

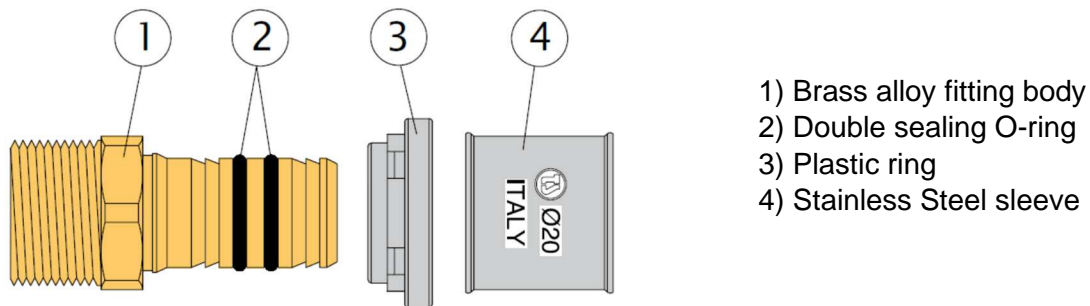
## Application

The **te-sa Press System Fittings** are suited to realize pressed connections with multilayer pipes in drinking water applications and in heating distribution systems. The developed special conformation shape of the fitting, allow using most of the pressing machine in the market equipped with jaws of "TH" profile (that is the suggested type besides certified DVGW in the sizes 16x2 and 20x2), or also "H" or "U" profiles following the appropriate pressing instructions. The excellent raw materials, the high-quality standard level realized by means of several controls adopted during production, and the complete available range of sizes and configurations, allow realizing also complex installations with easiness and reliability in the time.

Constructive particularities in the products are the four transparent windows located on the plastic ring that maintains engaged the stainless-steel sleeve. These windows allow seeing if the pipe reached the correct insertion position into the sleeve before the press. The second function of the plastic ring is to avoid the contact between the brass fitting and the aluminum of the multilayer pipe. This electrical insulation prevents corrosion phenomena due to electrolytic effects that can appear in rare and unlucky situations. On the fittings are positioned two O-ring that permit to have high safety in the junction. The brass alloys in use are compliant with the European Standards concerning the materials for uses in distribution systems of hot and cold water for human consumption.

All **te-sa** fittings are completely **Made in Italy**.

## Components, Materials and Technical data



- 1) Brass alloy fitting body
- 2) Double sealing O-ring
- 3) Plastic ring
- 4) Stainless Steel sleeve

The body of the fittings (1) is totally made of brass with a complete range for most of the pipe sizes. The brass alloys that **te-sa** uses for the Press Fittings Series are suitable for uses in drinking water applications and compliant with the "4MS Common Composition List" and with the "UBA HCACL List".

The screwed connections are in the size range from 1/2" to 1-1/4". Hydraulic seal is guaranteed by the presence of two O-rings in EPDM peroxidic (2). The position of the washers has been studied to press the fitting with the three pressing jaws most used that corresponding to the profiles TH, H and U. The Stainless-Steel Sleeve (4) is showing either the brand of the factory either the size of the fitting for an immediate recognizing of the dimension of the fitting. The plastic ring (3), beside to keep assembled the fitting it makes a physical separation between the material of the fitting and the aluminum of the multilayer pipe, this construction solution avoids a possible galvanic corrosion phenomenon made by the contact of the two different metals.

- Bodies forged before machining made of brass alloy UNI-EN 12165:2016 CW617N-DW
- Bodies directly machined from rods made of brass alloy UNI-EN 12164:2016 CW617N-DW
- Seals O-ring made of compound EPDM-PX 70SH
- Pipe sleeve made of Stainless Steel AISI 304 – EN 1.4301
- Insulation plastic ring made of Polypropylene
- Sizes available: 16x2 - 18x2 - 20x2 - 26x3 - 32x3
- Press Fitting suitable for use in the distribution of cold and hot drinking water, heating system also with glycol solutions at maximum percentage of 30%, compressed air distribution systems.
- Maximum Operating Pressure 10 bar
- Maximum Test Pressure at room temperature 16 bar
- Maximum Operating Temperature 95°C
- Maximum peak Temperature 110°C for 1 hour

*Warning: In a system application maximum pressure and temperature are depending to the characteristics of the pipe*

The series sizes 16x2 and 20x2 are certified DVGW for TH profile in combination with **te-sa Press System** multilayer PE-Xb/Al/PE-Xb pipe (DVGW certificate number DW-8501CT0402).

## Installation Instructions

The assembly instruction as below need to be followed step by step carefully to avoid malfunctioning or water leakages in the system. The absence of defects on the pipe and on the fittings need to be visual checked before their installation. After assembly, the system requires pressure test as prescribed by local standards and art rules, to verify that all fittings are pressed, and that there is absence of water leakage.



### 1) CUTTING

Cut the pipe by using a proper scissors which avoid the ovalization, and taking care it will be perpendicular to its axes.



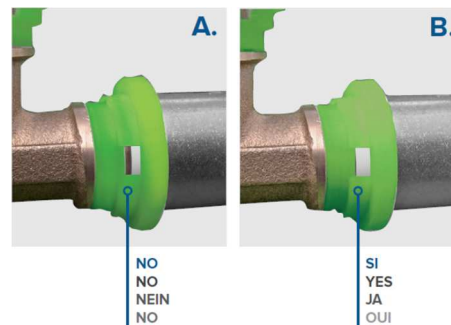
### 2) CALIBRATION

Use the proper flaring tool to calibrate and flare the pipe extremity, determining the right internal diameter of the pipe and creating a rounding-off that avoid the O-Rings movement during the pipe insertion.



### 3) INSERTION OF THE FITTING

Insert the fitting inside the pipe until the end, verifying that the pipe is completely visible through the openings of the plastic ring. It is forbidden to use any type of lubricant, because it can damage the O-Rings if is not suitable for use with the EPDM-PX compound.



The picture "A" shows a non-correct introduction of the pipe into the fitting. The picture "B" shows a correct introduction of the pipe that is in correspondence of the head of the plastic ring.



### 4) PRESSING

Open the tongs of the pressing machine. If using the "TH" profile tongs, place the fitting in order to have the plastic ring collar inside the dedicated seat of the tongs. If using other profiles place the tongs on the stainless steel sleeve based on specific instructions. Press the fitting only one time, and release it when the press cycle is completed. For a correct use of the press machine, follow the user manual of the manufacturer.



### 5) VERIFY

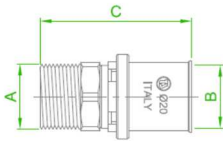
Visual and hydraulic check that the fitting is correctly pressed at the end of the procedure. The pressure test is required to verify absence of leakages, especially in the cases where the fitting will be positioned concealed in the structures.

**The te-sa Press fittings that are not pressed leak when submitted at test pressure.**

## The te-sa Press Fittings Range

### Art. 800

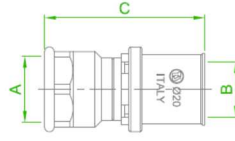
- Male straight fitting



Art.	A	B	C
800-04-160	1/2"	Ø16x2	49,8
800-04-180	1/2"	Ø18x2	49,8
800-04-200	1/2"	Ø20x2	49,8
800-05-180	3/4"	Ø18x2	52,8
800-05-200	3/4"	Ø20x2	52,8
800-05-260	3/4"	Ø26x3	57,8
800-06-260	1"	Ø26x3	57,8
800-06-320	1"	Ø32x3	57,8
800-07-320	1 1/4"	Ø32x3	57,8

### Art. 801

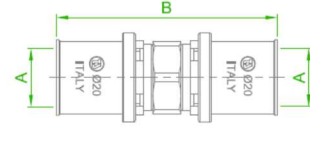
- Female straight fitting



Art.	A	B	C
801-04-160	1/2"	Ø16x2	52,3
801-04-180	1/2"	Ø18x2	52,3
801-04-200	1/2"	Ø20x2	52,3
801-05-180	3/4"	Ø18x2	54,3
801-05-200	3/4"	Ø20x2	54,3
801-05-260	3/4"	Ø26x3	58,3
801-06-260	1"	Ø26x3	58,3
801-06-320	1"	Ø32x3	58,3
801-07-320	1 1/4"	Ø32x3	58,3

### Art. 802

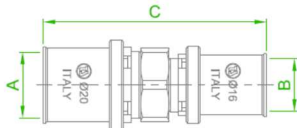
- Double straight fitting



Art.	A	B
802-160-160	Ø16x2	70
802-180-180	Ø18x2	70
802-200-200	Ø20x2	70
802-260-260	Ø26x3	80
802-320-320	Ø32x3	80

### Art. 803

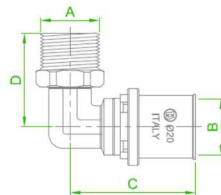
- Reduced straight fitting



Art.	A	B	C
803-180-160	Ø18x2	Ø16x2	70
803-200-160	Ø20x2	Ø16x2	70
803-200-180	Ø20x2	Ø18x2	70
803-260-160	Ø26x3	Ø16x2	75
803-260-180	Ø26x3	Ø18x2	75
803-260-200	Ø26x3	Ø20x2	75
803-320-160	Ø32x3	Ø16x2	75
803-320-180	Ø32x3	Ø18x2	75
803-320-200	Ø32x3	Ø20x2	75
803-320-260	Ø32x3	Ø26x3	80

### Art. 810

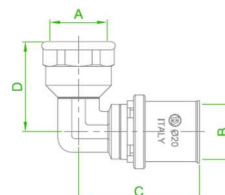
- Male elbow 90°



Art.	A	B	C	D
810-04-160	1/2"	Ø16x2	45,8	39,5
810-04-180	1/2"	Ø18x2	45,8	39,5
810-04-200	1/2"	Ø20x2	45,8	40,5
810-05-180	3/4"	Ø18x2	48,8	43,5
810-05-200	3/4"	Ø20x2	48,8	43,5
810-05-260	3/4"	Ø26x3	53,8	48,5
810-06-320	1"	Ø32x3	58,3	54,5

### Art. 811

- Female elbow 90°

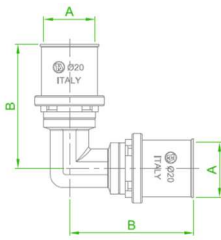


Art.	A	B	C	D
811-04-160	1/2"	Ø16x2	45,8	39,5
811-04-180	1/2"	Ø18x2	45,8	39,5
811-04-200	1/2"	Ø20x2	45,8	40,5
811-05-180	3/4"	Ø18x2	50,3	42,5
811-05-200	3/4"	Ø20x2	50,3	42,5
811-05-260	3/4"	Ø26x3	55,3	44,5
811-06-320	1"	Ø32x3	60,8	53,5

## The te-sa Press Fittings Range

### Art. 812

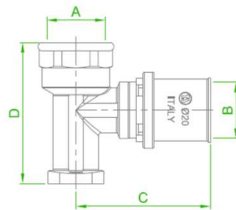
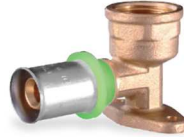
- Elbow 90°



Art.	A	B
812-160-160	Ø16x2	46
812-180-180	Ø18x2	46
812-200-200	Ø20x2	50
812-260-260	Ø26x3	54
812-320-320	Ø32x3	61

### Art. 813

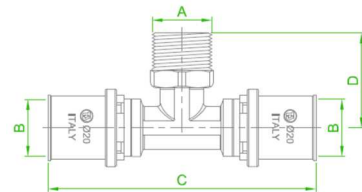
- Wall plate elbow



Art.	A	B	C	D
813-04-160	1/2"	Ø16x2	49,3	40
813-04-180	1/2"	Ø18x2	49,3	50
813-04-200	1/2"	Ø20x2	49,3	50
813-05-200	3/4"	Ø20x2	49,3	62
813-05-260	3/4"	Ø26x3	54,3	62

### Art. 820

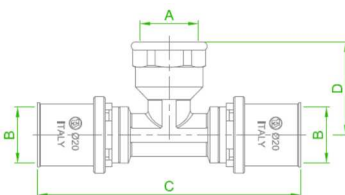
- Male Tee fitting



Art.	A	B	C	D
820-160-04-160	1/2"	Ø16x2	91,6	33
820-180-04-180	1/2"	Ø18x2	91,6	33
820-200-04-200	1/2"	Ø20x2	96,6	33
820-260-04-260	1/2"	Ø26x3	97,6	36
820-200-05-200	3/4"	Ø20x2	97,6	39
820-260-05-260	3/4"	Ø26x3	107,6	39
820-320-06-320	1"	Ø32x3	116,6	42

### Art. 821

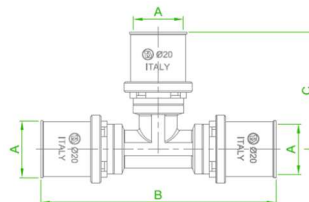
- Female tee fitting



Art.	A	B	C	D
821-160-04-160	1/2"	Ø16x2	91,6	33
821-180-04-180	1/2"	Ø18x2	91,6	33
821-200-04-200	1/2"	Ø20x2	96,6	33
821-260-04-260	1/2"	Ø26x3	97,6	33
821-200-05-200	3/4"	Ø20x2	100,6	36
821-260-05-260	3/4"	Ø26x3	110,6	36
821-320-06-320	1"	Ø32x3	116,6	42

### Art. 822

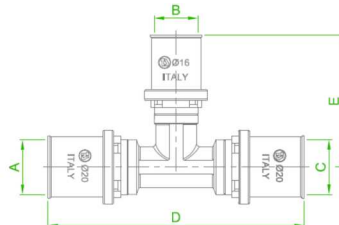
- Tee fitting equal



Art.	A	B	C
822-160-160-160	Ø16x2	91,6	46
822-180-180-180	Ø18x2	91,6	46
822-200-200-200	Ø20x2	96,6	50
822-260-260-260	Ø26x3	107,6	54
822-320-320-320	Ø32x3	116,6	58,5

### Art. 823

- Tee fitting reduced middle section



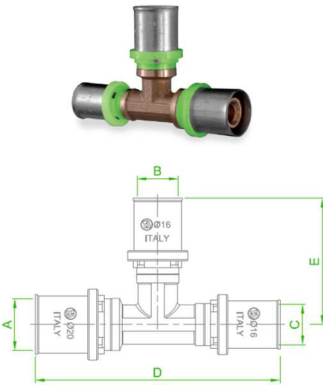
Art.	A	B	C	D	E
823-180-160-180	Ø18x2	Ø16x2	Ø18x2	91,6	46
823-200-160-200	Ø20x2	Ø16x2	Ø20x2	96,6	46
823-200-180-200	Ø20x2	Ø18x2	Ø20x2	96,6	46
823-260-160-260	Ø26x3	Ø16x2	Ø26x3	107,6	46
823-260-180-260	Ø26x3	Ø18x2	Ø26x3	107,6	46
823-260-200-260	Ø26x3	Ø20x2	Ø26x3	107,6	50
823-320-160-320	Ø32x3	Ø16x2	Ø32x3	116,6	46
823-320-180-320	Ø32x3	Ø18x2	Ø32x3	116,6	46
823-320-200-320	Ø32x3	Ø20x2	Ø32x3	116,6	50
823-320-260-320	Ø32x3	Ø26x2	Ø32x3	116,6	54



## The te-sa Press Fittings Range

### Art. 824

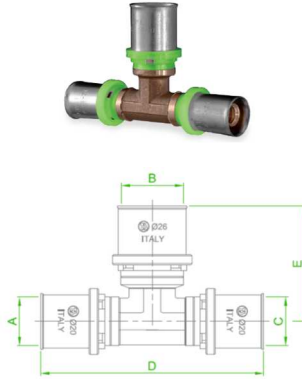
- Tee fitting reduced



Art.	A	B	C	D	E
824-180-160-160	Ø18x2	Ø16x2	Ø16x2	91,6	46
824-200-160-160	Ø20x2	Ø16x2	Ø16x2	96,6	46
824-200-200-160	Ø20x2	Ø20x2	Ø16x2	96,6	50
824-260-160-200	Ø26x3	Ø16x2	Ø20x2	102,6	46
824-260-200-160	Ø26x3	Ø20x2	Ø16x2	102,6	50
824-260-200-200	Ø26x3	Ø20x2	Ø20x2	102,6	50
824-260-260-160	Ø26x3	Ø26x3	Ø16x2	102,6	54
824-260-260-200	Ø26x3	Ø26x3	Ø20x2	102,6	54
824-320-200-260	Ø32x3	Ø20x2	Ø26x3	116,6	50
824-320-260-260	Ø32x3	Ø26x3	Ø26x3	116,6	54
824-320-320-200	Ø32x3	Ø32x3	Ø20x2	116,6	54
824-320-320-260	Ø32x3	Ø32x3	Ø26x2	116,6	54

### Art. 825

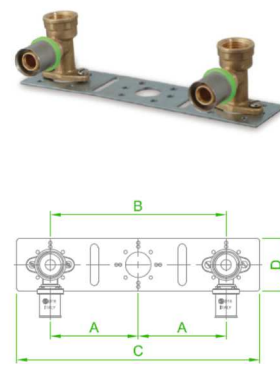
- Tee fitting enlarged middle section



Art.	A	B	C	D	E
825-160-180-160	Ø16x2	Ø18x2	Ø16x2	91,6	46
825-160-200-160	Ø16x2	Ø20x2	Ø16x2	91,6	50
825-200-260-200	Ø20x2	Ø26x3	Ø20x2	96,6	54
825-260-320-260	Ø26x3	Ø32x3	Ø26x3	107,6	54

### Art. 844

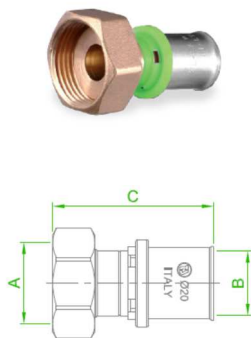
- Mounting plate with fittings Art. 813



Art.	Size	A	B	C	D
844-076-04-160	1/2" - 16x2	76	152	210	45
844-076-04-200	1/2" - 20x2	76	152	210	45
844-076-05-200	3/4" - 20x2	76	152	210	45

### Art. 830

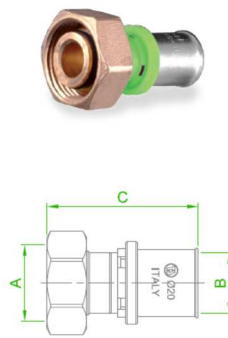
- Straight fitting with flat seal



Art.	A	B	C
830-05-160	3/4"	Ø16x2	49,8
830-05-180	3/4"	Ø18x2	49,8
830-05-200	3/4"	Ø20x2	49,8

### Art. 831

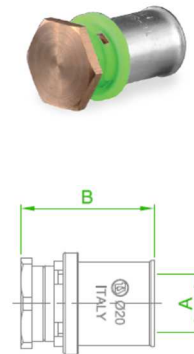
- Straight fitting with Eurocone connection



Art.	A	B	C
831-04-160	1/2"	Ø16x2	50
831-05-160	3/4"	Ø16x2	50
831-05-180	3/4"	Ø18x2	50
831-05-200	3/4"	Ø20x2	50

### Art. 832

- End cap fitting

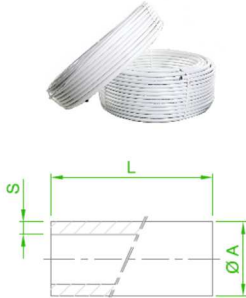


Art.	A	B
832-160	Ø16x2	35,3
832-180	Ø18x2	35,3
832-200	Ø20x2	35,3
832-260	Ø26x3	36,3
832-320	Ø32x3	36,3

## The te-sa Press Fittings Range

### Art. 8781

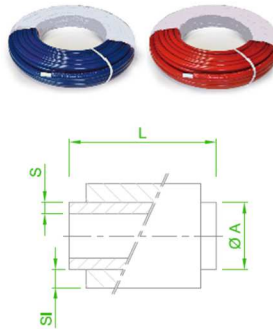
- Multilayer pipe PE-Xb/Al/PE-Xb



Art.	ØA x S	L
8781/2-16020	Ø16x2	200 m
8781/4-16020	Ø16x2	400 m
8781/1-20020	Ø20x2	100 m
8781/0-26030	Ø26x3	50 m
8781/0-32030	Ø32x3	50 m

### Art. 8783B – 8783R

- Multilayer pipe PE-Xb/Al/PE-Xb insulated

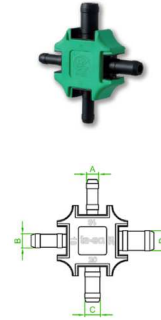


Art.	ØA x S	Si	L
8783B-16020	Ø16x2	6	50 m
8783B-20020	Ø20x2	6	50 m
8783B-26030	Ø26x3	6	50 m
8783B-32030	Ø32x3	10	25 m

Art.	ØA x S	Si	L
8783R-16020	Ø16x2	6	50 m
8783R-20020	Ø20x2	6	50 m
8783R-26030	Ø26x3	6	50 m
8783R-32030	Ø32x3	10	25 m

### Art. 840

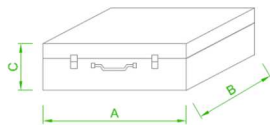
- Deburring tool / reamer



Art.	A	B	C	D
840-16-18-20-26	16x2	18x2	20x2	26x3

### Art. 862

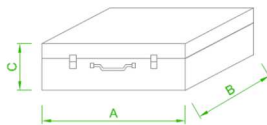
- Electric radial press machine with automatic return



Art.	A	B	C
862	510	290	125

### Art. 864

- Battery radial press machine with automatic return



Art.	A	B	C
864	510	290	125

### Art. 870

- Pressing tongs TH profile



870-16 for pipes Øe 16 mm  
870-18 for pipes Øe 18 mm  
870-20 for pipes Øe 20 mm  
870-26 for pipes Øe 26 mm  
870-32 for pipes Øe 32 mm

For more information it is possible refer to the **te-sa** catalogue or directly on the **te-sa** web site

## Pressure test of the system

After finishing assembly, the system must be inspected and subjected to pressure tests, and the results need to be recorded on a report that in copy remain available for the end user.

The scopes of the system pressure test are to verify its completeness, internal pressure resistance and tightness. Before the pressure test, the end fittings need to be plugged, the system must be filled with clean water, and the air remaining entrapped totally discharged in the highest points.

The test procedure depends to the local rules or standard that could be a little different in the European Countries. Normally a general rule provides that the systems are tested by apply a pressure amounting to 1.5 time of the operating pressure, that however need to be at least of 1.5 MPa (15 bar).

For example, in Germany, the referring standard is the DIN1988 that prescribe a preliminary test before the final test. The preliminary test is made by increasing the system pressure at 15 bar, that after 15 minutes need to be readjusted and maintained for 30 minutes. The reduction of the system pressure needs to be less than 0,3 bar, otherwise an immediate check of the system is required to verify where the losses are. After a positive preliminary test, the system pressure is reduced to zero and increased again to 15 bar. To consider the test positive the reduction of the system pressure after two hours needs to be less than 0,3 bar. Only consequently to the final positive test the system can be finished with the masonry works, by maintaining the pressure into the system.

The **te-sa** suggestion is to make a preliminary test with pressure air at 6 bar for a time of minimum one hour to verify if all fittings are pressed, and that there aren't macroscopic leakages, and in second time make the pressure test of the system with water at 15 bar for at least 2 hours. To be sure that the system is totally reliable, it is possible also make a third test at low pressure by using water at pressure 2 bar for 12 hours.

## Technical detail

### *Bending radius of the pipe*

The **te-sa** Press Multilayer pipe can be easily bent manually in case of smaller diameters with minimum bending radius that is 5 time the external diameter ( $R_{min} = 80$  mm for the size 16x2, and  $R_{min} = 100$  mm for the size 20x2), or by using bending spring or bending tools if lower radiuses are required. In these cases, the minimum bending radius that is 3 time the external diameter of the pipe ( $R_{min} = 45$  mm for the size 16x2, and  $R_{min} = 60$  mm for the size 20x2). Lower radiuses of the above mentioned are forbidden because in these cases the pipe can collapse or its ovalization reduces the water flow.

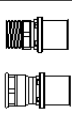







### *Longitudinal thermal expansion of the pipe and its clamping*

The **te-sa** Press Multilayer PE-Xb/Al/PE-Xb pipe, as per all other materials, when submitted to temperature variations it is subjected to longitudinal thermal expansion. Thanks to the internal aluminum layer this elongation is very low, but in any case, need to be take in consideration when the pipes are fixed with collars or when the straight pipe line are long. For the **te-sa** Press System Multilayer pipe the Thermal expansion coefficient is 0,026 mm/mK (for example 10 m of pipe submitted to a difference of temperature of 50°C has an elongation  $\Delta L$  that is  $0,026 \times 50 \times 10 = 13$  mm). The pipes when installed not concealed in the structures, need to be fixed by using a number of collars with rubber enough to maintain stable the pipeline. The suggested centre distance between the fixing points is 75-80 cm with additional collars close to Elbows and Tee fittings at about 25 cm distance. To avoid damaging of the pipe is forbidden to use metallic collars without insulation rubber.

### *Losses of pressure in the system*

The loss of pressure in a distribution system can be easily calculated by using the KV factors that permit to use calculation software. The low rugosity of the **te-sa** multilayer pipe and the developed shape of the Press Fitting series, allow obtaining distribution system characterized by very low loss of pressure with consequently high water flow available. The table below contain the KV factors of the main components of **te-sa** Press System.

*The KV factors are determined for water temperature of 50°C.*

Size	PIPE STRAIGHT	PIPE CURVED								
	KV									
16x2	4,36	5,63	4,87	4,59	3,68	3,82	3,98	3,56	3,44	3,44
20x2	7,67	10,84	12,12	10,84	7,31	7,67	9,91	6,73	6,48	6,48
26x3	15,82	25,02	28,88	25,02	15,82	15,82	22,37	14,44	13,87	13,87
32x3	31,60	57,69	70,66	57,69	35,33	---	57,69	31,60	30,13	30,13