14	18		26		30,2	
Weight slip on flange [kg]	W_F	0,8	1,2	2,5	2,5	3,6	0,6	0,9		2,1		3	
Available at Inlet		✓	✓	✓	✓	✓	✓	✓		✓		✓	✓
Available at Outlet		✓	✓	✓			✓	✓		✓			
DN 20							NPS 3/4"						
Flange thickness [mm]	s	20	22				15	18		25,4		32	
Weight slip on flange [kg]	W_F	1,1	1,3				0,8	1,4		2,3		3,5	
Available at Inlet		✓	✓				✓	✓		✓		✓	✓
Available at Outlet		✓	✓				✓	✓		✓			
DN 25							NPS 1"						
Flange thickness [mm]	s	22	26	30	36	40	17	21,5		32,5		40	
Weight slip on flange [kg]	W_F	1,3	2,6	3,5	5	7,5	1	2,1		4,1		5,1	
Available at Inlet		✓	✓	✓	✓	✓	✓	✓		✓		✓	✓
Available at Outlet		✓	✓	✓			✓	✓		✓			
DN 40							NPS 1 1/2"						
Flange thickness [mm]	s	23	23	34			22	24		38			
Weight slip on flange [kg]	W_F	2,1	2,9	4,3			1,4	2,2		3,9			
Available at Inlet		✓	✓	✓			✓	✓		✓			
Available at Outlet		✓	✓	✓			✓	✓		✓			



Conventional design



Balanced bellows design

Pressure temperature ratings – Metric Units

Metric Units												
Actual Orifice diameter d_0 [mm]		9			13			17,5				
Actual Orifice Area A_0 [mm ²]		63,6			133			241				
Body material: 1.4104 (430) Type 4593												
Base / Inlet Body	Connection size	1/2"	3/4"	1"	1/2"	3/4"	1"	3/4"	1"	1 1/4"	1 1/2"	2"
	Pressure rating	PN 400			PN 250			PN 160				
Outlet body	Pressure rating	PN 40			PN 40			PN 40				
Minimum set pressure	p [bar _g] S/G/L	1,5			0,2			0,2				
Min. set pressure ¹⁾ standard bellows	p [bar _g] S/G/L	40			40			40				
Min. set pressure low press. bellows	p [bar _g] S/G/L	3			3			3				
Maximum set pressure	p [bar _g] S/G/L	250			200			100				
Temperature acc. to DIN EN	min [°C]				-10							
	max [°C]				+300							
Temperature acc. to ASME	min [°C]				-29							
	max [°C]				+300							

Body material: 1.4404 (316L) Type 4592												
Base / Inlet Body	Connection size	1/2"	3/4"	1"	1/2"	3/4"	1"	3/4"	1"	1 1/4"	1 1/2"	2"
	Pressure rating	PN 250 PN 500 (Option code L20)			PN 160 PN 500 (Option code L20)			PN 160				
Outlet Body	Pressure rating	PN 40			PN 40			PN 40				
Minimum set pressure	p [bar _g] S/G/L	1,5			0,2			0,2				
Min. set pressure ¹⁾ standard bellows	p [bar _g] S/G/L	40			40			40				
Min. set pressure low press. bellows	p [bar _g] S/G/L	3			3			3				
Maximum set pressure	p [bar _g] S/G/L	250			200			100				
Temperature acc. to DIN EN	min [°C]				-85							
	max [°C]				+400							
Temperature acc. to ASME	min [°C]				-29							
	max [°C]				+300							

Body material: 1.4404 (316L) Type 4594												
Base / Inlet Body	Connection size	1/2"	3/4"	1"	1/2"	3/4"	1"	3/4"	1"	1 1/4"	1 1/2"	2"
	Pressure rating	PN 250 PN 500 (Option code L20)			PN 160 PN 500 (Option code L20)			PN 160				
Outlet Body	Pressure rating	PN 40			PN 40			PN 40				
Minimum set pressure	p [bar _g] S/G/L	1,5			0,2			0,2				
Min. set pressure ¹⁾ standard bellows	p [bar _g] S/G/L	40			40			40				
Min. set pressure low press. bellows	p [bar _g] S/G/L	3			3			3				
Maximum set pressure	p [bar _g] S/G/L	250			200			100				
Temperature acc. to DIN EN	min [°C]	-200			-200			-200				
	max [°C]	+400			+400			+400				
Temperature acc. to ASME	min [°C]	-184			-184			-184				
	max [°C]	+427			+427			+427				

¹⁾ Min. set pressure standard bellows = Max. pressure low pressure bellows.

Because there is no open bonnet for this type available, please use at a temperature of 300°C (572°F) a stainless steel bellows or a specific high temperature model without a bellows. For DIN EN applications at temperatures under -10°C please proceed according to AD-2000 Merkblatt W 10.

Approvals

Approvals				
Actual Orifice diameter d_0 [mm]		9	13	17,5
Actual Orifice area A_0 [mm ²]		63,6	133	241
Actual Orifice diameter d_0 [inch]		0,354	0,512	0,689
Actual Orifice area A_0 [inch ²]		0,099	0,206	0,374
Europe		Coefficient of discharge K_{dr}		
DIN EN ISO 4126-1	Approval No.	072020111Z0008/0/13		
	S/G	0,83	0,81	0,79
	L	0,61	0,53	0,52
Germany		Coefficient of discharge α_w		
AD 2000-Merkblatt A2	Approval No.	TÜV SV 909		
	S/G	0,83	0,81	0,79
	L	0,61	0,53	0,52
United States		Coefficient of discharge K		
ASME Sec. VIII	Approval No.	M 37112		
	S/G	0,811		
	Approval No.	M 37101		
	L	0,566		
Canada		Coefficient of discharge K		
CRN	Approval No.	OG0730.95		
	S/G	Refer to ASME Sec. VIII		
	L	Refer to ASME Sec. VIII		
China		Coefficient of discharge α_w		
CSBQTS	Approval No.			
	S/G	0,83	0,81	0,79
	L	0,61	0,53	0,52
Russia		Coefficient of discharge α_w		
GGTN/ GOSGOTECHNADZOR	Approval No.	PPC 00-18458		
GOST R	S/G	0,83	0,81	0,79
	L	0,61	0,53	0,52
Classification societies		Homepage		
Bureau Veritas	BV	www.bureauveritas.com		
Det Norske Veritas	DNV	www.dnv.com		
Germanischer Lloyd	GL	www.gl-group.com		
Lloyd' s Register EMEA	LREMEA	www.lr.org		
Registro Italiano Navale	RINA	www.rina.org		
		The valid certification number is changed with every renewal.		
		A sample certificate including the valid certification number can be taken from the homepage of the classification societies.		

Capacities – Metric Units

Capacities according to AD 2000-Merkblatt A2, based on set-pressure plus 10% overpressure.
 Capacities at 1 bar (14,5 psig) and below are based on 0,1 bar (1,45 psig) overpressure.

Metric Units		AD 2000-Merkblatt A2								
Actual Orifice diameter d_0 [mm]		9			13			17,5		
Actual Orifice area A_0 [mm ²]		63,6			133,0			241,0		
LEO*) [inch ²]		S/G = 0,082 L= 0,086			S/G = 0,171 L= 0,179			S/G = 0,310 L= 0,325		
Set pressure		Capacities			Capacities			Capacities		
		Steam saturated	Air 0°C and 1013 mbar	Water 20°C	Steam saturated	Air 0°C and 1013 mbar	Water 20°C	Steam saturated	Air 0°C and 1013 mbar	Water 20°C
[bar]		[kg/h]	[m ³ /h]	[10 ³ kg/h]	[kg/h]	[m ³ /h]	[10 ³ kg/h]	[kg/h]	[m ³ /h]	[10 ³ kg/h]
0,2					53	61	1,96	85	98	3,48
0,5					84	98	2,77	134	157	4,93
1					120	143	3,75	200	238	6,67
1,5		77	92	2,54	156	188	4,6	265	318	8,17
2		93	113	2,93	190	229	5,31	331	400	9,44
3		127	155	3,59	258	316	6,5	456	558	11,6
4		158	195	4,14	322	396	7,51	569	700	13,3
5		189	234	4,63	386	477	8,39	681	842	14,9
6		220	247	5,07	449	557	9,19	793	985	16,3
7		251	313	5,48	511	638	9,93	902	1127	17,7
8		282	353	5,86	573	718	10,6	1013	1269	18,9
9		312	392	6,21	636	799	11,3	1124	1412	20
10		343	432	6,55	699	879	11,9	1235	1554	21,1
12		405	511	7,17	824	1040	13	1457	1839	23,1
14		465	590	7,75	947	1201	14	1674	2123	25
16		527	669	8,28	1072	1363	15	1895	2408	26,7
18		588	748	8,78	1197	1524	15,9	2116	2693	28,3
20		650	827	9,26	1323	1685	16,8	2338	2977	29,8
22		709	906	9,71	1444	1846	17,6	2553	3262	31,3
24		771	986	10,1	1570	2007	18,4	2775	3547	32,7
26		833	1065	10,6	1696	2168	19,1	2997	3831	34
28		895	1144	11	1822	2329	19,9	3221	4116	35,3
30		957	1223	11,3	1949	2490	20,6	3445	4401	36,5
32		1020	1302	11,7	2076	2651	21,2	3669	4685	37,7
34		1079	1381	12,1	2198	2812	21,9	3884	4970	38,9
36		1142	1460	12,4	2325	2973	22,5	4110	5255	40
38		1205	1539	12,8	2453	3134	23,1	4336	5539	41,1
40		1268	1618	13,1	2582	3295	23,7	4564	5824	42,2
42		1332	1698	13,4	2711	3456	24,3	4792	6109	43,2
44		1395	1777	13,7	2841	3617	24,9	5021	6393	44,3
46		1459	1856	14	2971	3779	25,5	5251	6678	45,3
48		1524	1935	14,3	3102	3940	26	5483	6963	46,2
50		1588	2014	14,6	3234	4101	26,5	5715	7247	47,2
60		1910	2409	16	3889	4906	29,1	6874	8671	51,7
70		2245	2805	17,3	4571	5711	31,4	8079	10094	55,8
80		2583	3201	18,5	5259	6517	33,6	9294	11518	59,7
90		2938	3596	19,6	5982	7322	35,6	10572	12941	63,3
100		3296	3992	20,7	6711	8127	37,5	11862	14364	66,7
120		4077	4783	22,7	8302	9738	41,1			
140		4958	5574	24,6	10096	11349	44,4			
160		5977	6365	26,2	12171	12959	47,5			
180		7262	7156	27,8	14786	14570	50,3			
200		8989	7947	29,3	18303	16181	53,1			
220			8738	30,7						
240			9529	32,1						
250			9924	32,7						

*) LEO_{S/G/L} = LESER Effective Orifice steam / gas / liquids please refer to page 00/11
 How to use capacity-sheets refer to page 00/09

Capacities – US Units

Capacities according to ASME Section VIII (UV), based on set-pressure plus 10% overpressure.
 Capacities at 30 psig (2,07 bar) and below are based on 3 psig (0,207 bar) overpressure.

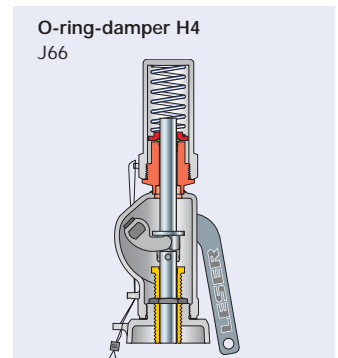
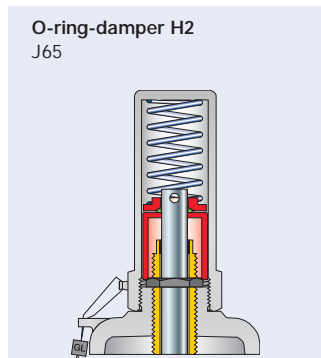
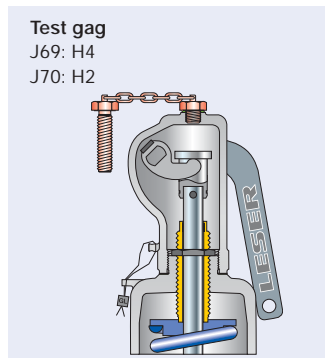
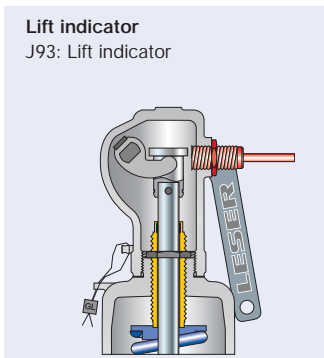
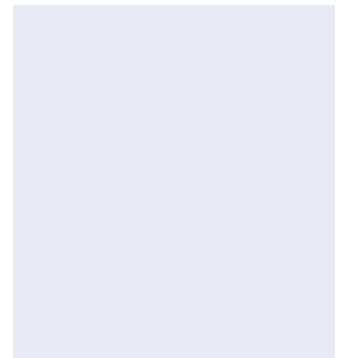
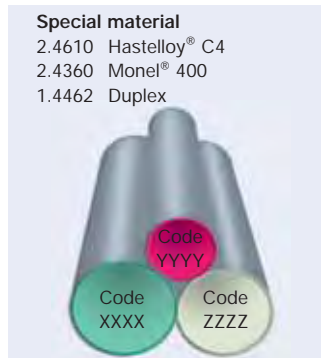
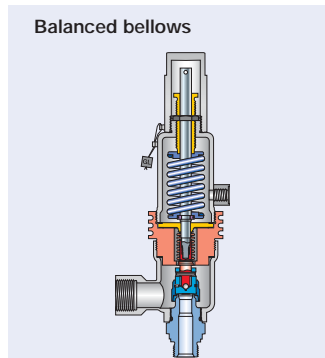
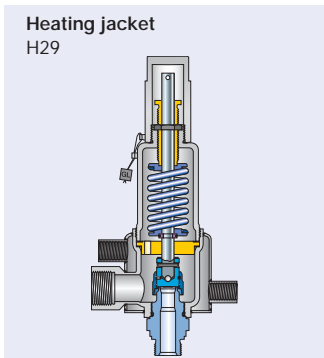
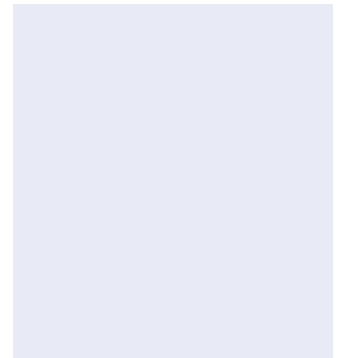
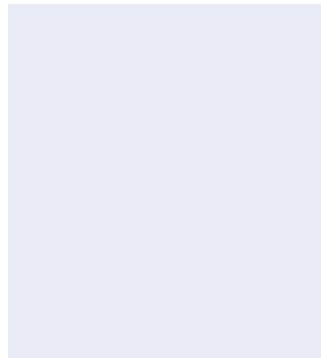
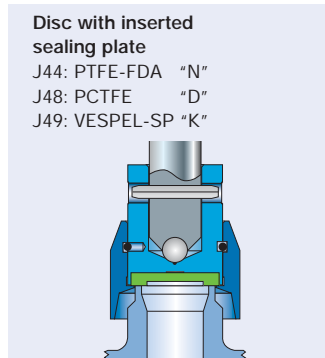
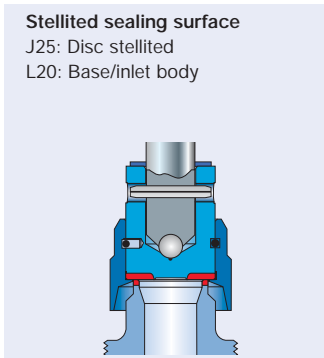
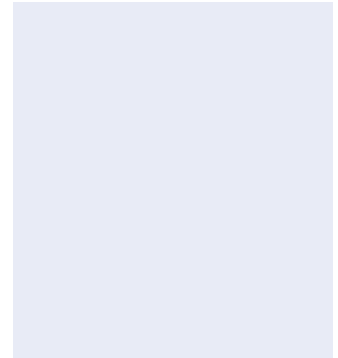
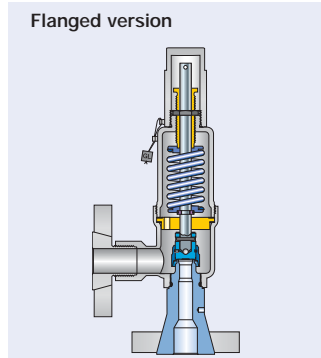
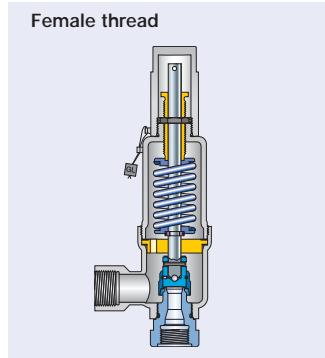
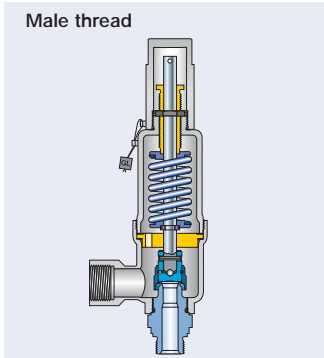
US Units		ASME Section VIII								
Actual Orifice diameter d_0 [inch]		0,354			0,512			0,689		
Actual Orifice area A_0 [inch ²]		0,099			0,206			0,374		
LEO ^{*)} [inch ²]		S/G = 0,082 L= 0,086			S/G = 0,171 L= 0,179			S/G = 0,310 L= 0,325		
Set pressure		Capacities			Capacities			Capacities		
		Steam saturated	Air 60° F and 14,5 psig [S.C.F.M.]	Water 70°F [US-G.P.M.]	Steam saturated	Air 60° F and 14,5 psig [S.C.F.M.]	Water 70°F [US-G.P.M.]	Steam saturated	Air 60° F and 14,5 psig [S.C.F.M.]	Water 70°F [US-G.P.M.]
[psig]		[lb/h]	[S.C.F.M.]	[US-G.P.M.]	[lb/h]	[S.C.F.M.]	[US-G.P.M.]	[lb/h]	[S.C.F.M.]	[US-G.P.M.]
15	134	48	9,02	281	100	18,8	509	181	34	
20	155	55	10,2	324	115	21,2	586	209	38,4	
30	196	70	12,2	410	146	25,4	742	264	46	
40	242	86	14,1	504	180	29,3	913	326	53,1	
50	287	103	15,8	599	213	32,8	1085	387	59,4	
60	332	119	17,3	693	247	35,9	1256	448	65,1	
70	377	135	18,7	788	281	38,8	1427	509	70,3	
80	423	151	19,9	882	315	41,5	1599	570	75,1	
90	468	167	21,2	977	348	44	1770	631	79,7	
100	513	184	22,3	1071	382	46,4	1941	692	84	
120	604	216	24,4	1260	449	50,8	2284	814	92	
140	695	248	26,4	1449	517	54,9	2626	936	99,4	
160	785	281	28,2	1638	584	58,7	2969	1058	106	
180	876	313	29,9	1827	652	62,3	3311	1180	113	
200	966	346	31,5	2016	719	65,6	3654	1302	119	
220	1057	378	33,1	2205	787	68,8	3996	1424	125	
240	1148	410	34,5	2394	854	71,9	4339	1546	130	
260	1238	443	36	2584	921	74,8	4682	1669	135	
280	1329	475	37,3	2773	989	77,6	5024	1791	141	
300	1419	508	38,6	2962	1056	80,4	5367	1913	146	
320	1510	540	39,9	3151	1124	83	5709	2035	150	
340	1601	572	41,1	3340	1191	85,6	6052	2157	155	
360	1691	605	42,3	3529	1259	88	6394	2279	159	
380	1782	637	43,5	3718	1326	90,5	6737	2401	164	
400	1872	670	44,6	3907	1393	92,8	7080	2523	168	
420	1963	702	45,7	4096	1461	95,1	7422	2645	172	
440	2054	734	46,8	4285	1528	97,3	7765	2767	176	
460	2144	767	47,8	4474	1596	100	8107	2889	180	
480	2235	799	48,9	4663	1663	102	8450	3011	184	
500	2326	832	49,9	4852	1731	104	8792	3134	188	
550	2552	913	52,3	5352	1899	109	9649	3439	197	
600	2779	994	54,6	5797	2068	114	10505	3744	206	
650	3005	1075	56,9	6270	2236	118	11362	4049	214	
700	3232	1156	59	6742	2405	123	12218	4354	222	
750	3458	1237	61,1	7215	2573	127	13075	4660	230	
800	3685	1318	63,1	7688	2742	131	13931	4965	238	
850	3911	1399	65	8160	2911	135	14787	5270	245	
900	4138	1480	66,9	8633	3079	139	15644	5575	252	
950	4364	1561	68,7	9105	3248	143	16500	5881	259	
1000	4591	1642	70,5	9578	3416	147	17357	6186	266	
1100	5044	1804	74	10523	3753	154	19070	6796	279	
1200	5497	1966	77,2	11469	4091	161	20782	7407	291	
1300	5950	2128	80,4	12414	4428	167	22495	8017	303	
1400	6394	2290	83,4	13340	4765	174	24174	8628	314	
1500	6889	2452	86,4	14373	5102	180				
1600	7393	2614	89,2	15424	5439	186				
1700	7907	2776	91,9	16497	5776	191				
1800	8433	2938	94,6	17594	6113	197				
1900	8971	3100	97,2	18718	6451	202				
2000	9525	3262	100	19872	6788	208				
2200	10684	3586	105	22292	7462	218				
2400	11935	3910	109	24901	8136	227				
2600	13310	4234	114	27770	8811	237				
2800	14864	4558	118	31012	9485	246				
3000		4882	122							
3200		5206	126							
3400		5530	130							
3600		5854	134							

*) LEO_{S/G/L} = LESER Effective Orifice steam / gas / liquids please refer to page 00/11
 How to use capacity-sheets refer to page 00/09

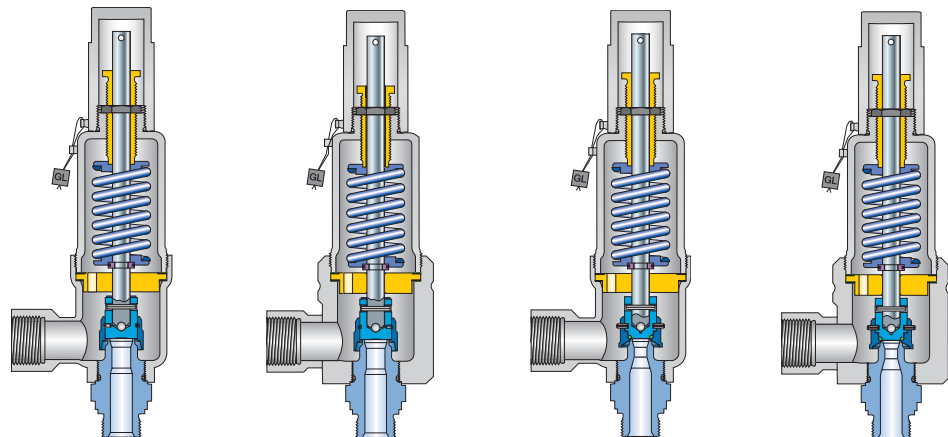
Type 459

Available Options

Type 459

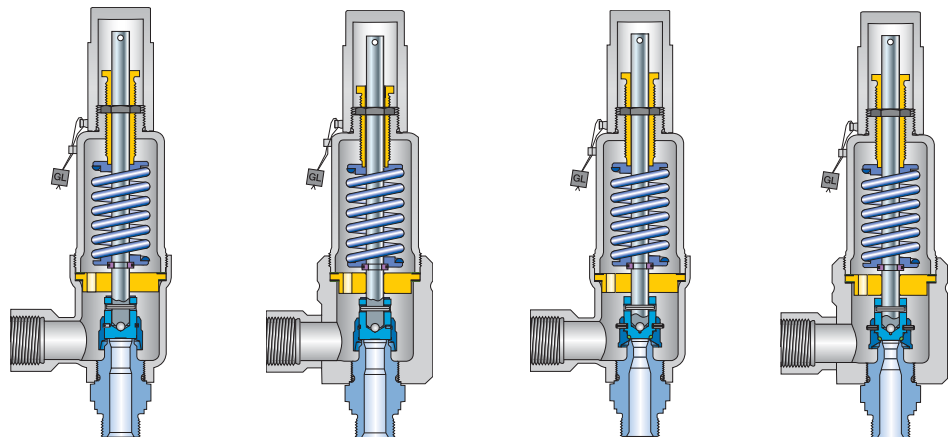


Overview



Options		459	459 HDD	462	462 HDD
Base / Inlet body					
	Male thread	✓	✓	✓	✓
	Female thread	✓	✓	✓	✓
Flanged version – DIN ISO 1092-1					
Size DN 15		✓	✓	✓	✓
	Inlet		Flange rating PN 40 – 400		
	Outlet		–		
Size DN 20		✓	✓	✓	✓
	Inlet		Flange rating PN 40 + PN 160		
	Outlet		–		
Size DN 25		✓	✓	✓	✓
	Inlet		Flange rating PN 40 – 400		
	Outlet		Flange rating PN 40 – PN 400		
Size DN 40		✓	✓	✓	✓
	Inlet		–		
	Outlet		Flange rating PN 40 – 400		
Flanged version – ASME B16.5					
Size NPS 1/2"		✓	✓	✓	✓
	Inlet		Flange rating class 150 – 2500		
	Outlet		–		
Size NPS 3/4"		✓	✓	✓	✓
	Inlet		Flange rating class 150 – 2500		
	Outlet		–		
Size NPS 1"		✓	✓	✓	✓
	Inlet		Flange rating class 150 – 2500		
	Outlet		Flange rating class 150 – 900		
Size NPS 1 1/2"		✓	✓	✓	✓
	Inlet		Flange rating class 150 – 2500		
	Outlet		Flange rating class 150 – 900		
Disc					
	Disc stellited L25	✓	*	–	–
Type of sealing					
Metal seat	Metal to metal	✓	✓	–	–
	Metal to metal stellited	✓	*	✓	*
Plastic seat	Sealing plate	✓	✓	–	–
Soft seal	O-ring	–	–	✓	✓

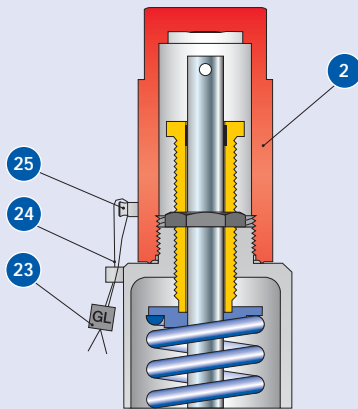
Overview



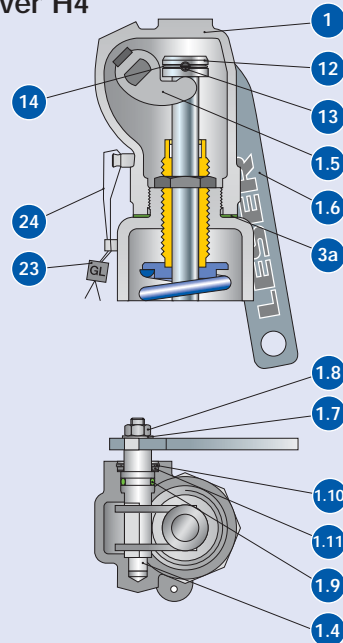
Options		Type	459	459 HDD	462	462 HDD
Caps and levers						
	H2		✓	✓	✓	✓
	H3		✓	-	✓	-
	H4		✓	✓	✓	✓
Heating jacket						
	Outlet body		✓	✓	✓	✓
	Bonnet spacer		✓	✓	✓	✓
Test gag						
	H2		✓	✓	✓	✓
	H4		-	-	-	-
Bellows						
	Stainless steel		✓	✓	✓	✓
	low pressure		✓	✓	✓	✓
	Hasteloy or spec. mat.		✓	✓	✓	✓
	High temp. equipment		-	✓	-	✓
	Elastomer		✓	-	✓	-
Lift indicator						
	Lifting device H4		✓	✓	✓	✓
Lift stopper						
	Bush		✓	✓ except d ₀ 6 mm	✓	✓
	Gag		✓	✓	✓	✓
O-ring damper						
	H2		✓	-	✓	-
	H4		✓	-	✓	-

Caps and levers – Subassembly item 40

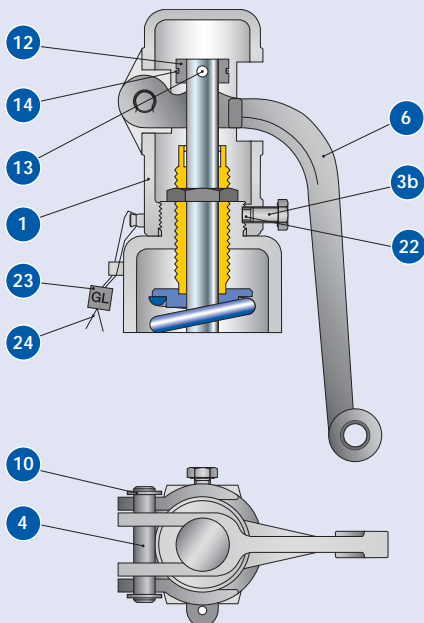
Cap H2



Packed lever H4

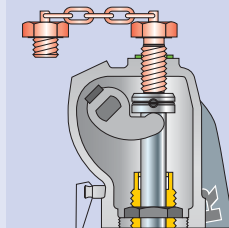
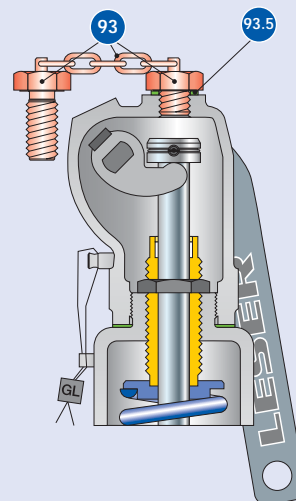


Plain lever H3



Test gag

Cap H2: J70
Packed lever H4: J69



BLOCKED
Remove
after testing

Test gag

The test gag blockades the spindle and keeps the safety valve tight while the system pressure exceeds the set pressure.

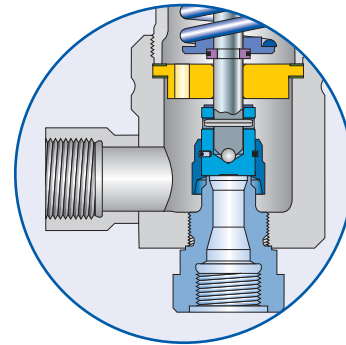
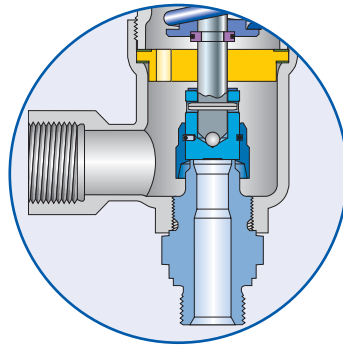
The test gag is used for:

- to perform pressure tests in a system without dismantling of the safety valve
- the individual adjustment of safety valves installed in the same system

After testing the test gag must be removed because otherwise the safety valve cannot protect the system against unallowable overpressure!

Available connections

For dimensions and weights refer to:
 Type 459 – page 05/08 + 05/10
 Type 459 HDD – page 06/08 + 06/10
 Type 462 – page 07/08 + 07/10
 Type 462 HDD – page 08/08 + 08/10



Male thread

Female thread

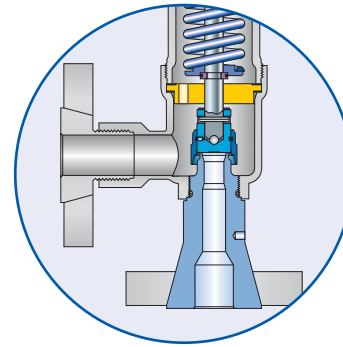
Threaded connections

Actual Orifice diameter d_0 [mm]		6		9 / 13		17,5	
Actual Orifice area A_0 [mm ²]		28,3		63,9 / 133		241	
Actual Orifice diameter d_0 [inch]		0,236		0,345 / 0,512		0,689	
Actual Orifice area A_0 [inch ²]		0,044		0,099 / 0,206		0,374	
Valve size	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	Outlet
Male thread DIN ISO 228-1							
G	1/2"	V54	-	-	-	-	-
	3/4"	V55	-	V55	-	-	-
	1"	V56	V68	V56	V68	V65	-
	1 1/4"	-	V79	-	V79	V83	V79
	1 1/2"	-	V69	-	V69	V57	V69
Female thread DIN ISO 228-1							
G	1/2"	V50	-	V50	-	-	-
	3/4"	V51	-	V51	-	V51	-
	1"	V52	V66	V52	V66	V52	-
	1 1/4"	-	V81	-	V81	V84	V81
	1 1/2"	-	V67	-	V67	V53	V67
Male thread DIN ISO 7-1/BS 21							
R/BSPT	1/2"	V30	-	-	-	-	-
	3/4"	V31	-	V31	-	-	-
	1"	V32	V42	V32	V42	V32	-
	1 1/2"	-	V43	-	V43	V33	V43
Female thread DIN ISO 7-1/BS 21							
Rc/BSPT	1/2"	V38	-	V38	-	-	-
	3/4"	V39	-	V39	-	V39	-
	1"	V40	V36	V40	V36	V40	-
	1 1/2"	-	V37	-	V37	V41	V37
Male thread ANSI/ASME B1.20.1							
NPT	1/2"	V61	-	-	-	-	-
	3/4"	V62	-	V62	-	-	-
	1"	V63	V73	V63	V73	V63	-
	1 1/4"	-	V82	-	V82	V85	V82
	1 1/2"	-	V74	-	V74	V64	V74
	2"	-	-	-	-	V86	-
Female thread ANSI/ASME B1.20.1							
NPT	1/2"	V58	-	V58	-	-	-
	3/4"	V59	-	V59	-	V59	-
	1"	V60	V71	V60	V71	V60	-
	1 1/4"	-	V80	-	V80	V87	V80
	1 1/2"	-	V72	-	V72	V75	V72
	2"	-	-	-	-	-	V88

Flanged and threaded connections can be combined.
 Threads according to other standards are available.
 Please specify in writing (diameter, pressure rating, standard).

Available connections

For dimensions and weights refer to:
 Type 459 – page 05/09 + 05/11
 Type 459 HDD – page 06/09 + 06/11
 Type 462 – page 07/09 + 07/11
 Type 462 HDD – page 08/09 + 08/11



Flanged connections

Flanged version

Actual Orifice diameter d_0 [mm]	6	9 / 13	17,5
Actual Orifice area A_0 [mm ²]	28,3	63,9 / 133	241
Actual Orifice diameter d_0 [inch]	0,236	0,345 / 0,512	0,689
Actual Orifice area A_0 [inch ²]	0,044	0,099 / 0,206	0,374

DIN ISO 1092-1 (PN > 100: DIN 2501)

	PN	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet
DN 15	40	I21	–	I21	–	–	–
	160	I22	–	I22	–	–	–
	250	I23	–	I23	–	–	–
	320	I24	–	I24	–	–	–
	400	I25	–	I25	–	–	–
DN 20	40	I26	–	I26	–	I26	–
	160	I27	–	I27	–	I27	–
	250	–	–	–	–	–	–
	320	–	–	–	–	–	–
	400	–	–	–	–	–	–
DN 25	40	I31	I46	I31	I46	I31	–
	160	I32	I47	I32	I47	I32	–
	250	I33	I48	I33	I48	I33	–
	320	I34	–	I34	–	I34	–
	400	I35	–	I35	–	I35	–
DN 40	40	–	–	–	I49	–	I49
	320	–	–	–	I50	–	I50
	400	–	–	–	I51	–	I51

ANSI/ASME B 16.5

	Class	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet
NPS 1/2"	150	V01	–	V01	–	–	–
	300	V02	–	V02	–	–	–
	600	V02	–	V02	–	–	–
	900	V03	–	V03	–	–	–
	1500	V03	–	V03	–	–	–
	2500	V04	–	V04	–	–	–
NPS 3/4"	150	V05	–	V05	–	V05	–
	300	V06	–	V06	–	V06	–
	600	V06	–	V06	–	V06	–
	900	V07	–	V07	–	V07	–
	1500	V07	–	V07	–	V07	–
	2500	V08	–	V08	–	V08	–
NPS 1"	150	V09	V18	V09	V18	V09	–
	300	V10	V19	V10	V19	V09	–
	600	V10	V19	V10	V19	V10	–
	900	V11	V20	V11	V20	V10	–
	1500	V11	–	V11	–	V11	–
	2500	V12	–	V12	–	V12	–
NPS 1 1/2"	150	–	–	–	V21	–	V21
	300	–	–	–	V22	–	V22
	600	–	–	–	V22	–	V22
	900	–	–	–	V23	–	V23

Flanged and threaded connections can be combined. Threads according to other standards are available. Please specify in writing (diameter, pressure rating, standard).

Sealing surface

Type 459 – Metal seat

LESER metal seats (disc and nozzle) are lapped to optical flatness to ensure a tight seal. LESER safety relief valves are supplied with standard leak tightness according to API 527. Improved tightness is available on request.

Stellited sealing surface – Option code L20 (base / inlet body) and J25 (disc)

The sealing surfaces of the stainless steel disc and nozzle can be stellited by build-up welding. Stellite is a cobalt-chromium based, non-ferrous alloy with increased hardness, corrosion resistance and wear resistance at high temperatures.

LESER recommends stellited sealing surfaces for type 4374 (seat and disc 1.4404/316L) in the following cases:

- high pressure applications, due to the high stress of the sealing surfaces
- high temperature applications to avoid a permanent deformation of the sealing surfaces, due to the material properties of the seat and disc
- applications with abrasive fluids to increase the wear resistance of the sealing surfaces.

The stellited sealing surfaces of the disc and base / inlet body are standard for type 459 HDD and 462 HDD.

Hardness metal seat								
Item	Component	Type	Option code	Material		Hardness of sealing surface		
				EN	ASME	Values from standards or manufacturers specification		Average value LESER stock
1	Base / Inlet body	4593	*	EN 10088-3, 1.4104	SA 479 430	≤ 220HBW	EN 10088-3 Table 8	17 – 20 HRC ¹⁾
		4592 / 4594	*	EN 10272, 1.4404	SA 479 316L	≤ 215HBW	EN 10272 Table 7	16 – 19 HRC ¹⁾
		4592/4594	L20	EN 10272, 1.4404 stellited	SA 479 316L stellited	≥ 35 HRC	Manufacturers specification	40 HRC
7.1	Disc	4593	*	EN 10088-3, 1.4122 hardened	Hardened stainless steel	≥ 40 HRC	LWN 325.01 Harding procedure	42 – 46 HRC
		4592 / 4594	*	EN 10272, 1.4404	SA 479 316L	≤ 215HBW	EN 10272 Table 7	16 – 19 HRC ¹⁾
		4592 / 4594	J25	EN 10272, 1.4404 stellited	SA 479 316L stellited	≥ 35 HRC	Manufacturers specification	40 HRC

Standard material of LESER balanced bellows is stainless steel 1.4571 / 316Ti.

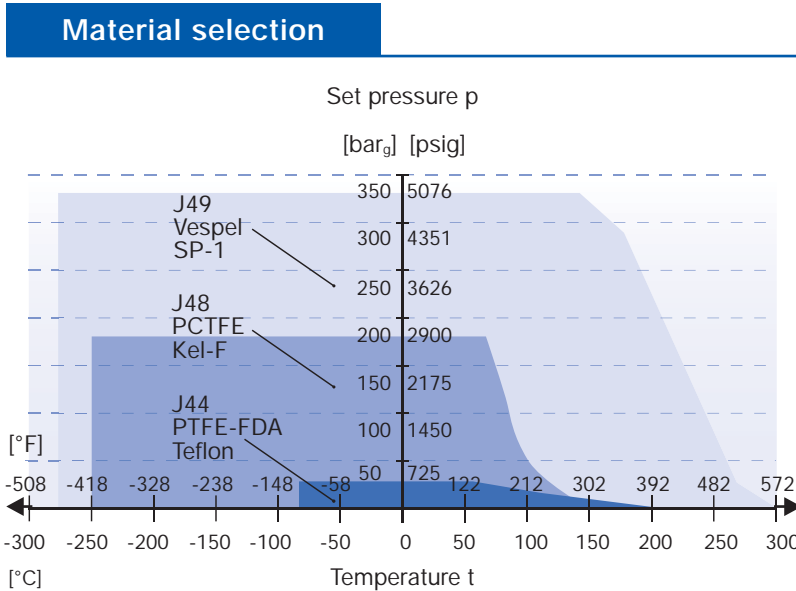
HBW: BRINELL hardness acc. DIN EN ISO 6506-1

HRC: ROCKWELL hardness acc. DIN EN ISO 6508-1

¹⁾ Rockwell hardness values below 20 HRC are not allowed according to DIN EN ISO 6508-1. Lower, fictitious values were created for better comparison.

Soft seal material selection

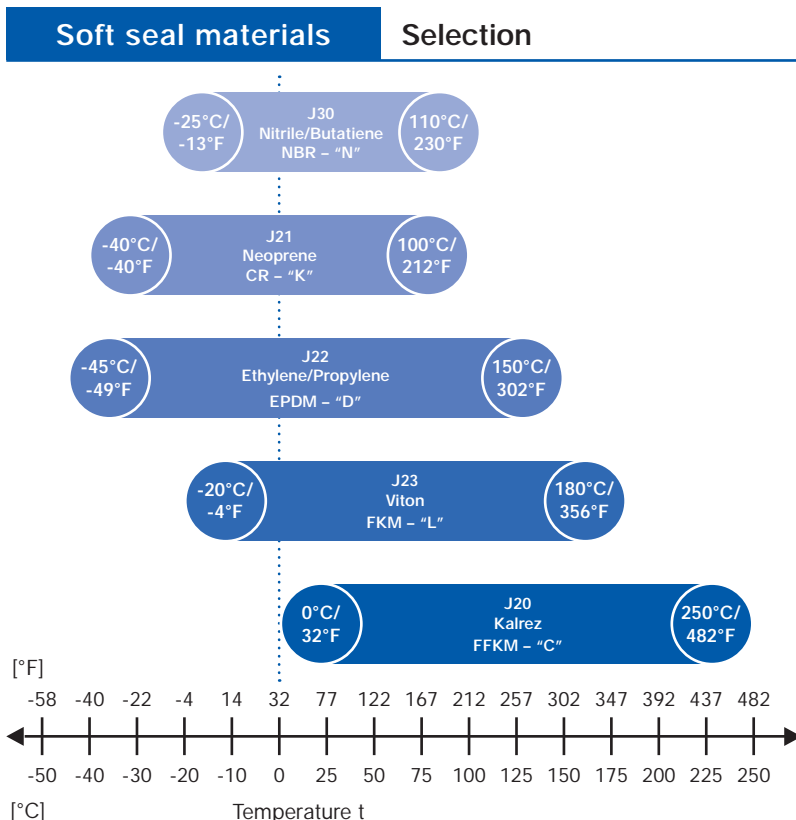
Type 459/459 HDD – Sealing plate



Option code		
Option code	Code letter ¹⁾	Application ²⁾
J44	PTFE-FDA "A"	Nearly all chemicals
J48	PCTFE "G"	Cryogenic and refrigeration applications, flammable media applications (e.g. gaseous oxygen) up to 50 bar, 725 psig at 60°C, 140°F
J49	VESPEL-SP1 "A"	High temperature and high pressure applications (no steam), for chemical resistance see www.DuPont.com
Other then listed	"X"	For other materials contact: your local representative or sales@leser.com

Standard material of LESER balanced bellows is stainless steel 1.4571 / 316Ti.

Type 462/462 HDD – O-ring disc



Option code		
Option code	Code letter ¹⁾	Application ²⁾
J30	NBR "N"	Hydraulic oil, vegetable and animal grease and oil
J21	CR "K"	Parafin oil, silicone oil and grease, water and water based solvents, refrigerants, ozone
J22	EPDM "D"	Hot water and superheated steam up to 150 °C, 302 °F, some organic and inorganic acids, silicone oil and grease, FDA compliant
J23	FKM "L"	High temperature service (no superheated steam), mineral oil and grease, silicone oil and grease, vegetable and animal grease and oil, ozone, FDA compliant compound available on request
J20	FFKM "C"	Nearly all chemicals, standard O-ring compound for Type 438 is Kalrez® 6375 with steam resistance, FDA compliant compound available on request
Other then listed	"X"	For other materials contact: your local representative or sales@leser.com

¹⁾ The code letters will be stamped on the disc (Item 7).

²⁾ Pressure and temperature service must be considered in any case. Chemical resistance information is supplied by the O-ring manufacturer.