TECHNICAL DATA SHEET

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

CONVEYED-EXHAUST SQUARE LIMITING PRESSURE VALVE ARTICLE 2

Index

Rev.	Date	Revision reason	Checked by RAQ	Approved by DG
2	28/05/07	Material, spring, pressure set changes		
1	27/07/06	Material and standards change		
0	04/11/02	First issue		

- 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	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 70° C

- PED classification

DN	PS	TABLE	CLASSIFICATION	MARKING
3/8"	16	7	ARTICOLO 3, COMMA 3	Size Fluid direction
½"				
¾"				
1"				
1 ¼"				
1 ½"				
2"				
2 ½"				
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 ISPESL 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

VALVE APPROXIMATE WEIGHT [G]	MEASURE	Ø SEAT [mm]	AREA [cm^2]
300	⅜	10,20	0,82
380	½	13,00	1,33
610	¾	19,00	2,83
860	1	25,70	5.18
1450	1 ¼	31,00	7,54
1900	1 ½	38,00	11,34
2900	2	48,00	18,09
6000	2 ½	64,00	32,15
7600	3	77,50	47,15

SPRING SIZING

MEASURE	MATERIAL	FREE LENGTH	TURNS	Ø OUTSIDE	Ø INSIDE	Ø WIRE	FINISH
3/8	C 72	43.5	11.5	12,5	7.5	2.5	galvanizing
½							
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	
				30	17	6.5	
2				28	16	6	
				30	17	6.5	
2 ½		90	8	38.5	22.5	8	
3							

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	cm^2	See table
K	Discharge coefficient	Coeff.	0.05

		DISCHARGE AREA [A] AS A FUNCTION OF THE SIZE								
		3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
		0,82	1,33	2,83	5,18	7,54	11,34	18,09	32.15	47,15
P	P_1									
1	2	0,6	1,0	2,0	3,7	5,4	8,2	13,0	23,2	33,9
2	3	0,7	1,2	2,5	4,6	6,7	10,0	15,9	28,4	41,6
3	4	0,8	1,4	2,9	5,3	7,7	11,5	18,4	32,7	48,0
4	5	0,9	1,5	3,2	5,9	8,6	12,9	20,6	36,6	53,7
5	6	1,0	1,7	3,5	6,5	9,4	14,1	22,6	40,1	58,8
6	7	1,1	1,8	3,8	7,0	10,2	15,3	24,4	43,3	63,5
7	8	1,2	1,9	4,1	7,5	10,9	16,3	26,0	46,3	67,9
8	9	1,2	2,0	4,3	7,9	11,5	17,3	27,6	49,1	72,0
9	10	1,3	2,1	4,6	8,3	12,1	18,2	29,1	51,8	75,9
10	11	1,4	2,2	4,8	8,8	12,7	19,1	30,5	54,3	79,6
11	12	1,4	2,3	5,0	9,1	13,3	20,0	31,9	56,7	83,2
12	13	1,5	2,4	5,2	9,5	13,8	20,8	33,2	59,0	86,6
13	14	1,6	2,5	5,4	9,9	14,4	21,6	34,5	61,3	89,8
14	15	1,6	2,6	5,6	10,2	14,9	22,4	35,7	63,4	93,0
15	16	1,7	2,7	5,8	10,6	15,4	23,1	36,8	65,5	96,0
16	17	1,7	2,8	5,9	10,9	15,8	23,8	38,0	67,5	99,0

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.	0.05
C	Expansion coefficient (as per ISPESL 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 P1 pressure (Mollier diagram)	m^3/Kg	See table

						DISCHARGE AREA [A] AS A FUNCTION OF THE SIZE								
						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	0,05	119,6	0,903	2,5	3,8	6,2	13,1	24,0	34,9	52,5	83,7	148,7
2	3	0,607	0,05	132,9	0,618	3,6	5,6	9,1	19,4	35,5	51,6	77,7	123,9	220,2
3	4	0,607	0,05	142,9	0,4718	4,8	7,4	12,0	25,6	46,9	68,2	102,6	163,7	291,0
4	5	0,607	0,05	151,1	0,3825	6,0	9,2	14,9	31,8	58,2	84,7	127,4	203,3	361,3
5	6	0,607	0,05	158,1	0,3222	7,1	11,0	17,8	38,0	69,5	101,1	152,1	242,7	431,3
6	7	0,607	0,05	164,2	0,2785	8,3	12,8	20,7	44,1	80,7	117,5	176,7	281,9	501,0
7	8	0,607	0,05	169,6	0,2454	9,4	14,6	23,6	50,2	91,9	133,8	201,3	321,1	570,6
8	9	0,607	0,05	174,5	0,2195	10,5	16,3	26,5	56,3	103,1	150,1	225,7	360,1	639,9
9	10	0,607	0,05	179	0,1985	11,7	18,1	29,3	62,4	114,3	166,4	250,2	399,1	709,3
10	11	0,607	0,05	183,2	0,1813	12,8	19,9	32,2	68,5	125,4	182,6	274,6	438,0	778,4
11	12	0,607	0,05	187,1	0,1668	14,0	21,6	35,1	74,6	136,6	198,8	299,0	477,0	847,7
12	13	0,607	0,05	190,7	0,1545	15,1	23,4	37,9	80,7	147,7	215,0	323,3	515,8	916,7
13	14	0,607	0,05	195	0,1407	16,4	25,4	41,2	87,7	160,6	233,8	351,6	560,9	996,9
14	15	0,607	0,05	198,2	0,1317	17,6	27,2	44,1	93,9	171,8	250,1	376,2	600,1	1066,5
15	16	0,607	0,05	201,4	0,1237	18,7	29,0	47,0	100,0	183,1	266,6	400,9	639,5	1136,6
16	17	0,607	0,05	204,3	0,1166	19,9	30,8	49,9	106,2	194,4	283,0	425,6	679,0	1206,7

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.	0.05
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	Molecolar 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 SIZE								
						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	0,685	0,05	293,0	28,97	4,1	6,3	10,2	21,6	39,6	57,6	86,7	138,3	245,8
2	3	0,685	0,05	293,0	28,97	6,1	9,4	15,3	32,5	59,4	86,5	130,1	207,5	368,7
3	4	0,685	0,05	293,0	28,97	8,1	12,5	20,3	43,3	79,2	115,3	173,4	276,6	491,6
4	5	0,685	0,05	293,0	28,97	10,1	15,7	25,4	54,1	99,0	144,1	216,8	345,8	614,5
5	6	0,685	0,05	293,0	28,97	12,2	18,8	30,5	64,9	118,8	172,9	260,1	414,9	737,4
6	7	0,685	0,05	293,0	28,97	14,2	21,9	35,6	75,7	138,6	201,8	303,5	484,1	860,3
7	8	0,685	0,05	293,0	28,97	16,2	25,1	40,7	86,5	158,4	230,6	346,8	553,2	983,2
8	9	0,685	0,05	293,0	28,97	18,3	28,2	45,8	97,4	178,2	259,4	390,2	622,4	1106,1
9	10	0,685	0,05	293,0	28,97	20,3	31,3	50,8	108,2	198,0	288,2	433,5	691,5	1229,0
10	11	0,685	0,05	293,0	28,97	22,3	34,5	55,9	119,0	217,8	317,1	476,9	760,7	1351,9
11	12	0,685	0,05	293,0	28,97	24,3	37,6	61,0	129,8	237,6	345,9	520,2	829,9	1474,8
12	13	0,685	0,05	293,0	28,97	26,4	40,8	66,1	140,6	257,4	374,7	563,6	899,0	1597,7
13	14	0,685	0,05	293,0	28,97	28,4	43,9	71,2	151,5	277,2	403,5	606,9	968,2	1720,6
14	15	0,685	0,05	293,0	28,97	30,4	47,0	76,3	162,3	297,0	432,4	650,3	1037,3	1843,5
15	16	0,685	0,05	293,0	28,97	32,5	50,2	81,3	173,1	316,8	461,2	693,6	1106,5	1966,4
16	17	0,685	0,05	293,0	28,97	34,5	53,3	86,4	183,9	336,6	490,0	737,0	1175,6	2089,3

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
Rubber-Teflon pressure-containing member pusher	1	1
Metal pressure-containing member pusher	1	1
Auger	2	3
Pressure-containing member	1/2/3	3
Gasket bearing	1/2/3	3
Rubber gasket	SBR	SBR
Teflon gasket	PTFE	PTFE
Washer	1	1
Gasket fastening guide	1/2/3	3
Body	2/3	4
Locking jam nut	1/5	1/5
Adjusting screw	1/5	1/5

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
	Nickel plated carbon steel		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

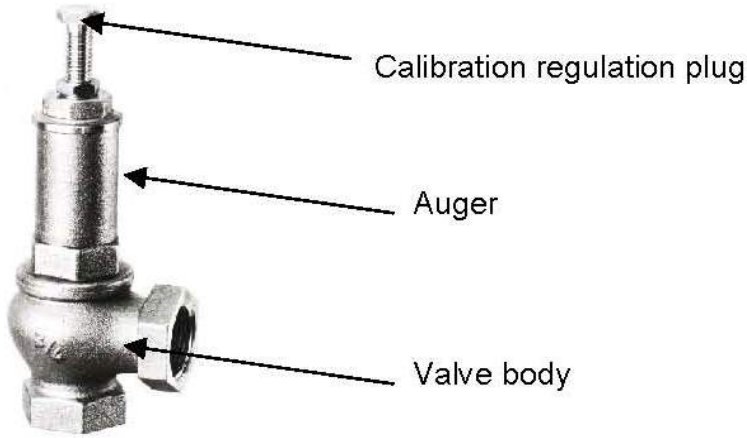
The following documents, belonging to the equipment documentation of the concern "Rubinetteria Mora", describe the different operative activities performed for the production of pressure devices.

type	code	document title
Process	PRO 7.2-01	Sales procedure
Process	PRO 7.4-01	Material supplying
Process	PRO 7.5-01	Turnery
Process	PRO 7.5-02	Assembly

type	code	document title
Instruction	IST 7.4-01	Incoming material controls
Instruction	IST 7.5-01	Production controls
Instruction	IST 7.5-02	Final controls
Instruction	IST 7.5-03/B	Test controls

type	code	document title
Plan	Annex IST 7.4-01	Control plan in acceptance
Plan	Annex IST 7.5-01	Control plan in production

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 70° 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 downwarts 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.