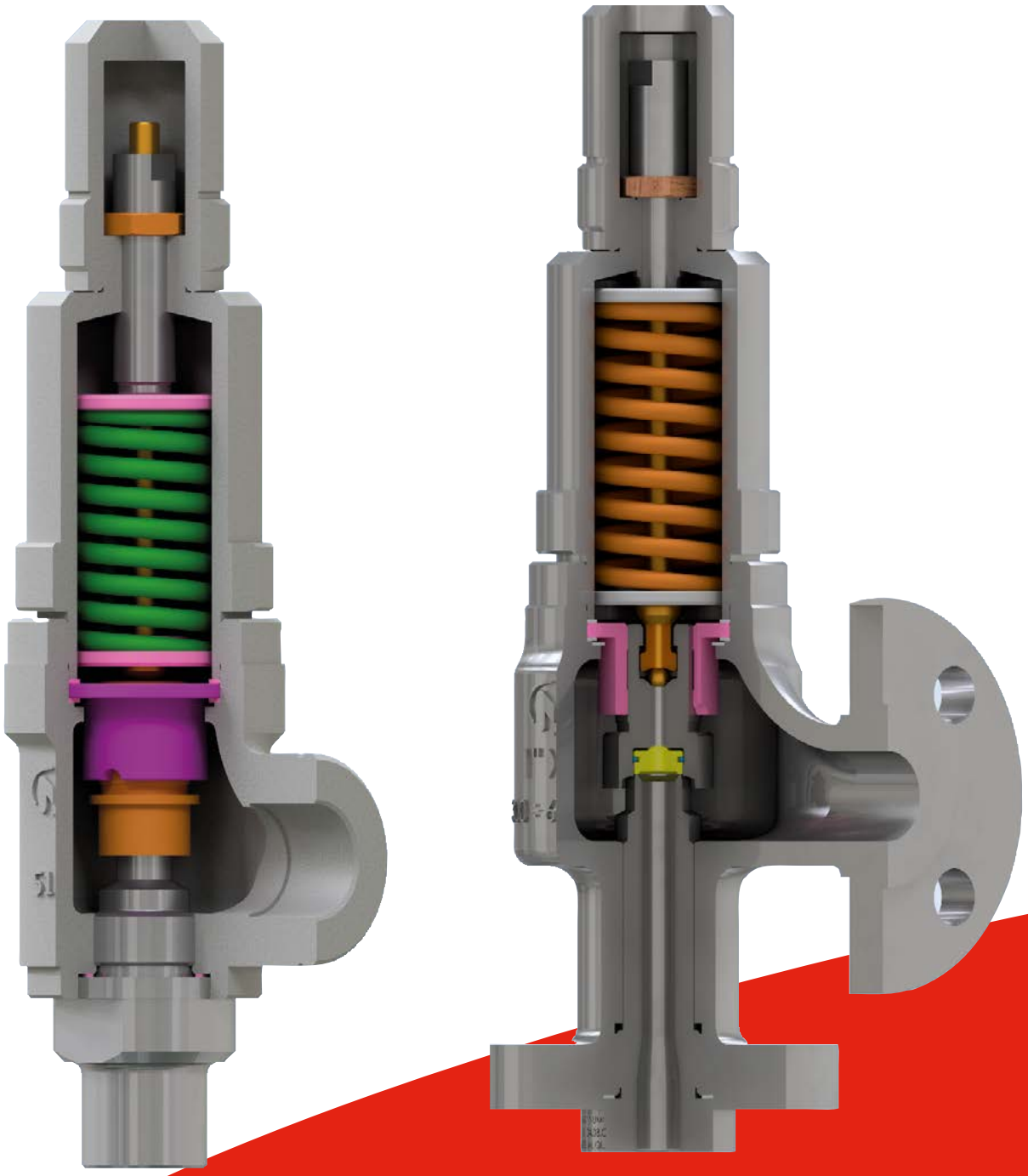
Nacional
SAFETY VALVES

Pekos Group



ASME UV

5100

Nacional
SAFETY VALVES

PRODUCTION, R+D+I, EVOLUTION

VALVULAS NACIONAL, S.A. was established in Spain in 1976. The main target was to assist the petrochemical and chemical industries emerging in Spain at that time. Right from the start VALVULAS NACIONAL, S.A., has been designing and producing safety valves according to most recognized international standards and norms: API, ASME, ASTM and the European directives 2014/68/UE and 2014/34/UE. Our production process is accredited by an ISO 9001-2015 certification.

Our know how and capacity to adapt to the constantly changing demands of the market, made possible the introduction of new products designed for new applications on the market, like THERMOSOLAR PLANTS, where VALVULAS NACIONAL has supplied safety valves to more than 31 complete plants all over the world, while at the same time continuously supplying to all main companies of the Spanish petrochemical, chemical and refining industries.

PRODUCTION CAPACITY

VALVULAS NACIONAL, S.A. valves' have their discharge coefficients approved in laboratory tests, in order to guarantee and assure that correct values are being used for every sizing process.

In our Technical sales department we have a modern software which allows us to verify all the possibilities, and to assure strict fulfillment of all international standards.

VALVULAS NACIONAL, S.A. has established representation agreements with the most important O.E.M. companies in the safety sector of the industry, consolidating us as one of the main companies by product range; design and consulting in new plants or in new process.

Our continuous growth, shows a clear trend, which confirms the integration of our workers to provide first class service to our customers and partners.

FACTORY & LOCATION

Our facilities in Rubí (Barcelona - Spain), with more than 3.000 Sq m are fully prepared for our production activities: machining with modern CNC, assembling and testing. We also have long term agreements with approved workshops, which provides us with flexibility and fast feedback to customers demands, with full quality guarantee which has always been our main target.

STRATEGIC ALLIANCES

Nowadays VALVULAS NACIONAL, S.A. is an international company, with representation agreements in different countries and continents all over the world, with specialized companies that will provide added value in our service towards the end user.

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General Features

Safety and Relief Valve 5100

Model 5100, is an angular type safety valve at 90º between the inlet and the outlet connections, full nozzle and direct action and spring loaded, with pop action and full lift.

Design

- Valve body is an angular type at 90º between inlet and outlet flanges. In flange version, flanges are casted (not welded). Its large internal capacity and smooth section changes help reducing turbulences. Therefore, fluid evacuation discharge is improved.
- Full nozzle type, guided and screwed to body, enabling perfect alignment and easy disassembling
- Disc is separate from disc-holder, for that reason its repair or change is improved and a better selection of materials can be performed
- Guide has a large push rod guide area to prevent premature damage, ensuring perfect alignment with all internals
- Bellows are performed so its average area is equal to orifice area thus achieving perfect valve balance and consequently perfect operation against variable back pressures. Its meticulous design enables maximum pressures and temperatures to be supported achieving a high degree of elasticity.
- Springs are designed with an experimented highly reliable calculation software and manufactured with the ideal material qualities for the process conditions, ensuring elasticity and accurate repetition of valve opening.
- They are used interchangeably as safety or relief valves, both in gases and liquids. Their use is typical as thermal expansion valves and they are also used to release small flows.
- They are constructed with threaded and flanged connections, in this case flanges are integral, although they can also be manufactured with buttwelding and socket-welding connections. Upon request, they allow the installation of different accessories such as manual operation lever, test-gag, O-Ring, heated jacket, etc.
- This catalogue reflects standard valves. Upon request, our technical department can design special applications. The safety valve is an automatic direct action accessory whose function is to relief excessive overpressures in the recipients and installations that protects. Its main characteristics, allowing is its sudden fluid discharge with complete and fast opening (pop) Automatic valve opening is produced because of the additional push provided by the overpressure of the fluid itself helping to overcome spring resistance. Once the installation has recovered its normal service condition, the valve closes again.
- Safety valve behaviour is totally different according to whether the fluid it works with on the installation is in gas or liquid phases. To achieve good valve functioning and correct dimensioning, this model was designed with internals for working with gas (Type-51G□) or liquid (Type-51L□).

Codes and Standards

Valves have been designed and manufactured in compliance with the following directives, codes and standards:

European Directive:	2014/68/UE (PED)
European Directive:	2014/34/UE (ATEX)
Design:	EN ISO 4126-1 / ASME XIII
Certifications:	PED MODULE B+D / ASME “UV” y NB”
Pressure and Temperature Limits:	ASME B16.34
Tests:	API-527 and ASME B16.34
Quality System:	EN ISO 9001:2015
Materials:	ASME/ASTM and EN

Size and Rating

NPT Threaded according to ASME B1.20.1

Sizes: ½”x ¾” up to 1”x1”

BSPP Threaded according to ISO 228-1

Sizes: ½”x ¾” up to 1”x1”

ASME Flanged according to ASME B16.5

Sizes: ½”x 1” up to 1”x1”
Rating: 150# up to 2500#

EN Flanged according to EN 1092-1

Sizes: DN15x25 up to DN25x25
Rating: PN10 up to PN320

Codification System

Example Code:

51	G	C	1	D	1	A	A	B	2	X
1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th

1st DIGIT: Valve model
2nd DIGIT: Work fluid state
G: Gas and Vapour
L: Liquid
3rd DIGIT: Valve Type
C: Conventional
F: Bellows
4th DIGIT: Inlet nominal size
5th DIGIT: Orifice Size
6th DIGIT: Outlet nominal size

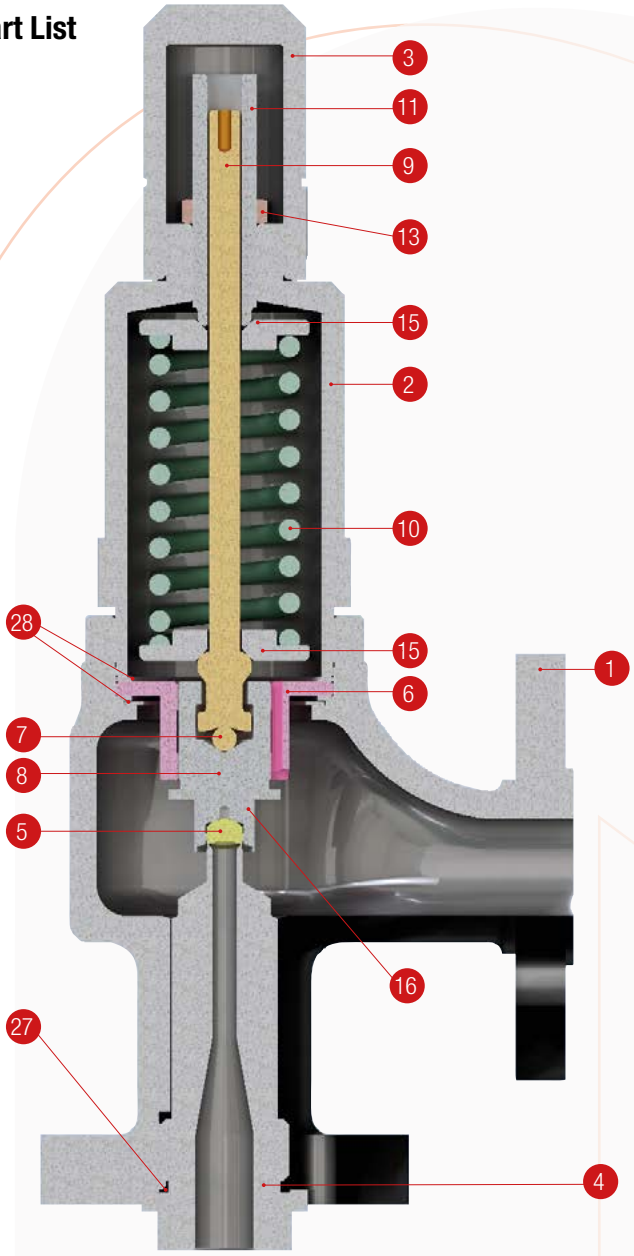
7th DIGIT: Inlet Rating

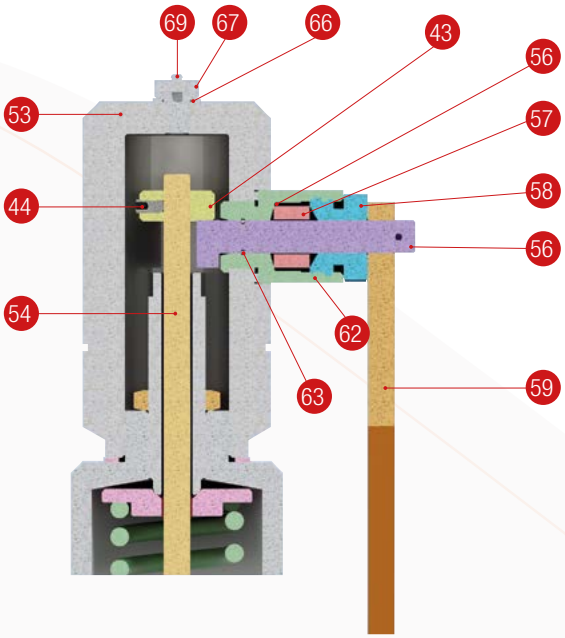
1: ASME 150
2: ASME 300
3: ASME 600
4: ASME 900
5: ASME 1500
6: ASME 2500

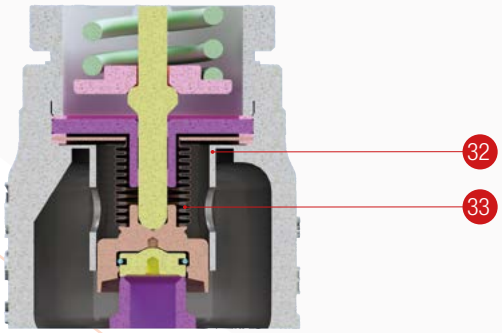
A: PN-10
B: PN-16
C: PN-25
D: PN-40
E: PN-63
F: PN-100
G: Gas M
H: Gas H
I: NPTM
J: NPTH
X: OTHERS

8th DIGIT: Outlet rating (sames as 7th)
9th DIGIT: Standard quality materials
10th DIGIT: Materials - 1 subclass
11th DIGIT: Standard Accesories

Part List







Technical Information / Operating Technical Performance Table

SAFETY VALVE MODEL 5100			
SERVICE		GAS/SAT.STEAM	LIQUID
REDUCED DISCHARGE COEFFICIENT Kdr (1) (2)		0,864 (3)	0,750 (4)
BLOWDOWN	MAX.	10% (5)	15% (6)
BACKPRESSURE	CONVENTIONAL	10%	
	BELLOWS (7)	30%	
MINIMUM SET PRESSURE	ASME XIII (barg)	1,0	
	EN ISO 4126-1 (barg)	0,5	

(1) Or 0,2 bar, the highest value, according to ASME XIII and EN ISO 4126-1
(2) Certificate tested in laboratory
(3) Kdr=0,90*Kd. Kd gas/sat. steam 0,960 with 10% overpressure tested in laboratory.
(4) Kdr=0,90*Kd. Kd gas/sat. steam 0,833 with 10% overpressure tested in laboratory.
(5) Or 0,3 bar, the highest value.
(6) Or 0,45 bar, the highest value.
(7) Backpressure values with which the coefficient does not change.

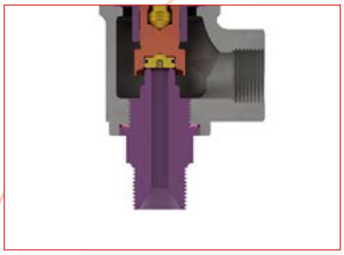
Bill of Materials

	CLASS	A	B	C	E
ITEM	DENOMINATION	-29ºC to 232ºC	233ºC to 400 ºC	40ºC to 538ºC	-268ºC to 400 ºC
1	BODY	1.0619	1.0619	1.7357	1.4408
2	BONNET	1.0460 (9)	1.0460 (9)	1.4401	1.4401
2A	OPEN BONNET	1.0460 (9)	1.0460 (9)	1.4401	1.4401
3	CAP	1.0460 (9)	1.0460 (9)	1.4401	1.4401
4	NOZZLE	SEE SUBCLASS			
5	DISC				
6	GUIDE	1.4401	1.4401	1.4401	1.4401
7	SPHERE	AISI 420-C	AISI 420-C	AISI 420-C	AISI 420-C
8	DISC HOLDER	1.4006 (8)	1.4006 (8)	1.4006 (8)	1.4401 (10)
9	STEM	1.4021 (8)	1.4021 (8)	1.4021 (8)	1.4401
10	SPRING	50CRV4 A.C.	2.4669	2.4669	1.4401 (4)
11	ADJUSTING SCREW	1.4401	1.4401	1.4401	1.4401
13	NUT	1.4401	1.4401	1.4401	1.4401
14	LOCK SCREW				
15	SPRING BUTTON	1.4401	1.4401	1.4401	1.4401
16	ELASTIC RING	1.4401	1.4401	1.4401	1.4401
27	GASKET	Compressed Fibers	Graphite + 316 S.S. (2)		Compressed Fibers
28	GASKET	Compressed Fibers	Graphite + 316 S.S. (2)		Compressed Fibers
32	PROTECTOR BELLOWS	1.4401	1.4401	1.4401	1.4401
33	BELLOWS	1.4571 (5)	1.4571 (5)	1.4571(5)(6)	1.4571 (5)
43	BRACKET	1.0460 (9)	1.0460 (9)	1.0460 (9)	1.4401
44	SET BOLT	DIN 913-A4	DIN 913 - A4	DIN 913 - A4	DIN 913 - A4
48	OPEN CAP LEVER	1.0460 (9)	1.0460 (9)	1.4401	1.4401
53	LEVER CAP	1.0460 (9)	1.0460 (9)	1.4401	1.4401
54	LEVER STEM	1.4401	1.4401	1.4401	1.4401
56	LEVER SHAFT	1.4401	1.4401	1.4401	1.4401
57	PACKING	Braid Graphite			
58	PACKING NUT	1.0460 (9)	1.0460 (9)	1.4401	1.4401
59	PACKED LEVER	A.C. (9)	A.C. (9)	A.C. (9)	A.C. (9)
62	SHAFT BRACKET	1.0460 (9)	1.0460 (9)	1.4401	1.4401
63	ELASTIC RING	1.4401	1.4401	1.4401	1.4401
64	GASKET	Compressed Fibers (1)			
65	SPIRAL PIN	DIN 7343-A2	DIN 7343 -A2	DIN 7343-A2	DIN 7343-A2
66	GASKET	Compressed Fibers (1)			
67	TEST GAG	DIN 933-A4	DIN 933-A4	DIN 933-A4	DIN 933 - A4
69	CHAIN	A.C. (9)	A.C. (9)	A.C. (9)	A.C. (9)
70	TEST-GAG SCREW	DIN 933-A4	DIN 933-A4	DIN 933-A4	DIN 933-A4

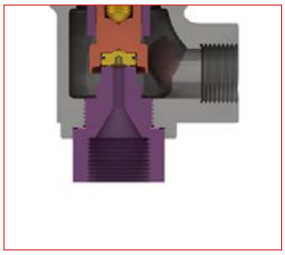
SUBCLASS		1	2	3	4
4	NOZZLE	1.4401	1.4401 + ST	1.4401 + ST	1.4401
5	DISC	1.4401	1.4542	1.4401 + ST	1.4542

(1)T>232ºC Graphite material
(2) T<-29ºC Graphite material
(3) Optional: Made of equivalent bar material
(4) T>300ºC Inconel X-750 material (tempered)
(5) Endings made of S.S. 316L
(6) T>450ºC Inconel 625 material
(7) H900 Condition, hardness between 40 ÷ 47 HRc. For temperatures > -30ºC.
H1150-M Condition, hardness between 27 ÷ 30 HRc. For temperatures < -30°C.
(8) Tempered and annealed a 45 ÷ 50 HRc
(9) Zinc plated electrolytic treatment
(10) For steam service or T ≥ 233ºC with Gas / Liquid, use A479 XM-19

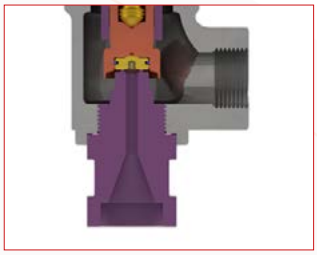
Connections



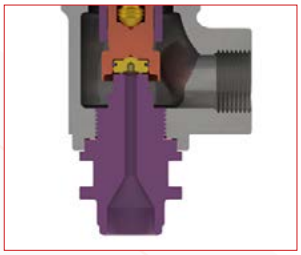
MALE



FEMALE

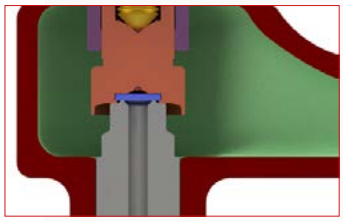


SOCKET WELDING

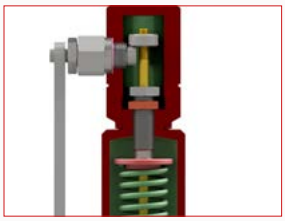


BUTT WELDING

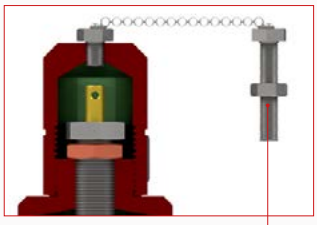
Accesories



O-RING



LEVER



TEST-GAG

HEATING JACKET

General dimensions and set pressure ranges

SET PRESSURE RANGE (barg)								
Orifice (∅mm)	Outlet	51GC	51GC (Open Bonnet)	51GF Bellows Mat: "316Ti S.S"	51GF Bellows Mat: "Inc. 625"	51LC	51LF Bellows Material "316Ti S.S"	51LF Bellows Mat: " Inc.625"
C	3/4"	1 ÷ 430	1 ÷ 430	N/A	N/A	0,75 ÷ 430	N/A	N/A
	1"			N/A	N/A		N/A	N/A
D	1"	0,5 ÷ 290	0,5 ÷ 290	N/A	N/A	0,5 ÷ 290	N/A	N/A
E	1"	0,5 ÷ 200	0,5 ÷ 200	5 ÷ 112	5 ÷ 125	0,5 ÷ 200	5 ÷ 110	5 ÷110

Orifice (∅mm)	Flow Area ($inch^2$)	Flow Area (cm^2)	Flow Diameter (mm.)	LIFT(mm.) GAS / STEAM	LIFT(mm.) LIQUID
C	0,048	0,310	∅ 6,3	1,8	2,2
D	0,122	0,785	∅ 10	3	3,5
E*	0,196	1,267	∅12,7	3,8	4,5

(*) The minimum lift in liquid service for set pressure up to 21,1 barg is 6 mm

5100 - FLANGED ASME B16.5				
Orifice (Ømm)	Rating Class In x Out	Set Pressure Range (barg)	Inlet Size	Outlet Size
C	150 X 150	1,0 ÷ 19,7	½" x 1" ¾" x 1" 1" x 1"	
	300 X 150	19,7 ÷ 51		
	600 X 150	51 ÷ 102		
	900 X 300	102 ÷ 153	½" x 1" ¾" x 1	
	1500 X 300	153 ÷ 255		
	2500 X 300	255 ÷ 430	½" x 1	
D	150 X 150	1,0 ÷ 19,7	¾" x 1" 1" x 1"	
	300 X 150	19,7 ÷51		
	600 X 150	51 ÷102		
	900 X 300	102 ÷153	¾" x 1"	
	1500 X 300	153 ÷255		
(*)E	150 X 150	1,0 ÷ 19,7	¾" x 1" 1" x 1"	
	300 X 150	19,7 ÷ 51		
	600 X 150	51 ÷ 102		
	900 X 300	102 ÷ 153	¾" x 1"	

(*) Only "E" Orifice has bellows option. Minimum set pressure for bellows = 5 barg

5100 - FLANGED EN 1092-1				
"Orifice (Ø mm)"	"Rating Class In x Out"	Set Pressure Range (barg)	Inlet Size	Outlet Size
C	PN16 x PN16	1,0 ÷ 16	DN15 x DN25 DN20 x DN25 DN25 x DN25	
	PN63 x PN16	16 ÷ 63		
	PN100 x PN16	63 ÷ 100		
	PN160 x PN40	100 ÷ 160	DN15 x DN25	
	PN250 x PN40	160 ÷ 250		
	PN320 x PN40	250 ÷ 320	DN15 x DN25	
	PN400 x PN40 (**)	255 ÷ 400		
D	PN16 x PN16	1,0 ÷ 16	DN20 x DN25 DN25 x DN25	
	PN63 x PN16	16 ÷ 63		
	PN100 x PN40	63 ÷ 100		
	PN160 x PN40	100 ÷ 160	DN20 x DN25	
	PN250 x PN40	160 ÷ 250		
(*) E	PN16 x PN16	1,0 ÷ 16	DN20 x DN25 DN25 x DN25	
	PN63 x PN16	16 ÷ 63		
	PN100 x PN40	63 ÷ 100		
	PN160 x PN40	100 ÷ 160	DN20 x DN25	

(*) Only "E" Orifice has bellows option. Minimum set pressure for bellows = 0,5 MPa [5 barg]

(**) Available on request

5100 - THREADED (MALE (INLET) - FEMALE (OUTLET)			
Orifice (Ømm)	Set Pressure Range (barg)	Inlet Size	Outlet Size
C	1,0 ÷ 19,7	½" x ¾" ÷ 1" ¾" x ¾" ÷ 1" 1" x 1"	
	19,7 ÷ 51		
	51 ÷ 102		
	102 ÷ 153		
	153 ÷ 255		
	255 ÷ 430	¾" x ¾" ÷ 1" 1" x 1"	
D	1,0 ÷ 19,7	¾" x 1" 1" x 1"	
	19,7 ÷51		
	51 ÷102		
	102 ÷153		
	153 ÷255	1" x 1"	
	255 ÷ 290		
(*)E	1,0 ÷ 19,7	¾" x 1" 1" x 1"	
	19,7÷51		
	51÷102		
	102÷153	1" x 1"	
	153÷200		

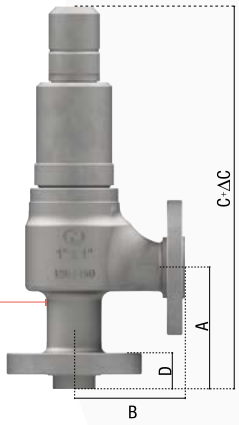
(*) Only "E" Orifice has bellows option. Minimum set pressure for bellows = 5 barg

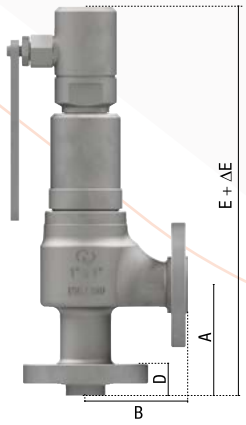
5100 - THREADED (FEMALE (INLET)- FEMALE (OUTLET)			
Orifice (Ømm)	Set Pressure Range (barg)	Inlet Size	Outlet Size
C	1,0 ÷ 19,7	½" x ¾" ÷ 1" ¾" x ¾" ÷ 1" 1" x 1"	
	19,7 ÷ 51		
	51 ÷ 102		
	102 ÷ 153		
	153 ÷ 255		
	255 ÷ 430	¾" x ¾" ÷ 1"	
D	1,0 ÷ 19,7	½" x 1" ¾" x 1" 1" x 1"	
	19,7 ÷ 51		
	51 ÷ 102		
	102 ÷ 153		
	153 ÷ 255		
	255÷290	1" x 1"	
(*)E	1,0÷19,7	¾" x 1" 1" x 1"	
	19,7÷51		
	51÷102		
	102÷153	1" x 1"	
	153÷200		

(*) Only "E" Orifice has bellows option. Minimum set pressure for bellows = 5 barg

Dimensions

			INLET	ORIFICIES	OUTLET	MODEL 5100 (Conventional)						
						General Dimensions (mm.)					Std.	Lever
						A	B	C	D	E	Weight (Kg.)	
FLANGED CONNECTIONS	DIN	INLET PN-16÷40 OUTLET PN16	DN15	C	DN25	99	90	321	26	354	6,5	7,7
			DN20	C, D, E					28			
			DN25									
		INLET PN-63÷100 OUTLET PN40	DN15	C	DN25	109	90	331	30	364		
			DN20	C, D, E					32			
			DN25									
		INLET PN160 OUTLET PN40	DN15	C	DN25	109	90	331	30	364	7,5	8,7
		INLET PN-250÷320 OUTLET PN40	DN15	C	DN25	109	90	331	36	364		
		INLET PN400 OUTLET PN40	DN15	C	DN25	AVAILABLE UPON REQUEST						
	ASME	INLET 150÷600# OUTLET 150#	1/2"	C	1"	99	90	321	30	354	6,5	7,7
			3/4"	C, D, E								
			1"									
		INLET 900# OUTLET 300#	1/2"	C	1"	109	90	331	34	364	7,5	8,7
			3/4"	C, D, E					37			
		INLET 1500# OUTLET 300#	1/2"	C	1"	109	90	331	34	364		
			3/4"	C, D					37			
		INLET 2500# OUTLET 300#	1/2"	C	1"	111	90	418	42	451	10,5	11,7
THREADED CONNECTIONS	NPT / GAS	M / H	1/2"	C	3/4" | 1"	81	64	302	-	335	4,6	5,8
			3/4"	C, D, E	1"	81	64	302	-	335		
			1"									
		H /H	1/2"	C	3/4" | 1"	46	64	267	-	300	4,4	5,6
			3/4"									
			1/2"	D	1"	46	64	267		300		
			3/4"									
			1"			61	64	282		315		
			3/4"	E	1"	46	64	267	-	300		
			1"			61	64	282		305		





			Set Pressure Range [barg]					
Orifice	Vented	Fluid	Up to	From	Up to	From	Up to	Exit Size
C	ALL	Liquid	31,9	32,0	58,9	86,0	430,0	¾" | 1"
		Gas & Steam	14,89	14,90	43,00	-	-	¾"
			13,29	13,30	35,59	35,60	430,0	1"
D	ALL	Liquid	25,9	26,0	68,9	69,0	290,0	1"
		Gas & Steam	40,9	41,0	119,0	120,0	290,0	
E	ALL	Liquid	18,9	19,0	55,9	60,0	200,0	1"
	OPEN + BELLOW		20,9	21,0	55,9	56,0	110,0	
	CLOSED	Gas & Steam	33,9	34,0	97,4	97,5	200,0	
	OPEN		18,1	18,2	453,0	454,0	200,0	
	OPEN + BELLOW		20,3	20,4	49,9	50,0	120,0	
		△C , △E	0 mm.	50 mm.		85 mm.		

DEFINITIONS (EN ISO 4126-1)

▪ **Blowdown**: The difference between actual popping pressure of a pressure relief valve and actual reseating pressure expressed as a percentage of set pressure or in pressure units.

▪ **Built-up back pressure:** The pressure existing at the outlet of the safety valve caused by fl ON through the valve and the discharge system

▪ **Coefficient of discharge**: The value of actual flowing capacity (from tests).

▪ **Cold differential test pressure**: The inlet static pressure at which a pressure relief valve is adjusted to open on the test stand.
This test pressure includes corrections for service conditions of superimposed back pressure and/or temperature.

▪ **Flow area**: The minimum cross-sectional flow area (but not the curtain area) between inlet and nozzle which is used to calculate the theoretical flow to discharge

▪ **Lift:**The diameter corresponding to the flow area.

▪ **Maximum allowable pressure**: The maximum pressure for which the equipment is designed as specified by the manufacturer.

▪ **Overpressure**: A pressure increase over the set pressure, at which the safety valve achieves the lift specified by manufacturer, usually expressed as a percentage of the set pressure.

▪ **Pressure**: The pressure unit used in this standard is the bar (1 bar = 105 Pa). It is quoted as gauge (relative to atmospheric pressure) or absolute as appropriate.

▪ **Relieving pressure**: The pressure used for the sizing of the safety valve which is greater than or equal to the set pressure plus the overpressure.

▪ **Re-seating pressure**: The value of decreasing inlet static pressure at which the valve disk re-establishes contact with the seat or at which lift becomes zero

▪ **Safety valve:** Valve which automatically, without the assistance of any energy other than that of the fluid concerned, discharges a quantity of the fluid so as to prevent a predetermined safe pressure being exceededand which is designed to re-clase and prevent further flow or fluid after nominal pressure conditions of service have been restored.

▪ **Set pressure**: The value of increasing inlet static pressure at which a pressure relief device displays one of the operational characteristics as defined under opening pressure, popping pressure, start-to-leak pressure, burst pressure, or breaking pressure. (The applicable operating characteristic for a specific device design is specified by the device manufacturer).

▪ **Superimposed back pressure**: The static pressure existing at the outlet of a pressure relief device at the time the device is required to operate. It is the result of pressure in the discharge system from other sources.

- The safety valve is an automatic direct action accessory whose function is to relief excessive overpressures in the recipients and installations that protects. Its main characteristics, allowing is its sudden fluid discharge with complete and fast opening (pop).
- Automatic valve opening is produced because of the additional push provided by the overpressure of the fluid itself helping to overcome spring resistance. Once the installation has recovered its normal service condition, the valve clases again.
- The data contained in this catalogue are indicative. Válvulas Nacional, S. A., reserves the right to change this catalogue without notice. Always check the specification sheets.

MOD-6400 ASME UV SAFETY VALVE

MOD-5100 ASME UV SAFETY VALVE

MOD-3-50 SAFETY VALVE

MOD-3-51 SAFETY VALVE

MOD-5500 SAFETY VALVE

PILOT OPERATED SAFETY VALVE

MOD-2000 EMERGENCY VALVE

MOD-3400 BREATHER VALVE

VALVE SILENCER

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