Type 438

Safety Relief Valves – spring loaded

Type 438
Packed knob H4
Conventional design

Type 438
Packed knob H4
Flanged connection

Type 438
Cap H2
Long version

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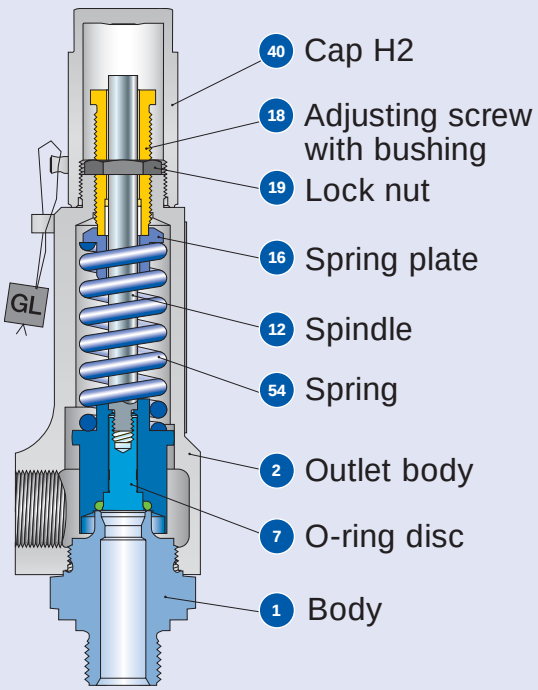
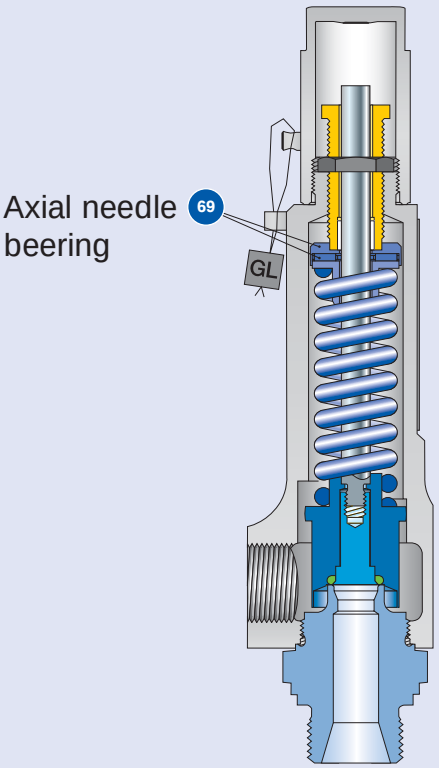
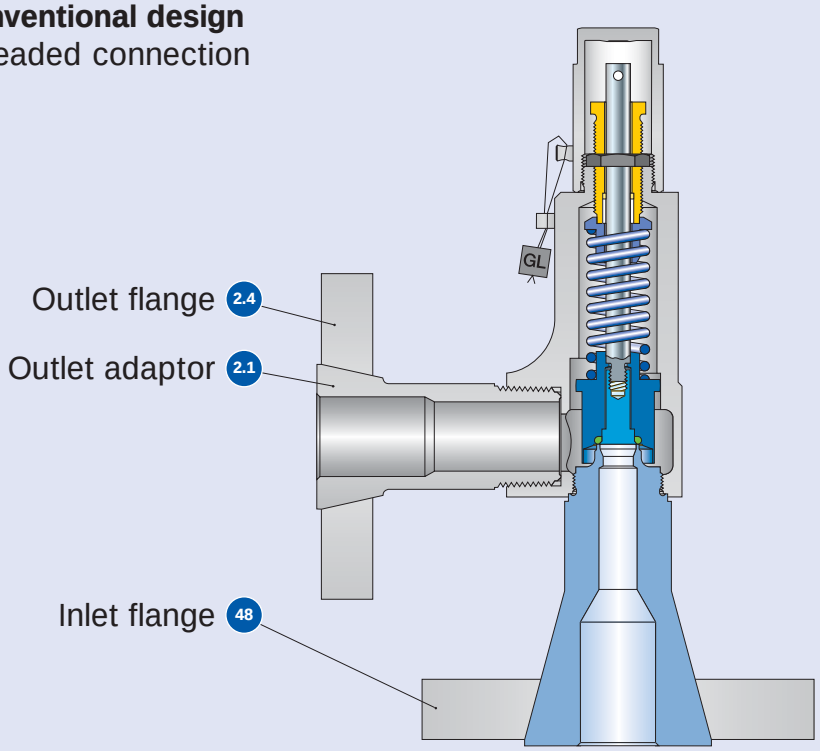
Available designs



Conventional design
Threaded connection



Long version
Threaded connection



Conventional design
Flange connection

Available designs – materials

Materials

Item	Component	Remarks	Type 4383	Type 4384
1	Base / Inlet body	Threaded connection	1.4104 SA 479 430	1.4404 SA 479 316L
		Flange connection	1.4404 SA 479 316L	1.4404 SA 479 316L
		Long version	1.4404 SA 479 316L	1.4404 SA 479 316L
2	Outlet body		1.4104 SA 479 430	1.4404 SA 479 316L
2.1	Outlet adaptor	Flange connection	1.4404 316L	1.4404 316L
2.4	Outlet flange	Flange connection	1.4404 316L	1.4404 316L
7	O-ring disc		1.4404 SA 479 316L	1.4404 SA 479 316L
7.4	Soft seal O-ring	“N”	NBR Nitrile-Butadiene	NBR Nitrile-Butadiene
		“K”	CR Chloroprene	CR Chloroprene
		“D”	EPDM Ethylen-Propylene-Diene	EPDM Ethylen-Propylene-Diene
		“L”	FKM Fluorocarbon	FKM Fluorocarbon
		“C”	FFKM Perflouro	FFKM Perflouro
12	Spindle		1.4021 420	1.4404 316L
16	Spring plate		1.4104 Chrome steel	1.4404 316L
18	Adjusting screw with bushing		1.4104 / PTFE Chrome steel / PTFE	1.4404 / PTFE 316L / PTFE
19	Lock nut		1.0718 Steel	1.4404 316L
40	Cap H2		1.0718 Steel	1.4404 316L
48	Inlet flange	Flange connection	1.4404 316L	1.4404 316L
54	Spring		1.4310 Stainless steel	1.4310 Stainless steel
57	Pin		1.4310 Stainless steel	1.4310 Stainless steel
61	Ball		1.3541 Hardened stainless steel	1.4401 316
69	Axial needle beering	Long version	1.4404 316L	1.4404 316L

Please notice:

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

How to order – Numbering system

1 Article Number

1	2	3	4
438	3	.286	2

1 **Type 438**

Types of sealing

Soft seal	Soft seal material
NBR	Buna-N®
EPDM	Buna-EP®
CR	Neoprene®
FKM	Viton®
FFKM	Kalrez® 6375

2 **Material code**

Code	Body material
3	1.4104 (430)
4	1.4404 (316L)

3 **Valve code**

Identifies valve size, body material and orifice, refer to page 02/07 and following.

4 **Code for lifting device**

Code	Lifting device	
2	Screwed cap	H2
3	Pull button	H3
4	Packed knob	H4

4383.2862

Article No.

2 Set Pressure

Please state unit (in gauge)!

Please do not exceed pressure range mentioned in the spring charts.

12 bar_g

Set Pressure

3 Connections

Please refer to table “Availabe Connections” on pages 04/04 and 04/05.

Please state one option code for each, inlet **and** outlet.

V55 **V65**

Connections

LESER

4 Options

Type 438		Option code
• Base / Inlet body 1.4404 (Type 4383 only)		L18
• Soft seal material		
NBR	"N"	J30
CR	"K"	J21
EPDM	"D"	J22
FKM	"L"	J23
FFKM	"C"	J20
• Heating jacket		H29

5 Documentation

Please select requested documentation:

Inspections, tests:	Option code
DIN EN 10204-3.2: TÜV-Nord Certificate for test pressure	M33
LESER Certificate for Global Application	H03

- Inspection certificate 3.1 acc. to DIN EN 10204
- Declaration of conformity acc. to PED 97/23/EC

Material test certificate:
DIN EN 10204-3.1

Part	Option code
Base / Inlet body	H01
Outlet body	L34
Cap / lever cover	L31
Disc	L23

6 Code and Medium

1 2
2 . 0

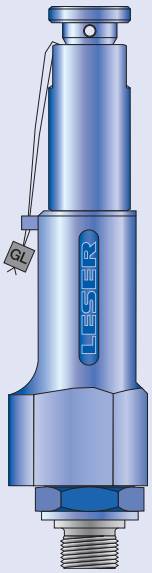
1 Code
1. ASME Section VIII
2. CE / VdTUEV
3. ASME Section VIII + CE / VdTUEV

2 Medium
.1 Gases
.2 Liquids
.3 Steam
.0 Steam / Gases / Liquids (valid only for CE / VdTUEV)

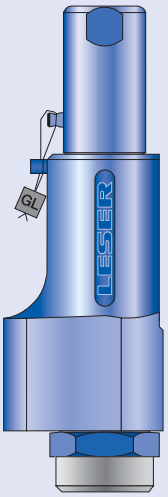
J23				H01	L23		2.0
Options				Documentation			Code and Medium

Type 438

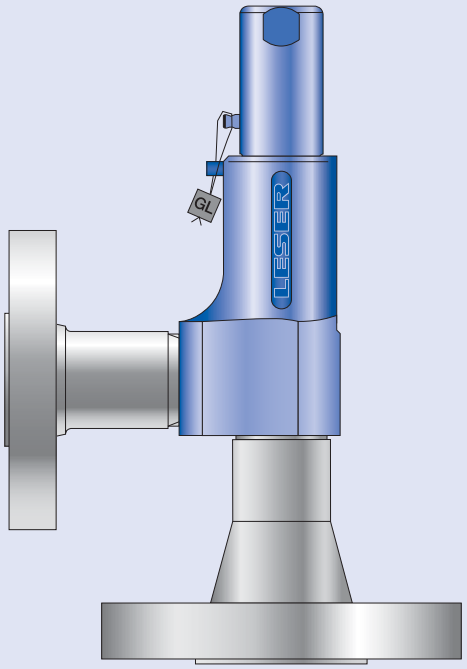
How to order – Article numbers



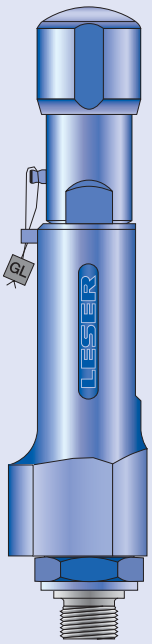
Type 438 Male
Outlet body $^1/_2$"
Pull button H3
Conventional design



Type 438 Female
Outlet body 1"
Cap H2
Conventional design



Type 438 Flanged connection
Outlet body 1"
Cap H2
Conventional design



Type 438 Male
Outlet body $^1/_2$"
Packed knob H4
Long version

How to order – Article numbers

Article numbers

		Conventional design	Long version
Actual Orifice diameter d_0 [mm]		10	10
Actual Orifice area A_0 [mm²]		78,5	78,5
Actual Orifice diameter d_0 [inch]		0,394	0394
Actual Orifice area A_0 [inch²]		0,122	0,122
O-ring material		NBR “N” J30	NBR “N” J30
		CR “K” J21	CR “K” J21
		EPDM “D” J22	EPDM “D” J22
		FKM “L” J23	FKM “L” J23
		FFKM “C” J20	FFKM “C” J20
Base / Inlet body material: 1.4104 (430)			
H2	Art.-No. **4383.**	**2862**	**2872**
H3 p_{max} **= 10 bar$_g$**	Art.-No. **4383.**	**2863**	**2873**
H4	Art.-No. **4383.**	**2864**	**2874**
p [bar$_g$]	S/G/L	**5 – 93**	**93 – 180**
p [psig]	S/G/L	**72,5 – 1349**	**1349 – 2611**
Base / Inlet body material: 1.4404 (316L)			
H2	Art.-No. **4374.**	**2982**	**2992**
H4	Art.-No. **4374.**	**2984**	**2994**
p [bar$_g$]	S/G/L	**5 – 68**	**68 – 180**
p [psig]	S/G/L	**72,5 – 986**	**986 – 2611**

Dimensions and weights – Metric Units

Threaded connections

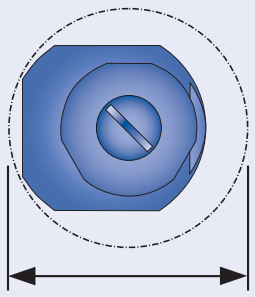
			Conventional design			Long version		
Size Outlet body			1/2"	3/4"	1"	1/2"	3/4"	1"
Actual Orifice diameter d_0 [mm]			10	10	10	10	10	10
Actual Orifice area A_0 [mm²]			78,5	78,5	78,5	78,5	78,5	78,5
Weight	[kg]		1,2	1,6	1,6	1,4	2,1	2,1
Required installation diameter	[mm]		65	80	80	65	80	80
Inlet thread "Female"								
DIN ISO 228-1 Center to face	[mm]	**G** Inlet a	45	55	55	45	55	55
		Outlet b	30	37	37	30	37	37
Height	[mm]	H max.	210	220	220	230	240	240
ISO 7-1/BS 21 Center to face	[mm]	**Rc** Inlet a	45	55	55	45	55	55
		Outlet b	30	37	37	30	37	37
Height	[mm]	H max.	210	220	220	230	240	240
ANSI/ASME B1.20.1 Center to face	[mm]	**NPT** Inlet a	45	55	55	45	55	55
		Outlet b	30	37	37	30	37	37
Height	[mm]	H max.	210	220	220	230	240	240
Inlet thread "Male"								
DIN ISO 228-1 Center to face	[mm]	**G** Inlet a	33	33	36	33	33	36
		Outlet b	30	37	37	30	37	37
ISO 7-1/BS 21 Center to face	[mm]	**R** Inlet a	31	31	34	31	31	34
		Outlet b	30	37	37	30	37	37
ANSI/ASME B1.20.1 Center to face	[mm]	**NPT** Inlet a	31	31	34	31	31	34
		Outlet b	30	37	37	30	37	37

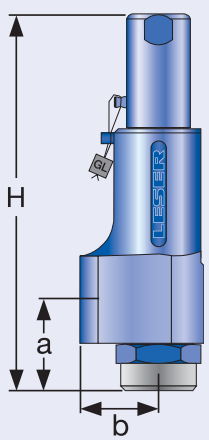
Height inlet thread "Male"

			Conventional design				Long version			
Inlet thread		Size	3/8"	1/2"	3/4"	1"	3/8"	1/2"	3/4"	1"
DIN ISO 228-1	[mm] **G**	H max.	210	212	214	216	230	232	234	236
ISO 7-1/BS 21	[mm] **R**	H max.	–	215	216	219	–	235	236	239
ASME B1.20.1	[mm] **NPT**	H max.	–	218	218	223	–	238	238	243

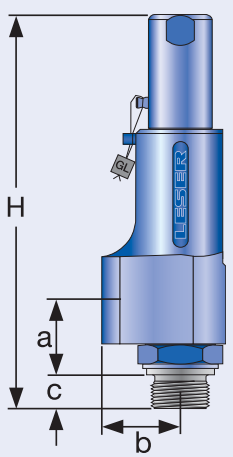
Length of screwed end "c" inlet thread "Male"

Inlet thread		Size	3/8"	1/2"	3/4"	1"
DIN ISO 228-1	[mm] **G**		12	14	16	18
ISO 7-1/BS 21	[mm] **R**		–	19	20	23
ASME B1.20.1	[mm] **NPT**		–	22	22	27

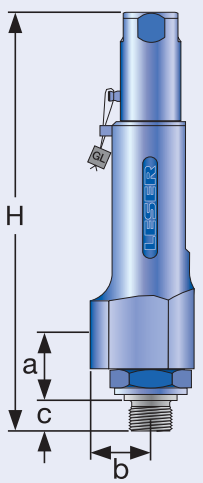




Conventional design – Female thread



Conventional design – Male thread



Long version – male thread

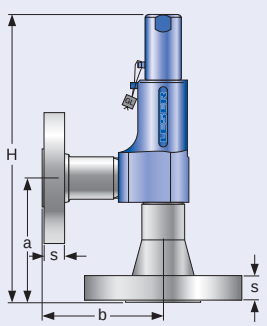
Dimensions and weights – Metric Units

Flanged connection

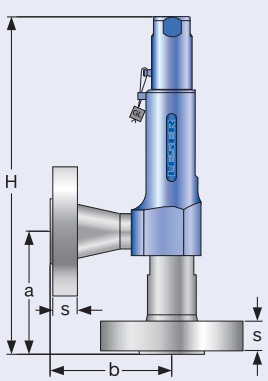
			Conventional design	Long version
Actual Orifice diameter d_0 [mm]			10	10
Actual Orifice area A_0 [mm²]			78,5	78,5
DIN ISO 1092-1 (Available flange sizes refer to page 04/05)				
			Flange rating PN 40	
Center to face	[mm]	Inlet a	100	100
		Outlet b	100	100
Height [H4]	[mm]	H max.	263	284
			Flange rating ≥ PN 160	
Center to face	[mm]	Inlet a	103	103
		Outlet b	100	100
Height [H4]	[mm]	H max.	266	287
ASME B 16.5 (Available flange sizes refer to page 04/05)				
			Flange rating class 150	
Center to face	[mm]	Inlet a	100	100
		Outlet b	100	100
Height [H4]	[mm]	H max.	263	284
			Flange rating class ≥ 300	
Center to face	[mm]	Inlet a	103	103
		Outlet b	100	100
Height [H4]	[mm]	H max.	266	287
Weight				
For the calculation of the total weight please use the Formular: $W_T = W_N + W_F$ (Inlet) + W_F (Outlet)				
Weight net (without inlet and outlet flange)	[kg]	W_N	2,4	2,8

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			✓	✓	✓	✓	✓		✓	✓		✓		



Conventional design



Long version

Dimensions and weights – US Units

Threaded connections

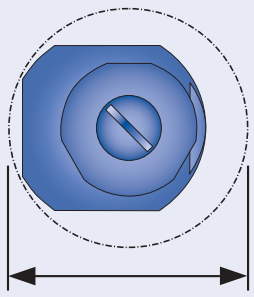
			Conventional design			Long version		
Size Outlet body			1/2"	3/4"	1"	1/2"	3/4"	1"
Actual Orifice diameter d_0 [inch]			0,394	0,394	0,394	0,394	0,394	0,394
Actual Orifice area A_0 [inch²]			0,122	0,122	0,122	0,122	0,122	0,122
Weight		[lbs]	2,6	3,5	3,5	3,1	4,6	4,6
Required installation diameter		[inch]	2 9/16	3 5/32	3 5/32	2 9/16	3 5/32	3 5/32
Inlet thread "Female"								
DIN ISO 228-1 Center to face	[inch]	**G** Inlet a	1 3/4	2 1/4	2 1/4	1 3/4	2 1/4	2 1/4
		Outlet b	1 1/8	1 7/16	1 7/16	1 1/8	1 7/16	1 7/16
Height	[inch]	H max.	8 1/2	8 11/16	8 11/16	9 1/16	9 7/16	9 7/16
ISO 7-1/BS 21 Center to face	[inch]	**Rc** Inlet a	1 3/4	2 1/4	2 1/4	1 3/4	2 1/4	2 1/4
		Outlet b	1 1/8	1 7/16	1 7/16	1 1/8	1 7/16	1 7/16
Height	[inch]	H max.	8 1/2	8 11/16	8 11/16	9 1/16	9 7/16	9 7/16
ANSI/ASME B1.20.1 Center to face	[inch]	**NPT** Inlet a	1 3/4	2 1/4	2 1/4	1 3/4	2 1/4	2 1/4
		Outlet b	1 1/8	1 7/16	1 7/16	1 1/8	1 7/16	1 7/16
Height	[inch]	H max.	8 1/2	8 11/16	8 11/16	9 1/16	9 7/16	9 7/16
Inlet thread "Male"								
DIN ISO 228-1 Center to face	[inch]	**G** Inlet a	1 5/16	1 5/16	1 7/16	1 5/16	1 5/16	1 7/16
		Outlet b	1 1/8	1 7/16	1 7/16	1 1/8	1 7/16	1 7/16
ISO 7-1/BS 21 Center to face	[inch]	**R** Inlet a	1 1/4	1 1/4	1 5/16	1 1/4	1 1/4	1 5/16
		Outlet b	1 1/8	1 7/16	1 7/16	1 1/8	1 7/16	1 7/16
ANSI/ASME B1.20.1 Center to face	[inch]	**NPT** Inlet a	1 1/4	1 1/4	1 5/16	1 1/4	1 1/4	1 5/16
		Outlet b	1 1/8	1 7/16	1 7/16	1 1/8	1 7/16	1 7/16

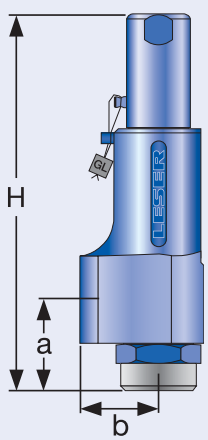
Height inlet thread "Male"

				Conventional design				Long version			
Inlet thread			Size	3/8"	1/2"	3/4"	1"	3/8"	1/2"	3/4"	1"
DIN ISO 228-1	[inch]	**G**	H max.	8 1/2	8 6/16	8 7/16	8 1/2	9 1/16	9 2/16	9 3/16	9 5/16
ISO 7-1/BS 21	[inch]	**R**	H max.	–	8 7/16	8 1/2	8 5/2	–	9 1/4	9 1/4	9 3/8
ASME B1.20.1	[inch]	**NPT**	H max.	–	8 5/8	8 5/8	8 3/4	–	9 3/8	9 3/8	9 5/8

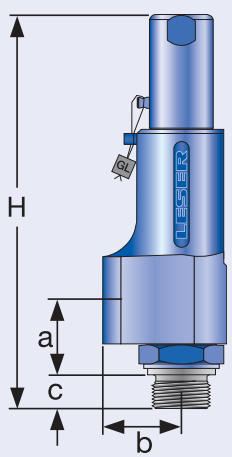
Length of screwed end "c" inlet thread "Male"

Inlet thread			Size	3/8"	1/2"	3/4"	1"
DIN ISO 228-1	[inch]	**G**		1/2	9/16	5/8	6/8
ISO 7-1/BS 21	[inch]	**R**		–	3/4	13/16	7/8
ASME B1.20.1	[inch]	**NPT**		–	7/8	7/8	1 1/8

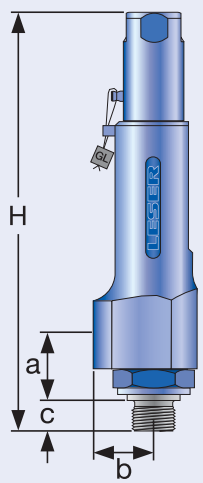




Conventional design – Female thread



Conventional design – Male thread



Long version – male thread

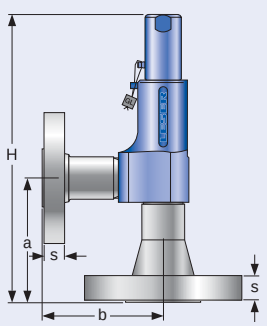
Dimensions and weights – US Units

Flanged connection

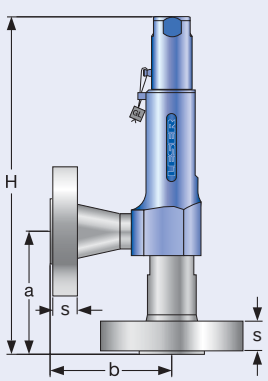
			Conventional design	Long version
Actual Orifice diameter d_0 [inch]			0,394	0,394
Actual Orifice area A_0 [inch²]			0,122	0,122
DIN ISO 1092-1 (Available flange sizes refer to page 04/05)				
			Flange rating PN 40	
Center to face	[inch]	Inlet a	$3^{7}/_{8}$	$3^{7}/_{8}$
		Outlet b	$3^{7}/_{8}$	$3^{7}/_{8}$
Height [H4]	[inch]	H max.	$10^{3}/_{8}$	$11^{3}/_{16}$
			Flange rating ≥ PN 160	
Center to face	[inch]	Inlet a	$4^{1}/_{16}$	$4^{1}/_{16}$
		Outlet b	$3^{7}/_{8}$	$3^{7}/_{8}$
Height [H4]	[inch]	H max.	$10^{1}/_{2}$	$11^{3}/_{16}$
ASME B 16.5 (Available flange sizes refer to page 04/05)				
			Flange rating class 150	
Center to face	[inch]	Inlet a	$3^{7}/_{8}$	$3^{7}/_{8}$
		Outlet b	$3^{7}/_{8}$	$3^{7}/_{8}$
Height [H4]	[inch]	H max.	$10^{3}/_{8}$	$11^{3}/_{16}$
			Flange rating class ≥ 300	
Center to face	[inch]	Inlet a	$4^{1}/_{16}$	$4^{1}/_{16}$
		Outlet b	$3^{7}/_{8}$	$3^{7}/_{8}$
Height [H4]	[inch]	H max.	$10^{1}/_{2}$	$11^{3}/_{16}$
Weight				
For the calculation of the total weight please use the Formular: $W_T = W_N + W_F$ (Inlet) + W_F (Outlet)				
Weight net (without inlet and outlet flange)	[lbs]	W_N	5,3	6,2

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	[inch]	s	$^{6}/_{8}$	$^{7}/_{8}$	$1^{1}/_{32}$	$1^{1}/_{32}$	$1^{1}/_{8}$		$^{9}/_{16}$	$^{11}/_{16}$		$1^{1}/_{32}$		$1^{3}/_{16}$
Weight slip on flange	[lbs]	W_F	1,8	2,6	5,5	5,5	7,9		1,3	2		4,6		6,6
Available at Inlet			✓	✓	✓	✓	✓		✓	✓		✓		✓
Available at Outlet			✓	✓	✓				✓	✓		✓		
DN 20								**NPS $^{3}/_{4}$"**						
Flange thickness	[inch]	s	$^{6}/_{8}$	$^{7}/_{8}$					$^{5}/_{8}$	$^{11}/_{16}$		1		$1^{1}/_{4}$
Weight slip on flange	[lbs]	W_F	2,4	2,9					1,8	3,1		5		7,7
Available at Inlet			✓	✓					✓	✓		✓		✓
Available at Outlet			✓	✓					✓	✓		✓		
DN 25								**NPS 1"**						
Flange thickness	[inch]	s	$^{7}/_{8}$	$1^{1}/_{32}$	$1^{1}/_{8}$	$1^{3}/_{8}$	$1^{5}/_{8}$		$^{5}/_{8}$	$^{7}/_{8}$		$1^{1}/_{4}$		$1^{5}/_{8}$
Weight slip on flange	[lbs]	W_F	2,9	5,7	7,7	11	16,5		2,2	4,6		9		11,2
Available at Inlet			✓	✓	✓	✓	✓		✓	✓		✓		✓
Available at Outlet			✓	✓	✓	✓	✓		✓	✓		✓		



Conventional design



Long version

Pressure temperature ratings

Metric Units

		Conventional design				Long version			
Actual Orifice diameter d_0 [mm]		10				10			
Actual Orifice Area A_0 [mm²]		78,5				78,5			
Body material: 1.4104 (430)									
Base / Inlet Body	Connection size	3/8"	1/2"	3/4"	1"	3/8"	1/2"	3/4"	1"
	Pressure rating	PN 320				PN 320			
Outlet body	Pressure rating	PN 160				PN 160			
Minimum set pressure	p [bar_g] S/G/L	5				93			
Maximum set pressure	p [bar_g] S/G/L	10 only H3 93				180			
Temperature acc. to DIN EN	min [°C]	-10				-10			
	max [°C]	+150				+150			
Temperature acc. to ASME	min [°C]	-29				-29			
	max [°C]	+150				+150			
Body material: 1.4404 (316L)									
Base / Inlet Body	Connection size	3/8"	1/2"	3/4"	1"	3/8"	1/2"	3/4"	1"
	Pressure rating	PN 320				PN 320			
Outlet body	Pressure rating	PN 160				PN 160			
Minimum set pressure	p [bar_g] S/G/L	5				68			
Maximum set pressure	p [bar_g] S/G/L	10 only H3 68				180			
Temperature acc. to DIN EN	min [°C]	-45				-45			
	max [°C]	+150				+150			
Temperature acc. to ASME	min [°C]	-268				-268			
	max [°C]	+150				+150			

US Units

		Standard				Long version			
Actual Orifice diameter d_0 [inch]		0,394				0,394			
Actual Orifice area A_0 [inch²]		0,122				0,122			
Body material: 1.4104 (430)									
Base / Inlet Body	Connection size	3/8"	1/2"	3/4"	1"	3/8"	1/2"	3/4"	1"
Minimum set pressure	p [psig] S/G/L	72,5				1349			
Maximum set pressure	p [psig] S/G/L	145 only H3 1349				2611			
Temperature acc. to DIN EN	min [°F]	+14				+14			
	max [°F]	+302				+302			
Temperature acc. to ASME	min [°F]	-20				-20			
	max [°F]	+302				+302			
Body material: 1.4404 (316L)									
Base / Inlet Body	Connection size	3/8"	1/2"	3/4"	1"	3/8"	1/2"	3/4"	1"
Minimum set pressure	p [psig] S/G/L	72,5				986			
Maximum set pressure	p [psig] S/G/L	145 only H3 986				2611			
Temperature acc. to DIN EN	min [°F]	-49				-49			
	max [°F]	+302				+302			
Temperature acc. to ASME	min [°F]	-450				-450			
	max [°F]	+302				+302			

The temperature is limited by soft seal material. The stated values are valid for EPDM.

Order information – Spare parts

Spare parts

Actual Orifice diameter d_0 [mm]	10
Actual Orifice area A_0 [mm²]	78,5
Actual Orifice diameter d_0 [inch]	0,394
Actual Orifice area A_0 [inch²]	0,122

Body (Item 1): Male thread			Material-No. / Art.-No.			
		Connection Size	3/8"	1/2"	3/4"	1"
DIN ISO 228-1	G	1.4104	136.5339.9000	136.4939.9000	136.5439.9000	136.6839.9000
		316L	136.5349.9000	136.4949.9000	136.5449.9000	136.6849.9000
ISO 7-1/BS 21	R	316L	–	136.4949.9220	136.5449.9220	136.6849.9220
ANSI/ASME B1.20.1	NPT	316L	–	136.4949.9204	136.5449.9204	136.6849.9204

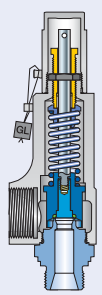
Body (Item 1): Female thread			Material-No. / Art.-No.			
		Connection Size	3/8"	1/2"	3/4"	1"
DIN ISO 228-1	G	316L	–	136.4949.9210	136.5449.9210	136.6849.9210
ISO 7-1/BS 21	Rc	316L	–	136.4949.9222	136.5449.9222	136.6849.9222
ANSI/ASME B1.20.1	NPT	316L	–	136.4949.9211	136.5449.9211	136.6849.9211

Body (Item 1): Flange design			Material-No. / Art.-No.
DN 15 / NPS 1/2"	PN 40 – 400	316L	136.4949.9208
	CL 150	316L	136.4949.9202
	CL 300 - 2500	316L	136.4949.9208
DN 20 / NPS 3/4"	PN 40 – 160	316L	136.5449.9208
	CL 150 – 2500	316L	136.5449.9208
DN 25 / NPS 1"	PN 40 – 400	316L	136.6449.9208
	CL 150	316L	136.6849.9202
	CL 150 – 2500	316L	136.6449.9208
Disc with O-ring (Item 7)			**Material-No. / Art.-No.**
Disc	NBR	"N"	200.8349.9781
	CR	"K"	200.8349.9751
	EPDM	"D"	200.8349.9741
	FKM	"L"	200.8349.9771
	FFKM	"C"	200.8349.9791
O-ring (Item 7.4)			**Material-No. / Art.-No.**
O-ring	NBR	"N"	502.0107.2681
	CR	"K"	502.0107.2651
	EPDM	"D"	502.0107.2641
	FKM	"L"	502.0107.2671
	FFKM	"C"	502.0107.2691
Pin (Item 57)			**Material-No. / Art.-No.**
Pin	1.4310		480.0305.0000
Ball (Item 61)			**Material-No. / Art.-No.**
Ball	Ball ø [mm]		6
	1.4401		510.0104.0000

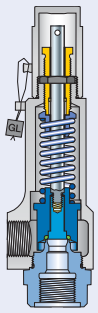
LESER

Available Options

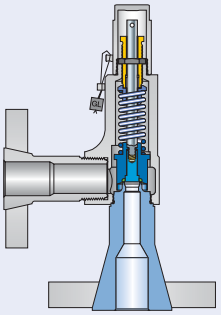
Male thread



Female thread

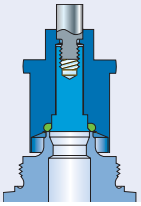


Flanged version



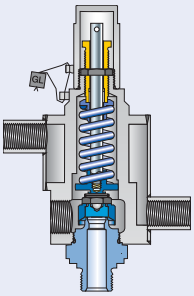
Soft seal o-ring disc

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



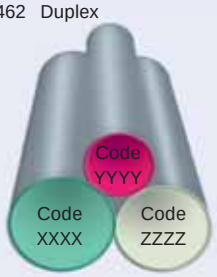
Heating jacket

H29



Special material

2.4610 Hastelloy® C4
2.4360 Monel® 400
1.4462 Duplex



Approvals

Approvals		
Actual Orifice diameter d_0 [mm]		10
Actual Orifice area A_0 [mm²]		78,5
Actual Orifice diameter d_0 [inch]		0,394
Actual Orifice area A_0 [inch²]		0,122
Europe		**Coefficient of discharge K_{dr}**
DIN EN ISO 4126-1	Approval No.	0720201110008/0/21-1
	S/G	0,40
	L	0,33
Germany		**Coefficient of discharge α_w**
AD 2000-Merkblatt A2	Approval No.	TÜV SV 980
	S/G	0,40
	L	0,33
United States		**Coefficient of discharge K**
ASME Sec. VIII	Approval No.	M 37190
	S/G	0,406
	Approval No.	M 37202
	L	0,322
Canada		**Coefficient of discharge K**
CRN	Approval No.	OG0772.9C
	S/G	0,406
	L	0,322
China		**Coefficient of discharge α_w**
CSBQTS	Approval No.	
	S/G	0,40
	L	0,33
Russia		**Coefficient of discharge α_w**
GGTN/	Approval No.	PPC 00-18458
GOSGOTECHNADZOR	S/G	0,40
GOST R	L	0,33

Classification societies		Homepage	
Bureau Veritas	BV	www.bureauveritas.com	The valid certification number is changed with every reneval. A sample certificate including the valid certification number can be taken from the homepage of the classification societies.
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	

Capacities

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]	10		
Actual Orifice area A_0 [mm²]	78,5		
LEO*) [inch²]	S/G = 0,051 L = 0,06		
Set pressure	**Capacities**		
	Steam saturated	**Air** 0°C and 1013 mbar	**Water** 20°C
[bar]	[kg/h]	[m_n^3/h]	[10^3kg/h]
0,5	Please select Type 439		
1			
2			
3			
4			
5	113	139	3,09
6	131	163	3,39
7	149	186	3,66
8	168	210	3,91
9	186	233	4,15
10	204	257	4,37
12		304	4,79
14		351	5,17
16		398	5,53
18		445	5,87
20		492	6,18
22		539	6,49
24		586	6,77
26		633	7,05
28		681	7,32
30		728	7,57
32		775	7,82
34		822	8,06
36		869	8,3
38		916	8,52
40		963	8,74
42		1010	8,96
44		1057	9,17
46		1104	9,38
48		1151	9,58
50		1198	9,78
60		1434	10,7
70		1669	11,6
80		1904	12,4
90		2140	13,1
100		2375	13,8
110		2610	14,5
120		2846	15,1
130		3081	15,8
140		3316	16,4
150		3552	16,9
160		3787	17,5
170		4022	18
180		4257	18,5

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]	0,394		
Actual Orifice area A_0 [inch²]	0,122		
LEO*) [inch²]	S/G = 0,051 L = 0,06		
Set pressure	**Capacities**		
	Steam saturated	**Air** 60°F and 14,5 psig	**Water** 70°F
[psig]	[lb/h]	[S.C.F.M.]	[US-G.P.M.]
10	Please select Type 439		
20			
30			
40			
50			
60	205	73	12,1
70	233	83	13,1
80	261	93	14
90	289	103	14,8
100	317	113	15,6
120	373	133	17,1
140		153	18,5
160		173	19,8
180		193	21
200		213	22,1
220		233	23,2
240		253	24,2
260		273	25,2
280		293	26,2
300		313	27,1
320		333	28
340		353	28,8
360		373	29,7
380		393	30,5
400		413	31,3
420		433	32
440		453	32,8
460		473	33,5
480		493	34,3
500		513	35
600		613	38,3
700		713	41,4
800		813	44,2
900		913	46,9
1000		1013	49,4
1100		1113	51,9
1200		1213	54,2
1300		1313	56,4
1400		1413	58,5
1500		1513	60,5
1600		1613	62,5
1700		1713	64,5
1800		1813	66,3
1900		1912	68,1
2000		2012	69,9
2500		2512	78,2
2650		2662	80,5

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

Determination of coefficent of discharge in case of lift restriction or back pressure

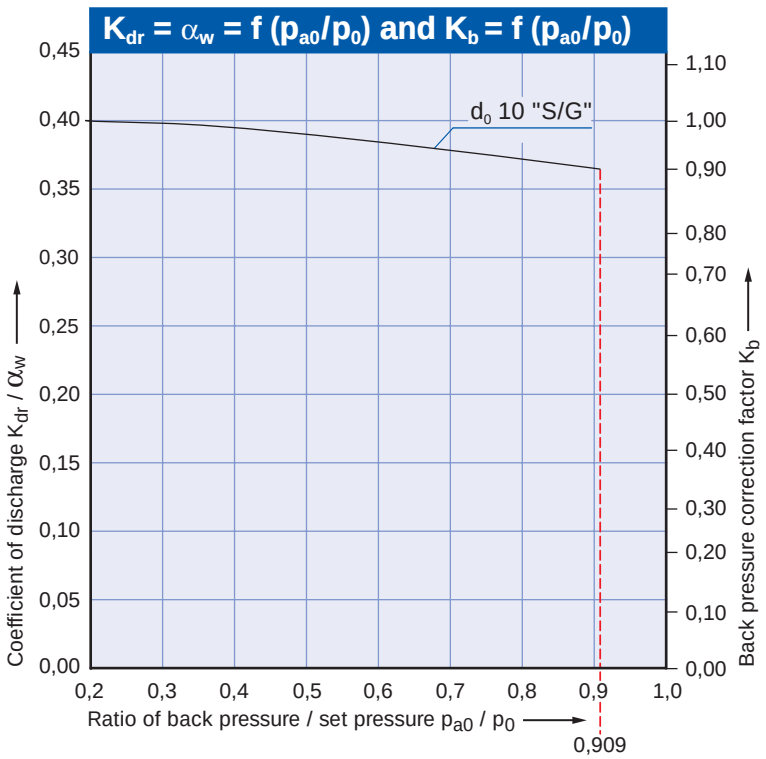
h	= Lift [mm]
d_0	= Flow diameter [mm] of selected safety valve, refer to table article numbers
h/d_0	= Ratio of lift / flow diameter
p_{a0}	= Back pressure [bar_a]
p_0	= Set pressure [bar_a]
p_{a0}/p_0	= Ratio of back pressure / set pressure
K_{dr}	= Coefficient of discharge acc. to DIN EN ISO 4126-1
α_w	= Coefficient of discharge acc. to AD 2000-Merkblatt A2
K_b	= Back pressure correction factor acc. to API 520 topic 3.3

Diagram for evaluation of ratio of lift / flow diameter (h/d_0)
in reference to the coefficient of discharge (K_{dr}/α_w)

$Kdr = \alpha_w = f\ (h/d_0)$

A lift restriction ist not applicable because the actual design and the certified lift are ≤ 1,5 mm / $^1/_{16}$ inch.

Diagram for evaluation of ratio of the coefficient of discharge (K_{dr}/α_w)
in reference to the ratio of back pressure / set pressure (p_{a0}/p_0)



How to use please refer to page 00/08

Type 438

Application range of conventional design and long version

Application range

Type 4383

Conventional design

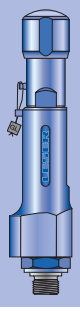
S/G/L

Act. Orifice diameter	d_0 [mm]	10
	[inch]	0,394
Act. Orifice area	A_0 [mm²]	78,5
	[inch²]	0,122

Components	Materials
Base / Inlet Body	1.4104 SA 479 430
Disc	1.4404 SA 479 316L

Long version

S/G/L



Act. Orifice diameter	d_0 [mm]	10
	[inch]	0,394
Act. Orifice area	A_0 [mm²]	78,5
	[inch²]	0,122

Components	Materials
Base / Inlet Body	1.4104 SA 479 430
Disc	1.4404 SA 479 316L

0	**986**	**1349**	**2611**	**Set pressure p [psig]**
0	**68**	**93**	**180**	**Set pressure p [bar]**

Type 4384

Conventional design

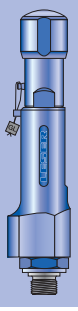
S/G/L

Act. Orifice diameter	d_0 [mm]	10
	[inch]	0,394
Act. Orifice area	A_0 [mm²]	78,5
	[inch²]	0,122

Components	Materials
Base / Inlet Body	1.4404 SA 479 316L
O-ring disc	1.4404 SA 479 316L

Long version

S/G/L



Act. Orifice diameter	d_0 [mm]	10
	[inch]	0,394
Act. Orifice area	A_0 [mm²]	78,5
	[inch²]	0,122

Components	Materials
Base / Inlet Body	1.4404 SA 479 316L
O-ring disc	1.4404 SA 479 316L