

# → Series 461



### ■ SUITABLE FOR

Liquids	neutral and non-neutral	
Air, gases and vapours	neutral and non-neutral	
Steam		

### ■ EXAMPLES OF USE

For the protection of:

- pressure tanks and -systems for neutral / non-neutral vapours, gases and liquids
- steam boilers and steam plants

Please observe plant-specific regulations and use of appropriate valve version and sealing material.

- chemical plants, biogas plants
- desalination plants
- process equipment construction and medical technology
- shipbuilding industry and marine equipment
- secondary areas in the food-, beverage-, pharmaceutical- and cosmetics-industries
- offshore-applications
- Hydrogen applications

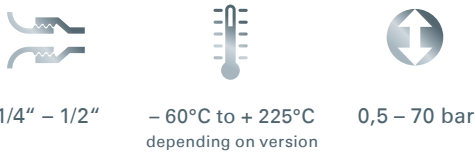
**Safety valves are set and sealed at the factory.**



### ■ MATERIAL



### ■ SPECIFICATION



### ■ APPROVALS

TÜV-Type test approval 2061	D/G, F
EU type examination	S/G, L
TSG ZF001-2006	D/G (S/G), F (L)
TR ZU 032/2013 - TR ZU 010/2011	D/G (S/G), F (L)
<b>Requirements</b>	
AD 2000 Data sheet A2 TRD 421 DIN EN ISO 4126-1	PED 2014/68/EU UK PESR 2016 No. 1105

### Classification society

DNV	DNV
Lloyd's Register EMEA	LR EMEA
American Bureau of Shipping	ABS
Russian Maritime Register of Shipping	RS
Registro Italiano Navale	RINA

### ■ MATERIALS

Component	Material	DIN EN	ASME
Inlet body	Stainless steel	1.4404	316 L
Outlet body	Stainless steel	1.4408	CF8M
Internal parts	Stainless steel	1.4404	316 L
Spring	Stainless steel	1.4310	302

Series 861 ■ VALVE VERSION

<b>s</b>	Standard, non-gastight version of the spring housing	for neutral media without counter pressure, not for medium in combination GF
<b>t</b>	gastight version of spring housing	for neutral and non-neutral media, not counter pressure compensated. The environment is protected from being affected by the medium.

■ MEDIUM

<b>G</b>	gaseous	Air, vapours, gases and steam
<b>F</b>	liquid	The temperature of the medium under atmospheric pressure must not reach boiling point
<b>GF</b>	gaseous and liquid	Air, vapours, gases, steam and liquids Only available as gastight version of the spring housing

■ TYPE OF LIFTING MECHANISM

<b>K</b>	Standard with twist-type lifting mechanism, non-gastight version
<b>L</b>	Lifting lever, non-gastight version
<b>O</b>	without lifting device, standard for gastight version

■ AVAILABLE NOMINAL DIAMETERS AND CONNECTION SIZES

Nominal diameter DN		8	10	15
Inlet		1/4" (8)	3/8" (10)	1/2" (15)
Outlet	1/2" (15)	■	■	■

■ TYPE OF CONNECTION INLET / OUTLET THREADED CONNECTIONS

<b>m / f</b>	Standard	Male thread BSP-P / Female thread BSP-P	DIN EN ISO 228-1 / DIN EN ISO 228-1
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Other connection types possible on request

■ SEALS

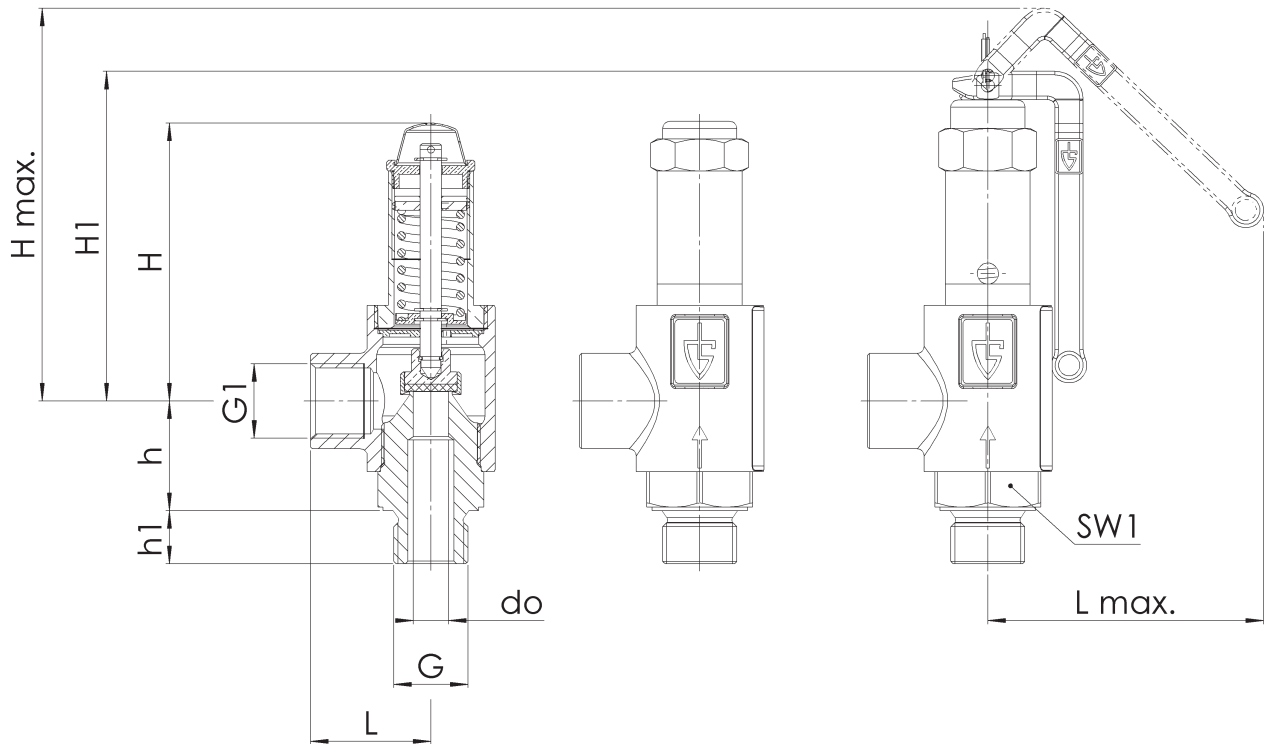
<b>PTFE</b>	Polytetrafluoroethylene	Flat seal up to 25 bar	-60°C to +225°C
<b>PTFE+Kohle</b>	Polytetrafluoroethylene + carbon	Flat seal from 25,1 bar	-60°C to +225°C

■ NOMINAL DIAMETERS, CONNECTIONS, INSTALLATION DIMENSIONS

Series 461: Connection, installation dimensions, ranges of adjustment					
Nominal diameter	DN	8	10	15	
Connection DIN EN ISO 228	G	1/4" (8)	3/8" (10)	1/2" (15)	1/2" (15)
Outlet DIN EN ISO 228	G1	1/2" (15)	1/2" (15)	1/2" (15)	1/2" (15)
Installation dimensions in mm	L	34	34	34	34
	Lmax	78	78	78	78
	H	79	79	79	133
	H1	93	93	93	150
	Hmax	111	111	111	168
	h	31	31	31	31
	h1	12	12	15	15
	SW	30	30	30	30
Coefficients of flow ISO 4126-1	$\alpha_w / Kdr (F)$	0,5	0,44	0,47	0,47
	$\alpha_w / Kdr (D/G)^1$	0,68	0,64	0,71	0,71
Weight	do	6	8	10	10
	kg	0,5	0,5	0,6	1
Range of adjustment	bar	0,5-70	0,5-70	0,5-30	30,1-70

<sup>1</sup>Coefficients of flow for blow-off pressures >3,0 bar. For lower pressures refer to values in the capacity table.

■ MAIN DIMENSIONS, INSTALLATION DIMENSIONS



Series	Valve version	Medium	Lifting device	Nominal diameter DN	Connection type		Connection size		Seal	Options	Set pressure	Quantity
					Inlet	Outlet	Inlet	Outlet				
461	t	G	0	8	m	f	8	15	PTFE		12,3	2
461					m	f		15				
461					m	f		15				
461					m	f		15				

### ■ PROPERTIES

<b>GOX</b>	Especially for gaseous O2 applications by employment of specific materials including oil- and grease free production process	<input type="checkbox"/>	<input type="checkbox"/>
<b>P01</b>	Oil- and grease-free production	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

### ■ CERTIFICATES / APPROVALS

<b>C01</b>	Factory certificate acc. DIN EN 10204 2.2 (WKZ 2.2)	<input type="checkbox"/>	<b>C06</b>	ATEX evaluation acc. to 2014/34/EU	<input type="checkbox"/>
<b>C02</b>	Test certificate acc. DIN EN 10204 3.1 (WPZ 3.1)	<input type="checkbox"/>	<b>C07</b>	SIL evaluation relating to IEC 61508-2	<input type="checkbox"/>
<b>C03</b>	Material test certificate acc. DIN EN 10204 3.1 (MPZ 3.1) (pressure retaining part)	<input type="checkbox"/>	<b>C09</b>	Seat tightness test with helium, leak detection method under vacuum incl. Factory Inspection Certificate 3.1 acc. to DIN EN 10204	<input type="checkbox"/>
<b>C04</b>	TÜV/DEKRA individual inspection acc. EN 10204 3.2 (TÜV/DEKRA-APZ)	<input type="checkbox"/>	<b>C10</b>	Certificate of oil- and grease free production	<input type="checkbox"/>
<b>C05</b>	Sealing material Manufacturer certification (FDA, USP 3, 3-A,...), Please indicate description of certificate: .....	<input type="checkbox"/>	<b>C11</b>	Certification of the production process especially for gaseous oxygen applications by employment of specific materials	<input type="checkbox"/>

### ■ ADMISSIONS / ACCREDITATIONS

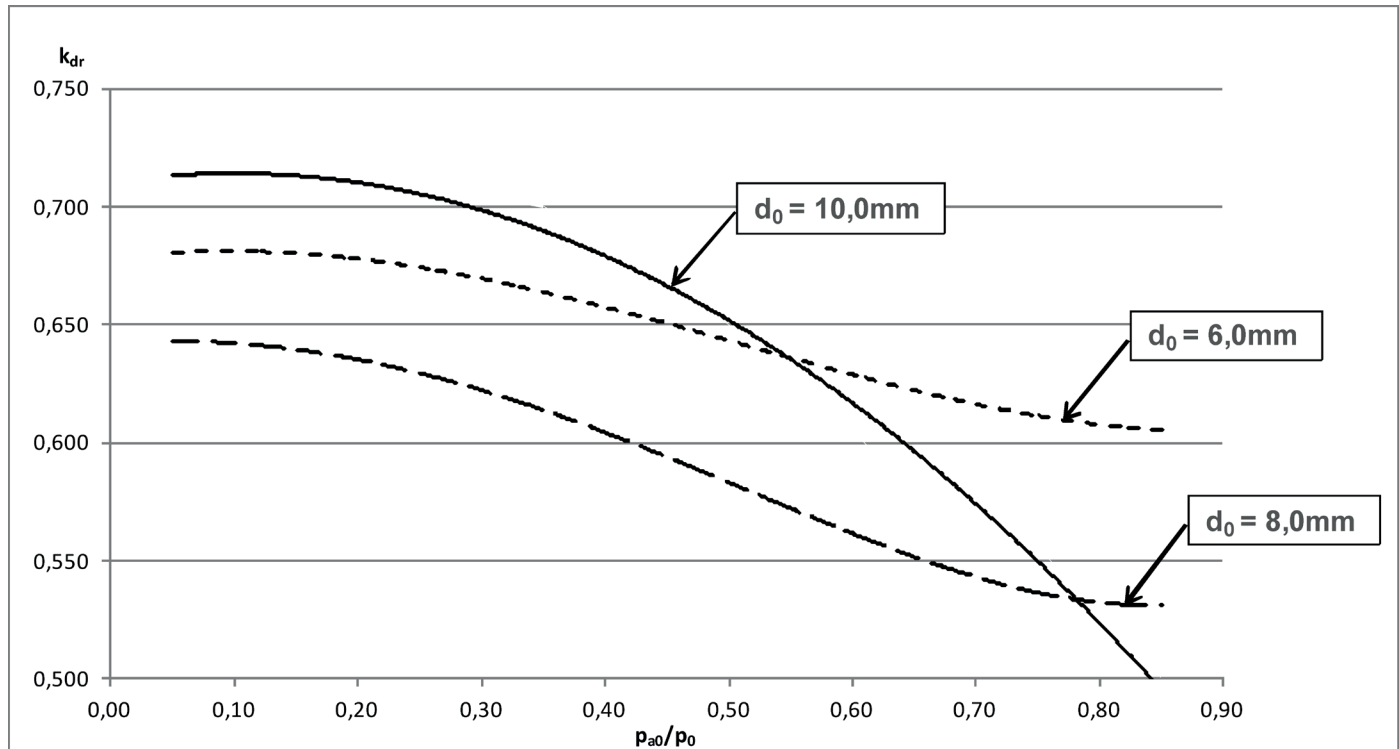
<b>AA1</b>	EC Type examination acc. to Directive 2014/68/EU	<input type="checkbox"/>	<b>AK1</b>	Det Norske Veritas (DNV) type approval	<input type="checkbox"/>
<b>AA2</b>	TÜV component test acc. to VdTÜV specification sheet SV 100	<input type="checkbox"/>	<b>AK2</b>	Lloyd's Register (LR) type approval	<input type="checkbox"/>
<b>AA4</b>	EAC - certificate/declaration with passport for the valve and laser marking of the valve	<input type="checkbox"/>	<b>AK3</b>	American Bureau of Shipping (ABS) type approval	<input type="checkbox"/>
<b>AA5</b>	Manufacture License of Special Equipment People's Republic of China (ML)	<input type="checkbox"/>	<b>AK4</b>	Bureau Veritas (BV) type approval	<input type="checkbox"/>
<b>AA11</b>	UK Type examination acc. to Directive UK PESR 2016 No. 1105	<input type="checkbox"/>	<b>AK5</b>	Russian Maritime Register of Shipping (RMRS) type approval	<input type="checkbox"/>
		<input type="checkbox"/>	<b>AK6</b>	Registro Italiano Navale (RINA) type approval	<input type="checkbox"/>
		<input type="checkbox"/>	<b>AL</b>	Individual inspection by notified body inspector – (body to be indicated): .....	<input type="checkbox"/>

### ■ ENQUIRY

Copy and send to: [order@goetze.de](mailto:order@goetze.de).

Series 461: Blowing-off rates at 10% above set pressure										
Nominal diameter DN		8 d0 = 6 mm			10 d0 = 8 mm			15 d0 = 10 mm		
Set pressure bar		I	II	III	I	II	III	I	II	III
Air I Nm³/h	0,5	18,9	15,5	0,6	29,7	24,3	0,9	49,4	40,4	1,4
	1,0	26,1	20,8	0,8	41,9	33,4	1,2	73,5	58,5	2,0
	1,5	33,8	26,7	0,9	55,3	43,8	1,4	97,5	77,2	2,4
Steam II kg/h	2,0	41,3	32,5	1,1	68,4	53,8	1,7	120,1	94,5	2,8
	2,5	48,8	38,2	1,2	81,0	63,4	1,9	141,7	110,9	3,1
	3,0	56,2	43,8	1,3	93,4	72,8	2,0	163,3	127,3	3,4
	3,5	63,4	49,3	1,4	105,8	82,2	2,2	184,2	143,1	3,7
	4,0	70,6	54,7	1,5	118,3	91,6	2,4	205,1	158,8	3,9
Water III m³/h	4,5	77,8	60,1	1,6	130,4	100,7	2,5	226,0	174,5	4,2
	5,0	85,1	65,5	1,7	142,4	109,7	2,6	246,9	190,2	4,4
	5,5	92,3	70,9	1,8	154,5	118,8	2,8	267,8	205,9	4,6
	6,0	99,5	76,3	1,8	166,6	127,8	2,9	288,7	221,5	4,8
	6,5	106,7	81,7	1,9	178,6	136,8	3,0	309,6	237,1	5,0
	7,0	113,9	87,1	2,0	190,7	145,8	3,1	330,5	252,7	5,2
	7,5	121,1	92,5	2,1	202,7	154,8	3,2	351,4	268,3	5,4
	8,0	128,3	97,8	2,1	214,8	163,7	3,3	372,3	283,8	5,6
	8,5	135,5	103,2	2,2	226,8	172,7	3,4	393,2	299,4	5,7
	9,0	142,8	108,6	2,3	238,9	181,7	3,5	414,1	314,9	5,9
	9,5	150,0	113,9	2,3	250,9	190,7	3,6	435,0	330,5	6,1
	10,0	157,2	119,3	2,4	263,0	199,6	3,7	455,8	346,0	6,2
	11,0	171,6	130,0	2,5	287,1	217,6	3,9	497,6	377,1	6,5
	12,0	186,0	140,7	2,6	311,2	235,5	4,1	539,4	408,1	6,8
	13,0	200,4	151,4	2,7	335,3	253,3	4,3	581,2	439,1	7,1
	14,0	214,8	162,1	2,8	359,4	271,3	4,4	623,0	470,2	7,4
	15,0	229,2	172,9	2,9	383,5	289,2	4,6	664,8	501,4	7,6
	16,0	243,6	183,5	3,0	407,6	307,1	4,7	706,6	532,3	7,9
	17,0	258,0	194,3	3,1	431,7	325,1	4,9	748,3	563,4	8,1
	18,0	272,4	205,0	3,2	455,8	343,0	5,0	790,1	594,6	8,4
	19,0	286,8	215,8	3,3	479,9	361,0	5,2	831,9	625,8	8,6
	20,0	301,2	226,5	3,4	504,0	379,0	5,3	873,7	657,0	8,8
	21,0	315,7	237,3	3,5	528,1	397,0	5,4	915,5	688,2	9,0
	22,0	330,1	248,0	3,5	552,3	415,0	5,5	957,3	719,4	9,3
	23,0	344,5	258,8	3,6	576,4	433,1	5,7	999,1	750,7	9,5
	24,0	358,9	269,6	3,7	600,5	451,2	5,8	1040,8	782,0	9,7
	25,0	373,3	280,4	3,8	624,6	469,2	5,9	1082,6	813,4	9,9
	26,0	387,7		3,9	648,7		6,0	1124,4		10,1
	27,0	402,1		3,9	672,8		6,1	1166,2		10,2
	28,0	416,5		4,0	696,9		6,3	1208,0		10,4
	29,0	430,9		4,1	721,0		6,4	1249,8		10,6
	30,0	445,3		4,1	745,1		6,5	1291,6		10,8
	32,0	474,1		4,3	793,3		6,7	1375,1		11,2
34,0	502,9		4,4	841,5		6,9	1458,7		11,5	
36,0	531,8		4,5	889,7		7,1	1542,3		11,8	
38,0	560,6		4,7	938,0		7,3	1625,8		12,2	
40,0	589,4		4,8	986,2		7,5	1709,4		12,5	
42,0	618,2		4,9	1034,4		7,7	1793,0		12,8	
44,0	647,0		5,0	1082,6		7,8	1876,6		13,1	
46,0	675,8		5,1	1130,8		8,0	1960,1		13,4	
48,0	704,6		5,2	1179,0		8,2	2043,7		13,7	
50,0	733,5		5,3	1227,2		8,4	2127,3		13,9	
51,0	747,9		5,4	1251,3		8,4	2169,1		14,1	
52,0	762,3		5,4	1275,4		8,5	2210,8		14,2	
53,0	776,7		5,5	1299,5		8,6	2252,6		14,4	
54,0	791,1		5,6	1323,7		8,7	2294,4		14,5	
55,0	805,5		5,6	1347,8		8,8	2336,2		14,6	
56,0	819,9		5,7	1371,9		8,8	2378,0		14,8	
57,0	834,3		5,7	1396,0		8,9	2419,8		14,9	
58,0	848,7		5,8	1420,1		9,0	2461,6		15,0	
59,0	863,1		5,8	1444,2		9,1	2503,4		15,2	
60,0	877,5		5,9	1468,3		9,2	2545,1		15,3	
61,0	891,9		5,9	1492,4		9,2	2586,9		15,4	
62,0	906,3		5,9	1516,5		9,3	2628,7		15,5	
63,0	920,8		6,0	1540,6		9,4	2670,5		15,7	
64,0	935,2		6,0	1564,7		9,5	2712,3		15,8	
65,0	949,6		6,1	1588,8		9,5	2754,1		15,9	
66,0	964,0		6,1	1612,9		9,6	2795,9		16,0	
67,0	978,4		6,2	1637,0		9,7	2837,6		16,1	
68,0	992,8		6,2	1661,1		9,7	2879,4		16,3	
69,0	1007,2		6,3	1685,2		9,8	2921,2		16,4	
70,0	1021,6		6,3	1709,4		9,9	2963,0		16,5	

Coefficient of discharge  $\alpha_w$  i.e.  $K_{dr}$  as a function of the relation between the pressures  $p_{a0} / p_0$  of vapours and gases



$$\frac{p_{a0}}{p_0} = \frac{\text{counter pressure bar(a)}}{\text{blow-off pressure bar(a)}} \quad p_{atm} = \text{ambient i.e. atmospheric pressure} = 1,01325 \text{ bar(a)}$$

Example to determine the coefficient of discharge  $\alpha_w$  i.e.  $K_{dr}$  in relation to the set-pressure  $p_{set}$

Set-pressure	Blow-off pressure
$p_{set}$ bar(g)	$p_0$ bar(a)
$\leq 1$	$p_{set} + p_{atm} + 0,1 \text{ bar}$
$> 1$	$p_{set} \times 1,1 + p_{atm}$

For a safety valve set at = 0,5bar(g) and blowing-off into the enviroment the blow-off pressure is determined as follows:

Set-pressure	0,5	bar(g)
+ Atmospheric pressure	1,01325	bar(a)
+ permissable overpressure	0,1	bar(g)
~ Blow-off pressure	1,61	bar(a)

Consequently:

$$\frac{p_{a0}}{p_0} = \frac{1,01325 \text{ bar(a)}}{1,61 \text{ bar(a)}} = 0,72 \quad \text{and extracted from the chart } \alpha_w \text{ i.e. } K_{dr} = 0,56 \text{ at } d_0=8,0\text{mm}$$

Units:

bar(a)  $\triangleq$  absolute pressure - pressure in relation to absolute vacuum (zero), e.g.  $p_{atm} = 1,01325 \text{ bar(a)}$

bar(g)  $\triangleq$  overpressure - pressure above i.e. in relation to  $p_{atm} = 1,01325 \text{ bar(a)}$