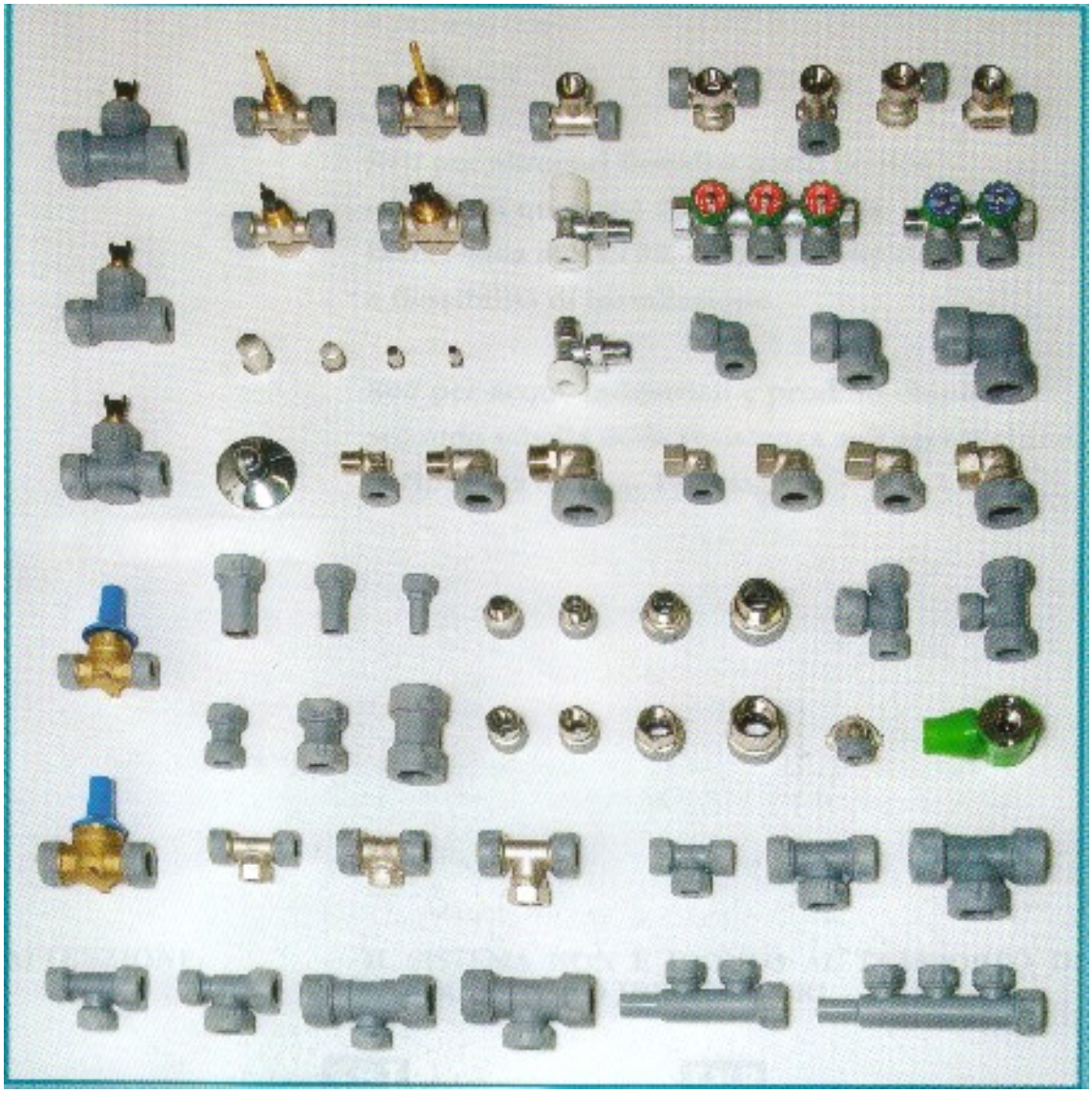
TECHNICAL MANUAL



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FIELDS OF APPLICATIONS OF THE THR SYSTEM

Water and heating networks.

Embedded networks for potable water for public use in new installations, restructuring and repair work:

- Hotels
- Schools
- Hospitals
- Boats
- Camping sites, caravans, etc.

Networks for liquid foodstuffs, fluids and all situations requiring maximum non-toxicity, safety and rapidity together with flexible installation solutions.
In industry, networks for conveying water and chemicals
(see table of resistance to chemical agents)

Warning: this system is not suitable for conduction of gas and hydrocarbons.

ADVANTAGE OF THE THR SYSTEM

- Great versatility and variety of components
- Extremely reliable
- Maximum freedom in networks' configuration for the variety of pipe types and widths.
- High resistance to mechanical forces
- High resistance to ageing process
- Ease and speed of fitting and installation
- No corrosion
- No build-up of encrustment
- High water capacity
- No transmission of noise or vibrations
- Little heat loss

No formation of micro organisms in sunlight

We wish to point out that the great success obtained by plastic systems is not only attributable to the lightness and easy handling of the components and consequent minor fatigue compared with other systems, but also to their better resistance to corrosion by modern cements which are increasingly treated with chemical additives and more corrosive than the types of cement used in the past.

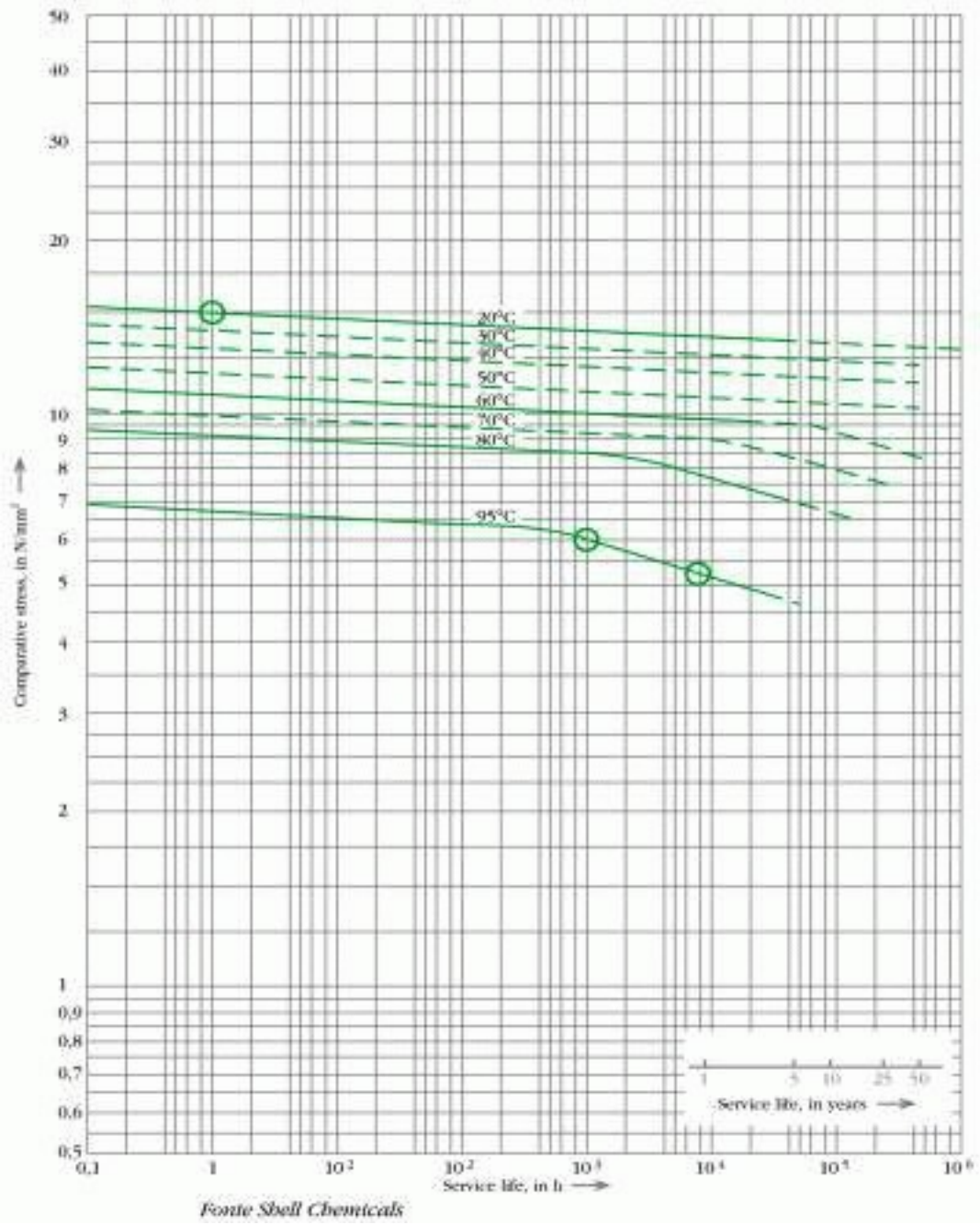
PHYSICAL AND MECHANICAL SPECIFICATIONS OF POLYBUTYLENE PIPES

Density	0,925 g/cm3
VICAT softening capacity	>= 113 °C
Melting point	da 122 to 128 °C
Minimum usable temperature	-15 °C
Lengthening on breaking	> 150%
Elasticity	3500 Kilos/cm2
Resistenza superficiale	> 10 12°
Coefficient of linear heat expansion between 0° and 90°	1,3x10-4 m/m °C
Coefficient of heat conduction	0,22 WK-1 m -1= 0,19 Kcal/h m °C
Dielectric constant	2,53

RESISTANCE TO PRESSURE AND HEAT

THR is manufactured in accordance with specification EN12319 that fixes the minimum resistance levels to internal pressure for Polybutylene pipes used for carrying fluids under pressure.
This specification establishes the tangential tension of work (sigma) for manufactured pipes. In the line with the sigma value, the specification fixes the maximum pressure in relation to the temperature of the fluid to which PB pipes may be subjected, for service life of 50 years of continuous use at a temperature of 60°C and for service life of 25 years at a temperature of between 60°C and 90°C.
The safety factor required by the specification for temperatures of less than 60°C is 1,5, for a service life of 50 years of continuous use.
For temperatures greater than 60°C but less than 90°C the safety factor is 2 for service life of 25 years of use in normal conditions.
In order for the system to be used correctly it is necessary to comply with the following parameters:
For heating networks, the maximum temperature of the fluid must not exceed 90°C. that pressure must be -/< 4 bars
For sanitary installations, the maximum temperature of the water must not exceed 60°C.
The pressure must be 4 bars, though occasional peaks of up to 10 bars are permitted.

REGRESSION DIAGRAM

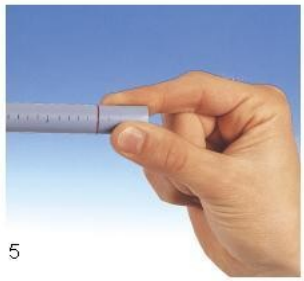


RELIABLE JOINTING

A very simple connection between pipe and fitting is, as all the simple things are, the most reliable.
The reliability of the joint is guaranteed by the high technology employed in manufacturing. The fittings are not of the compression-type, but elastic fittings instead which will absorb linear dilation on pipes of up to 2 metres that are typical of sanitary fittings.

As a result, these special fittings, which have the characteristic feature of maintaining the O-Ring in position without squashing it, may be used without hesitation in embedded fittings and without any limitations.

CONNECTING PIPES TO FITTINGS



Connecting the pipe to the fitting is very simple, but it must be carried out with the utmost care since it is the only operation for which the installer is entirely responsible.

1) Cut the pipe to size at one of the gauge marks present on the whole length of the pipe. Check that the cut rim is not jagged as this might ruin the O-RING. The cutters should be well sharpened.

2)

Using a felt tipped pen, draw a line the whole way round the pipe circumference at a distance of:

25 mm from the rim for pipes with ø 15-16,
30 mm from the rim for pipes with ø 20-22,
35 mm from the rim for pipes with ø 28

3)

Insert special pipe support sleeve

4-5-6)

Lightly grease the end of the pipe and the inside of the fitting with our special lubricant. Where metal pipes are used it is always necessary to properly trim the part that will be inserted into the fitting.

7)

Insert the pipe prepared in this way into the fitting until it can go no further (two clicks must be clearly audible.)
Check that the edge of the fitting reaches the line that was drawn around the pipe. This check is essential and should not be underrated.

IMPORTANT:

If for any reason the installer has to dismantle a fitting that has already been inserted, it is absolutely crucial to remove the grab rings, which may not be used again, discard it and substitute it with a new one, reassembling the fitting into its original state before starting the connecting procedure again

.

In order to be sure that the connections have been carried out properly, it is essential to test the pipe and fittings with pressurized water to check that there are no leaks before covering them with cement.

CHECKING THE SYSTEM

Let all of the air out of the pipes by flooding them with water, increase the pressure of the water to 8 bars and wait for 5 minutes until the pipe and fitting joint stabilizes, then increase the pressure of the water to 20 bar and leave the network like this for another 5 minutes. Check that there are no leaks.
Leave the network at water supply pressure while the layout is sealed.

HEAT EXPANSION AND CONTRACTION

All plastic components expand more than metallic components, and this must be taken into account when installing both heat and water networks. Using insulating pipes is undoubtedly a very good way of taking care of this.
There are no particular tips for sanitary networks since the short, straight, stretches of pipes and the minor changes in temperature only produce moderate dilation which is easily absorbed by the quick fittings joints that are themselves, up to a point, dilatory joints.
The coefficient of linear expansion of PB is 1.3×10^{-4} m/m with a Δt of 60°C, which, when determined by the given formula, results being 7,8 for every 10 ml.

m. (10 x 1,3 x 60: 10.000) = m. 0,078 = cm 7,8

this peculiarity gives to the Polybutylene pipes a good degree of elasticity.

In particular situation, such as drop in temperature (but not over 10°C), this elasticity allows to reduce breakage due to frost.

It is important to consider, in case of frost, that the water inside the system cause the breakage of fittings and cocks (in plastic or brass).

Especially in cold areas, it is better to use insulating pipe and to empty the system to prevent probable breakage.

METAL COLD FORMING BEND

If our cold forming bands are not used we recommend that the pipe be bent in the same direction as its natural inclination with a radius of at least 8 times the width of the pipe.
Where this is not possible, the special elbow should be used instead.

CONCENTRATED CHLORINE

In networks where there is heavily chlorinated water , above normal levels (0,1 p.p.m) straight rods of Polybutylene pipe must be used instead of coiled Polybutylene pipes.
Changes in direction must be made using elbow joints and never by bending the straight pipe. Chlorine enhances the stress on the bends in plastic pipes and damages them, in particular in cold – water networks.

STABILITY UNDER UV RAYS

The Polybutylene pipes and plastic fittings that make up the system are manufactured with an effective degree of protection against U.V. rays and sufficiently for the storage, transport and installation. In cases where the system is installed abroad, measures should be taken to adequately protect the entire network of pipes and fittings, which should not be exposed to direct sunlight for long periods.

TOXICITY

All the components used have been carefully selected:

There are no problem of toxicity
It does not allow , nor does it encourage, the spread of biological micro organism
There is no oxidization or corrosion
It does not allow crust to form, and as a result the pipes do not require regular cleaning with chemicals.

POSSIBLE USAGE OF FITTINGS

Our quick fittings are compatible with all plastic system sold and with copper pipes with diameters measuring.

12 – 15 – 16 – 20 – 22 – 25 – 28

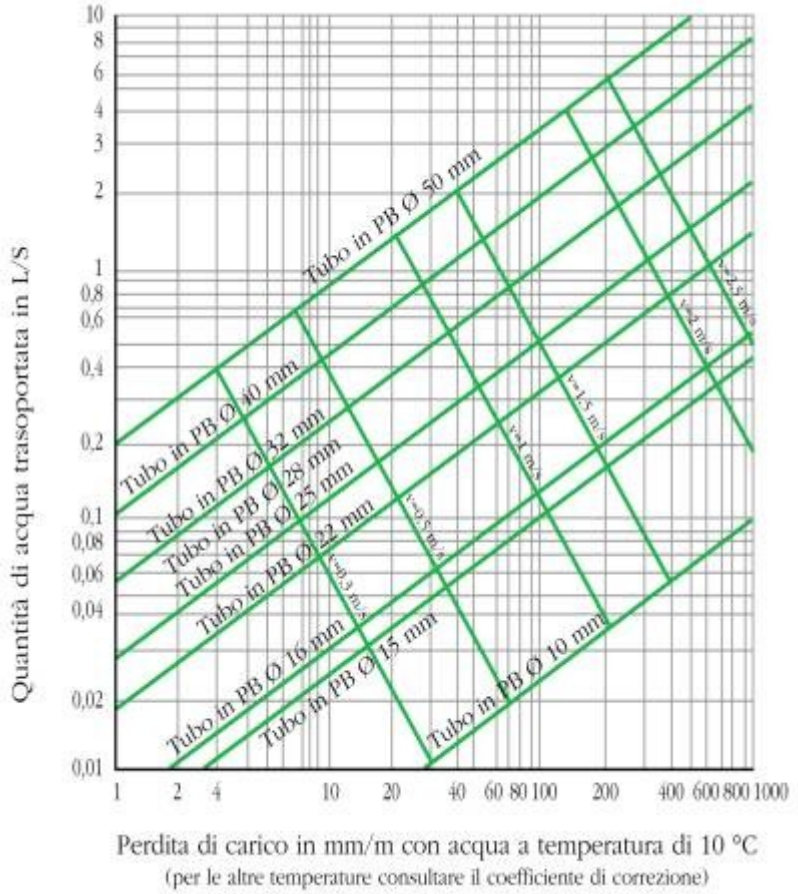
LUBRICANTS

To achieve best results it is essential to use only our non toxic silicon lubricant that is especially made for the system.
This will make all mounting tasks easier and will guarantee a perfect and easy connection.
Do not use lubricating products, which might alter the reliability of the components of the system ore create problems of pollution.

WARNINGS

If water should freeze inside the pipe and the normal flow has to be resumed, **in no case whatsoever** must be a bare flame be used on the pipe itself; use only hot water.

LOAD LOSS IN POLYBUTYLENE PIPES



load loss in millimetres per metre with water temperature of 10 °C
(for other temperatures consult the table of correction factors)

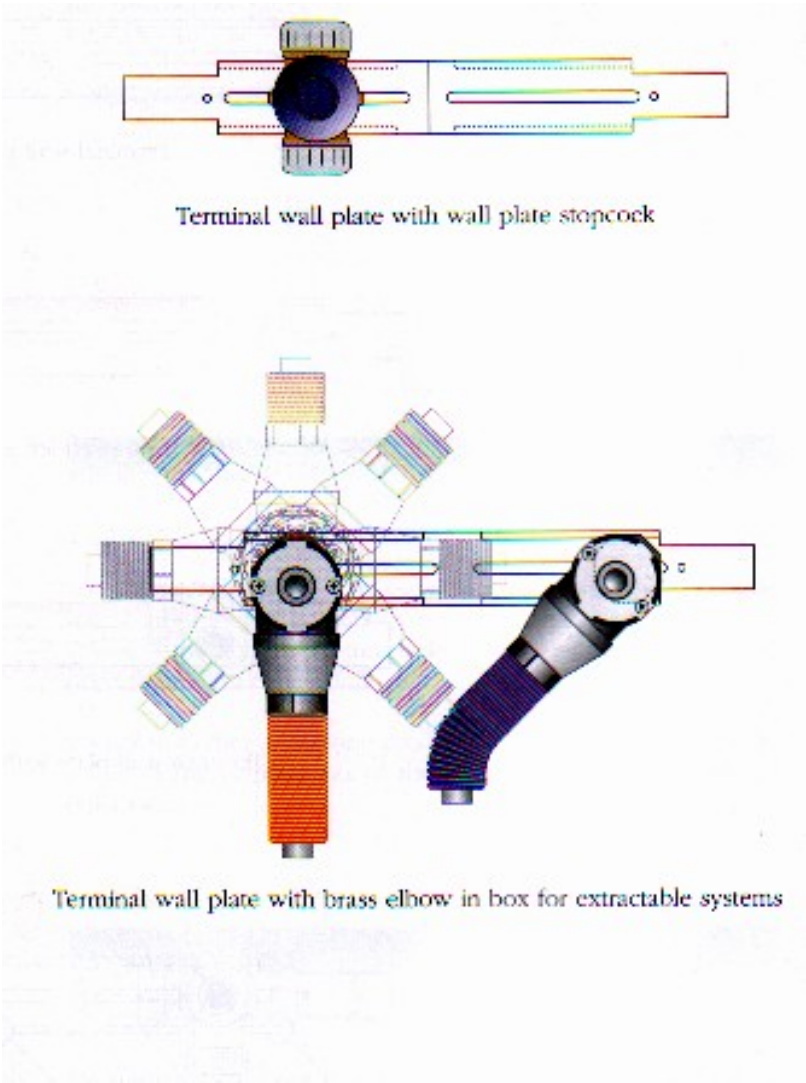
CORRECTION FACTORS (F) ACCORDING TO TEMPERATURE

°C	10	20	30	40	50	60	70	80	90	95
F	1	0,955	0,925	0,870	0,835	0,805	0,775	0,753	0,737	0,730

LOAD LOSS FACTOR RELATING TO ACCESSORIES

Straing coupling	0	
Double bend S	0,5	
90° right bend = 8	0,1	
Tee outlet	1,5	
Tee intlet	1	
Direct outflow tee	0	
Direct inflow tee	0,5	
Opposite flows tee	3,0	
Radiators and boilers	2,5	

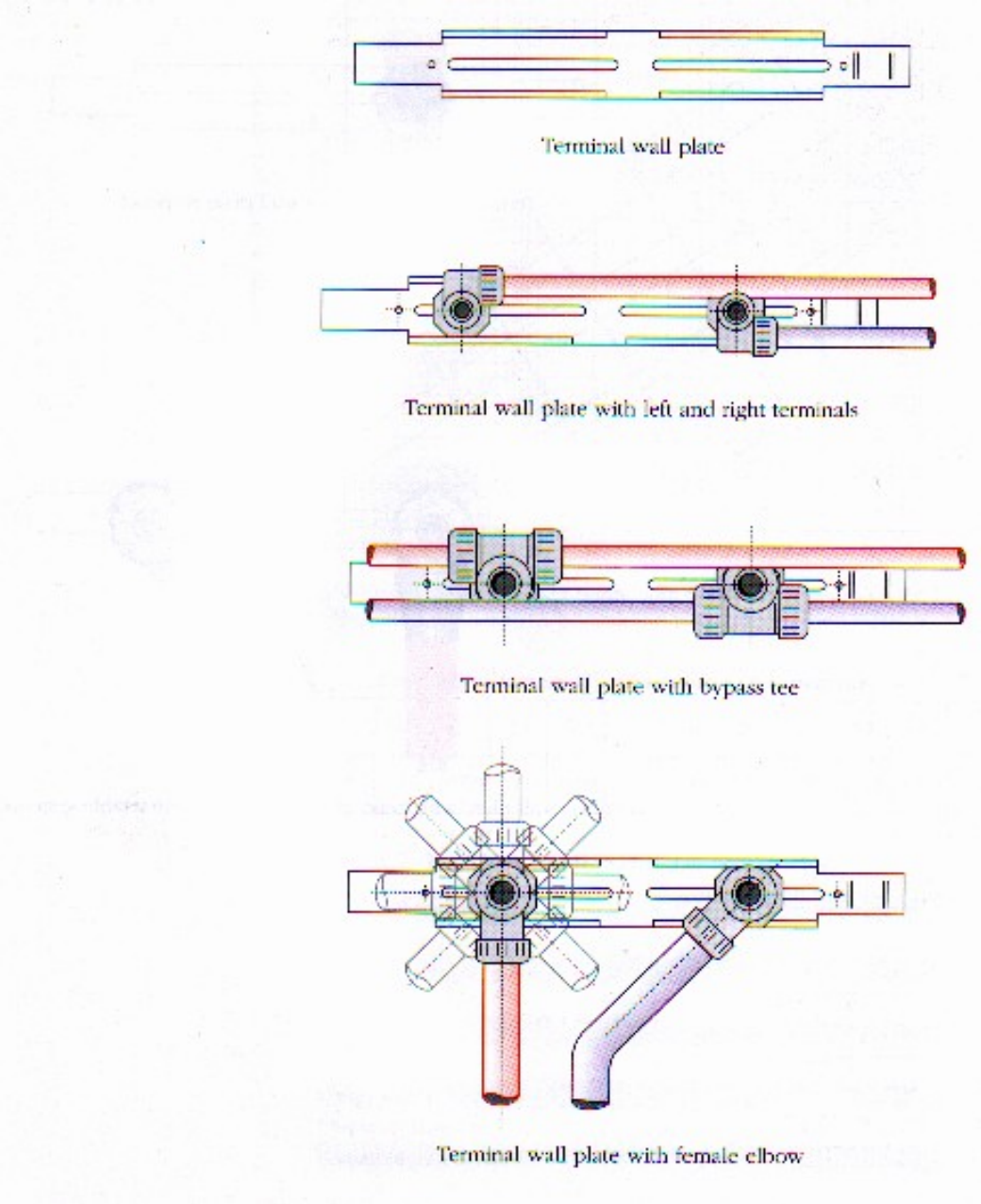
USE OF THE TERMINAL WALL PLATE



Terminal wall plate with wall plate stopcock

Terminal wall plate with brass elbow in box for extractable systems

USE OF THE TERMINAL WALL PLATE



Terminal wall plate

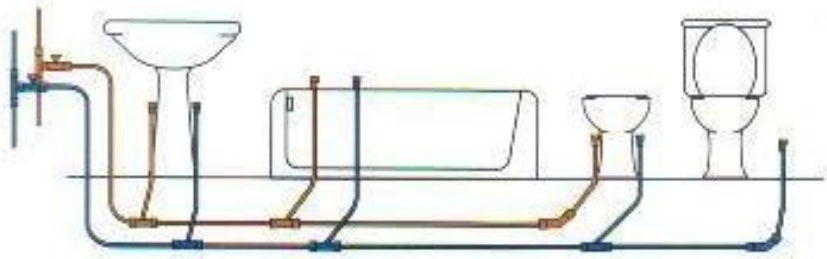
Terminal wall plate with left and right terminals

Terminal wall plate with bypass tee

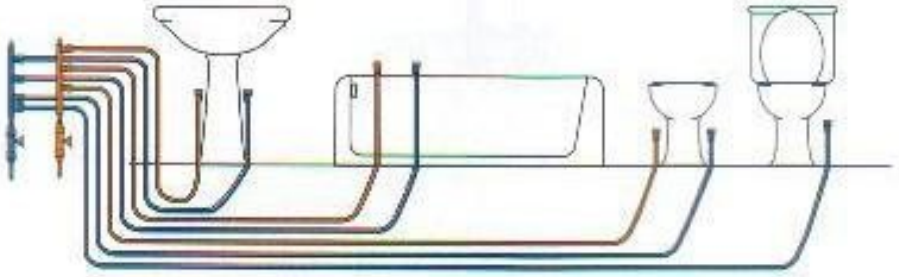
Terminal wall plate with female elbow

EXAMPLES OF

INSTALLATIONS



Floor embedded network



Retractable layout to manifold

Wall embedded network