

**IVAR**  
HYDRONIC IDEAS

# MULTI•PRESS®

**USER MANUAL**



# **MULTI•PRESS®**

## **User manual**

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## ■ INTRODUCTION



MULTI•PRESS® is a system of multi-crimping profile press fittings available in a complete range of figures for multilayer pipes from 16x2 to 63x4.5 mm diameter. The MULTI•PRESS® range of multi-crimping profile press fittings offers versatility and flexibility during installation. The fittings are designed, tested and guaranteed for use with seven crimping profiles: BE, B, TH, R, H, F and U. They can be used with multilayer pipes in climate control and sanitary DHW/DCW systems.

Figure 1. Tee fitting.

## ■ FITTING SPECIFICATIONS

- Tested and guaranteed for use with seven crimping profiles: BE, B, TH, R, H, F, U;
- Control of correct pipe positioning via the inspection holes in the bushing flange (orange plastic up to 32 mm diameter; white plastic from 40 to 63 mm diameter)
- Two o-rings for a more secure seal
- Wide range of diameters from 16 mm to 63 mm
- Maximum continuous operating temperature 120 °C (check the pipe specifications for the effective limit of the system)
- Maximum operating pressure 10 (bar check the pipe specifications for the effective limit of the system)
- High pull-out resistance thanks to the sawtooth insert profile
- Optimised bush/fitting coupling system to prevent detachment of the steel bush.

## ■ COMPATIBILITY

| Diameter (mm) | 16 | 18 | 20 | 25 | 26 | 32 | 40 | 50 | 63 |
|---------------|----|----|----|----|----|----|----|----|----|
| BE            | ✓  |    | ✓  |    | ✓  | ✓  |    |    |    |
| B             | ✓  | ✓  | ✓  |    | ✓  | ✓  |    |    |    |
| F             | ✓  | ✓  | ✓  |    | ✓  | ✓  | ✓  | ✓  | ✓  |
| R             | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |    |    |    |
| H             | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |    |    |
| TH            | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  | ✓  |
| U             | ✓  | ✓  | ✓  |    | ✓  | ✓  | ✓  | ✓  | ✓  |

## ■ MATERIALS AND COMPONENTS

The materials used in the fittings are:

- Body: brass, CW617N or Cuphin® CW724R (Pb ≤ 0.1%)
- Bushes: AISI 304 solution heat treated stainless steel
- Bush holders: nylon
- O-ring: peroxide-cured EPDM, certified safe for food contact and use in potable water systems

|   |  |
|---|--|
|    | <b>Body</b><br>The MULTI-PRESS range is available in two versions, with fitting body in CW617N brass or Cuphin® CW724R (alloy with ≤ 0.1% lead content). Both brass alloys are contained in the 4MS "Positive List" and can therefore be used in domestic potable water distribution networks. The sawtooth profile of the fitting terminals helps grip the pipe inside the fitting itself, increasing the pull-out resistance in the event that the pipe-fitting system is subjected to tensile stress.   |
|    | <b>Bush</b><br>The bushes used in MULTI-PRESS fittings are made of AISI 304 solution heat treated stainless steel. This material, in addition to guaranteeing long-term performance, also offers increased ductility, which facilitates the crimping operation and ensures greater longevity of the crimping tools. The bush always carries the name of the manufacturer, the diameter and thickness of the multilayer pipe with which the fitting can be used, as well as the traceability symbol which identifies the month and year of production of the fitting. |
|  | <b>Bush holder</b><br>Made of plastic, this prevents direct contact between the brass body of the fitting and the aluminium layer of the pipe, thus acting as a dielectric coupling; this prevents any damage due to electrolytic corrosion due to contact between dissimilar metals. The bush holder also features inspection holes which allow the installer to check correct positioning of the pipe once inserted.   |
|  | <b>O-ring</b><br>Each fitting has two peroxide-cured EPDM o-rings on each connection which, after crimping, ensure a perfect seal between the pipe and fitting. The o-rings meet all applicable European standards, allowing Multi-Press to be used in sanitary DHW/DCW systems.   |

## ■ RANGE

MULTI-PRESS press fittings are available in a broad range of configurations and sizes from 16x2 to 63x4.5. All figures with corresponding dimensional tables are provided in the appendix.

|   |  |   |   |
|---|--|---|---|
|    | <b>MP 5700 R</b><br>Straight reduced fitting                             |    | <b>MP 5717</b><br>Elbow fitting with flat-seal lock nut       |
|    | <b>MP 5700</b><br>Straight fitting                                       |    | <b>MP 5760</b><br>Wall fitting                                |
|    | <b>MP 5704</b><br>45° fitting  |    | <b>MP 5761</b><br>Wall fittings (kit with AS 1929)            |
|    | <b>MP 5710</b><br>Elbow fitting  |    | <b>MP 5762</b><br>Wall fittings (kit with AS 1927)            |
|   | <b>MP 5720</b><br>Tee fitting  |   | <b>MP 5780</b><br>Double wall fitting                         |
|  | <b>MP 5720 RLL</b><br>Tee fitting with reduced side connections          |  | <b>MP 5765</b><br>Double wall fittings (kit with AS 1929)     |
|  | <b>MP 5720 RCL</b><br>Tee fitting with reduced central and side branches |  | <b>MP 5766</b><br>Double wall fittings (kit with AS 1927)     |
|  | <b>MP 5720 RC</b><br>Tee fitting with reduced central connection         |  | <b>MP 5781</b><br>Double 90° wall fitting                     |
|  | <b>MP 5720 RL</b><br>Tee fitting with reduced side connection            |  | <b>MP 5769</b><br>Double 90° wall fittings (kit with AS 1929) |
|  | <b>MP 5720 RR</b><br>Tee fitting with double reduced connections         |  | <b>MP 5723</b><br>Wall fitting for horizontal chases          |

|   |  |   |  |
|---|--|---|--|
|    | <b>MP 5608</b><br>Male straight fitting                    |    | <b>MP 5724</b><br>RH wall terminal for horizontal chases                     |
|    | <b>MP 5711</b><br>Male elbow fitting                       |    | <b>MP 5725</b><br>LH wall terminal for horizontal chases                     |
|    | <b>MP 5721</b><br>Male tee fitting                         |    | <b>MP 5764</b><br>Wall terminals for horizontal chases (kit with AS 1928)    |
|    | <b>MP 5609</b><br>Soft-seal male straight fitting          |    | <b>MP 5701</b><br>Plug   |
|    | <b>MP 5607</b><br>Straight fitting with FASTEC fitting     |    | <b>MP 5702</b><br>Straight fitting with chrome-plated copper pipe            |
|  | <b>MP 5613</b><br>Female straight fitting                  |   | <b>MP 5715</b><br>Elbow fitting with chrome-plated copper pipe               |
|  | <b>MP 5712</b><br>Female elbow fitting                     |  | <b>MP 5716</b><br>Tee fitting with chrome-plated copper pipe                 |
|  | <b>MP 5712 L</b><br>Long female elbow fitting              |  | <b>MP 5729</b><br>Built-in valve with DN 15 press-fit fitting, knob and rose |
|  | <b>MP 5722</b><br>Female tee fitting                       |  | <b>MP 5730</b><br>Built-in valve with DN 15 press-fit fitting, cap and rose  |
|  | <b>MP 5703</b><br>Straight fitting with flat-seal lock nut |  | <b>MP 5610 B</b><br>Under-floor distribution box with 90° press fitting      |
|  | <b>MP 5705</b><br>Straight fitting with lock nut           |  | <b>MP 5610 R</b><br>Under-floor distribution box with 90° press fitting      |

## SPECIAL FIGURES

### U-Fittings

As well as properly distributing water to all connected components, any sanitary DHW/DCW plumbing system must guarantee the best hygienic conditions possible by preserving the quality of the mains water supply.

A sanitary DHW/DCW distribution system is composed of different sections of piping:

- Main distribution ring
- Ascending or descending risers
- Horizontal distribution sections to the floors
- Connections to the terminal units (i.e. basins, baths, showers etc.)

There are several possible options for these. The two best known are shown in the following images, with branch connection (left) or via manifold (right), which are not ideal from a sanitary perspective.

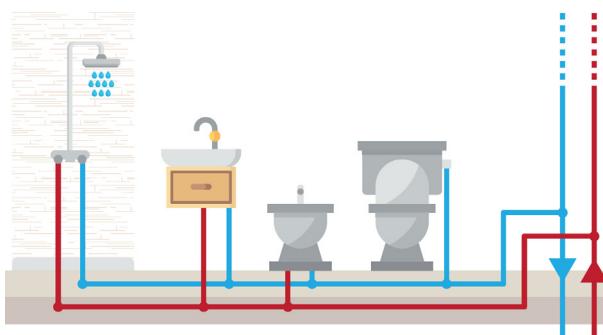


Figure 2 Branch system.

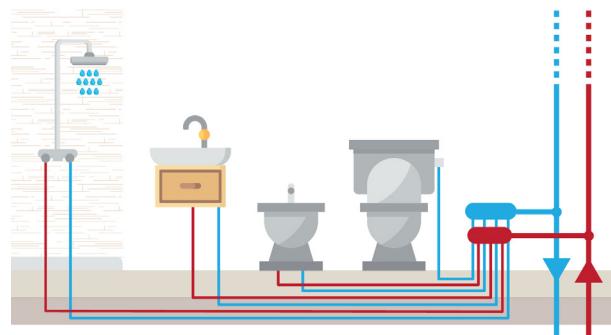


Figure 3 Manifold system.

Indeed, those pipe segments serving rarely used components suffer from a lack of water circulation, meaning the water in these becomes stagnant. The same water sitting inside pipes over a long period of time encourages the proliferation of bacteria (including legionella), and should therefore be avoided as much as possible.

IVAR's MP range of fittings includes the **5780 series**, which is essential for installations such as those shown in the following figures and which implement a series- (left) and a ring- (right) type distribution system.

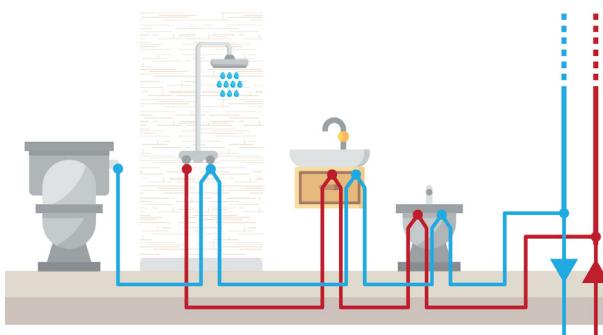


Figure 4 Series distribution system.

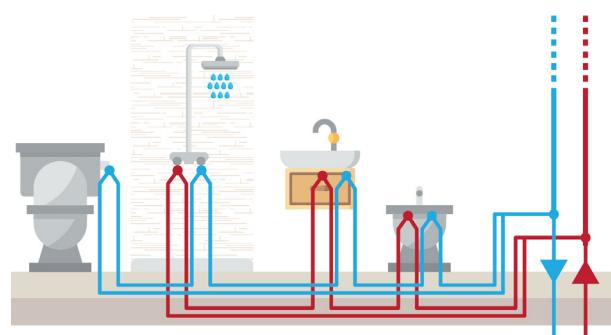


Figure 5 Ring distribution system.

In both cases, the goal of these configurations is to facilitate water circulation in the pipes, thus avoiding stagnation and reducing health risks. In the case of series distribution (left), the component used most frequently should be in the furthest position from the column so that every time this is used, the water is replaced completely through circulation in all the branches. In the case of ring distribution (right), the use of any plumbing fixture achieves the same result, making this distribution system the most effective for reducing hygienic risk. Depending on given regulations, there may be a requirement to build facilities for hospitals and community structures using a ring distribution system, including an automatic withdrawal point activated by timer. This ensures periodic water circulation in the system up to the terminal units during the thermal disinfection cycles.

### Under-floor distribution box fitting



Multilayer pipes are installed in corrugated conduit in some systems, for example, when additional protection is required or in countries where installation regulations require the pipes to be removable. For connection to the terminal units in these cases, the MP 5610 series under-floor distribution box fittings are required. Made with a 1/2" F connection, these accommodate the corrugated protective conduit inside, keeping the pipe insulated up to the point of exit from the masonry wall. The CW617N brass fitting is fixed to the plastic box by a pair of screws, so that it can be easily disassembled for crimping and then reinserted in the box.

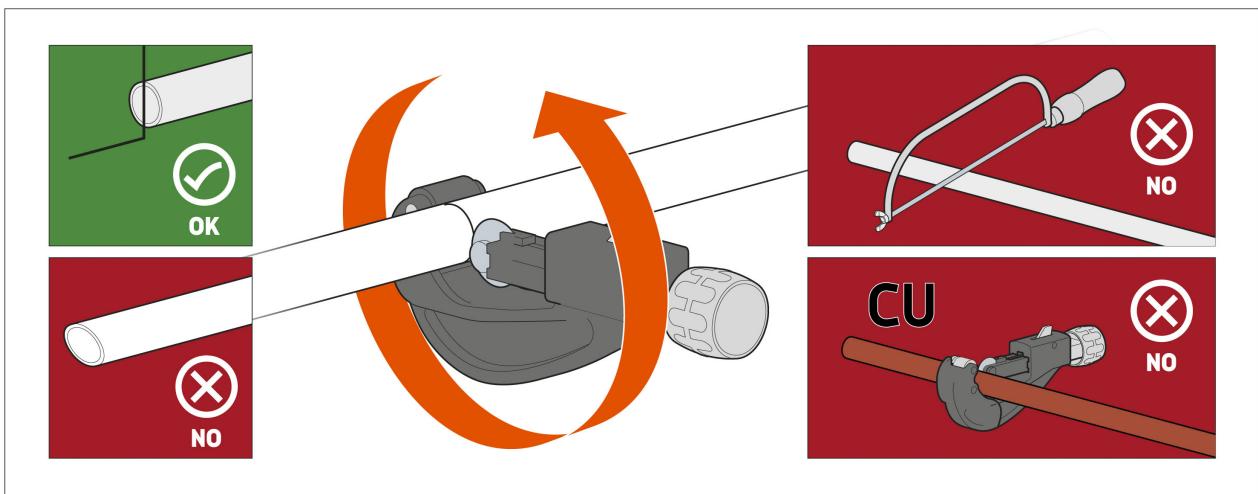
Figure 6 Hidden distribution.

## ■ ASSEMBLY AND INSTALLATION ACCESSORIES

|  |   |  |   |
|--|---|--|---|
|   | <b>AR 01</b><br>Calibration device for multilayer pipes                       |   | <b>AR 02</b><br>Calibration set for multilayer pipes including carry case |
|   | <b>AR 09</b><br>Grip for multilayer pipe calibration device                   |   | <b>AR 04</b><br>Calibration devices for multilayer pipes                  |
|   | <b>AR 37</b><br>Battery crimping machine with carry case, battery and charger |   | <b>AR 10 R</b><br>Jaws for press fittings                                 |
|   | <b>AR 37 B</b><br>Battery   |   | <b>AR 37 C</b><br>Battery charger   |
|  | <b>AR 110</b><br>Pressing collars   |  | <b>AR 120</b><br>Intermediate jaw for pressing collars                    |

## ■ INSTALLATION INSTRUCTIONS

### Cutting the Pipe

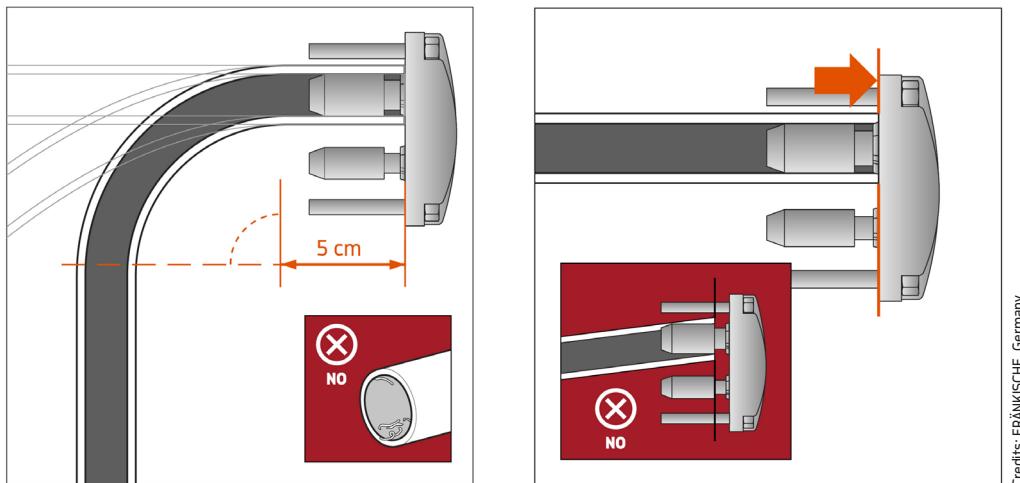


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Figure 7 Pipe Cutting Procedure.

Cuts in multilayer pipe must be performed to specifications using suitable pipe shears which prevent ovalisation of the pipe, ensuring that the cut is perpendicular to the pipe profile.

## Calibration



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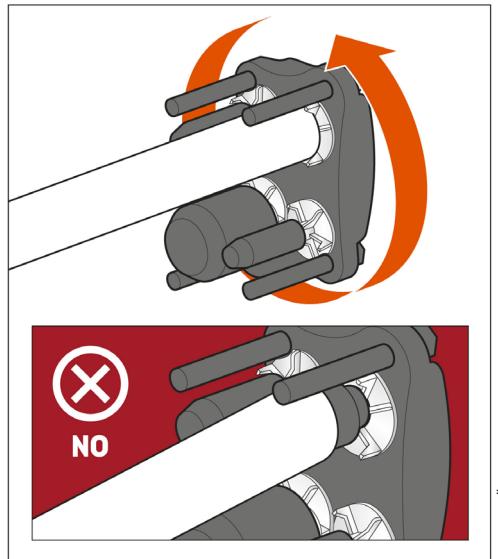
**Figure 8** Calibration Procedure.

The calibration operation determines the correct internal diameter of the pipe while the chamfering operation bevels the end of the pipe so as to avoid the displacement of the o-rings from their seat during insertion. Correct calibration and chamfering requires use of the AR 01 tool.

- For 16x2, 18x2, 20x2, 26x3 and 32x3 pipes, use code 500406
- For 40x3.5 pipes, use code 500407
- For 50x4 pipes, use code 500408
- For 63x4.5 pipes, use code 500409.

Alternatively, it is possible to use the complete set of calibration tools item no. AR 02 (code 501797).

## Chamfering



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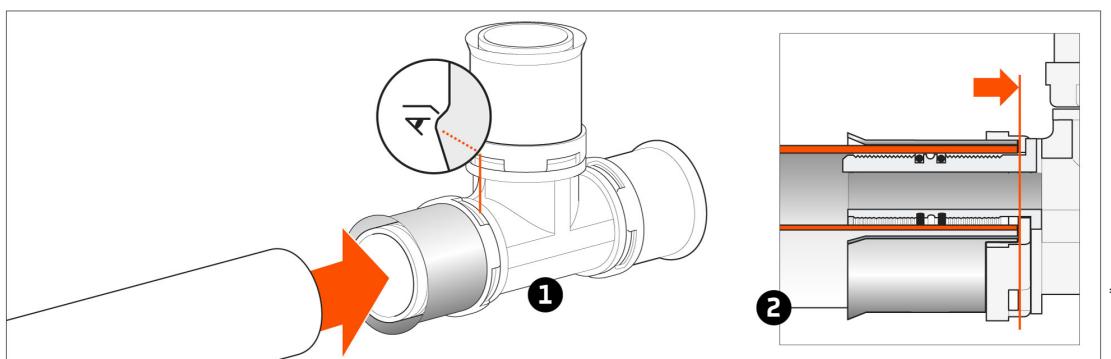
**Figure 9** Chamfering Procedure.

1. Insert the tool inside the pipe, making sure it enters the cutting blades.
2. Rotate the tool to create a bevel inside the pipe.
3. Lubricate the o-rings on the fittings with water or silicone-based oils and insert the pipe onto the fitting.

**WARNING!** Use only water or silicone-based oils to lubricate the fittings. Use of mineral-based oil or grease is prohibited. It is also prohibited to change the original o-rings.

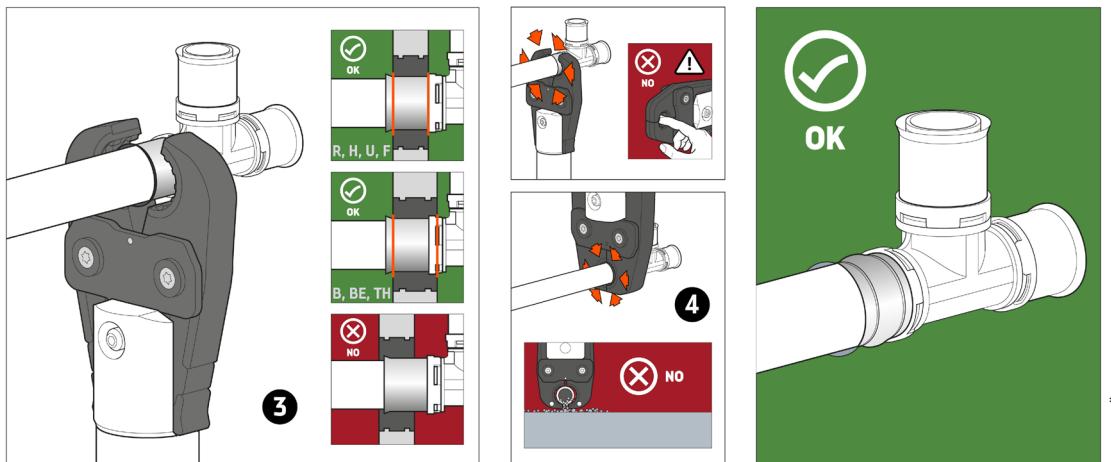
If it is necessary to join with a threaded component, the use of hemp is not recommended, while Teflon tape or sealant is permitted, always in adequate quantities and never excessive, applying a maximum tightening torque of between 15 and 20 Nm using a tool.

## Inserting the pipe onto the press fitting



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Figure 10 Inserting the Pipe.



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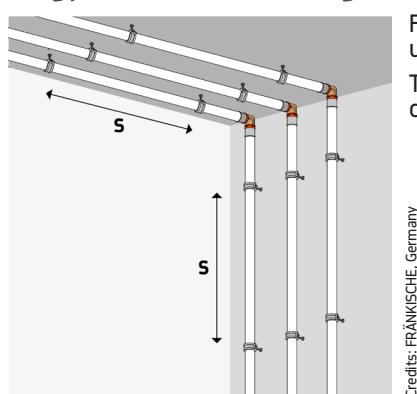
Figure 11 Crimping Procedure.

1. Insert the fitting up to the stop.
2. Ensure that you have reached the correct installation depth thanks to the opening on the plastic ring. If excessive resistance is encountered during insertion of the fitting, repeat the calibration/chamfering operations and lubricate the o-rings again with water or silicone-based oils.
3. Open the jaws of the crimp tool and insert the fitting to be crimped, ensuring that the plastic ring is inserted in the reference groove (with B and TH profile jaws), or that the jaws are in contact with the plastic ring (with F, H and U profile jaws).
4. Operate the crimping tool following the instructions given in the user manual.

Crimping is performed with the AR 37 electric crimping tool. Consult the manufacturer's instructions to ensure correct use of these tools.

## ■ PIPE BRACKET

### Fixing points and surface mounting



For surface mount installations, it is recommended that straight lengths of pipe be used for convenience (ALPEX-DUO and IVAR-APEX B).

The maximum unsupported distance "S", for surface-mount pipework in walls or ceilings installation, is given in the following table.

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Figure 12 Surface-mount installation on walls.

| Pipe size (mm) | Weight of pipe with water (kg/m) | S (cm)     |          |
|----------------|----------------------------------|------------|----------|
|                |                                  | Horizontal | Vertical |
| 16x2           | 0.225                            | 120        | 150      |
| 18x2           | 0.267                            | 130        | 150      |
| 20x2           | 0.355                            | 135        | 150      |
| 25x2.5         | 0.608                            | 150        | 175      |
| 26x3           | 0.608                            | 150        | 175      |
| 32x3           | 0.935                            | 165        | 200      |
| 40x3.5         | 1.438                            | 200        | 200      |
| 50x4           | 2.264                            | 250        | 250      |
| 63x4.5         | 3.611                            | 250        | 250      |

For ALPEX-DUO and IVAR-APEX B installed in the floor, the fastening points must be at minimum intervals of one metre. Appropriate fastening collars must also be used immediately before and after all elbows.

#### Use of expansion legs in risers

It is essential to use expansion legs (indicated in the following figures with "a") also for pipes passing through a hole which connect to risers between floors. The expansion leg will be able to absorb movements due to changes in length. It is essential to make use of a section of corrugated conduit or insulation to protect the pipe in the area where it passes through the hole. Do not place pipe bends near sharp edges, as there is a risk of damage in this case.

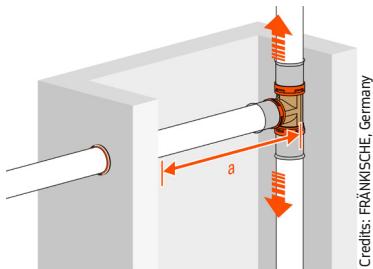


Figure 13 Example of expansion leg.

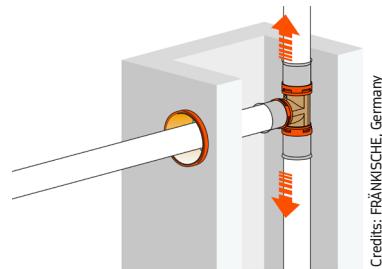


Figure 14 Example of expansion leg.

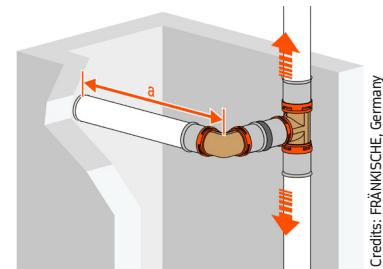


Figure 15 Example of expansion leg.

#### Linear expansion in pipes

The pipe brackets have a dual purpose, both to support the pipework and to handle changes in length caused by temperature variations occurring during operation. The brackets can be rigid or of sliding type, that is able to allow axial movement of the pipe. The pipework must always be laid out so that changes in length are not restricted. In general, fixed brackets can be installed at the centre of long lengths of pipe, in order to allow any change in length to occur in two directions.

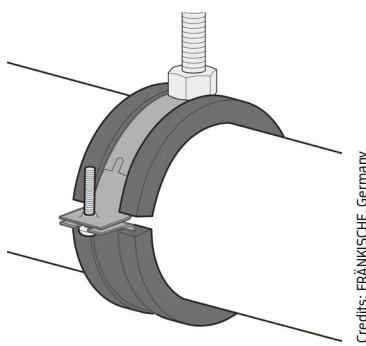


Figure 16 Fixed pipe bracket.

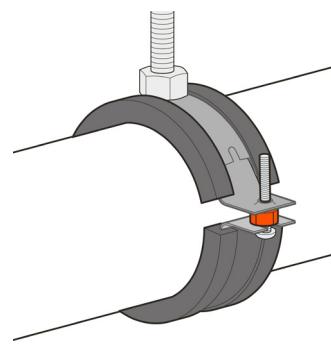


Figure 17 Sliding pipe bracket.

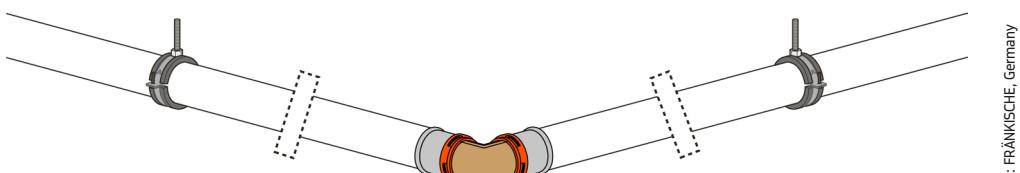


Figure 18 Use of pipe brackets.

## Example

Assuming a temperature variation of 50° C and a pipe length of 5 metres (with IVAR ALPEX DUO pipe), the following increase in length will occur:

$$\Delta L = 0.026 \text{ mm/m}^\circ\text{C} \cdot 50^\circ\text{C} \cdot 5\text{m} = 6.5 \text{ mm}$$

The linear expansion values for pipe are given below in millimetres, depending on  $\Delta T$  and pipe length.

| Pipe length | Temperature differential $\Delta T$ (°C) |            |            |            |            |      |      |
|-------------|--|------------|------------|------------|------------|------|------|
| m           | 10                                       | 20         | 30         | 40         | 50         | 60   | 70   |
| 1.0         | 0.3                                      | 0.5        | 0.8        | 1.0        | 1.3        | 1.6  | 1.8  |
| 2.0         | 0.5                                      | 1.0        | 1.6        | 2.1        | 2.6        | 3.1  | 3.6  |
| 3.0         | 0.8                                      | 1.6        | 2.3        | 3.1        | 3.9        | 4.7  | 5.5  |
| 4.0         | 1.0                                      | 2.1        | 3.1        | 4.1        | 5.2        | 6.2  | 7.3  |
| <b>5.0</b>  | <b>1.3</b>                               | <b>2.6</b> | <b>3.9</b> | <b>5.2</b> | <b>6.5</b> | 7.8  | 9.1  |
| 6.0         | 1.6                                      | 3.1        | 4.7        | 6.2        | 7.8        | 9.4  | 10.9 |
| 7.0         | 1.8                                      | 3.6        | 5.5        | 7.2        | 9.1        | 10.9 | 12.7 |
| 8.0         | 2.1                                      | 4.2        | 6.2        | 8.8        | 10.4       | 12.5 | 14.6 |
| 9.0         | 2.3                                      | 4.7        | 7.0        | 9.4        | 11.7       | 14.0 | 16.4 |
| 10.0        | 2.6                                      | 5.2        | 7.8        | 10.4       | 13.0       | 15.6 | 18.2 |

## Positioning

The positioning of expansion legs is essential in the case of changes in length or direction. The example on the left is a situation where it is essential to use an expansion leg on a change of direction.

The example on the right shows a situation where it is useful to apply a U-shaped bend: on very long pipes without changes in direction, it is recommended to use a U-shaped bend with two expansion legs installed vertically to absorb the linear expansion, and a fixed collar on the horizontal section.

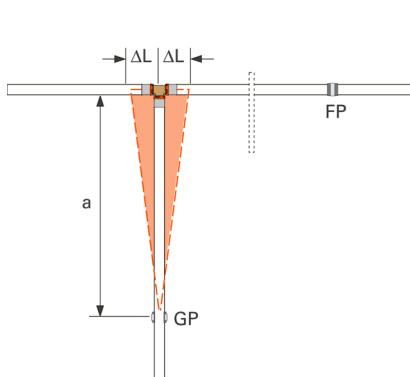


Figure 19 Fixed pipe bracket.

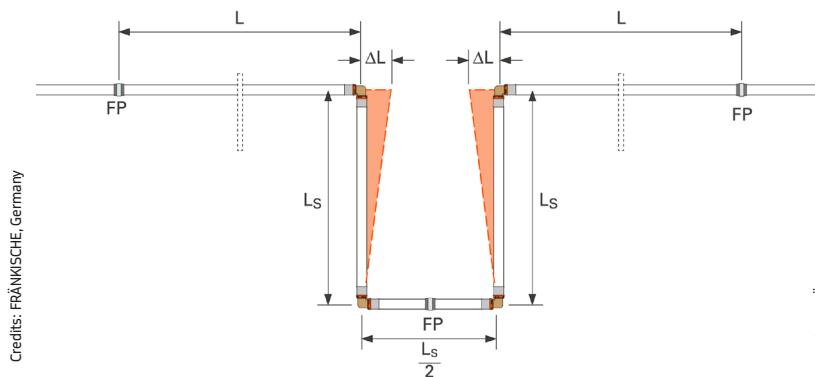


Figure 20 Change of direction.

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13

Another example where an expansion leg is required on the change of direction is shown below.

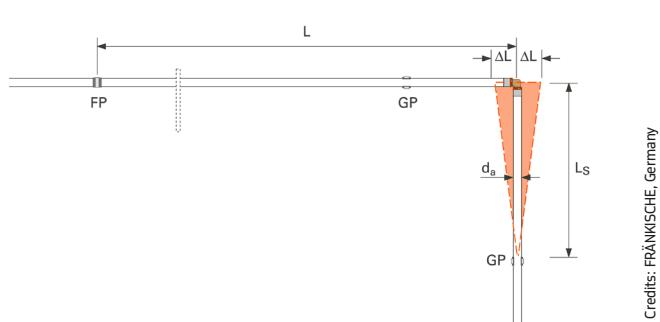


Figure 21 Change of direction.

a: expansion leg  
 $d_a$ : pipe outer diameter  
 FP: fixed pipe bracket  
 GP: sliding pipe bracket  
 L: pipe length  
 $\Delta L$ : linear expansion  
 L<sub>s</sub>: expansion leg length

Formulas for calculating the length of an expansion leg and graphs allowing for immediate sizing are given below.

$$\Delta L \text{ (m)} = \alpha \cdot L \cdot \Delta T$$

$$L_s = C \cdot \sqrt{(d_a \cdot \Delta L)}$$

where:

$\alpha$ : coefficient of expansion ( $1/^\circ\text{C}$ )

$C$ : constant depending on the type of material (33 for ALPEX DUO and IVAR-APEX B pipe)

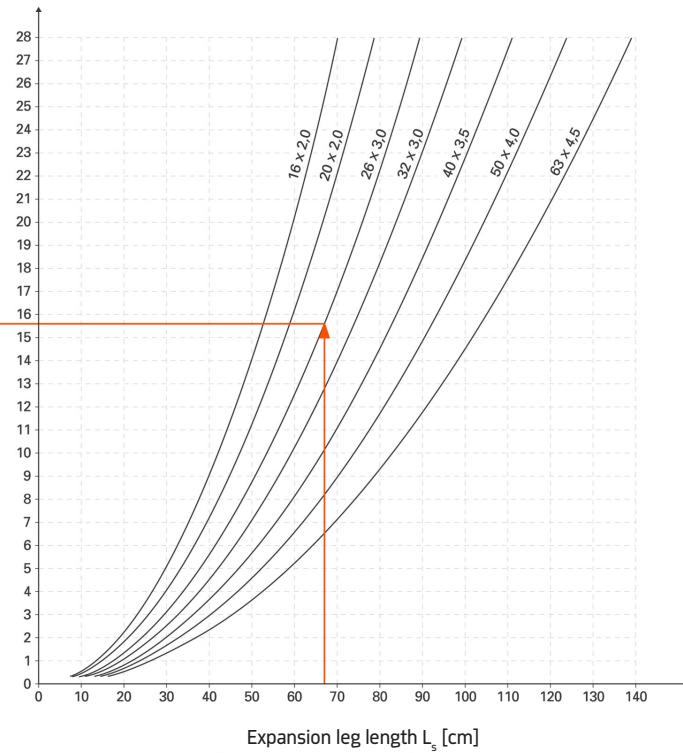
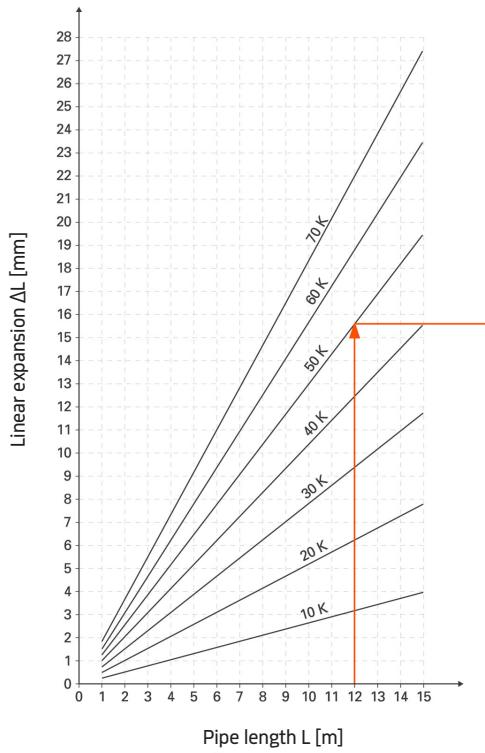
$d_a$ : pipe outer diameter (mm)

$L$ : pipe length (m)

$\Delta L$ : linear expansion (mm)

$L_s$ : expansion leg length (cm)

$\Delta T$ : temperature differential ( $^\circ\text{C}$ )



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Figure 22 Sizing graph examples.

## ■ QUALITY CONTROL AND PRODUCTION PROCESS

The production process for IVAR press fittings is monitored throughout. The characteristics of the end product depend on the care taken in its production. Some of the most important aspects of this are described below.



Figure 23 Three-dimensional scanning.

### Receipt of materials

The **body of the fitting blank** comes from **VALMON STAMPATI s.p.a.**, a Brescia-based industrial company part of the I.V.A.R. group, which deals with the printing of semi-finished products starting from brass bars, obtaining the shape of the final piece, which will then be deburred and sandblasted.

**IVAR's Quality Control** department receives the samples of the **raw brass components** forming the body of the **MULTI•PRESS®** fittings and checks their dimensions using a 3D scanning process. An operative uses a mobile scanner to do this.

The physical component is compared with the technical drawing, and if it falls within the tolerances, the lot is accepted for processing. Otherwise, the nonconformity is reported to the stamping company.

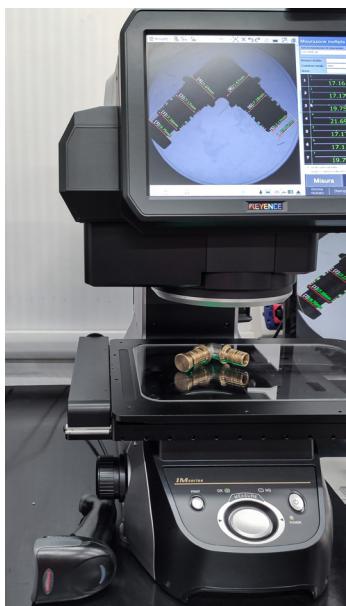


Figure 24 Comparison with technical drawing.

### Analysis during machining

The **machining process** for entire production batches is begun only after analysis of the initial samples of the machining itself. If they conform with the technical department's drawings, production of the batch begins.

**Throughout** the entire machining process, the QC operatives take samples of the components from the machines. Samples are checked with an optical dimensional verification tool through a comparison with the mathematical 3D reference model. For press fittings, for example, the critical dimensions are the threads, the bases where the bush holders will rest, and the seats for the sealing o-rings. In the event of non-conformities, batch production is halted and all items produced up to that point are checked again with the optical scanner.

The bodies of the **MULTI•PRESS®** press fittings are now ready to move on to the assembly phase with the other components.

## ■ ASSEMBLY

IVAR has dedicated machinery for preparing just the bush including the polymer bush holder. During this process, the bush is also laser engraved with information on the size of the fitting, the certifications and the crimping profiles which can be used. The purpose of this preliminary process is to **speed up the supply of components** to the machines which handle assembly of the press fitting.

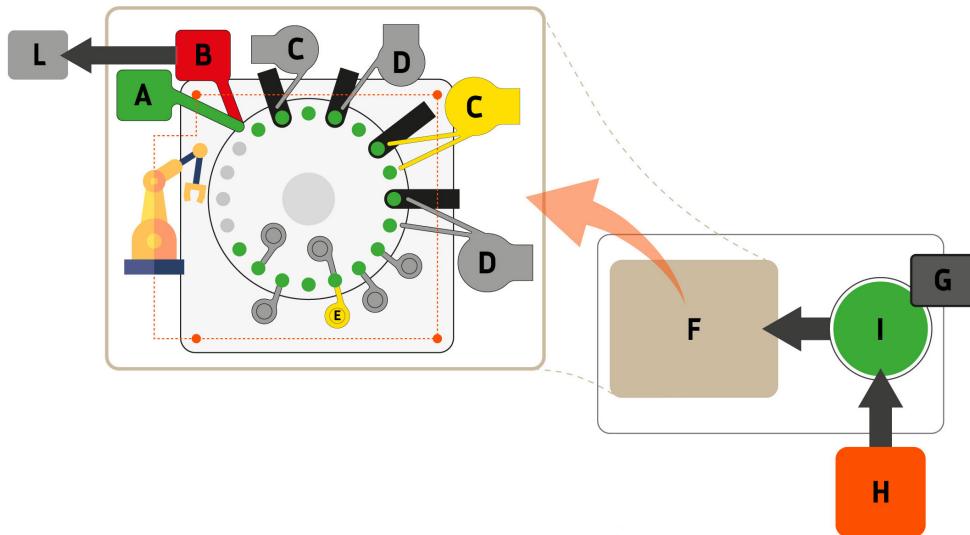
### MULTI•PRESS® fitting assembly

The assembly station for the fittings is supplied with the necessary components via automated systems. The fitting bodies enter the machine via a loading choke system which ensures constant supply of one piece at a time. Each piece is analysed by a vision system with video camera which recognises the profile and associates it with the correct assembly program, defining its pick-up co-ordinates for the robotic arm.

On board the machine, the fitting body is placed on the rotating table and reaches in turn the workstations required to obtain the end result.

For example, in order to make up a **single-bush fitting** with a single outlet for multilayer pipe, the fitting passes through two stations.

The **first** is responsible for inserting the two peroxide-cured EPDM sealing o-rings on the connection. Correct insertion of the o-rings is monitored by a dedicated video camera which films and analyses all the **MULTI•PRESS®** fittings manufactured by IVAR.



**Figure 25** Assembly station schematic diagram.

- A. Rejected components
- B. 20 mm bushes
- C. 16 mm bushes
- D. 20 mm O-rings
- E. Assembly machine
- F. Division system and robot
- G. Machine onboard PC
- H. Case tipper
- I. Body parts feeding
- L. Packaging machine

The second station fits the bush including bush holder on the fitting body. From here, the fitting reaches the end of the rotating table and is placed inside the package, which contains the correct quantity of fittings destined for sale.

A scale checks the weight of the bagged fittings to ensure that there have not been any errors during the process, and the bag is placed inside the recycled cardboard box.

Throughout the assembly process, the QC operatives monitor the components by picking samples. Moreover, each machine is network-connected and monitored remotely. It is possible to monitor the cycle times and performance over time, as well as any anomalies.



**Figure 26** Process control.



**Figure 27** Assembly station rotating table.

## ■ LABORATORY TESTS

### Reference standards

IVAR bases most of its laboratory tests on the **DVGW W-534** worksheet, a unambiguous basis for the assessment of fittings, joints and pipes for use in contact with potable water.

### Traction

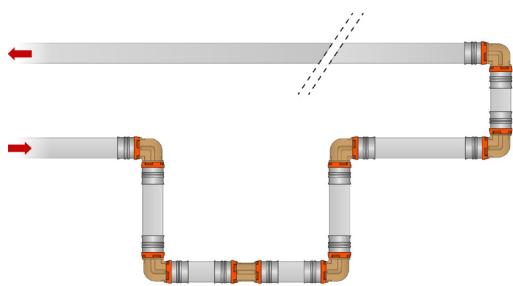


The purpose of this test is to define the mechanical characteristics of the pipe-fitting system. During the test, it must not be possible to pull the pipe out of the fitting, the pipe must not crack, kink or bend, while the fittings must not sustain damage which could affect their operation.

The pipes are clamped in a device for stress testing, which allows the maximum axial traction force to be reached without bending and/or kinking. The maximum traction force is reached in 10-15 seconds and held for more than an hour, with deviations of 2.5% permitted. The test is carried out at  $20 \pm 5^\circ\text{C}$  and  $93 \pm 2^\circ\text{C}$ ; different test pieces are used for the two different temperatures.

Figure 28 Schematic diagram of the test

### Thermal cycles

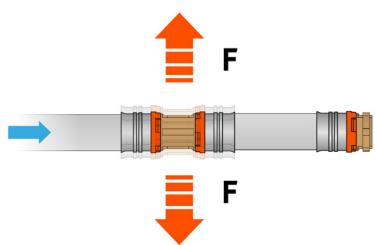


The thermal cycles test is a fatigue test which guarantees the reliability of the IVAR pipe-fitting system over time. In the first part of the test, a circuit is assembled composed of pipes and fittings in accordance with schemes set out by the reference standard. Once ready, the circuit undergoes 5,000 thermal cycles of alternating hot and cold water. The duration and temperature of the individual cycles depend on the specific case. Generally, IVAR bases its tests on the specifications provided by the DWGV W-534 worksheet. For an even more complete assessment of the pipe-fitting system, IVAR may adopt further tests in addition to those mentioned.

All components of the circuit must hold their seal throughout and at the end of the test. This also applies for threaded fittings of the fittings being examined, where applicable.

Figure 29 Schematic diagram of the test

### Vibration



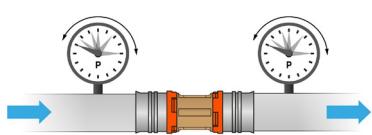
This test is designed to check the compatibility of the pipe-fitting system and ensure the pipe does not detach from the fitting. Two sections of pipe connected by a fitting undergo the combined action of two factors:

- Internal water pressure greater than 15 bar
- Mechanical misalignment stress of  $\pm 10$  mm at a frequency of 20 Hz.

The test is passed if no breakages or leaks occur after the number of vibration cycles provided for by the reference standard.

Figure 30 Schematic diagram of the test

### Water hammer



This test is designed to check the mechanical robustness of the fitting and the absence of leaks. The test is performed with pipes and with at least three fittings for each of the dimensions under examination.

The test is performed at an ambient temperature of  $20 \pm 5^\circ\text{C}$  with water as the pressure transmission fluid. Within the test circuit, the pressure is quickly and repeatedly varied from the minimum value (0.5 bar) to the maximum value (25 bar) at which it is to be tested.

Figure 31 Schematic diagram of the test

## ■ CALCULATION OF PRESSURE DROPS

As it passes through the pipework and the terminal devices making up the system, the fluid is subject to a reduction in pressure known as **pressure drops**.

### Distributed pressure drops

For every metre of pipework which the fluid flows through, a **distributed** pressure drop (or head loss) is assigned. The following equation can be used to calculate this:

$$\Delta P = \frac{8w\mu}{R^2} L$$

Where:

- $w$ : velocity of the fluid [m/s]
- $\mu$ : kinematic viscosity of the fluid [Pa s]
- $R$ : radius of the pipe in question [m]
- $L$ : length of the pipe in question [m]

The pressure drop is therefore directly proportional to the viscosity and the velocity of the fluid, and the length of the pipe; it is inversely proportional to the square of the radius of the pipe.

### Concentrated pressure drops

There are losses due to obstacles such as bends, elbows, valves and fittings that the fluid may meet as it flows through the pipes. These factors are defined as **concentrated** pressure drops and do not depend on the length of the pipework. They can be expressed using the following formula:

$$\Delta P = \frac{\rho w^2 \beta}{2}$$

Where:

- $\rho$ : density of the fluid [kg/m<sup>3</sup>]
- $w$ : velocity of the fluid [m/s]
- $\beta$ : coefficient of friction This is a dimensionless quantity whose value, generated experimentally, depends in turn on the Reynolds number, the internal roughness of the piping and the distance covered by the fluid from the pipe inlet.

### Equivalent length

In order to size the circulation pump for the climate control system (or to check compatibility with the available pressure in the sanitary DHW/DCW system), it is necessary to find the sum of pressure losses along the entire plumbing circuit. This can be done in two ways: analytically, by adding together the distributed and concentrated losses of each component, or else by using a **simplified method**.

This consists of calculating the pressure drops of the components of the system as if they were generated by a linear section of pipe  $L_{EQ}$  of a certain length.

The total pressure drops of the system are calculated with the following formula:

$$\Delta P = \frac{\rho w^2 \beta}{2D} (L + L_{EQ})$$

Where:

- $\rho$ : density of the fluid [kg/m<sup>3</sup>]
- $w$ : velocity of the fluid [m/s]
- $D$ : Diameter of the pipe in question [m]
- $\beta$ : coefficient of friction

Finally,  $L_{EQ}$  is the sum of the equivalent lengths for all roughness encountered by the fluid in its passage through the system. In order to convert the concentrated pressure drops into equivalent lengths of pipe, it is advisable to use conversion tables supplied by the manufacturers of the components in question.

## ■ PRESSURE TESTING TO EN 806 PART 4

Testing can be carried out either using water or, where permitted by national regulations, using low-pressure air (clean and unlubricated) or inert gases.

The DHW or DCW system must be filled only with potable water free of particles  $\geq 150 \mu\text{m}$  (for example using mechanical filters to EN 13443-1).

For the hydraulic testing, the pressure gauges and the recording device must be accurate to 0.02 MPa (0.2 bar), and must be installed at the lowest point of the system. The pressure gauge should have a range from 0 MPa to 1.6 MPa (0 bar - 16 bar). When required, the system test pressure can also be increased in accordance with national standards.

All details of the test (complete test procedure diagram) must be recorded and retained.

The maximum permissible speed of pressure increase when pressurising the system is calculated using the following formula:

$$v = (4 \cdot PN) / 60 \text{ bar} \cdot s^{-1} \quad (1)$$

When using plastic or metal-plastic pipework, the properties of these materials mean they may expand for a certain period of time when placed under pressure, and this may affect the results of the test.

For plastic pipework, for example, a change in system temperature may cause a change in pressure.

If the equilibrium temperature of the plastic pipework system exceeds  $25^\circ\text{C}$ , a reduction factor ( $f_T$ ) must be applied on the basis of the material used. The manufacturer of the system can provide the graphical function correlated with the operating temperature.

The test pressure is then calculated using the following formulas:

$$TP = 1.1 \cdot MDP, \text{ if } T \leq 25^\circ\text{C} \quad (2)$$

$$TP = 1.1 \cdot MDP \cdot f_T, \text{ if } T > 25^\circ\text{C} \quad (3)$$

where:

- T is the temperature
- TP is the test pressure
- MDP is the maximum design pressure

If the equilibrium temperature of the system is greater than  $25^\circ\text{C}$ , the reduction factor  $f_T$  of the material must be taken into consideration.

### Test procedure

| Material type   | Hydraulic testing procedure  |
|---|------------------------------|
| Linear elastic materials (i.e. metals)                                    |                              |
| Elastic materials (PVC-U, PVC-C etc.) and multilayer materials            | Test procedure A             |
| Viscoelastic materials (i.e. PP, PE, PEX, PA, PB, etc.) with $DN \leq 63$ |                              |
| Viscoelastic materials with $DN > 63$ (i.e. PE, PP, PEX, PA, PB etc.)     | Test procedure B or C        |
| <b>Combined systems with <math>DN \leq 63</math> (metals and plastic)</b> | <b>Test procedure A</b>      |
| <b>Combined systems with <math>DN &gt; 63</math> (metals and plastic)</b> | <b>Test procedure B or C</b> |

### Procedure A

Flush the system.

Fill the system with water and ensure that all air has been bled out; seal the purge and air vent valves.

Apply the selected test pressure TP equal to 1.1 times the maximum design pressure MDP using a pump for a period of ten minutes, in accordance with the following figure.

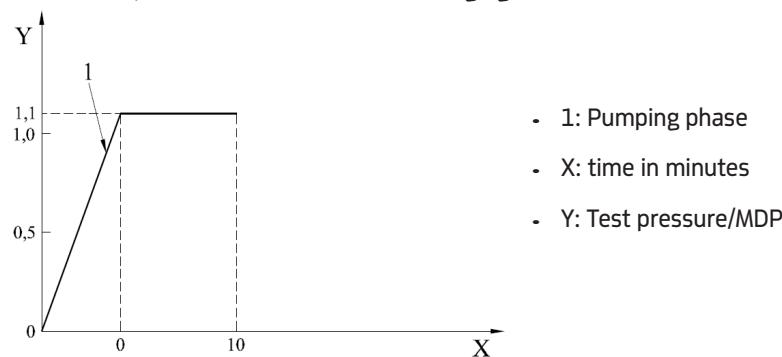


Figure 32 Test profile.

The test pressure must be kept constant for ten minutes. If a loss of pressure is determined, the system must be kept at the test pressure until any leaks in the system have been identified.

#### Procedure B

Flush the system.

Fill the system with water and ensure that all air has been bled out; seal the purge and air vent valves.

Apply the selected test pressure TP equal to 1.1 times the maximum design pressure MDP using a pump for a period of thirty minutes, in accordance with the following figure. An inspection must be made to identify any evident leaks in the system being tested.

Reduce the pressure to 0.5 times the test pressure by purging water from the system.

Close the flushing valve. The system is considered to have passed the leak test if the pressure maintains a value of at least 0.5 times the operating pressure for a period of thirty minutes following the reduction in pressure. Carry out a visual check for leaks. If, during this period, a pressure drop is determined, this means that there is a leak in the system. Maintain the pressure and identify the leak.

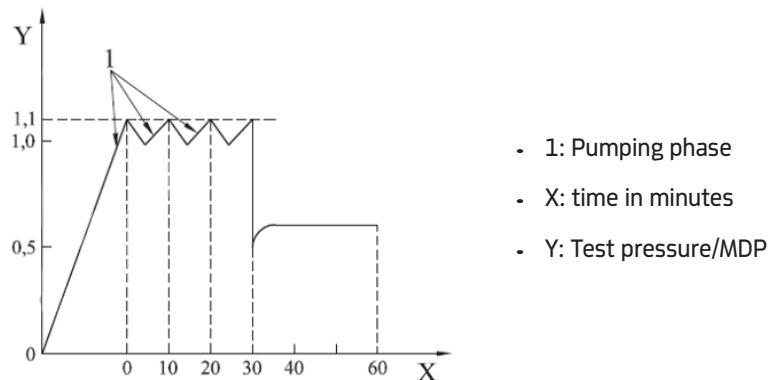


Figure 33 Test profile.

#### Procedure C

Flush the system.

Fill the system with water and ensure that all air has been bled out; seal the purge and air vent valves.

Apply the selected test pressure TP equal to 1.1 times the maximum design pressure MDP using a pump for a period of thirty minutes, in accordance with the following figure.

Record the pressure after thirty minutes have passed. An inspection should be made to identify any evident leaks in the system.

Record the pressure after another thirty minutes have passed. If the pressure drop is less than 0.06 MPa, the system can be considered free of evident leaks. Continue the test without pumping.

Carry out a visual check for leaks over the course of the next two hours. If the pressure falls by more than 0.02 MPa in this time, this means there is a leak in the system. Maintain the pressure and identify the leak.

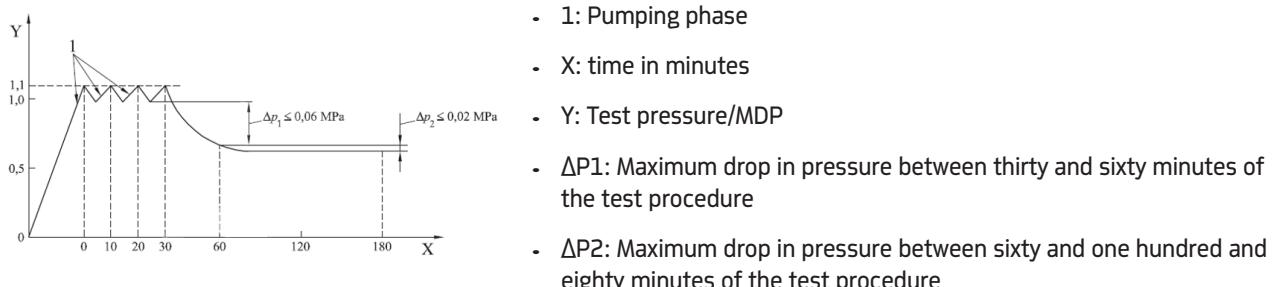


Figure 34 Test profile.

## CERTIFICATION



## ■ SPECIFICATION ITEMS

|   |   |
|---|---|
|    | <p><b>MP 5700 R</b><br/>Straight multi-crimp tool press fitting reducer. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>                             |
|    | <p><b>MP 5700</b><br/>Straight multi-crimping profile fitting. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>                                       |
|    | <p><b>MP 5704</b><br/>45° multi-crimp tool press fitting. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>  |
|    | <p><b>MP 5710</b><br/>Elbow multi-crimp tool press fitting. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>  |
|   | <p><b>MP 5720</b><br/>Tee multi-crimping profile press fitting. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>                                      |
|  | <p><b>MP 5720 RLL</b><br/>Tee multi-crimping profile press fitting with reduced side branches. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bush: AISI 304 solution heat treated stainless steel.</p>          |
|  | <p><b>MP 5720 RCL</b><br/>Tee multi-crimp tool press fitting with reduced central and side branches. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p> |
|  | <p><b>MP 5720 RC</b><br/>Tee multi-crimp tool press fitting with reduced central branch. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>             |
|  | <p><b>MP 5720 RL</b><br/>Tee multi-crimp tool press fitting with reduced side branch. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>                |
|  | <p><b>MP 5720 RR</b><br/>Tee multi-crimping profile press fitting with double reduction. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>             |
|  | <p><b>MP 5728</b><br/>Multi-crimping profile double crossed T fitting for skirting board systems. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>    |
|  | <p><b>MP 5608</b><br/>Male straight multi-crimping profile fitting. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>                                  |

|   |  |
|---|--|
|    | <b>MP 5711</b><br>Male elbow multi-crimping profile press fitting. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.                    |
|    | <b>MP 5711 L</b><br>Male long elbow multi-crimping profile press fitting. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.             |
|    | <b>MP 5721</b><br>Male tee multi-crimping profile press fitting. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.                      |
|    | <b>MP 5609</b><br>Soft-seal male straight multi-crimping profile fitting. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.             |
|    | <b>MP 5607</b><br>Straight multi-crimp tool press fitting with FASTEC fitting. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.        |
|  | <b>MP 5613</b><br>Female straight multi-crimp tool press fitting. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.                     |
|  | <b>MP 5712</b><br>Female elbow multi-crimping profile press fitting. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.                  |
|  | <b>MP 5712L</b><br>Long female elbow multi-crimping profile press fitting. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.            |
|  | <b>MP 5722</b><br>Female tee multi-crimp tool press fitting. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.                          |
|  | <b>MP 5703</b><br>Straight multi-crimping profile fitting with flat-seal lock nut. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.    |
|  | <b>MP 5705</b><br>Straight multi-crimping profile fitting with lock nut. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.              |
|  | <b>MP 5717</b><br>Elbow multi-crimping profile press fitting with flat-seal lock nut. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel. |

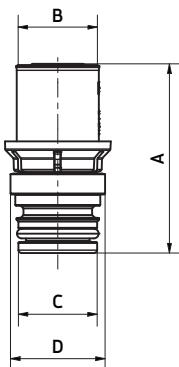
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|---|--|
|    | <p><b>MP 5760</b><br/>Multi-crimping profile press fitting wall fitting. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>  |
|    | <p><b>MP 5761</b><br/>Multi-crimping profile press fitting wall fitting on bracket (AS 1929 kit). Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>                       |
|    | <p><b>MP 5762</b><br/>Multi-crimping profile press fitting wall fitting on bracket (AS 1927 kit). Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>                       |
|    | <p><b>MP 5780</b><br/>Multi-crimping profile double wall fitting. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bush: AISI 304 solution heat treated stainless steel.</p>  |
|    | <p><b>MP 5765</b><br/>Multi-crimping profile press fitting double wall fitting on bracket (kit AS 1929). Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>                |
|   | <p><b>MP 5766</b><br/>Multi-crimping profile press fitting double wall fitting on bracket (AS 1927 kit). Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>                |
|  | <p><b>MP 5781</b><br/>Multi-crimping profile press double 90° wall fitting. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>   |
|  | <p><b>MP 5769</b><br/>Multi-crimping profile press fitting double 90° wall fitting on bracket (AS 1929 kit). Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>            |
|  | <p><b>MP 5723</b><br/>Multi-crimping profile press wall fitting for horizontal chases. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>                                  |
|  | <p><b>MP 5763</b><br/>Multi-crimping profile press fitting wall fitting for horizontal chases on bracket (AS 1928 kit). Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p> |
|  | <p><b>MP 5724</b><br/>Multi-crimping profile press fitting RH wall terminal for horizontal chases. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>                      |
|  | <p><b>MP 5725</b><br/>Multi-crimping profile press fitting RH wall terminal for horizontal chases. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>                      |

|  |   |
|--|---|
|  | <p><b>MP 5764</b><br/>Multi-crimping profile press fitting wall terminals for horizontal chases on bracket (kit with AS 1928). Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p> |
|  | <p><b>MP 5701</b><br/>Multi-crimping profile press fitting with plug. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>  |
|  | <p><b>MP 5702</b><br/>straight multi-crimping profile fitting with chrome-plated copper pipe. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>                                  |
|  | <p><b>MP 5715</b><br/>Stem elbow multi-crimping profile press fitting with chrome-plated copper pipe. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>                          |
|  | <p><b>MP 5716</b><br/>Tee multi-crimp tool press fitting with chrome-plated copper pipe. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>                                       |
|  | <p><b>MP 5729</b><br/>Multi-crimping profile press fitting with built-in valve with DN 15 press-fit fitting, knob and rose. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>    |
|  | <p><b>MP 5730</b><br/>Multi-crimping profile press fitting with built-in valve with DN 15 press-fit fitting, cap and rose. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>     |
|  | <p><b>MP 5610 B</b><br/>Multi-crimping profile press fitting in blue under-floor distribution box. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>                             |
|  | <p><b>MP 5610 R</b><br/>Multi-crimping profile press fitting in red under-floor distribution box. Maximum operating temperature: 120 °C. Maximum operating pressure: 10 bar. Body: CW617N brass. O-ring: Peroxide-cured EPDM. Bush holder: Nylon. Bushing: AISI 304 solution heat treated stainless steel.</p>                              |

## ■ FITTING DIMENSIONS

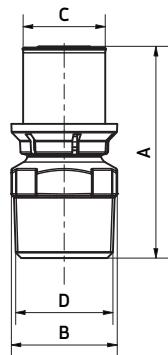
This section lists the main dimensions of all MULTI•PRESS® press fittings contained in the catalogue.

### MP 5607



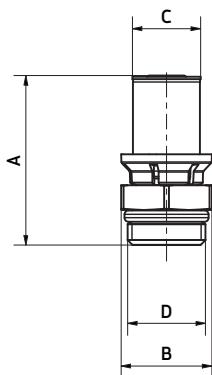
| Art.    | Cod.      | A  | B       | C      | D    |
|---------|-----------|----|---------|--------|------|
| MP 5607 | 511115 MP | 50 | 16/2    | FASTEC | 24.3 |
| MP 5607 | 511116 MP | 50 | 16/2.25 | FASTEC | 24.3 |
| MP 5607 | 511117 MP | 50 | 18/2    | FASTEC | 23.4 |
| MP 5607 | 511118 MP | 50 | 20/2    | FASTEC | 23.5 |
| MP 5607 | 511119 MP | 50 | 20/2.25 | FASTEC | 24.3 |
| MP 5607 | 511120 MP | 50 | 20/2.5  | FASTEC | 24.3 |
| MP 5607 | 511121 MP | 53 | 25/2.5  | FASTEC | 24.3 |
| MP 5607 | 511122 MP | 53 | 26/3    | FASTEC | 24.3 |

### MP 5608



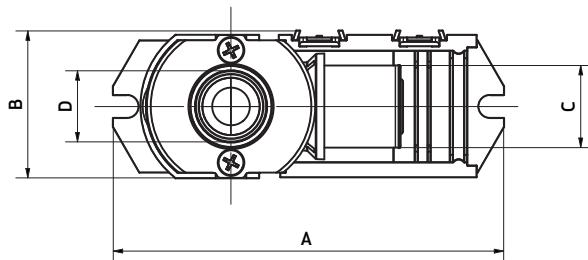
| Art.    | Codice    | A    | B    | C       | D    |
|---------|-----------|------|------|---------|------|
| MP 5608 | 510084 MP | 51.5 | SW19 | 16/2    | 3/8" |
| MP 5608 | 510001 MP | 53.5 | SW22 | 16/2    | 1/2" |
| MP 5608 | 511045 MP | 53.5 | SW22 | 16/2.25 | 1/2" |
| MP 5608 | 510105 MP | 56   | SW28 | 16/2    | 3/4" |
| MP 5608 | 510042 MP | 53.5 | SW22 | 18/2    | 1/2" |
| MP 5608 | 510043 MP | 56   | SW28 | 18/2    | 3/4" |
| MP 5608 | 510002 MP | 53.5 | SW22 | 20/2    | 1/2" |
| MP 5608 | 511046 MP | 53.5 | SW22 | 20/2.25 | 1/2" |
| MP 5608 | 511047 MP | 53.5 | SW22 | 20/2.5  | 1/2" |
| MP 5608 | 510003 MP | 56   | SW28 | 20/2    | 3/4" |

## MP 5609



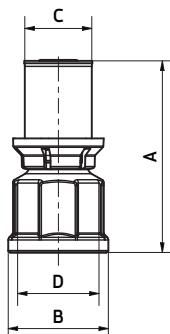
| Art.    | Cod.      | A    | B     | C       | D    |
|---------|-----------|------|-------|---------|------|
| MP 5609 | 510048 MP | 44.8 | SW 24 | 16/2    | 1/2" |
| MP 5609 | 511050 MP | 44.8 | SW 24 | 16/2.25 | 1/2" |
| MP 5609 | 510050    | 44.8 | SW 24 | 20/2    | 1/2" |
| MP 5609 | 511051    | 44.8 | SW 24 | 20/2.25 | 1/2" |

## MP 5610



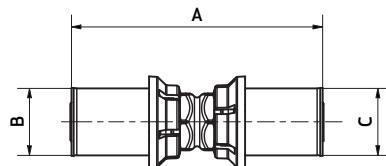
| Art.    | Cod.      | A   | B  | C    | D    |
|---------|-----------|-----|----|------|------|
| MP 5610 | 500304 MP | 104 | 38 | 16/2 | 1/2" |
| MP 5610 | 500306 MP | 104 | 38 | 20/2 | 1/2" |

## MP 5613



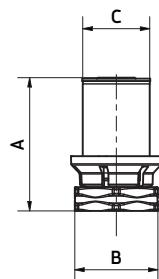
| Art.    | Cod.      | A    | B     | C       | D     |
|---------|-----------|------|-------|---------|-------|
| MP 5613 | 510011 MP | 51   | SW 24 | 16/2    | 1/2"  |
| MP 5613 | 511040 MP | 51   | SW 24 | 16/2.25 | 1/2"  |
| MP 5613 | 510109 MP | 52   | SW 30 | 16/2    | 3/4"  |
| MP 5613 | 510045 MP | 50.5 | SW 24 | 18/2    | 1/2"  |
| MP 5613 | 510046 MP | 51   | SW 30 | 18/2    | 3/4"  |
| MP 5613 | 510012 MP | 50.5 | SW 24 | 20/2    | 1/2"  |
| MP 5613 | 511041 MP | 50.5 | SW 24 | 20/2.25 | 1/2"  |
| MP 5613 | 511042 MP | 50.5 | SW 24 | 20/2.5  | 1/2"  |
| MP 5613 | 510013 MP | 52   | SW 30 | 20/2    | 3/4"  |
| MP 5613 | 511044 MP | 52   | SW 30 | 20/2.5  | 3/4"  |
| MP 5613 | 510132 MP | 54   | SW 30 | 25/2.5  | 3/4"  |
| MP 5613 | 510133 MP | 62   | SW 37 | 25/2.5  | 1"    |
| MP 5613 | 510014 MP | 54   | SW 30 | 26/3    | 3/4"  |
| MP 5613 | 510047 MP | 62   | SW 37 | 26/3    | 1"    |
| MP 5613 | 510022 MP | 63.5 | SW 37 | 32/3    | 1"    |
| MP 5613 | 510183    | 58   | SW 46 | 40/3.5  | 1"1/4 |
| MP 5613 | 510184    | 67   | SW 52 | 50/4    | 1"1/2 |
| MP 5613 | 510185    | 74   | SW 65 | 63/4.5  | 2"    |

## MP 5700



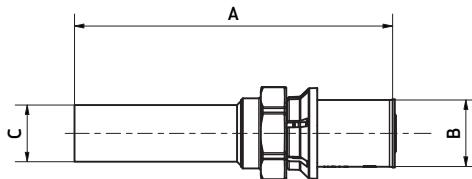
| Art.    | Cod.      | A    | B       | C       |
|---------|-----------|------|---------|---------|
| MP 5700 | 510005 MP | 67   | 16/2    | 16/2    |
| MP 5700 | 511030 MP | 67   | 16/2.25 | 16/2.25 |
| MP 5700 | 510038 MP | 67   | 18/2    | 18/2    |
| MP 5700 | 510006 MP | 67   | 20/2    | 20/2    |
| MP 5700 | 511034 MP | 67   | 20/2.25 | 20/2.25 |
| MP 5700 | 511037 MP | 67   | 20/2.5  | 20/2.5  |
| MP 5700 | 510134 MP | 74.5 | 25/2.5  | 25/2.5  |
| MP 5700 | 510007 MP | 74.5 | 26/3    | 26/3    |
| MP 5700 | 510020 MP | 80   | 32/3    | 32/3    |
| MP 5700 | 510030    | 98   | 40/3.5  | 40/3.5  |
| MP 5700 | 510028    | 109  | 50/4    | 50/4    |
| MP 5700 | 510053    | 122  | 63/4.5  | 63/4.5  |

## MP 5701



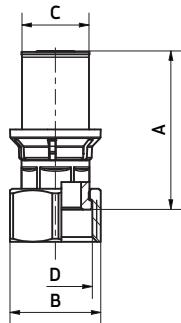
| Art.    | Cod.      | A    | B     | C      |
|---------|-----------|------|-------|--------|
| MP 5701 | 510071 MP | 35.3 | SW 22 | 16/2   |
| MP 5701 | 510073 MP | 35.3 | SW 22 | 20/2   |
| MP 5701 | 510170 MP | 38.8 | SW 27 | 25/2.5 |
| MP 5701 | 510074 MP | 38.8 | SW 27 | 26/3   |
| MP 5701 | 510075 MP | 46.3 | SW 35 | 32/3   |

## MP 5702



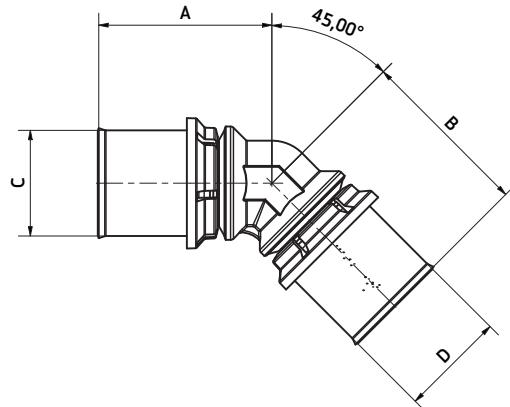
| Art.    | Cod.      | A    | B      | C  |
|---------|-----------|------|--------|----|
| MP 5702 | 510065 MP | 85   | 16/2   | 15 |
| MP 5702 | 510090 MP | 85   | 20/2   | 15 |
| MP 5702 | 510066 MP | 85   | 20/2   | 18 |
| MP 5702 | 510091 MP | 93   | 20/2   | 22 |
| MP 5702 | 510168 MP | 91.5 | 25/2.5 | 22 |
| MP 5702 | 510067 MP | 91.5 | 26/3   | 22 |
| MP 5702 | 510068 MP | 103  | 32/3   | 28 |

## MP 5703



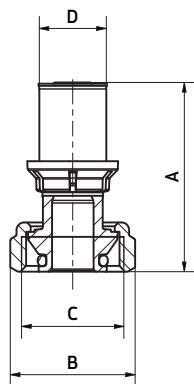
| Art.    | Cod.      | A     | B     | C      | D     |
|---------|-----------|-------|-------|--------|-------|
| MP 5703 | 510110 MP | 42    | SW 20 | 16/2   | 3/8"  |
| MP 5703 | 510085 MP | 42    | SW 24 | 16/2   | 1/2"  |
| MP 5703 | 510087 MP | 42.5  | SW 24 | 20/2   | 1/2"  |
| MP 5703 | 510076 MP | 42    | SW 30 | 16/2   | 3/4"  |
| MP 5703 | 510077 MP | 42    | SW 30 | 18/2   | 3/4"  |
| MP 5703 | 510078 MP | 42    | SW 30 | 20/2   | 3/4"  |
| MP 5703 | 510195 MP | 42    | SW 30 | 20/2.5 | 3/4"  |
| MP 5703 | 510171 MP | 45    | SW 30 | 25/2.5 | 3/4"  |
| MP 5703 | 510088 MP | 45    | SW 30 | 26/3   | 3/4"  |
| MP 5703 | 510172 MP | 47    | SW 36 | 25/2.5 | 1"    |
| MP 5703 | 510079 MP | 47    | SW 36 | 26/3   | 1"    |
| MP 5703 | 510089 MP | 50    | SW 36 | 32/3   | 1"    |
| MP 5703 | 510080 MP | 49.5  | SW 46 | 32/3   | 1"1/4 |
| MP 5703 | 510081    | 66.75 | SW 52 | 40/3.5 | 1"1/2 |
| MP 5703 | 510098    | 89    | SW 52 | 50/4   | 1"1/2 |
| MP 5703 | 510082    | 87    | SW 61 | 50/4   | 1"3/4 |
| MP 5703 | 510083    | 96.5  | SW 61 | 63/4.5 | 2"    |

## MP 5704



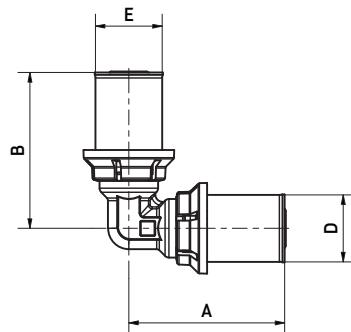
| Art.    | Cod.      | A    | B    | C      | D      |
|---------|-----------|------|------|--------|--------|
| MP 5704 | 510169 MP | 46   | 46   | 25/2.5 | 25/5   |
| MP 5704 | 510099 MP | 46   | 46   | 26/3   | 26/3   |
| MP 5704 | 510100 MP | 48   | 48   | 32/3   | 32/3   |
| MP 5704 | 510101    | 71   | 71   | 40/3.5 | 40/3.5 |
| MP 5704 | 510102    | 76.5 | 76.5 | 50/4   | 50/4   |
| MP 5704 | 511093    | 83   | 83   | 63/4.5 | 63/4.5 |

## MP 5705



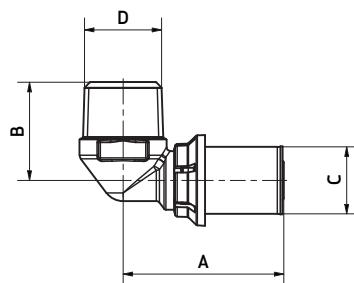
| Art.    | Cod.      | A  | B     | C    | D    |
|---------|-----------|----|-------|------|------|
| MP 5705 | 510017 MP | 50 | SW 30 | 16/2 | 3/4" |
| MP 5705 | 513020 MP | 50 | SW 30 | 18/2 | 3/4" |
| MP 5705 | 510018 MP | 50 | SW 30 | 20/2 | 3/4" |

## MP 5710



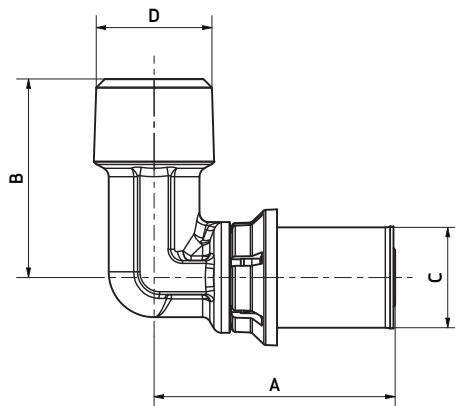
| Art.    | Cod.      | A    | B    | C       | D       |
|---------|-----------|------|------|---------|---------|
| MP 5710 | 511009 MP | 41.5 | 41.5 | 16/2    | 16/2    |
| MP 5710 | 511053 MP | 41.5 | 41.5 | 16/2.25 | 16/2.25 |
| MP 5710 | 511018 MP | 43.5 | 43.5 | 18/2    | 18/2    |
| MP 5710 | 511010 MP | 43.5 | 43.5 | 20/2    | 20/2    |
| MP 5710 | 511054 MP | 43.5 | 43.5 | 20/2.25 | 20/2.25 |
| MP 5710 | 511055 MP | 43.5 | 43.5 | 20/2.5  | 20/2.5  |
| MP 5710 | 510140 MP | 51   | 51   | 25/2.5  | 25/2.5  |
| MP 5710 | 511011 MP | 51   | 51   | 26/3    | 26/3    |
| MP 5710 | 511012 MP | 56   | 56   | 32/3    | 32/3    |
| MP 5710 | 510035    | 69.5 | 69.5 | 40/3.5  | 40/3.5  |
| MP 5710 | 510036    | 81   | 81   | 50/4    | 50/4    |
| MP 5710 | 510056    | 94   | 94   | 63/4.5  | 63/4.5  |

## MP 5711



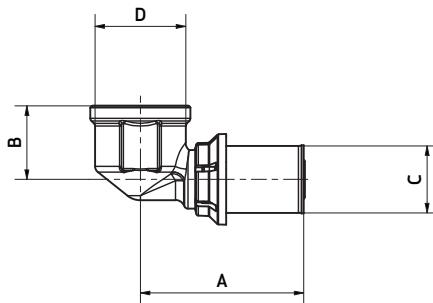
| Art.    | Cod.      | A    | B    | C       | D     |
|---------|-----------|------|------|---------|-------|
| MP 5711 | 511123 MP | 46.5 | 25.5 | 16/2    | 3/8"  |
| MP 5711 | 511001 MP | 42.5 | 26   | 16/2    | 1/2"  |
| MP 5711 | 511062 MP | 42.5 | 26   | 16/2.25 | 1/2"  |
| MP 5711 | 511021 MP | 42.5 | 26   | 18/2    | 1/2"  |
| MP 5711 | 511002 MP | 42.5 | 26   | 20/2    | 1/2"  |
| MP 5711 | 511063 MP | 42.5 | 26   | 20/2.25 | 1/2"  |
| MP 5711 | 511064 MP | 42.5 | 26   | 20/2.5  | 1/2"  |
| MP 5711 | 511003 MP | 45   | 29.5 | 20/2    | 3/4"  |
| MP 5711 | 511065 MP | 45   | 29.5 | 20/2.25 | 3/4"  |
| MP 5711 | 511066 MP | 45   | 29.5 | 20/2.5  | 3/4"  |
| MP 5711 | 510141 MP | 48   | 29.5 | 25/2.5  | 3/4"  |
| MP 5711 | 511004MP  | 48   | 29.5 | 26/3    | 3/4"  |
| MP 5711 | 510229 MP | 54   | 36   | 25/2.5  | 1"    |
| MP 5711 | 511113 MP | 54   | 36   | 26/3    | 1"    |
| MP 5711 | 511013 MP | 56   | 36   | 32/3    | 1"    |
| MP 5711 | 510033    | 69.5 | 45   | 40/3.5  | 1"1/4 |
| MP 5711 | 510034    | 81   | 49.5 | 50/4    | 1"1/2 |
| MP 5711 | 510057    | 94   | 59   | 63/4.5  | 2"    |

## MP 5711 L



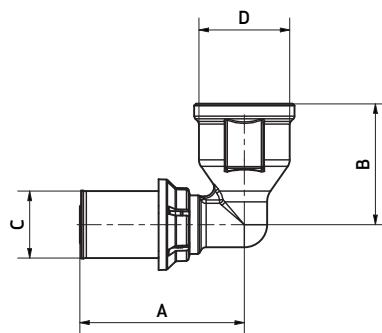
| Art.     | Cod.      | A    | B  | C    | D      |
|----------|-----------|------|----|------|--------|
| MP 5711L | 511001LMP | 42.5 | 35 | 16/2 | R 1/2" |
| MP 5711L | 511002LMP | 42.5 | 35 | 20/2 | R 1/2" |

## MP 5712



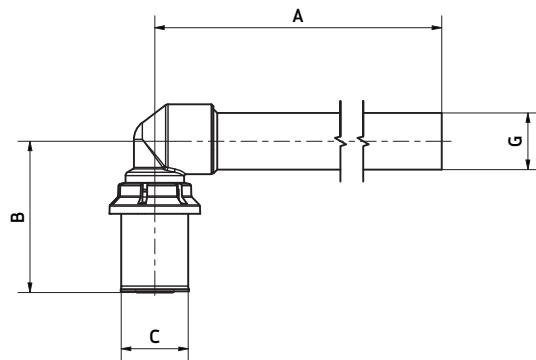
| Art.    | Cod.      | A    | B    | C       | D     |
|---------|-----------|------|------|---------|-------|
| MP 5712 | 511005 MP | 43.5 | 19.5 | 16/2    | 1/2"  |
| MP 5712 | 511056 MP | 43.5 | 19.5 | 16/2.25 | 1/2"  |
| MP 5712 | 511019 MP | 44.5 | 22.5 | 18/2    | 1/2"  |
| MP 5712 | 511006 MP | 44.5 | 22.5 | 20/2    | 1/2"  |
| MP 5712 | 511057 MP | 44.5 | 22.5 | 20/2.25 | 1/2"  |
| MP 5712 | 511058 MP | 44.5 | 22.5 | 20/2.5  | 1/2"  |
| MP 5712 | 511020 MP | 47   | 22.5 | 18/2    | 3/4"  |
| MP 5712 | 511007 MP | 47   | 22.5 | 20/2    | 3/4"  |
| MP 5712 | 511059 MP | 47   | 22.5 | 20/2.25 | 3/4"  |
| MP 5712 | 511060 MP | 47   | 22.5 | 20/2.5  | 3/4"  |
| MP 5712 | 510142 MP | 51   | 26   | 25/2.5  | 3/4"  |
| MP 5712 | 511008 MP | 51   | 26   | 26/3    | 3/4"  |
| MP 5712 | 511114 MP | 54   | 33   | 26/3    | 1"    |
| MP 5712 | 511014 MP | 56   | 33   | 32/3    | 1"    |
| MP 5712 | 510186    | 73.5 | 36   | 40/3.5  | 1"1/4 |
| MP 5712 | 510187    | 82   | 41   | 50/4    | 1"1/2 |
| MP 5712 | 510188    | 97   | 49   | 63/4.5  | 2"    |

## MP 5712 L



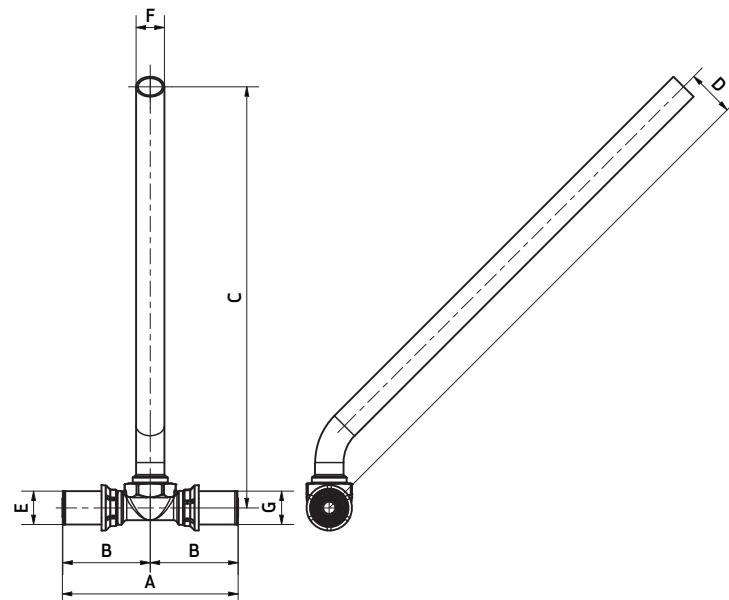
| Art.     | Cod.      | A    | B  | C       | D    |
|----------|-----------|------|----|---------|------|
| MP 5712L | 511029 MP | 43.5 | 32 | 16/2    | 1/2" |
| MP 5712L | 511069 MP | 43.5 | 32 | 16/2.25 | 1/2" |
| MP 5712L | 511102 MP | 43.5 | 32 | 18/2    | 1/2" |
| MP 5712L | 511103 MP | 43.5 | 32 | 20/2    | 1/2" |
| MP 5712L | 511104 MP | 43.5 | 32 | 20/2.25 | 1/2" |
| MP 5712L | 511105 MP | 43.5 | 32 | 20/2.5  | 1/2" |

## MP 5715



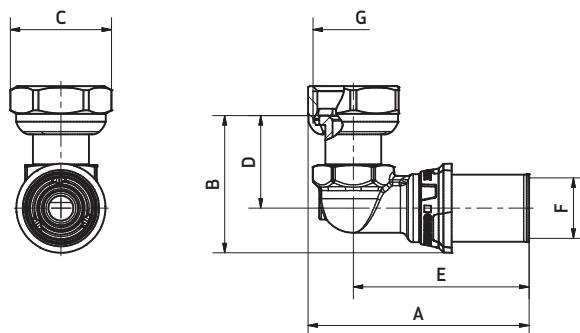
| Art.    | Cod.      | A      | B    | C    | D  |
|---------|-----------|--------|------|------|----|
| MP 5715 | 511015 MP | 165.5  | 40.5 | 16/2 | 15 |
| MP 5715 | 511016 MP | 345.5  | 40.5 | 16/2 | 15 |
| MP 5715 | 511017 MP | 1095.5 | 46.5 | 16/2 | 15 |
| MP 5715 | 511025 MP | 165.5  | 46.5 | 20/2 | 15 |
| MP 5715 | 511026 MP | 345.5  | 46.5 | 20/2 | 15 |
| MP 5715 | 511027 MP | 1095.5 | 46.5 | 20/2 | 15 |

## MP 5716



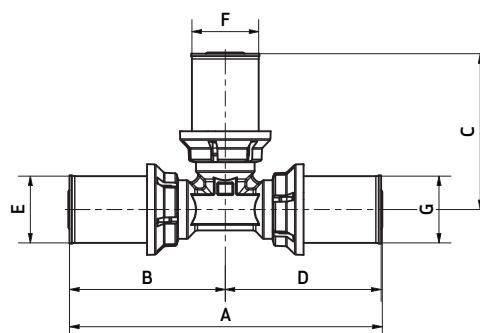
| Art.    | Cod.      | A  | B    | C   | D  | E    | F  | G    |
|---------|-----------|----|------|-----|----|------|----|------|
| MP 5716 | 512077 MP | 93 | 46.5 | 290 | 25 | 16/2 | 15 | 16/2 |
| MP 5716 | 512079 MP | 93 | 46.5 | 290 | 25 | 20/2 | 15 | 20/2 |

## MP 5717



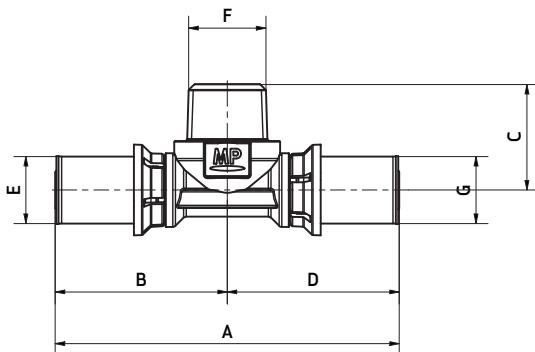
| Art.    | Cod.      | A    | B    | C    | D    | E    | F    | G    |
|---------|-----------|------|------|------|------|------|------|------|
| MP 5717 | 512033 MP | 60   | 36.5 | 27   | 24.5 | 46.5 | 16/2 | 1/2" |
| MP 5717 | 512034 MP | 59   | 38   | 33   | 26   | 42.5 | 16/2 | 3/4" |
| MP 5717 | 512109MP  | 58   | 38   | 23   | 26   | 46.5 | 16/2 | 3/8" |
| MP 5717 | 512110MP  | 60   | 40   | 27   | 26   | 46.5 | 20/2 | 1/2" |
| MP 5717 | 512111MP  | 59   | 40   | 33   | 26   | 42.5 | 20/2 | 3/4" |
| MP 5717 | 512112MP  | 64.5 | 45.5 | 33.5 | 28.5 | 48   | 26/3 | 3/4" |
| MP 5717 | 512113MP  | 70   | 48   | 38   | 31   | 51   | 26/3 | 1"   |

## MP 5720



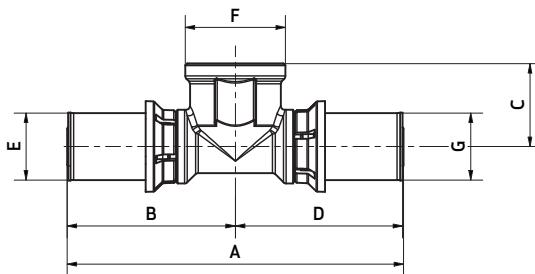
| Art.    | Cod.      | A   | B    | C    | D    | E       | F       | G       |
|---------|-----------|-----|------|------|------|---------|---------|---------|
| MP 5720 | 512010 MP | 83  | 41.5 | 41.5 | 41.5 | 16/2    | 16/2    | 16/2    |
| MP 5720 | 511067 MP | 83  | 41.5 | 41.5 | 41.5 | 16/2.25 | 16/2.25 | 16/2.25 |
| MP 5720 | 512054 MP | 85  | 42.5 | 42.5 | 42.5 | 18/2    | 18/2    | 18/2    |
| MP 5720 | 512002 MP | 87  | 43.5 | 43.5 | 43.5 | 20/2    | 20/2    | 20/2    |
| MP 5720 | 511070 MP | 87  | 43.5 | 43.5 | 43.5 | 20/2.25 | 20/2.25 | 20/2.25 |
| MP 5720 | 510143 MP | 102 | 51   | 51   | 51   | 25/2.5  | 25/2.5  | 25/2.5  |
| MP 5720 | 512003 MP | 102 | 51   | 51   | 51   | 26/3    | 26/3    | 26/3    |
| MP 5720 | 512020 MP | 112 | 56   | 56   | 56   | 32/3    | 32/3    | 32/3    |
| MP 5720 | 512035    | 139 | 69.5 | 69.5 | 69.5 | 40/3.5  | 40/3.5  | 40/3.5  |
| MP 5720 | 512036    | 162 | 81   | 81   | 81   | 50/4    | 50/4    | 50/4    |
| MP 5720 | 510058    | 188 | 94   | 94   | 94   | 63/4.5  | 63/4.5  | 63/4.5  |

## MP 5721



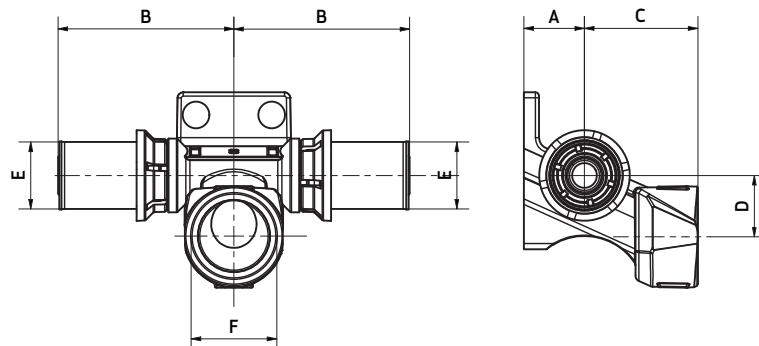
| Art.    | Cod.      | A  | B    | C    | D    | E        | F    | G        |
|---------|-----------|----|------|------|------|----------|------|----------|
| MP 5721 | 512029 MP | 91 | 45.5 | 28   | 45.5 | 16/2     | 1/2" | 16/2     |
| MP 5721 | 512066 MP | 91 | 45.5 | 28   | 45.5 | 18/2     | 1/2" | 18/2     |
| MP 5721 | 512030 MP | 91 | 45.5 | 28   | 45.5 | 20/2     | 1/2" | 20/2     |
| MP 5721 | 511091 MP | 91 | 45.5 | 28   | 45.5 | 20/2.25  | 1/2" | 20/2.25  |
| MP 5721 | 511092 MP | 91 | 45.5 | 28   | 45.5 | 20/2.5   | 1/2" | 20/2.5   |
| MP 5721 | 512031 MP | 91 | 45.5 | 29.5 | 45.5 | 16/2     | 3/4" | 16/2     |
| MP 5721 | 511101 MP | 91 | 45.5 | 29.5 | 45.5 | 18/2     | 3/4" | 18/2     |
| MP 5721 | 512032 MP | 91 | 45.5 | 29.5 | 45.5 | 20/2     | 3/4" | 20/2     |
| MP 5721 | 511094 MP | 91 | 45.5 | 29.5 | 45.5 | 20/2.25  | 3/4" | 20/2.25  |
| MP 5721 | 511095 MP | 91 | 45.5 | 29.5 | 45.5 | 20/2.5   | 3/4" | 20/2.5   |
| MP 5721 | 510161 MP | 96 | 48   | 29.5 | 48   | 25.5/2.5 | 3/4" | 25.5/2.5 |
| MP 5721 | 512067 MP | 96 | 48   | 29.5 | 48   | 26/3     | 3/4" | 26/3     |

## MP 5722



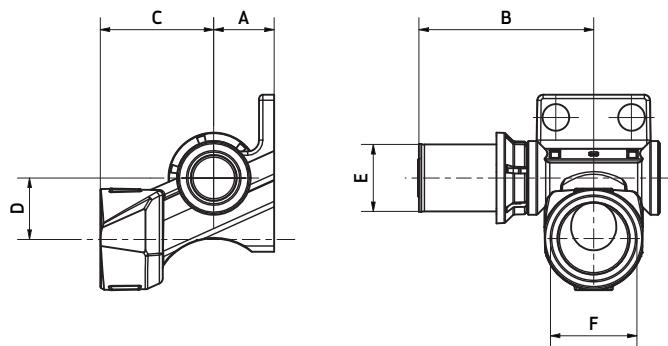
| Art.    | Cod.      | A   | B    | C    | D    | E       | F    | G       |
|---------|-----------|-----|------|------|------|---------|------|---------|
| MP 5722 | 512022 MP | 89  | 44.5 | 22   | 44.5 | 16/2    | 1/2" | 16/2    |
| MP 5722 | 511083 MP | 89  | 44.5 | 22   | 44.5 | 16/2.25 | 1/2" | 16/2.25 |
| MP 5722 | 512028 MP | 94  | 47   | 23   | 47   | 16/2    | 3/4" | 16/2    |
| MP 5722 | 512065 MP | 89  | 44.5 | 21   | 44.5 | 18/2    | 1/2" | 18/2    |
| MP 5722 | 512045 MP | 94  | 47   | 22.5 | 47   | 18/2    | 3/4" | 18/2    |
| MP 5722 | 512027 MP | 89  | 44.5 | 22   | 44.5 | 20/2    | 1/2" | 20/2    |
| MP 5722 | 511084 MP | 89  | 44.5 | 21   | 44.5 | 20/2.25 | 1/2" | 20/2.25 |
| MP 5722 | 511085 MP | 89  | 44.5 | 22   | 44.5 | 20/2.5  | 1/2" | 20/2.5  |
| MP 5722 | 512023 MP | 94  | 47   | 23   | 47   | 20/2    | 3/4" | 20/2    |
| MP 5722 | 511089 MP | 94  | 47   | 23   | 47   | 20/2.5  | 3/4" | 20/2.5  |
| MP 5722 | 510162 MP | 93  | 48   | 21.5 | 45   | 25/2.5  | 1/2" | 20/2    |
| MP 5722 | 511087 MP | 93  | 48   | 21.5 | 45   | 25/2.5  | 1/2" | 20/2.5  |
| MP 5722 | 510163 MP | 96  | 48   | 21.5 | 48   | 25/2.5  | 1/2" | 25/2.5  |
| MP 5722 | 510164 MP | 102 | 51   | 26   | 51   | 25/2.5  | 3/4" | 25/2.5  |
| MP 5722 | 512047 MP | 93  | 48   | 21.5 | 45   | 26/3    | 1/2" | 20/2    |
| MP 5722 | 512046 MP | 96  | 48   | 21.5 | 48   | 26/3    | 1/2" | 26/3    |
| MP 5722 | 512042 MP | 102 | 51   | 26   | 51   | 26/3    | 3/4" | 26/3    |

## MP 5723



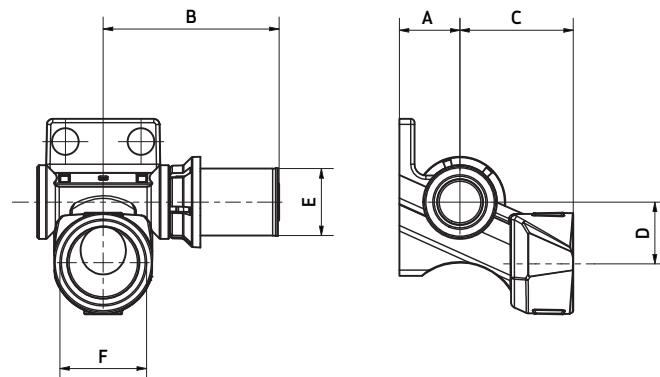
| Art.    | Cod.      | A  | B    | C  | D  | E    | F    |
|---------|-----------|----|------|----|----|------|------|
| MP 5723 | 513005 MP | 16 | 46.5 | 30 | 16 | 16/2 | 1/2" |
| MP 5723 | 513006 MP | 16 | 46.5 | 30 | 16 | 18/2 | 1/2" |
| MP 5723 | 513007 MP | 16 | 46.5 | 30 | 16 | 20/2 | 1/2" |

## MP 5724



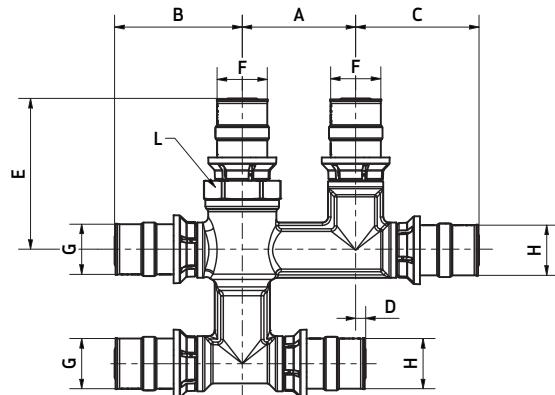
| Art.    | Cod.      | A  | B    | C  | D  | E    | F    |
|---------|-----------|----|------|----|----|------|------|
| MP 5724 | 513009 MP | 16 | 46.5 | 30 | 16 | 16/2 | 1/2" |
| MP 5724 | 513011 MP | 16 | 46.5 | 30 | 16 | 18/2 | 1/2" |
| MP 5724 | 513013 MP | 16 | 46.5 | 30 | 16 | 20/2 | 1/2" |

## MP 5725



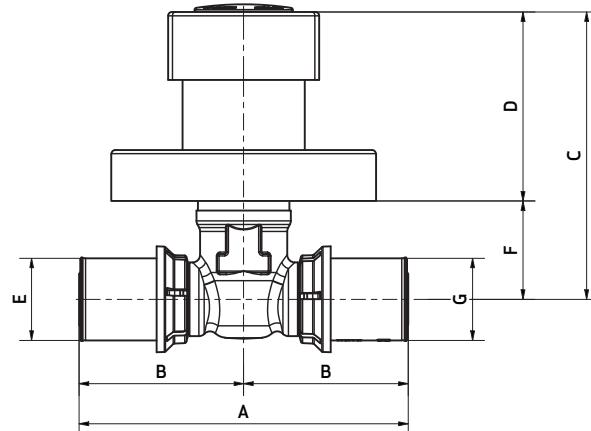
| Art.    | Cod.      | A  | B    | C  | D  | E    | F    |
|---------|-----------|----|------|----|----|------|------|
| MP 5725 | 513008 MP | 16 | 46.5 | 30 | 16 | 16/2 | 1/2" |
| MP 5725 | 513010 MP | 16 | 46.5 | 30 | 16 | 18/2 | 1/2" |
| MP 5725 | 513012 MP | 16 | 46.5 | 30 | 16 | 20/2 | 1/2" |

## MP 5728



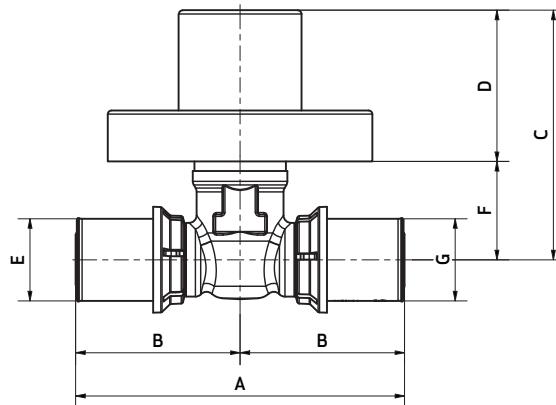
| Art.    | Cod.      | A  | B  | C    | D   | E    | F    | G    | H    | L     |
|---------|-----------|----|----|------|-----|------|------|------|------|-------|
| MP 5728 | 512080 MP | 40 | 45 | 43.5 | 3.5 | 53.5 | 16/2 | 16/2 | 16/2 | SW 24 |
| MP 5728 | 512082 MP | 40 | 45 | 43.5 | 3.5 | 53.5 | 20/2 | 16/2 | 20/2 | SW 24 |
| MP 5728 | 512083 MP | 40 | 45 | 43.5 | 3.5 | 53.5 | 20/2 | 16/2 | 16/2 | SW 24 |
| MP 5728 | 512084 MP | 40 | 45 | 43.5 | 3.5 | 53.5 | 16/2 | 20/2 | 16/2 | SW 24 |
| MP 5728 | 512085 MP | 40 | 45 | 43.5 | 3.5 | 53.5 | 20/2 | 20/2 | 20/2 | SW 24 |
| MP 5728 | 512086 MP | 40 | 45 | 43.5 | 3.5 | 53.5 | 20/2 | 20/2 | 16/2 | SW 24 |
| MP 5728 | 512096 MP | 40 | 45 | 43.5 | 3.5 | 53.5 | 16/2 | 16/2 | 20/2 | SW 24 |
| MP 5728 | 512097 MP | 40 | 45 | 43.5 | 3.5 | 53.5 | 16/2 | 20/2 | 20/2 | SW 24 |

## MP 5729



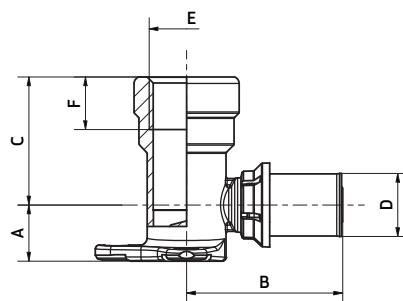
| Art.    | Cod.       | A  | B    | C  | D  | E       | F  | G       |
|---------|------------|----|------|----|----|---------|----|---------|
| MP 5729 | 510189 MMP | 87 | 43.5 | 79 | 54 | 16/2    | 25 | 16/2    |
| MP 5729 | 510192 MMP | 87 | 43.5 | 79 | 54 | 16/2.25 | 25 | 16/2.25 |
| MP 5729 | 510190 MMP | 87 | 43.5 | 79 | 54 | 18/2    | 25 | 18/2    |
| MP 5729 | 510191 MMP | 87 | 43.5 | 79 | 54 | 20/2    | 25 | 20/2    |
| MP 5729 | 510193 MMP | 87 | 43.5 | 79 | 54 | 20/2.25 | 25 | 20/2.25 |
| MP 5729 | 510194 MMP | 87 | 43.5 | 79 | 54 | 20/2.5  | 25 | 20/2.5  |

## MP 5730



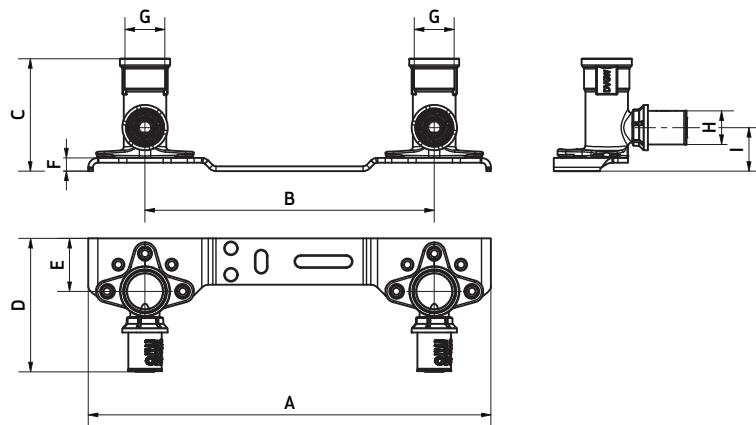
| Art.    | Cod.       | A  | B    | C  | D  | E       | F  | G       |
|---------|------------|----|------|----|----|---------|----|---------|
| MP 5730 | 510189 CMP | 87 | 43.5 | 70 | 45 | 16/2    | 25 | 16/2    |
| MP 5730 | 510192 CMP | 87 | 43.5 | 70 | 45 | 16/2.25 | 25 | 16/2.25 |
| MP 5730 | 510190 CMP | 87 | 43.5 | 70 | 45 | 18/2    | 25 | 18/2    |
| MP 5730 | 510191 CMP | 87 | 43.5 | 70 | 45 | 20/2    | 25 | 20/2    |
| MP 5730 | 510193 CMP | 87 | 43.5 | 70 | 45 | 20/2.25 | 25 | 20/2.25 |
| MP 5730 | 510194 CMP | 87 | 43.5 | 70 | 45 | 20/2.5  | 25 | 20/2.5  |

## MP 5760



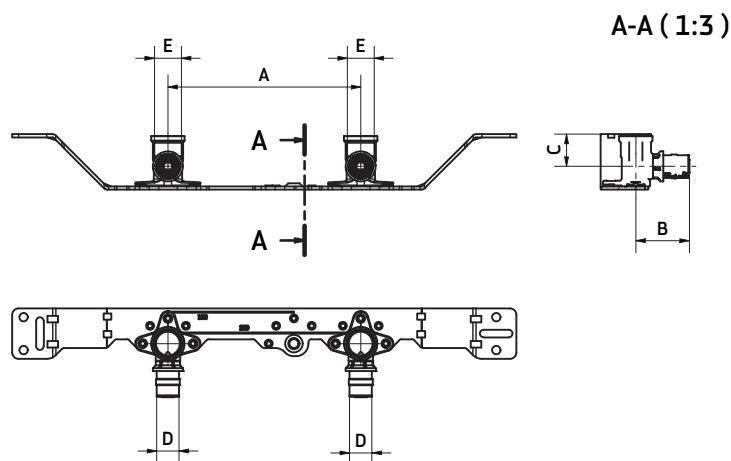
| Art.    | Cod.       | A  | B    | C    | D       | E    | F    |
|---------|------------|----|------|------|---------|------|------|
| MP 5760 | 513001 CMP | 16 | 42.5 | 24   | 16/2    | 1/2" | 15   |
| MP 5760 | 513014 CMP | 16 | 43   | 24   | 18/2    | 1/2" | 15   |
| MP 5760 | 513002 CMP | 16 | 43   | 24   | 20/2    | 1/2" | 15   |
| MP 5760 | 513001 MP  | 16 | 42.5 | 36.5 | 16/2    | 1/2" | 15   |
| MP 5760 | 513001 MPH | 16 | 44.5 | 36.5 | 16/2    | 1/2" | 15   |
| MP 5760 | 511096 MP  | 16 | 44.5 | 36.5 | 16/2.25 | 1/2" | 15   |
| MP 5760 | 513014 MP  | 16 | 43   | 36.5 | 18/2    | 1/2" | 15   |
| MP 5760 | 513002 MP  | 16 | 45   | 36.5 | 20/2    | 1/2" | 15   |
| MP 5760 | 511097 MP  | 16 | 45   | 36.5 | 20/2.25 | 1/2" | 15   |
| MP 5760 | 511098 MP  | 16 | 45   | 36.5 | 20/2.5  | 1/2" | 15   |
| MP 5760 | 513003 MP  | 19 | 49   | 36.5 | 20/2    | 3/4" | 16.5 |
| MP 5760 | 511099 MP  | 19 | 49   | 36.5 | 20/2.25 | 3/4" | 16.3 |
| MP 5760 | 511100 MP  | 19 | 49   | 36.5 | 20/2.5  | 3/4" | 16.3 |
| MP 5760 | 510167 MP  | 19 | 51.5 | 36.5 | 25/2.5  | 3/4" | 16.5 |
| MP 5760 | 513004 MP  | 19 | 51.5 | 36.5 | 26/3    | 3/4" | 16.5 |
| MP 5760 | 513001 LMP | 16 | 44.5 | 61   | 16/2    | 1/2" | 15   |
| MP 5760 | 513002 LMP | 16 | 45   | 61   | 20/2    | 1/2" | 15   |

## MP 5761



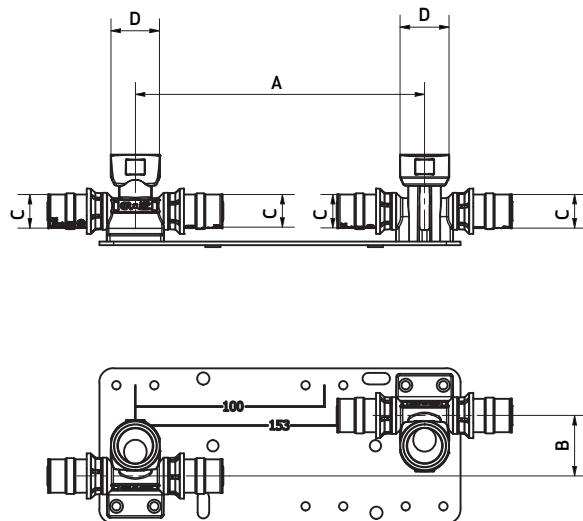
| Art.    | Cod.       | A   | B   | C    | D    | E  | F | G    | H    | I  |
|---------|------------|-----|-----|------|------|----|---|------|------|----|
| MP 5761 | 513024 CMP | 213 | 153 | 47   | 70.5 | 28 | 7 | 1/2" | 16/2 | 23 |
| MP 5761 | 513026 CMP | 123 | 153 | 47   | 71   | 28 | 7 | 1/2" | 18/2 | 23 |
| MP 5761 | 513025 CMP | 213 | 153 | 47   | 71   | 28 | 7 | 1/2" | 20/2 | 23 |
| MP 5761 | 513024 MP  | 213 | 153 | 59.5 | 72.5 | 28 | 7 | 1/2" | 16/2 | 23 |
| MP 5761 | 513026 MP  | 213 | 153 | 59.5 | 73   | 28 | 7 | 1/2" | 18/2 | 23 |
| MP 5761 | 513025 MP  | 213 | 153 | 59.5 | 73   | 28 | 7 | 1/2" | 20/2 | 23 |
| MP 5761 | 513024 LMP | 213 | 153 | 84   | 72.5 | 28 | 7 | 1/2" | 16/2 | 23 |
| MP 5761 | 513026 LMP | 213 | 153 | 84   | 73   | 28 | 7 | 1/2" | 18/2 | 23 |
| MP 5761 | 513025 LMP | 213 | 153 | 84   | 73   | 28 | 7 | 1/2" | 20/2 | 23 |

## MP 5762



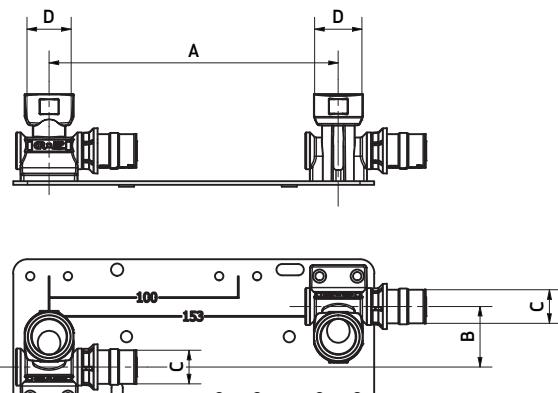
| Art.    | Cod.       | A       | B    | C    | D    | E    |
|---------|------------|---------|------|------|------|------|
| MP 5762 | 513027 CMP | 153/100 | 42.5 | 24   | 16/2 | 1/2" |
| MP 5762 | 513028 CMP | 153/100 | 43   | 24   | 18/2 | 1/2" |
| MP 5762 | 513029 CMP | 153/100 | 43   | 24   | 20/2 | 1/2" |
| MP 5762 | 513027 MP  | 153/100 | 42.5 | 36.5 | 16/2 | 1/2" |
| MP 5762 | 513028 MP  | 153/100 | 45   | 36.5 | 18/2 | 1/2" |
| MP 5762 | 513029 MP  | 153/100 | 45   | 36.5 | 20/2 | 1/2" |
| MP 5762 | 513027 LMP | 153/100 | 44.5 | 61   | 16/2 | 1/2" |
| MP 5762 | 513028 LMP | 153/100 | 45   | 61   | 18/2 | 1/2" |
| MP 5762 | 513029 LMP | 153/100 | 45   | 61   | 20/2 | 1/2" |

## MP 5763



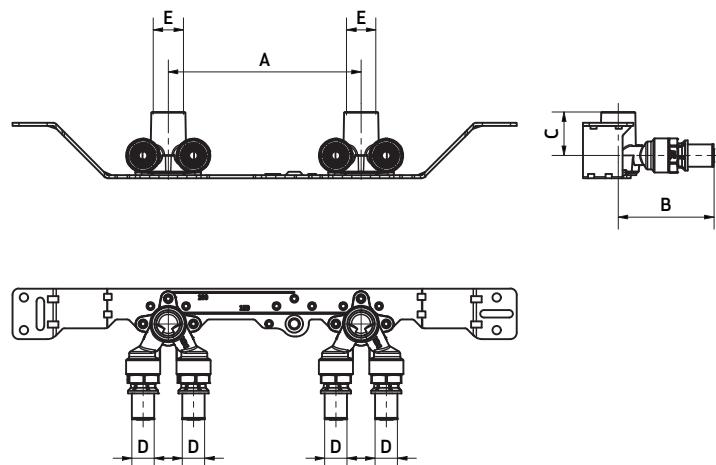
| Art.    | Cod.      | A   | B  | C    | D    |
|---------|-----------|-----|----|------|------|
| MP 5763 | 513030 MP | 153 | 32 | 16/2 | 1/2" |
| MP 5763 | 513031 MP | 153 | 32 | 182/ | 1/2" |
| MP 5763 | 513032 MP | 153 | 32 | 20/2 | 1/2" |

## MP 5764



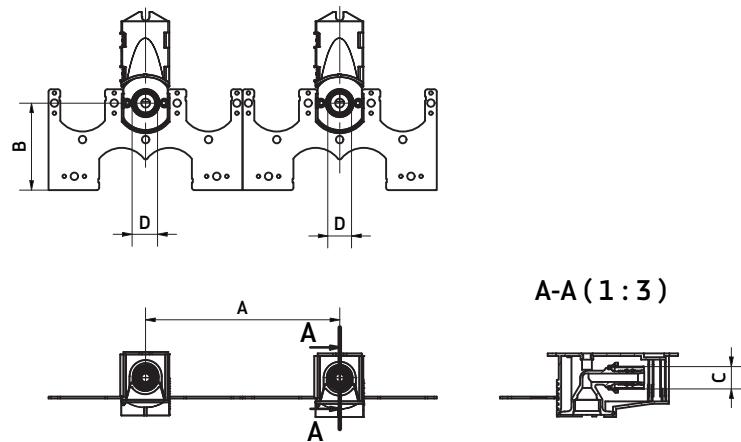
| Art.    | Cod.      | A       | B  | C    | D    |
|---------|-----------|---------|----|------|------|
| MP 5764 | 513033 MP | 153/100 | 32 | 16/2 | 1/2" |
| MP 5764 | 513034 MP | 153/100 | 32 | 18/2 | 1/2" |
| MP 5764 | 513035 MP | 153/100 | 32 | 20/2 | 1/2" |

## MP 5766



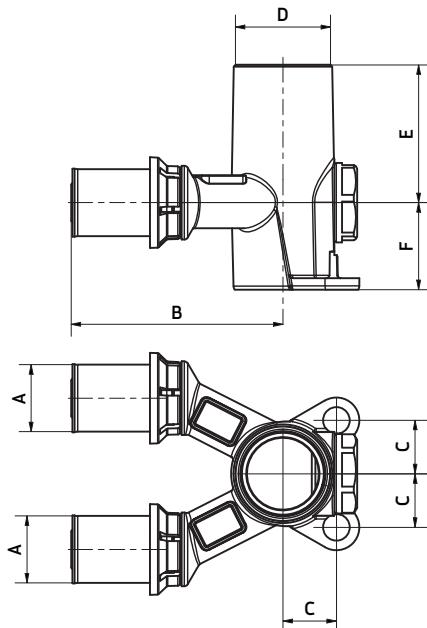
| Art.    | Cod.      | A       | B  | C    | D    | E    |
|---------|-----------|---------|----|------|------|------|
| MP 5766 | 513039 MP | 153/100 | 56 | 36.5 | 16/2 | 1/2" |
| MP 5766 | 513041 MP | 153/100 | 56 | 36.5 | 20/2 | 1/2" |

## MP 5767



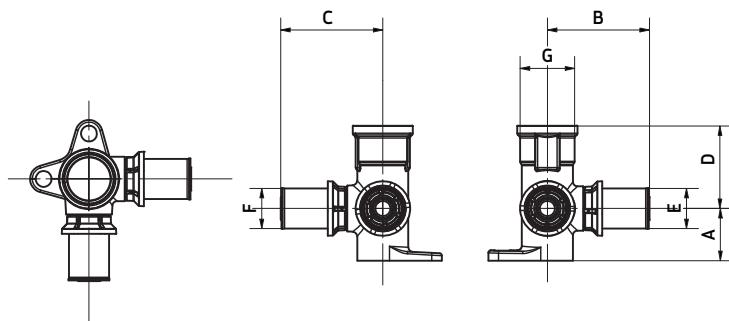
| Art.    | Cod.      | A   | B  | C    | D    |
|---------|-----------|-----|----|------|------|
| MP 5767 | 513042 MP | 153 | 69 | 16/2 | 1/2" |
| MP 5767 | 513044 MP | 153 | 69 | 20/2 | 1/2" |

## MP 5780



| Art.   | Cod.      | A    | B  | C     | D    | E    | F  |
|--------|-----------|------|----|-------|------|------|----|
| MP5780 | 510062 MP | 16/2 | 56 | 14.14 | 1/2" | 36.5 | 23 |
| MP5780 | 510064 MP | 20/2 | 56 | 14.14 | 1/2" | 36.5 | 23 |

## MP 5781



| Art.    | Cod.      | A  | B  | C  | D    | E    | F    | G      |
|---------|-----------|----|----|----|------|------|------|--------|
| MP 5781 | 511106 MP | 23 | 45 | 45 | 36.5 | 16/2 | 16/2 | 1 1/2" |
| MP 5781 | 511108 MP | 23 | 45 | 45 | 36.5 | 20/2 | 16/2 | 1 1/2" |





# IVAR APP

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