

TECHNICAL DATA SHEET

IN COMPLIANCE WITH THE DIRECTIVE 97/23/CE (PED)

CONVEYED-EXHAUST SQUARE LIMITING PRESSURE VALVE ARTICLE 2



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Table 12: characteristic values of the most common fluids	ALL-01	

1	27/07/08	Material and standards change		
0	04/11/02			
Rev.	Date	Revision reason	Checked by RAQ	Approved by DG

GENERAL DESCRIPTION OF THE EQUIPMENT

- Bronze/brass F/F conveyed-exhaust limiting pressure valves, adjustable from 0 to 16 bar, with the following characteristics:

ARTICLE CODE	ND	Pressure-containing member material	NP
2	from 3/8" to 3"	brass / bronze	16
2G		SBR rubber	
2T		PTFE teflon	

Connections	Threads UNI EN ISO 228-1	
Admitted fluids	Non-dangerous gases, vapours and liquids (group 2)	
Working temperatures	Metal pressure-containing member	from 0° C to 200° C
	Teflon pressure-containing member	from 0° C to 180° C
	Rubber pressure-containing member	from 0° C to 50° C

- PED classification

DN	PS	TABLE	CLASSIFICATION	MARKING
3/8"	16	7	ARTICOLO 3, COMMA 3	LOGO ARTICOLO
1/2"				
3/4"				
1"				
1 1/4"				
1 1/2"				
2"				
2 1/2"				
3"				

REFERENCE RULES

UNI EN ISO 228-1:2003	Piping threads for non-seal fit on the thread – Designation, Dimensions and tolerances.
UNI EN 1333: 1997	Components of piping networks – NP definition and selection.
UNI EN 12164: 2001	Copper and copper alloys – Turnery bars.
UNI EN 12165: 1999	Copper and copper alloys – Products for machined and raw product pressing.
UNI EN 12420: 2000	Copper and copper alloys – Forged and pressed products.
UNI EN 1982: 2000	Copper and copper alloys – Ingots and castings.
UNI 10197: 1993	Calibration benches for safety valves – General requirements
UNI EN ISO 4126-1:2006	Safety valves for pressure instruments – Generality, requirements and tests.
UNI EN 12516-3:2003	Valve-shell design strength

DESIGN

The article 2 has been designed using the standard BS 5154 with regard to the wall thickness of the parts under pressure.

The article 2 has been designed according to the requirements contained in the E ISPEL data collection and the planning results are reported on the following tables.

Moreover the design check of the valve walls has been confirmed by tests in compliance with EN 12516-3.

OUTFLOW AREA

MEASURE	Ø SEAT [mm]	AREA [cm ²]
3/8	10,20	0,82
1/2	13,00	1,33
3/4	19,00	2,83
1	25,70	5,18
1 1/4	31,00	7,54
1 1/2	38,00	11,34
2	48,00	18,09
2 1/2	68,00	36,30
3	77,50	47,15

SPRING SIZING

MEASURE	MATERIAL	FREE LENGTH	TURNS	Ø OUTSIDE	Ø INSIDE	Ø WIRE	FINISH	
3/8	C 72	46.5	13	10.2	6.2	2	galvanizing	
½		43.5	11.5	13	8	2.5		
¾	AISI 302	57.0	11	16.5	10.5	3	none	
	C72				16.6	10	3.3	galvanizing
1		58	10	18.2	11.2	3.5		
				19.3	11.3	4		
1 ¼		73	9.75	25	15	5		
1 ½		83.5	10	28	16	6	galvanizing	
				30	17	6.5		
2				28	16	6		
				30	17	6.5		
2 ½		90	8	38.5	22.5	8		
3								

As highlighted in the box, there is a second type of spring for some valve size.

Standard version for valve setting from 0 to 8 bar and "strong" version for valves setting from 8 to 16 bar.

PLEASE, SPECIFICATE MAXIMUM SETTING VALUE OF THE VALVE DURING ORDER PROCESS IN ORDER TO CHOOSE THE BEST SPRING SOLUTION.

If not specified, valve will be provided with standard spring.

WATER CAPACITY (UNI 9335 paragraph 7.5)

$$Q = 1.610 \times K \times A \times \sqrt{(\rho \times P_1)}$$

Where:

		MU	Value
Q	Capacity to be exhausted	m ³ /h	See table
ρ	Volume mass	Kg/m ³	1000
P ₁	Exhaust pressure = P + 1 bar (Max. overpressure: Ps = ± 20%)	bar	See table
A	Area of the gross orifice	mm ²	See table
K	Discharge coefficient	Coeff.	0.1

		DISCHARGE AREA [A] AS A FUNCTION OF THE ND								
		3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
		81,7	132,7	283,4	518,5	764,4	1133,5	1808,6	3629,8	4714,9
P	P ₁									
1	2	0,6	1,0	2,0	3,7	5,4	8,2	13,0	26,1	33,9
2	3	0,7	1,2	2,5	4,6	6,7	10,0	15,9	32,0	41,6
3	4	0,8	1,4	2,9	5,3	7,7	11,5	18,4	37,0	48,0
4	5	0,9	1,5	3,2	5,9	8,6	12,9	20,6	41,3	53,7
5	6	1,0	1,7	3,5	6,5	9,4	14,1	22,6	45,3	58,8
6	7	1,1	1,8	3,8	7,0	10,2	15,3	24,4	48,9	63,5
7	8	1,2	1,9	4,1	7,5	10,9	16,3	26,0	52,3	67,9
8	9	1,2	2,0	4,3	7,9	11,5	17,3	27,6	55,4	72,0
9	10	1,3	2,1	4,6	8,3	12,1	18,2	29,1	58,4	75,9
10	11	1,4	2,2	4,8	8,8	12,7	19,1	30,5	61,3	79,6
11	12	1,4	2,3	5,0	9,1	13,3	20,0	31,9	64,0	83,2
12	13	1,5	2,4	5,2	9,5	13,8	20,8	33,2	66,6	86,6

Attention, to calculate the capacity of other fluids, please enter the specific volume mass to be traced on technical literature.

STEAM CAPACITY (E DATA COLLECTION)

$$Q = (A) \times (0.9) \times (K) \times (113.8) \times (C) \times \sqrt{(P_1 / V_1)}$$

Where:

		MU	Value
Q	Capacity to be exhausted	Kg/h	See table
A	Area of the gross orifice	cm ²	See table
K	Discharge coefficient	Coeff.	0.1
C	Expansion coefficient (as per I SPESL data collection)	Coeff	0.607
P	Calibration pressure/valve use	bar	See table
P ₁	Exhaust pressure = P + 1 bar (Max. overpressure: Ps = ± 20%)	bar	See table
V ₁	Specific vapour volume at P ₁ pressure (Mollier diagram)	m ³ /Kg	See table

DISCHARGE AREA [A] AS A FUNCTION OF THE ND

						3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
P	P ₁	C	K	t [°C]	V ₁	0.82	1.33	2.83	5.18	7.54	11.34	18.09	36.30	47.15
1	2	0.607	0.1	119.6	0.9030	7.6	12.3	26.2	47.9	69.8	104.9	167.4	335.9	436.2
2	3	0.607	0.1	132.9	0.6180	11.2	18.2	38.8	71.0	103.3	155.3	247.8	497.2	645.8
3	4	0.607	0.1	142.9	0.4718	14.8	24.1	51.2	93.8	136.5	205.3	327.5	657.1	853.5
4	5	0.607	0.1	151.1	0.3926	18.4	29.9	63.8	116.4	169.5	254.9	406.8	815.9	1069.9
5	6	0.607	0.1	158.1	0.3222	22.0	35.7	75.9	139.0	202.3	304.2	485.3	973.9	1264.9
6	7	0.607	0.1	164.2	0.2786	25.8	41.5	88.2	161.5	235.0	353.4	563.8	1131.4	1469.8
7	8	0.607	0.1	169.6	0.2454	29.1	47.2	100.5	183.9	267.6	402.5	642.1	1288.5	1673.8
8	9	0.607	0.1	174.5	0.2195	32.6	52.9	112.7	205.2	300.2	451.4	720.1	1445.1	1877.0
9	10	0.607	0.1	179.0	0.1985	36.2	58.7	124.9	228.6	332.7	500.4	798.2	1601.8	2080.5
10	11	0.607	0.1	183.2	0.1813	39.7	64.4	137.0	250.8	365.1	549.1	876.0	1757.8	2283.2
11	12	0.607	0.1	187.1	0.1668	43.2	70.1	149.2	273.1	397.8	598.0	953.9	1914.1	2486.3
12	13	0.607	0.1	190.7	0.1545	46.8	75.8	161.4	295.4	430.0	648.7	1031.8	2070.1	2688.8

GAS AND VAPOUR CAPACITY (E DATA COLLECTION)

$$Q = \frac{(0.9) \times (K) \times 394.4 \times (C) \times (P_1) \times (A)}{\sqrt{\frac{(Z_1 \times T_1)}{MW}}}$$

Where:

		MU	Value
Q	Capacity to be exhausted	Kg/h	See table
A	Area of the orifice	cm ²	See table
K	Discharge coefficient	Coeff.	0.1
C	Expansion coefficient	Coeff.	Variable
P	Calibration pressure	bar	See table
P ₁	Exhaust pressure = calibration pressure + 1 bar	bar	See table
Z ₁	Compressibility factor (if unknown, use 1)	m ³ /Kg	Variable
T ₁	Absolute exhaust temperature	°K	Variable
MW	Molecular weight	Kg/Kmol	Variable

Example

Fluid	air
C	0,685
MW	28,970
Temperature	20 °C = 293 °K

DISCHARGE AREA [A] AS A FUNCTION OF THE ND

						3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
P	P ₁	C	K	T [°K]	MW	0,82	1,33	2,83	5,18	7,54	11,34	18,09	36,30	47,15
1	2	0,607	0,1	293,0	28,970	12,5	20,3	43,3	79,2	115,3	173,4	276,6	555,1	721,0
2	3	0,607	0,1	293,0	28,970	18,8	30,5	64,9	118,8	172,9	260,1	414,9	832,6	1081,5
3	4	0,607	0,1	293,0	28,970	25,1	40,7	86,5	158,4	230,6	346,8	553,2	1110,1	1442,0
4	5	0,607	0,1	293,0	28,970	31,3	50,8	108,2	198,0	288,2	433,5	691,5	1387,7	1802,4
5	6	0,607	0,1	293,0	28,970	37,6	61,0	129,8	237,6	345,9	520,2	829,9	1665,2	2162,9
6	7	0,607	0,1	293,0	28,970	43,9	71,2	151,5	277,2	403,5	605,9	938,2	1942,7	2523,4
7	8	0,607	0,1	293,0	28,970	50,2	81,3	173,1	316,8	461,2	693,5	1106,5	2220,3	2883,9
8	9	0,607	0,1	293,0	28,970	56,4	91,5	194,7	356,4	518,8	790,3	1244,9	2497,8	3244,4
9	10	0,607	0,1	293,0	28,970	62,7	101,7	216,4	396,0	576,5	867,0	1383,1	2775,3	3604,9
10	11	0,607	0,1	293,0	28,970	69,0	111,9	238,0	435,6	634,1	953,7	1521,4	3052,9	3965,4
11	12	0,607	0,1	293,0	28,970	75,2	122,0	259,6	475,2	691,8	1040,4	1659,7	3330,4	4325,9
12	13	0,607	0,1	293,0	28,970	81,5	132,2	281,3	514,9	749,4	1127,1	1798,0	3607,9	4686,4

LIST / RULES / CERTIFICATES OF USED MATERIALS

COMPONENT	MATERIAL	
	da DN 3/8" a DN 2"	da DN 2 1/2" a DN 3"
Plug	2	4
Spring pusher	1	1
Spring	C72/AISI302	C72/AISI302
Rubber-Teflon pressure-containing member pusher	1	1
Metal pressure-containing member pusher	1	1
Auger	2	4
Pressure-containing member	1/2	3
Gasket bearing	1/2	3
Rubber gasket	SBR	SBR
Teflon gasket	PTFE	PTFE
Washer	1	1
Gasket fastening guide	1/2	3
Body	3	4
Locking jam nut	1/5	1/5
Adjusting screw	1	1

STANDARD	ALLOY	STANDARD TITLE	CODE
UNI EN 12164: 1999	CW614 CW617	Copper and copper alloys – Turnery bars.	1
UNI EN 12420: 2000	CW614 CW617	Copper and copper alloys – Pressed and forged products	2
UNI EN 1982: 2000	CC754S (brass)	Copper and copper alloys – Ingots and castings	3
UNI EN 1982: 2000	CC491K (bronze)	Copper and copper alloys – Ingots and castings	4
	ALLUMINIUM		5

DENOMINATION	Required certificate	SUPPLIER
Main parts under pressure	EN 10204 2.2	Non-certified ISO 9001
Secondary parts under pressure		
Spring		
Gaskets		

There is no documentary possibility of tracing the product.

MARKING

1. No marking is put on the valves reported on points 2 and 3 of page 2.

TEST / TRIAL / CALIBRATION MODALITY

1. Install on the trial bench the valve to be calibrated with free spouts exposed to the atmosphere.
2. Install the manometer with class 0.6.
3. Increase slowly the pressure at the source of the valve until you cause the start of the opening that can be visually detected or heard.
4. The requested value of the opening pressure is obtained by means of following adjustments, acting on the calibration regulation plug.
5. Once you have obtained the desired value, repeat twice the calibration control to check the reproducibility.
6. Tighten the locking jam nut to avoid variations in the calibration pressure.

PRODUCTION PROCEDURES

type	code	document title
Process	PRO 7.4.2-01	Material supplying
Process	PRO 7.5.1-01	Turnery
Process	PRO 7.5.1-02	Assembly
Procedure	PRC 8.3.1-01	Management of non-complying material

type	code	document title
Instruction	IST 4.2-01	Base list
Instruction	IST 4.2-02	Management of technical drawings
Instruction	IST 6.3-01	Machinery maintenance
Instruction	IST 7.4-01	Acceptance controls
Instruction	IST 7.5-01	Production controls
Instruction	IST 7.5-02	Working cycles
Instruction	IST 7.5-03	Machinery tooling cards

type	code	document title
Plan	PCA	Control plan in acceptance
Plan	PCP	Control plan in production

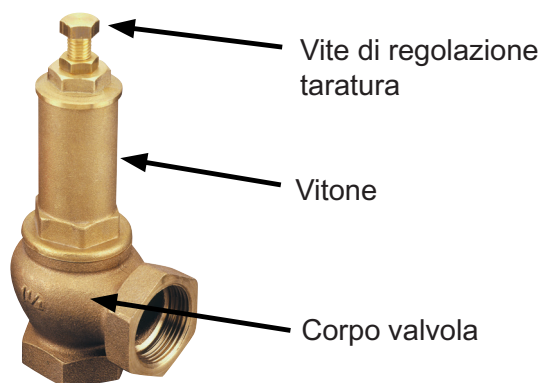
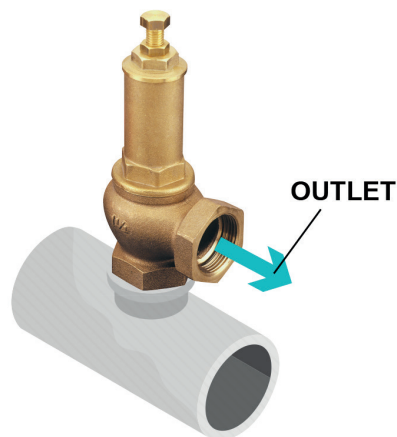
TECHNICAL DRAWINGS

Component	3/8	1/2	3/4	1"	1"1/4	1"1/2	2"	2"1/2	3"
<i>Metal unit</i>	1	1	1	4	6	6	6	9	9
<i>Rubber-Teflon unit</i>	2	2	3	5	7	7	8	10	10
<i>Plug</i>	201	2101	217	228	242	254	267	275	286
<i>Spring pusher</i>	202	212	218	218	243	255	255	276	276
<i>Spring</i>	203	213	239	229	244	256	256	277	277
<i>Hard spring</i>			227	237		261	261		
<i>Stainless steel spring</i>			241						
<i>Rubber-Teflon small valve pusher</i>	207	215	222	232	249	262	270	278	287
<i>Metal small valve pusher</i>				230	245	257	268	278	287
<i>Auger</i>	101	101	105	108	111	113	115	117	119
<i>Small valve</i>	204	214	219	231	246	258	269	279	288
<i>Raw small valve</i>	204/G	214/G	219/G						
<i>Gasket bearing</i>	208	208	223	233	250	263	271	282	289
<i>Rubber gasket</i>	211	211	224	234	251	264	272	283	290
<i>Teflon gasket</i>	209	209	240	238	253	266	274	285	292
<i>Washer</i>			225	235					
<i>Gasket fastening guide</i>	210	216	226	236	252	265	273	284	291
<i>Body</i>	102	103	106	109	112/1-112/2	114/1-114/2	116/1-116/2	118/1-118/2	120/1-120/2
<i>Rubber-Teflon body</i>		104	107	110	112/1-112/2	114/1-114/2	116/1-116/2	118/1-118/2	120/1-120/2
<i>Jam nut</i>	205	205	220	220	247	259	259	280	280
<i>Adjusting screw</i>	206	206	221	221	248	260	260/1	281	281

All listed drawings have revision index 0.

INSTALLATION, START-UP, APPLICATION AND MAINTENANCE INSTRUCTIONS

Art. 2



Application

The article 2 is a **CONVEYED-EXHAUST SQUARE LIMITING PRESSURE VALVE**.

IF THE VALVE IS DISASSEMBLED, MODIFIED OR TAMPERED WITH, THE CONCERN DECLINES ALL RESPONSIBILITY.

The use conditions are the following:

Fluids	Non-dangerous gases, vapours and liquids
Max. working pressure	16 bar

Working temperatures	Metal pressure-containing member	from 0° C to 200° C
	Teflon pressure-containing member	from 0° C to 180° C
	Rubber pressure containing member	from 0° C to 50° C

- For a proper installation, the valve has to be installed vertically, otherwise its operation is compromised; however we strongly recommend to convey the valve outlet to an exhaust unit
- For thread sealing use a material compatible with the used fluid.
- Screw the valve on the threaded pipes, positioning the key exclusively on the special hexagonal parts until the valve is blocked on the pipe.
- Do not exert any strength on the auger.

- ❑ The exhaust piping has to be properly supported not to stress the valve structure; then use heavy clamps to support the pipes.
- ❑ If you use a pipe, it is necessary to place it in a slightly inclined position.
- ❑ The exhausted fluid has to be properly conveyed and deviated downwards to prevent its return to the valve and not to alter the calibration pressure.

WARNING !!!

PAY MUCH ATTENTION WHEN YOU INSTALL THE VALVE, AS THE DISCHARGE OCCURS DIRECTLY WITH NO PROTECTION. THE VALVE HAS TO BE POSITIONED IN SUCH A WAY NOT TO BE HARMFUL TO PEOPLE SAFETY / PHYSICAL INTEGRITY, IN CASE OF OPENING OF THE SAME VALVE.

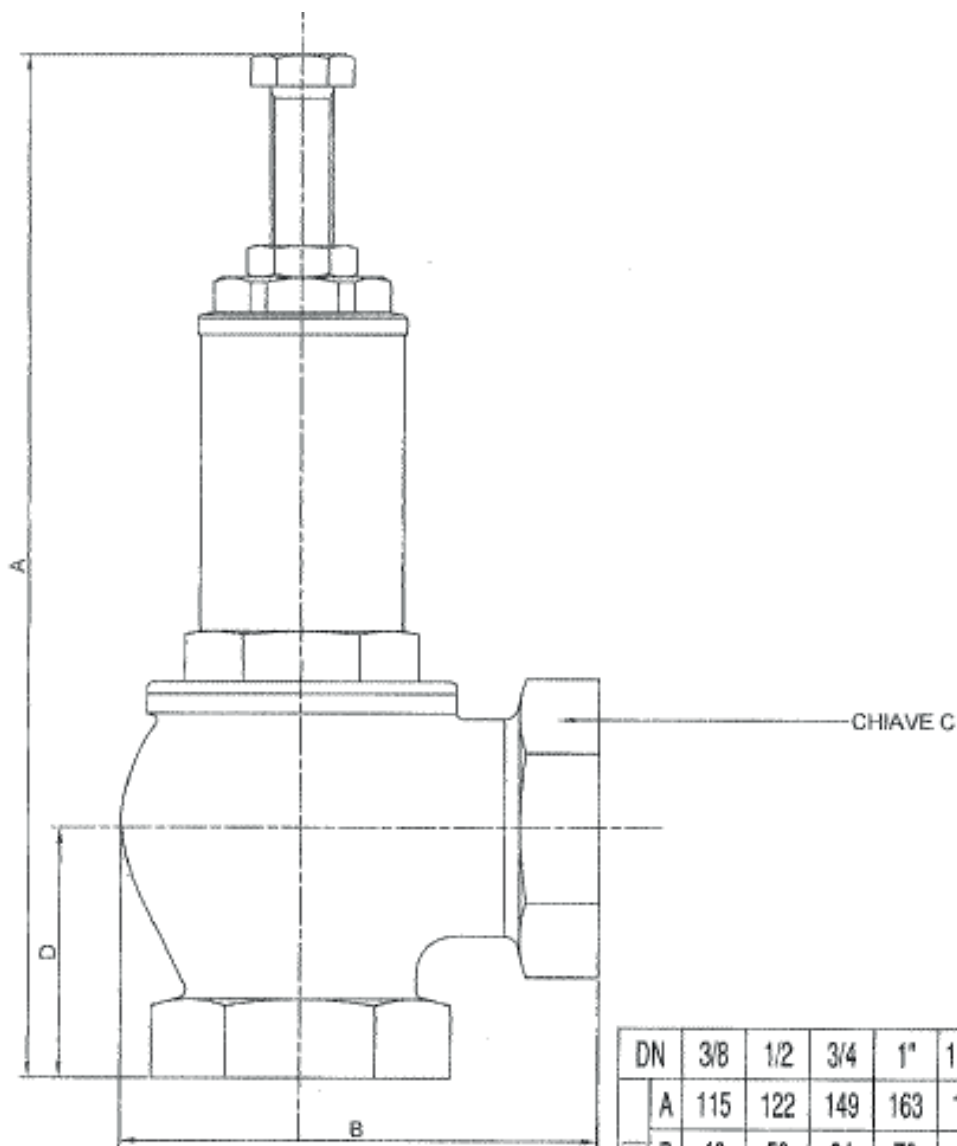
Maintenance

- ❑ No maintenance operations are expected.

WARNING !!!

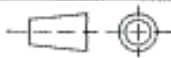
DO NOT DISASSEMBLE THE LIMITING PRESSURE VALVE, DO NOT CHANGE THE CALIBRATION SET BY THE USER, DO NOT MODIFY AND DON NOT TAMPER WITH THE LIMITING PRESSURE VALVE.

OVERALL DIMENSIONS



DN	3/8	1/2	3/4	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"
A	115	122	149	163	192	218	247	304	336
B	46	56	64	76	90	100	124	147	155
C	24	28	35	41	49	56	71	91	102
D	24.5	30	32	40	44	47	60	74.5	86

REV	DATA	DESCRIZIONE MODIFICHE	FIRMA
1			
2			
3			
4			
5			

TOLLERANZE LINEARI DOVE NON INDICATE	MATERIALE	PESO gr.	SCALA
TOLLERANZE ANGOLARI DOVE NON INDICATE			
	DISEGNATO	CONTROLLATO	APPROVATO
DENOMINAZIONE			DATA
			DISEGNO N. REV

DISSEGNO DI PROPRIETA' DELLA RUBINETTERIA MORO ANGELO CHE SI RISERVA TUTTI I DIRITTI SANCTI DALLA LEGGE