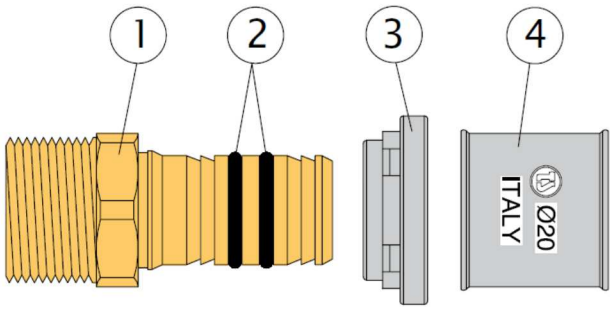
Application

The **te-sa Press** 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 the use of 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).
The excellent raw materials, the high quality standard level realized reached through several controls adopted during production and the complete available range of sizes and configurations, allow to realize 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 maintain 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 compliance with standard UNI-EN 10226-1. 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 most used pressing jaws, corresponding to the profiles TH, H and U. The Stainless Steel Sleeve (**4**) shows either the brand of the factory and the size of the fitting for an immediate recognition of the dimension of the fitting. The plastic ring (**3**), besides keeping assembled the fitting, creates a physical separation between the material of the fitting and the aluminum of the multilayer pipe; this construction solution avoids a possible galvanic corrosion phenomena 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
- Press Fitting suitable to be used 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

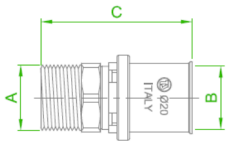
- The series sizes 16x2 and 20x2 are certified DVGW for TH profile in combination with **te-sa Press** multilayer PE-Xb/Al/PE-Xb pipe (DVGW certificate number DW-8501CT0402)

(In a system application maximum pressure and temperature depend on the characteristics of the pipe)

The te-sa Press fittings Range

Art. 800

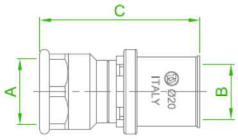
- Male straight fitting



Art.	A	B	C
800-04-160	1/2"	Ø16x2	49,8
800-04-200	1/2"	Ø20x2	49,8
800-05-200	3/4"	Ø20x2	52,8

Art. 801

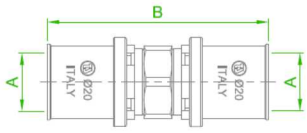
- Female straight fitting



Art.	A	B	C
801-04-160	1/2"	Ø16x2	52,3
801-04-200	1/2"	Ø20x2	52,3
801-05-200	3/4"	Ø20x2	54,3

Art. 802

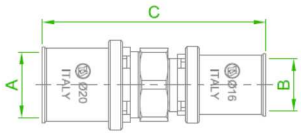
- Double straight fitting



Art.	A	B
802-160-160	Ø16x2	70
802-200-200	Ø20x2	70

Art. 803

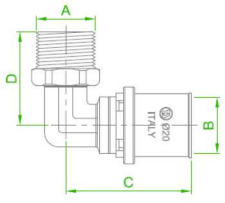
- Reduced straight fitting



Art.	A	B	C
803-200-160	Ø20x2	Ø16x2	70

Art. 810

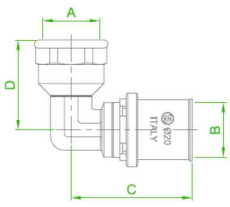
- Male elbow 90°



Art.	A	B	C	D
810-04-160	1/2"	Ø16x2	45,8	39,5
810-04-200	1/2"	Ø20x2	45,8	40,5
810-05-200	3/4"	Ø20x2	48,8	43,5

Art. 811

- Female elbow 90°

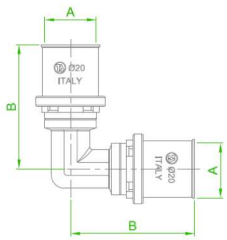


Art.	A	B	C	D
811-04-160	1/2"	Ø16x2	45,8	39,5
811-04-200	1/2"	Ø20x2	45,8	40,5
811-05-200	3/4"	Ø20x2	50,3	42,5

The te-sa Press Fittings Range

Art. 812

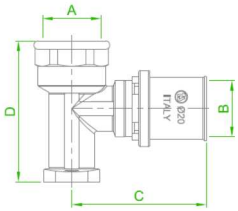
- Elbow 90°



Art.	A	B
812-160-160	Ø16x2	46
812-200-200	Ø20x2	50

Art. 813

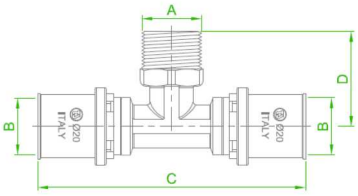
- Wall plate elbow



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

Art. 820

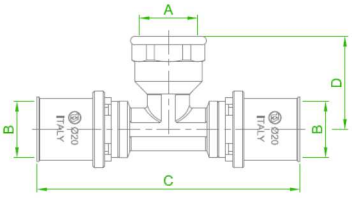
- Male Tee fitting



Art.	A	B	C	D
820-160-04-160	1/2"	Ø16x2	91,6	33
820-200-04-200	1/2"	Ø20x2	96,6	33
820-200-05-200	3/4"	Ø20x2	97,6	39

Art. 821

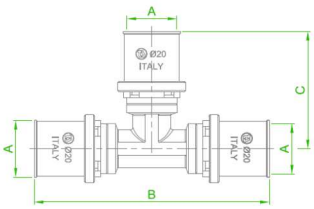
- Female tee fitting



Art.	A	B	C	D
821-160-04-160	1/2"	Ø16x2	91,6	33
821-200-04-200	1/2"	Ø20x2	96,6	33
821-200-05-200	3/4"	Ø20x2	100,6	36

Art. 822

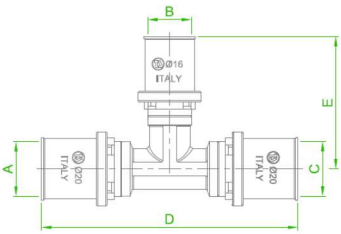
- Tee fitting equal



Art.	A	B	C
822-160-160-160	Ø16x2	91,6	46
822-200-200-200	Ø20x2	96,6	50

Art. 823

- Tee fitting reduced middle section

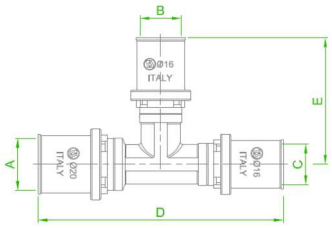


Art.	A	B	C	D	E
823-200-160-200	Ø20x2	Ø16x2	Ø20x2	96,6	46

The te-sa Press Fittings Range

Art. 824

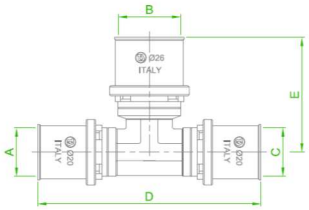
- Tee fitting reduced



Art.	A	B	C	D	E
824-200-160-160	Ø20x2	Ø16x2	Ø16x2	96,6	46
824-200-200-160	Ø20x2	Ø20x2	Ø16x2	96,6	50

Art. 825

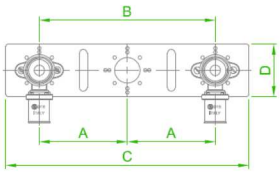
- Tee fitting enlarged middle section



Art.	A	B	C	D	E
825-160-200-160	Ø16x2	Ø20x2	Ø16x2	91,6	50

Art. 844

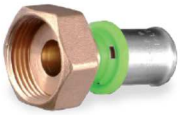
- Mounting plate with fittings Art. 813

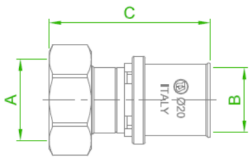


Art.	Size	A	B	C	D
844-076-04-160	1/2" - 16x2	76	152	210	45
844-076-04-200	1/2" - 20x2	76	152	210	45
844-076-05-200	3/4" - 20x2	76	152	210	45

Art. 830

- Straight fitting with flat seal

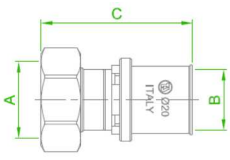




Art.	A	B	C
830-05-160	3/4"	Ø16x2	49,8
830-05-200	3/4"	Ø20x2	49,8

Art. 831

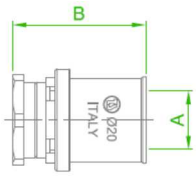
- Straight fitting with Eurocone connection



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

Art. 832

- End cap fitting

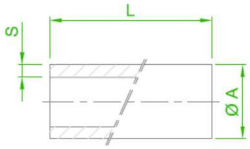


Art.	A	B
832-160	Ø16x2	35,3
832-200	Ø20x2	35,3

The te-sa Press Fittings Range

Art. 8781

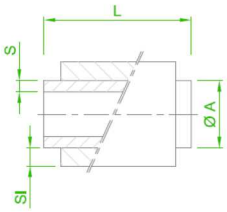
- Multilayer pipe PE-Xb/Al/PE-Xb



Art.	ØA x S	L
8781/2-16020	Ø16x2	200 m
8781/4-16020	Ø16x2	400 m
8781/1-20020	Ø20x2	100 m

Art. 8783

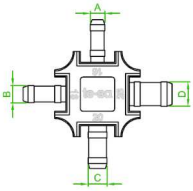
- Multilayer pipe PE-Xb/Al/PE-Xb insulated



Art.	ØA x S	Sl	L
8783-16020	Ø16x2	6	50 m
8783-20020	Ø20x2	6	50 m

Art. 840

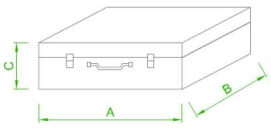
- Deburring tool / reamer



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

Art. 862

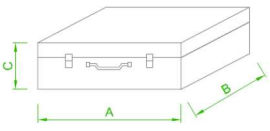
- Electric radial press machine with automatic return



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
870-20 for pipes Øe 20 mm

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

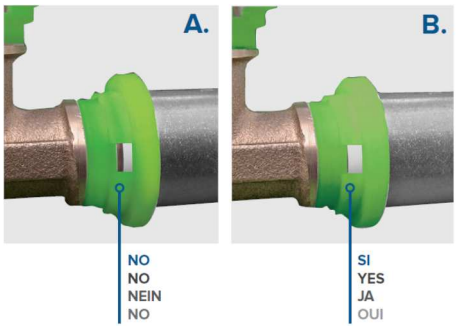
Installation Instructions

The assembly instructions below need to be carefully followed step by step in order to avoid malfunctioning or water leakages in the system. The absence of defects on the pipe and on the fittings need to be visually checked before their installation. After assembly, the system requires a 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 the proper scissors in order to avoid ovalization, and taking care it will be perpendicular to its axes.

2) CALIBRATION
Use the proper flaring tool to calibrate and flair 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 the “H” or “U” profiles, place the tongs on the stainless steel sleeve next to the plastic ring. 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
At the end of the procedure, perfom a visual and hydraulic check that the fitting is correctly pressed. The pressure test is required to verify absence of leakages, especially in case the fitting will be positioned concealed in the structures.
te-sa press fittings that are not pressed leak when submitted at test pressure.

Pressure test of the system

After finishing the 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 purpose of the system pressure test is 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 remaining entrapped air totally discharged in the highest points.
The test procedure depends to the local rules or standards that could be a little different in the European Countries. Generally speaking, the rule provides that the systems are tested applying a pressure amounting to 1.5 time of the operating pressure, that however needs to be at least of 1.5 MPa (15 bar).
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, then after 15 minutes needs to be readjusted and maintained for 30 minutes. The reduction of 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. In order to consider the test positive, the reduction of the system pressure after two hours needs to be less than 0,3 bar. Only after the final positive test, the system can be finished with the masonry works, by maintaining the pressure into the system.
te-sa suggests 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. Then in a second time, perform 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

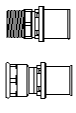
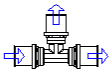
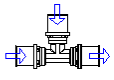
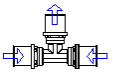
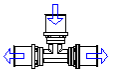
The **te-sa** Press Multilayer pipe can be easily bent manually in case of smaller diameters, with minimum bending radius that is 5 time the external diameter (R_{min} = 80 mm for the size 16x2, and R_{min} = 100 mm for the size 20x2), or by using bending spring or bending tools if lower radiuses are 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). Radiuses lower than the above mentioned are forbidden because in these cases the pipe can collapse or its ovalization reduce 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 needs to be taken into consideration when the pipes are fixed with collars or when the straight pipe lines are long. For the **te-sa** Press 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 have an elongation ΔL that is 0,026x50x10 = 13 mm). The pipes when installed not concealed in the structures, need to be fixed by using a number of collars with enough number 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 calculation software permit to use. The low rugosity of the **te-sa** multilayer pipe and the developed shape of the press fitting series, allow to obtain a 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.

	PIPE STRAIGHT	PIPE CURVED								
Size	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