

See FIVPRESS System introductory page (page 11) for details

## Components

- |   |   |
|---|---|
| 1 | Inner pipe in PE-RT   |
| 2 | Bonding layer connecting the inner pipe to the aluminium pipe             |
| 3 | Horizontal-roller-position welding (see table on next page for thickness) |
| 4 | Bonding layer connecting the outer pipe to the aluminium pipe             |
| 5 | Outer pipe in PE-RT   |

## STRUCTURAL FEATURES AND PERFORMANCE

The PE-RT/AL/PE-RT multilayer pipe for underfloor heating, heating and sanitary systems, belongs to the new generation of multilayer pipes for plumbing-sanitary systems. It consists of composite material, made even and more solid by a technologically advanced process, with which a PE-RT (not-crosslinked polyethylene with high resistance to high temperatures) pipe is implemented, reinforced by an aluminium core welded and covered externally by another layer of PE-RT.

## REGULATORY COMPLIANCE

The FIVPERT pipe complies with UNI EN ISO 21003 standard (class 2/10 bar, class 5/10 bar) and with the Ministerial Decree Italian 174/2004.

## CONDITIONS OF USE ACCORDING TO THE APPLICATION CLASSES PURSUANT TO UNI ISO 21003 (SEE TECHNICAL ATTACHMENTS).

### EN TECHNICAL CHARACTERISTICS

Coefficient of linear expansion: 0,026 mm/m °C  
 Thermal conductivity: 0,45 W/m K  
 Minimum radius of bending: 5 x Ø pipe  
 Pipe roughness: 7 µm  
 Fire reaction class: E<sub>L</sub> (EN 13501-1)

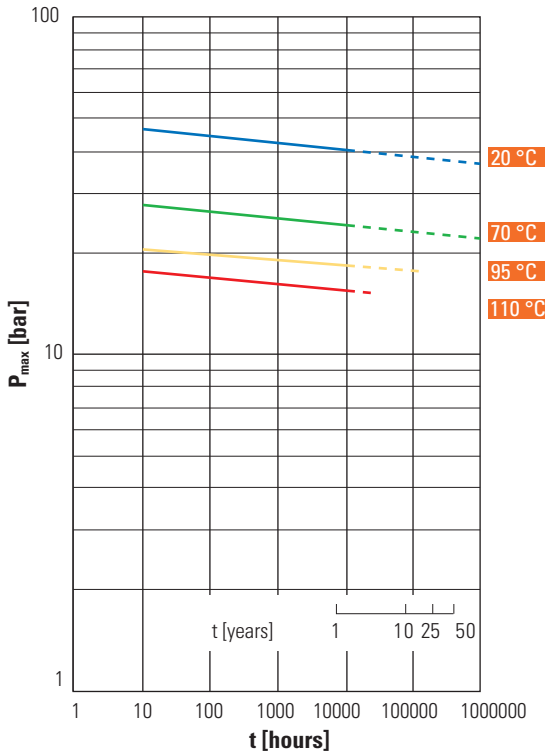
### TECHNICAL DATA OF INSULATING SHEATH

Material: Closed-cell expanded polyethylene, covered with a film in extruded LD-PE.  
 Thermal conductivity (at 40 °C): ≤ 0,040 W/mK (UNI EN ISO 8497).  
 Water vapour diffusion resistance µ: 5000 (UNI EN 13469)  
 Fire reaction class: B<sub>L</sub> - s2, d0 (EN 13501-1)

### OPERATING CONDITIONS OF FIVPERT PIPE

Classes of application (UNI ISO 21003 - see table "Classifications of conditions of use" in the "Technical attachments" section): 2/10 bar, 5/10 bar  
 Maximum operating conditions for 50 years:  
 - Design temperature T<sub>D</sub> = 70 °C;  
 - Design pressure p<sub>D</sub> = 10 bar

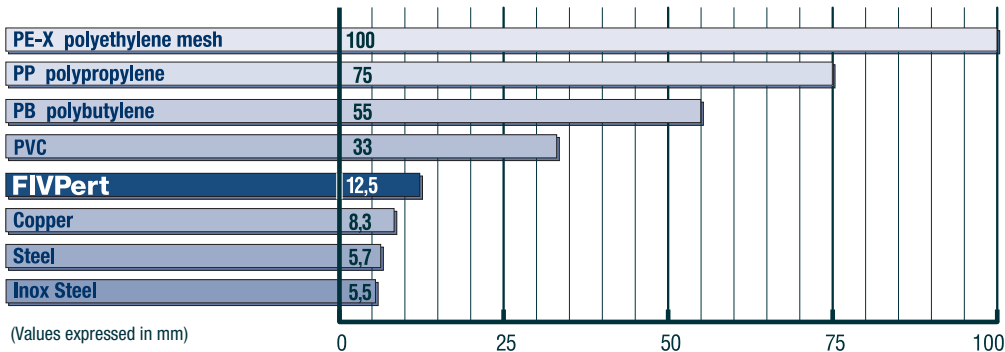
### FIVPERT pipe regression curve (16x2)



#### Example of reading

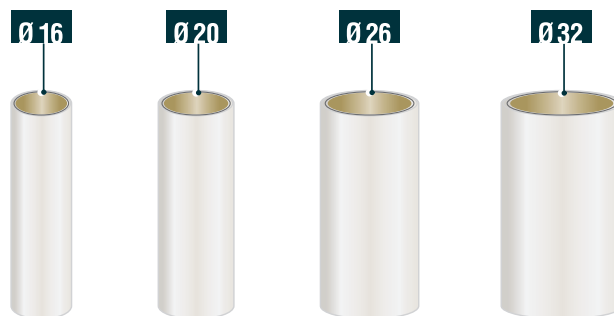
The maximum pressure ( $P_{max}$ ) for a duration of 50 years at a given temperature is identified by intersecting the vertical line for 50 years with the coloured line for said temperature. Once the expected operating pressure is known ( $P_{es}$ ), the safety coefficient will be equal to  $k_s = P_{max} / P_{es}$ .

### Linear thermal expansion for 10 m pipes in different materials $\Delta T$ 50 °C



### FIVPERT PIPE RANGE

Available in rolls with diameters DN 16 - 20 - 26 - 32 and in bars DN 26 and 32. The pipe in rolls is also available pre-insulated with a coated expanded polyethylene sheath.



#### FIVPERT pipe dimensional and characteristics

	mm	16	20	26	32
FIVPERT pipe external $\varnothing$	mm	16	20	26	32
FIVPERT pipe internal $\varnothing$	mm	12	16	20	26
Total thickness	mm	2	2	3	3
Thickness of aluminum sheet	mm	0,20	0,25	0,30	0,35
Weight (1)	Kg/m	0,10	0,13	0,26	0,33
Water content	l/m	0,11	0,20	0,31	0,53
Insulation thickness	mm	6	6/9	9	9

(1) Bare pipe

GP 2035  
FIVPERT



FIVPERT BARE pipe in rolls.

CODE	Size	m Pallet	N° Rolls	Pack m
9517P917	16 x 2	2200	22	100
9517P969	16 x 2	2600	13	200
9517P971	16 x 2	2000	4	500
9517P931	20 x 2	1600	16	100
9517P240	20 x 2	1920	8	240
9517P981	26 x 3	600	12	50
9517P982	32 x 3	800	16	50

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FIVPERT PREINSULATED pipe in rolls.

CODE	Size	Insulation thickness mm	m Pallet	N° Rolls	Pack m
9512P916	16 x 2	6 (1)	700	14	50
9512P917	16 x 2	6 (1)	900	9	100
9512P931	20 x 2	6	600	12	50
9512P934	20 x 2	9 (1)	450	9	50
9512P938	26 x 3	9	600	12	50
9512P939	32 x 3	9	350	14	25

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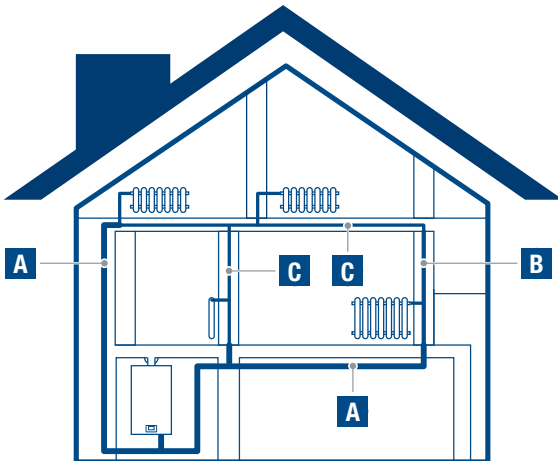
FIVPERT BARE pipe in bars of 4 m.

Available only on request.

CODE	Size	Pack m
9517P985	26 x 3	40
9517P986	32 x 3	28

(1) Compliant with Italian Law: L. 10/91 and D.P.R. 412/93 Attachment B - TAB 1  
(Pipes in structure which do not face outside or onto unheated areas).

## INSULATION OF HEAT DISTRIBUTION NETWORKS IN HEATING SYSTEMS



### External Ø of piping (mm)

(W/m °C)	<20	20-39	40-59	60-79	80-90	>100
0,030	13	19	26	33	37	40
0,032	14	21	29	36	40	44
0,034	15	23	31	39	44	48
0,036	17	25	34	43	47	52
0,038	18	28	37	46	51	56
0,040	20	30	40	50	55	60
0,042	22	32	43	54	59	64
0,044	24	35	46	58	63	69
0,046	26	38	50	62	68	74
0,048	28	41	54	66	72	79
0,050	30	44	58	71	77	84

### Reference for the calculation example

#### Installation type A (symbol A)

The piping in the distribution networks for warm fluids, whether in liquid form or steam, of thermic power plants, must be insulated with a special insulating material, where the minimum required thickness determined by the following table, in relation to the diameter of the piping given in mm and the useful thermic conductivity of the insulating material shown in W/m °C at a temperature of 40 °C.

#### Installation type B (symbol B)

The vertical mounting of the piping is to be placed on the other side of the building's heat insulation, towards the inside of the building, and the relevant minimum required thicknesses for the insulation, as resulting from the table, must be multiplied by 0,5.

#### Installation type C (symbol C)

For pipes running inside structures which do not face either outside or unheated rooms, the thicknesses indicated in the table just be multiplied by 0,3.

#### Compliance with Italian regulation

The principal regulation on the subject is contained in Annex B of Presidential Decree 412/93. Note the useful thermal conductivity for each diameter of pipe can be derived from the minimum thickness of the insulation in relation to the pipe to be insulated with respect to the outside, multiplying the thickness indicated in the table in Appendix B below by 0,3, 0,5 or 1,0.

#### Example of calculation

Thermal conductivity of material = 0,040 W/m °C

External diameter of pipe / 22 mm

Position (see drawing) C

Calculation  $30 \times 0,3 = 9$  mm

where 30 = thickness from table; 0,3 coefficient for category.

Emmett insulating pipes, in accordance with Statute 549 of 28/12/1993, do not contain CFCs and are composed of non-toxic materials.

Insulation of heat distribution networks within thermic plants