



Type 459

**Safety Relief Valves
– spring loaded**

Metric + US Units

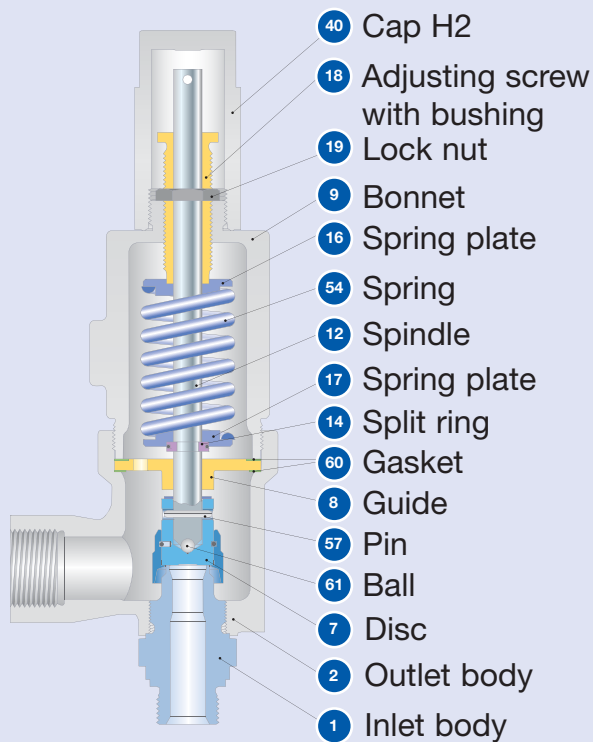


Facts

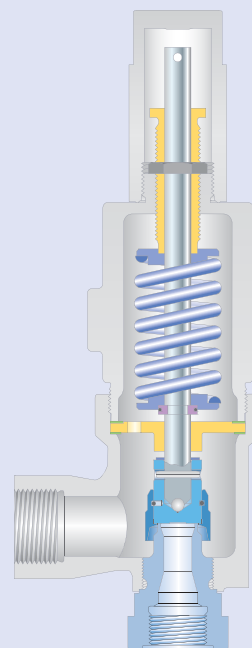
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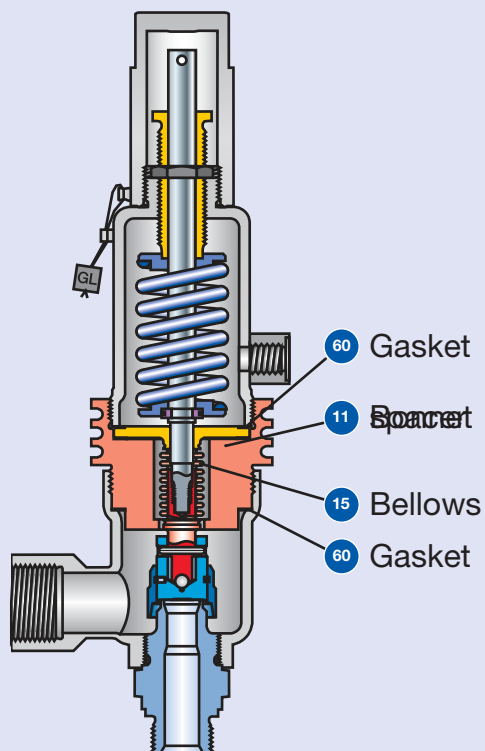
Designs



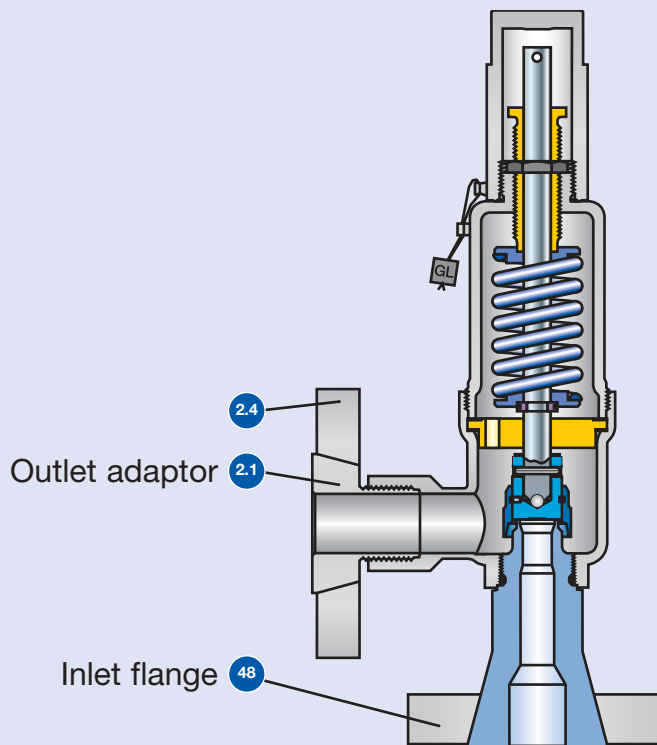
Conventional design
Threaded connection



Conventional design
Threaded connection



Balanced bellows
Threaded connection



Conventional design
Flange connection

Materials

Materials							
Item	Component	Design	Type 4593		Type 4592		Type 4594
1	Base / Inlet body	Threaded connection	1.4104 ¹⁾ , 1.4404 SA 479 430 ¹⁾ , SA 479 316L		1.4404 SA 479 316L		1.4404 SA 479 316L
		Flange connection	1.4404		1.4404		1.4404
			SA 479 316L		SA 479 316L		SA 479 316L
2	Outlet body		1.0619		1.0619		1.4408
			WCB		WCB		CF8M
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		1.4122		1.4404
			Hardened stainless steel		Hardened stainless steel		316L
8	Guide		1.4104 tenifer		1.4104 tenifer		1.4404
			Chrome steel tenifer		Chrome steel tenifer		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		1.0460 ^{3)/1.0619} ²⁾		1.4404 ^{3)/1.4408} ²⁾
			Ductile Gr. 60-40-18		SA 105 ^{3)/WCB} ²⁾		316L ^{3)/CF8M} ²⁾
		Balanced bellows design	1.4404 ^{3)/1.0619} ²⁾ 316L ^{3)/WCB} ²⁾		1.4404 ^{3)/1.0619} ²⁾ 316L ^{3)/WCB} ²⁾		1.4404 ^{3)/1.4408} ²⁾ 316L ^{3)/CF8M} ²⁾
11	Bonnet spacer	Balanced bellows design	1.0460		1.0460		1.4404
			Carbon steel		Carbon steel		316L
12	Spindle		1.4021		1.4021		1.4404
			420		420		316L
		Balanced bellows design	1.4404 316L		1.4404 316L		1.4404 316L
14	Split ring		1.4104		1.4104		1.4404
			Chrome steel		Chrome steel		316L
15	Bellows	Balanced bellows design	1.4571		1.4571		1.4571
			SA 316Ti		316Ti		316Ti
16/17	Spring plate		1.0718		1.0718		1.4404
			Steel		Steel		316L
18	Adjusting screw with bushung		1.4104	PTFE	1.4104	PTFE	1.4404
			Chrome steel	PTFE	Chrome steel	PTFE	316L
19	Lock nut		1.4104		1.4104		1.4404
			Chrome steel		Chrome steel		316L
40	Cap H2		1.0460		1.0460		1.4404
			SA 105		SA 105		316L
48	Inlet flange	Flange connection	1.4404		1.4404		1.4404
			316L		316L		316L
54	Spring	Standard	1.1200 / 1.8159 / 1.7107		1.1200 / 1.8159 / 1.7107		1.4310
			Carbon steel		Carbon steel		Stainless steel
		Optional	1.4310		1.4310		-
57	Pin		1.4310		1.4310		1.4310
			Stainless steel		Stainless steel		Stainless steel
60	Gasket		Graphite / 1.4401		Graphite / 1.4401		Graphite / 1.4401
			Graphite / 316		Graphite / 316		Graphite / 316
61	Ball		1.3541		1.3541		1.4401
			Hardened stainless steel		Hardened stainless steel		316

Please notice:

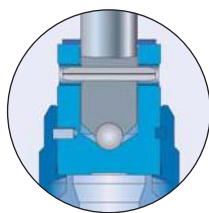
- Modifications reserved by LESER.
- LESER can upgrade materials without notice.
- Every part can be replaced by other material acc. to customer specification.

¹⁾ only valid for male thread DIN ISO 228-1 G $\frac{3}{4}$, G1, G1 $\frac{1}{2}$ (Option codes V55, V56, V57) (please note availability regarding d₀)

²⁾ from end of 2015

³⁾ until end of 2015

Article numbers



Metal seat

Article numbers

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
Outlet body casted						
Inlet body	1.4104	H2	Art. No. 4593.	2502	2512	2522
Outlet body	1.0619 WCB	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 ¹⁾ 0.2 – 200 ¹⁾ 0.2 – 100 ¹⁾			
p [psig]			21.7 – 3626 ¹⁾ 2.9 – 2901 ¹⁾ 2.9 – 1450 ¹⁾			
Outlet body investment casted						
Inlet body	1.4404	H2	Art. No. 4592.	2472	2482	2492
Outlet body	1.0619 WCB	H3	Art. No. 4592.	2473	2483	2493
Bonnet	1.0460 1.0619	H4	Art. No. 4592.	2474	2484	2494
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 body investment casted						
Inlet body	1.4404	H2	Art. No. 4594.	2162	2172	2182
Outlet body	1.4408 (CF8M)					
Bonnet	1.4404 1.4408	H4	Art. No. 4594.	2164	2174	2184
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			

¹⁾ Max. set pressure 69 bar / 1000 psig for Type 4593 acc. to ASME-Code Sec. VIII, Div. 1 with UV-Stamp.
The design of Type 4593 is permitted with limitations acc. to ASME-Code Sec. VIII, Div. 1, UCD-2, UCD-3.
Type 4593 shall not be used for lethal substances, irrespective of their state of aggregation.

Dimensions and weights – Threaded connections [Metric units]

Threaded connections

Size Outlet body		1/2" x 1"	3/4" x 1"	1" x 1"	1/2" x 1"	3/4" x 1"	1" x 1"	3/4" x 1 1/2"	1" x 1 1/2"	1 1/4" x 1 1/2"	1 1/2" x 1 1/2"
Actual Orifice diameter d ₀ [mm]		9	9	9	13	13	13	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
Weight [kg]		3.1	3.1	3.1	3.1	3.1	3.1	3.9	3.9	3.9	3.9
Balanced bellows [kg]		3.9	3.9	3.9	3.9	3.9	4.7	4.7	4.7	4.7	4.7
Required installation diameter d [mm]		165	165	165	165	165	165	165	165	165	165

Inlet thread female

Size outlet body			1/2" x 1"	3/4" x 1"	1" x 1"	1/2" x 1"	3/4" x 1"	1" x 1"	3/4" x 1 1/2"	1" x 1 1/2"	1 1/4" x 1 1/2"	1 1/2" x 1 1/2"	
Actual Orifice diameter d ₀ [mm]			9	9	9	13	13	13	17.5	17.5	17.5	17.5	
Center to face / Height													
DIN ISO 228-1 ASME B1.20.1	G NPT	Inlet a	53	56	62	53	56	62	60	66	67	73	
		Center to face [mm]	Outlet b	75	75	75	75	75	75	75	75	75	75
		Height [mm]	H max	283	286	292	283	286	292	287	293	294	300
		Balanced bellows	H max	315	318	324	315	318	324	319	325	326	332
ISO 7-1/BS 21	Rc	Inlet a	53	56	64	53	56	64	60	68	–	77	
		Center to face [mm]	Outlet b	75	75	75	75	75	75	75	75	–	75
		Height [mm]	H max	283	286	294	283	286	294	287	295	–	304
		Balanced bellows	H max	315	318	326	315	318	326	319	327	–	336

Inlet thread male

Size outlet body			1" – 1½"	1" – 1½"	1½"	2"
Actual Orifice diameter d ₀ [mm]			9	13	17.5	17.5
Center to face [mm]						
DIN ISO 228-1	G	Inlet ½" – 1" a	52	52	–	–
		Inlet 1"– 1½" a	–	–	56	–
		Outlet b	75	75	75	–
ISO 7-1/BS 21	R	Inlet ½" – 1" a	49	49	–	–
ASME B1.20.1	NPT	Inlet 1" – 2" a ¹⁾	–	–	53	53
		Outlet b	75	75	75	100

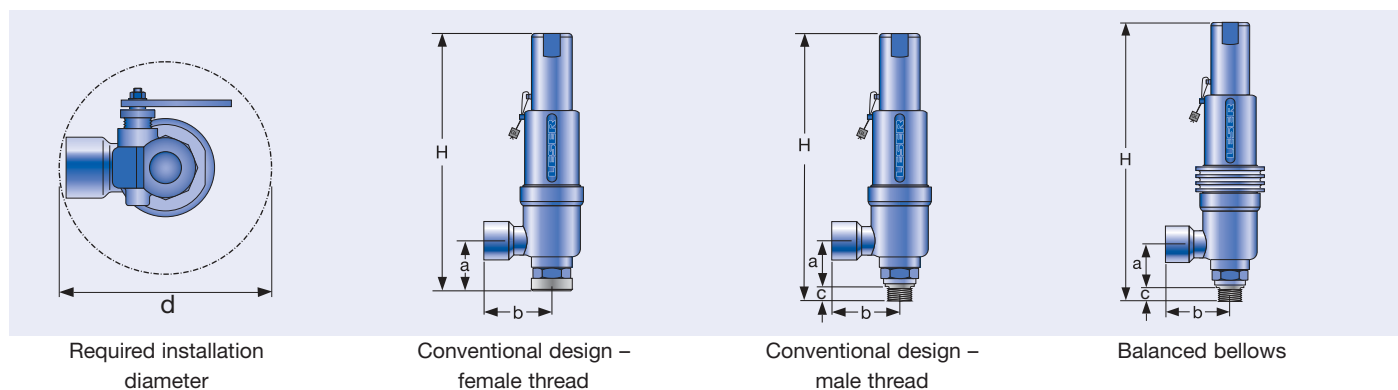
Height [mm]

		Conventional design							Balanced bellows					
		Size inlet thread	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	G	H max.	296	298	301	303	305	–	328	330	333	335	337	–
ISO 7-1/BS 21	R	H max.	298	299	303	–	305	–	330	331	335	–	337	–
ASME B1.20.1	NPT	H max.	301	301	307	308	308	309	333	333	339	340	340	341

Length of screwed end c [mm]

Size inlet thread		1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
DIN ISO 228-1	G	14	16	18	20	22	–
ISO 7-1/BS 21	R	19	20	23	–	25	–
ASME B1.20.1	NPT	22	22	27	28	28	29

¹⁾ Inlet thread R only up to 1 1/2".



Dimensions and weights – Threaded connections [US units]

Threaded connections

Size Outlet body	1/2" x 1"	3/4" x 1"	1" x 1"	1/2" x 1"	3/4" x 1"	1" x 1"	3/4" x 1 1/2"	1" x 1 1/2"	1 1/4" x 1 1/2"	1 1/2" x 1 1/2"
Actual Orifice diameter d ₀ [inch]	0.354	0.354	0.354	0.512	0.512	0.512	0.689	0.689	0.689	0.689
Actual Orifice area A ₀ [inch ²]	0.099	0.099	0.099	0.206	0.206	0.206	0.374	0.374	0.374	0.374
Weight [lbs]	6.8	6.8	6.8	6.8	6.8	6.8	8.6	8.6	8.6	8.6
Balanced bellows [lbs]	8.6	8.6	8.6	8.6	8.6	8.6	10.4	10.4	10.4	10.4
Required installation diameter d [inch]	6 1/2	6 1/2	6 1/2	6 1/2	6 1/2	6 1/2	6 1/2	6 1/2	6 1/2	6 1/2

Inlet thread female

Size outlet body		1/2" x 1"	3/4" x 1"	1" x 1"	1 1/2" x 1"	3/4" x 1"	1" x 1"	3/4" x 1 1/2"	1" x 1 1/2"	1 1/4" x 1 1/2"	1 1/2" x 1 1/2"	
Actual Orifice diameter d ₀ [inch]		0.354	0.354	0.354	0.512	0.512	0.512	0.689	0.689	0.689	0.689	
Center to face / Height												
DIN ISO 228-1 ASME B1.20.1	G NPT	Inlet a	2 ³ / ₃₂	2 ⁷ / ₃₂	2 ⁷ / ₁₆	2 ³ / ₃₂	2 ⁷ / ₃₂	2 ⁷ / ₁₆	2 ³ / ₈	2 ¹⁹ / ₃₂	2 ⁵ / ₈	2 ⁷ / ₈
	Outlet b	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆
Center to face [inch]		H max.	11 ⁵ / ₃₂	11 ¹ / ₁₄	11 ¹ / ₂	11 ⁵ / ₃₂	11 ¹ / ₁₄	11 ¹ / ₂	11 ⁵ / ₁₆	11 ¹⁷ / ₃₂	11 ⁹ / ₁₆	11 ¹³ / ₁₆
Height [inch]		H max.	12 ¹³ / ₃₂	12 ¹⁷ / ₃₂	12 ³ / ₄	12 ¹³ / ₃₂	12 ¹⁷ / ₃₂	12 ³ / ₄	12 ⁹ / ₁₆	12 ²⁵ / ₃₂	12 ²⁷ / ₃₂	13 ¹ / ₁₆
Balanced bellows		H max.	12 ¹³ / ₃₂	12 ¹⁷ / ₃₂	12 ²⁷ / ₃₂	12 ¹³ / ₃₂	12 ¹⁷ / ₃₂	12 ²⁷ / ₃₂	12 ⁹ / ₁₆	12 ⁷ / ₈	13 ⁷ / ₃₂	13 ¹ / ₁₆
ISO 7-1/BS 21	Rc	Inlet a	2 ³ / ₃₂	2 ⁷ / ₃₂	2 ¹⁷ / ₃₂	2 ³ / ₃₂	2 ⁷ / ₃₂	2 ¹⁷ / ₃₂	2 ³ / ₈	2 ¹¹ / ₁₆	–	3 ¹ / ₃₂
	Outlet b	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	–	2 ¹⁵ / ₁₆
Center to face [inch]		H max.	11 ⁵ / ₃₂	11 ¹ / ₁₄	11 ⁹ / ₁₆	11 ⁵ / ₃₂	11 ¹ / ₁₄	11 ⁹ / ₁₆	11 ⁵ / ₁₆	11 ⁵ / ₈	–	11 ³¹ / ₃₂
Height [inch]		H max.	12 ¹³ / ₃₂	12 ¹⁷ / ₃₂	12 ²⁷ / ₃₂	12 ¹³ / ₃₂	12 ¹⁷ / ₃₂	12 ²⁷ / ₃₂	12 ⁹ / ₁₆	12 ⁷ / ₈	–	13 ⁷ / ₃₂
Balanced bellows		H max.	12 ¹³ / ₃₂	12 ¹⁷ / ₃₂	12 ²⁷ / ₃₂	12 ¹³ / ₃₂	12 ¹⁷ / ₃₂	12 ²⁷ / ₃₂	12 ⁹ / ₁₆	12 ⁷ / ₈	–	13 ⁷ / ₃₂

Inlet thread male

Size outlet body	1" – 1 1/2"	1" – 1 1/2"	1 1/2"	2"
Actual Orifice diameter d ₀ [mm]	0.354	0.512	0.689	0.689
Center to face [inch]				
DIN ISO 228-1 G	Inlet 1/2" – 1" a	2 ¹ / ₁₆	2 ¹ / ₁₆	–
	Inlet 1" – 1 1/2" a	–	–	2 ⁷ / ₃₂
	Outlet b	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆
ISO 7-1/BS 21 R	Inlet 1/2" – 1" a	1 ¹⁵ / ₁₆	1 ¹⁵ / ₁₆	–
ASME B1.20.1 NPT	Inlet 1" – 2" a ¹⁾	–	–	2 ³ / ₃₂
	Outlet b	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆	2 ¹⁵ / ₁₆

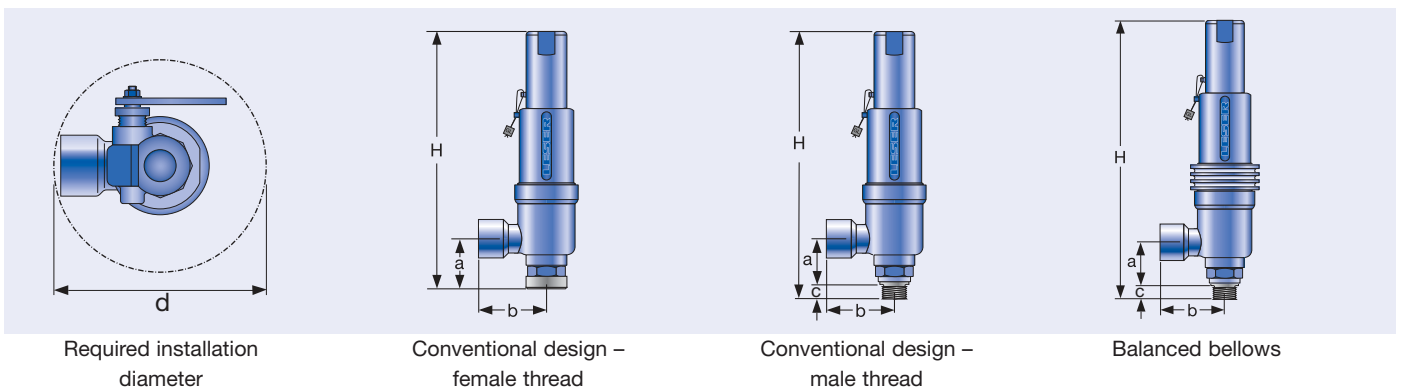
Height [inch]

Conventional design								Balanced bellows				
Size inlet thread	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"		1/2"	3/4"	1"	1 1/4"	1 1/2"
DIN ISO 228-1 G	H max.	11 ²¹ / ₃₂	11 ²³ / ₃₂	11 ²⁷ / ₃₂	11 ¹⁵ / ₁₆	12	–	12 ²⁹ / ₃₂	13	13 ¹ / ₈	13 ³ / ₁₆	13 ⁹ / ₃₂
ISO 7-1/BS 21 R	H max.	11 ²³ / ₃₂	11 ²⁵ / ₃₂	11 ¹⁵ / ₁₆	–	12	–	13	13 ¹ / ₃₂	13 ³ / ₁₆	–	13 ⁹ / ₃₂
ASME B1.20.1 NPT	H max.	11 ²⁷ / ₃₂	11 ²⁷ / ₃₂	12 ³ / ₃₂	12 ¹ / ₈	12 ¹ / ₈	12 ⁵ / ₃₂	13 ¹ / ₈	13 ¹ / ₈	13 ¹¹ / ₃₂	13 ³ / ₈	13 ³ / ₈

Length of screwed end c [inch]

Size inlet thread	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
DIN ISO 228-1 G	9/16	5/8	23/32	25/32	7/8	–
ISO 7-1/BS 21 R	3/4	25/32	29/32	–	31/32	–
ASME B1.20.1 NPT	7/8	7/8	1 1/16	1 3/32	1 3/32	1 5/32

¹⁾ Inlet thread R only to 1 1/2".



Dimensions and weights – Flanged connections [Metric units]

Flanged connections

	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 EN 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
		Outlet b	100	100	100	100	100
Height	[mm]	H max.	330	330	333	375	375

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
		Outlet b	100	100	100	100	100
Height	[mm]	H max.	330	330	333	375	375

Note The outlet dimension b can differ at special combinations of nominal diameter and pressure range if flanged connections are used at the inlet and outlet.
Special dimensions are possible. More information at sales@leser.com.

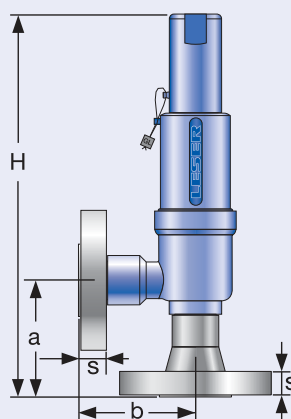
Weight

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

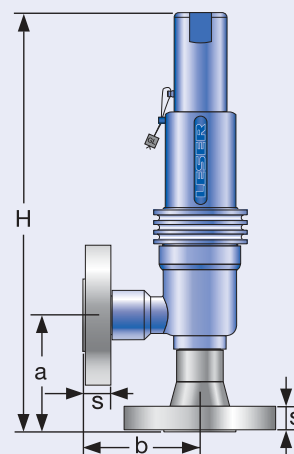
Weight net [kg]	m_N	3.1	3.1	3.9	4.3	4.3	5.1
(without inlet and outlet flange)							

Flange dimensions

		DIN EN 1092-1 / Flange rating PN						ASME B16.5 / Flange rating						
Size		40	100	160	250	320	400	Size	150	300	600	900	1500	2500
DN 15								NPS 1/2"						
Flange thickness [mm]	s	18	–	22	28	28	30		14	18	18	26	26	30.2
Weight slip on flange [kg]	m_F	0.8	–	1.2	2.5	2.5	3.6		0.6	0.9	0.9	2.1	2.1	3
DN 20								NPS 3/4"						
Flange thickness [mm]	s	20	22	–	–	–	–		15	18	18	25.4	25.4	32
Weight slip on flange [kg]	m_F	1.1	1.3	–	–	–	–		0.8	1.4	1.4	2.3	2.3	3.5
DN 25								NPS 1"						
Flange thickness [mm]	s	22	–	26	30	36	40		17	21.5	21.5	32.5	32.5	40
Weight slip on flange [kg]	m_F	1.3	–	2.6	3.5	5	7.5		1	2.1	2.1	4.1	4.1	5.1
DN 40								NPS 1 1/2"						
Flange thickness [mm]	s	21	–	23	32	–	–		22	24	24	32	–	–
Weight slip on flange [kg]	m_F	2.1	–	2.9	4.3	–	–		1.4	2.2	2.2	3.9	–	–



Conventional design



Balanced bellows

Dimensions and weights – Flanged connections [US units]

Flanged connection

	Conventional design			Balanced bellows		
Actual Orifice diameter d_0 [inch]	0.354	0.512	0.689	0.354	0.512	0.689
Actual Orifice area A_0 [inch ²]	0.099	0.206	0.374	0.099	0.206	0.374

DIN EN 1092-1

Flange rating PN 40 – PN 400

Center to face	[inch]	Inlet a	$3^{15}/_{16}$	$3^{15}/_{16}$	$4^{1}/_{8}$	$3^{15}/_{16}$	$3^{15}/_{16}$	$4^{1}/_{8}$
		Outlet b	$3^{15}/_{16}$	$3^{15}/_{16}$	$3^{15}/_{16}$	$3^{15}/_{16}$	$3^{15}/_{16}$	$3^{15}/_{16}$
Height [H4]	[inch]	H max.	13	13	$13^{1}/_{8}$	$14^{3}/_{4}$	$14^{3}/_{4}$	$14^{7}/_{8}$

ASME B 16.5

Flange rating class 150 – 2500

Center to face	[inch]	Inlet a	$3^{15}/_{16}$	$3^{15}/_{16}$	$4^{1}/_{8}$	$3^{15}/_{16}$	$3^{15}/_{16}$	$4^{1}/_{8}$
		Outlet b	$3^{15}/_{16}$	$3^{15}/_{16}$	$3^{15}/_{16}$	$3^{15}/_{16}$	$3^{15}/_{16}$	$3^{15}/_{16}$
Height	[inch]	H max.	13	13	$13^{1}/_{8}$	$14^{3}/_{4}$	$14^{3}/_{4}$	$14^{7}/_{8}$

Note The outlet dimension b can differ at special combinations of nominal diameter and pressure range if flanged connections are used at the inlet and outlet.
Special dimensions are possible. More information at sales@leser.com.

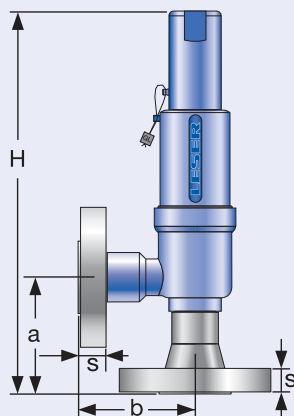
Weight

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

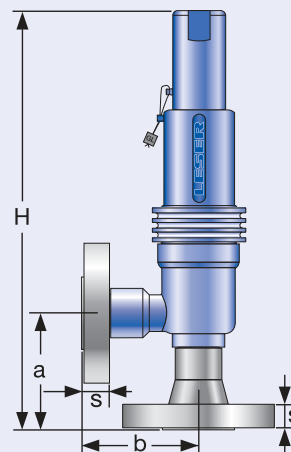
Weight net	[lbs]							
(without inlet and outlet flange)	m_N	6.8	6.8	8.6	9.5	9.5	11.3	

Flange dimensions

			DIN EN 1092-1 / Flange rating PN						ASME B16.5 / Flange rating						
			Size	40	100	160	250	320	400	Size	150	300	600	900	1500
DN 15									NPS 1/2"						
Flange thickness	[inch]	s	23/32	–	7/8	13/32	13/32	13/16		9/16	23/32	23/32	11/32	11/32	13/16
Weight slip on flange [lbs]	mF		1.8	–	2.6	5.5	5.5	7.9		1.3	2.0	2.0	4.6	4.6	6.6
DN 20									NPS 3/4"						
Flange thickness	[inch]	s	25/32	7/8	–	–	–	–		19/32	23/32	23/32	1	1	11/4
Weight slip on flange [lbs]	mF		2.4	2.9	–	–	–	–		1.8	3.1	3.1	5.1	5.1	7.7
DN 25									NPS 1"						
Flange thickness	[inch]	s	7/8	–	11/32	13/16	113/32	19/16		21/32	27/32	27/32	19/32	19/32	19/16
Weight slip on flange [lbs]	mF		2.9	–	5.7	7.7	11.0	16.5		2.2	4.6	4.6	9.0	9.0	11.2
DN 40									NPS 1 1/2"						
Flange thickness	[inch]	s	13/16	–	29/32	1 1/4	–	–		7/8	15/16	15/16	1 1/4	–	–
Weight slip on flange [lbs]	mF		4.5	–	6.3	9.5	–	–		3.2	4.8	4.8	8.6	–	–



Conventional design



Balanced bellows

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 standard bellows	p [bar _g] S/G/L	3			3			3				
Min. set pressure ⁵⁾ high press. bellows	p [bar _g] S/G/L	40			40			40				
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 250 (Option code L20)			PN 160				
Outlet Body	Pressure rating	PN 160			PN 160			PN 160				
Minimum set pressure	p [bar _g] S/G/L	1.5			0.2			0.2				
Min. set pressure standard bellows	p [bar _g] S/G/L	3			3			3				
Min. set pressure ⁵⁾ high press. bellows	p [bar _g] S/G/L	40			40			40				
Maximum set pressure	p [bar _g] S/G/L	250			200			100				
Temperature acc. to DIN EN	min. [°C]				-85 ¹⁾							
	max. [°C]				+450 ²⁾							
Temperature acc. to ASME	min. [°C]				-29							
	max. [°C]				+427							
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 250 (Option code L20)			PN 160				
Outlet Body	Pressure rating	PN 160			PN 160			PN 160				
Minimum set pressure	p [bar _g] S/G/L	1.5			0.2			0.2				
Min. set pressure standard bellows	p [bar _g] S/G/L	3			3			3				
Min. set pressure ⁵⁾ high press. bellows	p [bar _g] S/G/L	40			40			40				
Maximum set pressure	p [bar _g] S/G/L	250			200			100				
Temperature acc. to DIN EN	min. [°C]				-273 ³⁾							
	max. [°C]				+400 ²⁾							
Temperature acc. to ASME	min. [°C]				-196							
	max. [°C]				+450 ²⁾ 4)							

¹⁾ For DIN EN applications at temperatures under -10°C please proceed in accordance to AD-2000 Merkblatt W10:

- Load case II: under -10°C / 14°F to -60°C / -76°F, $p_{\max} = PN \times 0.75$
- Load case III: under -60°C / -76°F to -85°C / -121°F, $p_{\max} = PN \times 0.25$

²⁾ Please notice: from 300°C / 572°F a bellows or suitable spring material e.g. Inconel X750 should be selected (refer to LDeS 3001.19).

³⁾ For DIN EN applications at temperatures under -200°C please proceed in accordance to AD-2000 Merkblatt W10:

- Load case II: under -200°C / -328°F to -255°C / -427°F, $p_{\max} = PN \times 0.75$
- Load case III: under -255°C / -427°F to -273°C / -459°F, $p_{\max} = PN \times 0.25$

⁴⁾ The temperature is limited by the standard inlet body. For applications up to 538°C/1000°F (temperature limit of outlet body) a suitable inlet body material and a bellows or Inconel spring is required.

⁵⁾ Min. set pressure high pressure bellows = Max. pressure standard 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.

Pressure/temperature ratings [US units]

US units												
Actual Orifice diameter d ₀ [inch]		0.354				0.512				0.689		
Actual Orifice Area A ₀ [inch ²]		0.099				0.206				0.347		
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"
Minimum set pressure	p [psig] S/G/L	21.8			2.9			2.9				
Min. set pressure ⁵⁾ standard bellows	p [psig] S/G/L	43.5			43.5			43.5				
Min. set pressure high press. bellows	p [psig] S/G/L	580			580			580				
Maximum set pressure	p [psig] S/G/L	3626			2900			1450				
Temperature acc. to DIN EN	min. [°F]						+14					
	max. [°F]						+572					
Temperature acc. to ASME	min. [°F]						-20					
	max. [°F]						+572					
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"
Minimum set pressure	p [psig] S/G/L	21.8			2.9			2.9				
Min. set pressure ⁵⁾ standard bellows	p [psig] S/G/L	43.5			43.5			43.5				
Min. set pressure high press. bellows	p [psig] S/G/L	580			580			580				
Maximum set pressure	p [psig] S/G/L	3626			2900			1450				
Temperature acc. to DIN EN	min. [°F]						-121 ¹⁾					
	max. [°F]						+752 ²⁾					
Temperature acc. to ASME	min. [°F]						-20					
	max. [°F]						+800 ²⁾					
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"
Minimum set pressure	p [psig] S/G/L	21.8			2.9			2.9				
Min. set pressure ⁵⁾ standard bellows	p [psig] S/G/L	43.5			43.5			43.5				
Min. set pressure high press. bellows	p [psig] S/G/L	580			580			580				
Maximum set pressure	p [psig] S/G/L	3626			2900			1450				
Temperature acc. to DIN EN	min. [°F]						-328 ³⁾					
	max. [°F]						+752 ²⁾					
Temperature acc. to ASME	min. [°F]						-321					
	max. [°F]						+842 ^{2) 4)}					

¹⁾ For DIN EN applications at temperatures under -10 °C please proceed in accordance to AD-2000 Merkblatt W10:

- Load case II: under -10 °C / 14 °F to -60 °C / -76 °F, p_{max} = PN x 0.75
- Load case III: under -60 °C / -76 °F to -85 °C / -121 °F, p_{max} = PN x 0.25

²⁾ Please notice: from 300 °C / 572 °F a bellows or suitable spring material e.g. Inconel X750 should be selected (refer to LDs 3001.19).

³⁾ For DIN EN applications at temperatures under -200 °C please proceed in accordance to AD-2000 Merkblatt W10:

- Load case II: under -200 °C / -328 °F to -255 °C / -427 °F, p_{max} = PN x 0.75
- Load case III: under -255 °C / -427 °F to -273 °C / -459 °F, p_{max} = PN x 0.25

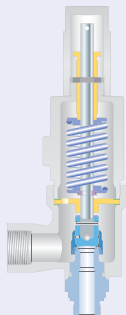
⁴⁾ The temperature is limited by the standard inlet body. For applications up to 538 °C/1000 °F (temperature limit of outlet body) a suitable inlet body material and a bellows or Inconel spring is required.

⁵⁾ Min. set pressure high pressure bellows = Max. pressure standard 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.

Available Options

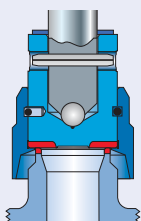
Male thread



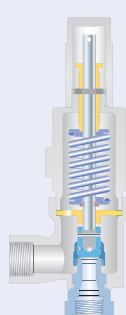
Type 459

Stellited sealing surface

J25: Disc stellited
L20: Base/inlet body



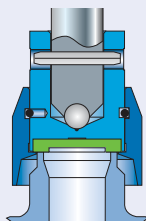
Female thread



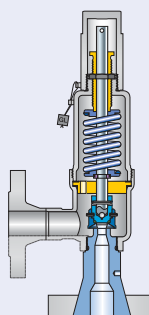
Type 459

Disc with inserted sealing plate

J44: PTFE-FDA "A"
J48: PCTFE "G"
J49: VESPEL-SP "T"



Flanged version



Type 462

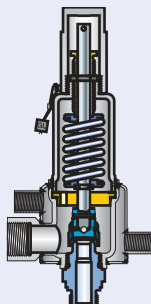
Soft seal o-ring disc

J30: NBR "N"
J21: CR "K"
J22: EPDM "D"
J23: FKM "L"
J20: FFKM "C"

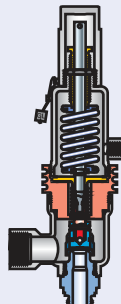
**Solar valve
N80**

4592.2482
4592.2484

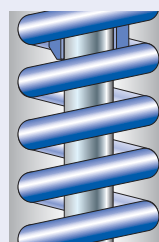
**Heating jacket
H29**



Balanced bellows



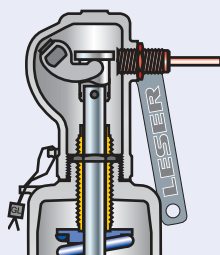
**INCONEL X-750 spring
X08**



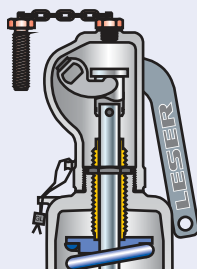
Special material

Code
YYYY
Code Code
XXXX ZZZZ

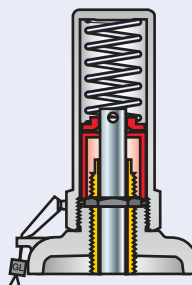
**Lift indicator
J93: Lift indicator**



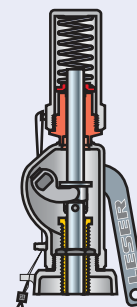
**Test gag
J69: H4
J70: H2**



**O-ring-damper H2
J65**



**O-ring-damper H4
J66**



Available connections

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	
		Inlet	Outlet	Inlet	Outlet	Inlet	Outlet
Male thread DIN ISO 228-1							
G	1/2"	V54 ⁵⁾	–	V54 ¹⁾	–	–	–
	3/4"	V55 ⁵⁾	–	V55	–	–	–
	1"	V56 ⁵⁾	–	V56	V68	V56	–
	1 1/4"	–	–	–	–	V83	–
	1 1/2"	–	V69	–	V69	V57	V69
Female thread DIN ISO 228-1							
G	1/2"	V50 ⁵⁾	–	V50	–	–	–
	3/4"	V51 ⁵⁾	–	V51	–	V51	–
	1"	–	V66	V52 ²⁾	V66	V52	–
	1 1/4"	–	V81	–	V81	V84	–
	1 1/2"	–	V67	–	V67	V53	V67
Male thread ISO 7-1/BS 21							
R/BSPT	1/2"	V30 ^{3) 5)}	–	V30 ⁶⁾	–	–	–
	3/4"	V31 ⁵⁾	–	V31	–	–	–
	1"	V32 ⁵⁾	–	V32	V42	V32	–
	1 1/2"	–	V43	–	V43	V33	V43
Female thread ISO 7-1/BS 21							
Rc/BSPT	1/2"	V38 ⁵⁾	–	V38	–	–	–
	3/4"	V39 ⁵⁾	–	V39	–	V39	–
	1"	V40 ⁵⁾	–	V40	V36	V40	–
	1 1/2"	–	V37	–	V37	V41	V37
Male thread ANSI/ASME B1.20.1							
NPT	1/2"	V61 ⁵⁾	–	V61 ⁴⁾	–	–	–
	3/4"	V62 ⁵⁾	–	V62	–	–	–
	1"	V63 ⁵⁾	–	V63	V73	V63	–
	1 1/4"	–	–	–	–	V85	–
	1 1/2"	–	V74	–	V74	V64	V74
	2"	–	–	–	–	V86	–
Female thread ANSI/ASME B1.20.1							
NPT	1/2"	V58 ⁵⁾	–	V58	–	–	–
	3/4"	V59 ⁵⁾	–	V59	–	V59	–
	1"	V60 ⁵⁾	V71	V60	V71	V60	–
	1 1/4"	–	V80	–	V80	V87	–
	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).

¹⁾ Only for d_0 9 mm

²⁾ d_0 9 mm: up to PN 420

³⁾ Only as special design

⁴⁾ d_0 13 mm: up to 125 bar and 455 °C

⁵⁾ max. PN 700: For higher set pressures a special inlet body is required (see LDeS 3001.19)

⁶⁾ V30 d_0 9 mm

Available connections

Flanged connections

Nominal diameter		Pressure rating	d ₀ 6 mm		d ₀ 9 mm		d ₀ 13 mm		d ₀ 17.5 mm	
DIN EN 1092-1										
			Option code		Option code		Option code		Option code	
DN		PN	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet
15		40	I21	–	I21	–	I21	–	–	–
		160	I22	–	I22	–	I22	–	–	–
		250	I23	–	I23	–	I23	–	–	–
		320	I24	–	I24	–	I24	–	–	–
		400	I25	–	I25	–	I25	–	–	–
20		40	I26	–	I26	–	I26	–	I26	–
		160	I27	–	I27	–	I27	–	I27	–
25		40	I31	I46	I31	I46	I31	I46	I31	–
		160	I32	I47	I32	I47	I32	I47	I32	–
		250	I33	I48 ²⁾	I33	I48 ¹⁾	I33	I48 ¹⁾	I33	–
		320	I34	–	I34	–	I34	–	I34	–
		400	I35	–	I35	–	I35	–	I35	–
40		40	–	–	–	I49	–	I49	–	I49
		160	–	–	–	I50	–	I50	–	I50
		250	–	–	–	I51 ¹⁾	–	I51 ¹⁾	–	I51 ¹⁾
ANSI/ASME B 16.5										
NPS		CL	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet
1/2"		150	V01	–	V01	–	V01	–	–	–
		300	V02	–	V02	–	V02	–	–	–
		600	V02	–	V02	–	V02	–	–	–
		900	V03	–	V03	–	V03	–	–	–
		1500	V03	–	V03	–	V03	–	–	–
		2500	V04	–	V04	–	V04	–	–	–
3/4"		150	V05	–	V05	–	V05	–	V05	–
		300	V06	–	V06	–	V06	–	V06	–
		600	V06	–	V06	–	V06	–	V06	–
		900	V07	–	V07	–	V07	–	V07	–
		1500	V07	–	V07	–	V07	–	V07	–
		2500	V08	–	V08	–	V08	–	V08	–
1"		150	V09	–	V09	V18	V09	V18	V09	–
		300	V10	V19	V10	V19	V10	V19	V10	–
		600	V10	V19	V10	V19	V10	V19	V10	–
		900	V11	–	V11	–	V11	–	V11	–
		1500	V11	–	V11	–	V11	–	V11	–
		2500	V12	–	V12	–	V12	–	V12	–
1 1/2"		150	–	–	–	V21	–	V21	–	V21
		300	–	–	–	V22	–	V22	–	V22
		600	–	–	–	V22	–	V22	–	V22

Type 462 Refrigeration technology

Flange facings DIN EN 1092 – groove, face D

Nominal diameter		Center to face [mm]		d ₀ 13 mm		d ₀ 13 mm		d ₀ 17,5 mm	
DIN EN 1092-1									
DN		a	b	Option code		Option code		Option code	
Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet
15	20	90	80	I1C	I1J	–	–	–	–
20	20	90	80	I1D	I1J	–	–	–	–
15	25	100	100	–	–	I1A	I1H	–	–
15	25	95	95	–	–	I1F	I1L	–	–
20	25	90	80	–	–	I1D	I1K	–	–
20	25	95	95	–	–	I1G	I51	–	–
25	25	100	100	–	–	I1B	I1H	–	–
25	25	90	80	–	–	I1E	I1K	–	–
25	32	100	100	–	–	–	–	I1B	I1M

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

¹⁾ Caution! Only connecting dimensions correspond to PN 250, outlet body and bonnet are designed for PN 160.