

## ARTICLE LIST 10/2020 TECHNICAL MANUAL

TAP WATER INSTALLATION  
RADIATOR CONNECTION  
RADIANT HEATING/COOLING



*ALU  
MULTI-LAYER PIPE*

*+ PRESS-FITTING  
+ PUSH-FITTING  
+ WELD-FITTING*

*= 1 SYSTEM*

made in germany



MULTITUBO

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All information in this manual is compiled to the best of our knowledge. No liability can be assumed for possible faults. **We reserve the right to make technical amendments and carry out updates!**

**1 The Metal-Press-Fitting**

Universal connection-technology from 16 mm up to 110 mm by MULTITUBO systems.

**2 The PPSU-Press-Fitting**

The economical extension to the Metal-Press-Fitting range from 16 mm up to 50 mm.

**3 The Metal-Push-Fitting**

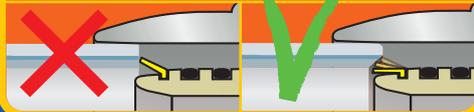
Invincible where press-tools cannot be used or where a rapid installation progress is required – from 16 mm up to 32 mm.

**4 The PPSU-Push-Fitting**

As fast as the Metal-Push-Fitting, with the same safety features, but a still more economic alternative.

**With PROTECTOR-Ring**

The PROTECTOR-Ring prevents insertion of non-calibrated pipes and thus damage of the O-Rings.



**5 The Welding-Fitting**

This cost efficient connection is perfect solution for acrid conditions. With an increased resistance against salt and many other corrosives\*, the Welding-Fitting is the new alternative from 16 mm up to 75 mm.

made in germany

**6 Multilayer Pipes**

With more than 30 years of expertise in the development and production of multilayer pipes, our pipes are an equivalent to highest quality. This enables MULTITUBO systems to offer 5 connection techniques, fully compatible within the same dimension.

A unique advantage that allows the highest possible flexibility at each building site.

ALU  
MULTI-LAYER PIPE

+ PRESS-FITTING  
+ PUSH-FITTING  
+ WELD-FITTING

= 1 SYSTEM

We developed five different connection types, each with its own strength. So the installer can always select the optimal way to complete his installation.

And the best of the MULTITUBO systems is: All these connections are fully compatible within their dimension range. That's the way of success.

\* Please contact us to assure utilisability for your special conditions of use.



**Established  
Press  
technology**

**Simple  
connected  
with gripper  
clamps**

**Stainless  
steel body**  
Slim with a high  
performance

**NEW  
IN COMFORT  
AND SAFETY**

# MODULAIRE PERFITTING 90|110

## INNOVATION FOR EASIER WORK!

Flexibility creates enormous temporal or economic advantages in practice. That is why MULTITUBO systems develops innovative approaches that offer more flexibility to the user. Combining these possibilities results in much more economical work!

## FITTINGS RAPIDLY AND FLEXIBLE ASSEMBLED!

With the modular system you are able to assemble more than 150 connections by using just 15 different parts.

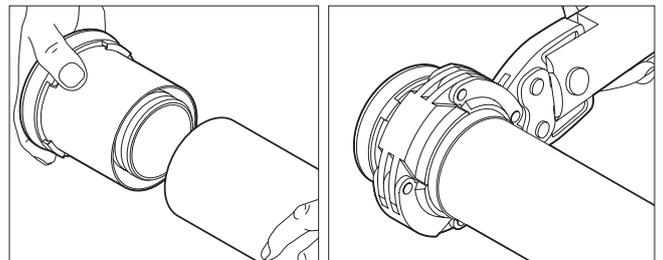
- **Stainless steel fittingbody:**  
high performance –  
low weight
- **Connection-technology:**  
Modular coupling: Adapter to  
adapter or adapter to fittingbody
- An **economic installation**  
of large sizes
- **Less overhead work**  
by modular pre-mounting
- **Highest Flexibility**  
in each project
- **Fully compatible**  
within the system
- **Pressing on the workbench,**  
**installing on site**



## PRESSING ON THE WORKBENCH, INSTALLING ON SITE:

Convenient pressing on the work-bench. First, the pipe is prepared with a circumferential bevel by the universal deburring tool.

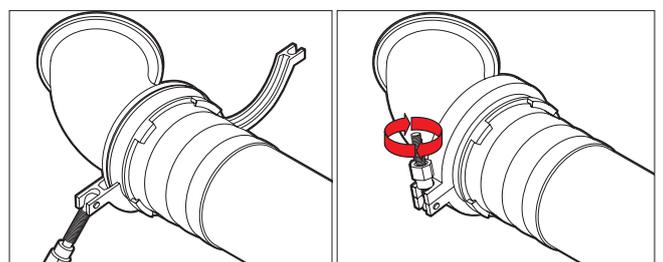
Push the adapter onto the tube as far as it will go (so that the tube is visible in the inspection windows). Place the press chain at the plastic stop points and connect it to the base pressing unit / pressing machine. Press the connection.



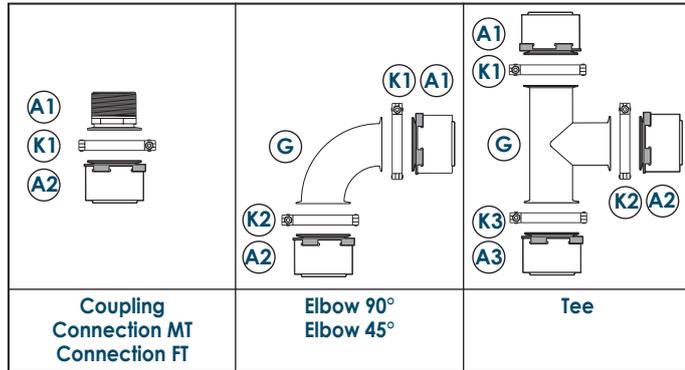
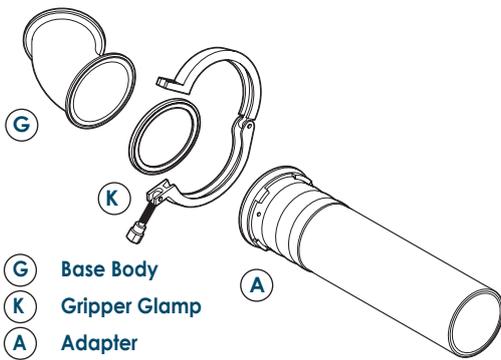
## SIMPLE CONNECTION WITH GRIPPER CLAMPS:

The gripper clamps for the connection enable easy connection of the adapter piece to the basic body or with a further pipe section. No heavy tool is required for overhead work.

So less weight is an important contribution to more work safety at high altitude!



## METAL-PRESS-FITTINGS MODULAR 90/110, MODULES



| Type                 | Adapter 1<br>(A1) | Gripper Clamp 1<br>(K1) | Elbow/<br>Tee<br>(G) | Gripper Clamp 2<br>(K2) | Adapter 2<br>(A2) | Gripper-Clamp 3<br>(K3) | Adapter 3<br>(A3) | alternative* |
|----------------------|-------------------|-------------------------|----------------------|-------------------------|-------------------|-------------------------|-------------------|--------------|
| <b>Connection MT</b> |                   |                         |                      |                         |                   |                         |                   |              |
| 75 x 21/2" MT        | (M22075)          | (M28000)                |                      |                         | (M20212)          |                         |                   | F20090       |
| 90 x 3" MT           | M22090            | M28000                  |                      |                         | M20300            |                         |                   |              |
| 110 x 3" MT          | M22110            | M28000                  |                      |                         | M20300            |                         |                   |              |
| <b>Connection FT</b> |                   |                         |                      |                         |                   |                         |                   |              |
| 75 x 2" FT           | M22075            | M28000                  |                      |                         | M21200            |                         |                   |              |
| 90 x 3" FT           | M22090            | M28000                  |                      |                         | M21300            |                         |                   |              |
| 110 x 3" FT          | M22110            | M28000                  |                      |                         | M21300            |                         |                   |              |
| <b>Elbow 90°</b>     |                   |                         |                      |                         |                   |                         |                   |              |
| 75 x 75              | (M22075)          | (M28000)                | (M23000)             | (M28000)                | (M22075)          |                         |                   | F23090       |
| 90 x 90              | M22090            | M28000                  | M23000               | M28000                  | M22090            |                         |                   |              |
| 110 x 110            | M22110            | M28000                  | M23000               | M28000                  | M22110            |                         |                   |              |
| <b>Elbow 45°</b>     |                   |                         |                      |                         |                   |                         |                   |              |
| 75 x 75              | (M22075)          | (M28000)                | (M23200)             | (M28000)                | (M22075)          |                         |                   | F23290       |
| 90 x 90              | M22090            | M28000                  | M23200               | M28000                  | M22090            |                         |                   |              |
| 110 x 110            | M22110            | M28000                  | M23200               | M28000                  | M22110            |                         |                   |              |
| <b>Elbow 90° MT</b>  |                   |                         |                      |                         |                   |                         |                   |              |
| 75 x 21/2" MT        | M22075            | M28000                  | M23000               | M28000                  | M20212            |                         |                   |              |
| 90 x 3" MT           | M22090            | M28000                  | M23000               | M28000                  | M20300            |                         |                   |              |
| 110 x 3" MT          | M22110            | M28000                  | M23000               | M28000                  | M20300            |                         |                   |              |
| <b>Tee</b>           |                   |                         |                      |                         |                   |                         |                   |              |
| 75 x 75 x 75         | (M22075)          | (M28000)                | (M25000)             | (M28000)                | (M22075)          | (M28000)                | (M22075)          | F25090       |
| 75 x 110 x 75        | M22075            | M28000                  | M25000               | M28000                  | M22110            | M28000                  | M22075            |              |
| 90 x 63 x 90         | M22090            | M28000                  | M25000               | M22063                  | M28000            | M22090                  | M28000            |              |
| 90 x 75 x 90         | M22075            | M28000                  | M25000               | M28000                  | M22090            | M28000                  | M22090            |              |
| 90 x 90 x 90         | M22090            | M28000                  | M25000               | M28000                  | M22090            | M28000                  | M22090            |              |
| 90 x 110 x 90        | M22090            | M28000                  | M25000               | M28000                  | M22110            | M28000                  | M22090            |              |
| 110 x 63 x 90        | M22110            | M28000                  | M25000               | M22063                  | M28000            | M22090                  | M28000            |              |
| 110 x 90 x 110       | M22110            | M28000                  | M25000               | M28000                  | M22090            | M28000                  | M22110            |              |
| 110 x 110 x 110      | M22110            | M28000                  | M25000               | M28000                  | M22110            | M28000                  | M22110            |              |
| <b>Coupling</b>      |                   |                         |                      |                         |                   |                         |                   |              |
| 75 x 63              | (M22075)          | (M28000)                |                      | (M22063)                |                   |                         |                   | 27093        |
| 75 x 75              | (M22075)          | (M28000)                |                      |                         | (M22075)          |                         |                   | F27090       |
| 75 x 90              | M22075            | M28000                  |                      |                         | M22090            |                         |                   |              |
| 75 x 110             | M22075            | M28000                  |                      |                         | M22110            |                         |                   |              |
| 90 x 90              | M22090            | M28000                  |                      |                         | M22090            |                         |                   |              |
| 90 x 110             | M22090            | M28000                  |                      |                         | M22110            |                         |                   |              |
| 110 x 110            | M22110            | M28000                  |                      |                         | M22110            |                         |                   |              |

\* For the dimensions 63 mm / 75mm there are also MULTITUBO systems Metal Press-fittings beside the MODULAR Fittings available - a range of solutions ready for many requirements.

## ADAPTERS FOR COPPER PPIPIPES - OVERVIEW

| Cu 10                                     | Cu 12                                     | Cu 15  | Cu 18                                      | Cu 22  | Cu 28                                      |   |
|---|---|--|--|--|--|---|
|   |   |  |  |  |  | <b>PRESS-FITTINGS</b><br>METAL-PRESS-FITTINGS<br>Adapter for copper pipes<br><br>The copper-side adapter is suitable for pressing only! |
| art.nr. <b>29706</b><br>16 x 2,00 - Cu 10 | art.nr. <b>29708</b><br>16 x 2,00 - Cu 12 | art.nr. <b>29710</b><br>16 x 2,00 - Cu 15  | art.nr. <b>29730</b><br>20 x 2,25 - Cu 18  | art.nr. <b>29731</b><br>20 x 2,25 - Cu 22<br><br>art.nr. <b>29740</b><br>25 x 2,50 - Cu 22   | art.nr. <b>29750</b><br>32 x 3,00 - Cu 28  |   |
|   |   | art.nr. <b>F29710</b><br>16 x 2,00 - Cu 15   | art.nr. <b>F29730</b><br>20 x 2,25 - Cu 18 | art.nr. <b>F29731</b><br>20 x 2,25 - Cu 22<br><br>art.nr. <b>F29740</b><br>25 x 2,50 - Cu 22 | art.nr. <b>F29750</b><br>32 x 3,00 - Cu 28 |   |
|   |   | art.nr. <b>F20710</b><br>16 x 2,00 - Cu 15<br><br>art.nr. <b>F23715</b><br>16 x 2,00 - Cu 15                               |  | art.nr. <b>F20731</b><br>20 x 2,00 - Cu 22<br><br>art.nr. <b>F20740</b><br>25 x 2,50 - Cu 22 |  | <b>METAL-PRESS-CONNECTIONS</b><br>For connections between MULTITUBO multilayer pipe and copper pipe.                                    |
|   |   | art.nr. <b>69710</b><br>16 x 2,00 - Cu 15  | art.nr. <b>69730</b><br>20 x 2,25 - Cu 18  | art.nr. <b>69740</b><br>25 x 2,50 - Cu 22  | art.nr. <b>69750</b><br>32 x 3,00 - Cu 28  | <b>PUSH-FITTINGS</b><br>METAL-PUSH-FITTINGS<br>Adapter for copper pipes   |
|   |   | art.nr. <b>19010</b><br>16 x 2,00 x 3/4"<br>art.nr. <b>19100</b><br>3/4" x 3/4"<br>art.nr. <b>19050</b><br>3/4" IG x Cu 15 |  |  |  | <b>SCREW-CONNECTORS</b><br>Screw connectors for connections between MULTITUBO multilayer pipe and copper pipe (Euro-Cone).              |
|   |   | art.nr. <b>79710</b><br>16 x 2,00 - Cu 15  |  | art.nr. <b>79731</b><br>20 x 2,25 - Cu 22  |  | Compression adapter for copper pipes  |

# PIPES



## Multi-layer Pipe PE-RT/AL/PE-RT, white, coils

MULTITUBO systems multi-layer pipe, according to ISO 21003, absolutely diffusion tight. Application: Installation of tap water- and heating-systems.

| Art.-No.: | Type      | Unit  | Palet   |
|-----------|-----------|-------|---------|
| 10011     | 16 x 2.00 | 100 m | 2.000 m |
| 10010     | 16 x 2.00 | 200 m | 2.600 m |
| 10015     | 16 x 2.00 | 500 m | 3.000 m |
| 1001920*  | 16 x 2.00 | 20 m  | 1.000 m |
| 10020     | 18 x 2.00 | 200 m | 2.600 m |
| 10030     | 20 x 2.25 | 100 m | 1.300 m |
| 1003920*  | 20 x 2.25 | 20 m  | 500 m   |
| 10040     | 25 x 2.50 | 50 m  | 650 m   |
| 10050     | 32 x 3.00 | 25 m  | 375 m   |
| 10051     | 32 x 3.00 | 50 m  | 500 m   |

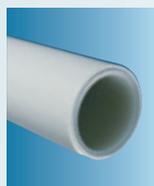
\* Coils are stretchwrapped, not packed in cartons.



## Multi-layer Pipe PE-RT/AL/PE-RT, red, coils

MULTITUBO systems multi-layer pipe, absolutely diffusion tight. Application: Installation of panel heating ( $t_{max} : 60 \text{ }^\circ\text{C}$ ,  $p_{max} : 6 \text{ bar}$ ).  
**Now extra thin aluminium layer (AL = 0,15 mm), for more flexibility and easier handling.**

| Art.-No.: | Type      | Unit  | Palet   |
|-----------|-----------|-------|---------|
| 12010     | 16 x 2.00 | 200 m | 2.600 m |
| 12015     | 16 x 2.00 | 500 m | 3.000 m |



## Multi-layer Pipe, PE-RT/AL/ PE-RT, white, lengths

MULTITUBO systems multi-layer pipe, absolutely diffusion tight. Application: Installation of tap water- and heating-systems. Supplied in straight lengths of 5 m / 3 m.

| Art.-No.: | Type        | Length | Unit  |
|-----------|-------------|--------|-------|
| 15012     | 16 x 2.00   | 5 m    | 125 m |
| 15030     | 20 x 2.25   | 5 m    | 85 m  |
| 15040     | 25 x 2.50   | 5 m    | 50 m  |
| 15050     | 32 x 3.00   | 5 m    | 35 m  |
| 15060     | 40 x 4.00   | 5 m    | 20 m  |
| 15070     | 50 x 4.50   | 5 m    | 10 m  |
| 15080     | 63 x 6.00   | 5 m    | 15 m  |
| 15090     | 75 x 7.50   | 5 m    | 5 m   |
| 15100     | 90 x 8.50   | 5 m    | 5 m   |
| 15110     | 110 x 10.00 | 5 m    | 5 m   |

| Art.-No.: | Type      | Length | Unit |
|-----------|-----------|--------|------|
| 15013     | 16 x 2.00 | 3 m    | 75 m |
| 15031     | 20 x 2.25 | 3 m    | 51 m |
| 15041     | 25 x 2.50 | 3 m    | 30 m |
| 15051     | 32 x 3.00 | 3 m    | 21 m |
| 15061     | 40 x 4.00 | 3 m    | 12 m |
| 15071     | 50 x 4.50 | 3 m    | 6 m  |
| 15081     | 63 x 6.00 | 3 m    | 9 m  |
| 15091     | 75 x 7.50 | 3 m    | 3 m  |



## Multi-layer Pipe nipples

Multi-layer pipe nipple, calibrated on both sides, for short connection of two fittings.

| Art.-No.: | Type              | Unit/Bag | Unit/Carton |
|-----------|-------------------|----------|-------------|
| 17010     | 16 x 2.00 x 71 mm | 10 pcs.  | 200 pcs.    |
| 17030     | 20 x 2.25 x 71 mm | 10 pcs.  | 160 pcs.    |
| 17040     | 25 x 2.50 x 83 mm | 10 pcs.  | 100 pcs.    |



## Multi-layer Pipe, white, in protective tube, red

MULTITUBO systems multi-layer pipe, in corrugated protective tube made of PE-HD.

| Art.-No.: | Type      | Unit | Palet |
|-----------|-----------|------|-------|
| 16110R    | 16 x 2.00 | 75 m | 975 m |
| 16130R    | 20 x 2.25 | 75 m | 675 m |
| 16140R    | 25 x 2.50 | 50 m | 450 m |



## Multi-layer Pipe, white, in protective tube, blue

MULTITUBO systems multi-layer pipe, in corrugated protective tube made of PE-HD.

| Art.-No.: | Type      | Unit | Palet |
|-----------|-----------|------|-------|
| 16110B    | 16 x 2.00 | 75 m | 975 m |
| 16130B    | 20 x 2.25 | 75 m | 675 m |
| 16140B    | 25 x 2.50 | 50 m | 450 m |



## Multi-layer Pipe, white, in protective tube, black

MULTITUBO systems multi-layer pipe, in corrugated protective tube made of PE-HD.

| Art.-No.: | Type      | Unit | Palet |
|-----------|-----------|------|-------|
| 16110     | 16 x 2.00 | 75 m | 975 m |
| 16130     | 20 x 2.25 | 75 m | 675 m |



## Multi-layer Pipe Plus S4, white, insulation blue, coils

MULTITUBO systems multi-layer pipe, with round insulation, thickness of insulation 4 mm, heat conductance rate (WLG) 040.

| Art.-No.: | Type      | Unit  | Palet |
|-----------|-----------|-------|-------|
| 14110     | 16 x 2.00 | 100 m | 800 m |
| 14111     | 16 x 2.00 | 50 m  | 750 m |
| 14120     | 18 x 2.00 | 100 m | 800 m |
| 14130     | 20 x 2.25 | 100 m | 800 m |
| 14131     | 20 x 2.25 | 50 m  | 750 m |



### Multi-layer Pipe Plus S4, white, insulation red, coils

MULTITUBO systems multi-layer pipe, with round insulation, thickness of insulation 4 mm, heat conductance rate (WLG) 040.

| Art.-No.: | Type      | Unit  | Palet |
|-----------|-----------|-------|-------|
| 14110R    | 16 x 2.00 | 100 m | 800 m |
| 14111R    | 16 x 2.00 | 50 m  | 750 m |
| 14130R    | 20 x 2.25 | 100 m | 800 m |
| 14131R    | 20 x 2.25 | 50 m  | 750 m |



### Pipe Clip

Pipe to fix pipe in position. Made of plastic with snap into place mechanism.

| Art.-No.: | Type    | Unit     |
|-----------|---------|----------|
| 19310     | 16 - 20 | 100 pcs. |
| 19340     | 25      | 50 pcs.  |
| 19350     | 32      | 50 pcs.  |



### Multi-layer Pipe Plus S9, white, insulation blue, coils

MULTITUBO systems multi-layer pipe, with round insulation, thickness of insulation 9 mm, heat conductance rate (WLG) 040.

| Art.-No.: | Type      | Unit | Palet |
|-----------|-----------|------|-------|
| 14310     | 16 x 2.00 | 50 m | 500 m |
| 14330     | 20 x 2.25 | 50 m | 400 m |
| 14340     | 25 x 2.50 | 50 m | 400 m |
| 14350*    | 32 x 3.00 | 50 m | 250 m |

\* Coils are stretchwrapped, not packed in cartons.



### Multi-layer Pipe Plus S9, white, insulation red, coils

MULTITUBO systems multi-layer pipe, with round insulation, thickness of insulation 9 mm, heat conductance rate (WLG) 040.

| Art.-No.: | Type      | Unit | Palet |
|-----------|-----------|------|-------|
| 14310R    | 16 x 2.00 | 50 m | 500 m |
| 14330R    | 20 x 2.25 | 50 m | 400 m |
| 14340R    | 25 x 2.50 | 50 m | 400 m |
| 14350R*   | 32 x 3.00 | 50 m | 250 m |

\* Coils are stretchwrapped, not packed in cartons.



### Multi-layer Pipe Plus S13, white, insulation blue, coils

MULTITUBO systems multi-layer pipe, with round insulation, thickness of insulation 13 mm, heat conductance rate (WLG) 040.

| Art.-No.: | Type      | Unit | Palet |
|-----------|-----------|------|-------|
| 14410     | 16 x 2.00 | 50 m | 400 m |
| 14430     | 20 x 2.25 | 50 m | 400 m |
| 14440     | 25 x 2.50 | 50 m | 250 m |
| 14450*    | 32 x 3.00 | 50 m | 250 m |

\* Coils are stretchwrapped, not packed in cartons.



### Multi-layer Pipe Plus S26, white, insulation blue, coils

MULTITUBO systems multi-layer pipe, with round insulation, thickness of insulation 26 mm, heat conductance rate (WLG) 040.

| Art.-No.: | Type      | Unit | Palet |
|-----------|-----------|------|-------|
| 14510*    | 16 x 2.00 | 25 m | 150 m |
| 14530*    | 20 x 2.25 | 25 m | 150 m |
| 14550*    | 32 x 3.00 | 25 m | 150 m |
| 14560*    | 40 x 4.00 | 25 m | 125 m |

\* Coils are stretchwrapped, not packed in cartons.

# METAL-PRESS-FITTINGS



## Metal-Press-Connection MT

Made of tin-plated brass with press sleeve with inspection window, conical thread.

| Art.-No.: | Type           | Unit/Bag | Unit/Carton |
|-----------|----------------|----------|-------------|
| 20012     | 16 x 3/8" MT   | 10 pcs.  | 200 pcs.    |
| 20010     | 16 x 1/2" MT   | 10 pcs.  | 200 pcs.    |
| 20014     | 16 x 3/4" MT   | 10 pcs.  | 200 pcs.    |
| 20020     | 18 x 1/2" MT   | 10 pcs.  | 200 pcs.    |
| 20021     | 18 x 3/4" MT   | 10 pcs.  | 200 pcs.    |
| 20030     | 20 x 1/2" MT   | 10 pcs.  | 200 pcs.    |
| 20031     | 20 x 3/4" MT   | 10 pcs.  | 170 pcs.    |
| 20032     | 20 x 1" MT     | 10 pcs.  | 100 pcs.    |
| 20040     | 25 x 3/4" MT   | 10 pcs.  | 100 pcs.    |
| 20041     | 25 x 1" MT     | 10 pcs.  | 100 pcs.    |
| 20050     | 32 x 1" MT     | 10 pcs.  | 80 pcs.     |
| 20051     | 32 x 1 1/4" MT | 8 pcs.   | 56 pcs.     |
| 20060     | 40 x 1 1/4" MT | 1 pc.    | 18 pcs.     |
| 20061     | 40 x 1 1/2" MT | 1 pc.    | 18 pcs.     |
| 20070     | 50 x 1 1/2" MT | 1 pc.    | 12 pcs.     |
| 20071     | 50 x 2" MT     | 1 pc.    | 12 pcs.     |
| 20080     | 63 x 2" MT     | 1 pc.    | 8 pcs.      |
| 20090     | 75 x 2 1/2" MT | 1 pc.    | 2 pcs.      |



## Metal-Press-Connection FT

Made of tin-plated brass with press sleeve with inspection window, parallel thread.

| Art.-No.: | Type           | Unit/Bag | Unit/Carton |
|-----------|----------------|----------|-------------|
| 21010     | 16 x 1/2" FT   | 10 pcs.  | 200 pcs.    |
| 21014     | 16 x 3/4" FT   | 10 pcs.  | 180 pcs.    |
| 21020     | 18 x 1/2" FT   | 10 pcs.  | 200 pcs.    |
| 21030     | 20 x 1/2" FT   | 10 pcs.  | 200 pcs.    |
| 21031     | 20 x 3/4" FT   | 10 pcs.  | 180 pcs.    |
| 21032     | 20 x 1" FT     | 10 pcs.  | 100 pcs.    |
| 21040     | 25 x 3/4" FT   | 10 pcs.  | 100 pcs.    |
| 21041     | 25 x 1" FT     | 10 pcs.  | 100 pcs.    |
| 21050     | 32 x 1" FT     | 10 pcs.  | 80 pcs.     |
| 21051     | 32 x 1 1/4" FT | 8 pcs.   | 56 pcs.     |
| 21061     | 40 x 1 1/4" FT | 1 pc.    | 18 pcs.     |
| 21062     | 40 x 1 1/2" FT | 1 pc.    | 18 pcs.     |
| 21071     | 50 x 1 1/2" FT | 1 pc.    | 10 pcs.     |
| 21080     | 63 x 2" FT     | 1 pc.    | 8 pcs.      |
| 21090     | 75 x 2 1/2" FT | 1 pc.    | 2 pcs.      |



## Metal-Press-Elbow 90°

Made of tin-plated brass with press sleeve with inspection window.

| Art.-No.: | Type    | Unit/Bag | Unit/Carton |
|-----------|---------|----------|-------------|
| 23010     | 16 x 16 | 10 pcs.  | 200 pcs.    |
| 23020     | 18 x 18 | 10 pcs.  | 150 pcs.    |
| 23030     | 20 x 20 | 10 pcs.  | 150 pcs.    |
| 23040     | 25 x 25 | 10 pcs.  | 80 pcs.     |
| 23050     | 32 x 32 | 4 pcs.   | 44 pcs.     |
| 23060     | 40 x 40 | 1 pc.    | 10 pcs.     |
| 23070     | 50 x 50 | 1 pc.    | 8 pcs.      |
| 23080     | 63 x 63 | 1 pc.    | 4 pcs.      |
| 23090     | 75 x 75 | 1 pc.    | 2 pcs.      |



## Metal-Press-Elbow 90°, Zeta<sup>plus</sup>

Made of tin-plated brass with press sleeve with inspection window. Zeta-optimized through specially designed flow channel.

| Art.-No.: | Type    | Unit/Bag | Unit/Carton |
|-----------|---------|----------|-------------|
| Z23010    | 16 x 16 | 10 pcs.  | 180 pcs.    |
| Z23030    | 20 x 20 | 10 pcs.  | 130 pcs.    |
| Z23040    | 25 x 25 | 10 pcs.  | 70 pcs.     |



## Metal-Press-Elbow 90° MT

Made of tin-plated brass with press sleeve with inspection window.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| 23012     | 16 x 3/8" MT | 10 pcs.  | 200 pcs.    |
| 23015     | 16 x 1/2" MT | 10 pcs.  | 200 pcs.    |
| 23035     | 20 x 1/2" MT | 10 pcs.  | 160 pcs.    |
| 23037     | 20 x 3/4" MT | 10 pcs.  | 120 pcs.    |
| 23045     | 25 x 3/4" MT | 10 pcs.  | 90 pcs.     |
| 23047     | 25 x 1" MT   | 6 pcs.   | 54 pcs.     |
| 23055     | 32 x 1" MT   | 6 pcs.   | 54 pcs.     |



## Metal-Press-Elbow 90° FT

Made of tin-plated brass with press sleeve with inspection window.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| 23016     | 16 x 1/2" FT | 10 pcs.  | 180 pcs.    |
| 23026     | 18 x 1/2" FT | 10 pcs.  | 180 pcs.    |
| 23036     | 20 x 1/2" FT | 10 pcs.  | 160 pcs.    |
| 23038     | 20 x 3/4" FT | 10 pcs.  | 100 pcs.    |
| 23046     | 25 x 3/4" FT | 10 pcs.  | 100 pcs.    |
| 23048     | 25 x 1" FT   | 6 pcs.   | 54 pcs.     |
| 23056     | 32 x 1" FT   | 6 pcs.   | 54 pcs.     |



## Metal-Press-Elbow 45°

Made of tin-plated brass with press sleeve with inspection window.

| Art.-No.: | Type    | Unit/Bag | Unit/Carton |
|-----------|---------|----------|-------------|
| 23250     | 32 x 32 | 4 pcs.   | 44 pcs.     |
| 23260     | 40 x 40 | 1 pc.    | 10 pcs.     |
| 23270     | 50 x 50 | 1 pc.    | 8 pcs.      |
| 23280     | 63 x 63 | 1 pc.    | 4 pcs.      |
| 23290     | 75 x 75 | 1 pc.    | 2 pcs.      |



### Metal-Press-Tee

Made of tin-plated brass with press sleeve with inspection window.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| 25010     | 16 x 16 x 16 | 10 pcs.  | 150 pcs.    |
| 25020     | 18 x 18 x 18 | 10 pcs.  | 100 pcs.    |
| 25030     | 20 x 20 x 20 | 10 pcs.  | 100 pcs.    |
| 25040     | 25 x 25 x 25 | 4 pcs.   | 40 pcs.     |
| 25050     | 32 x 32 x 32 | 4 pcs.   | 32 pcs.     |
| 25060     | 40 x 40 x 40 | 1 pc.    | 8 pcs.      |
| 25070     | 50 x 50 x 50 | 1 pc.    | 6 pcs.      |
| 25080     | 63 x 63 x 63 | 1 pc.    | 2 pcs.      |
| 25090     | 75 x 75 x 75 | 1 pc.    | 2 pcs.      |



### Metal-Press-Tee, Zeta<sup>plus</sup>

Made of tin-plated brass with press sleeve with inspection window. Zeta-optimized through specially designed flow channel.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| Z25010    | 16 x 16 x 16 | 10 pcs.  | 150 pcs.    |
| Z25030    | 20 x 20 x 20 | 10 pcs.  | 100 pcs.    |
| Z25040    | 25 x 25 x 25 | 4 pcs.   | 40 pcs.     |



### Metal-Press-Tee, reduced

Made of tin-plated brass with press sleeve with inspection window.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| 25011     | 16 x 20 x 16 | 10 pcs.  | 100 pcs.    |
| 25021     | 18 x 16 x 16 | 10 pcs.  | 100 pcs.    |
| 25022     | 18 x 16 x 18 | 10 pcs.  | 100 pcs.    |
| 25023     | 18 x 18 x 16 | 10 pcs.  | 100 pcs.    |
| 25031     | 20 x 16 x 16 | 10 pcs.  | 100 pcs.    |
| 25032     | 20 x 16 x 20 | 10 pcs.  | 100 pcs.    |
| 25034     | 20 x 18 x 18 | 10 pcs.  | 100 pcs.    |
| 25036     | 20 x 18 x 20 | 10 pcs.  | 100 pcs.    |
| 25033     | 20 x 20 x 16 | 10 pcs.  | 100 pcs.    |
| 25037     | 20 x 25 x 20 | 4 pcs.   | 60 pcs.     |
| 25048     | 25 x 16 x 16 | 4 pcs.   | 60 pcs.     |
| 25047     | 25 x 16 x 20 | 4 pcs.   | 60 pcs.     |
| 25041     | 25 x 16 x 25 | 4 pcs.   | 60 pcs.     |
| 25044     | 25 x 18 x 25 | 4 pcs.   | 60 pcs.     |
| 25042     | 25 x 20 x 20 | 4 pcs.   | 60 pcs.     |
| 25043     | 25 x 20 x 25 | 4 pcs.   | 48 pcs.     |
| 25057     | 25 x 32 x 25 | 4 pcs.   | 40 pcs.     |
| 25049     | 25 x 25 x 16 | 4 pcs.   | 48 pcs.     |
| 25054     | 32 x 16 x 32 | 4 pcs.   | 40 pcs.     |
| 25051     | 32 x 20 x 32 | 4 pcs.   | 40 pcs.     |
| 25053     | 32 x 25 x 25 | 4 pcs.   | 40 pcs.     |
| 25052     | 32 x 25 x 32 | 4 pcs.   | 32 pcs.     |
| 25061     | 40 x 20 x 40 | 1 pc.    | 8 pcs.      |
| 25067     | 40 x 25 x 32 | 1 pc.    | 8 pcs.      |
| 25062     | 40 x 25 x 40 | 1 pc.    | 8 pcs.      |
| 25063     | 40 x 32 x 32 | 1 pc.    | 8 pcs.      |
| 25064     | 40 x 32 x 40 | 1 pc.    | 8 pcs.      |
| 25076     | 50 x 25 x 40 | 1 pc.    | 6 pcs.      |
| 25072     | 50 x 25 x 50 | 1 pc.    | 6 pcs.      |
| 25073     | 50 x 32 x 50 | 1 pc.    | 6 pcs.      |
| 25074     | 50 x 40 x 50 | 1 pc.    | 6 pcs.      |
| 25081     | 63 x 25 x 63 | 1 pc.    | 2 pcs.      |
| 25082     | 63 x 32 x 63 | 1 pc.    | 2 pcs.      |
| 25083     | 63 x 40 x 63 | 1 pc.    | 2 pcs.      |
| 25084     | 63 x 50 x 63 | 1 pc.    | 2 pcs.      |
| 25092     | 75 x 40 x 75 | 1 pc.    | 2 pcs.      |
| 25093     | 75 x 50 x 75 | 1 pc.    | 2 pcs.      |



### Metal-Press-Tee MT

Made of tin-plated brass with press sleeve with inspection window, conical thread.

| Art.-No.: | Type             | Unit/Bag | Unit/Carton |
|-----------|------------------|----------|-------------|
| 25110     | 16 x 1/2"MT x 16 | 10 pcs.  | 100 pcs.    |
| 25140     | 25 x 3/4"MT x 25 | 4 pcs.   | 44 pcs.     |
| 25150     | 32 x 3/4"MT x 32 | 4 pcs.   | 40 pcs.     |

# METAL-PRESS-FITTINGS



## Metal-Press-Tee FT

Made of tin-plated brass with press sleeve with inspection window.

| Art.-No.: | Type              | Unit/Bag | Unit/Carton |
|-----------|-------------------|----------|-------------|
| 25015     | 16 x 1/2" FT x 16 | 10 pcs.  | 100 pcs.    |
| 25025     | 18 x 1/2" FT x 18 | 10 pcs.  | 100 pcs.    |
| 25035     | 20 x 1/2" FT x 20 | 10 pcs.  | 100 pcs.    |
| 25038     | 20 x 3/4" FT x 20 | 10 pcs.  | 80 pcs.     |
| 25045     | 25 x 1/2" FT x 25 | 4 pcs.   | 48 pcs.     |
| 25046     | 25 x 3/4" FT x 25 | 4 pcs.   | 44 pcs.     |
| 25056     | 32 x 1/2" FT x 32 | 4 pcs.   | 40 pcs.     |
| 25055     | 32 x 3/4" FT x 32 | 4 pcs.   | 40 pcs.     |
| 25066     | 40 x 1" FT x 40   | 1 pc.    | 8 pcs.      |
| 25075     | 50 x 1" FT x 50   | 1 pc.    | 6 pcs.      |
| 25085     | 63 x 1" FT x 63   | 1 pc.    | 2 pcs.      |
| 25095     | 75 x 1" FT x 75   | 1 pc.    | 2 pcs.      |



## Metal-Press-Coupling

Made of tin-plated brass with press sleeve with inspection window.

| Art.-No.: | Type    | Unit/Bag | Unit/Carton |
|-----------|---------|----------|-------------|
| 27010     | 16 x 16 | 10 pcs.  | 200 pcs.    |
| 27020     | 18 x 18 | 10 pcs.  | 180 pcs.    |
| 27030     | 20 x 20 | 10 pcs.  | 160 pcs.    |
| 27040     | 25 x 25 | 10 pcs.  | 100 pcs.    |
| 27050     | 32 x 32 | 10 pcs.  | 60 pcs.     |
| 27060     | 40 x 40 | 1 pc.    | 18 pcs.     |
| 27070     | 50 x 50 | 1 pc.    | 12 pcs.     |
| 27080     | 63 x 63 | 1 pc.    | 8 pcs.      |
| 27090     | 75 x 75 | 1 pc.    | 2 pcs.      |



## Metal-Press-Coupling, reduced

Made of tin-plated brass with press sleeve with inspection window.

| Art.-No.: | Type    | Unit/Bag | Unit/Carton |
|-----------|---------|----------|-------------|
| 27021     | 18 x 16 | 10 pcs.  | 180 pcs.    |
| 27031     | 20 x 16 | 10 pcs.  | 160 pcs.    |
| 27032     | 20 x 18 | 10 pcs.  | 160 pcs.    |
| 27041     | 25 x 16 | 10 pcs.  | 120 pcs.    |
| 27042     | 25 x 20 | 10 pcs.  | 120 pcs.    |
| 27051     | 32 x 20 | 10 pcs.  | 80 pcs.     |
| 27052     | 32 x 25 | 10 pcs.  | 80 pcs.     |
| 27062     | 40 x 25 | 1 pc.    | 20 pcs.     |
| 27061     | 40 x 32 | 1 pc.    | 18 pcs.     |
| 27072     | 50 x 32 | 1 pc.    | 12 pcs.     |
| 27071     | 50 x 40 | 1 pc.    | 12 pcs.     |
| 27081     | 63 x 40 | 1 pc.    | 8 pcs.      |
| 27082     | 63 x 50 | 1 pc.    | 8 pcs.      |
| 27091     | 75 x 40 | 1 pc.    | 2 pcs.      |
| 27092     | 75 x 50 | 1 pc.    | 2 pcs.      |
| 27093     | 75 x 63 | 1 pc.    | 2 pcs.      |



## Metal-Press-Screw-Connection FT (swivel nut)

Made of tin-plated brass with press sleeve with inspection window and flat gasket. Detachable fitting for the surface-mounted connection of filters and valves.

| Art.-No.: | Type           | Unit/Bag | Unit/Carton |
|-----------|----------------|----------|-------------|
| 28012     | 16 x 3/8" FT   | 10 pcs.  | 200 pcs.    |
| 28011     | 16 x 1/2" FT   | 10 pcs.  | 200 pcs.    |
| 28010     | 16 x 3/4" FT   | 10 pcs.  | 200 pcs.    |
| 28020     | 18 x 1/2" FT   | 10 pcs.  | 200 pcs.    |
| 28031     | 20 x 1/2" FT   | 10 pcs.  | 200 pcs.    |
| 28030     | 20 x 3/4" FT   | 10 pcs.  | 200 pcs.    |
| 28041     | 25 x 3/4" FT   | 10 pcs.  | 100 pcs.    |
| 28040     | 25 x 1" FT     | 10 pcs.  | 100 pcs.    |
| 28050     | 32 x 1 1/4" FT | 8 pcs.   | 64 pcs.     |



## Metal-Press-Screw-Connection FT (swivel nut)

Made of brass with press sleeve with inspection window and flat gasket. Detachable fitting for the surface-mounted connection of filters and valves.

| Art.-No.: | Type           | Unit/Bag | Unit/Carton |
|-----------|----------------|----------|-------------|
| F28051    | 32 x 1" FT     | 10 pcs.  | 80 pcs.     |
| F28050    | 32 x 1 1/4" FT | 8 pcs.   | 64 pcs.     |
| F28061    | 40 x 1 1/4" FT | 1 pc.    | 18 pcs.     |
| F28060    | 40 x 1 1/2" FT | 1 pc.    | 18 pcs.     |
| F28070    | 50 x 2" FT     | 1 pc.    | 10 pcs.     |
| F28080    | 63 x 2" FT     | 1 pc.    | 8 pcs.      |



## Metal-Press-Elbow 90° FT (swivel nut)

Made of brass with press sleeve with inspection window and flat gasket. Detachable fitting for the surface-mounted connection of filters and valves.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| F23013    | 16 x 1/2" FT | 10 pcs.  | 180 pcs.    |
| F23033    | 20 x 1/2" FT | 10 pcs.  | 160 pcs.    |
| F23034    | 20 x 3/4" FT | 10 pcs.  | 120 pcs.    |
| F23044    | 25 x 3/4" FT | 10 pcs.  | 100 pcs.    |



## Metal-Press-Adapter for copper pipes

Made of tin-plated brass and copper, with press sleeve with inspection window. For connection between MULTITUBO systems multi-layer pipe with copper pipe.  
**Important: The copper-side adapter is suitable for pressing only!**

| Art.-No.: | Type              | Unit/Bag | Unit/Carton |
|-----------|-------------------|----------|-------------|
| 29706     | 16 x 2,00 - Cu 10 | 10 pcs.  | 220 pcs.    |
| 29708     | 16 x 2,00 - Cu 12 | 10 pcs.  | 220 pcs.    |
| 29710     | 16 x 2,00 - Cu 15 | 10 pcs.  | 200 pcs.    |
| 29730     | 20 x 2,25 - Cu 18 | 10 pcs.  | 200 pcs.    |
| 29731     | 20 x 2,25 - Cu 22 | 10 pcs.  | 100 pcs.    |
| 29740     | 25 x 2,50 - Cu 22 | 10 pcs.  | 100 pcs.    |
| 29750     | 32 x 3,00 - Cu 28 | 10 pcs.  | 50 pcs.     |



### Metal-Press-Adapter for copper pipes

Made of brass and copper, with press sleeve with inspection window. For connection between MULTITUBO systems multi-layer pipe with copper pipe.

**Important: The copper-side adapter is suitable for pressing only!**

| Art.-No.: | Type              | Unit/Bag | Unit/Carton |
|-----------|-------------------|----------|-------------|
| F29710    | 16 x 2,00 - Cu 15 | 10 pcs.  | 200 pcs.    |
| F29730    | 20 x 2,25 - Cu 18 | 10 pcs.  | 200 pcs.    |
| F29731    | 20 x 2,25 - Cu 22 | 10 pcs.  | 100 pcs.    |
| F29740    | 25 x 2,50 - Cu 22 | 10 pcs.  | 100 pcs.    |
| F29750    | 32 x 3,00 - Cu 28 | 10 pcs.  | 50 pcs.     |



### Metal-Press-connection for copper pipes

Made of brass with press sleeve incl. inspection window. For connections between MULTITUBO multilayer pipe and copper pipe.

| Art.-No.: | Type          | Unit/Bag | Unit/Carton |
|-----------|---------------|----------|-------------|
| F20710    | 16 x 15 mm Cu | 10 pcs.  | 200 pcs.    |
| F20731    | 20 x 22 mm Cu | 10 pcs.  | 100 pcs.    |
| F20740    | 25 x 22 mm Cu | 10 pcs.  | 100 pcs.    |



### Metal-Press-connection 90° for copper pipes

Made of brass with press sleeve incl. inspection window. For connections between MULTITUBO multilayer pipe and copper pipe.

| Art.-No.: | Type          | Unit/Bag | Unit/Carton |
|-----------|---------------|----------|-------------|
| F23715    | 16 x 15 mm Cu | 10 pcs.  | 200 pcs.    |



### Compression adapter for copper pipes

Made of brass with tin plated nut. For connections between MULTITUBO multilayer pipe and copper pipe.

| Art.-No.: | Type          | Unit/Bag | Unit/Carton |
|-----------|---------------|----------|-------------|
| 79710     | 16 x 15 mm Cu | 10 pcs.  | 200 pcs.    |



### Compression adapter for copper pipes

Made of brass. For connections between MULTITUBO multilayer pipe and copper pipe.

| Art.-No.: | Type          | Unit/Bag | Unit/Carton |
|-----------|---------------|----------|-------------|
| 79731     | 20 x 22 mm Cu | 10 pcs.  | 150 pcs.    |



### Metal-Press-Tab-Connection Elbow FT, with flange

Made of tin-plated brass with press sleeve with inspection window.

| Art.-No.: | Type                    | Unit/Bag | Unit/Carton |
|-----------|-------------------------|----------|-------------|
| 29013     | 16 x 3/8"FT, l = 38 mm  | 10 pcs.  | 100 pcs.    |
| 29010     | 16 x 1/2"FT, l = 38 mm  | 10 pcs.  | 100 pcs.    |
| 29012     | 16 x 1/2" FT, l = 46 mm | 10 pcs.  | 100 pcs.    |
| 29020     | 18 x 1/2"FT, l =        | 10 pcs.  | 100 pcs.    |
| 29030     | 20 x 1/2"FT, l = 38 mm  | 10 pcs.  | 100 pcs.    |
| 29031     | 20 x 3/4"FT, l = 49 mm  | 10 pcs.  | 80 pcs.     |
| 29040     | 25 x 3/4"FT, l = 56 mm  | 6 pcs.   | 54 pcs.     |



### Metal-Press-Tab-Connection Elbow FT, with flange, Zeta<sup>plus</sup>

Made of tin-plated brass with press sleeve with inspection window. Zeta-optimized through specially designed flow channel.

| Art.-No.: | Type                   | Unit/Bag | Unit/Carton |
|-----------|------------------------|----------|-------------|
| Z29010    | 16 x 1/2"FT, l = 48 mm | 10 pcs.  | 100 pcs.    |
| Z29030    | 20 x 1/2"FT, l = 48 mm | 10 pcs.  | 100 pcs.    |



### Metal-Press-Tab-Connection Elbow FT, with flange

Made of tin-plated brass with press sleeve with inspection window.

| Art.-No.: | Type                        | Unit/Bag | Unit/Carton |
|-----------|-----------------------------|----------|-------------|
| 29410     | 16 x 1/2"FT x 16, l = 46 mm | 8 pcs.   | 56 pcs.     |
| 29430     | 20 x 1/2"FT x 20, l = 46 mm | 8 pcs.   | 56 pcs.     |



### Metal-Press-U-Tab-Connection Elbow FT, with flange

Made of tin-plated brass with press sleeve with inspection window.

| Art.-No.: | Type                        | Unit/Bag | Unit/Carton |
|-----------|-----------------------------|----------|-------------|
| 29415     | 16 x 1/2"FT x 16, l = 46 mm | 10 pcs.  | 50 pcs.     |
| 29435     | 20 x 1/2"FT x 20, l = 46 mm | 10 pcs.  | 50 pcs.     |



### Mounting set "Gemini"

Mounting plate with 2 Metal-Press-Tab-Connection Elbows FT, with flange, made of tin-plated brass with press sleeve with inspection window, premounted.

| Art.-No.: | Type                          | Unit/Bag | Unit/Carton |
|-----------|-------------------------------|----------|-------------|
| 29317     | 16 x 3/8"FT (2x 29013)/120 mm | 1 pc.    | 10 pcs.     |
| 29318     | 16 x 1/2"FT (2x 29010)/120 mm | 1 pc.    | 10 pcs.     |
| 29321     | 16 x 1/2"FT (2x 29010)/150 mm | 1 pc.    | 10 pcs.     |
| 29322     | 20 x 1/2"FT (2x 29030)/150 mm | 1 pc.    | 10 pcs.     |

# METAL-PRESS-FITTINGS



## Mounting set

Mounting plate with 2 Metal-Press-Tab-Connection Elbows FT, with flange, made of tin-plated brass with press sleeve with inspection window, premounted.

| Art.-No.: | Type                           | Unit/Bag | Unit/Carton |
|-----------|--------------------------------|----------|-------------|
| 29315     | 16 x 1/2" FT (2x 29010)/150 mm | 1 pc.    | 10 pcs.     |
| 29375     | 16 x 1/2" FT (2x 29010)/75 mm  | 1 pc.    | 10 pcs.     |



## Mounting set - sound absorbing

Mounting plate with 2 Metal-Press-Tab-Connection Elbows FT, with flange, made of tin-plated brass with press sleeve with inspection window, premounted, sound absorbing.

| Art.-No.: | Type                           | Unit/Bag | Unit/Carton |
|-----------|--------------------------------|----------|-------------|
| 29315S    | 16 x 1/2" FT (2x 29012)/150 mm | 1 pc.    | 9 pcs.      |



## Metal-Press-Tab-Connection for wall penetration

Made of tin-plated brass with press sleeve with inspection window, for lightweight constructions.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| 29110     | 16 x 1/2" FT | 10 pcs.  | 60 pcs.     |



## Metal-Press-UPS-Connection Elbow

Made of tin-plated brass with press sleeve with inspection window, for connection to concealed cisterns.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| 29210     | 16 x 1/2" FT | 10 pcs.  | 80 pcs.     |



## Metal-Press-UPS-Connection Elbow, Geberit

Made of tin-plated brass, with press sleeve incl. inspection window, for connection to Geberit flush-mounted cisterns (from 2002) and all MEPLA FIX 1/2" AG.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| 29215     | 16 x 1/2" FT | 10 pcs.  | 180 pcs.    |



## Metal-Press-Radiator-Connection Elbow

Radiator connection elbow with plated copper pipe.

| Art.-No.: | Type                    | Unit/Bag | Unit/Carton |
|-----------|-------------------------|----------|-------------|
| 23508     | 16 x Cu 12 x 1 - 150 mm | 2 pcs.   | 60 pcs.     |
| 23509     | 16 x Cu 15 x 1 - 150 mm | 2 pcs.   | 60 pcs.     |
| 23510     | 16 x Cu 15 x 1 - 330 mm | 2 pcs.   | 60 pcs.     |
| 23520     | 18 x Cu 15 x 1 - 330 mm | 2 pcs.   | 60 pcs.     |



## Metal-Press-Radiator-Connection Tee

Radiator connection tee with plated copper pipe 15 x 1 mm.

| Art.-No.: | Type                    | Unit/Bag | Unit/Carton |
|-----------|-------------------------|----------|-------------|
| 25510     | 16 x Cu 15 x 1 - 330 mm | 2 pcs.   | 30 pcs.     |
| 25530     | 20 x Cu 15 x 1 - 330 mm | 2 pcs.   | 20 pcs.     |



## SL Baseboard-Connection-Set

For press connection, made of tin-plated brass with press sleeve with inspection window, for the use of SL Bend or SL Angle.

| Art.-No.: | Type           | Unit  | Unit/Carton |
|-----------|----------------|-------|-------------|
| 25710     | 16 x 1/2" x 16 | 1 set |             |
| 25711     | 16 x 1/2" x ST | 1 set |             |
| 25712     | ST x 1/2" x 16 | 1 set |             |
| 25713     | 16 x 1/2" x 20 | 1 set |             |
| 25731     | 20 x 1/2" x 16 | 1 set |             |
| 25730     | 20 x 1/2" x 20 | 1 set |             |



## SL Bend

Radiator connection bend made of tin-plated copper (15 x 1 mm) with screw connector for baseboard connection set. Connection to the radiator with Art.-No. 19050.

| Art.-No.: | Type      | Unit  | Unit/Carton |
|-----------|-----------|-------|-------------|
| 23710     | 15 x 1 mm | 1 set |             |



## SL Angle

Radiator connection bend (blockable) made of tin-plated copper (15 x 1 mm) with screw connector for baseboard connection set. Connection to the radiator with Art.-No. 19050.

| Art.-No.: | Type      | Unit  | Unit/Carton |
|-----------|-----------|-------|-------------|
| 23720     | 15 x 1 mm | 1 set |             |



## Metal-Crossing-Fitting

Made of brass, for crossover-free connection of radiators, incl. box made from EPS.

| Art.-No.: | Type         | Unit  |
|-----------|--------------|-------|
| 25610     | 16 x 16 x 16 | 1 pc. |
| 25620     | 20 x 16 x 16 | 1 pc. |
| 25630     | 20 x 16 x 20 | 1 pc. |



## Metal-Press-End Plug

Made of brass, without exhaust valve, for permanent closing of the pipes.

| Art.-No.: | Type  | Unit             |
|-----------|-------|------------------|
| 29510     | 16 mm | 10 pcs. 200 pcs. |
| 29530     | 20 mm | 10 pcs. 200 pcs. |
| 29540     | 25 mm | 10 pcs. 250 pcs. |
| 29530     | 32 mm | 10 pcs. 200 pcs. |

## PPSU-PRESS-FITTINGS



### PPSU-Press-Elbow 90°

Made of PPSU with press sleeve, incl. inspection-window.

| Art.-No.: | Type    | Unit/Bag | Unit/Carton |
|-----------|---------|----------|-------------|
| 53010     | 16 x 16 | 10 pcs.  | 200 pcs.    |
| 53030     | 20 x 20 | 10 pcs.  | 150 pcs.    |
| 53040     | 25 x 25 | 10 pcs.  | 80 pcs.     |
| 53050     | 32 x 32 | 4 pcs.   | 44 pcs.     |
| 53060     | 40 x 40 | 2 pcs.   | 30 pcs.     |
| 53070     | 50 x 50 | 2 pcs.   | 14 pcs.     |



### PPSU-Press-Coupling, reduced

Made of PPSU with press sleeve, incl. inspection-window.

| Art.-No.: | Type    | Unit/Bag | Unit/Carton |
|-----------|---------|----------|-------------|
| 57031     | 20 x 16 | 10 pcs.  | 160 pcs.    |
| 57041     | 25 x 16 | 10 pcs.  | 120 pcs.    |
| 57042     | 25 x 20 | 10 pcs.  | 120 pcs.    |
| 57052     | 32 x 25 | 10 pcs.  | 80 pcs.     |



### PPSU-Press-Tee

Made of PPSU with press sleeve, incl. inspection-window.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| 55010     | 16 x 16 x 16 | 10 pcs.  | 150 pcs.    |
| 55030     | 20 x 20 x 20 | 10 pcs.  | 100 pcs.    |
| 55040     | 25 x 25 x 25 | 4 pcs.   | 40 pcs.     |
| 55050     | 32 x 32 x 32 | 4 pcs.   | 32 pcs.     |
| 55060     | 40 x 40 x 40 | 1 pc.    | 18 pcs.     |
| 55070     | 50 x 50 x 50 | 1 pc.    | 10 pcs.     |



### PPSU-Press-System Transition (TH↔U)

Special fitting for system transition from TH contour (20 x 2.00 mm) to U contour (20 x 2.25 mm). The special profile can be pressed on both sides with TH contour as well as with U contour.

| Art.-No.: | Type              | Unit/Bag | Unit/Carton |
|-----------|-------------------|----------|-------------|
| 57030MM   | 20x2,25 / 20x2,00 | 10 pcs.  | 160 pcs.    |



### PPSU-Press-Tee, reduced

Made of PPSU with press sleeve, incl. inspection-window.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| 55011     | 16 x 20 x 16 | 10 pcs.  | 100 pcs.    |
| 55031     | 20 x 16 x 16 | 10 pcs.  | 100 pcs.    |
| 55032     | 20 x 16 x 20 | 10 pcs.  | 100 pcs.    |
| 55033     | 20 x 20 x 16 | 10 pcs.  | 100 pcs.    |
| 55041     | 25 x 16 x 25 | 4 pcs.   | 60 pcs.     |
| 55042     | 25 x 20 x 20 | 4 pcs.   | 60 pcs.     |
| 55043     | 25 x 20 x 25 | 4 pcs.   | 48 pcs.     |
| 55051     | 32 x 20 x 32 | 4 pcs.   | 32 pcs.     |
| 55053     | 32 x 25 x 25 | 4 pcs.   | 40 pcs.     |
| 55052     | 32 x 25 x 32 | 4 pcs.   | 32 pcs.     |



### PPSU-Press-Coupling

Made of PPSU with press sleeve, incl. inspection-window.

| Art.-No.: | Type    | Unit/Bag | Unit/Carton |
|-----------|---------|----------|-------------|
| 57010     | 16 x 16 | 10 pcs.  | 200 pcs.    |
| 57030     | 20 x 20 | 10 pcs.  | 160 pcs.    |
| 57040     | 25 x 25 | 10 pcs.  | 100 pcs.    |
| 57050     | 32 x 32 | 10 pcs.  | 60 pcs.     |
| 57060     | 40 x 40 | 2 pcs.   | 40 pcs.     |
| 57070     | 50 x 50 | 2 pcs.   | 22 pcs.     |

# MODULAR 90/110



## Press-Adapter

with press sleeve incl. inspection window, for connection of base bodies or coupling of 2 pipes with clamp and sealing.

| Art.-No.: | Type        | Unit/Bag | Unit/Carton |
|-----------|-------------|----------|-------------|
| M22063    | 63 x 6,00   | 1 pc.    | 6 pcs.      |
| M22075    | 75 x 7,50   | 1 pc.    | 6 pcs.      |
| M22090    | 90 x 8,50   | 1 pc.    | 6 pcs.      |
| M22110    | 110 x 10,00 | 1 pc.    | 6 pcs.      |



## Base Body Elbow 90°

Made of stainless steel.

| Art.-No.: | Type | Unit/Bag | Unit/Carton |
|-----------|------|----------|-------------|
| M23000    | 90°  | 1 pc.    | 2 pcs.      |



## Base Body Elbow 45°

Made of stainless steel.

| Art.-No.: | Type | Unit/Bag | Unit/Carton |
|-----------|------|----------|-------------|
| M23200    | 45°  | 1 pc.    | 2 pcs.      |



## Base Body Tee

Made of stainless steel.

| Art.-No.: | Type | Unit/Bag | Unit/Carton |
|-----------|------|----------|-------------|
| M25000    |      | 1 pc.    | 1 pc.       |



## Connector MT

Made of stainless steel.

| Art.-No.: | Type      | Unit/Bag | Unit/Carton |
|-----------|-----------|----------|-------------|
| M20212    | 2 1/2" MT | 1 pc.    | 6 pcs.      |
| M20300    | 3" MT     | 1 pc.    | 6 pcs.      |



## Connector FT

Made of stainless steel.

| Art.-No.: | Type      | Unit/Bag | Unit/Carton |
|-----------|-----------|----------|-------------|
| M21034    | 3/4" FT   | 1 pc.    | 16 pcs.     |
| M21114    | 1 1/4" FT | 1 pc.    | 6 pcs.      |
| M21112    | 1 1/2" FT | 1 pc.    | 6 pcs.      |
| M21200    | 2" FT     | 1 pc.    | 6 pcs.      |
| M21212    | 2 1/2" FT | 1 pc.    | 6 pcs.      |
| M21300    | 3" FT     | 1 pc.    | 6 pcs.      |



## Blind Cap

Made of stainless steel.

| Art.-No.: | Type | Unit/Bag | Unit/Carton |
|-----------|------|----------|-------------|
| M29500    |      | 1 pc.    | 16 pcs.     |



## Gripper Clamp with Sealing

for easy connection of the base bodies to the adapters, or coupling of 2 adapters. Including sealing ring, tightening with a torque wrench.

| Art.-No.: | Type       | Unit/Bag | Unit/Carton |
|-----------|------------|----------|-------------|
| M28000    |            | 1 pc.    | 10 pcs.     |
| M28010    | spare seal | 1 pc.    | 200 pcs.    |

## METAL-PUSH-FITTINGS



### Metal-Push-Connection MT

Made of tin-plated brass with transparent plastic sleeve, thread for caulking.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| 60010     | 16 x 1/2" MT | 10 pcs.  | 180 pcs.    |
| 60030     | 20 x 1/2" MT | 10 pcs.  | 180 pcs.    |
| 60031     | 20 x 3/4" MT | 10 pcs.  | 150 pcs.    |
| 60040     | 25 x 3/4" MT | 10 pcs.  | 100 pcs.    |
| 60041     | 25 x 1" MT   | 10 pcs.  | 80 pcs.     |
| 60053     | 32 x 1/2" MT | 10 pcs.  | 60 pcs.     |
| 60052     | 32 x 3/4" MT | 10 pcs.  | 60 pcs.     |
| 60050     | 32 x 1" MT   | 10 pcs.  | 60 pcs.     |



### Metal-Push-Connection FT

Made of tin-plated brass with transparent plastic sleeve, parallel thread.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| 61010     | 16 x 1/2" FT | 10 pcs.  | 180 pcs.    |
| 61030     | 20 x 1/2" FT | 10 pcs.  | 180 pcs.    |
| 61031     | 20 x 3/4" FT | 10 pcs.  | 150 pcs.    |
| 61040     | 25 x 3/4" FT | 10 pcs.  | 90 pcs.     |
| 61041     | 25 x 1" FT   | 10 pcs.  | 80 pcs.     |
| 61050     | 32 x 1" FT   | 10 pcs.  | 60 pcs.     |



### Metal-Push-Elbow 90°

Made of tin-plated brass with transparent plastic sleeve.

| Art.-No.: | Type    | Unit/Bag | Unit/Carton |
|-----------|---------|----------|-------------|
| 63010     | 16 x 16 | 10 pcs.  | 150 pcs.    |
| 63030     | 20 x 20 | 10 pcs.  | 100 pcs.    |
| 63040     | 25 x 25 | 10 pcs.  | 70 pcs.     |
| 63050     | 32 x 32 | 4 pcs.   | 44 pcs.     |



### Metal-Push-Elbow 90°, Zeta<sup>plus</sup>

Made of tin-plated brass with transparent plastic sleeve. Zeta-optimized through specially designed flow channel.

| Art.-No.: | Type    | Unit/Bag | Unit/Carton |
|-----------|---------|----------|-------------|
| Z63010    | 16 x 16 | 10 pcs.  | 130 pcs.    |
| Z63030    | 20 x 20 | 10 pcs.  | 80 pcs.     |
| Z63040    | 25 x 25 | 10 pcs.  | 60 pcs.     |



### Metal-Push-Elbow 90° MT

Made of tin-plated brass with transparent plastic sleeve.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| 63015     | 16 x 1/2" MT | 10 pcs.  | 180 pcs.    |
| 63035     | 20 x 1/2" MT | 10 pcs.  | 160 pcs.    |
| 63037     | 20 x 3/4" MT | 10 pcs.  | 90 pcs.     |
| 63045     | 25 x 3/4" MT | 10 pcs.  | 90 pcs.     |
| 63055     | 32 x 1" MT   | 6 pcs.   | 48 pcs.     |



### Metal-Push-Elbow 90° FT

Made of tin-plated brass with transparent plastic sleeve.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| 63016     | 16 x 1/2" FT | 10 pcs.  | 160 pcs.    |
| 63036     | 20 x 1/2" FT | 10 pcs.  | 160 pcs.    |
| 63038     | 20 x 3/4" FT | 10 pcs.  | 100 pcs.    |
| 63046     | 25 x 3/4" FT | 10 pcs.  | 90 pcs.     |
| 63056     | 32 x 1" FT   | 6 pcs.   | 48 pcs.     |



### Metal-Push-Elbow 45°

Made of tin-plated brass with transparent plastic sleeve.

| Art.-No.: | Type    | Unit/Bag | Unit/Carton |
|-----------|---------|----------|-------------|
| 63240     | 25 x 25 | 10 pcs.  | 70 pcs.     |
| 63250     | 32 x 32 | 4 pcs.   | 44 pcs.     |



### Metal-Push-Tee

Made of tin-plated brass with transparent plastic sleeve.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| 65010     | 16 x 16 x 16 | 10 pcs.  | 100 pcs.    |
| 65030     | 20 x 20 x 20 | 10 pcs.  | 80 pcs.     |
| 65040     | 25 x 25 x 25 | 4 pcs.   | 40 pcs.     |
| 65050     | 32 x 32 x 32 | 4 pcs.   | 24 pcs.     |



### Metal-Push-Tee, Zeta<sup>plus</sup>

Made of tin-plated brass with transparent plastic sleeve. Zeta-optimized through specially designed flow channel.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| Z65010    | 16 x 16 x 16 | 10 pcs.  | 100 pcs.    |
| Z65030    | 20 x 20 x 20 | 10 pcs.  | 80 pcs.     |
| Z65040    | 25 x 25 x 25 | 4 pcs.   | 40 pcs.     |



### Metal-Push-Tee, reduced

Made of tin-plated brass with transparent plastic sleeve.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| 65011     | 16 x 20 x 16 | 10 pcs.  | 80 pcs.     |
| 65031     | 20 x 16 x 16 | 10 pcs.  | 80 pcs.     |
| 65032     | 20 x 16 x 20 | 10 pcs.  | 80 pcs.     |
| 65033     | 20 x 20 x 16 | 10 pcs.  | 80 pcs.     |
| 65048     | 25 x 16 x 16 | 4 pcs.   | 48 pcs.     |
| 65047     | 25 x 16 x 20 | 4 pcs.   | 48 pcs.     |
| 65041     | 25 x 16 x 25 | 4 pcs.   | 48 pcs.     |
| 65042     | 25 x 20 x 20 | 4 pcs.   | 48 pcs.     |
| 65043     | 25 x 20 x 25 | 4 pcs.   | 40 pcs.     |
| 65054     | 32 x 16 x 32 | 4 pcs.   | 24 pcs.     |
| 65051     | 32 x 20 x 32 | 4 pcs.   | 24 pcs.     |
| 65053     | 32 x 25 x 25 | 4 pcs.   | 24 pcs.     |
| 65052     | 32 x 25 x 32 | 4 pcs.   | 24 pcs.     |

# METAL-PUSH-FITTINGS



## Metal-Push-Tee FT

Made of tin-plated brass with transparent plastic sleeve.

| Art.-No.: | Type              | Unit/Bag | Unit/Carton |
|-----------|-------------------|----------|-------------|
| 65015     | 16 x 1/2" FT x 16 | 10 pcs.  | 100 pcs.    |
| 65035     | 20 x 1/2" FT x 20 | 10 pcs.  | 80 pcs.     |
| 65045     | 25 x 1/2" FT x 25 | 4 pcs.   | 48 pcs.     |
| 65046     | 25 x 3/4" FT x 25 | 4 pcs.   | 44 pcs.     |
| 65056     | 32 x 1/2" FT x 32 | 4 pcs.   | 32 pcs.     |
| 65055     | 32 x 3/4" FT x 32 | 4 pcs.   | 32 pcs.     |



## Metal-Push-Coupling

Made of tin-plated brass with transparent plastic sleeve.

| Art.-No.: | Type    | Unit/Bag | Unit/Carton |
|-----------|---------|----------|-------------|
| 67010     | 16 x 16 | 10 pcs.  | 200 pcs.    |
| 67030     | 20 x 20 | 10 pcs.  | 140 pcs.    |
| 67040     | 25 x 25 | 10 pcs.  | 90 pcs.     |
| 67050     | 32 x 32 | 10 pcs.  | 60 pcs.     |



## Metal-Push-Coupling, reduced

Made of tin-plated brass with transparent plastic sleeve.

| Art.-No.: | Type    | Unit/Bag | Unit/Carton |
|-----------|---------|----------|-------------|
| 67031     | 20 x 16 | 10 pcs.  | 140 pcs.    |
| 67041     | 25 x 16 | 10 pcs.  | 120 pcs.    |
| 67042     | 25 x 20 | 10 pcs.  | 120 pcs.    |
| 67053     | 32 x 16 | 10 pcs.  | 70 pcs.     |
| 67051     | 32 x 20 | 10 pcs.  | 70 pcs.     |
| 67052     | 32 x 25 | 10 pcs.  | 70 pcs.     |



## Metal-Push-Screw-Connection FT (swivel nut)

Made of tin-plated brass with transparent plastic sleeve and flat gasket. Detachable fitting for the surface-mounted connection of filters and valves.

| Art.-No.: | Type           | Unit/Bag | Unit/Carton |
|-----------|----------------|----------|-------------|
| 68011     | 16 x 1/2" FT   | 10 pcs.  | 200 pcs.    |
| 68010     | 16 x 3/4" FT   | 10 pcs.  | 200 pcs.    |
| 68030     | 20 x 3/4" FT   | 10 pcs.  | 170 pcs.    |
| 68041     | 25 x 3/4" FT   | 10 pcs.  | 100 pcs.    |
| 68040     | 25 x 1" FT     | 10 pcs.  | 100 pcs.    |
| 68052     | 32 x 3/4" FT   | 8 pcs.   | 56 pcs.     |
| 68051     | 32 x 1" FT     | 8 pcs.   | 56 pcs.     |
| 68050     | 32 x 1 1/4" FT | 8 pcs.   | 56 pcs.     |



## Metal-Push-Tab-Connection Elbow FT, with flange

Made of tin-plated brass with transparent plastic sleeve.

| Art.-No.: | Type                    | Unit/Bag | Unit/Carton |
|-----------|-------------------------|----------|-------------|
| 69010     | 16 x 1/2" FT, l = 46 mm | 10 pcs.  | 80 pcs.     |
| 69030     | 20 x 1/2" FT, l = 46 mm | 10 pcs.  | 80 pcs.     |
| 69031     | 20 x 3/4" FT, l = 50 mm | 10 pcs.  | 60 pcs.     |
| 69040     | 25 x 3/4" FT, l = 50 mm | 10 pcs.  | 60 pcs.     |



## Metal-Push-Tab-Connection Elbow FT, with flange, Zeta<sup>plus</sup>

Made of tin-plated brass with transparent plastic sleeve. Zeta-optimized through specially designed flow channel.

| Art.-No.: | Type                    | Unit/Bag | Unit/Carton |
|-----------|-------------------------|----------|-------------|
| Z69010    | 16 x 1/2" FT, l = 46 mm | 10 pcs.  | 80 pcs.     |
| Z69030    | 20 x 1/2" FT, l = 46 mm | 10 pcs.  | 80 pcs.     |



## Metal-Push-U-Tab-Connection Elbow FT, with flange

Made of tin-plated brass with transparent plastic sleeve.

| Art.-No.: | Type                         | Unit/Bag | Unit/Carton |
|-----------|------------------------------|----------|-------------|
| 69415     | 16 x 1/2" FT x 16, l = 46 mm | 10 pcs.  | 50 pcs.     |
| 69435     | 20 x 1/2" FT x 20, l = 46 mm | 10 pcs.  | 40 pcs.     |
| 69445     | 25 x 1/2" FT x 25, l = 46 mm | 4 pcs.   | 32 pcs.     |



## Mounting-Set "Gemini"

Mounting plate with 2 Metal-Press-Tab-Connection Elbows FT, with flange, made of tin-plated brass with press sleeve with inspection window, premounted.

| Art.-No.: | Type                           | Unit/Bag | Unit/Carton |
|-----------|--------------------------------|----------|-------------|
| 69318     | 16 x 1/2" FT (2x 69010)/120 mm | 1 pc.    | 10 pcs.     |
| 69321     | 16 x 1/2" FT (2x 69010)/150 mm | 1 pc.    | 10 pcs.     |



## Mounting set

Mounting plate with 2 Metal-Press-Tab-Connection Elbows FT, with flange, made of tin-plated brass with press sleeve with inspection window, premounted.

| Art.-No.: | Type                           | Unit/Bag | Unit/Carton |
|-----------|--------------------------------|----------|-------------|
| 69315     | 16 x 1/2" FT (2x 69010)/120 mm | 1 pc.    | 10 pcs.     |
| 69375     | 16 x 1/2" FT (2x 69010)/150 mm | 1 pc.    | 10 pcs.     |



## Mounting set - sound absorbing

Mounting plate with 2 Metal-Press-Tab-Connection Elbows FT, with flange, made of tin-plated brass with press sleeve with inspection window, premounted, sound absorbing.

| Art.-No.: | Type                           | Unit/Bag | Unit/Carton |
|-----------|--------------------------------|----------|-------------|
| 69315S    | 16 x 1/2" FT (2x 69010)/120 mm | 1 pc.    | 9 pcs.      |



### Metal-Push-Radiator-Connection Elbow

Radiator connection elbow with plated copper pipe 15 x 1 mm, with transparent plastic sleeve.

| Art.-No.: | Type                    | Unit/Bag | Unit/Carton |
|-----------|-------------------------|----------|-------------|
| 63510     | 16 x CU 15 x 1 - 330 mm | 1 pc.    | 20 pcs.     |



### Metal-Push-Radiator-Connection Tee

Radiator connection tee with plated copper pipe 15 x 1 mm, with transparent plastic sleeve.

| Art.-No.: | Type                    | Unit/Bag | Unit/Carton |
|-----------|-------------------------|----------|-------------|
| 65510     | 16 x CU 15 x 1 - 330 mm | 1 pc.    | 30 pcs.     |
| 65530     | 20 x CU 15 x 1 - 330 mm | 1 pc.    | 20 pcs.     |



### SL Baseboard-Connection-Set

For push connection, made of tin-plated brass with transparent sleeve to control insertion depth of pipe, for the use of SL Bend or SL Angle.

| Art.-No.: | Type           | Unit  | Unit/Carton |
|-----------|----------------|-------|-------------|
| 65710     | 16 x 1/2" x 16 | 1 set |             |
| 65711     | 16 x 1/2" x ST | 1 set |             |
| 65712     | ST x 1/2" x 16 | 1 set |             |
| 65713     | 16 x 1/2" x 20 | 1 set |             |
| 65731     | 20 x 1/2" x 16 | 1 set |             |
| 65730     | 20 x 1/2" x 20 | 1 set |             |



### SL Bend

Radiator connection bend made of tin-plated copper (15 x 1 mm) with screw connector for baseboard connection set. Connection to the radiator with Art.-No. 19050.

| Art.-No.: | Type      | Unit  | Unit/Carton |
|-----------|-----------|-------|-------------|
| 23710     | 15 x 1 mm | 1 set |             |



### SL Angle

Radiator connection bend (blockable) made of tin-plated copper (15 x 1 mm) with screw connector for baseboard connection set. Connection to the radiator with Art.-No. 19050.

| Art.-No.: | Type      | Unit  | Unit/Carton |
|-----------|-----------|-------|-------------|
| 23720     | 15 x 1 mm | 1 set |             |



### Press-adapter for stainless steel / Cu pipes

Made of with plated brass with transparent plastic sleeve. For connection between MULTITUBO pipe with copper-pipe.

**IMPORTANT: The copper-side adapter is suitable for pressing or a suitable copper olive must be used! NO SOLDERING OR WELDING!**

| Art.-No.: | Type                  | Unit/Bag | Unit/Carton |
|-----------|-----------------------|----------|-------------|
| 69710     | 16 x 2,00 - Cu 15 x 1 | 10 pcs.  | 160 pcs.    |
| 69730     | 20 x 2,25 - Cu 18 x 1 | 10 pcs.  | 140 pcs.    |
| 69740     | 25 x 2,50 - Cu 22 x 1 | 10 pcs.  | 80 pcs.     |
| 69750     | 32 x 3,00 - Cu 28 x 1 | 10 pcs.  | 60 pcs.     |



### Multi-layer Pipe nipples

Multi-layer pipe nipple, calibrated on both sides, for short connection of two fittings.

| Art.-No.: | Type              | Unit/Bag | Unit/Carton |
|-----------|-------------------|----------|-------------|
| 17010     | 16 x 2,00 x 71 mm | 10 pcs.  | 200 pcs.    |
| 17030     | 20 x 2,25 x 71 mm | 10 pcs.  | 160 pcs.    |
| 17040     | 25 x 2,50 x 83 mm | 10 pcs.  | 100 pcs.    |

## PPSU-PUSH-FITTINGS



### PPSU-Push-Elbow 90°

Made of PPSU with transparent plastic sleeve.

| Art.-No.: | Type    | Unit/Bag | Unit/Carton |
|-----------|---------|----------|-------------|
| P63010    | 16 x 16 | 10 pcs.  | 150 pcs.    |
| P63030    | 20 x 20 | 10 pcs.  | 100 pcs.    |
| P63040    | 25 x 25 | 10 pcs.  | 70 pcs.     |



### PPSU-Push-Tee

Made of PPSU with transparent plastic sleeve.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| P65010    | 16 x 16 x 16 | 10 pcs.  | 100 pcs.    |
| P65030    | 20 x 20 x 20 | 10 pcs.  | 80 pcs.     |
| P65040    | 25 x 25 x 25 | 4 pcs.   | 40 pcs.     |



### PPSU-Push-Tee, reduced

Made of PPSU with transparent plastic sleeve.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| P65031    | 20 x 16 x 16 | 10 pcs.  | 80 pcs.     |
| P65032    | 20 x 16 x 20 | 10 pcs.  | 80 pcs.     |
| P65033    | 20 x 20 x 16 | 10 pcs.  | 80 pcs.     |
| P65041    | 25 x 16 x 25 | 4 pcs.   | 48 pcs.     |
| P65042    | 25 x 20 x 20 | 4 pcs.   | 48 pcs.     |
| P65043    | 25 x 20 x 25 | 4 pcs.   | 40 pcs.     |



### PPSU-Push-Coupling

Made of PPSU with transparent plastic sleeve.

| Art.-No.: | Type    | Unit/Bag | Unit/Carton |
|-----------|---------|----------|-------------|
| P67010    | 16 x 16 | 10 pcs.  | 200 pcs.    |
| P67030    | 20 x 20 | 10 pcs.  | 140 pcs.    |
| P67040    | 25 x 25 | 10 pcs.  | 90 pcs.     |



### PPSU-Push-Coupling, reduced

Made of PPSU with transparent plastic sleeve.

| Art.-No.: | Type    | Unit/Bag | Unit/Carton |
|-----------|---------|----------|-------------|
| P67031    | 20 x 16 | 10 pcs.  | 140 pcs.    |
| P67042    | 25 x 20 | 10 pcs.  | 120 pcs.    |

## WELDING-FITTINGS



### Welding-Connection MT

Made of PE-RT with conical metal thread.

| Art.-No.: | Type           | Unit/Bag | Unit/Carton |
|-----------|----------------|----------|-------------|
| 80000     | 16 x 1/2" MT   | 10 pcs.  | 100 pcs.    |
| 80010     | 20 x 1/2" MT   | 10 pcs.  | 100 pcs.    |
| 80011     | 20 x 3/4" MT   | 5 pcs.   | 80 pcs.     |
| 80020     | 25 x 3/4" MT   | 5 pcs.   | 80 pcs.     |
| 80021     | 25 x 1" MT     | 5 pcs.   | 40 pcs.     |
| 80030     | 32 x 1" MT     | 5 pcs.   | 40 pcs.     |
| 80040     | 40 x 1 1/4" MT | 2 pcs.   | 24 pcs.     |
| 80050     | 50 x 1 1/2" MT | 2 pcs.   | 18 pcs.     |
| 80060     | 63 x 2" MT     | 2 pcs.   | 12 pcs.     |
| 80070     | 75 x 2 1/2" MT | 2 pcs.   | 10 pcs.     |



### Welding-Connection FT

Made of PE-RT with parallel metal thread.

| Art.-No.: | Type           | Unit/Bag | Unit/Carton |
|-----------|----------------|----------|-------------|
| 81000     | 16 x 1/2" FT   | 10 pcs.  | 150 pcs.    |
| 81010     | 20 x 1/2" FT   | 10 pcs.  | 150 pcs.    |
| 81011     | 20 x 3/4" FT   | 5 pcs.   | 80 pcs.     |
| 81020     | 25 x 3/4" FT   | 5 pcs.   | 80 pcs.     |
| 81021     | 25 x 1" FT     | 5 pcs.   | 40 pcs.     |
| 81030     | 32 x 1" FT     | 5 pcs.   | 40 pcs.     |
| 81040     | 40 x 1 1/4" FT | 2 pcs.   | 36 pcs.     |
| 81050     | 50 x 1 1/2" FT | 2 pcs.   | 20 pcs.     |
| 81060     | 63 x 2" FT     | 2 pcs.   | 24 pcs.     |
| 81070     | 75 x 2 1/2" FT | 2 pcs.   | 8 pcs.      |



### Welding-Elbow 90°

Made of PE-RT.

| Art.-No.: | Type    | Unit/Bag | Unit/Carton |
|-----------|---------|----------|-------------|
| 83000     | 16 x 16 | 10 pcs.  | 500 pcs.    |
| 83010     | 20 x 20 | 10 pcs.  | 500 pcs.    |
| 83020     | 25 x 25 | 10 pcs.  | 300 pcs.    |
| 83030     | 32 x 32 | 10 pcs.  | 200 pcs.    |
| 83040     | 40 x 40 | 10 pcs.  | 80 pcs.     |
| 83050     | 50 x 50 | 10 pcs.  | 30 pcs.     |
| 83060     | 63 x 63 | 10 pcs.  | 20 pcs.     |
| 83070     | 75 x 75 | 8 pcs.   | 16 pcs.     |



### Welding-Elbow 90° MT

Made of PE-RT.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| 83005     | 16 x 1/2" MT | 10 pcs.  | 100 pcs.    |
| 83015     | 20 x 1/2" MT | 10 pcs.  | 100 pcs.    |
| 83017     | 20 x 3/4" MT | 5 pcs.   | 80 pcs.     |



### Welding-Elbow 90° FT

Made of PE-RT.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| 83006     | 16 x 1/2" FT | 10 pcs.  | 150 pcs.    |
| 83012     | 20 x 1/2" FT | 10 pcs.  | 150 pcs.    |
| 83014     | 20 x 3/4" FT | 5 pcs.   | 80 pcs.     |



### Welding-Tee

Made of PE-RT.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| 85000     | 16 x 16 x 16 | 10 pcs.  | 500 pcs.    |
| 85010     | 20 x 20 x 20 | 10 pcs.  | 400 pcs.    |
| 85020     | 25 x 25 x 25 | 10 pcs.  | 250 pcs.    |
| 85030     | 32 x 32 x 32 | 10 pcs.  | 100 pcs.    |
| 85040     | 40 x 40 x 40 | 10 pcs.  | 50 pcs.     |
| 85050     | 50 x 50 x 50 | 8 pcs.   | 32 pcs.     |
| 85060     | 63 x 63 x 63 | 8 pcs.   | 24 pcs.     |
| 85070     | 75 x 75 x 75 | 2 pcs.   | 10 pcs.     |



### Welding-Tee, reduced

Made of PE-RT.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| 85012     | 20 x 16 x 20 | 10 pcs.  | 400 pcs.    |
| 85022     | 25 x 16 x 25 | 10 pcs.  | 250 pcs.    |
| 85021     | 25 x 20 x 25 | 10 pcs.  | 250 pcs.    |
| 85032     | 32 x 25 x 32 | 10 pcs.  | 100 pcs.    |



### Welding-Tee, reduced

Made of PE-RT.

| Art.-No.: | Type              | Unit/Bag | Unit/Carton |
|-----------|-------------------|----------|-------------|
| 85005     | 16 x 1/2" FT x 16 | 10 pcs.  | 100 pcs.    |
| 85015     | 20 x 1/2" FT x 20 | 10 pcs.  | 100 pcs.    |
| 85026     | 25 x 3/4" FT x 25 | 10 pcs.  | 70 pcs.     |
| 85037     | 32 x 1" FT x 32   | 5 pcs.   | 30 pcs.     |



### Welding-Coupling

Made of PE-RT.

| Art.-No.: | Type    | Unit/Bag | Unit/Carton |
|-----------|---------|----------|-------------|
| 87000     | 16 x 16 | 10 pcs.  | 500 pcs.    |
| 87010     | 20 x 20 | 10 pcs.  | 500 pcs.    |
| 87020     | 25 x 25 | 10 pcs.  | 400 pcs.    |
| 87030     | 32 x 32 | 10 pcs.  | 300 pcs.    |
| 87040     | 40 x 40 | 10 pcs.  | 120 pcs.    |
| 87050     | 50 x 50 | 10 pcs.  | 80 pcs.     |
| 87060     | 63 x 63 | 10 pcs.  | 50 pcs.     |
| 87070     | 75 x 75 | 4 pcs.   | 28 pcs.     |



### Welding-Coupling, reduced

Made of PE-RT.

| Art.-No.: | Type    | Unit/Bag | Unit/Carton |
|-----------|---------|----------|-------------|
| 87041     | 40 x 32 | 10 pcs.  | 150 pcs.    |



### Welding-Adapter

Made of PE-RT. To be welded into T-pieces, Elbows and Couplings to create reductions

| Art.-No.: | Type    | Unit/Bag | Unit/Carton |
|-----------|---------|----------|-------------|
| 86011     | 20 x 16 | 10 pcs.  | 500 pcs.    |
| 86012     | 25 x 16 | 10 pcs.  | 500 pcs.    |
| 86021     | 25 x 20 | 10 pcs.  | 400 pcs.    |
| 86032     | 32 x 20 | 10 pcs.  | 400 pcs.    |
| 86031     | 32 x 25 | 10 pcs.  | 400 pcs.    |
| 86042     | 40 x 25 | 10 pcs.  | 160 pcs.    |
| 86053     | 50 x 25 | 10 pcs.  | 80 pcs.     |
| 86052     | 50 x 32 | 10 pcs.  | 80 pcs.     |
| 86051     | 50 x 40 | 10 pcs.  | 80 pcs.     |
| 86064     | 63 x 25 | 10 pcs.  | 70 pcs.     |
| 86063     | 63 x 32 | 10 pcs.  | 70 pcs.     |
| 86062     | 63 x 40 | 10 pcs.  | 70 pcs.     |
| 86061     | 63 x 50 | 10 pcs.  | 50 pcs.     |
| 86072     | 75 x 50 | 4 pcs.   | 40 pcs.     |
| 86071     | 75 x 63 | 4 pcs.   | 32 pcs.     |



### Welding-Tab connection elbow FT

Made of PE-RT.

| Art.-No.: | Type                    | Unit/Bag | Unit/Carton |
|-----------|-------------------------|----------|-------------|
| 89000     | 16 x 1/2" FT, l = 44 mm | 10 pcs.  | 100 pcs.    |
| 89010     | 20 x 1/2" FT, l = 46 mm | 10 pcs.  | 100 pcs.    |



### Welding-Endcap

Made of PE-RT.

| Art.-No.: | Type | Unit/Bag | Unit/Carton |
|-----------|------|----------|-------------|
| 89500     | 16   | 10 pcs.  | 500 pcs.    |
| 89510     | 20   | 10 pcs.  | 500 pcs.    |
| 89520     | 25   | 10 pcs.  | 500 pcs.    |
| 89530     | 32   | 10 pcs.  | 400 pcs.    |

# ACCESSORIES TAP WATER



## Sound Insulation-Set

Made of vulcanized rubber, consists of sound absorbing element and protection cap fits to tap connection elbows of l = 46 mm.

| Art.-No.: | Type | Unit   |
|-----------|------|--------|
| 19810     |      | 5 pcs. |



## U-Sound Insulation-Set

Made of vulcanized rubber, consists of sound absorbing element and protection cap fits to press- and push tap connection elbows of l = 46 mm.

| Art.-No.: | Type | Unit   |
|-----------|------|--------|
| 19810     |      | 5 pcs. |



## Sound Absorbing Element

Made of vulcanized rubber, fits to press- and push tap connection elbows.

| Art.-No.: | Type | Unit   |
|-----------|------|--------|
| 19810     |      | 5 pcs. |



## Mounting Track

Made of galvanized steel, for all installation clearances, 2 m long.

| Art.-No.: | Type    | Unit    |
|-----------|---------|---------|
| 19800     | 2000 mm | 10 pcs. |



## Mounting Track, edged

Made of galvanized steel, for installation clearances 75 mm and 150 mm, suitable for press-tab connection elbow FT with flange, including 6 screws.

| Art.-No.: | Type      | Unit  | Unit/Carton |
|-----------|-----------|-------|-------------|
| 19805     | 75/150 mm | 1 pc. | 10 pcs.     |



## Mounting Plate „Gemini“

Made of galvanized steel, for installation clearances of 120 mm/150 mm suitable for press-tab connection elbow FT with flange, including 4 screws.

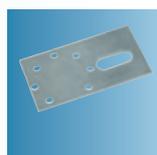
| Art.-No.: | Type                | Unit  | Unit/Carton |
|-----------|---------------------|-------|-------------|
| 70318     | 120 mm (L = 180 mm) | 1 pc. | 50 pcs.     |
| 70321     | 150 mm (L = 210 mm) | 1 pc. | 30 pcs.     |



## Double Mounting Plate

Made of galvanized steel, for different installation clearances suitable for press-tab connection elbow FT with flange, including 6 screws.

| Art.-No.: | Type   | Unit  | Unit/Carton |
|-----------|--------|-------|-------------|
| 70210     | 75 mm  | 1 pc. | 10 pcs.     |
| 70218     | 100 mm | 1 pc. | 10 pcs.     |
| 70212     | 150 mm | 1 pc. | 10 pcs.     |



## Single Mounting Plate

Made of galvanized steel, suitable for press-tab connection elbow FT with flange, including 3 screws.

| Art.-No.: | Type   | Unit    | Unit/Carton |
|-----------|--------|---------|-------------|
| 70210     | 75 mm  | 10 pcs. |             |
| 70218     | 100 mm | 10 pcs. |             |
| 70212     | 150 mm | 10 pcs. |             |



## Manifold for Tap Water

Made of brass, with 1" MT and 1" FT connection and 3/4" MT outlet connection. Compatible for MULTITUBO systems screw connector for euro-cone.

| Art.-No.: | Type  | Unit  |
|-----------|-------|-------|
| 19922     | 2 way | 1 pc. |
| 19923     | 3 way | 1 pc. |
| 19924     | 4 way | 1 pc. |



## Manifold Bracket

Made of galvanized steel, for the sound absorbing installation of manifold for tap water. 1 set = 2 pieces.

| Art.-No.: | Type | Unit  |
|-----------|------|-------|
| 19930     |      | 1 set |



## Cap

Made of brass, for use with manifold for tap water.

| Art.-No.: | Type  | Unit    |
|-----------|-------|---------|
| 19940     | 1" FT | 10 pcs. |



## Screw Plug

Made of brass, for use with manifold for tap water.

| Art.-No.: | Type  | Unit    |
|-----------|-------|---------|
| 19950     | 1" MT | 10 pcs. |

## ACCESSORIES HEATING



### Screw Connector for Euro-Cone

Made of brass, plated nut, fits to euro-cone connections. 1 piece comprises: 1 swivel nut, 1 clamp ring, 1 pipe insert.

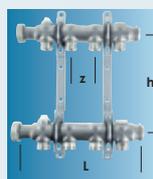
| Art.-No.: | Type      | Unit/Bag | Unit/Carton |
|-----------|-----------|----------|-------------|
| 19010     | 16 x 3/4" | 10 pcs.  | 200 pcs.    |
| 19030     | 20 x 3/4" | 10 pcs.  | 200 pcs.    |



### Cabinet Concealed

Made of galvanized steel, with demountable and adjustable door, in wall use.

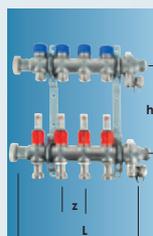
| Art.-No.: | Type | W<br>mm | H<br>mm | D<br>mm | Unit |
|-----------|------|---------|---------|---------|------|
| 18601     | 1    | 490     | 705-775 | 110-150 | 1pc. |
| 18602     | 2    | 575     | 705-775 | 110-150 | 1pc. |
| 18603     | 3    | 725     | 705-775 | 110-150 | 1pc. |
| 18604     | 4    | 875     | 705-775 | 110-150 | 1pc. |



### Manifold H for Radiator-Connection

Stainless steel manifold 1" for radiator connection system, 3/4" euro-cone connection and air vent valve 1/2" including holder.

| Art.-No.: | Type        | L<br>mm | h<br>mm | z<br>mm | Unit  |
|-----------|-------------|---------|---------|---------|-------|
| 18402     | 2 circuits  | 140     | 185     | 50      | 1 pc. |
| 18403     | 3 circuits  | 190     | 185     | 50      | 1 pc. |
| 18404     | 4 circuits  | 240     | 185     | 50      | 1 pc. |
| 18405     | 5 circuits  | 290     | 185     | 50      | 1 pc. |
| 18406     | 6 circuits  | 340     | 185     | 50      | 1 pc. |
| 18407     | 7 circuits  | 390     | 185     | 50      | 1 pc. |
| 18408     | 8 circuits  | 440     | 185     | 50      | 1 pc. |
| 18409     | 9 circuits  | 490     | 185     | 50      | 1 pc. |
| 18410     | 10 circuits | 540     | 185     | 50      | 1 pc. |
| 18411     | 11 circuits | 590     | 185     | 50      | 1 pc. |
| 18412     | 12 circuits | 640     | 185     | 50      | 1 pc. |



### Manifold FBH for Underfloor-heating, euro-cone

Stainless steel manifold 1" for underfloor-heating, 3/4" euro-cone connection, including holder. With adjustable and shut-off inserts for flow adjustment. Return collector with thermostat upper section (M30x1,5). Supplied without ball valves.

| Art.-No.: | Type        | L<br>mm | h<br>mm | z<br>mm | Unit  |
|-----------|-------------|---------|---------|---------|-------|
| 18302     | 2 circuits  | 190     | 200     | 50      | 1 pc. |
| 18303     | 3 circuits  | 240     | 200     | 50      | 1 pc. |
| 18304     | 4 circuits  | 290     | 200     | 50      | 1 pc. |
| 18305     | 5 circuits  | 340     | 200     | 50      | 1 pc. |
| 18306     | 6 circuits  | 390     | 200     | 50      | 1 pc. |
| 18307     | 7 circuits  | 440     | 200     | 50      | 1 pc. |
| 18308     | 8 circuits  | 490     | 200     | 50      | 1 pc. |
| 18309     | 9 circuits  | 540     | 200     | 50      | 1 pc. |
| 18310     | 10 circuits | 590     | 200     | 50      | 1 pc. |
| 18311     | 11 circuits | 640     | 200     | 50      | 1 pc. |
| 18312     | 12 circuits | 690     | 200     | 50      | 1 pc. |

# ACCESSORIES HEATING



## Ball Valve

Made of plated brass, flat sealing, for use with manifolds. 1 set containing 2 pieces of ball valves.

| Art.-No.: | Type            | Unit  | Unit/Carton |
|-----------|-----------------|-------|-------------|
| 18501     | 1" MT x 3/4" FT | 1 set | 1 set       |
| 18502     | 1" MT x 1" FT   | 1 set | 1 set       |



## Actuator

Suitable for FBH-manifold.

| Art.-No.: | Type  | Unit  | Unit/Carton |
|-----------|-------|-------|-------------|
| 40100     | 230 V | 1 pc. |             |



## Screw Connector for Cu-Pipe

For connecting press radiator connections and SL bends or angles (Cu-pipe) to 3/4" euro-cone, elastic sealing.

| Art.-No.: | Type            | Unit    | Unit/Carton |
|-----------|-----------------|---------|-------------|
| 19050     | 3/4" FT x 15 Cu | 10 pcs. | 200 pcs.    |



## Screw Connector for Euro-Cone

Made of brass, plated nut, fits to euro-cone connections. 1 piece comprises: 1 swivel nut, 1 clamp ring, 1 pipe insert.

| Art.-No.: | Type               | Unit    | Unit/Carton |
|-----------|--------------------|---------|-------------|
| 19010     | 16 x 3/4"          | 10 pcs. | 200 pcs.    |
| 19011     | 16 x 3/4", 2-piece | 10 pcs. | 200 pcs.    |
| 19030     | 20 x 3/4"          | 10 pcs. | 200 pcs.    |
| 19031     | 20 x 3/4", 2-piece | 10 pcs. | 100 pcs.    |



## Double Nipple for Euro-Cone

Made of nickel-plated brass.

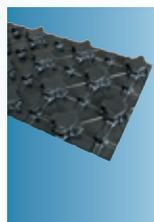
| Art.-No.: | Type        | Unit    | Unit/Carton |
|-----------|-------------|---------|-------------|
| 19100     | 3/4" x 3/4" | 10 pcs. | 360 pcs.    |



## Radiator Connection Box

Made from PST for premounted in wall radiator connections, including bended pipe for pressure test of installed pipe. Simple installation by integrated mounting track. Pipe distance 50 mm (valve for compact radiator).

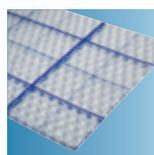
| Art.-No.: | Type                 | Unit    | Unit/Carton |
|-----------|----------------------|---------|-------------|
| 19200     | 16 mm, height 215 mm | 10 pcs. |             |



## Pipe Positioning Panel

Pipe positioning panel, designed to simplify the installation of MULTITUBO systems pipes 14 to 20 mm. Height of the panel: 23 mm. Dimensions of each panel: 1,275 m x 0,975 m. Effectively panel surface: 1,2 m x 0,9 m (1,08 m<sup>2</sup>). Each carton contains 22,4 m<sup>2</sup> to cover 19,4 m<sup>2</sup>.

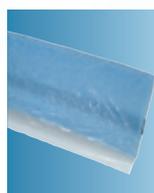
| Art.-No.: | Type    | Unit                | Unit/Carton        |
|-----------|---------|---------------------|--------------------|
| 40020     | 14 - 20 | 22,4 m <sup>2</sup> | 178 m <sup>2</sup> |



## Multi-Foil

Multi-layer reflective/sound insulating foil, load capacity: 10 kN/m<sup>2</sup>.

| Art.-No.: | Type | Unit              |
|-----------|------|-------------------|
| 40010     | 4 mm | 60 m <sup>2</sup> |



## Edging Strip

Edging strip, made of polyethylene with self-adhesive backing, self-adhesive strip on outer face provides tight seal between edging strip and insulation. Supplied in plastic bag of 400 m (8 rolls of 50 m).

| Art.-No.: | Type        | Unit | Unit/Carton |
|-----------|-------------|------|-------------|
| 40060     | 10 x 150 mm | 50 m | 400 m       |



## Clamp Track

Self-adhesive universal clip rail made of plastic, for pipe dimensions 14 - 17 mm. Length of the track: 1,00 m.

| Art.-No.: | Type       | Unit  | Palet   |
|-----------|------------|-------|---------|
| 40075     | 14 - 17 mm | 100 m | 2.400 m |

## TOOLS



### Pipe Cutter

Precision pipe cutting pliers for most efficient and fast cutting of MULTITUBO systems pipes, diameter 14 mm up to 20 mm.

| Art.-No.: | Type        | Unit  |
|-----------|-------------|-------|
| 30020     | 16 - 20     | 1 pc. |
| 30025     | spare blade | 1 pc. |



### Pipe Cutter

Pipe cutting pliers for MULTITUBO systems pipes for diameter up to 32 mm.

| Art.-No.: | Type   | Unit  |
|-----------|--------|-------|
| 30022     | 14 -32 | 1 pc. |



### Pipe Cutting Tool

Pipe cutting tool for MULTITUBO systems pipes for diameters up to 75/110 mm.

| Art.-No.:          | Type                              | Unit  |
|--------------------|-----------------------------------|-------|
| 30030              | 20 - 75                           | 1 pc. |
| 30031              | 50 - 110                          | 1 pc. |
| Spare cutting disc |                                   |       |
| 30035              | 20 - 63 (for model until 09/2013) | 1 pc. |
| 30037              | 20 - 75 (for model after 09/2013) | 1 pc. |
| 30036              | 50 - 110                          | 1 pc. |



### Pipe Cutting Tool 63 mm -110 mm

Cutting and bevelling of MULTITUBO multi-layer pipes in one step, for dimensions 63/75/90/110 mm, detachable bevelling tool integrated in the handle (supplied in a storage box).

| Art.-No.: | Type       | Unit  |
|-----------|------------|-------|
| 30039     | 63 -110 mm | 1 pc. |



### Combined Beveling Tool

Combined beveling tool for the dimensions 16 mm, 20 mm and 25 mm.

| Art.-No.: | Type    | Unit  |
|-----------|---------|-------|
| 30281     | 16 - 25 | 1 pc. |



### Handle for Beveling Tool

Ergonomically designed handle with quick exchange mechanism for use of beveling inserts 16 mm to 32 mm.

| Art.-No.: | Type   | Unit  |
|-----------|--------|-------|
| 30050     | 16 -32 | 1 pc. |



### Beveling-Insert

For bevelling of the MULTITUBO systems multi-layer pipes in combination with handle or as an attachment for cordless-screwdriver.

| Art.-No.: | Type | Unit  |
|-----------|------|-------|
| 30110     | 16   | 1 pc. |
| 30120     | 18   | 1 pc. |
| 30130     | 20   | 1 pc. |
| 30140     | 25   | 1 pc. |
| 30150     | 32   | 1 pc. |



### Beveling-Inserts, Set in case

Bevelling tool set 16 / 20 / 25 / 32 with exchange mechanism, delivered in a stable plastic case.

| Art.-No.: | Type              | Unit  |
|-----------|-------------------|-------|
| 30040     | 16 / 20 / 25 / 32 | 1 set |



### Beveling Tool

For bevelling of the MULTITUBO systems multi-layer pipes.

| Art.-No.: | Type | Unit  |
|-----------|------|-------|
| 30160     | 40   | 1 pc. |
| 30170     | 50   | 1 pc. |
| 30180     | 63   | 1 pc. |
| 30190     | 75   | 1 pc. |



### Inside Bending Spring

For bending the MULTITUBO systems multi-layer pipes.

| Art.-No.: | Type | Unit  |
|-----------|------|-------|
| 32010     | 16   | 1 pc. |
| 32020     | 18   | 1 pc. |
| 32030     | 20   | 1 pc. |
| 32040     | 25   | 1 pc. |



### Outside Bending Spring

For bending the MULTITUBO systems multilayer pipes.

| Art.-No.: | Type | Unit  |
|-----------|------|-------|
| 32110     | 16   | 1 pc. |
| 32120     | 18   | 1 pc. |
| 32130     | 20   | 1 pc. |
| 32140     | 25   | 1 pc. |

## TOOLS



### Battery Pressing Tool (Li-Ion technology)

Supplied in carrying case, including a Li-Ion battery and charger unit. For dimensions 16 - 75 mm, turnable pressing jaw entry. Weight of the machine and battery approx. 4.3 kgs, piston force: 32 kN.

| Art.-No.: | Type                             | Unit  |
|-----------|----------------------------------|-------|
| 30002     | 16 -75 with stop signal          | 1 pc. |
| 30005     | 16 -75 with automatic retraction | 1 pc. |
| 30008     | substitute battery (Li-Ion)      | 1 pc. |



### Pressing Jaw

For pressing of the MULTITUBO systems press-fittings.

| Art.-No.: | Type              | Unit  |
|-----------|-------------------|-------|
| 31010     | 16                | 1 pc. |
| 31020     | 18                | 1 pc. |
| 31030     | 20                | 1 pc. |
| 31040     | 25                | 1 pc. |
| 31050     | 32                | 1 pc. |
| 31060     | 40                | 1 pc. |
| 31070     | 50                | 1 pc. |
| 31080     | 63                | 1 pc. |
| 31090     | 75 Pressing chain | 1 pc. |



### Pressing Chain

Pressing chain for use with 75/90/110 mm MODULAR 90/110 Press Fittings and the base pressing unit. To be used only with pressing machines of min. 32 kN piston force.

| Art.-No.: | Type | Unit  |
|-----------|------|-------|
| 31175     | 75   | 1 pc. |
| 31190     | 90   | 1 pc. |
| 31110     | 110  | 1 pc. |



### Base Pressing Unit

Pressing unit to connect pressing chains to the pressing machine.

| Art.-No.: | Type      | Unit  |
|-----------|-----------|-------|
| 31100     | 75/90/110 | 1 pc. |



### Mini Battery Pressing Tool (Li-Ion technology)

Supplied in carrying case, including a Li-Ion battery and charger unit. For dimensions 16 - 32 mm, turnable pressing jaw entry. Weight of the machine and battery approx. 2.4 kgs, piston force: 22 kN.

| Art.-No.: | Type                             | Unit  |
|-----------|----------------------------------|-------|
| 30006     | 16 -32 with automatic retraction | 1 pc. |
| 30009     | substitute battery (Li-Ion)      | 1 pc. |



### Mini Pressing Jaw

For pressing of the MULTITUBO systems press fittings in combination with Mini battery pressing tool.

| Art.-No.: | Type | Unit  |
|-----------|------|-------|
| 31310     | 16   | 1 pc. |
| 31320     | 18   | 1 pc. |
| 31330     | 20   | 1 pc. |
| 31340     | 25   | 1 pc. |
| 31350     | 32   | 1 pc. |



### Manual Pressing Tool

For use with MULTITUBO systems Press-Fittings in conjunction with replaceable inserts. Supplied in carrying case, with inserts 16 mm / 20 mm / 25 mm / 32 mm.

| Art.-No.: | Type       | Unit  |
|-----------|------------|-------|
| 30501     | 16 - 32 mm | 1 pc. |



### Heat Element 16 - 110 mm

Supplied in carrying case. For dimensions 16 - 110 mm. Weight of machine approx. 1.6 kg. Power: 1.4 kW, 230 V - 50/60 Hz.

| Art.-No.: | Type     | Unit  |
|-----------|----------|-------|
| 38010     | 16 - 110 | 1 pc. |



### Heat Element 16 - 75 mm

Supplied in carrying case. For dimensions 16 - 75 mm. Weight of machine approx. 1.4 kg. Power: 1.4 kW, 230 V - 50/60 Hz.

| Art.-No.: | Type    | Unit  |
|-----------|---------|-------|
| 38000     | 16 - 75 | 1 pc. |



### Welding Tool

Made of steel with a non-stick coating. The Welding Tools consist each of a socket (for MULTITUBO systems welding fittings) and a plug (for MULTITUBO systems pipe) mounted on the heating plate.

| Art.-No.: | Type | Unit  |
|-----------|------|-------|
| 38105     | 16   | 1 Set |
| 38110     | 20   | 1 Set |
| 38120     | 25   | 1 Set |
| 38130     | 32   | 1 Set |
| 38140     | 40   | 1 Set |
| 38150     | 50   | 1 Set |
| 38160     | 63   | 1 Set |
| 38170     | 75   | 1 Set |



### Signal Timer

Signal watch for exact and easy handling of welding times.

| Art.-No.: | Type    | Unit  |
|-----------|---------|-------|
| 38019     | min/sec | 1 pc. |



### Universal Beveling Tool Welding/Modular

For beveling the MULTITUBO systems multi-layer pipes, **only when using Welding-fittings or MODULAR 90/110 Fittings.**

| Art.-No.: | Type     | Unit  |
|-----------|----------|-------|
| 38300     | 40 - 110 | 1 pc. |



### Pipe Uncoiler

3- or 4-arm pipe uncoiler, especially designed to be used with pipe coils of max. 200 m (3-arm) or 500 m (4-arm).

| Art.-No.: | Type  | Unit  |
|-----------|-------|-------|
| 33000     | 3-arm | 1 pc. |
| 33010     | 4-arm | 1 pc. |



### Pipe Straightener

For the simple alignment of the MULTITUBO systems multilayer pipe. Can be mounted to the pipe uncoiler with the adapter.

| Art.-No.: | Type    | Unit  |
|-----------|---------|-------|
| 33020     | 16 - 25 | 1 pc. |
| 33030     | Adapter | 1 pc. |



### Pressure Test Plug

Re-usable plug with exhaust valve, designed for the pressure test of MULTITUBO systems-installations. Exhaust valve can be removed.

| Art.-No.: | Type                   | Unit  |
|-----------|------------------------|-------|
| 30310     | with exhaust valve, 16 | 1 pc. |
| 30330     | with exhaust valve, 20 | 1 pc. |
| 30340     | with exhaust valve, 25 | 1 pc. |
| 30350     | with exhaust valve, 32 | 1 pc. |



### Pressure Test Plug FT

Re-usable plug with female thread, designed for the pressure-test of MULTITUBO installations.

| Art.-No.: | Type         | Unit/Bag | Unit/Carton |
|-----------|--------------|----------|-------------|
| 30315     | 16 x 1/2" FT | 10 pcs.  | 200 pcs.    |
| 30335     | 20 x 1/2" FT | 10 pcs.  | 200 pcs.    |
| 30345     | 25 x 1/2" FT | 10 pcs.  | 170 pcs.    |
| 30355     | 32 x 1/2" FT | 10 pcs.  | 100 pcs.    |
| 30365     | 40 x 1/2" FT | 10 pcs.  | 60 pcs.     |



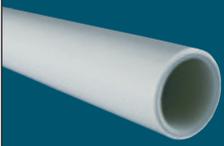
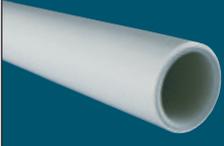
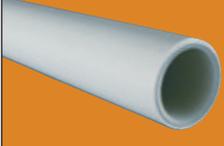
### Metal-Press-End Plug

Made of brass, without exhaust valve, for permanent closing of the pipes.

| Art.-No.: | Type  | Unit/Bag | Unit/Carton |
|-----------|-------|----------|-------------|
| 29510     | 16 mm | 10 pcs.  | 200 pcs.    |
| 29530     | 20 mm | 10 pcs.  | 200 pcs.    |
| 29540     | 25 mm | 10 pcs.  | 50 pcs.     |
| 29530     | 32 mm | 10 pcs.  | 50 pcs.     |

# Compatibility

MULTITUBO systems press fittings are compatible to Uponor MLC multilayer pipe\* and Uni Pipe PLUS\*. MULTITUBO systems alu-multi-layer pipe is compatible to Uponor S-Press-fittings\* and Uponor S-Press PLUS fittings\* when using the appropriate pressing tools.

| Pipe   | Fitting   | Tools   |   |
|--|---|---|---|
|  <p>MULTITUBO systems MSR</p>            |    |    | ✓ |
|  | + MULTITUBO systems Press-Fittings  | + Contour U/UP (KSP5/KSP0)  | = |
|  |    |    | ✓ |
|  | + MULTITUBO systems MODULAR 90/110 Press-Fittings                                   | + Contour U/UP (KSP5/KSP0)  | = |
|  <p>MULTITUBO systems MSR</p>           |   | -   | ✓ |
|  | + MULTITUBO systems Push-Fittings   | -   | = |
|  |  |  | ✓ |
|  | + MULTITUBO systems Welding-Fittings  | + MULTITUBO systems Welding-Machine   | = |
|  <p>MULTITUBO systems MSR</p>           |  |  | ✓ |
|  | + Uponor S-Press-*/S-Press PLUS Fittings*   | + Contour UP/UPP (KSP0)   | = |
|  |  |  | ✓ |
|  | + Uponor Riser system RS*   | + Contour U/UP (KSP5/KSP0)  | = |
|  <p>Uponor MLC*<br/>+ Unipipe Plus*</p> |  |  | ✓ |
|  | + MULTITUBO systems Press-Fittings  | + Contour U/UP (KSP5/KSP0)  | = |
|  |  |  | ✓ |
|  | + MULTITUBO systems MODULAR 90/110 Press-Fittings                                   | + Contour U/UP (KSP5/KSP0)  | = |
|  <p>Uponor MLC*<br/>+ Unipipe Plus*</p> |  |  | ✓ |
|  | + MULTITUBO systems Welding-Fittings  | + MULTITUBO systems Welding-Machine   | = |

In case of mixed installations each producer has to comply with the legal requirements, concerning his products. According to the terms of our warranty we assume liability for all MULTITUBO system components if installed according to our technical regulations.

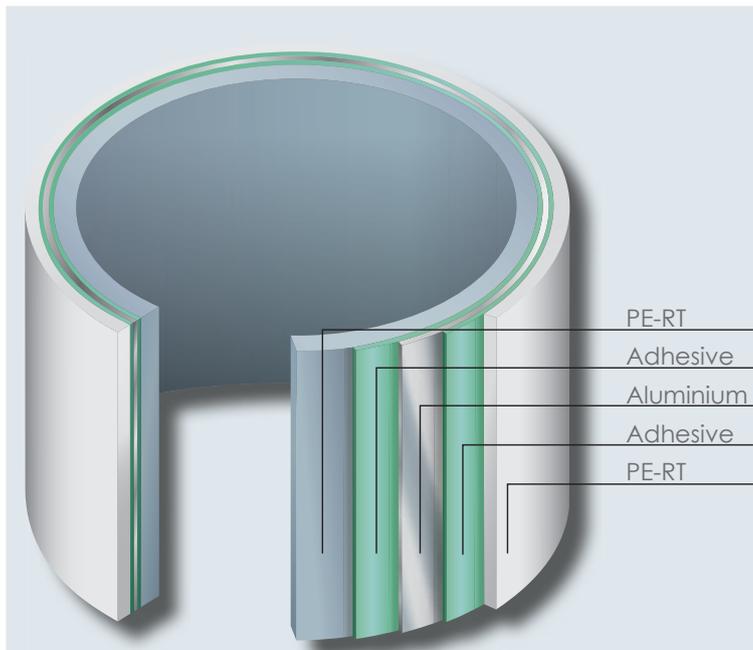


## 1.0. System description

### 1.1. MULTITUBO systems – multi-layer pipe

The MULTITUBO systems multi-layer pipe consists of 5 layers. One polyethylene layer is applied to the inside and one to the outside of the welded aluminium pipe. Both PE layers are permanently bonded to the aluminium pipe by means of an adhesive layer. The polyethylene used is a non-cross-linked polyethylene of raised temperature resistance according to

DIN 16833 (PE-RT – polyethylene of raised temperature resistance). The MULTITUBO systems multi-layer pipe is designed for the specific requirements of drinking water and heating installations. The 5-layer structure combines the advantages of plastics and metal.



made in germany

#### The low thermal expansion

Due to the inner aluminium layer the thermal expansion is similar to those of metal pipes. Thus the fastening with slide points and fixed points corresponds to those of metal pipes.



#### Easy bendable

Dimensions up to 25 mm can easily be bent by hand. Therefore work can be carried out much more efficient.



#### Formstable

Once bent, the pipe will keep its shape. This means a significant reduction in fastening points.

| Length of pipe | Expansion at $\Delta t$ 50K |
|----------------|-----------------------------|
| PEX            | 500 mm                      |
| PP             | 450 mm                      |
| PB             | 375 mm                      |
| PVC            | 200 mm                      |
| Multitubo      | 62,50 mm                    |
| Copper         | 41,25 mm                    |
| galv. steel    | 28,50 mm                    |
| stainl. steel  | 27,50 mm                    |

50 m →

#### Highest material safety

Selected raw materials and a continuous experience in production of more than 30 years, guarantee the high quality of a technically perfected product. The high loading capacity of a continuous operating temperature\* exceeds the requirements of the DVGW\*\* test requirements of  $t_{max}$  70 °C (tap water) and  $t_{max}$  80 °C (heating) as well as a continuous operating pressure\* of  $p_{max}$  10 bar as the basis for daily safety.

#### Simple bendability

The standard diameters up to 25 mm can be easily bent without any tools. The bending spring provides exact rounding at narrow bend radii.

#### Advantages of a metal pipe

- absolutely oxygen tight because of welded aluminium pipe
- form stable, no spring back forces
- low thermal expansion

#### Advantages of a plastic pipe

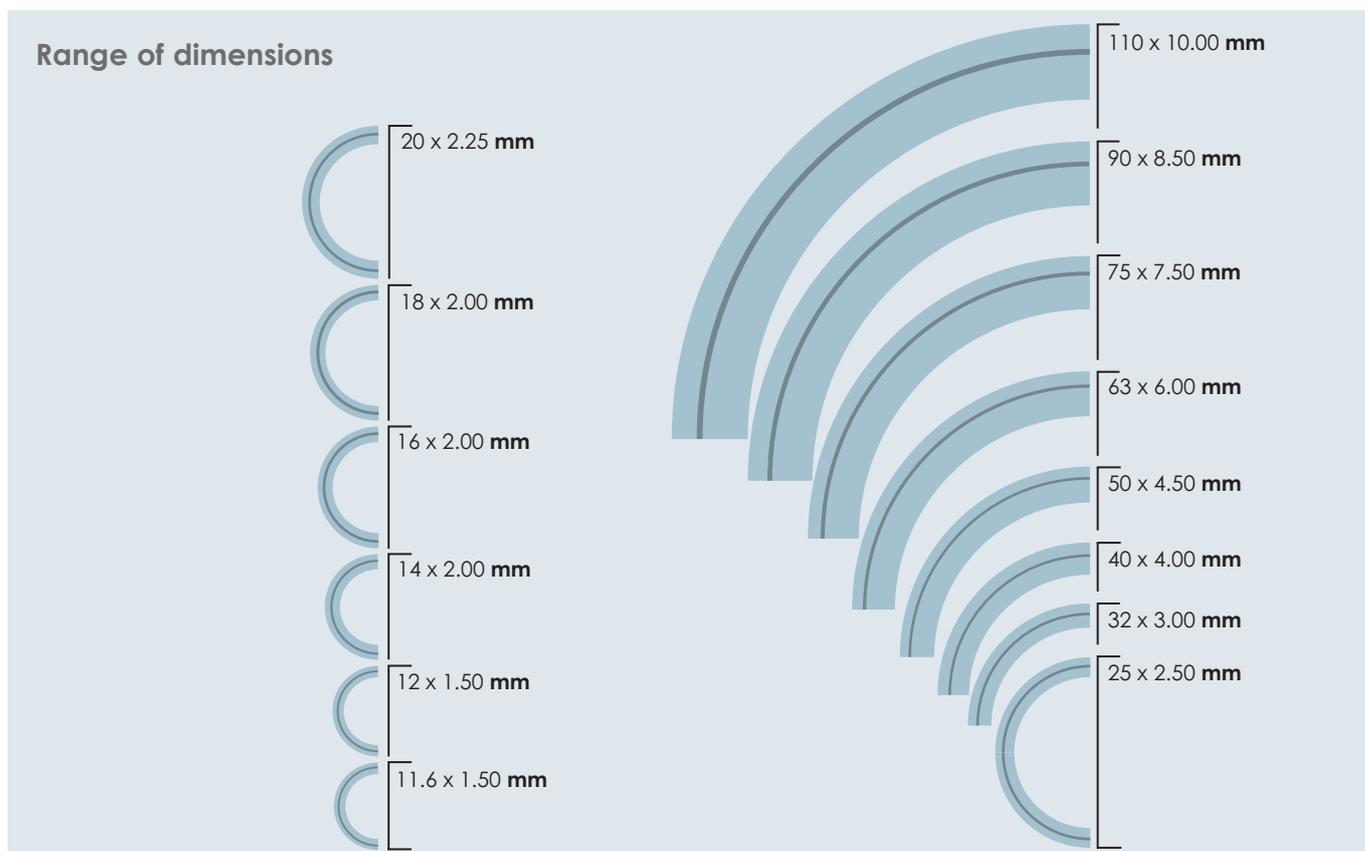
- no deposits because of the smooth inside wall
- no corrosion because of high chemical resistance
- low weight

\* Except pipe qualities with special characteristics in performance (e.g. panel heating, red).

\*\* The DVGW, the German Technical and Scientific Association for Gas and Water is the German technical standardization organisation.

## 1.0. System description

### 1.1. MULTITUBO systems – multi-layer pipe



#### 1.1.1. Technical data MULTITUBO systems multi-layer pipes

| Pipe dimension                          | mm       | 16 x 2.00   | 18 x 2.00  | 20 x 2.25   | 25 x 2.50   | 32 x 3.00   | 40 x 4.00 | 50 x 4.50 | 63 x 6.00 | 75 x 7.50 | 90 x 8.50 | 110 x 10.00 |
|---|----------|---|------------|-------------|-------------|-------------|-----------|-----------|-----------|-----------|-----------|-------------|
| Inner diameter                          | mm       | 12  | 14         | 15.5        | 20          | 26          | 32        | 41        | 51        | 60        | 73        | 90          |
| Material                                |          | PE-RT/AL/PE-RT  |            |             |             |             |           |           |           |           |           |             |
| Fire classification                     |          | normally inflammable B2 according to DIN 4102 / Euroclass E |            |             |             |             |           |           |           |           |           |             |
| Length, coil (standard)                 | m        | 200/500   | 200        | 100         | 50          | 25          | -         | -         | -         | -         | -         | -           |
| Straight length (standard)              | m        | 5   | 5          | 5           | 5           | 5           | 5         | 5         | 5         | 5         | 5         | 5           |
| Weight of pipe                          | kg/m     | 0.102   | 0.126      | 0.145       | 0.214       | 0.328       | 0.500     | 0.740     | 1.215     | 1.777     | 2.5556    | 3.625       |
| Water volume                            | l/m      | 0.113   | 0.154      | 0.190       | 0.314       | 0.531       | 0.803     | 1.320     | 2.042     | 2.827     | 4,185     | 6.362       |
| Weight of pipe (filled with water)      | kg/m     | 0.218   | 0.273      | 0.338       | 0.529       | 0.854       | 1.310     | 2.062     | 3.265     | 4.615     | 6.730     | 9.959       |
| Roughness of surface (inner pipe)       | mm       | 0.0004  |            |             |             |             |           |           |           |           |           |             |
| Heat conductivity                       | W/m x K  | 0.4   |            |             |             |             |           |           |           |           |           |             |
| Expansion coefficient                   | mm/m x K | 0.025   |            |             |             |             |           |           |           |           |           |             |
| Min. bending radius (by hand)           | mm       | 80 (5 x d)  | 90 (5 x d) | 100 (5 x d) | 125 (5 x d) | 160 (5 x d) | -         | -         | -         | -         | -         | -           |
| Min. bending radius (by bending spring) | mm       | 60 (4 x d)  | 72 (4 x d) | 80 (4 x d)  | 100 (4 x d) | 125 (4 x d) | -         | -         | -         | -         | -         | -           |
| Min. bending radius (by bending tool)   | mm       | 50  | 60         | 70          | 90          | 110         | 160       | 200       | 250       | 300       | -         | -           |

#### Temperature resistance, MULTITUBO systems standard pipe:

**Application tap water:** The daily use of the pipe may not exceed the permanent operating temperature range from 0 °C up to 70 °C and the permanent operating pressure of 10 bar. The maximum short-time accidental temperature is 95 °C and may not occur for longer than 100 operating hours.

**Application heating:** The daily use of the pipe may not exceed the permanent operating temperature range from 0 °C up to 80 °C and the permanent operating pressure of 10 bar. The maximum short-time accidental temperature is 100 °C and may not occur for longer than 100 operating hours.

## 1.0. System description

### 1.2. MULTITUBO systems – Connection techniques

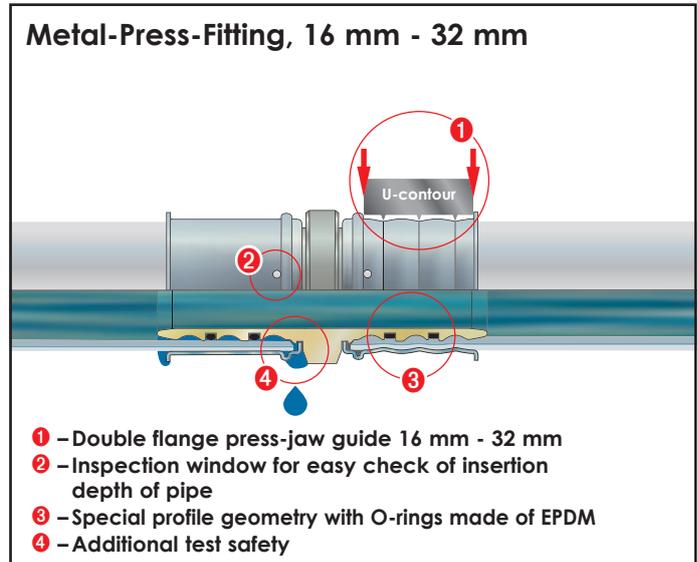
#### 1.2.1. Metal-Press-Fitting, 16 mm - 32 mm

##### The pressing-sleeve

- is fixed to the tin-plated brass body and protects the O-rings from being damaged.
- enables an easy check of the correct insertion-depth due to the inspection windows.
- has a double flange press-jaw guide, that makes a proper pressing easier even at poorly accessible positions.
- keeps the pipe permanently fixed to the fitting body after pressing. The pipe still can be turned and adjusted after the pressing.

##### Additional test safety

- Non-pressed connections can be easily detected during the pre-pressure-test (test pressure 1.5 bar for 15 minutes) by appearance of water.



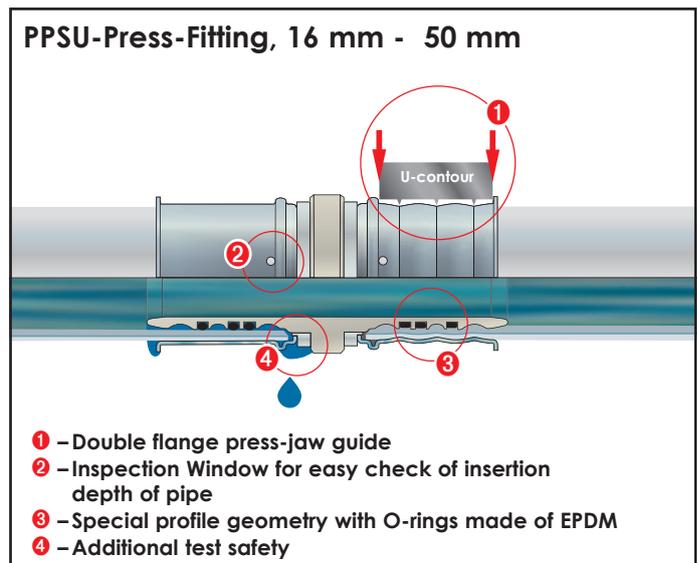
#### 1.2.2. PPSU-Press-Fitting, 16 mm - 50 mm

##### The pressing-sleeve

- is fixed to the PPSU-body and protects the O-rings from being damaged
- enables an easy check of the correct insertion-depth due to the inspection windows.
- has a double flange press-jaw guide, that makes a proper pressing easier even at poorly accessible positions.
- keeps the pipe permanently fixed to the fitting body after pressing. The pipe still can be turned and adjusted after the pressing.

##### Additional test safety

- Non-pressed connections can be easily detected during the pre-pressure-test (test pressure 1.5 bar for 15 minutes) by appearance of water.



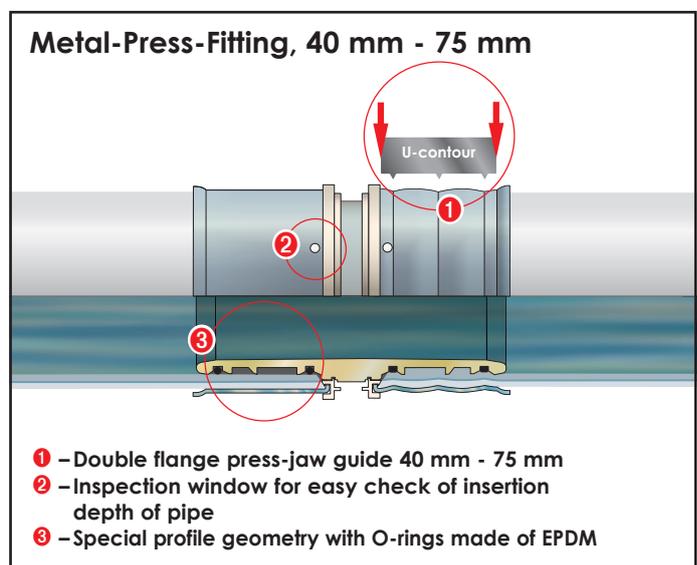
#### 1.2.3. Metal-Press-Fitting, 40 mm - 75 mm

##### The pressing-sleeve

- protects the O-rings from being damaged.
- enables an easy check of the correct insertion-depth due to the inspection windows.

##### The fitting

- has a double flange press-jaw guide, that makes a proper pressing easier.
- keeps the pipe permanently fixed to the fitting body after pressing. The pipe still can be turned and adjusted after the pressing.



## 1.0. System description

### 1.2. MULTITUBO systems – Connection techniques

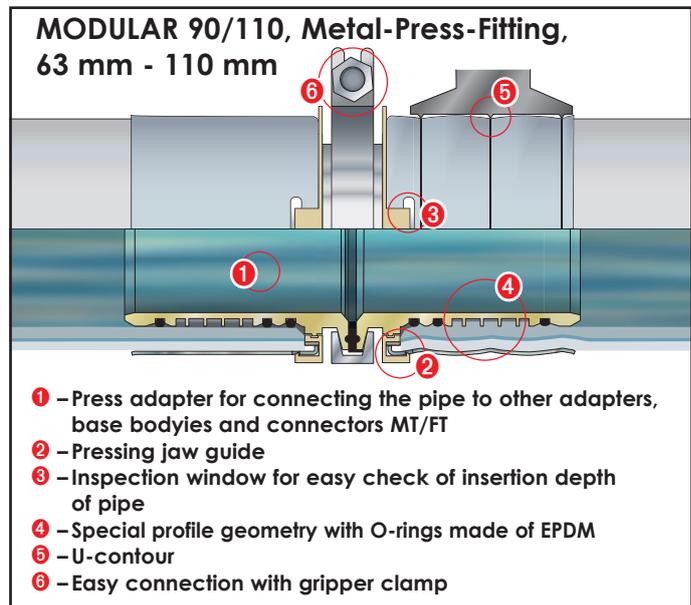
#### 1.2.4. MODULAR 90/110 Metal-Press-Fitting, 63 mm - 110 mm

##### The Modular concept

- Pressing adapter is connected to the pipe by pressing.
- Joints, tees or elbows are easily connected to the adapter by gripper clamps.
- Easy realisation of fittings in a project.
- High grade of prefabricated installation steps.

##### Flexible and safe

- Working with premounted parts means higher safety at work. Weight reduced pipes and fittings (compared to traditional metal materials) and easy connecting technique make the handling even over head more safe.



#### 1.2.5. Zeta – values and equivalent pipe length for Metal- and PPSU-Press-Fittings

| Dimension $d_a \times s$          | mm | Zeta <sup>plus</sup> 16 |         | Zeta <sup>plus</sup> 20 |         | Zeta <sup>plus</sup> 25 |         | Zeta <sup>plus</sup> 32 |         | Zeta <sup>plus</sup> 40 |         | Zeta <sup>plus</sup> 50 |         | Zeta <sup>plus</sup> 63 |         | Zeta <sup>plus</sup> 75 |         | Zeta <sup>plus</sup> 90 |         | Zeta <sup>plus</sup> 110 |         |
|-----------------------------------|----|-------------------------|---------|-------------------------|---------|-------------------------|---------|-------------------------|---------|-------------------------|---------|-------------------------|---------|-------------------------|---------|-------------------------|---------|-------------------------|---------|--------------------------|---------|
|                                   |    | x 2.00                  | x 2.00  | x 2.25                  | x 2.25  | x 2.50                  | x 2.50  | x 3.00                  | x 4.00  | x 4.50                  | x 6.00  | x 7.50                  | x 8.50  | x 10.00                 |         |                         |         |                         |         |                          |         |
| Inner-diameter $d_i$              | mm | 12                      | 12      | 15,5                    | 15,5    | 20                      | 20      | 26                      | 32      | 41                      | 51      | 60                      | 73      | 90                      |         |                         |         |                         |         |                          |         |
| Zeta-value                        |    | $\zeta$                 | $\zeta$ | $\zeta$                  | $\zeta$ |
| Elbow 90°                         |    | 17,3                    | 7,1     | 10,1                    | 2,8     | 7,1                     | 2,5     | 4,5                     | 3,3     | 2,5                     | 2,4     | 2,4                     | 3,7     | 2,9                     |         |                         |         |                         |         |                          |         |
| Elbow 45°                         |    | -                       | -       | -                       | -       | -                       | -       | 1,5                     | 1,3     | 1,0                     | 1,0     | 1,0                     | 0,7     | 0,6                     |         |                         |         |                         |         |                          |         |
| Branch at disconnection           |    | 17,9                    | 9,6     | 10,0                    | 4,8     | 8,4                     | 4,0     | 4,8                     | 3,4     | 2,5                     | 2,5     | 2,5                     | 3,7     | 2,9                     |         |                         |         |                         |         |                          |         |
| Branch, pass-way at disconnection |    | 5,9                     | 5,9     | 3,3                     | 2,4     | 2,3                     | 1,9     | 1,1                     | 0,8     | 0,4                     | 1,1     | 1,1                     | 0,5     | 0,4                     |         |                         |         |                         |         |                          |         |
| Tab-Connection                    |    | 12,9                    | 6,7     | 9,8                     | 2,9     | -                       | -       | -                       | -       | -                       | -       | -                       | -       | -                       |         |                         |         |                         |         |                          |         |

Base: Flow rate of 2 m/s

All information is compiled to the best of our knowledge. No liability can be assumed for possible faults.

#### 1.2.6. Metal-/PPSU-Push-Fitting, 16 mm - 32 mm

##### The PROTECTOR-ring (visible yellow ring on the fitting body)

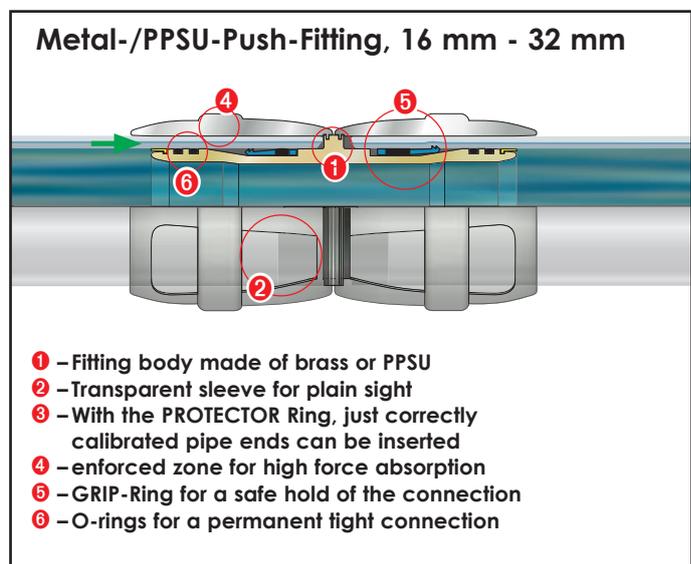
The PROTECTOR ring secures more safety in the daily work: it prevents an insertion of the pipe when not calibrated and beveled and thus a damage of the O-rings. If the pipe end is correctly prepared, the PROTECTOR ring slides away and gives way for a secure connection.

##### The GRIP-Ring

With the special designed GRIP-Ring, an insertion of the pipe into the fitting is quite easy. Due to the conical guidance the GRIP-Ring – made of high performance plastic – bites into the pipe material and keeps a safe connection.

##### The transparent plastic sleeve

The transparent plastic sleeve gives safe hold for the pipe and equals the force of the grip ring. For utmost safety, the connection the sleeve is well enforced at height of the grip ring.





## 2.0. Fields of application

### 2.0. Fields of application

#### Applications

Domestic and building technology, industry applications.

#### Available dimensions

16 x 2.00 mm / 18 x 2.00 / 20 x 2.25 mm / 25 x 2.50 mm / 32 x 3.00 mm / 40 x 4.00 mm / 50 x 4.50 mm / 63 x 6.00 mm / 75 x 7.50 mm / 90 x 8.50 mm / 110 x 10.00 mm

#### Drinking water installation

In its function as a drinking water pipe for cold and hot water of every drinking water quality (according to TrinkwV) MULTITUBO fulfills all requirements of the sanitary technology.

#### Heating installation

In its function as a heating pipe within the mentioned load values, MULTITUBO can be used without limitations for radiator connection or for radiant heating/cooling.

#### Rain water piping

For rain water piping separately laid from drinking water installations within buildings. The ph-value of the water must be > 6.

#### Compressed air

As piping for compressed air in installations with preceding oil filter (oil-free).

#### Automotive engineering

Water transport in vehicles and aeroplanes.

#### Other media

Further media and fields of application on inquiry (e.g. antifreeze and disinfectant).

#### Installation possibilities

##### within the building

- applicable for the installation within buildings in form of surface or concealed installation, of rising main and distributing main systems, as well as for the pre-wall installation with prefabricated fastening options or in concrete components.
- MULTITUBO press connections are permanently tight and thus allowed for concealed installations.

##### in the open-air

- MULTITUBO systems has to be protected reliably from constant direct UV load (solar radiation).

#### Building material class

MULTITUBO systems corresponds to the building material class B2 (normally inflammable) according to DIN 4102 (please see also topic 4.7.).

#### Comparison of the MULTITUBO pipe dimensions with other pipe materials

The dimensions of MULTITUBO systems pipes can be roughly compared with other materials like copper and galvanized steel according to the following list. (Only a hydraulic calculation can provide information on the dimensioning of whole installations.)

| DN     | MULTITUBO   | Copper      | Steel   |
|--------|-------------|-------------|---------|
| DN 12  | 16 x 2.00   | 15 x 1.00   | R 3/8   |
| DN 15  | 20 x 2.25   | 18 x 1.00   | R 1/2   |
| DN 20  | 25 x 2.50   | 22 x 1.00   | R 3/4   |
| DN 25  | 32 x 3.00   | 28 x 1.50   | R 1     |
| DN 32  | 40 x 4.00   | 35 x 1.50   | R 1 1/4 |
| DN 40  | 50 x 4.50   | 42 x 1.50   | R 1 1/2 |
| DN 50  | 63 x 6.00   | 54 x 2.00   | R 2     |
| DN 65  | 75 x 7.50   | 64 x 2.00   | R 2 1/2 |
| DN 80  | 90 x 8.50   | 88.9 x 2.00 | R 3     |
| DN 100 | 110 x 10.00 | 108 x 2.50  | R 4     |

## 3.0. Installation and assembly instructions

### 3.1. Mounting instructions

The mounting instruction must be considered! The components of the system are harmonised and tested. For all work-steps original MULTITUBO Systems tools, or tools that are approved by MULTITUBO systems have to be used.

For outside supplied components we do not incur any warranty. In particular the preparation of the pipes is valid for all types of connection.

#### 3.1.1. Preparation of the connection

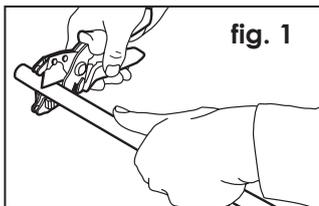


fig. 1

##### 1. CUT TO LENGTH OF THE PIPE

**16 mm – 20 mm (fig. 1)**  
Cut the MULTITUBO systems pipe right-angled with the pipe cutter.

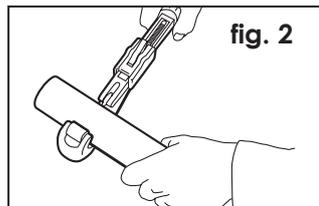


fig. 2

**25 mm - 110 mm (fig. 2)**  
Cut the MULTITUBO systems pipe right-angled with the pipe cutting tool.

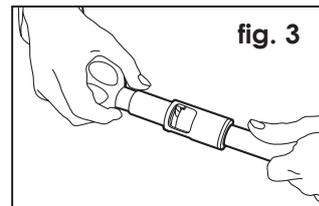


fig. 3

##### 2. CENTERING AND BEVELING OF THE PIPES

**16 mm – 32 mm (fig. 3)**  
Bevel the MULTITUBO systems multi-layer pipe by using the beveling insert in combination with the handle until there is a clearly visible edge all over the pipe end.

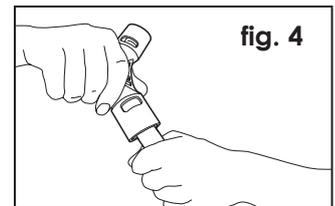


fig. 4

**16 mm / 20 mm / 25 mm (fig. 4)**  
Use the Combined Beveling Tool for press-, push- or welding connections to make a clearly visible edge all over the pipe end.

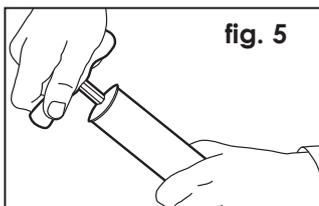


fig. 5

**40 mm – 75 mm (fig. 5)**  
Use the Beveling Tool until there is a clearly visible edge all over the pipe end.

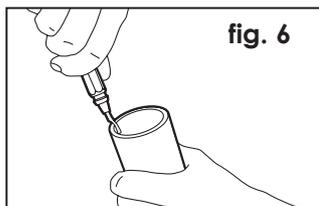


fig. 6

##### IMPORTANT: ONLY FOR WELDING AND MODULAR 90/110 CONNECTIONS

**32 mm – 110 mm (fig. 6)**  
Make a visible edge all over the pipe end by using the Universal Beveling Tool Welding/Modular. Please be aware of the roundness of the pipe!

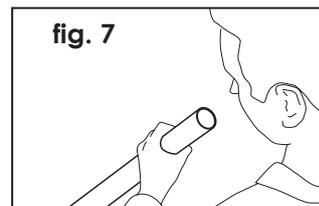


fig. 7

##### 3. INSPECTION OF THE PIPE AND THE FITTING BEFORE INSERTING THE FITTING

Visual inspection of the beveled pipe end and the fitting to identify damages or impurities (fig. 7 + fig. 8). Visual inspection of the beveled pipe end to ensure an equal edge all over (fig. 7 + fig. 9).

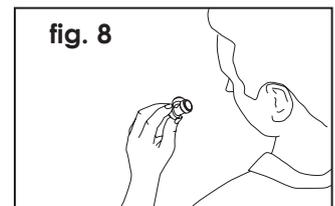


fig. 8

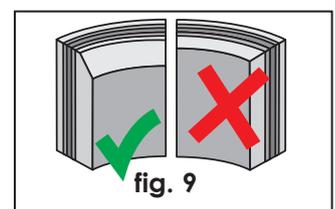


fig. 9

#### 3.1.2. Connections with press fittings 16 mm - 32 mm

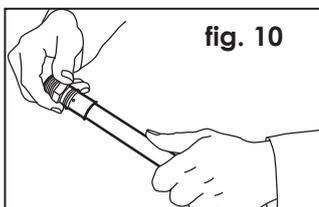


fig. 10

##### 1. ATTACH FITTING TO PIPE

a) Preparation of the MULTITUBO systems multi-layer pipe as described in point 3.1.1.  
b) Push the fitting into the pipe as far as it will go (fig. 10); the correct insertion depth is indicated by the appearance of the pipe in the inspection window of the metal sleeve.

##### 2. PRESSING OF THE FITTING

Open the pressing jaws and position the jaws between the double

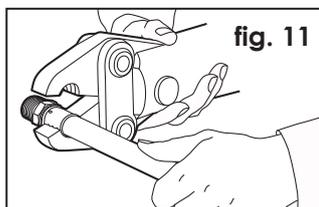


fig. 11

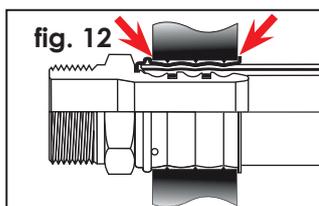


fig. 12

guides on the press-sleeve (fig. 11, fig. 12). Close pressing jaws and start pressing procedure.

#### 3.1.3. Connections with press fittings 40 mm - 75 mm

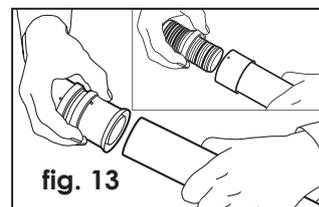


fig. 13

##### 1. ATTACH FITTING TO PIPE

a) Preparation of the MULTITUBO systems multi-layer pipe as described in point 3.1.1.  
b) Push the metal sleeve over the pipe, push the fitting into the pipe as far as it will go (fig. 13). When the fitting lies against the metal sleeve and the pipe can be seen in the inspection window the connection is ready for pressing (fig. 14).

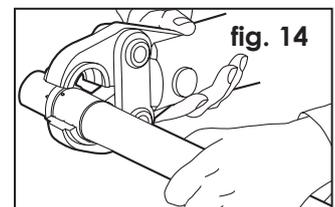


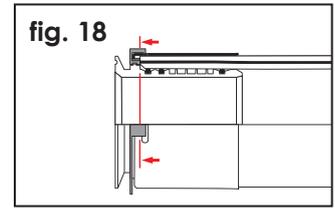
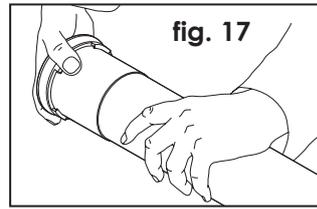
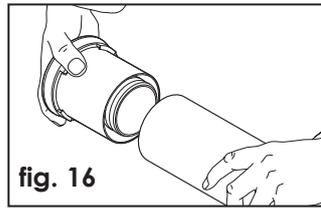
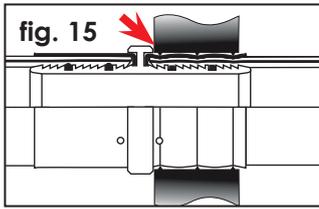
fig. 14

##### 2. PRESSING OF THE FITTING

Open the pressing jaws (75 mm: pressing chain!) and position the jaws on the end-stop of the fitting. Close pressing jaws/pressing chain and start pressing procedure (fig. 15). (Please refer to the instructions supplied with the pressing tool).

### 3.0. Installation and assembly instructions

#### 3.1.4. Press-connection MODULAR 90/110, 63 mm / 75 mm / 90 mm / 110 mm



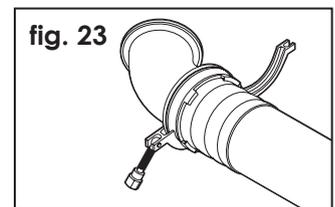
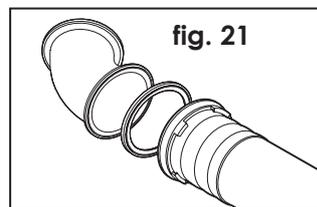
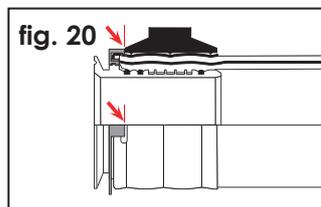
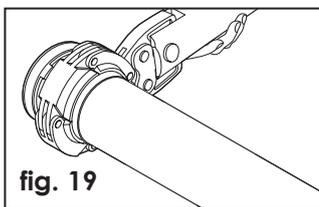
##### 1. ATTACH FITTING TO PIPE

a) Preparation of the MULTITUBO systems multi-layer pipe as described in point 3.1.1. (fig. 2, fig. 6).

b) Push the pipe into the fitting as far as possible (fig. 16, fig. 17); The correct insertion depth is indicated by the appearance of the pipe in the inspection-window of the sleeve (fig. 18).

##### 2. PRESSING OF THE FITTING

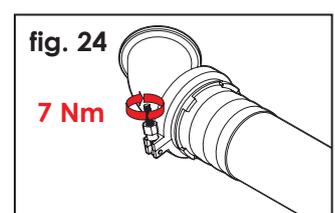
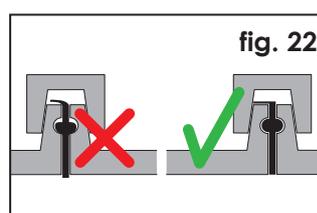
Position the pressing-chain at the plastic-stop and connect it with the pressing unit / -device. Start the pressing-procedure. Please be sure that a device with min. 32 Nm of piston force is used (fig. 19, fig. 20).



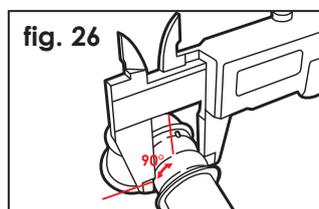
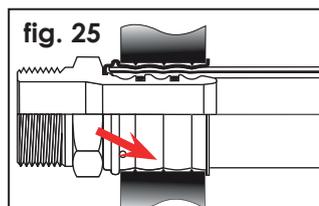
##### 3. CONNECTING TO BASE BODY OR PRESS ADAPTER

Before connecting the base bodies with the press adapter be sure that the joint surfaces and the sealing-ring are undamaged and free of deposits. Place the sealing-ring in the centre of the joint surface,

Place adapter / base body accordingly and fix everything with the gripper clamp (fig. 21, fig. 22). Make sure that the sealing ring is still positioned correctly and tighten the gripper clamp with 7Nm by using a torching wrench (fig. 23, fig. 24).



#### 3.1.5. Use of the pressing jaws



##### 3. Use of the pressing jaws

For the pressing of MULTITUBO systems press fittings, pressing jaws of contour U must be used. It must be ensured that the pressing jaws used are suitable for the application and are in technically perfect conditions. This includes in particular compliance with the following pressing measures after pressing:

|                                      |                                      |   |
|--------------------------------------|--------------------------------------|---|
| Ø 16 pressing measure 16.0 - 16.4 mm | Ø 32 pressing measure 32.0 - 32.3 mm | Ø 75 pressing measure 75.0 - 75.5 mm    |
| Ø 18 pressing measure 18.0 - 18.3 mm | Ø 40 pressing measure 40.0 - 40.5 mm | Ø 90 pressing measure 91.0 - 91.5 mm    |
| Ø 20 pressing measure 20.0 - 20.3 mm | Ø 50 pressing measure 50.0 - 50.5 mm | Ø 110 pressing measure 111.0 - 111.6 mm |
| Ø 25 pressing measure 25.0 - 25.3 mm | Ø 63 pressing measure 63.0 - 63.5 mm |   |

The determination of the pressing measures is carried out after the pressing process in the middle pressing groove (fig. 25), 90° of the push of the pressing jaws, respectively central between the bulges of the pressing chains segments (fig. 26).

### General notes on the use of electrical tools and accessories

#### 1. PRESSING MACHINE

**CAUTION: IMPROPER USE MAY RESULT IN SERIOUS INJURY (CRUSHING, ELECTRIC SHOCK).**

For a correct connection

- Only MLTITUBO systems press jaws, or press jaws with U contour in the corresponding dimension may be used.
- The press machine and the press jaws must be in a sound, orderly and maintained condition (according to

manufacturer specifications).

- The MULTITUBO systems Installation and assembly guidelines must be observed.

#### 2. WELDING MACHINE

**CAUTION: IMPROPER USE MAY RESULT IN SERIOUS INJURY (BURNS, ELECTRIC SHOCK).**

For a correct connection

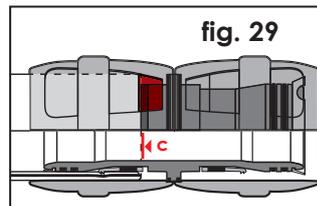
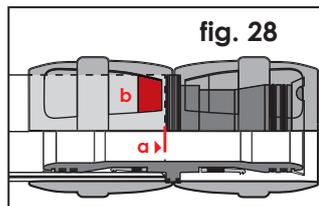
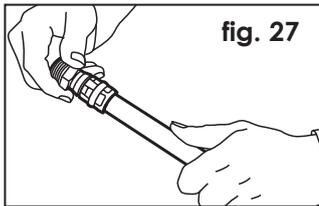
- Only MLTITUBO systems welding machines and welding inserts may be used.

- Only welding machines and welding inserts in perfect and maintained condition (according to manufacturer's specifications) may be used.

**IMPORTANT: THE OPERATING INSTRUCTIONS ARE BINDING FOR THE USE OF THE RESPECTIVE MACHINE. BEFORE PUTTING THE MACHINE INTO OPERATION THESE ARE TO BE READ AND OBSERVED.**

### 3.0. Installation and assembly instructions

#### 3.1.6. Connections with Push-Fittings 16 mm - 32 mm



##### 1. ATTACH FITTING TO PIPE

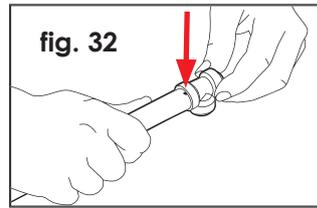
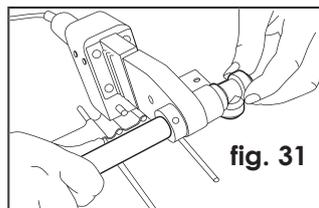
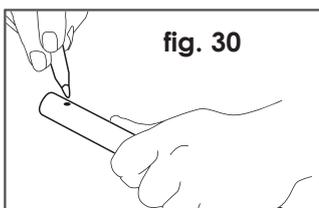
a) Preparation of the MULTITUBO systems multi-layer pipe as described in point 3.1.1.

**IMPORTANT:**  
**FOR CONNECTIONS WITH MULTITUBO SYSTEMS PUSH FITTINGS, THE BEVELING TOOL WITH OUTSIDE GUIDING SLEEVE HAS TO BE USED EXCLUSIVELY!**

b) Push the fitting as far as possible into the pipe (fig. 27, 28, a); the correct insertion depth is indicated if the pipe's end reaches well into the inspection area of the plastic

sleeve (fig. 28, b). The pipe's end may not retreat from this area after the pressure test or during operation (fig. 29, c).

#### 3.1.7. Connections with welding fittings 16 mm - 75 mm



**IMPORTANT TO INSURE A SECURE CONNECTION ALL INSTRUCTIONS, ESPECIALLY THE SAFETY INSTRUCTIONS, TEMPERATURES AND PROCESSING TIMES, MUST BE CONSIDERED.**

a) Preparation of the MULTITUBO systems multi-layer pipe as described under 3.1.1.  
b) For the MULTITUBO systems welding fittings just MULTITUBO systems welding machines must be used.  
c) To insure a perfect connection of pipe and fitting all parts must be free from deposits and free of grease. Eventually the pipe and fitting must be cleaned before welding

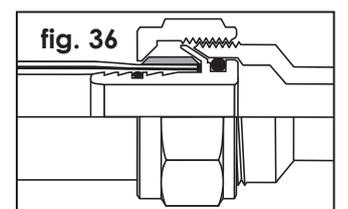
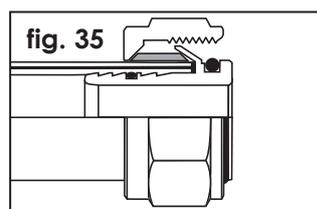
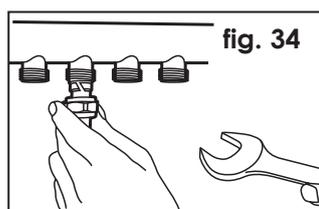
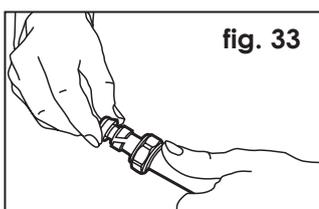
and protected against an anew impurity. Be aware that the fittings could not get in touch with grease or other similar materials during storage and transport.  
d) Heat up the welding machine according to the instructions  
e) Mark the insertion depth of the pipe into the fitting on the pipe (see table 1, insertion depth, Technical Manual) (fig. 30).  
f) Insert the pipe into the plug and at the same the fitting onto the socket. Insert straight, don't turn or align (fig. 31)!  
g) The heat up time starts when pipe and fitting are fully inserted.  
h) After the prescribed heat-up

time remove pipe and fitting rapidly from the welding machine and put both directly and without turning / align them together. The correct insertion depth must be checked by the previous marked check mark (fig. 32).  
i) The pipe must not be overheated or inserted too deep. That would cause counterproductive narrowing flow channels by the flowing material.  
j) During the processing-time the connection can be adjusted a little bit but the pipe must not be turned inside the fitting. After that the connection must be fixed to prevent it from unexpected impacts.

k) After the cooling-off time the connection is able to work under full pressure.  
l) Adapter reductions: Equal to connecting pipes with welding fittings, the adapters are welded directly to the fittings. The insertion depth is defined by the fitting design.

**IMPORTANT: THE INSERTION DEPTHS, THE TIMES FOR HEATING-UP, PROCESSING AND COOLING-OFF ARE MENTIONED IN THE TECHNICAL MANUAL "WELDING" AND MUST BE FOLLOWED! THIS MANUAL IS ENCLOSED TO EACH WELDING MACHINE OR CAN BE REQUESTED FROM US.**

#### 3.1.8. Connections with screw fittings 16 mm - 20 mm



##### 1. ASSEMBLY OF SCREW FITTINGS (fig. 33, fig. 34)

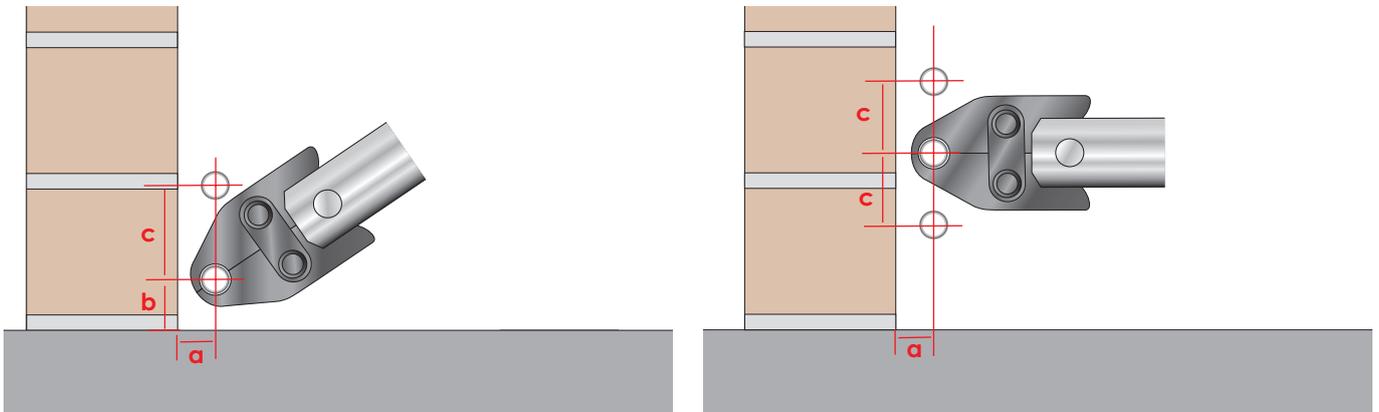
a) Preparation of the MULTITUBO systems multi-layer pipe as described in point 3.1.1.  
b) Push the nut onto the pipe.

c) Push the clamping ring onto the pipe.  
d) Push the fitting as far as it will go into the pipe (fig. 35).  
e) Tighten the nut with a torque of 40 Nm (fig. 36).

**IMPORTANT: PLEASE MIND THAT THE FITTING IS NOT BEING PULLED OUT OF THE PIPE DURING TIGHTENING.**

### 3.0. Installation and assembly instructions

#### 3.2. Installation measures



| Pipe dimension (mm) | a (mm)             | b (mm) | c (mm) |
|---------------------|--------------------|--------|--------|
| 16 x 2.00           | 30                 | 30     | 90     |
| 18 x 2.00           | 31                 | 31     | 90     |
| 20 x 2.25           | 32                 | 32     | 90     |
| 25 x 2.50           | 50                 | 50     | 105    |
| 32 x 3.00           | 50                 | 50     | 110    |
| 40 x 4.00           | 55                 | 60     | 115    |
| 50 x 4.50           | 60                 | 60     | 120    |
| 63 x 6.00           | 80                 | 75     | 125    |
| 75 x 7.50           | 82                 | 82     | 125    |
| 90 x 8.50           | modular connection |        |        |
| 110 x 10.00         | modular connection |        |        |

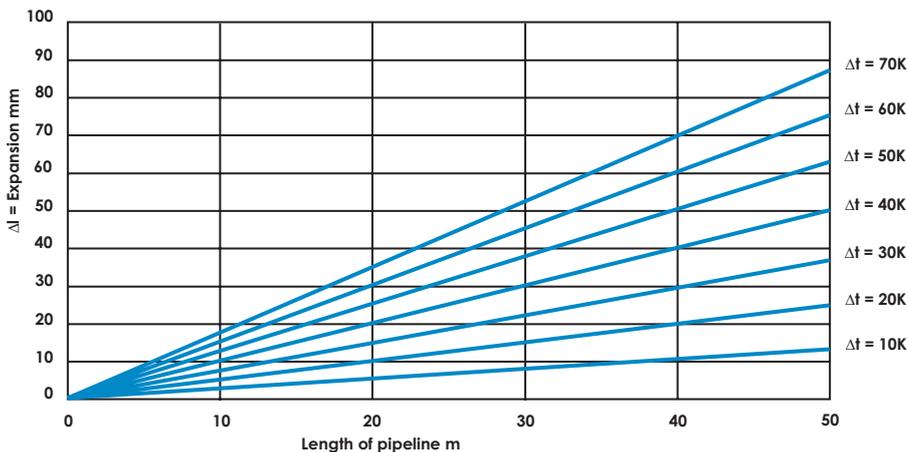
| Pipe dimension (mm) | a (mm)             | c (mm) |
|---------------------|--------------------|--------|
| 16 x 2.00           | 15                 | 45     |
| 18 x 2.00           | 0                  | 0      |
| 20 x 2.25           | 18                 | 48     |
| 25 x 2.50           | 27                 | 71     |
| 32 x 3.00           | 27                 | 75     |
| 40 x 4.00           | 45                 | 105    |
| 50 x 4.50           | 50                 | 105    |
| 63 x 6.00           | 80                 | 120    |
| 75 x 7.50           | 82                 | 125    |
| 90 x 8.50           | modular connection |        |
| 110 x 10.00         | modular connection |        |

#### 3.3. Thermal expansion

The thermal expansion occurring during operation has to be taken into consideration during the installation process and the arrangement of the piping. The thermal expansion can be calculated by means of the following formula, and it is shown in the graph:

**$\Delta L = \alpha \times L \times \Delta t$**   
 Legend:  
 $\Delta L$ : Expansion (mm)  
 $\alpha$ : Coefficient of expansion (0,025 mm/(m x K))  
 $L$ : Length of pipeline (m)  
 $\Delta t$ : Difference of temperature (K)

#### Thermal expansion MULTITUBO multi-layer pipes



### 3.0. Installation and assembly instructions

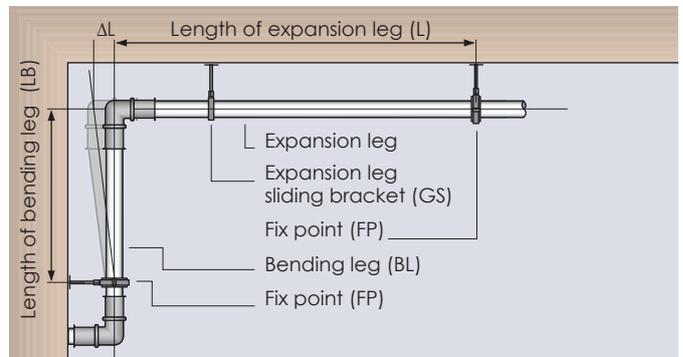
#### 3.4. Thermal expansion of distribution lines and risers

For planning and installing MULTITUBO systems multi-layer pipes in distribution lines and risers, additional to the structurally engineered requirement, the thermal related length expansion must also be considered.

The multi-layer pipes must not be fixed between two fix-points. The length expansion of the pipes must always be absorbed respectively directed. On-wall installed MULTITUBO systems multi-layer pipes, which could be effected by a thermal expansion need adequate space for compensation.

For that, all positions of the fix-points must be known. The compensation is always between two fix-points (FP) and changes in direction (bending leg BL).

#### Scheme for length compensation at thermal length expansion



#### 3.5. Bending leg length

All pipes have to be arranged in such a way that the thermal expansion (warming and cooling) is not hindered. As a rule, the thermal expansion is regulated by a suitable arrangement of the piping. A pipe installation with bending leg is inevitable at changes of direction or at right-angled connections using the correct placing of slide and fixed points.

#### Determination of the bending leg length:

$$LB = C\sqrt{d \cdot \Delta L}$$

Legend:

LB = Length of bending leg [mm]

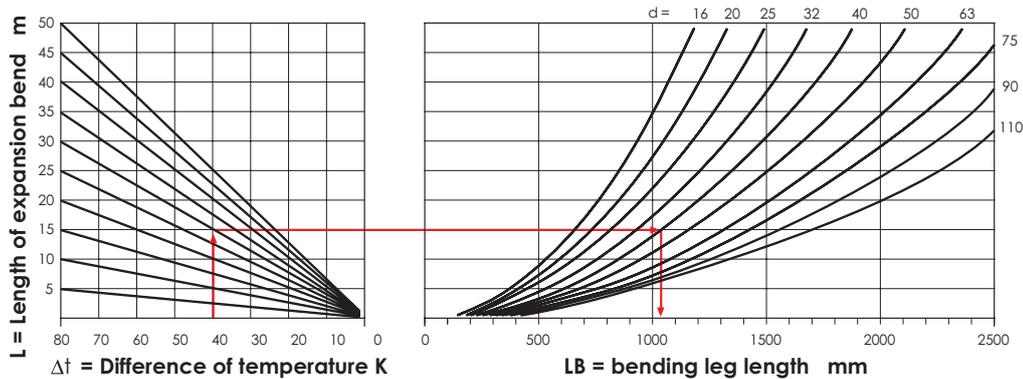
d = Outer diameter of pipe [mm]

ΔL = Expansion [mm]

C = Material-specific constant for MULTITUBO (= 30)

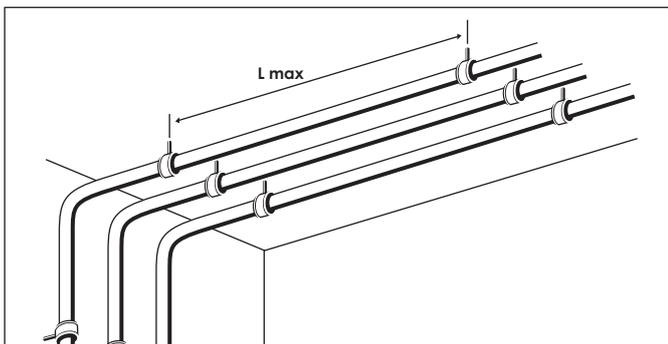
#### Determination of the bending leg length

##### Graphical determination of the bending leg length required



#### 3.6. Fastening technique

##### 3.6.1. Pipe fastening on the ceiling



If MULTITUBO multi-layer pipes are openly installed on the ceiling, additional pipe supports are not necessary. The following chart shows the maximal fastening distances between the individual pipe clamps for the different pipe dimensions.

### 3.0. Installation and assembly instructions

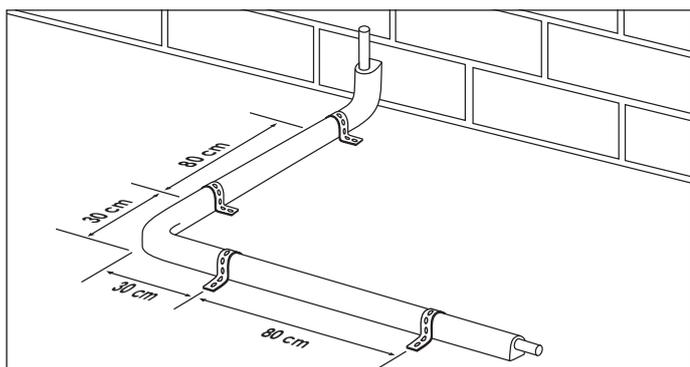
#### 3.6. Fastening technique

##### 3.6.1. Pipe fastening on the ceiling

The type and the distance of the pipe fixing devices are depending on the pressure, the temperature and the medium. The dimensioning of the pipe clamps has to be carried out expertly taking into consideration the overall mass (weight of pipe + weight of the water inside + weight of insulation), observing the approved technical rules.

| Dimension<br><b>da x s (mm)</b> | Maximum distance between pipe clamps L |                 | Weight of pipe filled with water of 10 °C/without insulation |                               |
|---------------------------------|--|-----------------|--|-------------------------------|
|                                 | <b>horizontal (m)</b>                  | <b>vertical</b> | <b>Coil (kg/m)</b>   | <b>Straight length (kg/m)</b> |
| 16 x 2.00                       | 1.20                                   | 1.55            | 0.218  | 0.218                         |
| 18 x 2.00                       | 1.20                                   | 1.60            | 0.273  | 0.273                         |
| 20 x 2.25                       | 1.30                                   | 1.70            | 0.338  | 0.338                         |
| 25 x 2.50                       | 1.50                                   | 1.95            | 0.529  | 0.529                         |
| 32 x 3.00                       | 1.60                                   | 2.10            | 0.854  | 0.854                         |
| 40 x 4.00                       | 1.70                                   | 2.20            | -  | 1.310                         |
| 50 x 4.50                       | 2.00                                   | 2.60            | -  | 2.062                         |
| 63 x 6.00                       | 2.20                                   | 2.85            | -  | 3.265                         |
| 75 x 7.50                       | 2.40                                   | 3.10            | -  | 4.615                         |
| 90 x 8.50                       | 2.40                                   | 3.10            | -  | 6,730                         |
| 110 x 10.00                     | 2.40                                   | 3.10            | -  | 9,959                         |

##### 3.6.2. Pipe fastening on the bare floor



If MULTITUBO multi-layer pipes are installed on the floor or in the supporting floor, a fastening distance of 80 cm has to be observed. The distance between each bend and the fixing device before and after it must be 30 cm.

#### 3.7. Pipe bending

MULTITUBO multi-layer pipes in dimensions 16 – 25 mm can be bent easily by hand, with or without a bending spring, larger dimensions can be bent using a suitable bending tool.

Minimal bending radii:

| Pipe dimension<br><b>mm</b> | bending radius by hand<br><b>mm</b> | bending radius with bending spring<br><b>mm</b> | bending radius with adequate bending tool<br><b>mm</b> |
|-----------------------------|-------------------------------------|---|--|
| 16 x 2.00                   | 5 x OD ≈ 80                         | 4 x OD ≈ 60                                     | 50   |
| 18 x 2.00                   | 5 x OD ≈ 90                         | 4 x OD ≈ 70                                     | 60   |
| 20 x 2.25                   | 5 x OD ≈ 100                        | 4 x OD ≈ 80                                     | 70   |
| 25 x 2.50                   | 5 x OD ≈ 125                        | 4 x OD ≈ 100                                    | 90   |
| 32 x 3.00                   | 5 x OD ≈ 160                        | 4 x OD ≈ 125                                    | 110  |
| 40 x 4.00                   | -                                   | -   | 160  |
| 50 x 4.50                   | -                                   | -   | 200  |
| 63 x 6,00                   | -                                   | -   | 250  |
| 75 x 7,50                   | -                                   | -   | 300  |

## 4.0. General technical information

### 4.1. Potential equalisation

The regulations VDE 0190 part 410 and 540 require a potential equalisation between protective conductors, „conductive“ water and heating pipes. As MULTITUBO multi-layer pipes are not conductive pipe installations, they cannot be used for potential equalisation and thus they need not be earthed.

An approved electrician has to check whether the MULTITUBO installation impairs the existing electrical protective and earthing arrangements (VOB part C General technical contract terms ATV).

### 4.2. Use of rainwater

The MULTITUBO system can be used for the installation in a rainwater utilisation installation. Regulations concerning the marking of the tapping locations as well as the drinking water feeding can be found in DIN 1988 part 4.

### 4.3. Installation in the mastic asphalt

A direct connection between MULTITUBO and the tar screed is not allowed. It has to be guaranteed by a suitable floor construction that the maximal allowed temperatures of the pipe system of 95 °C is not exceeded.

### 4.4. Connection to water heaters

A direct connection of the MULTITUBO multi-layer pipe without metal intermediary is always possible if the water heaters (flow heater, small and large water storage tanks) do not create higher temperatures than 95 °C in line with the standard regulations (DIN 4753, DIN VDE 0700, DIN 1988 DVGW).

### 4.5. Trace heating

MULTITUBO multi-layer pipes are suitable for the use of trace heating. The pipe's aluminium core guarantees an even heat transfer around the pipe. The choice and the fastening are carried out in line with the manufacturer's instructions; here the MULTITUBO multi-layer pipe is classified as a plastic pipe.

### 4.6. Antifreeze

MULTITUBO multi-layer pipes in building parts where frost can occur have to be protected from freezing.

### 4.7. Fire-protection

The structurally engineered requirements for fire-protection varies from area to area and thus the local requirements must be considered.

**Upfront, the designer and installer must check the actual valid local fire protection guidelines and laws before installation.**

### 4.7.1. Fire classification

To realise the local required fire protection guidelines, it is important to classify the used materials according to their fire-behaviour. For this all materials are classified into a fire classification according to a fire test (DIN 4102). Here all materials are tested on inflammability, flammability and gas release. The actual valid fire classification according to DIN 4102 will be replaced by a European classification in the future.

The MULTITUBO systems multi-layer pipes are in Fire classification class B2, "normal combustible", according to the new European classification they are in Fire classification class E (combustible, dripping off).

### 4.7.2. Fire Classification according to DIN 4102-1 and Euro classification

| Requirement        | DIN 4102 old | Euro classification new |
|--------------------|--------------|-------------------------|
| non-combustible    | A1           | A1                      |
|                    | A2           | A2                      |
| combustible        | B1           | B                       |
|                    |              | C                       |
| normal combustible | B2           | D                       |
|                    |              | E                       |
| easy combustible   | B3           | F                       |

### 4.8. Legionella

Measures to avoid legionella growth are stipulated in the work sheet W 551 by the DVGW.

Measures are, for example:

- potable water storage temperature of min. 60°C
- Avoidance of aerosol formation at tap fittings
- Avoidance of non-circulating installations without trace heating
- The cooling in the hot-water pipes and the circulation pipes must not be higher than 5 K

Existing studies show that it is not the material that favours the growth of legionella but the incrustation in the material.

### 4.10. Pipe installation in concrete, screed and in-wall

The MULTITUBO systems multi-layer pipe is protected by the outer PE layer. Considering the surface corrosion prevention, the installation of fittings in concrete, screed and in-wall is possible, though it must be insured that there is no permanent moisture penetration and no pH-values higher than 12.5.

## 4.0. General technical information

For such installations it is recommended to protect the connection with adequate coatings (e.g. duct tape, insulation tape, shrink-tape / -socket or something similar) against destructive influences.

All regulations and standards referring thermal and acoustic insulation are unaffected and must be considered.

The tightness test (pressure test) always has to be done before protection and / or insulation activities.

### 4.11. Installation in the soil, outdoor

The MULTITUBO systems multi-layer pipe is protected by the outer PE layer. An installation in the soil is possible, if following issues are considered:

- Pay attention to freeze protection, an adequate installation depth must be chosen.
- During installation or operating state no mechanical loads are allowed on the pipe (e.g. traffic-load)
- The refilling must be done with fine-grained materials. Coarse-grained and sharp-edged materials cause damages on the pipe.
- The fittings must be protected with corrosion protection tape against the soil.
- For outdoor application in the open air, the pipes must be protected against UV-radiation and mechanical impact.
- For this, multi-layer pipes in a protective tube can be used.

### 4.12. Application in compressed air systems

The MULTITUBO multi-layer pipe in connection with the press fittings is also suitable for compressed air installations. For the permanently tight connection the following parameters have to be observed:

|                                  |          |
|----------------------------------|----------|
| Nominal pressure:                | 16 bar   |
| Allowed excess working pressure: | 12 bar   |
| Maximal working temperature:     | 60°C     |
| Minimum durability:              | 50 years |
| Safety factor:                   | 1.3      |

In oil-free compressed air installations, for example as used in medicine technology, the MULTITUBO system can be used. In case of compressed air installations that are not oil-free, the MULTITUBO system is only suitable if only oils on silicon basis are used.

#### Note:

**Due to the valid German regulations it is not allowed to transport combustible and fire-promoting media (such as for example pure oxygen, acetylene, butane, etc.) through combustible pipe installations. Here above all local rules and regulations must be adhered to.**

### 4.13. Mounting instructions of screw connections

At installations of connections with threats, the mechanical impact has to be kept as low as possible to avoid material damages.

- Thus, the screw-connections should be done - if possible - before connecting the pipes to minimise the stress of the pipe connection.
- To tighten the screw connections, just suitable and approved materials must be used. Please check the respective manufacturer information.
- As each connection, the screw connection must be professionally connected according to rules of technology and under consideration of the MULTITUBO systems installation- and mounting instructions.
- Each kind of brute force must be avoided, like the increased effort that is needed when there is too much sealing tape put on the threat. Also an overly forced screwing in or extensions on the tool to generate an increased lever must be avoided.
- The used utilities like fitting aids, tightening- or cleaning agents must match the respective application purpose. They must not contain substances or compounds that cause stress-cracking corrosion (like ammoniac or chloride containing compounds).

### 4.14. Storage and assembly requirements

Apart from the assembly instructions of all devices and components, for **the storage and assembly of MULTITUBO multi-layer pipes** the following requirements have to be fulfilled (this is also valid for finished installation parts):

The assembly temperature for the pipe system should not be below -10°C. The working temperature of pressing tools must not be below 0°C and must not exceed 40°C. The optimal working temperature range for MULTITUBO system components is between 5°C and 25°C.

If the MULTITUBO multi-layer pipes are stored below -10°C, the pipes should be protected from mechanical damage. The pipes and fittings are optimally protected in the original packaging. The pipes should be protected from direct intensive solar radiation and load by UV radiation. This is both true for the storage and the installation of the pipes. Finished installation parts have to be correspondingly covered or protected from UV radiation by other suitable measures (for example insulation or installation in a protective pipe).

#### Solvents in direct contact with PPSU-Fittings

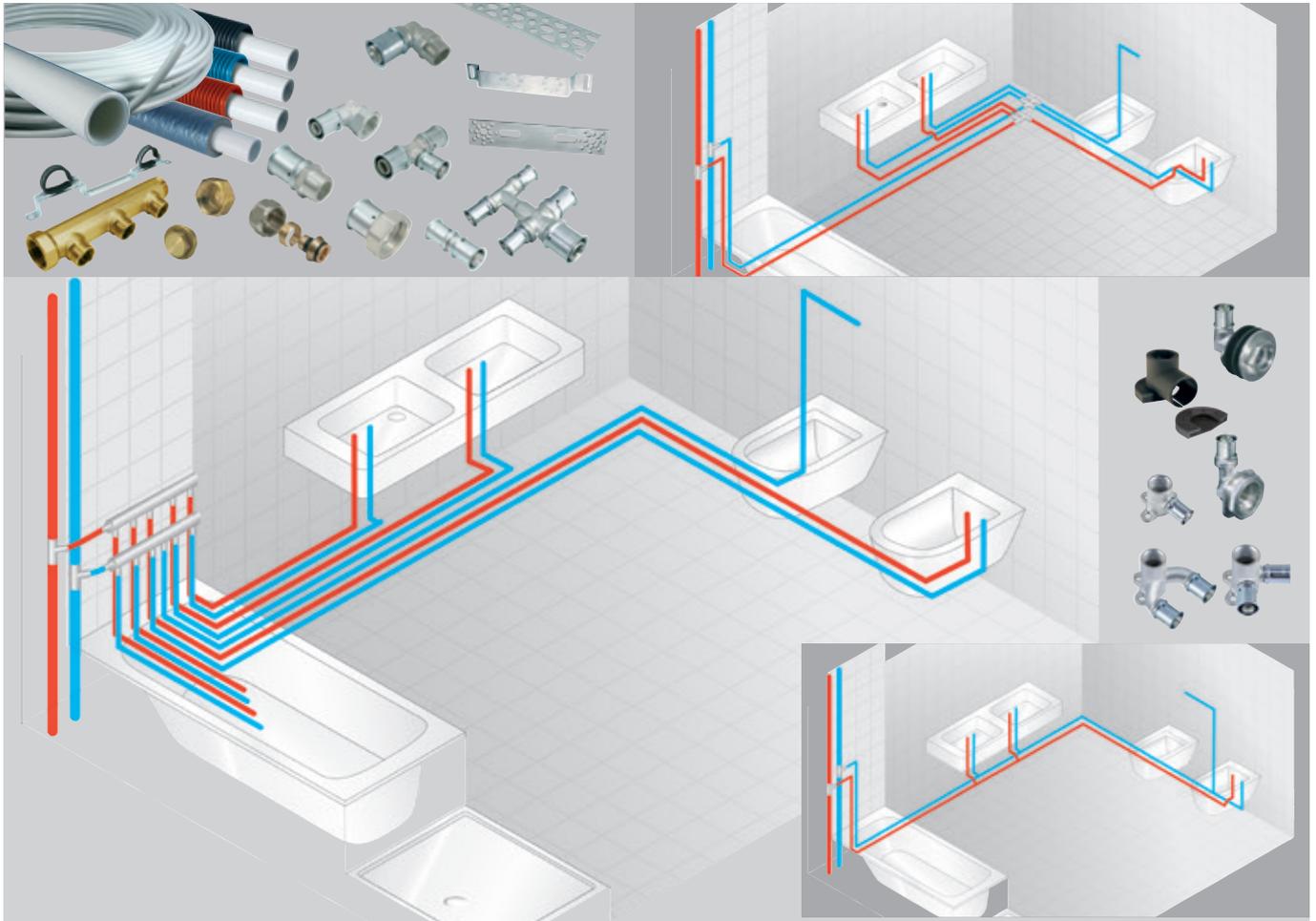
MULTITUBO systems PPSU fittings tolerate all components dissolved in non-hazardous potable- and heating water. Aggressive chemical substances used in solvents could interfere the mechanical properties of the PPSU material under certain circumstances and thus eventually harm the fitting.

Following working materials could contain solvents:

- polyurethane foam
- spray
- paint
- adhesive
- lubricant
- sealant
- two-part mortar
- cold flux

Please prevent the PPSU fitting to be in direct contact with solvents.

## 5.0. Technical information sanitary applications



### 5.1. General information

MULTITUBO systems is a complete system for the entire sanitary installation from the house connection and the cellar piping, rising and distributing mains to the tapping point. The installation is possible in all sanitary rooms, for example for commercial and public buildings, for residential buildings and for communal washing troughs. It is perfectly suitable for drinking water installations for cold and hot water and circulation installations respectively. In the field of renovation, the clean and quick processing of

MULTITUBO systems using the press technique, without complicated welding, thread cutting, soldering or gluing, turns out to be an additional advantage.

All installations have to be carried out in line with the currently valid regulations and standards, inter alia concerning thermal insulation, sound insulation and fire protection.

### 5.2. Basis of design

#### 5.2.1. Dimensioning

The dimensioning and design of the MULTITUBO system is carried out on the basis of DIN 1988 part 3.

## 5.0. Technical information sanitary applications

### 5.2.2. Determination of the pipe friction resistance (Water 10 °C)

| Vs<br>l/s | 16 x 2.00<br>DN 12<br>V/l = 0.11 l/m |            | 18 x 2.00<br>DN 14<br>V/l = 0.15 l/m |            | 20 x 2.25<br>DN 15<br>V/l = 0.19 l/m |            | 25 x 2.50<br>DN 20<br>V/l = 0.31 l/m |            |
|-----------|--------------------------------------|------------|--------------------------------------|------------|--------------------------------------|------------|--------------------------------------|------------|
|           | v<br>m/s                             | R<br>hPa/m | v<br>m/s                             | R<br>hPa/m | v<br>m/s                             | R<br>hPa/m | v<br>m/s                             | R<br>hPa/m |
| 0.01      | 0.09                                 | 0.22       | 0.06                                 | 0.11       | 0.05                                 | 0.07       | 0.03                                 | 0.02       |
| 0.02      | 0.18                                 | 0.69       | 0.13                                 | 0.34       | 0.11                                 | 0.21       | 0.06                                 | 0.06       |
| 0.03      | 0.27                                 | 1.36       | 0.19                                 | 0.66       | 0.16                                 | 0.41       | 0.10                                 | 0.13       |
| 0.04      | 0.35                                 | 2.21       | 0.26                                 | 1.07       | 0.21                                 | 0.66       | 0.13                                 | 0.20       |
| 0.05      | 0.44                                 | 3.23       | 0.32                                 | 1.56       | 0.26                                 | 0.97       | 0.16                                 | 0.30       |
| 0.06      | 0.53                                 | 4.41       | 0.39                                 | 2.13       | 0.32                                 | 1.32       | 0.19                                 | 0.40       |
| 0.07      | 0.62                                 | 5.75       | 0.45                                 | 2.78       | 0.37                                 | 1.72       | 0.22                                 | 0.52       |
| 0.08      | 0.71                                 | 7.23       | 0.52                                 | 3.49       | 0.42                                 | 2.16       | 0.25                                 | 0.66       |
| 0.09      | 0.80                                 | 8.86       | 0.58                                 | 4.28       | 0.48                                 | 2.68       | 0.29                                 | 0.80       |
| 0.10      | 0.88                                 | 10.63      | 0.65                                 | 5.13       | 0.53                                 | 3.17       | 0.32                                 | 0.96       |
| 0.15      | 1.33                                 | 21.49      | 0.97                                 | 10.35      | 0.79                                 | 6.39       | 0.48                                 | 1.94       |
| 0.20      | 1.77                                 | 35.52      | 1.30                                 | 17.08      | 1.06                                 | 10.54      | 0.64                                 | 3.20       |
| 0.25      | 2.21                                 | 52.55      | 1.62                                 | 25.24      | 1.32                                 | 15.56      | 0.80                                 | 4.73       |
| 0.30      | 2.65                                 | 72.43      | 1.95                                 | 34.76      | 1.59                                 | 21.41      | 0.95                                 | 6.51       |
| 0.35      | 3.09                                 | 95.07      | 2.27                                 | 45.59      | 1.85                                 | 28.07      | 1.11                                 | 8.55       |
| 0.40      | 3.54                                 | 120.39     | 2.60                                 | 57.70      | 2.12                                 | 35.52      | 1.27                                 | 10.84      |
| 0.45      | 3.98                                 | 148.33     | 2.92                                 | 71.05      | 2.38                                 | 43.72      | 1.43                                 | 13.36      |
| 0.50      | 4.42                                 | 178.83     | 3.25                                 | 85.62      | 2.65                                 | 52.67      | 1.59                                 | 16.12      |
| 0.55      | 4.86                                 | 211.85     | 3.57                                 | 101.38     | 2.91                                 | 62.35      | 1.75                                 | 19.11      |
| 0.60      | 5.31                                 | 247.33     | 3.90                                 | 118.31     | 3.18                                 | 72.74      | 1.91                                 | 22.33      |
| 0.65      | 5.75                                 | 285.24     | 4.22                                 | 136.40     | 3.44                                 | 83.84      | 2.07                                 | 25.78      |
| 0.70      | 6.19                                 | 325.56     | 4.55                                 | 155.63     | 3.71                                 | 95.64      | 2.23                                 | 29.45      |
| 0.75      | 6.63                                 | 368.25     | 4.87                                 | 175.98     | 3.97                                 | 10.13      | 2.39                                 | 33.35      |
| 0.80      | 7.07                                 | 413.27     | 5.20                                 | 197.44     | 4.24                                 | 121.29     | 2.55                                 | 37.47      |
| 0.85      |                                      |            | 5.52                                 | 219.99     | 4.50                                 | 135.12     | 2.71                                 | 41.80      |
| 0.90      |                                      |            | 5.85                                 | 243.63     | 4.77                                 | 149.62     | 2.86                                 | 46.36      |
| 0.95      |                                      |            | 6.17                                 | 268.35     | 5.03                                 | 164.77     | 3.02                                 | 51.13      |
| 1.00      |                                      |            | 6.50                                 | 294.13     | 5.30                                 | 180.57     | 3.18                                 | 56.12      |
| 1.05      |                                      |            | 6.82                                 | 320.97     | 5.56                                 | 197.02     | 3.34                                 | 61.32      |
| 1.10      |                                      |            | 7.15                                 | 348.86     | 5.83                                 | 214.11     | 3.50                                 | 66.74      |
| 1.15      |                                      |            |                                      |            | 6.09                                 | 231.84     | 3.66                                 | 72.36      |
| 1.20      |                                      |            |                                      |            | 6.36                                 | 250.19     | 3.82                                 | 78.21      |
| 1.25      |                                      |            |                                      |            | 6.62                                 | 269.17     | 3.98                                 | 84.26      |
| 1.30      |                                      |            |                                      |            | 6.89                                 | 288.77     | 4.14                                 | 90.52      |
| 1.35      |                                      |            |                                      |            |                                      |            | 4.30                                 | 96.99      |
| 1.40      |                                      |            |                                      |            |                                      |            | 4.46                                 | 103.67     |
| 1.45      |                                      |            |                                      |            |                                      |            | 4.62                                 | 110.56     |
| 1.50      |                                      |            |                                      |            |                                      |            | 4.77                                 | 117.65     |
| 1.60      |                                      |            |                                      |            |                                      |            | 4.93                                 | 124.96     |
| 1.70      |                                      |            |                                      |            |                                      |            | 5.41                                 | 148.11     |
| 1.80      |                                      |            |                                      |            |                                      |            | 5.73                                 | 164.57     |
| 1.90      |                                      |            |                                      |            |                                      |            | 6.05                                 | 181.86     |

Vs = Peak flow of water [l/s], v = Flow rate [m/s],  
R = Pipe friction-pressure loss [hPa/m]

| Vs<br>l/s | 32 x 3.00<br>DN 25<br>V/l = 0.53 l/m |            | 40 x 4.00<br>DN 32<br>V/l = 0.80 l/m |            |
|-----------|--------------------------------------|------------|--------------------------------------|------------|
|           | v<br>m/s                             | R<br>hPa/m | v<br>m/s                             | R<br>hPa/m |
| 0.10      | 0.19                                 | 0.28       | 0.12                                 | 0.10       |
| 0.20      | 0.38                                 | 0.91       | 0.25                                 | 0.34       |
| 0.30      | 0.57                                 | 1.84       | 0.37                                 | 0.69       |
| 0.40      | 0.75                                 | 3.03       | 0.50                                 | 1.13       |
| 0.50      | 0.94                                 | 4.48       | 0.62                                 | 1.67       |
| 0.60      | 1.13                                 | 6.17       | 0.75                                 | 2.30       |
| 0.70      | 1.32                                 | 8.10       | 0.87                                 | 3.01       |
| 0.80      | 1.51                                 | 10.25      | 0.99                                 | 3.81       |
| 0.90      | 1.70                                 | 12.63      | 1.12                                 | 4.69       |
| 1.00      | 1.88                                 | 15.22      | 1.24                                 | 5.65       |
| 1.10      | 2.07                                 | 18.02      | 1.37                                 | 6.69       |
| 1.20      | 2.26                                 | 21.03      | 1.49                                 | 7.80       |
| 1.30      | 2.45                                 | 24.24      | 1.62                                 | 8.99       |
| 1.40      | 2.64                                 | 27.66      | 1.74                                 | 10.25      |
| 1.50      | 2.83                                 | 31.28      | 1.87                                 | 11.59      |
| 1.60      | 3.01                                 | 35.09      | 1.99                                 | 13.00      |
| 1.70      | 3.20                                 | 39.10      | 2.11                                 | 14.48      |
| 1.80      | 3.39                                 | 43.30      | 2.24                                 | 16.03      |
| 1.90      | 3.58                                 | 47.69      | 2.36                                 | 17.65      |
| 2.00      | 3.77                                 | 52.27      | 2.49                                 | 19.34      |
| 2.10      | 3.96                                 | 57.04      | 2.61                                 | 21.10      |
| 2.20      | 4.14                                 | 61.99      | 2.74                                 | 22.92      |
| 2.30      | 4.33                                 | 67.13      | 2.86                                 | 24.82      |
| 2.40      | 4.52                                 | 72.45      | 2.98                                 | 26.78      |
| 2.50      | 4.71                                 | 77.96      | 3.11                                 | 28.81      |
| 2.60      | 4.90                                 | 83.64      | 3.23                                 | 30.90      |
| 2.70      | 5.09                                 | 89.50      | 3.36                                 | 33.06      |
| 2.80      | 5.27                                 | 102.43     | 3.48                                 | 35.28      |
| 2.90      | 5.46                                 | 109.28     | 3.61                                 | 37.57      |
| 3.00      | 5.65                                 | 116.35     | 3.73                                 | 39.93      |
| 3.10      | 5.84                                 | 123.62     | 3.85                                 | 44.68      |
| 3.20      | 6.03                                 | 131.09     | 3.98                                 | 47.36      |
| 3.30      | 6.22                                 | 138.78     | 4.10                                 | 50.11      |
| 3.40      | 6.40                                 | 146.68     | 4.23                                 | 52.93      |
| 3.50      | 6.59                                 | 154.78     | 4.35                                 | 55.82      |
| 3.60      | 6.78                                 | 163.09     | 4.48                                 | 58.79      |
| 3.70      |                                      |            | 4.60                                 | 61.83      |
| 3.80      |                                      |            | 4.72                                 | 64.94      |
| 3.90      |                                      |            | 4.85                                 | 68.12      |
| 4.00      |                                      |            | 4.97                                 | 71.37      |
| 4.50      |                                      |            | 5.60                                 | 88.71      |
| 5.00      |                                      |            | 6.22                                 | 107.83     |

Vs = Peak flow of water [l/s], v = Flow rate [m/s],  
R = Pipe friction-pressure loss [hPa/m]

## 5.0. Technical information sanitary applications

### 5.2.2. Determination of the pipe friction resistance (Water 10 °C)

| 50 x 5.00<br>DN 40<br>V/l = 1.32 l/m |          |            |
|--------------------------------------|----------|------------|
| Vs<br>l/s                            | v<br>m/s | R<br>hPa/m |
| 0.10                                 | 0.08     | 0.03       |
| 0.20                                 | 0.15     | 0.11       |
| 0.30                                 | 0.23     | 0.21       |
| 0.40                                 | 0.30     | 0.35       |
| 0.50                                 | 0.38     | 0.52       |
| 0.60                                 | 0.45     | 0.72       |
| 0.70                                 | 0.53     | 0.94       |
| 0.80                                 | 0.61     | 1.19       |
| 0.90                                 | 0.68     | 1.46       |
| 1.00                                 | 0.76     | 1.76       |
| 1.10                                 | 0.83     | 2.09       |
| 1.20                                 | 0.91     | 2.43       |
| 1.30                                 | 0.98     | 2.81       |
| 1.40                                 | 1.06     | 3.20       |
| 1.50                                 | 1.14     | 3.62       |
| 1.60                                 | 1.21     | 4.07       |
| 1.70                                 | 1.29     | 4.53       |
| 1.80                                 | 1.36     | 5.02       |
| 1.90                                 | 1.44     | 5.53       |
| 2.00                                 | 1.51     | 6.07       |
| 2.10                                 | 1.59     | 6.62       |
| 2.20                                 | 1.67     | 7.20       |
| 2.30                                 | 1.74     | 7.80       |
| 2.40                                 | 1.82     | 8.42       |
| 2.50                                 | 1.89     | 9.07       |
| 2.60                                 | 1.97     | 9.73       |
| 2.70                                 | 2.05     | 10.42      |
| 2.80                                 | 2.12     | 11.13      |
| 2.90                                 | 2.20     | 11.86      |
| 3.00                                 | 2.27     | 12.31      |
| 3.10                                 | 2.35     | 13.38      |
| 3.20                                 | 2.42     | 14.17      |
| 3.30                                 | 2.50     | 14.99      |
| 3.40                                 | 2.58     | 15.82      |
| 3.50                                 | 2.65     | 16.68      |
| 3.60                                 | 2.73     | 17.55      |
| 3.70                                 | 2.80     | 18.45      |
| 3.80                                 | 2.88     | 19.37      |
| 3.90                                 | 2.95     | 20.31      |
| 4.00                                 | 3.03     | 21.27      |
| 4.50                                 | 3.41     | 26.37      |
| 5.00                                 | 3.79     | 31.99      |
| 5.50                                 | 4.17     | 38.10      |
| 6.00                                 | 4.54     | 44.72      |
| 6.50                                 | 4.92     | 51.83      |
| 7.00                                 | 5.30     | 59.44      |
| 7.50                                 | 5.68     | 67.54      |
| 8.00                                 | 6.06     | 76.12      |
| 8.50                                 |          |            |

Vs = Peak flow of water [l/s],  
v = Flow rate [m/s],  
R = Pipe friction-pressure loss [hPa/m]

| 63 x 6.00<br>DN 51<br>V/l = 2.04 l/m |          |            | 75 x 7.50<br>DN 60<br>V/l = 2.83 l/m |            | 90 x 8.50<br>V/l = 4.18 l/m |            | 110 x 10.00<br>V/l = 6.36 l/m |            |
|--------------------------------------|----------|------------|--------------------------------------|------------|-----------------------------|------------|-------------------------------|------------|
| Vs<br>l/s                            | v<br>m/s | R<br>hPa/m | v<br>m/s                             | R<br>hPa/m | v<br>m/s                    | R<br>hPa/m | v<br>m/s                      | R<br>hPa/m |
| 1.00                                 | 0.49     | 0.61       | 0.35                                 | 0.28       | 0.24                        | 0.11       | 0.16                          | 0.04       |
| 1.25                                 | 0.61     | 0.91       | 0.44                                 | 0.42       | 0.30                        | 0.17       | 0.20                          | 0.06       |
| 1.50                                 | 0.73     | 1.25       | 0.53                                 | 0.58       | 0.36                        | 0.23       | 0.24                          | 0.08       |
| 1.75                                 | 0.86     | 1.65       | 0.62                                 | 0.76       | 0.42                        | 0.30       | 0.28                          | 0.11       |
| 2.00                                 | 0.98     | 2.08       | 0.71                                 | 0.96       | 0.48                        | 0.38       | 0.31                          | 0.14       |
| 2.25                                 | 1.10     | 2.57       | 0.80                                 | 1.18       | 0.54                        | 0.46       | 0.35                          | 0.17       |
| 2.50                                 | 1.22     | 3.10       | 0.88                                 | 1.43       | 0.60                        | 0.56       | 0.39                          | 0.21       |
| 2.75                                 | 1.35     | 3.67       | 0.97                                 | 1.69       | 0.66                        | 0.66       | 0.43                          | 0.24       |
| 3.00                                 | 1.47     | 4.28       | 1.06                                 | 1.97       | 0.72                        | 0.77       | 0.47                          | 0.28       |
| 3.25                                 | 1.59     | 4.94       | 1.15                                 | 2.27       | 0.78                        | 0.89       | 0.51                          | 0.33       |
| 3.50                                 | 1.71     | 5.64       | 1.24                                 | 2.59       | 0.84                        | 1.01       | 0.55                          | 0.37       |
| 3.75                                 | 1.84     | 6.38       | 1.33                                 | 2.93       | 0.90                        | 1.15       | 0.59                          | 0.42       |
| 4.00                                 | 1.96     | 7.16       | 1.41                                 | 3.29       | 0.96                        | 1.29       | 0.63                          | 0.47       |
| 4.25                                 | 2.08     | 7.98       | 1.50                                 | 3.66       | 1.02                        | 1.43       | 0.67                          | 0.53       |
| 4.50                                 | 2.20     | 8.84       | 1.59                                 | 4.06       | 1.08                        | 1.59       | 0.71                          | 0.58       |
| 4.75                                 | 2.33     | 9.73       | 1.68                                 | 4.47       | 1.13                        | 1.75       | 0.75                          | 0.64       |
| 5.00                                 | 2.45     | 10.67      | 1.77                                 | 4.90       | 1.19                        | 1.92       | 0.79                          | 0.70       |
| 6.00                                 | 2.94     | 14.80      | 2.12                                 | 6.79       | 1.43                        | 2.65       | 0.94                          | 0.97       |
| 7.00                                 | 3.43     | 19.53      | 2.48                                 | 8.95       | 1.67                        | 3.49       | 1.10                          | 1.28       |
| 8.00                                 | 3.92     | 24.84      | 2.83                                 | 11.38      | 1.91                        | 4.44       | 1.26                          | 1.63       |
| 9.00                                 | 4.41     | 30.71      | 3.18                                 | 14.07      | 2.15                        | 5.49       | 1.41                          | 2.01       |
| 10.00                                | 4.90     | 37.15      | 3.54                                 | 17.01      | 2.39                        | 6.63       | 1.57                          | 2.43       |
| 11.00                                | 5.38     | 44.13      | 3.89                                 | 20.20      | 2.63                        | 7.87       | 1.73                          | 2.88       |
| 12.00                                |          |            | 4.24                                 | 23.63      | 2.87                        | 9.21       | 1.89                          | 3.37       |
| 13.00                                |          |            | 4.60                                 | 27.31      | 3.11                        | 10.63      | 2.04                          | 3.89       |
| 14.00                                |          |            | 4.95                                 | 31.23      | 3.34                        | 12.16      | 2.20                          | 4.45       |
| 15.00                                |          |            | 5.31                                 | 35.38      | 3.58                        | 13.77      | 2.36                          | 5.03       |
| 16.00                                |          |            | 5.66                                 | 39.77      | 3.82                        | 15.47      | 2.52                          | 5.65       |
| 17.00                                |          |            | 6.01                                 | 44.39      | 4.06                        | 17.27      | 2.67                          | 6.31       |
| 18.00                                |          |            |                                      |            | 4.30                        | 19.15      | 2.83                          | 6.99       |
| 19.00                                |          |            |                                      |            | 4.54                        | 21.12      | 2.99                          | 7.71       |
| 20.00                                |          |            |                                      |            | 4.78                        | 23.17      | 3.14                          | 8.46       |
| 21.00                                |          |            |                                      |            | 5.02                        | 25.31      | 3.30                          | 9.24       |
| 22.00                                |          |            |                                      |            | 5.26                        | 27.54      | 3.46                          | 10.05      |
| 23.00                                |          |            |                                      |            | 5.50                        | 29.86      | 3.62                          | 10.89      |
| 24.00                                |          |            |                                      |            | 5.73                        | 32.25      | 3.77                          | 11.77      |
| 25.00                                |          |            |                                      |            |                             |            | 3.93                          | 12.67      |
| 26.00                                |          |            |                                      |            |                             |            | 4.09                          | 13.60      |
| 27.00                                |          |            |                                      |            |                             |            | 4.24                          | 14.57      |
| 28.00                                |          |            |                                      |            |                             |            | 4.40                          | 15.56      |
| 29.00                                |          |            |                                      |            |                             |            | 4.56                          | 16.58      |
| 30.00                                |          |            |                                      |            |                             |            | 4.72                          | 17.63      |

Vs = Peak flow of water [l/s], v = Flow rate [m/s],  
R = Pipe friction-pressure loss [hPa/m]

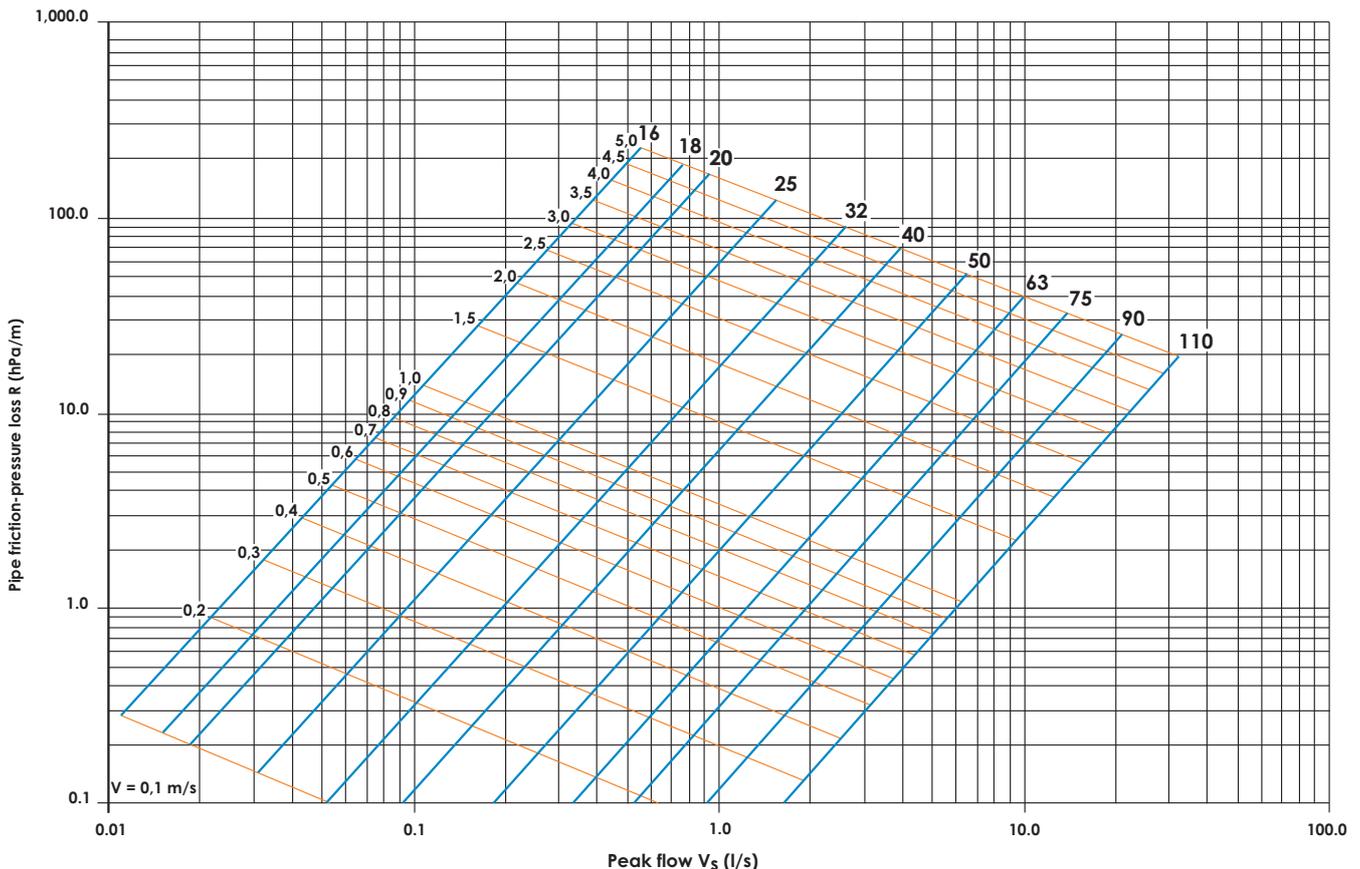
## 5.0. Technical information sanitary applications

### 5.2.3. Pressure loss graph

The pressure loss graph includes the piping characteristic curve with the different dimensions for MULTITUBO multi-layer pipes well as the limit lines of the flow rates.

By means of the graph, at a given volume flow or flowing-through respectively, the pipe friction resistance per metre in the pipe dimension and the flow rate can be determined in a simple graphic way.

### Pipe friction-pressure loss of MULTITUBO multi-layer pipes (Water 10 °C)



## 5.3. Pressure test

### 5.3.1. Pressure test with water

According to DIN EN 806-4, for MULTITUBO systems a pressure test has to be carried out in an uncovered state after finishing.

At first each connection has to be checked visually for the correct pressing. Only pressure gauges are suitable for the test that allows a clear reading of a pressure change of 0.1 bar.

The pressure gauge has to be installed at the lowest point of the installation to be tested.

#### Preliminary test:

#### Additional test safety for Metal-Press-Fittings and PPSU-Press-Fittings from dim 16 mm to 32 mm

The press - fittings from dim 16 to 32 mm of the MULTITUBO systems plumbing system have an additional test safety feature. That means that the installer - when original MULTITUBO systems tools were used - is able to detect non-pressed connections during a pre-pressure test of min. 15 minutes with 1.5 bar. After that pretest, the pressure test procedure is done separately.

## 5.0. Technical information sanitary applications

### 5.3.1. Pressure test with water

#### Main test:

The main test is carried out directly after the preliminary test. The test pressure shall be 1.1 times the allowable working pressure. The operating pressure for drinking water installations according to DIN EN 806-2 is 1 MPa (10 bar). The test pressure according to DIN EN 806-4 and ZVSHK bulletin is thus 1.1 MPa (11 bar). The test time is 30 minutes. During this test period of 30 minutes, the test pressure shall remain constant ( $\Delta p = 0$ ). If a pressure drop occurs during this period, there is a leak in the system. The pressure must be maintained and the leak located. After the leak has been removed, a new leak test must be carried out.

### 5.3.2. Pressure test with air or inert gases

Alternatively to the pressure test with water, the pressure test for the MULTITUBO installation system can also be carried out using compressed air or inert gases. This is particularly recommended in the freezing period. Here,

the ZVSHK information "Execution of a pressure test with compressed air or inert gases for drinking water installations according to DIN 1988/TRWI" has to be observed.

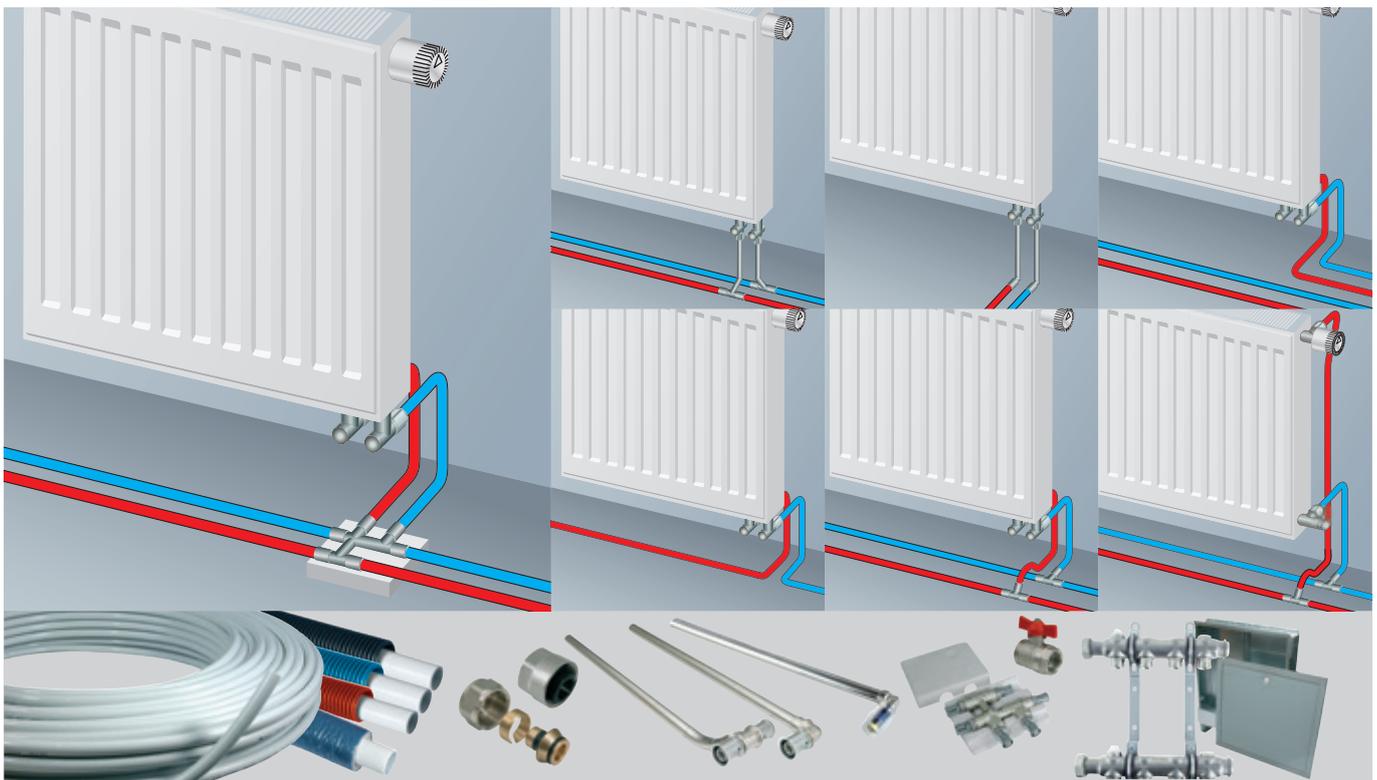
### 5.3.3. Pipe flushing

After the pressure test, the complete installation has to be flushed thoroughly. The procedure for the pipe flushing is described in DIN 1988 T2 section 11.2.

### 5.3.4. Pressure test protocol for sanitary applications

In order to comply with our liability regulations, the system must be tested in accordance to the specifications of our pressure test protocols. The test reports can be downloaded from our website or requested directly from us.

## 6.0. Technical information radiator connection



### 6.1. Technical information radiator connection

MULTITUBO systems allow the complete installation of heating facilities from the heat generator to the radiator. Both single pipe connections and two-pipe connections are possible without any problems. Not only in a new building, but also in the field of the reconstruction of old buildings the press connection technique, which allows an installation without soldering and welding, shows its clear advantages. All installations must be carried out in line with the currently valid regulations and standards,

inter alia thermal insulation, sound protection and fire protection.

**Important information: Installations such as solar or long-distance energy installations, which are operated with working temperatures exceeding 95 °C, must not be connected directly to MULTITUBO systems! It has to be guaranteed in every working situation that the operating limits of MULTITUBO multi-layer pipes are not exceeded.**

## 6.0. Technical information radiator connection

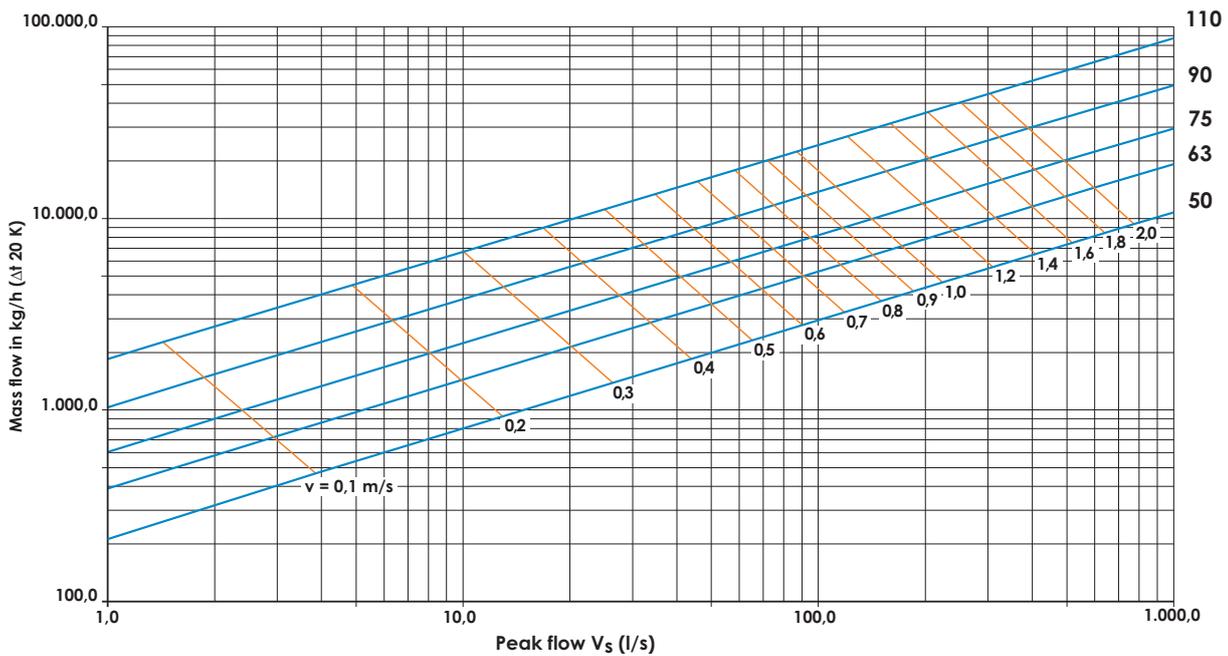
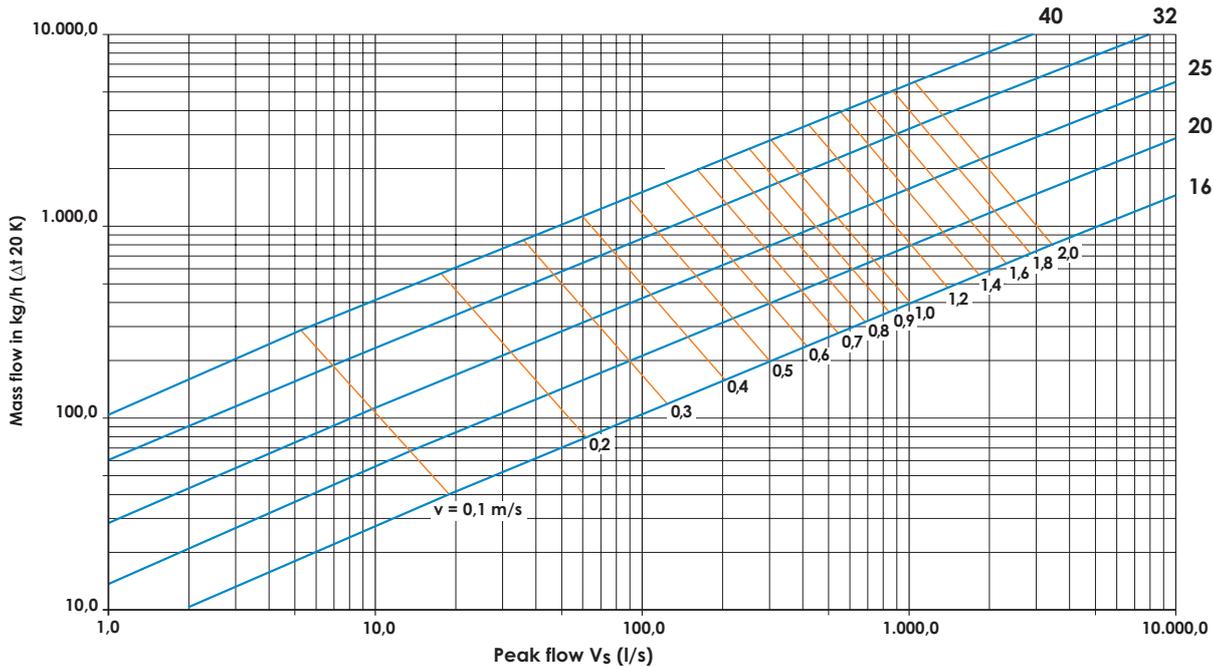
### 6.2. Pressure loss graph

The pressure loss graph includes the piping characteristic curve for MULTITUBO with the different dimensions as well as the limit lines of the flow rates.

By means of the graph, for the spread  $T = 20\text{ K}$  at an average

water temperature of  $60\text{ °C}$  and at a given flow (volume flow), the pipe friction resistance per metre in dependence of the pipe dimension and the flow rate can be determined in a simple graphic way.

**Pressure-loss, depending on the mass flow (Water  $60\text{ °C}$ )**



## 6.0. Technical information radiator connection

### 6.3. Heat capacity of MULTITUBO multi-layer pipes

#### Heat capacity of MULTITUBO multi-layer pipes

| Radiator connection pipeline: | ≤ 0.3 m/s |           |           |           |           |  |
|-------------------------------|-----------|-----------|-----------|-----------|-----------|--|
| Pipe dimension                | 16 x 2.00 | 18 x 2.00 | 20 x 2.25 | 25 x 2.50 | 32 x 3.00 |  |
| Mass flow (kg/h)              | 122       | 166       | 204       | 339       | 573       |  |
| Heat capacity (W) at ΔT = 20K | 2,840     | 3,865     | 4,738     | 7,889     | 13,332    |  |
| Heat capacity (W) at ΔT = 15K | 2,130     | 2,899     | 3,554     | 5,916     | 9,999     |  |
| Heat capacity (W) at ΔT = 10K | 1,420     | 1,933     | 2,369     | 3,944     | 6,666     |  |
| Heat capacity (W) at ΔT = 5K  | 710       | 966       | 1,185     | 1,972     | 3,333     |  |

| Heating distribution pipeline: | ≤ 0.5 m/s |           |           |           |           |           |
|--------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Pipe dimension                 | 16 x 2.00 | 18 x 2.00 | 20 x 2.25 | 25 x 2.50 | 32 x 3.00 | 40 x 4.00 |
| Mass flow (kg/h)               | 204       | 277       | 340       | 565       | 956       | 1,448     |
| Heat capacity (W) at ΔT = 20K  | 4,733     | 6,442     | 7,897     | 13,148    | 22,119    | 33,658    |
| Heat capacity (W) at ΔT = 15K  | 3,550     | 4,832     | 5,923     | 9,861     | 16,665    | 25,243    |
| Heat capacity (W) at ΔT = 10K  | 2,367     | 3,221     | 3,948     | 6,574     | 11,110    | 16,829    |
| Heat capacity (W) at ΔT = 5K   | 1,183     | 1,611     | 1,974     | 3,287     | 5,555     | 8,414     |

| Risers and basement distribution pipeline: | ≤ 1.0 m/s |           |           |           |           |           |
|--|-----------|-----------|-----------|-----------|-----------|-----------|
| Pipe dimension                             | 16 x 2.00 | 18 x 2.00 | 20 x 2.25 | 25 x 2.50 | 32 x 3.00 | 40 x 4.00 |
| Mass flow (kg/h)                           | 407       | 554       | 679       | 1,131     | 1,911     | 2,895     |
| Heat capacity (W) at ΔT = 20K              | 9,466     | 2,885     | 15,794    | 26,295    | 44,439    | 67,316    |
| Heat capacity (W) at ΔT = 15K              | 7,100     | 9,663     | 11,845    | 19,721    | 33,329    | 50,487    |
| Heat capacity (W) at ΔT = 10K              | 4,733     | 6,442     | 7,897     | 13,148    | 22,219    | 33,698    |
| Heat capacity (W) at ΔT = 5K               | 2,367     | 3,221     | 3,948     | 6,574     | 11,110    | 16,829    |

### 6.4. Pressure test

For MULTITUBO systems, a leak test has to be carried out according to DIN 18380. This test has to be executed after the installation and before the wall slots and cut-throughs of walls and ceilings are closed

At first, a visual check of each connection point for proper pressing has to be carried out.

Hot water heating systems must be tested with a pressure of the 1.3-fold of the total pressure at all points of the installation, but at least with 1 bar excess pressure. Immediately after the cold water test, the impermeability at the maximum temperature must be tested by means of heating up to the highest heating water temperature that was the basis for the calculation.

#### Preliminary test:

#### Additional test safety for Metal-Press-Fittings and PPSU-Press-Fittings from dim 16 mm to 32 mm

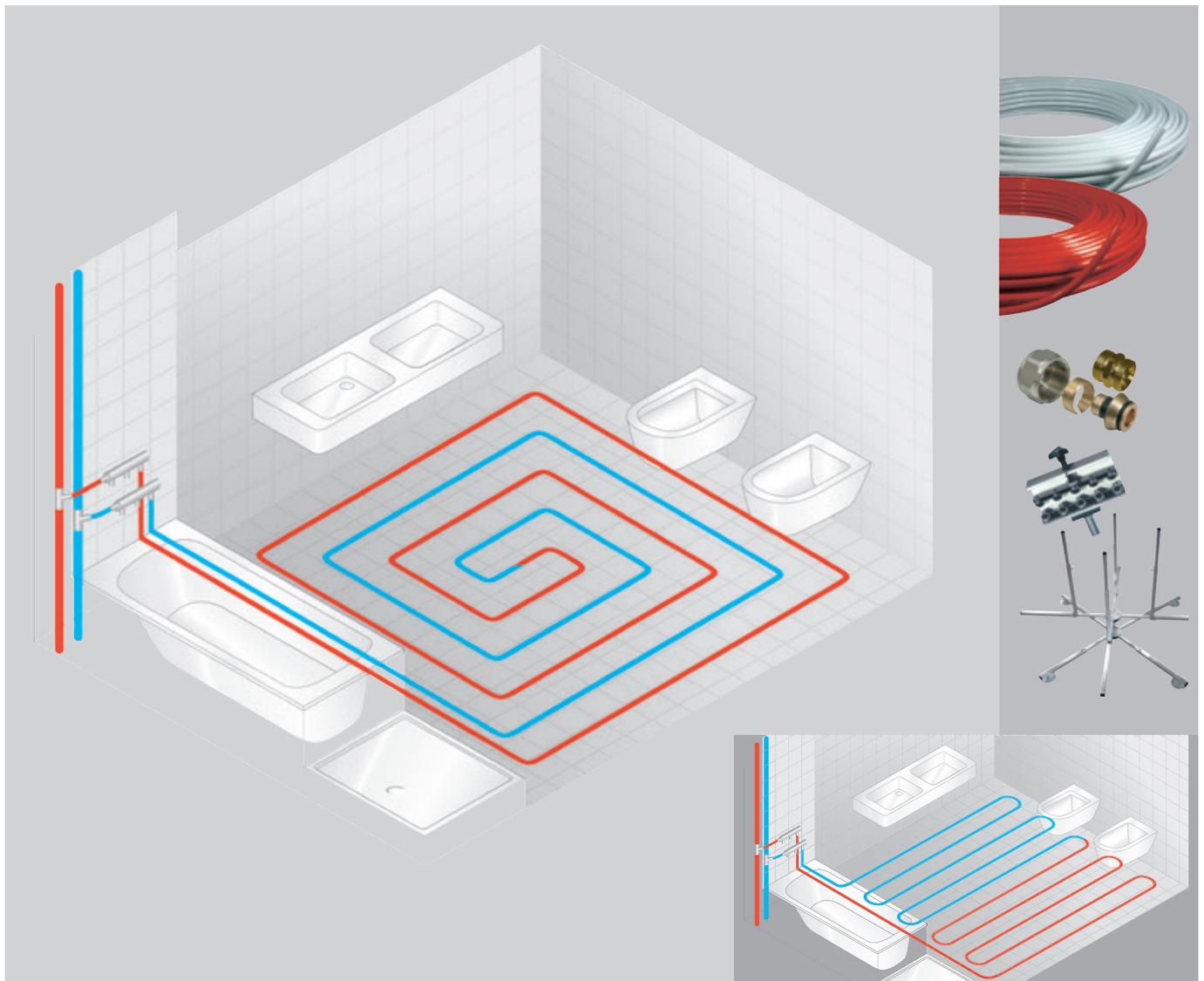
The press - fittings from dim 16 to 32 mm of the MULTITUBO systems plumbing system have an additional test safety feature. That means that the installer - when original MULTITUBO systems tools were used - is able to detect non-pressed connections during a pre-pressure test of min. 15 minutes with 1.5 bar. After that pretest, the pressure test procedure is done separately.

If radiators are already connected during the pressure test, the maximum pressure requirements of the radiator supplier must be considered.

#### 6.4.1. Pressure test protocol for radiator connection

In order to comply with our liability regulations, the system must be tested in accordance to the specifications of our pressure test protocols. The test reports can be downloaded from our website or requested directly from us.

## 7.0. Technical information radiant heating/cooling



### 7.1. General information

Today, the radiant heating/cooling is becoming more and more important because of the use of the most modern heating/cooling and control technology. With its white multi-layer pipe, or with the red multi-layer pipe particularly suitable for radiant heating/cooling, MULTITUBO systems offers pipes which have decisive advantages concerning reliability, durability and easy handling. These pipes fulfil all occurring requirements, such as for example absolute oxygen tightness, a low thermal expansion, they are flexible, can be bent easily

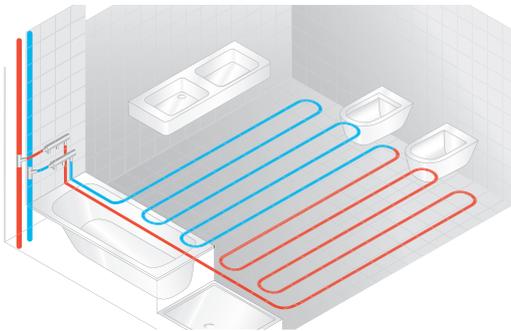
by hand, they are absolutely corrosion-resistant, maintenance-free and offer a quick and easy installation. Here the MULTITUBO multi-layer pipe can be combined with many underfloor heating/cooling components (distributors, pipe positioning plates, tacker systems, dry construction systems etc.) available on the market.

**To guarantee a correct operation of the system, please mind the technical rules of heating and cooling installations to prevent damage from health and building.**

## 7.0 Technical Instruction panel heating

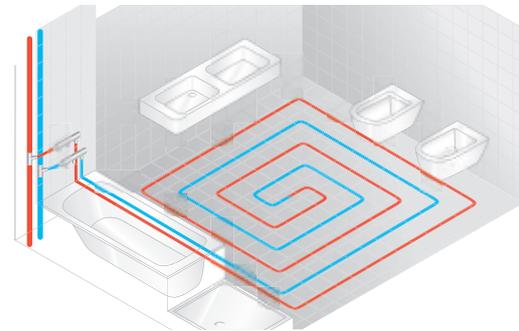
### 7.2. Laying systems

In general there are two different types of laying for underfloor heating systems:



#### Meander laying

At the meander laying the pipe is laid from the exterior wall to the inner wall of the room resulting from the decreasing heat-capacity of the pipe.



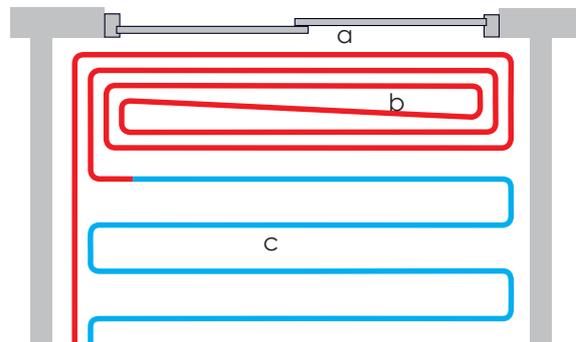
#### Counterflow laying

At the counterflow laying the pipe is positioned helical. Due to the declining heat load in the pipe and that the "flow" is always next to the "return" the heat emission is nearly the same all-over the room.

### 7.3. Fringe area

In rooms with big windows or at exterior walls a fringe area with narrow pipe spacing can be laid. So cooler parts of the room or steaming up of the windows can be avoided. Meander or Counterflow laying are suitable for those fringe areas, but the min. bending radii of the pipe must be considered. Resulting from this a Counterflow laying with an adequate turning-back loop in fringe areas with a pipe spacing less than 15 cm is in general more suitable.

- a - Exterior wall with window
- b - Turning back loop of the Counterflow laying in the fringe area
- c - Continued laying system: Meander laying

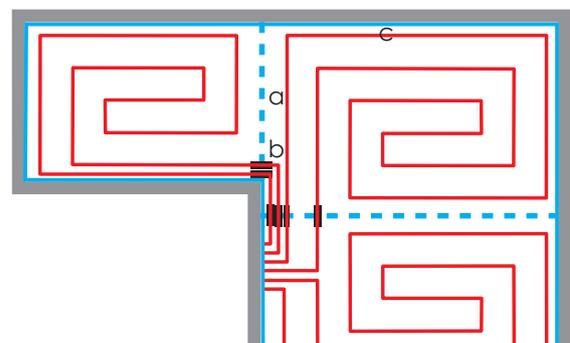


### 7.4. Expansion joints

In general all fixed parts must be isolated against noise by using edging strips before placing the screed. Depending on the structural situation additional movement joints must be placed – see DIN EN 1264-4 (German institute for standardisation – European standard):

- Screed surface > 40 m<sup>2</sup>
- Lateral length > 8 m
- Width-to-length ratio w/l > 1/2
- Movement-joint below the screed
- Strong staggered screed surface

When passing the pipe through the expansion joint, the pipe has to be protected against mechanical loads by using joint protection pipe.



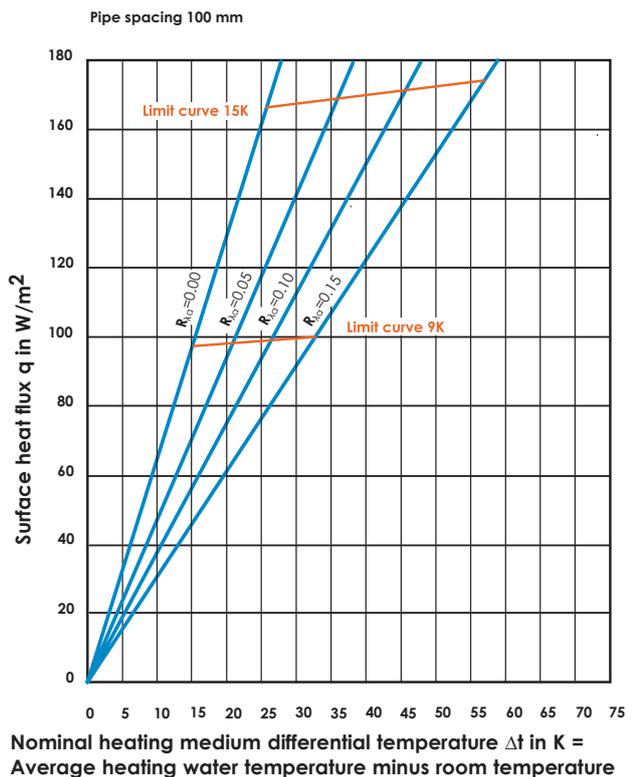
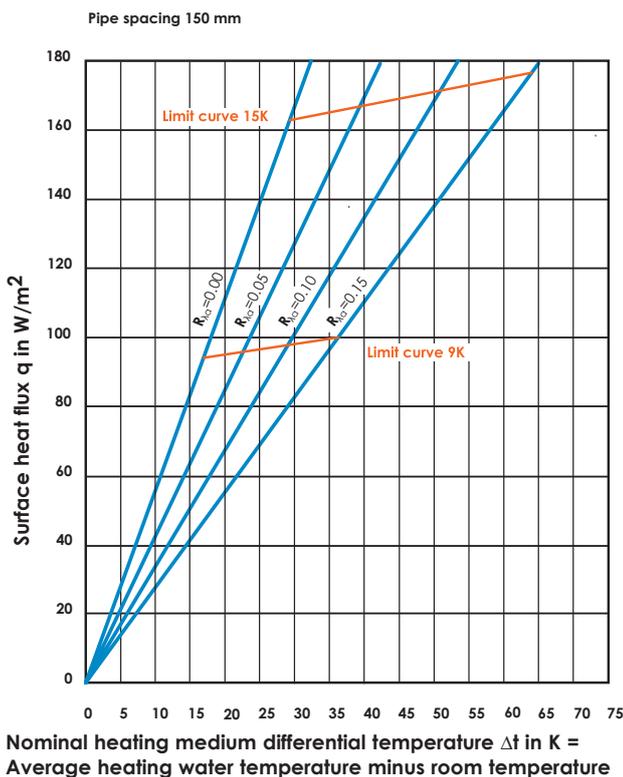
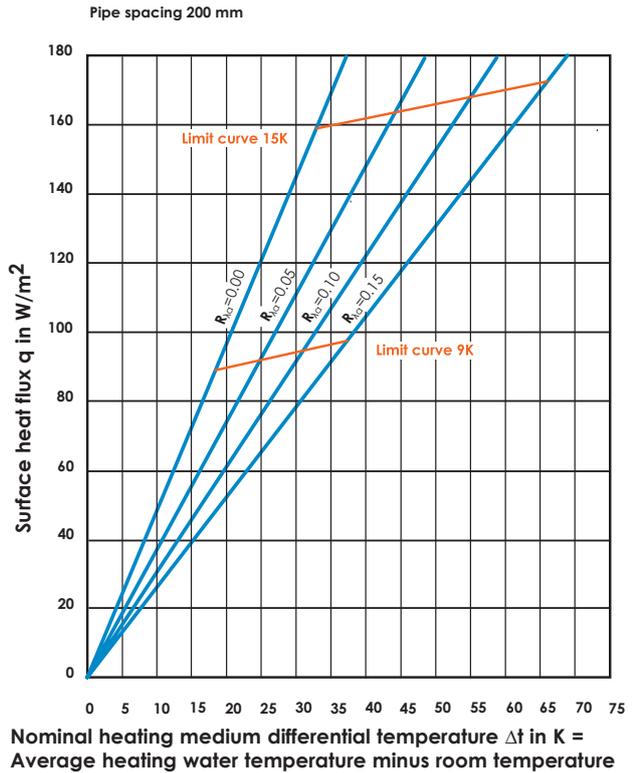
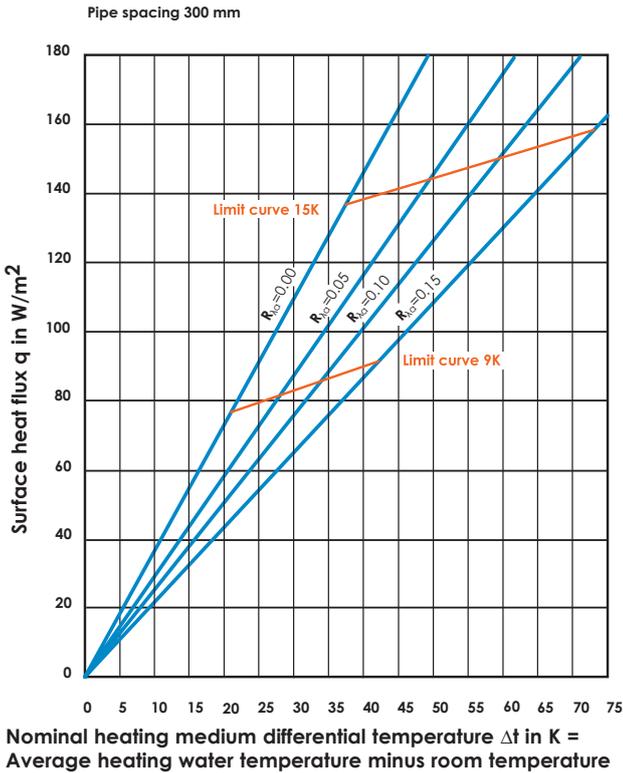
- a – Expansion joint with expansion joint profile
- b – Pipe penetration through the expansion joint with joint protection pipe
- c – Edging strip to avoid a sound bridge

## 7.0 Technical Instruction panel heating

### 7.5. Calculation diagram underfloor heating

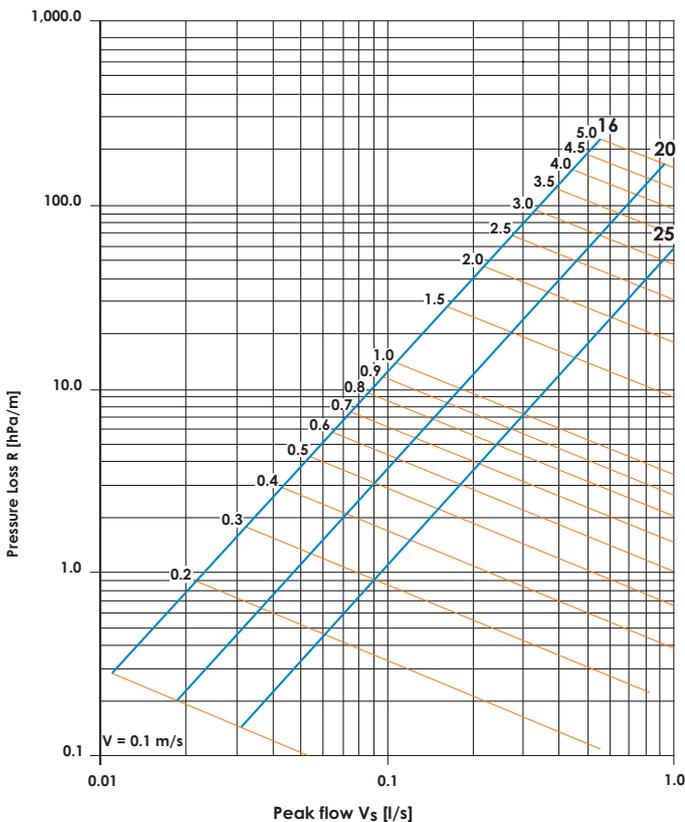
#### Thermal resistance of various floor coverings:

|                |   |
|----------------|---|
| Tiles, marble: | $R_{\lambda a} = 0,00 \text{ (m}^2\text{K)W}$ |
| PVC:           | $R_{\lambda a} = 0,05 \text{ (m}^2\text{K)W}$ |
| Parquet:       | $R_{\lambda a} = 0,10 \text{ (m}^2\text{K)W}$ |
| Carpet:        | $R_{\lambda a} = 0,15 \text{ (m}^2\text{K)W}$ |



## 7.0 Technical Instruction panel heating

### 7.6. Pressure-loss diagram



### 7.7. Pipe spacing and corresponding pipe demand

| Pipe spacing [cm]               | 10    | 15   | 20   | 25   | 30   |
|---------------------------------|-------|------|------|------|------|
| Pipe demand [m <sup>2</sup> /m] | 10.00 | 6.70 | 5.00 | 4.00 | 3.40 |

## 8.0. Service

### International partnership

International partnership for MULTITUBO is a topic with outstanding meaning. The idea of a system that will serve with high quality and practical solutions for the daily challenge on building sites demands a good communication with our partners. We try to provide a close contact to all the questions and suggestions the market could have to improve our products and us.

If there are any questions about our products or technical features, please do not hesitate to contact our partner or us directly:

### 7.8. Pressure test

The pressure test for underfloor heating circulation installations with the MULTITUBO alu multilayer pipe must be carried out following DIN EN 1264-4. Only pressure gauges are to be used for the test that allows a clear reading of a pressure change of 0.1 bar.

After completion, the heating circuits must be tested for leakages by means of a water pressure test. Before the water pressure test, all heating circuits must be filled completely and must be de-aired. The impermeability must be guaranteed immediately before and during the floor screed works.

The level of the test pressure is at least the 1.3-fold of the maximally allowed working pressure.

We recommend a test with at least 5 bar and maximal 6 bar during 24 hours, here it has to be observed that the stop valves before and after the underfloor heating distributor are closed, so that the test pressure is kept away from the rest of the installation.

The test pressure must not fall by more than 0.2 bar. Leakages must not occur at any point of the tested installation. At the laying of the floor pavement, the test pressure has to be adapted to the highest allowed working pressure of the installation.

#### 7.8.1. Pressure test protocol for panel heating

In order to comply with our liability regulations, the system must be tested in accordance to the specifications of our pressure test protocols. The test reports can be downloaded from our website or requested directly from us.

### Contact

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**97437 Hassfurt/Germany**

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**Fax +49 (0) 95 21/95 35 6-9**

**e-mail info@multitubo.eu**  
**net www.multitubo.eu**

Valid for all products of multitubo systems delivered by us with the exception of electronic components

## Warranty

### MULTITUBO systems tap water and heating connection system

All components of the multitubo systems are made from high quality materials. The most important parameters and attributes are constantly checked during quality assurance.

Multitubo systems consist of multilayer pipes, fittings and accessories.

For damages occurring at our products within 10 years after the date of delivery and which are provably resulting from faults in production or material we perform free insurance cover.

For other damages (personal injury and damage to property) as well as for all costs for dismantling, removal, and re-installation we are liable in the extent in which our business liability insurance and product liability insurance pays compensation.

The sums insured are the following:

**EUR 3.000.000 for bodily injury and property damage**

DW Verbundrohr GmbH does not assume liability for improper assembly or installation.

DW Verbundrohr GmbH  
Langer Rain 38  
D-97437 Hassfurt  
Germany

