



Technical manual

**VSH SudoPress**

**Disclaimer:**

This technical data is non-binding and may not reflect the guaranteed characteristics of the products, which are subject to change. Please consult our General Terms and Conditions. Additional information is available upon request. It is the designer's responsibility to select products suitable for the intended purpose and to ensure that pressure ratings and performance data are not exceeded. The installation instructions must always be read and followed. It is never permitted to remove, modify or correct any system component or defective part without first depressurizing the system and allowing it to drain.

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**VSH Integrated Piping Systems consist of various product lines for connection technology and valve technology that together create the ultimate solution for top-quality integrated piping systems. These systems, which are suitable for both gases and liquids, are used in residential and commercial construction, industry, fire safety and shipbuilding.**

### VSH Integrated Piping Systems

VSH Integrated Piping Systems are known for their consistently high level of quality along with quick and simple installation and maintenance. All VSH piping systems can be seamlessly combined, allowing VSH to offer an Integrated Piping System from 6 mm to 104" in groove, press, compression and push connections that are suitable for thick- or thin-walled metal or plastic tubes.

### The right technology for the right application

At VSH, we know that the right technology needs to be chosen for every application in an installation to ensure that the best connection is provided and processing is performed with maximum efficiency. Our VSH Engineering Service advises and guides you in complex projects. A system from a single manufacturer will avoid the need for compatibility discussions with different manufacturers.

### VSH Fittings B.V.

VSH was founded more than 85 years ago and has an extensive history. It belongs to the leading international technology group Aalberts Industries as part of the Building Installations division. This gives VSH a healthy, solid financial basis that customers can trust and build on. It also enables VSH to stay ahead of the competition at all times when it comes to innovation and develop the best integrated piping systems for its customers both now and in the future.

# 1 VSH SudoPress system

VSH SudoPress is a complete piping system suitable for a wide variety of applications, from drinking water, gas, heating and solar installations to cooling water and compressed air systems. The VSH SudoPress range consists of press fittings, tubes and pressing tools and is available in galvanized steel, stainless steel and copper. Convenient installation and double safety are the top priorities. The VSH SudoPress fittings are either V-profile (up to 54 mm) or M-profile (66.7 to 108 mm).

## Quality and availability

All VSH SudoPress fittings are produced in our modern, automated factory in Hilversum (Netherlands). We maintain strict quality control in the production process. All products are therefore subjected to a high-precision test procedure. The complete VSH SudoPress product range is available from our reliable network of expert, service-oriented wholesalers in the Netherlands.

The VSH SudoPress system offers installers a complete solution with great flexibility. The VSH SudoPress system includes fittings, tools and tubes. Under certain conditions, tubes from other manufacturers may also be used\*. Furthermore, the VSH SudoPress fittings range is compatible with various press tool brands\*\*.

Overall, the SudoPress system by VSH is a complete, high-quality press system that offers a wide range of freedom of choice in terms of the materials and tools available.



\* See section 2.2

\*\* See section 2.4

## Advantages of VSH SudoPress

- One of the main advantages of the VSH SudoPress system is that the tube components can be connected to one another without using a heat source, meaning that you do not have to take out an expensive insurance policy as there is no risk of fire damage.
- In comparison to other 'cold' connection techniques, VSH SudoPress eliminates the need for complicated clamping techniques, time-consuming preparations and drying times. The installation is faster and cleaner.
- The quality of the connection is determined by the tool and not the user, which guarantees consistent quality and enables the couplings to be visually checked.
- This simple, fast connection technology and the short preparation times for the tube result in further considerable cost savings in the installation. As the connection is achieved using only press tools, you do not need to purchase or hire any other materials, such as gases, adhesives, threading machines, etc.



**Press  
(V profile)  
12 - 54 mm**



**Visu-Control®  
12 - 54 mm**



**protected  
O-ring**



**patented  
O-ring**

## VSH SudoPress press fittings have the following technical advantages:

- Outstanding flow properties thanks to the laser-welded fittings.
- No risk of leakage due to highly accurate press profiles.
- The tube is easy to insert thanks to the tolerances on the fittings and the O-rings.
- An EPDM O-ring that is resistant to high temperatures.
- The O-rings are treated with a special lubricant so that the tube can be inserted more easily, thus significantly reducing the risk of damage to the O-ring.
- VSH supplies end couplings instead of stops. Pipe ends are therefore easy to cap, and can quickly be made available for further connections.

## Technical advantages:

- The VSH SudoPress system is a lightweight solution.
- VSH SudoPress galvanized steel tubes and fittings are protected against corrosion using a zinc coating.
- VSH SudoPress galvanized steel tubes are protected against internal corrosion by a thermally applied oil film on the inside.
- To prevent dirt from getting into the tubes, all VSH SudoPress tubes are provided with colored end-caps.
- The bends have a radius of  $1.2 \times d$ , meaning the fitting is more compact. This increases the flexibility of the installation.
- All laser-welded and soldered fittings are fully tested by an advanced leak test machine.
- Adapters and reducers are made as single-piece units.

## Dual safety: Visu-Control® and Leak Before Pressed (LBP) function



The VSH SudoPress LBP function is achieved using a special, patented O-ring. Fittings with a Leak Before Pressed function have the advantage that connections which have not been pressed will leak water during pressure testing. This means that an incomplete press connection can easily be identified. If correctly assembled, the press fittings will be water- and airtight after being pressed.



Visu-Control® is an additional safety feature on VSH SudoPress fittings which ensures a visual and tactile check is carried out (in addition to the Leak Before Pressed function). After pressing, the Visu-Control® ring can simply be removed from the fitting to confirm at a glance that the fitting has been pressed. As a result, there is no longer any need to mark pressed fittings afterwards.



## 2 Technical data

### 2.1 Areas of application for VSH SudoPress



Potable  
water



Heating



Cooling



Natural gas



Solar



Compressed  
air



Vacuum

#### Potable water installations

*VSH SudoPress stainless steel fittings with stainless steel tubes that fulfill EN10312, DVGW Worksheet W534 - GW541 and, for Switzerland, SVGW W/TPW 132 (10/04).*

O-ring:	EPDM* (black)
Operating temperature:	-20°C to +110°C
Max. temperature:	130°C (for short periods)
Operating pressure:	Max. 16 bar

*VSH SudoPress copper fittings with copper tubes that satisfy EN 1057 R220/ R250/R290.*

O-ring:	EPDM (black)
Operating temperature:	-20°C to +110°C
Max. temperature:	130°C (for short periods)
Operating pressure:	Max. 16 bar

In potable water installations with VSH SudoPress stainless steel fittings and tubes, the content of water-soluble chloride ions may not exceed 250 mg/l.

#### Installation for heating installations

*VSH SudoPress galvanized steel fittings with galvanized steel precision tubes that satisfy EN 10305-3 or VSH SudoPress stainless steel fittings with stainless steel tube that satisfy EN 10312.*

O-ring:	EPDM (black)
Operating temperature:	-20°C to +110°C
Max. temperature:	130°C (for short periods)
Operating pressure:	Max. 16 bar

\* Ethylene Propylene Diene Monomer

*VSH SudoPress copper fittings with copper tubes that satisfy EN 1057 R220/R250/R290.*

O-ring:	EPDM (black)
Operating temperature:	-20°C to +110°C
Max. temperature:	130°C (for short periods)
Operating pressure:	Max. 16 bar

### **Gas installation**

*VSH SudoPress copper and gas fittings with copper tubes that satisfy EN 1057 R250/R290.*

O-ring:	HNBR* (yellow)
Operating temperature:	-20°C to +70°C
Operating pressure:	Max. 5 bars inside and outside
Application:	Inside (HTC**, proven tightness of the connection at 650°C for 30 min) or outside buildings. No other corrosion protection is required during construction or embedding in concrete. Outside of buildings, above-ground installation only Local regulations must always be observed.

For tools approved for gas installations, see [www.vsh.nl/presstools](http://www.vsh.nl/presstools).

### **Cooling water installations**

*VSH SudoPress galvanized steel fittings with galvanized steel precision tubes that satisfy EN 10305-3 in closed-loop systems or VSH SudoPress stainless steel fittings with stainless steel tubes that satisfy EN 10312 in closed-loop and open systems.*

O-ring:	EPDM (black)
Operating temperature:	-20°C to +110°C
Max. temperature:	130°C (for short periods)
Operating pressure:	Max. 16 bar

\* Hydrogenated Nitrile Butadiene Rubber

\*\* Higher Thermal Capacity

*VSH SudoPress copper fittings with copper tubes that satisfy EN 1057 in closed-loop and open systems.*

O-ring:	EPDM (black)
Operating temperature:	-20°C to +110°C
Max. temperature:	130°C (for short periods)
Operating pressure:	Max. 16 bar

In cooling water installations with VSH SudoPress stainless steel fittings and tubes, the content of water-soluble chloride ions may not exceed 250 mg/l.

### **Solar installations**

*VSH SudoPress galvanized steel fittings with galvanized steel precision tubes in accordance with EN 10305-3 or VSH SudoPress stainless steel fittings with stainless steel tubes in accordance with EN 10312.2.*

O-ring:	FPM* (green)
Operating temperature	-20°C to +180°C
Max. temperature	230°C (for short periods)
Operating pressure:	Max. 16 bar
Application:	VSH SudoPress galvanized steel for closed-loop systems inside buildings only; VSH SudoPress stainless steel for both closed-loop systems and systems with return.

*VSH SudoPress copper fittings with copper tubes that satisfy EN 1057 R250/R290.*

O-ring:	FPM (green)
Operating temperature	-20°C to +180°C
Max. temperature	230°C (for short periods)
Operating pressure:	Max. 10 bar

**Compressed air systems**

VSH SudoPress galvanized steel fittings with galvanized steel precision tubes that satisfy EN 10305-3, VSH SudoPress stainless steel fittings with stainless steel tubes that satisfy EN 10312 or VSH SudoPress copper fittings with copper tubes that satisfy EN 1057 R220/R250/R290.

VSH SudoPress galvanized steel fittings with galvanized steel precision tubes can be used for compressed air under the following conditions:

Water content Max. 880 mg/m<sup>3</sup>, Class 3, ISO 8573 - Part 1

Oil content Max. 25 mg/m<sup>3</sup>, Class 5, ISO 8573 - Part 1

Class	Water content [mg/m <sup>3</sup> ]	Oil content [mg/m <sup>3</sup> ]	O-ring
1	3	0.01	EPDM
2	120	0.1	EPDM
3	880	1	EPDM
4	6,000	5	EPDM
5	7,800	25	EPDM
6	9,400	>25	FPM (green)

TABLE 1: COMPRESSED AIR AND ISO CLASSIFICATION - WHICH O-RING TO USE

If the maximum water content is exceeded, copper or stainless steel must be used. If the compressed air contains mineral or vegetable oil, then FPM O-rings are to be used. EPDM O-rings may only be used for synthetic oil or dry compressed air (not exceeding 25 mg/m<sup>3</sup>).

O-ring:	EPDM (black)
Operating temperature:	-20°C to +110°C
Max. temperature:	130°C (for short periods)
Operating pressure:	12-54 mm; max. 16 bar 66.7-108 mm; max. 10 bar

O-ring:	FPM (green)
Operating temperature:	-30°C to +200°C
Max. temperature:	230°C (for short periods)
Operating pressure:	12-54 mm; max. 16 bar 66.7-108 mm; max. 10 bar

*VSH SudoPress copper fittings with copper tubes that satisfy EN 1057 R220/R250/R290.*

O-ring:	EPDM (black)
Operating temperature:	-20°C to +110°C
Max. temperature:	130°C (for short periods)
Operating pressure:	12-54 mm; max. 16 bar 66.7-108 mm; max. 10 bar

O-ring:	FPM (green)
Operating temperature	-20°C to +180°C
Max. temperature	230°C (for short periods)
Operating pressure:	Max. 16 bar

Compressed air pipeline systems must be properly tested as soon as the installation work is finished. The system designer and installation contractor must ensure safe methods are selected for testing the system. The methods must comply with all current health and safety regulations. They may include testing compressed air lines with fluids or compressed air at a specific pressure, or a combination of both. We recommend that the maximum working pressure of the product not be exceeded under any circumstances during this process.

Since 30 May 2002, most pressure equipment and installations on the market have had to comply with the Pressure Equipment Directive (PED) 1999. The Directive concerns items such as vessels, pressurized storage containers, heat exchangers, steam generators, boilers, industrial piping, safety equipment and pressure accessories.

Please note that Article 3(3) of the PED applies to the VSH SudoPress. This means that only sound design and safe instructions for use and maintenance are required.

## 2.2 VSH SudoPress tubes

### 2.2.1 VSH SudoPress stainless steel tubes

The VSH SudoPress stainless steel tubes are thin-walled precision steel tubes. The outer and inner surfaces of the tubes are plain, free of discoloration and are supplied free of manufacturing residue that could otherwise cause corrosion. Caps on both ends of the tubes prevent dirt or dust from entering the tubes during transport or storage. This section lists the technical parameters that are especially relevant when working with VSH SudoPress stainless steel tubes.

#### **Insulation**

The following regulations apply to the insulation of potable water piping systems:

- Cold water lines should be protected against condensation and overheating in accordance with DIN 1988 - Part 200. For installations in the Netherlands, the 'Water Work Sheets' must be followed.
- Hot water lines must be insulated to prevent heat loss in accordance with the Energy Conservation Act (EnEG). For installations in the Netherlands, the 'Water Work Sheets' must be followed.

The soluble chloride content in the insulation materials used must not exceed 0.05% by weight in accordance with DIN 1988 - Part 7.

**Important:** AS-quality insulation materials (see also AGI Q 135) contain significantly less chloride than the maximum permissible content.

#### **Flammability**

VSH SudoPress stainless steel tubes are considered to be non-combustible tubes according to German Class A building materials, DIN 4102 - Part 1.

### **VSH SudoPress stainless steel tube 1.4401 (AISI 316)**

VSH SudoPress stainless steel tubes have been tested and approved for potable water installations by many international certifying bodies and in accordance with DVGW/DIN and DVGW - Worksheet GW 541, for example.

## Applications

- All potable water installations in accordance with international potable water institutes, such as for example the German Potable Water Decree (TrinkwV) and EU Directive 98/83/EC, DIN 50930 - Part 6 and in compliance with DIN 1988
- Water supply and rain water installations
- Potable water for industrial applications
- Conditioned water, such as decalcinated/softened water, partially and completely desalinated water, distilled water, water with glycol\*
- Compressed air

Technical characteristics	
Material	X5CrNiMo 17 12 2 material no. 1.4401 in accordance with DIN-EN 10088
Specification	EN 10312 - DVGW - Work sheet GW541 (2004) Table 2
Approvals	DVGW, SVGW, ETA, ÖVGW, BYGGFORSK, STF, PZH, SITAC, CSTBat, WRAS, VdS, FM, FG, CNBOP, SBSC, SETSCO, LPCB, DNV, GL, RINA, UL, ULc, BV, LR, SPF, GDV
Type of tube	TIG or laser-welded
Weld slag check	100% EDDY CURRENT in accordance with EN 10893-2:2011
Weld slag removal	External
Tolerances	In accordance with EN10312 - table 2
Surface finish	Matt silver
Marking	SudoXPress stainless [DN/dimension x wall thickness] Stainless steel/Sanitary Steel/Sanitary GAS 1.4401/AISI316 EN10312 DVGW GW541 Reg. No. [DVGW Reg. No.] SVGW ÖVGW W1.397 WRAS VA1.22/20294 VA1.12/18769 SINTEF PZH SITAC 0168/05 ATEC 14/15-2097 CSTBat 116-1482 LPCB VdS G4080037 [operating pressure VdS/LPCB] bar <FM> [operating pressure FM] psi C(UL)US Listed 4NB1 [operating pressure UL/cUL] psi KK NDE [batch number], [supplier code] [model number, to be repeated every 60 cm]
Smallest bending radius	3.5 x external diameter of the tube (max. 28 mm)
Supply mode	Tubes, length 6 m +/-50 mm, with protective caps (green)
Heat expansion coefficient	0.0160 mm/m at $\Delta T = 1K$
Max. working pressure	16 bar

TABLE 2: TECHNICAL CHARACTERISTICS OF STAINLESS STEEL TUBE 1.4401

\* Antifreeze additives must be compatible with EPDM O-rings.  
For this, written permission is required.

DN	External Ø xs [mm]	Internal Ø [mm]	Weight [kg/m]	Tube capacity [l/m]
DN 12	15 x 1.0	13.0	0.333	0.133
DN 15	18 x 1.0	16.0	0.410	0.201
DN 20	22 x 1.2	19.6	0.624	0.302
DN 25	28 x 1.2	25.6	0.790	0.515
DN 32	35 x 1.5	32.0	1.240	0.804
DN 40	42 x 1.5	39.0	1.503	1.195
DN 50	54 x 1.5	51.0	1.972	2.043
DN 65	76.1 x 2.0	72.1	3.550	4.548
DN 80	88.9 x 2.0	84.9	4.150	5.661
DN 100	108 x 2.0	104.0	5.050	8.495

TABLE 3: WEIGHT AND DIMENSIONS OF STAINLESS STEEL TUBE 1.4401

### VSH SudoPress stainless steel tube 1.4521 (AISI 444)

VSH SudoPress stainless steel tubes 1.4521 have been tested and approved for potable water installations in accordance with DVGW - Worksheet GW 541, ETA, ÖVGW and SVGW.

#### Applications

- All potable water installations in accordance with the German Potable Water Decree (TrinkwV) and EU Directive 98/83/EC, DIN 50930 - Part 6, and in accordance with DIN 1988.
- Water supply and rain water installations
- Potable water for industrial applications
- Wet and dry fire sprinkler installations in accordance with DIN 1988 - Part 6, FM or LPCB.
- Conditioned water, such as decalcinated/softened water, partially and completely desalinated water, distilled water, water with glycol
- Compressed air
- Shipbuilding



Technical characteristics	
Material	X2CrMoTi 18 2 material no. 1.4521 in accordance with DIN-EN 10088
Specification	EN 10312 - DVGW - Work sheet GW541 (2004) Table 2
Approvals	DVGW, SVGW, ETA, ÖVGW, FM, FG, CNBOP, SBSC, SETSCO, LPCB, DNV, GL, RINA, GDV, Kiwa
Type of tube	Laser-welded
Weld slag check	100% EDDY CURRENT in accordance with EN 10893-2:2011
Weld slag removal	External
Tolerances	In accordance with EN10312 - table 2
Surface finish	Matt silver
Marking	SudoXPress stainless [DN/dimension x wall thickness] Stainless steel 1.4521/AISI444 EN10312 DVGW GW541 Reg. No. [DVGW Reg. No.] SVGW ÖVGW W1.397 WRAS VA1.22/20294 VA1.12/18769 VdS G4080037 LPCB [operating pressure VdS/LPCB] bar <FM> [operating pressure FM] psi KK ATEC 14/15-2097 CSTBat 235-2097 Tectite 316 [batch number] [supplier code] [model number, to be repeated every 60 cm]
Smallest bending radius	3.5 x external diameter of the tube (max. 28 mm)
Supply mode	Tubes, length 6 m +0/-50 mm, with protective caps (green)
Heat expansion coefficient	0.0104 mm/m at $\Delta T=1K$
Max. working pressure	16 bar

TABLE 4: TECHNICAL CHARACTERISTICS OF STAINLESS STEEL TUBE 1.4521

DN	External Ø xs [mm]	Internal Ø [mm]	Weight [kg/m]	Tube capacity [l/m]
DN 12	15 x 1.0	13.0	0.333	0.133
DN 15	18 x 1.0	16.0	0.410	0.201
DN 20	22 x 1.2	19.6	0.624	0.302
DN 25	28 x 1.2	25.6	0.790	0.515
DN 32	35 x 1.5	32.0	1.240	0.804
DN 40	42 x 1.5	39.0	1.503	1.195
DN 50	54 x 1.5	51.0	1.972	2.043

TABLE 5: WEIGHT AND DIMENSIONS OF STAINLESS STEEL TUBE 1.4521

## VSH SudoPress stainless steel tube 1.4520 (AISI 439)

The VSH SudoPress stainless steel tube 1.4520 is an alternative to the stainless steel AISI304 tube, but without nickel, making it a cost-effective alternative for applications where potable water certification is not required.

### Applications

- Compressed air
- Solar installations
- Cooling installations
- Heating installations
- Shipbuilding

Technical characteristics	
Material	X2CrTi 18 2 material no. 1.4520 in accordance with DIN-EN 10088,
Specification	EN 10296-2
Approvals	FM, FG, LPCB, RINA
Type of tube	Laser-welded
Weld slag check	100% EDDY CURRENT in accordance with EN 10893-2:2011
Weld slag removal	External
Tolerances	In accordance with EN10296-2
Surface finish	Matt silver
Marking	SudoXPress stainless [DN]/dimension x wall thickness] Stainless steel 1.4520/AISI439 Heating/Compressed Air Heating/Compressed Air LPCB [operating pressure LPCB] bar <FM> [operating pressure FM] psi NDE [batch number] [supplier code] [model number, to be repeated every 60 cm]
Smallest bending radius	3.5 x external diameter of the tube (max. 28 mm)
Supply mode	Tubes, length 6 m +/-50 mm, with protective caps (black)
Heat expansion coefficient	0.0104 mm/m at $\Delta T = 1K$
Max. working pressure	16 bar

TABLE 6: TECHNICAL CHARACTERISTICS OF STAINLESS STEEL TUBE 1.4520

DN	External Ø xs [mm]	Internal Ø [mm]	Weight [kg/m]	Tube capacity [l/m]
DN 12	15 x 1.0	13.0	0.333	0.133
DN 15	18 x 1.0	16.0	0.410	0.201
DN 20	22 x 1.2	19.6	0.624	0.302
DN 25	28 x 1.2	25.6	0.790	0.515
DN 32	35 x 1.5	32.0	1.240	0.804
DN 40	42 x 1.5	39.0	1.503	1.195
DN 50	54 x 1.5	51.0	1.972	2.043

TABLE 7: WEIGHT AND DIMENSIONS OF STAINLESS STEEL TUBE 1.4520

### 2.2.2 VSH SudoPress galvanized steel tubes

VSH SudoPress galvanized steel tubes are thin-walled precision tubes.

VSH SudoPress galvanized steel tubes are protected against external corrosion by a zinc coating and a passivating chrome layer. The zinc layer is applied thermally, which results in good adhesion between the zinc layer and the tube.

#### Insulation

The following must be observed when insulating VSH SudoPress galvanized steel piping systems:

- Cold water lines should be protected against condensation and overheating in accordance with DIN 1988 - Part 200.
- Hot water lines must be insulated to prevent heat loss in accordance with the Energy Conservation Act (EnEG).

#### Flammability

VSH SudoPress galvanized steel tubes are considered to be non-combustible tubes according to German Class A building materials - DIN 4102 Part 1.

## VSH SudoPress galvanized steel tube

VSH SudoPress galvanized steel tubes are thin-walled precision tubes manufactured in accordance with EN 10305-3 (formerly DIN 2394/NEN 1982). The resulting product is very easy to bend. The tubes are also tested for leaks in accordance with EN 10246-1, so that all tubes are guaranteed to be leak-free.

### Applications

- Closed heating installations in accordance with DIN 4751
- Closed cooling installations with water/glycol mixture
- Compressed air
- Solar

Technical characteristics	
Material	Unalloyed ULC ('Ultra Light Carbon') galvanized steel, RSt 34-2 mat. no. 1.0034 according to EN 10305-3
Specification	EN 10305-3 (formerly DIN 2394)
Approvals	CSTBat, DNV, GL, RINA
Type of tube	HF-welded
Weld slag check	100% EDDY CURRENT in accordance with EN 10893-2:2011
Weld slag removal	Outside flat, inside max. rise 0.5 mm
Tolerances	In accordance with EN10305-3
Finish	Zinc coating of 8-15 µm. The tube welding seam is subsequently galvanized on the outside. The inside of the tube is protected by a thermally applied oil film.
Surface finish	Silver
Marking	SudoXPress galvanized [DN/[dimension x wall thickness] EN10305-3 CSTBat 116-1483 [batch number] [supplier code] [model number, to be repeated every 60 cm]
Smallest bending radius	3.5 x external diameter of the tube (max. 28 mm)
Supply mode	Tubes, length 6 m +0/-50 mm, with protective caps (red)
Heat expansion coefficient	0.0108 mm/m at $\Delta T = 1K$
Max. working pressure	16 bar

TABLE 8: TECHNICAL CHARACTERISTICS OF GALVANIZED STEEL TUBE

DN	External Ø xs [mm]	Internal Ø [mm]	Weight [kg/m]	Tube capacity [l/m]
DN 10	12 x 1.2	7.6	0.271	0.045
DN 12	15 x 1.2	12.6	0.420	0.125
DN 15	18 x 1.2	15.6	0.494	0.191
DN 20	22 x 1.5	19.0	0.761	0.284
DN 25	28 x 1.5	25.0	0.980	0.491
DN 32	35 x 1.5	32.0	1.241	0.804
DN 40	42 x 1.5	39.0	1.542	1.195
DN 50	54 x 1.5	51.0	1.999	2.043
DN 65	66.7 x 1.5	63.7	2.411	3.187
DN 65	76.1 x 2.0	72.1	3.503	4.083
DN 80	88.9 x 2.0	84.9	4.412	5.661
DN 100	108 x 2.0	104.0	5.382	8.495

TABLE 9: WEIGHT AND DIMENSIONS OF GALVANIZED STEEL TUBE

### 2.2.3 Copper tubes

The copper tubes that may be used for the VSH SudoPress copper system for water applications must comply with the EN 1057 R220/R250/R290 standard. The copper tubes that may be used for the VSH SudoPress system for gas applications must comply with the EN 1057 R220/R250 standard. EN 1057 is the standard for seamless copper and copper alloyed tubes for potable water, gas and heating installations. A distinction is made between soft, medium-hard and hard alloy tubes, identified as R220 (1 mm), R250 and R290. The higher the figure, the harder the metal. The values refer to the tube's tensile strength (220 N/mm<sup>2</sup>, 250 N/mm<sup>2</sup> and 290 N/mm<sup>2</sup>).

#### Flammability

Uninsulated copper tubes certified according to EN 1057/DVGW are considered to be non-combustible tubes according to German Class A building materials, DIN 4102 - Part 1.

## **Insulation**

Hot water lines must be insulated to prevent heat loss in accordance with the Energy Conservation Act (EnEG).

For regulations regarding heating installations, please see the manufacturer's guidelines. In order to avoid any corrosion on the outside, ensure that the insulating materials do not contain any traces of ammonia or nitrates (paragraph 2.8.3D). In order to minimize the risk of corrosion on the outside of the tube, insulation materials should, as far as possible, be used in conjunction with a moisture barrier. Possible solutions include the use of materials, such as Densotape or a synthetic layer, between the outside of the copper tube and the insulation material. For installations in the Netherlands, the 'Water Work Sheets' must be followed.

## **Applications**

- All potable water installations in accordance with the German Potable Water Decree (TrinkwV) and EU Directive 98, DIN 50930 - Part 6 and in compliance with DIN 1988
- Cold and hot water installations
- Heating systems
- District heating installations
- Solar installations
- Compressed air systems
- Cooling water/industrial water installations
- Gas systems
- Installations using (extra light) heating oil

**Technical characteristics**

Material	DHP copper material no. CW 024A in accordance with DIN EN 1412
External tolerance	EN 1057
Tensile strength	R220 - Soft - 220 N/mm <sup>2</sup> R250 - Medium-hard - 250 N/mm <sup>2</sup> R290 - Hard - 290 N/mm <sup>2</sup>
Smallest bend radius:	3.5 x external diameter of the tube (down to -10°C)

TABLE 10: TECHNICAL CHARACTERISTICS FOR APPROVED COPPER TUBES

External Ø (mm)	Wall thickness (mm)									
	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.5	2.0	2.5
12	R250				R220					
15		R250			R220 R250 R290					
18					R250 R290					
22				R250	R250 R290	R220				
28				R250	R290		R250	R290		
35					R290		R250 R290	R290		
42					R290		R250 R290	R290		
54					R290		R250 R290		R290	

TABLE 11: COPPER TUBES IN ACCORDANCE WITH EN 1057

## 2.3 VSH SudoPress fittings

### 2.3.1 Approvals\*

Certificate	VSH SudoPress Galvanized steel	VSH SudoPress Stainless steel	VSH SudoPress Copper
ACS	-	-	12-54 mm
ARGB/KVBG	-	-	12-54 mm for gas
ATG	-	-	12-54 mm
Bureau Veritas	-	-	12-54 mm
Certigaz	-	-	12-54 mm for gas
CSTBat	-	-	12-54 mm
DVGW	-	15-108 mm	12-54 mm for water and gas
ETA/VA	-	15-54 mm	-
GASTEC	-	-	15-54 mm for gas
INIG	-	-	12-54 mm for gas
KIWA	-	15-54 mm	12-54 mm
ÖVGW	-	15-54 mm	-
SITAC	12-54 mm	15-54 mm	12-54 mm
SPF	12-54 mm**	15-54 mm**	-
SVGW	-	15-108 mm	15-54 mm
TSU	-	-	12-54 mm

\* For water unless otherwise specified

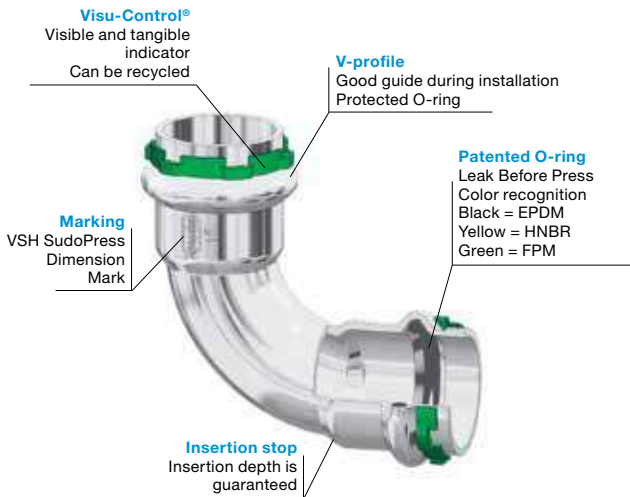
\*\* Only in combination with an FPM O-ring

TABLE 12: APPROVALS



VSH SudoPress fittings are tested and approved for potable water installations, gas installations and many more applications besides. The applications for which VSH SudoPress fittings are currently approved are listed in section 2.1.

### 2.3.2 Technical characteristics



**VSH SudoPress stainless steel fittings** are produced from material 1.4404 and provide a Leak Before Pressed (LBP) function (for detailed information see page 26). VSH SudoPress stainless steel fittings in sizes 15 to 54 are fitted with an LBP O-ring. Fittings in sizes 76.1 to 108 (M-profile) are fitted with a standard EPDM O-ring.

In addition, Visu-Control® offers a visual press check, which makes it virtually impossible to forget about the pressing process. The colored Visu-Control® ring ensures high visibility.

**VSH SudoPress galvanized steel fittings** are manufactured from RSt 34-2 steel and protected against corrosion by a layer of zinc that has been thermally applied. The zinc coating provides limited protection against short term exposure to moisture if the fittings are able to dry out again quickly afterwards. VSH SudoPress galvanized steel fittings provide a Leak Before Pressed (LBP) function. VSH SudoPress galvanized steel fittings in sizes 15 to 54 are fitted with an LBP O-ring. Fittings in sizes 66.7 to 108 (M-profile) are fitted with a standard EPDM O-ring.

In addition, Visu-Control® offers a visual press check, which makes it virtually impossible to forget about the pressing process. The colored Visu-Control® ring ensures high visibility.





**VSH SudoPress copper fittings** are manufactured from CU-DHP copper, bronze CC499K or brass CW617N. VSH SudoPress copper fittings are fitted with a Leak Before Pressed (LBP) EPDM O-ring.

In addition, Visu-Control® offers a visual press check, which makes it virtually impossible to forget about the pressing process. The colored Visu-Control® ring ensures high visibility.

**VSH SudoPress copper and gas fittings** are manufactured from CU-DHP copper, bronze CC499K or brass CW617N. VSH SudoPress copper fittings are fitted with a yellow HNBR O-ring.

### Visu-Control® technology

Using a plastic ring (polyamide) on each end of the fittings (12 to 54 mm), the patented Visu-Control® technology offers a visual and tangible press indicator. The visual check: a plastic ring forms during pressing, causing two 'ears' to appear. The tangible check: a recyclable ring is easy to remove from the fitting after pressing and is mechanically secured during transport. Thanks to the different colors of the Visu-Control® ring, the different applications of the VSH SudoPress fittings can be recognized with ease.

Product		Applications
VSH SudoPress Stainless Steel	 <span data-bbox="500 601 578 627">Green</span>	Potable water Cooling Process water Compressed air
VSH SudoPress Galvanized Steel	 <span data-bbox="500 802 550 828">Red</span>	Heating Cooling Process water Compressed air
VSH SudoPress Copper	 <span data-bbox="500 1006 578 1032">Green</span>	Potable water Cooling Process water Compressed air
VSH SudoPress Copper Gas	 <span data-bbox="500 1208 581 1234">Yellow</span>	Natural gas LPG (butane, propane) Benzene and other hydrocarbons Compressed air

### Threaded transition couplings

The VSH SudoPress product range also includes male and female threaded fittings. VSH SudoPress stainless steel, galvanized steel and copper fittings with male and female threads are manufactured in accordance with DIN 2999/ISO 7/1.

Hemp or other chloride-free sealants are suitable for the threads of VSH SudoPress stainless steel press fittings. PTFE sealing may not be used in conjunction with stainless steel due to the water-soluble chloride ions that it contains. With threaded couplings, we recommend that the sealing be carried out before pressing, so as not to stress the press connection.

### Markings on VSH SudoPress fittings

VSH SudoPress stainless steel fittings		
	<b>Marking</b> VSH SudoPress Green Visu-Control® ring 316L Approvals Dimension	<b>Packaging label</b> Type ... Dimension Description EAN no. Art. no. Approvals Quantity
VSH SudoPress galvanized steel fittings		
	<b>Marking</b> Sticker Red Visu-Control® ring	<b>Packaging label</b> Type ... Dimension Description EAN no. Art. no. , Approvals Quantity

**VSH SudoPress Copper****Marking**

VSH SudoPress  
Green Visu-Control® ring

**Packaging label**

Type ...  
Dimension  
Description  
EAN no.  
Art. no.  
Approvals  
Quantity

**VSH SudoPress Copper Gas****Marking**

VSH SudoPress  
Yellow Visu-Control® ring

**Packaging label**

Type ...  
Dimension  
Description  
EAN no.  
Art. no.  
Approvals  
Quantity

**MARKINGS ON VSH SUDOPRESS FITTINGS****O-rings**

The standard fittings for water and heating are fitted with EPDM O-rings. The type of O-ring which has to be used depends on the application and the medium. This is why gas press fittings are fitted with HNBR O-rings. An FPM O-ring has to be fitted for special applications, such as media containing oil or high temperatures.

If your application is not listed in the tables, please contact VSH to find out whether the medium is suitable for use in combination with the type of press fitting you are using.

The O-rings in sizes 12 to 35 can be exchanged (stainless steel, galvanized steel and copper). For the sizes 42 and 54 mm, separate rings are available.

**EPDM 'Leak Before Pressed' (LBP) - Black****Temperature**

-20°C to +110°C  
For short periods at  
130°C

**Applications**

For all installations for potable water and treated water, hot water, circulation tubes, cooling, heating, etc.

**FPM 'Leak Before Pressed' (LBP) - Green****Temperature**

-20°C to +180°C  
For short periods at  
230°C

**Applications**

Installations for compressed air, fuel oil, vegetable oil, fuels, greases and industrial purposes, ozone-resistant (industrial design). Not suitable for hot water applications.

**HNBR 'Leak Before Pressed' (LBP) - Yellow****Temperature**

-20°C to +70°C

**Applications**

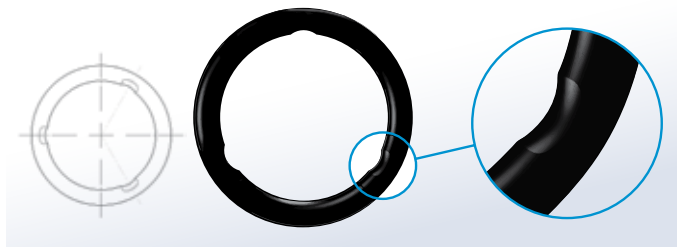
Installations for combustible gases: natural gases and liquid gases in accordance with Worksheet DVGW-G260 I/II. Installations for natural gas in accordance with Worksheet DVGW-G600 TRGI 86/96, and liquid gases in accordance with TRF (1996).

**VSH SudoPress Leak Before Pressed function**

VSH SudoPress Galvanized Steel, VSH SudoPress Stainless Steel and VSH SudoPress Copper fittings are delivered with a Leak Before Pressed (LBP) function. Fittings with a Leak Before Pressed function have the advantage that connections which have not been pressed will leak water during pressure testing. This means that an incomplete press connection can easily be identified. If correctly assembled, the press fittings will be water- and airtight after being pressed.

### How the VSH SudoPress LBP O-rings operate (12 to 54 mm)

The design of the VSH SudoPress LBP O-ring is based upon the creation of a leak path on the O-ring itself.



Small grooves have been created at three strategic points on the surface of the O-ring by removing material. As long as the fitting is not pressed, water will flow between these grooves. When the pressure is increased, the fitting will begin to leak. When pressed, the O-ring is deformed. As a result, the rubber from the raised surfaces fills the gaps between them, creating a fully water- and airtight connection.



#### Advantages

- Additional safety: any missed fittings will be identified, as the connection will leak until pressed.
- Easy: easy to recognize any non-pressed connections because of water leakage during the pressure test.
- Warranty: guaranteed water- and airtight once fitting has been pressed.

### 2.3.3 Alternative VSH SudoPress applications

The choice of fittings and tubes depends on what the purpose of the system is, the medium and the operating conditions. Please contact VSH regarding approval for the use of VSH SudoPress fittings for applications other than for water, compressed air and gas. Installations must comply with local regulations.

### 2.3.4 Electrical heat tracing

VSH SudoPress stainless steel, galvanized steel and copper may be used with electrical heat tracing in order to maintain the temperature of the piping. In the case of VSH SudoPress stainless steel, electrical heat tracing may be used to maintain the temperature of the piping provided the medium does not continuously exceed 60°C.

Thermal disinfection, e.g. temperatures of 70°C for short periods (max. 1 hour per day), is permitted. Sealed tubes must not be heated because of the danger posed by the excessive and inadmissible increase in pressure in the tubes.

### 2.3.5 (Main) Equipotential bonding in residential premises

All metal piping systems using equipotential bonding must comply with equipotential bonding requirements. Continuity checks must always be conducted by a qualified electrician in accordance with the regulations once the installation work has been finished. VSH SudoPress galvanized steel and stainless steel system tubes, and copper tubes that satisfy EN 1057 R250/R290 used in combination with the respective fittings provide guaranteed electrical continuity and, therefore, must be included in the equipotential bonding requirements. VSH SudoPress galvanized steel tube with polypropylene coating does not conduct electricity and therefore does not need to be included in the equipotential bonding checks.



## 2.4 Press tools

Press tools consist of a press machine and the corresponding press jaws or slings. The press machine can be either battery or electrically powered. The corresponding press jaws and slings must be used for each diameter of tube in the system in order to achieve a perfect connection.

All VSH SudoPress fittings with a diameter from 12 to 54 mm can be pressed using the appropriate press tools listed in our product range or tools approved by us. You must use the V-profile jaws or slings that correspond to the diameter to be installed. A special adaptor may also be required for diameters of 35 to 54 mm in addition to the press slings.

VSH SudoPress fittings from 66.7 mm can be pressed using the appropriate press tool listed in our product range or a tool approved by us. The M-profile slings must correspond to the diameter to be installed.

**ACO102**



**ACO202**



**ECO301**



**Note:** VSH SudoPress Gas press fittings may only be pressed with the press jaws/slings stated on the website and certificate.

### 2.4.1 Approved press tools for VSH SudoPress

Use the online tool selector to find the right tool for the right material.

Visit **[www.vsh.eu/presstool](http://www.vsh.eu/presstool)**.

### 2.4.2 Maintenance and correct usage of press tools

Correct pressing with the VSH SudoPress systems is guaranteed if the press tools are used correctly. Regular maintenance and lubrication of the press jaws, slings and tools is necessary. Please observe the manufacturer's instructions for use and maintenance.

Poor maintenance and/or damaged press jaws pose a potential risk. Damaged jaws can damage the fittings, leaving metal particles behind in the jaw as a result. If the same jaw is then used to press a stainless steel fitting, these metal particles will be pressed into the fitting, which could lead to pitting and further corrosion. Therefore, always make sure that press jaws and slings are properly cleaned when switching between materials. Press tools not mentioned in the online tool selector may be approved upon request.

## 2.5 Installation guidelines



FIGURE 1: CUTTING THE TUBE

### 2.5.1 Cutting the tube to length

After measuring, the VSH SudoPress tubes can be cut to length using a tube cutter, a fine-toothed handsaw or a mechanical saw with electrical motor suitable for the tube material. The tube must always be cut completely through. Never partially cut the tube and break it off as this could cause corrosion.

**Do not use oil-cooled saws, grinding wheels or flame cutters.**

## VSH SudoPress galvanized steel tubes with PP coating and coated copper tubes (Wicu)

To ensure the safe connection of a press fitting, the tube's PP coating must be removed using a stripper up to the insertion depth before assembling the press fitting. With Wicu copper tubes, a support sleeve must be used to maintain the rigidity of the press connection. Please note that when using white Liaan tube, the coating should not be removed; the tube should be pressed with the coating in place. This is the opposite of what is done with PP-coated tubes.



FIGURE 2: DEBURRING THE TUBE

### 2.5.2 Deburring the tube

The tube ends must be carefully and thoroughly deburred inside and out after being cut to length. This is necessary to avoid any damage to the O-ring when inserting the tube into the press fitting. Deburring the inside of tubes prevents pitting and corrosion. A hand deburrer suitable for the material or an electrical tube deburrer may be used to deburr both the inside and outside of the tube.

### 2.5.3 Calibration

Always ensure the tube ends are radial and evenly rounded-off. This particularly applies to copper tubes with a coating in accordance with DIN EN 1057/R220, such as Wicu tubes, the ends of which must be calibrated before pressing.



FIGURE 3: MARKING INSERTION DEPTH

### 2.5.4 Marking insertion depth

The required insertion depth (see Table 15) must be marked on the tube or the press fitting (the latter for fittings with tube ends) in order to guarantee a safe and proper joint.

Reliable pressing with the corresponding tensile strengths can only be achieved if the elements are correctly

installed. The pressing connection in front of and behind the bead is of crucial importance to the tensile strength. The marking on the tube must remain visible (but close to the fitting) after the connection is pressed to identify any movement before or after pressing.

### **2.5.5 Checking the fitting and tube**

Before assembly, the fitting must be checked to ensure that the O-rings are present and correctly positioned. The tube, fitting and O-ring must be examined for any foreign materials (e.g. dirt, burrs), which must be removed, if present.

### **2.5.6 Assembling the fitting and tube**

Insert the tube carefully into the press fitting up to the marked insertion depth, simultaneously rotating and pushing it in the direction of the axis. The insertion depth marking must remain visible. In the case of fittings without a stop, the fittings should be inserted at least as far as the marked insertion depth. Rough and careless insertion of the tube into the fitting may result in damage to the O-ring. This is therefore not permitted. If assembly is difficult because of the permitted tolerances in size, a lubricant such as water or soap may be used.

**Under no circumstances may oils, fats or grease be used as lubricants.**

To optimize the installation time, you can first assemble a number of connections and then press the various tube connections one after the other. Marking the distance (Fig. 4; A) enables you to check that the tube has not been pushed out of the fitting during the pressing process. Before starting the final pressing process of the various tube connections, it is also important to check the minimum required distances for the installation (see Table 15).

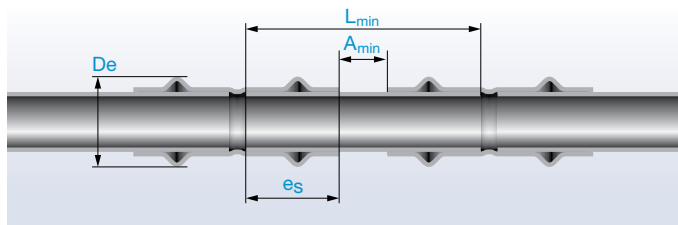


FIGURE 4

Dimension $\varnothing$ [mm]	O-ring size $D_e$ [mm]	Minimum fitting distance $A_{min}$ [mm]	Minimum tube length $L_{min}$ [mm]	Insertion depth $e_s$ [mm]
12	20	0	36*	18
15	23	0	44*	22
18	27	0	44*	22
22	32	0	46*	23
28	38	0	48*	24
35	45	25	75	25
42	54	30	102	36
54	66	35	117	41
66.7	83	30	130	50
76.1	95	55	165	55
88.9	110	65	191	63
108	133	80	234	77

\* When connecting two fittings directly to one another, it is essential to respect this minimal tube lengths.

TABLE 15: MINIMUM DISTANCE BETWEEN PRESSINGS

The tables below give the minimum required working space so that the fittings can be pressed correctly using the appropriate press tools. These distances relate to the general installation configurations that are schematically shown in Figures 5 and 6.

Ø [mm]	X [mm]	Y [mm]
12	31	60
15	31	62
18	31	65
22	31	69
28	31	72
35	31	76
42	75	115
54	85	120
66.7	110	145
76.1	110	140
88.9	120	150
108	140	170

Ø [mm]	X [mm]	Y1 [mm]	Y2 [mm]
12	35	44	69
15	35	44	71
18	35	44	73
22	35	44	77
28	35	44	81
35	35	44	86
42	75	75	115
54	85	85	120
66.7	100	100	145
76.1	115	115	165
88.9	125	125	185
108	135	135	200

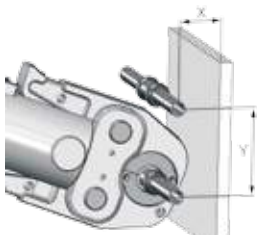


FIGURE 5: INSTALLATION AT A WALL

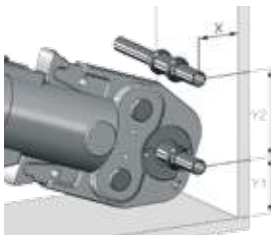


FIGURE 6: INSTALLATION AT A FLOOR

## 2.5.7 Pressing

Before starting to press, the press jaws and slings must be checked for dirt, which must be removed if present. Furthermore, the press tool must be in good condition and the manufacturer's operating and maintenance instructions for the device must be observed.



Make sure that you are using the correct press jaws and slings for the application. To create a correctly pressed connection, the groove of the press tool must enclose the head of the press fitting. Once the pressing has started, always complete the press cycle. Under no circumstances interrupt the process.

**It is not permitted to press a connection more than once.**

### Pressing gas installations

VSH SudoPress Copper Gas is suitable for gases of the second and third gas family (natural gas and liquid gases) in accordance with DVGW Worksheet G 260 and is installed inside buildings (with HTC\*) and outside buildings (without HTC\*). Connections to gas fittings and gas parts in brass, bronze, ductile grey cast iron and die-cast aluminum may be connected with gas thread/press fittings or flanges. If renovations or repairs are being carried out, make sure the tubes are in accordance with the DIN-EN/DVGW standards, have perfect, undamaged outer surfaces and have not been painted. VSH SudoPress Copper Gas is certified by Gastec.

Local regulations (e.g. DVGW TRGI 2008) must be observed at all times.

1. Gas tubes and fittings should be marked yellow to avoid confusion.
2. Tubes must be protected during construction against mechanical damage.
3. Carry out tests according to G1 Gas Guidelines (e.g. check covered tubes).
4. When laid under screed (above the reinforcement), place in concrete slots.
5. Operating temperature: -20°C to +70°C.

\* Higher Thermal Capacity



### 2.5.8 Visu-Control® (up to 54 mm)

Every pressed connection is easy to recognize by the installer thanks to Visu-Control® technology (a plastic ring at the end of the fitting). Visual check a plastic ring forms during pressing, causing two visible 'ears' to appear. The tangible check: a recyclable ring secured during transport can be easily removed from the fitting after pressing.

### 2.5.9 Bending the tube

It may be necessary to bend a tube in order to carry out the installation. Normal hand, hydraulic or electrically-operated pipe benders with the corresponding bend formers can be used for this. The manufacturer will determine the suitability of the bending tool. VSH SudoPress stainless steel, galvanized steel and copper tubes may be bent cold in accordance with DIN EN 1057.

**The tube may not be bent when warm due to the danger of corrosion.**

**The smallest bending radius is calculated as follows:**

Stainless steel (15-28 mm)

$$r_{\min} = 3.5 \times d$$

Galvanized steel (12-28 mm)

$$r_{\min} = 3.5 \times d$$

Copper tubes (12 - 54 mm)

$$r_{\min} = 3.5 \times d$$

in accordance with EN 1057 and DVGW-GW 392

**A smaller bend radius is not permitted.**



### 2.5.10 Mixed metal installation

VSH SudoPress stainless steel fittings and tubes can easily be combined with accessories and fittings in stainless steel and non-ferrous metals. However, connections with hot-dip galvanized steel, galvanized steel or other non-stainless steel fittings or accessories can give rise to galvanic corrosion. This can be prevented by using synthetic or non-ferrous metal fittings or spacers that are at least 50 mm long (DIN 1988 - Part 7). For more information on corrosion, see 2.8. Table 16 shows the possible combinations. The combinations given below are valid only when the connections are made using a mechanical connection that can be dismantled (e.g. threaded or grooved connection).

Tube type	System	VSH SudoPress fittings			
		Copper	Bronze/brass	Galvanized steel	Stainless steel
Copper	Closed	Compatible	Compatible	Compatible	Compatible
	Open	Compatible	Compatible	Not compatible	Compatible
Galvanized steel	Closed	Compatible	Compatible	Compatible	Compatible
	Open	Not compatible	Not compatible	Not compatible	Not compatible
Stainless steel	Closed	Compatible	Compatible	Compatible	Compatible
	Open	Compatible	Compatible	Not compatible	Compatible

TABLE 16

We recommend using bronze or brass fittings for the transition from copper/stainless steel to steel, such as the bronze joint transition fittings that come with VSH SudoPress Copper. Combinations must be avoided in the case of gas installations (see 2.5.7, Pressing gas installations).

## 2.6 General installation information

### 2.6.1 Thermal expansion (in the piping system)

The level of thermal expansion within piping systems depends on the type of materials used. This linear expansion needs to be taken into account during the installation. Small changes in length can be accommodated by calculating adequate space for expansion as well as through the elastic properties of the pipework system itself. More substantial changes in length need to be offset by other methods, e.g. installation of special expansion compensation devices, fixed anchoring points and brackets. Expansion can be offset by the use of a tube segment (Figure 7) or a  $\Omega$ -bend (Figure 9). The level of expansion to be offset can be determined beforehand by calculating the changes in length.



FIGURE 7



FIGURE 8



FIGURE 9

The equation for calculating the changes in length is as follows:

$$\Delta l = l \times \alpha \times \Delta T$$

- $\Delta l$  = total linear expansion [mm]
- $l$  = length of the segment in question [m]
- $\Delta T$  = temperature difference [K]
- $\alpha$  = linear expansion coefficient, where: for VSH SudoPress stainless steel tube 1.4401  $\alpha = 0.0165$  mm/mK for VSH SudoPress stainless steel tube 1.4520/1.4521  $\alpha = 0.0104$  mm/mK for VSH SudoPress galvanized steel tube  $\alpha = 0.0108$  mm/mK for copper tube  $\alpha = 0.0170$  mm/mK

Tables 17-19 show the expansion of the various pipelines depending on the length of the tube and the rise in temperature.

l [m]	$\Delta T$ [K]									
	10	20	30	40	50	60	70	80	90	100
1	0.17	0.33	0.50	0.66	0.83	0.99	1.16	1.32	1.49	1.65
2	0.33	0.66	0.99	1.32	1.65	1.98	2.31	2.64	2.97	3.30
3	0.50	0.99	1.49	1.98	2.48	2.97	3.47	3.96	4.46	4.95
4	0.66	1.32	1.98	2.64	3.30	3.96	4.62	5.28	5.94	6.60
5	0.83	1.65	2.48	3.30	4.13	4.95	5.78	6.60	7.43	8.25
6	0.99	1.98	2.97	3.96	4.95	5.94	6.93	7.92	8.91	9.90
7	1.16	2.31	3.47	4.62	5.78	6.93	8.09	9.24	10.40	11.55
8	1.32	2.64	3.96	5.28	6.60	7.92	9.24	10.56	11.88	13.20
9	1.49	2.97	4.46	5.94	7.43	8.91	10.40	11.88	13.37	14.85
10	1.65	3.30	4.95	6.60	8.25	9.90	11.55	13.20	14.85	16.50
12	1.98	3.96	5.94	7.92	9.90	11.88	13.86	15.84	17.82	19.80
14	2.31	4.62	6.93	9.24	11.55	13.86	16.17	18.48	20.79	23.10
16	2.64	5.28	7.92	10.56	13.20	15.84	18.48	21.12	23.76	26.40
18	2.97	5.94	8.91	11.88	14.85	17.82	20.79	23.76	26.73	29.70
20	3.30	6.60	9.90	13.20	16.50	19.80	23.10	26.40	29.70	33.00

TABLE 17: TOTAL LINEAR EXPANSION  $\Delta l$  [mm] ONLY FOR STAINLESS STEEL 1.4401

l [m]	$\Delta T$ [K]									
	10	20	30	40	50	60	70	80	90	100
1	0.11	0.22	0.32	0.43	0.54	0.65	0.76	0.86	0.97	1.08
2	0.22	0.43	0.65	0.86	1.08	1.30	1.51	1.73	1.94	2.16
3	0.32	0.65	0.97	1.30	1.62	1.94	2.27	2.59	2.92	3.24
4	0.43	0.86	1.30	1.73	2.16	2.59	3.02	3.46	3.89	4.32
5	0.54	1.08	1.62	2.16	2.70	3.24	3.78	4.32	4.86	5.40
6	0.65	1.30	1.94	2.59	3.24	3.89	4.54	5.18	5.83	6.48
7	0.76	1.51	2.27	3.02	3.78	4.54	5.29	6.05	6.80	7.56
8	0.86	1.73	2.59	3.46	4.32	5.18	6.05	6.91	7.78	8.64
9	0.97	1.94	2.92	3.89	4.86	5.83	6.80	7.78	8.75	9.72
10	1.08	2.16	3.24	4.32	5.40	6.48	7.56	8.64	9.72	10.80
12	1.30	2.59	3.89	5.18	6.48	7.78	9.07	10.37	11.66	12.96
14	1.51	3.02	4.54	6.05	7.56	9.07	10.58	12.10	13.61	15.12
16	1.73	3.46	5.18	6.91	8.64	10.37	12.10	13.82	15.55	17.28
18	1.94	3.89	5.83	7.78	9.72	11.66	13.61	15.55	17.50	19.44
20	2.16	4.32	6.48	8.64	10.80	12.96	15.12	17.28	19.44	21.60

TABLE 18: TOTAL LINEAR EXPANSION  $\Delta l$  [mm] ONLY FOR GALVANIZED STEEL

l [m]	$\Delta T$ [K]									
	10	20	30	40	50	60	70	80	90	100
1	0.17	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70
2	0.34	0.68	1.02	1.36	1.70	2.04	2.38	2.72	3.06	3.40
3	0.51	1.02	1.53	2.04	2.55	3.06	3.57	4.08	4.59	5.10
4	0.68	1.36	2.04	2.72	3.40	4.08	4.76	5.44	6.12	6.80
5	0.85	1.70	2.55	3.40	4.25	5.10	5.95	6.80	7.65	8.50
6	1.02	2.04	3.06	4.08	5.10	6.12	7.14	8.16	9.18	10.20
7	1.19	2.38	3.57	4.76	5.95	7.14	8.33	9.52	10.71	11.90
8	1.36	2.72	4.08	5.44	6.80	8.16	9.52	10.88	12.24	13.60
9	1.53	3.06	4.59	6.12	7.65	9.18	10.71	12.24	13.77	15.30
10	1.70	3.40	5.10	6.80	8.50	10.20	11.90	13.60	15.30	17.00
12	2.04	4.08	6.12	8.16	10.20	12.24	14.28	16.32	18.36	20.40
14	2.38	4.76	7.14	9.52	11.90	14.28	16.66	19.04	21.42	23.80
16	2.72	5.44	8.16	10.88	13.60	16.32	19.04	21.76	24.48	27.20
18	3.06	6.12	9.18	12.24	15.30	18.36	21.42	24.48	27.54	30.60
20	3.40	6.80	10.20	13.60	17.00	20.40	23.80	27.20	30.60	34.00

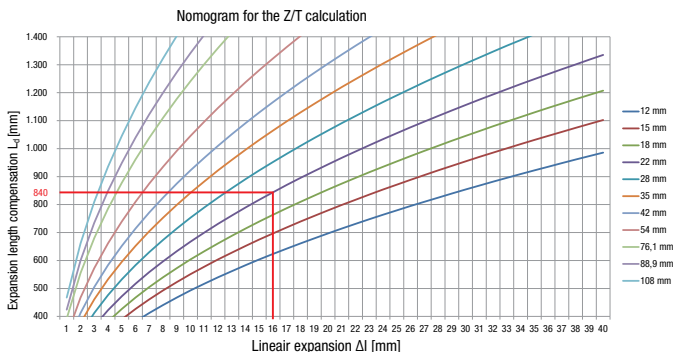
TABLE 19: TOTAL LINEAR EXPANSION  $\Delta l$  [mm] ONLY FOR COPPER

## Calculation of the expansion length to be allowed for

In the case of major expansion, expansion compensators or, in complex cases,  $\Omega$ -shaped compensation loops will need to be determined and fitted. The compensation is calculated in mm using the following formula:

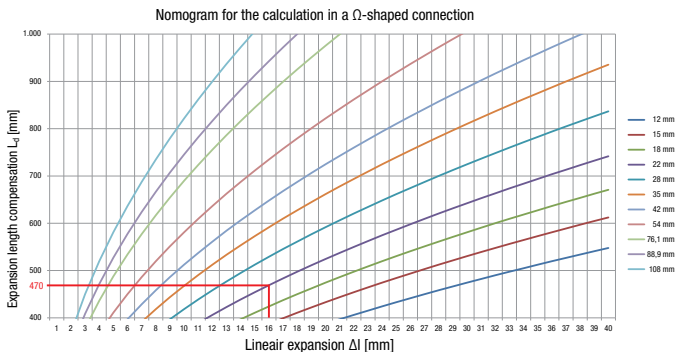
$$B_d = k \times \sqrt{d_e \times \Delta l}$$

- $B_d$  = expansion length to be allowed for  
 $k$  = material constant  
 = 45 for stainless steel and galvanized steel  
 = 35 for copper tubes  
 $d_e$  = external diameter of the tube [mm]  
 $\Delta l$  = linear expansion that needs to be compensated [mm]



GRAPH 1: NOMOGRAM (FOR VSH SUDOPRESS STAINLESS STEEL) FOR CALCULATING THE SITUATIONS IN FIGURES 7 AND 8. EXPANSION  $B_d$  [MM]

The nomogram in Graph 1 enables the expansion bend length [ $B_d$ ] to be rapidly and accurately determined by taking account of the respective tube types and the expansion to be compensated [ $\Delta l$ ]. Graph 2 shows the values [ $L_b$ ] for the installation situation illustrated in Figure 9.



GRAPH 2: NOMOGRAM (FOR VSH SUDOPRESS STAINLESS STEEL) FOR CALCULATING THE SITUATIONS IN FIGURE 9. COMPENSATOR  $L_b$  [MM]

The following is an example of an analytical calculation: A tube network with a length of 16 m, consisting of stainless steel tubes with a diameter of 22 mm subject to a temperature difference of 60 K. If we use the equation for calculating the expansion, the result is:

$$\Delta l = 16 \times 0.0165 \times 60 = 15.84 \text{ mm}$$

The same result would be achieved through the (possible) interpolation of the data in Table 17 without having to perform the calculation. In addition to the expansion for the respective section of the pipeline, the length of the requisite expansion compensator needs to be calculated - see Figures 7 and 8. Using the nomogram in Graph 1, this results in a length of approx. 840 mm. The analytical calculation gives the following result:

$$B_d = 45 \times \sqrt{(22 \times 15.84)} = 840 \text{ mm}$$

In the case of an  $\Omega$ -shaped expansion connection, the calculated value of an expansion equalizer as in Figure 9 has to be halved, as it is actually two expansion sections. The value [Bd] does not have to be divided exactly by two, but should be divided by a factor of 1.8:

$$L_b = 25 \times \sqrt{(22 \times 15.84)} = 466.7 \text{ mm}$$

or:

$$L_b = B_d / 1.8 = 840 / 1.8 = 466.7 \text{ mm}$$

Graph 2 shows a value for  $L_b$  of approx. 470 mm.

As can be seen clearly in Figures 7-9, the correct compensation of the expansion also depends on the placement of fixing devices, such as brackets and anchoring points. Never plan to or actually place fixed tube mounting clips close to a tube connection. The clips should be positioned so that they do not act as a fixed restraint. When there are straight segments of tube, without expansion compensation, use only one saddle clip to prevent possible deformation. Place this saddle clip as close as possible to the middle of the straight segment. In this way, any expansion will be distributed in both directions and the length of the expansion equalizer required will be halved.

It is recommended that tube clips with a rubber inlay be used as this will muffle any possible noise and vibrations and better distribute stresses.

### 2.6.2 Pressure drop

Every fluid that flows through a piping system experiences continuous and local flow resistances, known as pressure drops. There is a difference between the continuous and the local pressure drop. A continuous pressure drop is mainly caused by the flow resistance in straight tube sections, which essentially is a result of the friction between the fluid and the tube wall. Local pressure drops, on the contrary, are those flow resistances that are created by, for instance, a change in the internal tube diameter, a tube branch, an elbow, etc.

#### Continuous pressure drop

To calculate the resistance of a fluid flow in a straight section of a piping system, first determine the resistance in a unit of length and then multiply the total length by this value. This value can be determined analytically using the Hazen-Williams formula.

$$p = \frac{6.05 \times 10^5}{C^{1.85} \times d_i^{4.87}} \times Q^{1.85}$$

- p** = pressure drop in the tube [bar/m]
- Q** = flow through the tube [l/min]
- d<sub>i</sub>** = mean internal diameter of the tube [mm]
- C** = constant for type and condition of the tube  
= 140 for VSH SudoPress Stainless Steel and Galvanized Steel

If you wish to perform these calculations, please consult the relevant specialized literature. For the normal installation calculations, the appropriate diagrams such as those given in Figure 10 can be used to solve this problem. The unit drop [R] and the flow velocity [m/s] for a given water flow rate can be determined simply and quickly in this way.



Once [R] and the actual or equivalent length of the tubing system are known, the total pressure drop over the particular segment can be calculated. Figure 11 gives the values that apply to water with a temperature of 80°C. It can be seen that [R] changes with temperature and, as such, a correction is needed. Graphs can be prepared for the different operating temperatures and various velocity ranges.

In addition to the temperature, water additives e.g. anti-freeze, will affect the value [R] and will need to be corrected accordingly. It would be too complex to use several diagrams to perform a calculation for each temperature. That is why the nomogram in Figure 11 can be used. It gives the correction factor [Kc] that needs to be applied to [R] for the actual temperature of the fluids.

The following example explains the use of the nomogram. If we assume a flow rate of 700 l/h for a tube of 22 x 1.2 mm, the value of R is 27 WS/m ( $\pm$  270 Pa/m) for a temperature of 80°C. Imagine that we want to calculate the value of [R] for a water temperature of 40°C. We must first find the value of [R] for this temperature and then multiply that value by the correction factor [Kc] for a temperature of 40°C.

$$R = (27/0.82) \times 0.89 = 29.3 \text{ mm WS/m [293 Pa/m]}$$

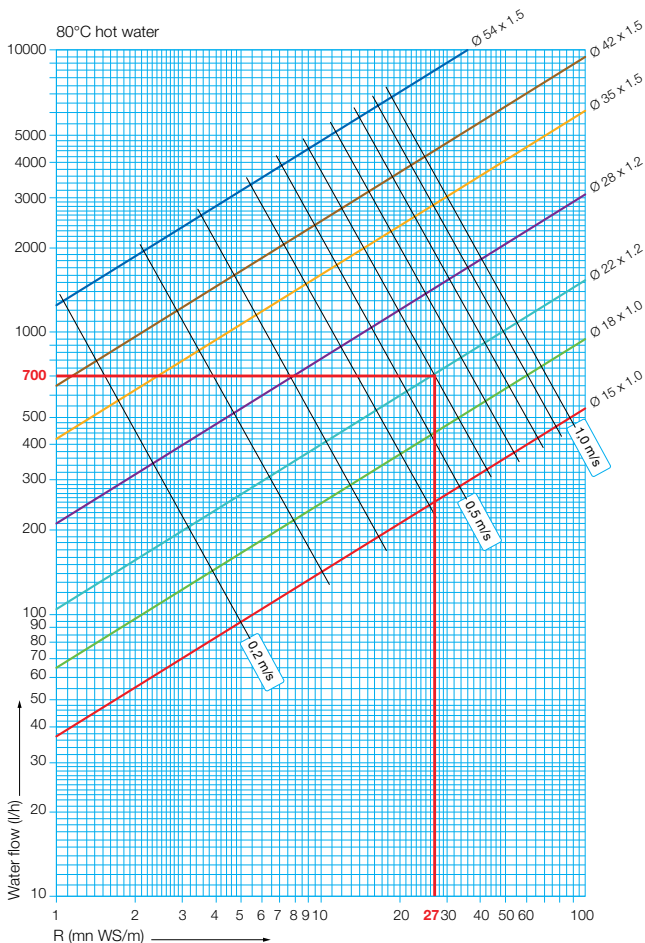


FIGURE 10 NOMOGRAM OF PRESSURE DROP AT 80°C

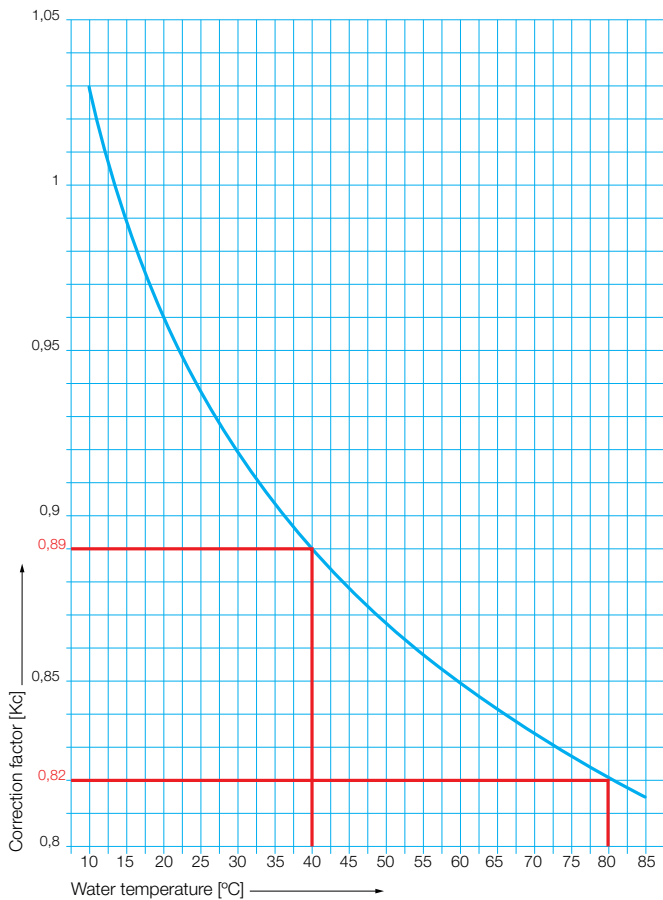


FIGURE 11 DETERMINING THE CORRECTION FACTOR AT OTHER WATER TEMPERATURES

### Local pressure drops

A local pressure drop is, as mentioned at the start of this section, the resistance to flow that results from changes in the flow direction and cross-sectional area, flow splitting over several channels, etc. There are, in general, two ways of calculating such flow resistances: the direct analytical method and the method that uses 'equivalent lengths'.

### Equivalent length method

This method assumes that the pressure drop at a particular point can be considered to be the same as an equivalent increase in the length of a straight tubing system with the same internal diameter. The final result is a pressure drop that is equal to the real pressure drop. In other words, the actual length of the tubing system is added to all the equivalent lengths of the individual joints (from Table 20). The actual length is then multiplied by the pressure drop per unit-length [R] in order to be able to calculate the total pressure drop of the system. This method is not as accurate as the direct method but has the advantage that the calculation can be carried out faster.

$\zeta$ Direct analytical method / equivalent length method (m)															
$\varnothing$	DN	90°		45°		T		T		R		R		R	
		$\zeta$	(m)	$\zeta$	(m)	$\zeta$	(m)	$\zeta$	(m)	$\zeta$	(m)	$\zeta$	(m)	$\zeta$	(m)
15	12	1.02	0.49	0.69	0.33	0.40	0.19	1.13	0.55	0.36	0.17	0.52	0.25	0.64	0.31
18	15	0.93	0.58	0.77	0.48	0.50	0.32	1.41	0.89	0.46	0.29	1.06	0.67	0.96	0.60
22	20	0.44	0.35	0.38	0.30	0.15	0.12	1.05	0.84	0.11	0.08	0.73	0.59	1.29	1.04
28	25	0.35	0.38	0.28	0.32	0.13	0.28	0.93	1.01	0.05	0.06	0.65	0.72	0.82	0.92
35	32	0.31	0.43	0.29	0.40	0.08	0.11	0.93	1.34	0.03	0.04	0.53	0.79	1.47	2.19
42	40	0.25	0.48	0.22	0.42	0.11	0.20	1.20	2.27	0.06	0.11	0.46	0.85	-	-
54	50	0.30	0.79	0.19	0.49	0.09	0.24	1.15	3.06	0.06	0.14	0.36	1.43	-	-
76.1	65	0.25	1.04	0.15	0.62	0.08	0.31	1.07	4.42	0.04	0.17	0.32	1.68	-	-
88.9	80	0.24	1.22	0.13	0.66	0.07	0.36	1.06	5.38	0.04	0.20	0.27	2.10	-	-
108	100	0.23	1.51	0.12	0.76	0.07	0.43	1.05	6.90	0.03	0.20	-	-	-	-

TABLE 20: EQUIVALENT LENGTHS AND VALUES OF LOCAL PRESSURE DROPS

### Direct analytical method

The local pressure drop can be calculated using the following equation:

$$\Delta p_L = \sum \zeta \times v^2 \times \gamma / 2 \times 10^{-5} \text{ [bar]}$$

- $v$  = flow rate of the fluid [m/s]
- $\gamma$  = specific density of the fluid [kg/m<sup>3</sup>]
- $\zeta$  = local flow resistance coefficient

Table 14 gives the  $[\zeta]$  values for each type of fitting. We can assume that  $[\zeta]$  is velocity-independent for those velocities that occur in domestic installations or other normal applications; this is supported by the fact that the change in  $[\zeta]$  as a function of the Reynolds number in these velocity ranges is only minimal. Once the  $[\zeta]$  value is known, you can read the corresponding local pressure drop off directly.

### 2.6.3 Heat losses

Just as with all other types of tubes made from metal or synthetic materials, adequate measures must be taken with VSH SudoPress tubes to limit heat losses. Please consult the relevant regulations on minimum insulation thicknesses and the insulation standards.

Figures 12, 13, 14 and 15 show the linear heat losses of the tubes according to their diameter and temperature difference. The temperature difference is the difference between the temperature of the liquid inside the tubing system and the surrounding air temperature. This applies to uninsulated tubing that is laid against the walls or partitions of the building.

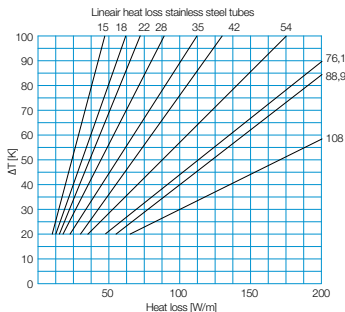


FIGURE 12

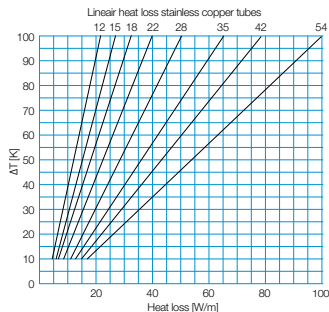


FIGURE 13

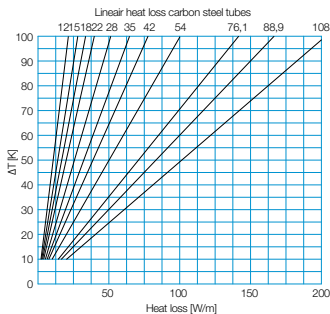


FIGURE 14

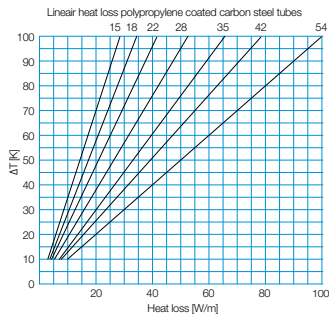


FIGURE 15

### 2.6.4 VSH SudoPress tubes

Table 21 on the following pages gives the friction loss  $R$  in the tube as a function of the flow rate  $Q$  and the flow velocity at a temperature of  $10^{\circ}\text{C}$  for VSH SudoPress stainless steel tubes in accordance with DVGW - Worksheet GW 541 (2004), Series 2, with a wall roughness  $[k]$  of  $0.0015\text{ mm}$ . The tables for VSH SudoPress galvanized steel and copper tubes, as well as the tables for other situations (for example other temperatures or other applications), are available from VSH or can be downloaded from [www.vsh.nl/sudopress](http://www.vsh.nl/sudopress).

Maximum flow rate Qs [l/s]	15 x 1.0 mm		18 x 1.0 mm		22 x 1.2 mm		28 x 1.2 mm	
	R [mbar/m]	v [m/s]	R [mbar/m]	v [m/s]	R [mbar/m]	v [m/s]	R [mbar/m]	v [m/s]
0.05	2.2	0.4	0.8	0.2	0.3	0.2	0.1	0.1
0.10	7.3	0.8	2.7	0.5	1.0	0.3	0.3	0.2
0.15	14.8	1.1	5.5	0.7	1.9	0.5	0.7	0.3
0.20	24.5	1.5	9.1	1.0	3.3	0.6	1.1	0.4
0.25	36.2	1.9	13.5	1.2	4.8	0.8	1.6	0.5
0.30	49.9	2.3	18.5	1.6	6.5	1.0	2.1	0.6
0.35	65.8	2.8	24.3	1.7	8.6	1.1	2.8	0.7
0.40	83.1	3.0	30.8	2.0	10.8	1.3	3.5	0.8
0.45	102.4	3.4	37.9	2.2	13.4	1.4	4.4	0.9
0.50	123.8	3.8	45.7	2.5	16.0	1.5	5.3	1.0
0.55	146.5	4.1	54.1	2.7	19.0	1.8	6.2	1.1
0.60	171.1	4.5	63.2	3.0	22.2	1.9	7.3	1.2
0.65	197.5	4.9	72.9	3.2	25.5	2.1	8.3	1.3
0.70	225.5	5.3	83.2	3.5	29.1	2.2	9.5	1.4
0.75			94.1	3.7	33.0	2.4	10.8	1.5
0.80			105.6	4.0	37.0	2.5	12.0	1.6
0.85			117.6	4.2	41.2	2.7	13.5	1.7
0.90			130.3	4.5	45.6	2.9	14.8	1.8
0.95			143.6	4.7	50.3	3.0	15.4	1.9
1.00			157.4	5.0	55.1	3.2	17.9	2.0
1.05					60.1	3.3	19.6	2.1
1.10					65.3	3.5	21.2	2.2
1.15					70.7	3.7	23.0	2.3
1.20					76.3	3.8	24.8	2.4
1.25					82.1	4.0	26.7	2.5
1.30					86.1	4.1	28.6	2.6
1.35					94.2	4.3	30.7	2.8
1.40					100.8	4.5	32.7	2.9
1.45					107.1	4.6	34.8	3.0
1.50					113.9	4.8	37.0	3.1
1.55					120.8	4.9	39.2	3.2
1.60					127.9	5.1	41.5	3.3
1.65							43.8	3.4

Maximum flow rate Qs [l/s]	15 x 1.0 mm		18 x 1.0 mm		22 x 1.2 mm		28 x 1.2 mm	
	R [mbar/m]	v [m/s]	R [mbar/m]	v [m/s]	R [mbar/m]	v [m/s]	R [mbar/m]	v [m/s]
1.70							46.3	3.5
1.75							48.7	3.6
1.80							51.2	3.7
1.85							53.8	3.8
1.90							56.5	3.9
1.95							59.3	4.0
2.00							62.0	4.1
2.05							64.8	4.2
2.10							67.6	4.3
2.15							70.5	4.4
2.20							73.5	4.5
2.25							76.5	4.6
2.30							79.6	4.7
2.35							82.8	4.8
2.40							86.0	4.9

Maximum flow rate Qs [l/s]	35 x 1.5 mm		42 x 1.5 mm		54 x 1.5 mm	
	R [mbar/m]	v [m/s]	R [mbar/m]	v [m/s]	R [mbar/m]	v [m/s]
0.2	0.3	0.2	0.1	0.2	0.0	0.1
0.4	1.1	0.5	0.4	0.3	0.1	0.2
0.6	2.3	0.7	0.9	0.5	0.3	0.3
0.8	3.8	1.0	1.5	0.7	0.5	0.4
1.0	5.7	1.2	2.2	0.8	0.7	0.5
1.2	7.8	1.5	3.1	1.0	0.9	0.6
1.4	10.3	1.7	4.0	1.2	1.2	0.7
1.6	13.1	2.0	5.1	1.3	1.6	0.8
1.8	16.2	2.2	6.3	1.5	1.9	0.9
2.0	19.5	2.5	7.6	1.7	2.3	1.0
2.2	23.1	2.7	9.0	1.8	2.6	1.1
2.4	27.0	3.0	10.5	2.0	3.1	1.2
2.6	31.2	3.2	12.1	2.2	3.6	1.3
2.8	35.7	3.5	13.8	2.3	4.1	1.4
3.0	40.4	3.7	15.6	2.5	4.6	1.5



Maximum flow rate Qs [l/s]	35 x 1.5 mm		42 x 1.5 mm		54 x 1.5 mm	
	R [mbar/m]	v [m/s]	R [mbar/m]	v [m/s]	R [mbar/m]	v [m/s]
3.2	45.3	4.0	17.5	2.7	5.2	1.6
3.4	50.6	4.2	19.5	2.8	5.8	1.7
3.6	56.1	4.5	21.6	3.0	6.5	1.8
3.8	61.8	4.7	23.8	3.2	7.1	1.9
4.0	67.8	5.0	26.2	3.3	7.7	2.0
4.2	74.1	5.2	28.6	3.5	8.4	2.1
4.4			31.0	3.7	9.2	2.2
4.6			33.6	3.9	10.0	2.3
4.8			36.3	4.0	10.8	2.4
5.0			39.1	4.2	11.6	2.5
5.2			42.0	4.4	12.5	2.6
5.4			44.9	4.5	13.3	2.8
5.6			48.0	4.7	14.2	2.9
5.8			51.1	4.9	15.0	3.0
6.0			54.4	5.0	16.1	3.1
6.2					17.1	3.2
6.4					18.0	3.3
6.6					19.1	3.4
6.8					20.2	3.5
7.0					21.3	3.6
7.2					22.3	3.7
7.4					23.5	3.8
7.6					24.7	3.9
7.8					25.9	4.0
8.0					27.0	4.1
8.2					28.3	4.2
9.0					33.5	4.6
10.0					40.6	5.1

Maximum flow rate Qs [l/s]	76.1 x 2.0 mm		88.9 x 2.0 mm		108 x 2.0 mm	
	R [mbar/m]	v [m/s]	R [mbar/m]	v [m/s]	R [mbar/m]	v [m/s]
1	0.1	0.2	0.1	0.2	0.0	0.1
2	0.4	0.5	0.2	0.4	0.1	0.2
3	0.8	0.7	0.4	0.5	0.1	0.4
4	1.4	1.0	0.6	0.7	0.2	0.5
5	2.0	1.2	0.9	0.9	0.4	0.6
6	2.8	1.5	1.3	1.1	0.5	0.7
7	3.7	1.7	1.7	1.2	0.6	0.8
8	4.7	2.0	2.2	1.4	0.8	0.9
9	5.9	2.2	2.7	1.6	1.0	1.1
10	7.1	2.5	3.2	1.8	1.2	1.2
11	8.4	2.7	3.8	1.9	1.4	1.3
12	9.9	2.9	4.5	2.1	1.7	1.4
13	11.4	3.2	5.2	2.3	2.0	1.5
14	13.0	3.4	5.9	2.5	2.2	1.7
15	14.8	3.7	6.7	2.7	2.5	1.8
16	16.6	3.9	7.5	2.8	2.8	1.9
17	18.5	4.2	8.4	3.0	3.2	2.0
18	20.6	4.4	9.3	3.2	3.5	2.1
19	22.7	4.7	10.3	3.4	3.9	2.2
20	24.9	4.9	11.3	3.5	4.3	2.4
21	27.2	5.1	12.4	3.7	4.6	2.5
22			13.4	3.9	5.1	2.6
23			14.6	4.1	5.5	2.7
24			15.7	4.2	5.9	2.8
25			17.0	4.4	6.4	3.0
26			18.2	4.6	6.8	3.1
27			19.6	4.8	7.3	3.2
28			20.9	5.0	7.8	3.3
29			22.2	5.1	8.4	3.4
30					8.9	3.5
31					9.5	3.7
32					10.0	3.8
33					10.6	3.9

Maximum flow rate Qs [l/s]	76.1 x 2.0 mm		88.9 x 2.0 mm		108 x 2.0 mm	
	R [mbar/m]	v [m/s]	R [mbar/m]	v [m/s]	R [mbar/m]	v [m/s]
34					11.1	4.0
35					12.3	4.2
36					12.9	4.3
37					13.6	4.4
38					14.3	4.6
39					15.0	4.7
40					15.7	4.8
41					16.4	4.9
42					17.1	5.0
43					17.9	5.2

TABLE 21: FRICTION COEFFICIENTS (ONLY FOR STAINLESS STEEL TUBES)

## 2.7 Recessed/buried tubing

### 2.7.1. Recommendations

For aesthetic and practical reasons it is rare that tubes are installed uncovered other than in spaces such as cellars and garages. Several precautionary measures, depicted in Figures 16 and 17, are necessary if tubes are to be built in/recessed in walls or floors. The following systems can be built in/recessed:

- VSH SudoPress Stainless Steel without corrosion protection\*
- VSH SudoPress Galvanized Steel with a polypropylene coating (fittings must be protected against corrosion)
- VSH SudoPress Copper with corrosion protection (e.g. coated/protective sleeve)
- VSH SudoPress Copper Gas with corrosion protection (e.g. coated/protective sleeve)

**Important:** tubes for water that are built in (e.g. walls or floors) must always have a suitable coating/sleeve made from a suitable material in order to ensure that there is no contact between the tube and the building structure (e.g. in connection with noise issues).



FIGURE 16

### Installation in a wall

Figure 16 shows a cross-section of a tube installed inside a wall. The tubes and fittings have to be wrapped by an elastic and pliable coating that separates the installation completely from the building so that there is no direct contact. Insulation materials as set out in DIN 1988 are a good solution here. They also provide heat insulation.

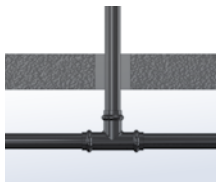


FIGURE 17

### Installation in a floor or sprung floor

Similarly for tubes installed inside floors, even sprung floors, the horizontal stretches must be isolated by a protective sleeve such as shown in Figure 17. An adequate elastic sleeve must be used where the tube exits the floor so that the tube does not come into contact with the cement, should the tube expand.

Figure 18 shows a classical situation of branching from the outside riser to a point in the building. In such a case, you must make sure that the Tee is not subjected to any stresses as a result of a change in the direction of the axis of the fitting. In this context, the mounting brackets, as fixed mounting points and clips, are therefore very important. Tubes and fittings, in all installations, should always as a general rule be enclosed in a soft material in order to allow for expansion. We must emphasize once again that great care must be taken when selecting insulation materials for stainless steel tubes and materials for surrounding such tubes so as to ensure that they do not ever allow any chloride ions to come into contact with the tubes. In the case of copper, harmful substances from the environment, such as ammonia or nitrates, must be prevented from penetrating the insulating material.

## Guidelines for distances of mounting brackets

Ø tube diameter [mm]	Max. distance [m]
12 x 1.0	1.00
15 x 1.0	1.25
18 x 1.0	1.50
22 x 1.2	2.00
28 x 1.2	2.25
35 x 1.5	2.75
42 x 1.5	3.00
54 x 1.5	3.50
66.7 x 1.5	4.25
76.1 x 2.0	4.25
88.9 x 2.0	4.75
108 x 2.0	5.00

TABLE 22: DISTANCE BETWEEN SUPPORT BRACKETS IN ACCORDANCE WITH DIN 1988 - PART 200

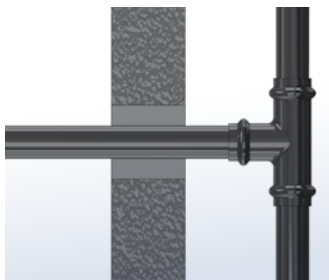


FIGURE 18

Observance of the above distances between attachment points is not sufficient in itself. Heat expansion also needs to be appropriately compensated for in horizontal stretches and, therefore, the distances above may need to be adjusted.

### 2.7.2 Mounting tubes

When securing the tubes, you must take account of the following: The load-bearing capacity of the mounting brackets must correspond to the weight of the tubes and also withstand expansion and torsion forces. Mounting brackets, such as fixed mounting points and clips, must therefore be correctly placed and assembled. Attachment points may only be fitted onto straight tube sections. Mounting directly onto fittings is not allowed.

### 2.7.3 Pressure test

As soon as a tubing system has been installed, it must be checked for leaks before being covered up and concealed. With potable water and heating installations, the pressure test can be carried out with water, air or inert gases. The test medium and the results of the pressure test must be documented in a so-called pressure test report.

**Important:** For VSH SudoPress tubes, a pressure test of the tubing system must be carried out in all cases. A tubing system must first undergo a pressure test in order to be certain that there are no leaks. Before being covered up, insulated, painted or walled in. Pressure tests must always be performed in accordance with local regulations. As a rule of thumb, a pressure of 1.5 times the operating pressure is used for pressure tests with water.

**Important:** When testing a VSH SudoPress Galvanized Steel installation, make sure that no water remains in the system afterwards in order to avoid the risk of corrosion, unless the system is going to be put into service shortly afterwards.

#### **Pressure test of potable water systems**

**Important:** The pressure test with water of potable water tubing that has already been laid is performed in accordance with the ZVSHK/BHKS technical bulletins.

The medium used for the pressure test with water must be of potable water quality (free of oil and other impurities) in order to avoid any contamination of the piping system. After being filled with pure water, the pipe must be properly bled.

#### **Pressure test with air**

**Important:** The pressure test with air or inert gases can be carried out in accordance with the ZVSHK/BHKS technical bulletins, Pressure test with air or inert gases (at 100 l tube capacity carry out a leak tightness test at 110 mbar for at least 30 minutes. For every additional 100 l, the time must be increased by 10 minutes. After the leak tightness test, the strength of the connection should be tested during 10 minutes at a maximum of 3 bar up to DN50, maximum of 1 bar >DN50). For safety reasons, the maximum test pressure is set at 3 bar. This maximum test pressure applies also for gas piping.

### **Pressure test for heating systems and cooling systems**

**Important:** As a rule, the pressure test for tubing that has already been laid is carried out with water in accordance with DIN-VOB 18380.

- The test pressure at each point of the system must be 1.3 times the operating pressure and at least 1 bar overpressure.
- Immediately after the cold water pressure test, the water must be heated up to the highest hot water temperature on which the calculations were based in order to be certain that the system remains water tight at high temperatures.
- During the test there must be no drop in pressure.
- The pressure test must be adequately documented.

### **Pressure test for natural gas systems**

**Important:** The pressure test for natural gas and liquid gas systems must be performed in accordance with local regulations.

#### **2.7.4 Flushing the network**

Each tubing system must be flushed thoroughly before being put into use so that any foreign matter is removed from the inside of the tube surface and so that hygiene problems and corrosion damage are largely prevented.

Potable water tubing must be flushed as soon as possible after installing the pipelines and after the pressure test. Installation regulations, such as the Potable Water Act and worksheets, must be followed. In exceptional cases, it may be necessary to flush the system with a disinfecting substance. When flushing with a disinfectant substance, special care must be taken to ensure that no chlorides remain on the inside of the tubes. Always make sure to flush with clean potable water.

## 2.8 Corrosion

There are different kinds of corrosion: chemical corrosion, electro-chemical corrosion, internal and external local corrosion, stray current corrosion, etc. All these kinds of corrosion have very particular chemical or mechanical causes. The following paragraphs provide some simple hints on how to avoid such problems.

### **Electro-chemical corrosion**

Electro-chemical corrosion occurs under the following circumstances:

- An electrochemical potential difference between both parts
- The presence of a conductive fluid (electrolyte), such as water
- The presence of oxygen (O<sub>2</sub>)

A distinction must be made between heating installations and water supply installations. There are no significant amounts of oxygen in heating installations, when they are properly installed and operated and there will thus be very little corrosion. In potable water installations, however, the oxygen content is very high, nearly at the saturation point.

It is of primary importance that the VSH SudoPress system components be installed only downstream of other, metallurgically inferior (less noble) components that may be present in these kinds of installations. For example, it is possible to install branches with VSH SudoPress stainless steel tubes from a tube system consisting of galvanized steel tubes. In such a case, a non-ferrous metal or synthetic connection piece can be used (see DIN 1988).

Another important factor is the ratio between the surface of the noble metal and that of the less noble metal.

The higher this ratio, the greater the corrosion rate may be. It is therefore recommended that you avoid, as far as possible, the use of extensions or connection pieces of galvanized steel and substitute them with stainless steel or brass fittings.



## Stray currents

Corrosion by stray currents rarely occurs in practice and is immediately recognizable as it starts on the outside of the tube with a cone-shaped crater to the inside. Stray current corrosion requires a direct current that turns the metal into an anode. The current, which in practice and despite insulation measures penetrates into the earth and from there goes into other neighboring metal structures, such as a water supply installation, runs through a particular stretch of the system before it returns to earth again. In order to penetrate into the tubing system, the earth current must have an entry point at a spot where the normal protective cover of the tube or connection is damaged or missing.

For this reason, metal pipelines must be earthed (see EU legislation). Direct current installations are generally not used in domestic households and no real problems occur with alternating current. Research over decades has shown that problems with stray currents only occur sporadically and do not depend on the type of metal.

### 2.8.1 Stainless steel

#### Internal corrosion

VSH SudoPress stainless steel tubes and fittings are completely passive when in contact with potable water and are therefore not at risk of corrosion. Potable water is considered to be water with properties that comply with current regulations on physical-chemical tolerances.

The tubes and fittings also react in a safe and problem-free manner as regards a water chlorine content if 1.34 mg/l is added for disinfection purposes. The VSH SudoPress stainless steel system can also be used for all water treatment installations for domestic purposes (such as water softeners). VSH SudoPress Stainless Steel is corrosion-resistant as regards demineralized and distilled water, and water containing glycol. What's more, hygiene problems regarding heavy metal contamination do not occur when VSH SudoPress Stainless Steel is used. Point or crack corrosion can only occur if the maximum values for the water chloride content, as defined in the applicable regulations, are significantly exceeded.

**External corrosion**

External corrosion of the VSH SudoPress stainless steel components can only occur when wet potable water tubes come into contact with mortar, droplets or covering materials that contain or cause chlorides to be created. Ensure that the outer insulating layer of the tubes and fittings is continuous and that, if necessary, sufficient corrosion-protective insulation tape is applied. Correctly applied closed-cell insulation is an effective protection against corrosion.

**2.8.2 Galvanized steel****Internal corrosion**

Internal corrosion cannot occur with closed-loop water heating systems. The oxygen in the water in closed-loop systems creates a layer of iron oxide on the inside of the tube thereby preventing any further corrosion. When the heating system is not in use, it must be kept filled at all times or, alternatively, be completely drained and subsequently dried out, to avoid the presence of water and oxygen in the system at the same time.

The necessary additives should be added to prevent frost damage, calcification or corrosion. Please contact us should you have any questions regarding permitted additives. Please observe the applicable legislation, regulations and local rules regarding corrosion.

**External corrosion**

VSH SudoPress galvanized steel systems are generally installed in such a way that the outer surfaces do not come into contact with corrosive media. VSH SudoPress galvanized steel tubes must, however, not be permanently exposed to moisture. VSH SudoPress galvanized steel tubes with PP coating offer good protection against corrosion.

**2.8.3 Prevention of corrosion**

Instructions will be found in the following paragraphs on how to prevent corrosion problems in the most usual places. A distinction is made between inner and outer corrosion, and the area of application. We shall also examine the various application possibilities of various materials that can be combined in an installation (combi-installations).

## A. Internal corrosion

### A.1 Heating installations

The penetration of oxygen in **closed-loop** heating installations will be prevented if high-quality accessories and compensators with closed membranes are used. When filling the installation, the small quantity of oxygen contained in the water is directly absorbed into the inner tube surface, in the process of which a thin layer of iron oxide is formed and after which there is no longer any possibility of corrosion. The loss in wall thickness can be disregarded. The heating-circuit water is practically oxygen-free after this reaction.

#### **Stainless steel**

SudoPress stainless steel tubes and fittings are suitable for all open and **closed-loop** heating installations. **Combi-installations:** SudoPress stainless steel can be used in combi-installations with other materials in any sequence.

#### **Galvanized steel**

Internal corrosion is normally impossible in closed-loop heating installations with SudoPress galvanized steel tubes and fittings as oxygen from outside cannot penetrate the installation. **Combi-installations:** Unalloyed galvanized steel can be used without any problems and can be combined with other metals in any sequence in closed-loop systems.

#### **Copper**

SudoPress Copper is suitable for all **open** and **closed-loop** heating systems. **Combi-installations:** Copper can be used with other metals in any sequence in combi-installations.

#### **Other combination possibilities**

Galvanized steel - copper - stainless steel. **Combi-installations:** These materials can be combined in all **closed-loop** systems.

#### **Water additives**

Oxygen scavengers and corrosion inhibitors can be added to the heating-circuit water as a preventive measure against inadmissible oxygen absorption. Observe the supplier's instructions for use.

## A.2 (Potable) water installations

### **Stainless steel**

SudoPress stainless steel fittings and tubes have the advantage that stainless steel is passive in potable water. The physical and chemical properties of the potable water are not affected by stainless steel. In this passive state, no internal corrosion will take place. The danger of heavy metal contamination is avoided and the growth of bacteria is countered by the use of stainless steel tubes and connection pieces. Pitting or ring corrosion can only occur if the chloride content of the water is significantly higher than the maximum level allowed under current regulations. SudoPress stainless steel system components are suitable for all water treatment methods (water softening) for potable water. They are also corrosion-resistant towards demineralized and distilled water, and water containing glycol.

SudoPress stainless steel fittings and tubes are, however, not suitable for use in dosing systems for disinfectants, for example, which are added to the potable water. SudoPress stainless steel fittings and tubes are suitable for all other **open** and **closed-loop** water systems (such as cooling water).

**Combi-installations:** The corrosion behavior of stainless steel is not influenced by its use in combi-installations independent of the direction of the flow of water (no flow rule). Stainless steel can be used in any sequence in combi-installations.

Discoloration from a deposit of foreign corrosion products does not indicate corrosion on the stainless steel. Stainless steel can be used with all copper alloys (bronze, copper or brass) in a combi-installation. There is no risk of contact corrosion with stainless steel.

### **Galvanized steel**

SudoPress galvanized steel tubes and fittings are not permitted in potable water installations. Contact corrosion will occur with galvanized steel if it comes into direct contact with stainless steel. The possibility of contact corrosion is negligibly small if bronze, copper or brass fittings are used between a galvanized steel tube and a stainless steel tube. Contact corrosion on a galvanized steel tube can also be prevented by using 50 mm couplings made of bronze, copper or brass.

## Copper

The physical and chemical properties of potable water can be affected by copper in the event of inner corrosion. An unfavorable potable water composition can also lead to corrosion. The limit values for the use of copper material with respect to the salt content of the potable water must, therefore, correspond to the legal requirements for potable water. If these limit values are adhered to and the potable water composition does not deteriorate, copper is suitable for potable water installations.

**Combi-installations with copper and galvanized steel:** The following rule is important if copper and galvanized steel tubes are used in water systems, including open water systems, because of the various properties of the metals:

Flow from base metal to noble metal	
Base	Galvanized steel
↓	<b>Copper</b>
Noble	<b>Stainless steel</b>

Copper must always be used downstream of galvanized steel couplings or tubes.

## B. External corrosion

### B.1 General

There are few situations in which outer corrosion occurs in buildings. It is, however, possible in many cases that installations are exposed for a longer period to unwanted ingress of rain, humidity or dampness, and this can lead to problems. However, responsibility for taking relevant protective measures rests with the user and the installer. Only suitable corrosion protection can offer permanent certainty against corrosion. One way of doing so is to use 'closed cell' insulation, which must be applied in a guaranteed waterproof condition. Suitable primers - or metallic paints may offer minimal corrosion protection. It is advisable to always use corrosion protection on the tubing in situations where corrosion is likely to occur (damp room, crawl spaces, etc.).

## B.2 Stainless steel

Outer corrosion can only occur in the following circumstances:

- If SudoPress stainless steel heat-conducting tubing (50°C) comes into contact with building and insulating materials containing chlorides (as the result of humidity);
- If water vapor on SudoPress stainless steel heat-conducting tubing leads to a local chloride concentration;
- If SudoPress stainless steel tubing (including cold water tubing) comes into contact with chlorine gas, saltwater or brine or (oxygen-saturated) water with a high chlorine content.

If there is the danger of building materials coming into contact over a long period with highly chlorinated water, suitable corrosion protection must be used. SudoPress stainless steel tubes in cement floors will not be subject to electrolytic outer corrosion in connection with potential equalization.

## B.3 Galvanized steel

Special attention must be paid to preventing outer corrosion where an environment remains humid for longer periods. Only in cases of sporadic short-term corrosion stress caused by humidity will SudoPress Galvanized Steel also be resistant against corrosion for a longer period. SudoPress galvanized steel press fittings must be protected in cases of increased risk of corrosion due to electrolytic outer corrosion (or longer periods of humidity). A polypropylene coating offers SudoPress galvanized steel tubes effective corrosion protection.

## B.4 Copper

Copper's high resistance to corrosion renders corrosion-protection measures superfluous. Copper tubes in cement floors will not be subject to outer electrolytic outer corrosion in connection with potential equalization. However, copper tubing must sometimes also be protected from the impact of outer corrosion, such as sulfites, nitrites and ammonia. Gas tubes must be protected against corrosion in accordance with local guidelines, such as e.g. NEN 1078-NPR 3378-10.

## C. Impact of application and processing

### C.1 General

Corrosion may occur due to incorrectly designed installations and faulty applications. The following points must be observed:

### C.2 Stainless steel

#### **Cutting stainless steel**

Cutting through SudoPress stainless steel tubes is not allowed due to the amount of heat developed.

#### **Bending stainless steel tubes**

SudoPress stainless steel tubes may not be bent in a hot state. The heating of the SudoPress stainless steel tubes alters the structure of the material (sensitization) and inter-crystalline corrosion can take place.

#### **Heat transfer (e.g. with a heating band)**

Heat transfer from outside inwards must be prevented as this can lead to the build-up of film on the inside of the tube wall. This film can cause an increase in the concentration of chloride ions, which can cause pitting in critical concentrations.

#### **Connections**

Welding of SudoPress stainless steel tubes may cause pitting or ring corrosion. In the case of TIG welding of SudoPress stainless steel, discoloration occurs at the welding joints, which may lead to corrosion on contact with salt water. This discoloration, mainly on the inside of the tube, can only be removed by staining, which is not practical with tubing that has already been installed.

### C.3 Stainless steel, galvanized steel and copper

With all materials (stainless steel, galvanized steel, copper), waterline corrosion can occur as a result of interaction between three actors (water, metal and gas (air)). This corrosion can be prevented if the tubing installation remains permanently filled once filled for the first time. Partial filling will take place, for example, if the tubes are emptied again after a pressure test with water, in which case a pressure test using gas/air is to be recommended.

## D. Effect of insulation

### D.1 General

Insulation does not, as a rule, offer any protection against corrosion except in the case of 'closed cell insulation' (sealed watertight), which offers effective protection against corrosion. The installation instructions of the supplier of the insulation material must always be followed carefully. Remove dust, dirt, oil or water from the tubing prior to insulating. The different sections of the insulation material must be carefully joined, taking care that no moisture or water can enter the material. Also take care that the water barrier of the insulation material is not damaged during installation as moisture could otherwise penetrate under the insulation material.

### D.2 Insulating stainless steel

Insulating materials that release chloride ions in water or which could cause a local increase in chloride ions are not permitted. The weight ratio of water-solution chloride ions in the thermal insulation of the tubes may not exceed 0.05% (AS quality).

### D.3 Insulating galvanized steel

No corrosion can occur if there is no humidity between the insulation material and the tube. If there is a possibility of humidity (condensation) occurring under the insulation, the outside of the tube will corrode.

### D.4 Insulating copper

Insulation materials for copper must be nitrate-free. The nitrate content may not be more than 0.02%.



## 3 Warranty

Please contact VSH for the most recent warranty conditions that apply to VSH SudoPress.



VSH 



4.1 Stainless Steel

**VSH SudoPress**

R2750     Stainless steel tube 1.4401 (AISI 316) 6 m length



Dimension	Article No.	DN
15 x 1.0	6117914	12
18 x 1.0	6117925	15
22 x 1.2	6117936	20
28 x 1.2	6117947	25
35 x 1.5	6117958	32
42 x 1.5	6117969	40
54 x 1.5	6117971	50
76.1 x 2.0	6117980	65
88.9 x 2.0	6117991	80
108 x 2.0	6118002	100

R2752     Stainless steel tube 1.4521 (AISI 444) 6 m length



Dimension	Article No.	DN
15 x 1.0	6194001	12
18 x 1.0	6194012	15
22 x 1.2	6194023	20
28 x 1.2	6194034	25
35 x 1.5	6194045	32
42 x 1.5	6194056	40
54 x 1.5	6194064	50

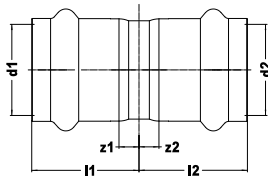
R2753     Stainless steel tube 1.4520 (AISI 439) 6 m length



Dimension	Article No.	DN
15 x 1.0	6193000	12
18 x 1.0	6193011	15
22 x 1.2	6193022	20
28 x 1.2	6193033	25
35 x 1.5	6193044	32
42 x 1.5	6193055	40
54 x 1.5	6193066	50
76.1 x 2.0*	6118178	65
88.9 x 2.0*	6118189	80
108 x 2.0*	6118200	100

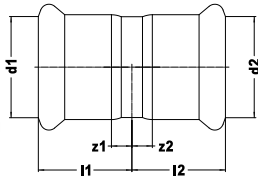
\* 76.1-108 mm in 1.4301 (AISI 304)

## SP6270V Straight coupling (2 x press)



Dimension	Article No.	l1/l2	z1/z2
15	6550522	28	6
18	6550533	28	6
22	6550544	29	6
28	6550555	30	6
35	6550566	32	7
42	6550577	44	8
54	6550588	49	8

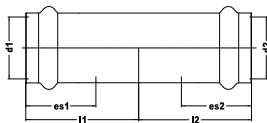
## SP6270VM Straight coupling (2 x press)



Dimension	Article No.	l1/l2	z1/z2
76.1	6552172	71	16
88.9	6552183	82	19
108	6552194	96	19

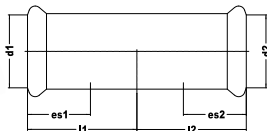
Diameters up to 54 mm have a V-profile. 76.1-108 mm have an M-profile.

## SP6275V Slip coupling (2 x press)



Dimension	Article No.	l1/l2	es1/es2
15	6550599	38	22
18	6550601	40	22
22	6550610	41	23
28	6550621	47	24
35	6550632	52	25
42	6550643	60	36
54	6550654	68	41

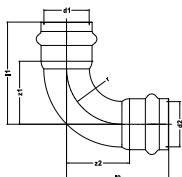
## SP6275VM Slip coupling (2 x press)



Dimension	Article No.	l1/l2	es1/es2
76.1	6552205	115	60
88.9	6552216	129	70
108	6552227	153	80

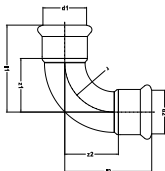


## SP6002V Bend 90° (2 x press)



Dimension	Article No.	1/1/2	z1/z2	r
15	6550005	44	22	18
18	6550016	48	26	22
22	6550027	55	32	27
28	6550038	63	39	34
35	6550049	73	48	42
42	6550051	93	57	51
54	6550060	112	71	65

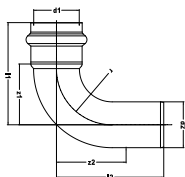
## SP6002VM Bend 90° (2 x press)



Dimension	Article No.	1/1/2	z1/z2	r
76.1	6552326	150	95	91
88.9	6552337	174	111	107
108	6552348	215	138	130

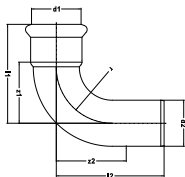
Diameters up to 54 mm have a V-profile. 76.1-108 mm have an M-profile.

SP6001V Bend 90° (press x male)



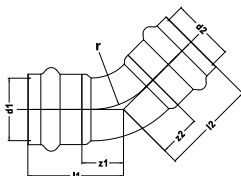
Dimension	Article No.	l1	l2	z1	z2	r
15	6550071	44	58	22	36	18
18	6550082	48	53	26	31	22
22	6550093	55	64	32	41	27
28	6550104	63	68	39	44	34
35	6550115	73	78	48	53	42
42	6550126	93	98	57	62	51
54	6550137	112	117	71	76	65

SP6001VM Bend 90° (press x male)



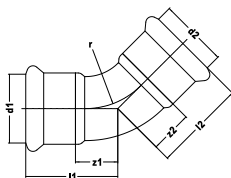
Dimension	Article No.	l1	l2	z1	z2	r
76.1	6552359	150	165	95	110	91
88.9	6552361	175	190	112	127	107
108	6552370	216	238	139	161	130

## SP6041V Bend 45° (2 x press)



Dimension	Article No.	l1/l2	z1/z2	r
15	6550214	34	12	18
18	6550225	36	14	22
22	6550236	39	16	27
28	6550247	43	19	34
35	6550258	48	23	42
42	6550269	63	27	51
54	6550271	74	33	65

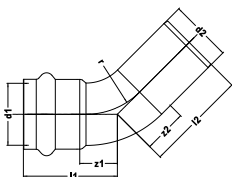
## SP6041VM Bend 45° (2 x press)



Dimension	Article No.	l1/l2	z1/z2	r
76.1	6552414	98	43	91
88.9	6552425	112	49	107
108	6552436	138	61	130

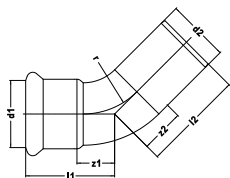
Diameters up to 54 mm have a V-profile. 76.1-108 mm have an M-profile.

SP6040V Bend 45° (press x male)



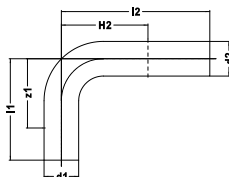
Dimension	Article No.	l1	l2	Z1	z2	r
15	6550148	34	39	12	17	18
18	6550159	36	41	14	19	22
22	6550161	39	44	16	21	27
28	6550170	43	48	19	24	34
35	6550181	48	53	23	28	42
42	6550192	63	68	27	32	51
54	6550203	74	79	33	38	65

SP6040VM Bend 45° (press x male)



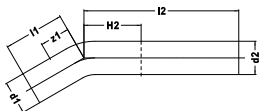
Dimension	Article No.	l1	l2	Z1	z2	r
76.1	6552381	98	117	43	62	91
88.9	6552392	112	131	49	68	107
108	6552403	138	154	61	77	130

## SP6725V Bend tube 90° (2 x male)



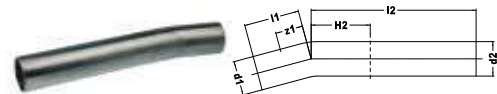
Dimension	Article No.	l1	l2	z1	H2
Ø15	6551930	70	120	48	58
Ø18	6551941	70	120	48	63
Ø22	6551952	72	120	49	70
Ø28	6551963	82	120	58	80
Ø35	6551974	120	200	95	100
Ø42	6551985	150	250	114	120
Ø54	6551996	200	300	159	145

## SP6723V Bend tube 30° (2 x male)



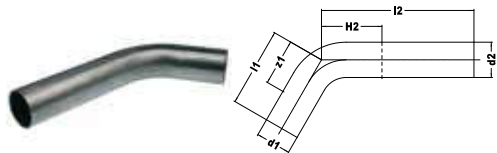
Dimension	Article No.	l1	l2	z1	H2
Ø28	6552007	51	130	27	54
Ø35	6552018	73	214	48	60
Ø42	6552029	99	272	63	69
Ø54	6552031	134	326	93	79

SP6722V Bend tube 15° (2 x male)



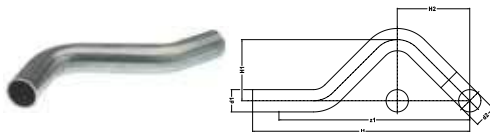
Dimension	Article No.	l1	l2	z1	H2
Ø28	6552040	45	134	21	48
Ø35	6552051	73	222	48	53
Ø42	6552062	89	280	53	59
Ø54	6552073	122	337	81	67

SP6724V Bend tube 60° (2 x male)



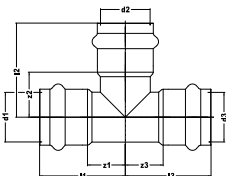
Dimension	Article No.	l1	l2	z1	H2
Ø28	6552084	63	121	39	66
Ø35	6552095	97	203	72	77
Ø42	6552106	102	256	66	90
Ø54	6552117	162	306	121	107

## SP6717V Bend tube (2 x male)



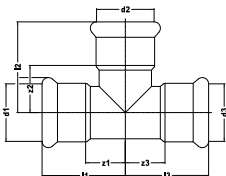
Dimension	Article No.	l1	z1	H1	H2
Ø15	6552128	158	136	37	57
Ø18	6552139	165	143	40	60
Ø22	6552141	178	155	44	65
Ø28	6552150	210	186	50	74

## SP6130V Tee (3 x press)



Dimension	Article No.	l1/l3	l2	z1/z3	z2
15	6550280	38	41	16	19
18	6550291	39	43	17	21
22	6550302	43	47	20	24
28	6550313	47	51	23	27
35	6550324	52	56	27	31
42	6550335	68	69	32	33
54	6550346	79	82	38	41

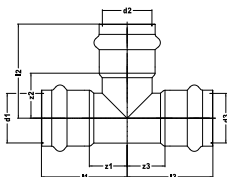
## SP6130VM Tee (3 x press)



Dimension	Article No.	l1/l3	l2	z1/z3	z2
76.1	6552447	116	115	61	60
88.9	6552458	131	127	68	64
108	6552469	156	155	79	78

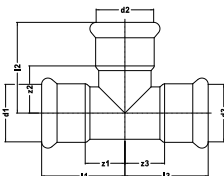


## SP6130RV T-reduced (3 x press)



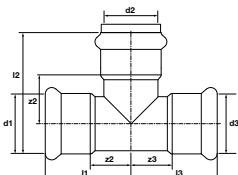
Dimension	Article No.	l1/l3	l2	z1/z3	z2
18 x 15 x 18	6550357	39	43	17	21
22 x 15 x 22	6550368	43	45	20	23
22 x 18 x 22	6550379	43	45	20	23
28 x 15 x 28	6550381	47	48	23	26
28 x 18 x 28	6550390	47	48	23	26
28 x 22 x 28	6550401	47	50	22	27
35 x 15 x 35	6550412	52	52	27	30
35 x 18 x 35	6550423	52	52	27	30
35 x 22 x 35	6550434	52	53	27	30
35 x 28 x 35	6550445	52	54	27	30
42 x 22 x 42	6550456	68	56	32	33
42 x 28 x 42	6550467	68	57	32	33
42 x 35 x 42	6550478	68	58	32	33
54 x 22 x 54	6550489	79	62	38	39
54 x 28 x 54	6550491	79	63	38	39
54 x 35 x 54	6550500	79	64	38	39
54 x 42 x 54	6550511	79	75	38	39

SP6130RVM T-reduced (3 x press)



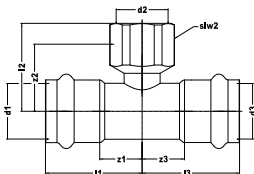
Dimension	Article No.	I1/I3	I2	z1/z3	z2
88.9 x 76.1 x 88.9	6552579	131	116	68	61
108 x 76.1 x 108	6552634	156	125	79	70
108 x 88.9 x 108	6552645	156	135	79	72

SP6130RVVM T-reduced (3 x press)



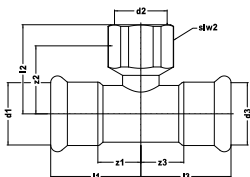
Dimension	Article No.	I1/I3	I2	z1/z3	z2
76.1 x 42 x 76.1	6552502	116	87	61	51
76.1 x 54 x 76.1	6552513	116	94	61	53
88.9 x 42 x 88.9	6552557	131	94	68	58
88.9 x 54 x 88.9	6552568	131	100	68	59
108 x 42 x 108	6552612	155	104	79	68
108 x 54 x 108	6552623	155	111	79	70

## SP6130GV Tee female branch (press x female thread x press)



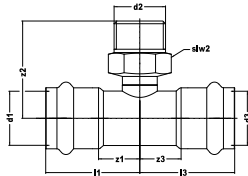
Dimension	Article No.	l1/l3	l2	z1/z3	z2	slw2
15 x Rp1/2 x 15	6551094	38	34	16	24	24
18 x Rp1/2 x 18	6551105	39	35	17	25	24
18 x Rp3/4 x 18	6551655	39	37	17	27	30
22 x Rp1/2 x 22	6551116	43	37	20	27	24
22 x Rp3/4 x 22	6551127	43	39	20	28	30
28 x Rp1/2 x 28	6551138	47	40	23	30	24
28 x Rp3/4 x 28	6551149	47	42	23	31	30
28 x Rp1 x 28	6551666	47	46	23	33	38
35 x Rp1/2 x 35	6551151	52	44	27	34	24
35 x Rp3/4 x 35	6552832	52	49	27	32	30
35 x Rp1 x 35	6551182	52	50	27	37	38
42 x Rp1/2 x 42	6551160	68	46	32	36	24
42 x Rp1 x 42	6551193	68	52	32	39	38
54 x Rp1/2 x 54	6551171	79	52	38	42	24
54 x Rp1 x 54	6551204	79	58	38	45	38

SP6130GVM Tee female branch (press x female thread x press)



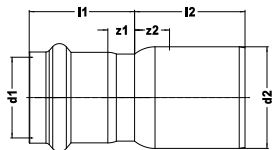
Dimension	Article No.	l1/l3	l2	z1/z3	z2	slw2
76.1 x Rp3/4 x 76.1	6552656	116	68	61	55	30
76.1 x Rp2 x 76.1	6552689	116	81	61	59	65
88.9 x Rp3/4 x 88.9	6552667	131	87	68	74	30
88.9 x Rp2 x 88.9	6552691	131	88	68	66	65
108 x Rp3/4 x 108	6552678	156	86	79	73	30
108 x Rp2 x 108	6552700	156	98	79	76	65

## SP6132GV Tee male branch (press x male thread x press)



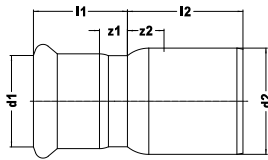
Dimension	Article No.	l1/l3	z1/z3	z2	slw2
15 x R1/2 x 15	6551811	38	16	39	22
18 x R1/2 x 18	6551820	39	17	41	22
18 x R3/4 x 18	6551831	39	17	45	28
22 x R1/2 x 22	6551842	43	20	44	22
22 x R3/4 x 22	6551853	43	20	47	28
28 x R3/4 x 28	6551864	47	23	50	28
28 x R1 x 28	6551897	47	23	53	34
35 x R3/4 x 35	6551875	52	27	54	28
35 x R1 x 35	6551908	52	27	56	34
42 x R3/4 x 42	6551886	68	32	56	28
42 x R1 x 42	6551919	68	32	59	34
54 x Rp1 x 54	6551921	79	38	65	34

## SP6243V Reducer (male x press)



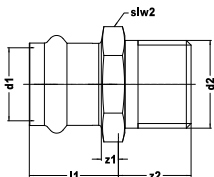
Dimension	Article No.	l1	l2	z1	z2
Ø18 x 15	6550665	31	28	9	6
Ø22 x 15	6550676	31	33	9	10
Ø22 x 18	6550687	31	30	9	7
Ø28 x 15	6550698	31	39	9	15
Ø28 x 18	6550709	31	37	9	13
Ø28 x 22	6550711	33	34	10	10
Ø35 x 18	6551545	31	49	9	24
Ø35 x 22	6550720	33	42	10	17
Ø35 x 28	6550731	34	38	10	3
Ø42 x 22	6550742	33	56	10	20
Ø42 x 28	6550753	34	51	10	15
Ø42 x 35	6550764	35	43	10	7
Ø54 x 22	6550775	33	70	10	29
Ø54 x 28	6550786	34	66	10	25
Ø54 x 35	6550797	35	58	10	17
Ø54 x 42	6550808	48	54	12	13
Ø76.1 x 42	6552251	46	74	10	19
Ø76.1 x 54	6552260	53	100	12	45
Ø88.9 x 54	6552271	53	116	12	53

## SP6243VM Reducer (male x press)



Dimension	Article No.	l1	l2	z1	z2
Ø88.9 x 76.1	6552282	68	88	13	25
Ø108 x 76.1	6552304	69	127	14	50
Ø108 x 88.9	6552315	77	113	14	36

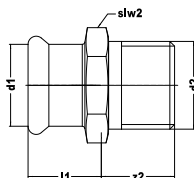
SP6243GV Straight connector (press x male thread)



Dimension	Article No.	l1	z1	z2	slw2
15 x R1/2	6551336	24	2	21	24
15 x R3/4	6551347	30	8	17	27
18 x R1/2	6551358	23	1	21	27
18 x R3/4	6551369	29	7	18	27
22 x R1/2	6551380	25	2	21	32
22 x R3/4	6551391	24	1	24	32
22 x R1	6551371	27	4	24	34
28 x R3/4	6551413	26	2	22	38
28 x R1	6551402	25	1	26	38
35 x R1	6551424	28	3	24	49
35 x R1 1/4	6551435	26	1	31	49
35 x R1 1/2	6552801	30	5	27	49
42 x R1 1/4	6552810	39	3	25	54
42 x R1 1/2	6551446	37	1	26	54
54 x R1 1/2	6552821	45	4	24	67
54 x R2	6551457	42	1	32	67

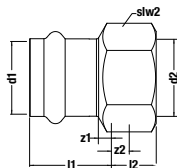


## SP6243GVM Straight connector (press x male thread)



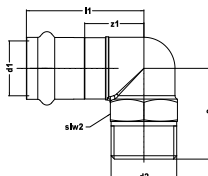
Dimension	Article No.	l1	z1	z2	slw2
76.1 x R2 1/2	6552238	55	0	75	80
88.9 x R3	6552249	63	0	74	95

## SP6270GV Straight connector (press x female thread)



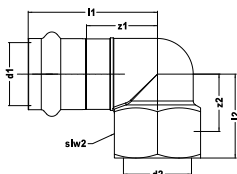
Dimension	Article No.	l1	l2	z1	z2	slw2
15 x Rp1/2	6551215	24	15	2	5	24
15 x Rp3/4	6551226	25	17	3	6	30
18 x Rp1/2	6551237	24	15	2	5	27
18 x Rp3/4	6551248	25	17	3	6	30
22 x Rp1/2	6551261	23	16	0	6	32
22 x Rp3/4	6551270	25	17	2	6	32
22 x Rp1	6551259	26	20	3	7	38
28 x Rp1/2	6552777	26	15	2	4	38
28 x Rp3/4	6551292	24	17	0	6	38
28 x Rp1	6551281	26	20	2	7	38
35 x Rp1	6551468	26	19	1	6	46
35 x Rp1 1/4	6551303	30	22	5	7	46
42 x Rp1 1/4	6552788	36	22	0	0	54
42 x Rp1 1/2	6551314	38	22	2	8	54
54 x Rp1 1/2	6552799	42	22	1	8	67
54 x Rp2	6551325	43	26	2	8	67

## SP6092GV 90° angle adapter (press x male thread)



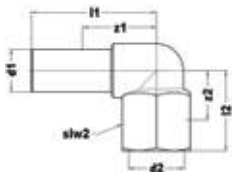
Dimension	Article No.	l1	z1	z2	slw2
15 x R1/2	6551743	48	26	31	22
18 x R1/2	6551754	49	27	32	24
22 x R3/4	6551765	53	30	39	30
28 x R1	6551776	56	32	46	34
35 x R1 1/4	6551787	60	35	52	43
42 x R1 1/2	6551798	75	39	58	49
54 x R2	6551809	88	47	68	62

## SP6090GV 90° angle adapter (press x female thread)



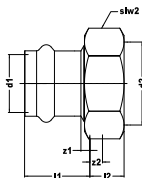
Dimension	Article No.	l1	l2	z1	z2	slw2
15 x Rp1/2	6551556	49	28	27	13	24
18 x Rp1/2	6551567	49	28	27	13	24
22 x Rp3/4	6551578	53	33	30	17	30
28 x Rp1	6551589	57	37	33	24	38
35 x Rp1 1/4	6551591	62	42	37	27	46
42 x Rp1 1/2	6551600	78	47	42	32	54
54 x Rp2	6551611	90	61	49	43	67

## SP6710V 90° angle adapter (male x female thread)



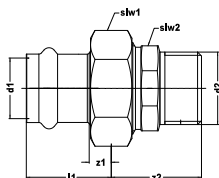
Dimension	Article No.	l1	l2	z1	z2	slw2
15 x Rp1/2	6552161	44	28	22	13	24

## SP6359GV Coupling with nut (press x female thread)

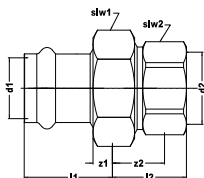


Dimension	Article No.	l1	l2	z1	z2	slw2
15 x G3/4	6551479	34	8	12	2	30
18 x G3/4	6551481	35	8	13	2	30
22 x G1	6551490	37	10	14	2	37
28 x G1 1/4	6551501	38	10	14	2	46
35 x G1 1/2	6551512	40	11	15	2	52
42 x G1 3/4	6551523	47	12	11	2	58
54 x G2 3/8	6551534	53	12	12	3	75

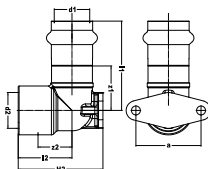
## SP6331GV Three-part union, flat seal (press x male thread)



Dimension	Article No.	l1	z1	z2	slw1	slw2
15 x R1/2	6550885	34	12	33	30	25
15 x R3/4	6550896	34	12	36	30	32
18 x R1/2	6550907	35	13	33	30	25
18 x R3/4	6550918	35	13	36	30	32
22 x R1/2	6550929	37	14	33	37	25
22 x R3/4	6550931	37	14	39	37	32
22 x R1	6550940	37	14	42	37	39
28 x R1	6550951	38	14	42	46	39
35 x R1 1/4	6550962	40	15	44	52	49
42 x R1 1/2	6550973	47	11	44	58	51
54 x R2	6550984	53	12	52	75	65

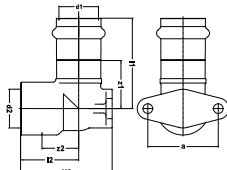
**SP6330GV** Three-part union, flat seal (press x female thread)

Dimension	Article No.	l1	l2	z1	z2	slw1	slw2
15 x Rp1/2	6550995	34	28	12	18	30	24
15 x Rp3/4	6551006	34	31	12	20	30	30
18 x Rp1/2	6551017	35	28	13	18	30	24
18 x Rp3/4	6551028	35	31	13	20	30	30
22 x Rp3/4	6551039	37	33	14	22	37	30
22 x Rp1	6551041	37	36	14	23	37	38
28 x Rp1	6551050	38	34	14	21	46	38
35 x Rp1 1/4	6551061	40	39	15	24	52	46
42 x Rp1 1/2	6551072	47	41	11	27	58	54
54 x Rp2	6551083	53	45	12	27	75	67

**SP6471GV** Wall plate 90° (press x female thread)

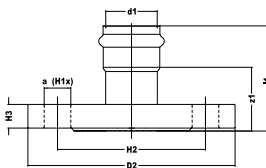
Dimension	Article No.	l1	l2	z1	z2	a	H2
15 x Rp1/2	6551622	50	28	28	13	34	41
18 x Rp1/2	6551633	50	28	28	13	34	44
22 x Rp3/4	6551644	53	33	30	17	40	52

## SP6471GLV Wall plate 90°, long (press x female thread)



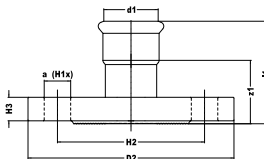
Dimension	Article No.	l1	l2	z1	z2	a	H2
15 x Rp1/2	6552843	50	28	28	13	40	63
18 x Rp1/2	6552854	50	28	28	13	40	63

## SP6500V Flanged connector PN10/16 (1 x press)



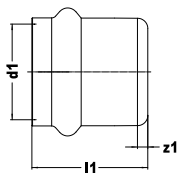
Dimension	Article No.	l1	z1	H1	H2	H3	a
15	6551677	59	37	4	65	13	14
18	6551688	60	38	4	65	13	14
22	6551699	63	40	4	75	14	14
28	6551701	69	45	4	85	16	14
35	6551710	71	46	4	100	17	18
42	6551721	85	49	4	110	18	18
54	6551732	95	54	4	125	18	18

## SP6500VM Flanged connector PN10/16 (1 x press)



Dimension	Article No.	l1	z1	H1	H2	H3	a
76.1	6552711	126	71	4	145	18	18
88.9	6552722	147	84	8	160	20	18
108	6552733	167	90	8	180	20	18

## SP6301V Stop end (1 x press)

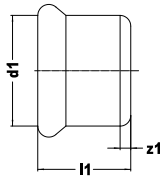


Dimension	Article No.	l1	z1
15	6550819	25	3
18	6550821	25	3
22	6550830	26	3
28	6550841	27	3
35	6550852	29	4
42	6550863	43	7
54	6550874	48	7

*Diameters up to 54 mm have a V-profile. 76.1-108 mm have an M-profile.*



## SP6301VM Stop end (1 x press)



Dimension	Article No.	l1	z1
76.1	6552744	95	40
88.9	6552755	107	44
108	6552766	127	50

## SP5501 O-ring (LBP) - EPDM Black



Dimension	Article No.	
12	6569805	
15	6569816	
18	6569827	
22	6569838	
28	6569849	
35	6569851	
42	6569860	Only for galvanized steel and stainless steel
42	6673348	Only for copper
54	6569871	Only for galvanized steel and stainless steel
54	6673359	Only for copper

NB: 42 and 54 mm SudoPress EPDM O-rings are different for copper

SP5501M O-ring - EPDM Black



Dimension	Article No.
76.1	6562921
88.9	6562930
108	6562941

SP8452 Flat seal - EPDM Black



Dimension	Article No.
15-18	6568122
22	6568133
28	6568144
35	6568155
42	6568166
54	6568177

## R2767 Flat seal for special applications (green, FPM) for galvanized steel and stainless steel



Dimension	Article No.	
15-18	6118301	
22	6118310	
28	6118321	
35	6118332	
42	6118343	
54	6118354	

## SP5501S O-ring (LBP) - FPM green



Dimension	Article No.	
15	6558519	
18	6558521	
22	6558530	
28	6558541	
35	6558552	
42	6558563	Only for galvanized steel and stainless steel
42	6673425	Only for copper
54	6558574	Only for galvanized steel and stainless steel

*Diameters up to 54 mm have a V-profile. 76.1-108 mm have an M-profile.*

SP5501SM O-ring - FPM green



Dimension	Article No.
76.1	6562963
88.9	6562974
108	6562985

VSH 



4.2 Galvanized steel

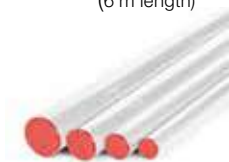
**VSH SudoPress**

C1459 Galvanized steel tube  
(6 m length)



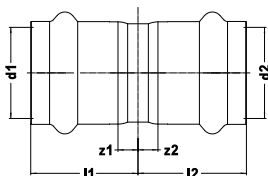
Dimension	Article No.	DN
12 x 1.2	6205144	10
15 x 1.2	6205155	12
18 x 1.2	6205166	15
22 x 1.5	6205177	20
28 x 1.5	6205188	25
35 x 1.5	6205199	32
42 x 1.5	6205201	40
54 x 1.5	6205221	50
66.7 x 1.5	6204836	60
76.1 x 2.0	6204803	65
88.9 x 2.0	6204814	80
108 x 2.0	6204825	100

## C1460 Galvanized steel tube with PP coating (6 m length)



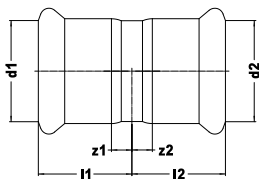
Dimension	Article No.	DN
15 x 1.2	6204682	12
18 x 1.2	6204693	15
22 x 1.5	6204704	20
28 x 1.5	6204715	25
35 x 1.5	6204726	32
42 x 1.5	6204737	40
54 x 1.5	6204748	50

## SP8270V Straight coupling (2 x press)



Dimension	Article No.	l1/l2	z1/z2
12	6561588	23	5
15	6561599	28	6
18	6561601	28	6
22	6561610	29	6
28	6561621	30	6
35	6561632	32	7
42	6561643	44	8
54	6561654	49	8

## SP8270VM Straight coupling (2 x press)



Dimension	Article No.	l1/l2	z1/z2
66.7	6562017	60	10
76.1	6562028	63	8
88.9	6562039	72	9
108	6562041	86	9

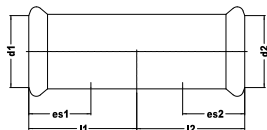


## SP8275V Slip coupling (2 x press)



Dimension	Article No.	l1/l2	es1/es2
12	6561665	34	18
15	6561676	38	22
18	6561687	40	22
22	6561698	41	23
28	6561709	47	24
35	6561711	52	25
42	6561720	60	36
54	6561731	68	41

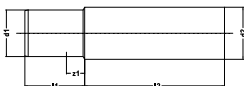
## SP8275VM Slip coupling (2 x press)



Dimension	Article No.	l1/l2	es1/es2
66.7	6562050	99	60
76.1	6562061	115	60
88.9	6562072	131	70
108	6562083	151	80

Diameters up to 54 mm have a V-profile. Diameters between 66.7-108 mm have an M-profile.

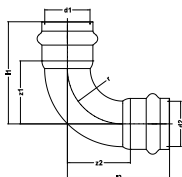
SP8350V Welding end (ungalvanized, welding end x male)



Dimension	Article No.	l1	l2	z1
Ø17 x Ø15	6561874	32	88	10
Ø20 x Ø18	6561885	32	88	10
Ø24 x Ø22	6561896	35	85	12
Ø31 x Ø28	6561907	35	85	11
Ø38 x Ø35	6561918	35	85	10
Ø44.5 x Ø42	6561929	40	80	4
Ø57 x Ø54	6561931	48	72	7
Ø80.5 x Ø76.1	6562842	100	130	45
Ø94.9 x Ø88.9	6562853	115	115	52
Ø110 x Ø108	6562864	115	115	38

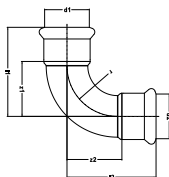
After welding, a protective coating is required against corrosion!

## SP8002V Bend 90° (2 x press)



Dimension	Article No.	1/12	z1/z2	r
12	6560499	36	18	15
15	6560501	44	22	18
18	6560510	48	26	22
22	6560521	55	32	27
28	6560532	63	39	34
35	6560543	73	48	42
42	6560554	93	57	51
54	6560565	112	71	65

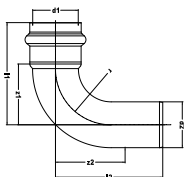
## SP8002VM Bend 90° (2 x press)



Dimension	Article No.	1/12	z1/z2	r
66.7	6562259	145	95	80
76.1	6562261	155	100	92
88.9	6562270	179	116	107
108	6562281	216	139	130

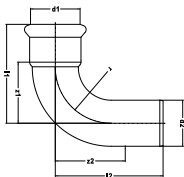
Diameters up to 54 mm have a V-profile. Diameters between 66.7-108 mm have an M-profile.

## SP8001V Bend 90° (press x male)



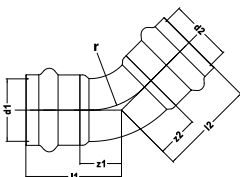
Dimension	Article No.	l1	l2	z1	z2	r
12	6560642	36	50	18	32	15
15	6560653	44	31	22	9	18
18	6560664	48	53	26	31	22
22	6560675	55	60	32	37	27
28	6560686	63	68	39	44	34
35	6560697	73	78	48	53	42
42	6560708	93	98	57	62	51
54	6560719	112	117	71	76	65

## SP8001VM Bend 90° (press x male)



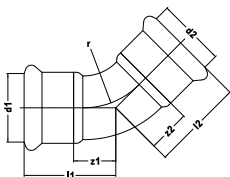
Dimension	Article No.	l1	l2	z1	z2	r
66.7	6562292	145	157	95	107	80
76.1	6562303	155	168	100	113	92
88.9	6562314	179	193	116	130	107
108	6562325	216	233	139	156	130

## SP8041V Bend 45° (2 x press)



Dimension	Article No.	l1/l2	z1/z2	r
15	6560796	34	12	18
18	6560807	36	14	22
22	6560818	39	16	27
28	6560829	48	24	34
35	6560831	48	23	42
42	6560840	63	27	51
54	6560851	74	33	65

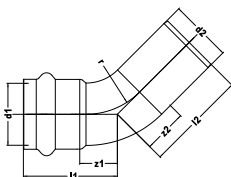
## SP8041VM Bend 45° (2 x press)



Dimension	Article No.	l1/l2	z1/z2	r
66.7	6562371	98	48	80
76.1	6562380	101	46	92
88.9	6562391	116	53	107
108	6562402	139	62	130

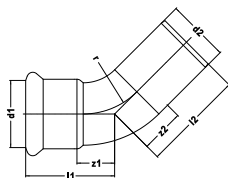
Diameters up to 54 mm have a V-profile. Diameters between 66.7-108 mm have an M-profile.

## SP8040V Bend 45° (press x male)



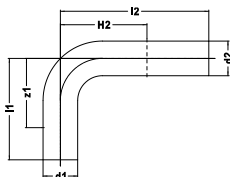
Dimension	Article No.	l1	l2	z1	z2	r
15 x Ø15	6560721	34	39	12	17	18
18 x Ø18	6560730	36	41	14	19	22
22 x Ø22	6560741	39	44	16	21	27
28 x Ø28	6560752	48	48	24	24	34
35 x Ø35	6560763	48	53	23	28	42
42 x Ø42	6560774	63	68	27	32	51
54 x Ø54	6560785	74	79	33	38	65

## SP8040VM Bend 45° (press x male)



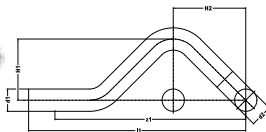
Dimension	Article No.	l1	l2	z1	z2	r
66.7	6562336	98	110	48	60	80
76.1	6562347	101	114	46	59	92
88.9	6562358	116	130	53	67	107
108	6562369	139	157	62	80	130

## SP8090LV Bend 90° (2 x male)



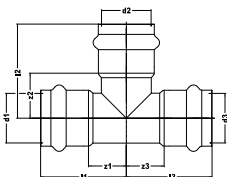
Dimension	Article No.	l1	l2	z1	H2
Ø12	6561797	72	122	54	58
Ø15	6561808	72	122	50	58
Ø18	6561819	72	122	50	63
Ø22	6561821	74	122	51	70
Ø28	6561830	84	122	60	80
Ø35	6561841	122	202	97	100
Ø42	6561852	152	252	116	120
Ø54	6561863	202	302	161	145

## SP8086V Bend tube (2 x male)



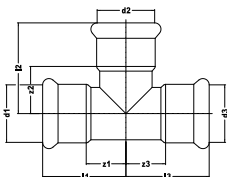
Dimension	Article No.	l1	z1	H1	H2
Ø12	6561742	154	136	35	55
Ø15	6561753	158	136	37	57
Ø18	6561764	165	143	40	60
Ø22	6561775	178	155	44	65
Ø28	6561786	210	186	50	74

## SP8130V Tee (3 x press)



Dimension	Article No.	l1/l3	l2	z1/z3	z2
15	6560873	38	48	16	26
18	6560884	39	49	17	27
22	6560895	43	52	20	29
28	6560906	47	56	23	32
35	6560917	52	61	27	36
42	6560928	68	74	32	38
54	6560939	79	85	38	44

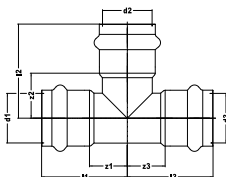
## SP8130VM Tee (3 x press)



Dimension	Article No.	l1/l3	l2	z1/z3	z2
66.7	6562413	99	101	49	51
76.1	6562424	115	110	60	55
88.9	6562435	130	128	67	65
108	6562446	155	153	78	76

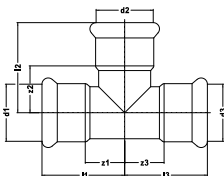


## SP8130RV T-reduced (3 x press)



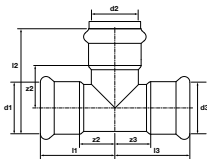
Dimension	Article No.	l1/l3	l2	z1/z3	z2
15 x 18 x 15	6560961	38	50	16	28
18 x 15 x 18	6560983	39	49	17	27
22 x 15 x 22	6560994	43	51	20	29
22 x 18 x 22	6561005	43	51	20	29
22 x 28 x 22	6561016	43	58	20	34
28 x 15 x 28	6561027	47	54	23	32
28 x 18 x 28	6561038	47	54	23	32
28 x 22 x 28	6561049	47	55	23	32
35 x 15 x 35	6561051	52	58	27	36
35 x 18 x 35	6561060	52	58	27	36
35 x 22 x 35	6561071	52	59	27	36
35 x 28 x 35	6561082	52	59	27	35
42 x 22 x 42	6561093	68	61	32	38
42 x 28 x 42	6561104	68	62	32	38
42 x 35 x 42	6561115	68	63	32	38
54 x 22 x 54	6561126	79	67	38	44
54 x 28 x 54	6561137	79	68	38	44
54 x 35 x 54	6561148	79	69	38	44
54 x 42 x 54	6561159	79	80	38	44

## SP8130RVM T-reduced (3 x press)



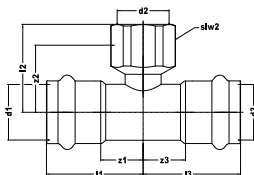
Dimension	Article No.	l1/l3	l2	z1/z3	z2
76.1 x 66.7 x 76.1	6562501	126	105	71	55
88.9 x 66.7 x 88.9	6562512	128	112	65	62
88.9 x 76.1 x 88.9	6562523	130	117	67	62
108 x 76.1 x 108	6562688	155	128	78	73
108 x 88.9 x 108	6562534	155	137	78	82

## SP8130RVVM T-reduced (3 x press)



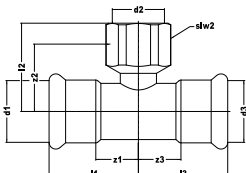
Dimension	Article No.	l1/l3	l2	z1/z3	z2
76.1 x 42 x 76.1	6562578	115	104	60	68
76.1 x 54 x 76.1	6562490	115	117	60	76
88.9 x 42 x 88.9	6562611	130	112	67	76
88.9 x 54 x 88.9	6562622	130	124	67	83
108 x 42 x 108	6562666	155	122	78	86
108 x 54 x 108	6562677	155	135	78	94

## SP8130GV Tee female branch (press x female thread x press)



Dimension	Article No.	l1/l3	l2	z1/z3	z2	slw2
15 x Rp1/2 x 15	6561161	38	37	16	22	24
18 x Rp1/2 x 18	6561170	39	37	17	22	24
22 x Rp1/2 x 22	6561192	43	39	20	24	24
22 x Rp3/4 x 22	6561203	43	42	20	26	30
28 x Rp1/2 x 28	6561214	47	42	23	27	24
28 x Rp3/4 x 28	6561225	47	45	23	29	30
35 x Rp1/2 x 35	6561236	52	46	27	31	24
35 x Rp3/4 x 35	6561247	52	49	27	32	30
42 x Rp1/2 x 42	6561258	68	48	32	33	24
42 x Rp3/4 x 42	6561269	68	51	32	35	30
54 x Rp1/2 x 54	6561271	79	54	38	39	24
54 x Rp3/4 x 54	6563128	79	43	38	41	30

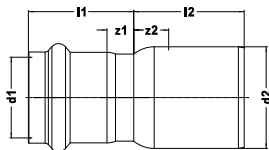
## SP8130GVM Tee female branch (press x female thread x press)



Dimension	Article No.	l1/l3	l2	z1/z3	z2	slw2
66.7 x Rp3/4 x 66.7	6562699	99	65	49	62	30
76.1 x Rp3/4 x 76.1	6562701	115	82	60	66	30
88.9 x Rp3/4 x 88.9	6562710	130	84	67	68	30
108 x Rp3/4 x 108	6562721	155	94	78	78	30

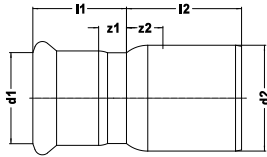
Diameters up to 54 mm have a V-profile. Diameters between 66.7-108 mm have an M-profile.

## SP8243V Reducer (press x male)



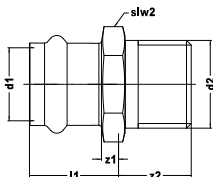
Dimension	Article No.	l1	l2	z1	z2
Ø15 x 12	6560301	31	27	13	5
Ø18 x 12	6560312	28	29	10	7
Ø18 x 15	6560334	31	28	9	6
Ø22 x 15	6560345	31	33	9	10
Ø22 x 18	6560356	31	30	9	7
Ø28 x 15	6560367	31	39	9	15
Ø28 x 18	6560378	31	37	9	13
Ø28 x 22	6560389	33	34	10	10
Ø35 x 22	6560391	33	42	10	17
Ø35 x 28	6560400	34	38	10	13
Ø42 x 22	6560411	33	51	10	15
Ø42 x 28	6560422	34	51	10	15
Ø42 x 35	6560433	35	43	10	7
Ø54 x 22	6560455	38	61	15	20
Ø54 x 28	6560466	34	58	10	17
Ø54 x 35	6560477	35	58	10	17
Ø54 x 42	6560488	48	54	12	13
Ø66.7 x 54	6562151	55	72	14	22
Ø76.1 x 42	6562160	57	97	21	42
Ø76.1 x 54	6562171	62	86	21	31
Ø88.9 x 54	6562182	61	101	20	38

## SP8243VM Reducer (press x male)



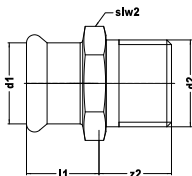
Dimension	Article No.	l1	l2	z1	z2
Ø76.1 x 66.7	6562193	64	75	14	20
Ø88.9 x 66.7	6562204	65	92	15	29
Ø88.9 x 76.1	6562226	68	90	13	27
Ø108 x 66.7	6562215	65	122	15	45
Ø108 x 76.1	6562237	68	120	13	43
Ø108 x 88.9	6562248	77	110	14	33

## SP8243GV Straight connector (press x male thread)



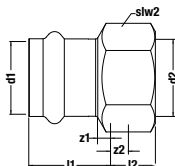
Dimension	Article No.	l1	z1	z2	slw2
12 x R3/8	6560171	18	0	17	22
15 x R3/8	6560191	23	1	17	24
15 x R1/2	6560180	24	2	21	24
18 x R1/2	6560202	23	1	21	27
18 x R3/4	6560213	29	7	18	27
22 x R1/2	6560224	25	2	21	32
22 x R3/4	6560235	24	1	24	32
22 x R1	6560246	27	4	24	34
28 x R3/4	6560268	26	2	22	38
28 x R1	6560257	25	1	26	38
35 x R1	6563007	28	3	25	45
35 x R1 1/4	6560279	26	1	31	49
42 x R1 1/2	6560281	37	1	26	55
54 x R2	6560290	42	1	32	67

## SP8243GVM Straight connector (press x male thread)



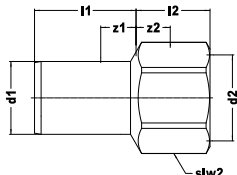
Dimension	Article No.	l1	z2	slw2
66.7 x R2 1/2	6562094	50	40	85
76.1 x R2 1/2	6562105	55	64	80
88.9 x R3	6562116	63	69	95

## SP8270GV Straight connector (press x female thread)



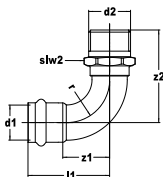
Dimension	Article No.	l1	l2	z1	z2	slw2
15 x Rp1/2	6560015	24	15	2	5	24
18 x Rp1/2	6560026	24	15	2	5	27
18 x Rp3/4	6560037	25	17	3	6	30
22 x Rp1/2	6563018	23	15	0	0	32
22 x Rp3/4	6560059	25	17	2	6	32
28 x Rp1/2	6560061	24	17	0	6	38
28 x Rp3/4	6560081	24	17	0	5	38
28 x Rp1	6560070	26	20	2	7	38
35 x Rp1	6563029	25	22	0	9	46
35 x Rp1 1/4	6560103	30	22	5	7	46
42 x Rp1 1/2	6563031	38	22	2	8	54
54 x Rp2	6563040	43	26	2	8	67

Diameters up to 54 mm have a V-profile. Diameters between 66.7-108 mm have an M-profile.

**SP8433V** Straight connector (male x female thread)

Dimension	Article No.	l1	l2	z1	z2	slw2
Ø12 x Rp3/8	6561940	25	17	7	6	19
Ø12 x Rp1/2	6561951	25	24	7	9	24
Ø15 x Rp1/2	6561962	28	23	6	8	24
Ø18 x Rp1/2	6561973	28	22	6	7	24
Ø18 x Rp3/4	6561984	28	25	6	9	34
Ø22 x Rp1/2	6561995	29	21	6	6	24
Ø22 x Rp3/4	6562006	29	24	6	8	34

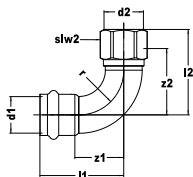
When pressing, make sure the jaws do not touch the wrench flats.

**SP8092GV** Bend 90° (press x male thread)

Dimension	Article No.	l1	z1	z2	slw2	r
12 x R3/8	6561280	36	18	42	17	15
15 x R3/8	6561302	44	22	45	19	18
15 x R1/2	6561291	44	22	50	22	18
18 x R1/2	6561313	48	26	54	22	22
22 x R3/4	6561324	55	32	62	30	27
28 x R1	6561335	63	39	74	36	34
35 x R1 1/4	6561346	73	48	86	46	42
42 x R1 1/2	6561357	93	57	96	50	51

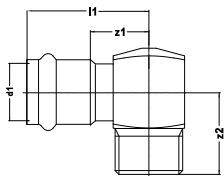


## SP8090GV Bend 90° (press x female thread)



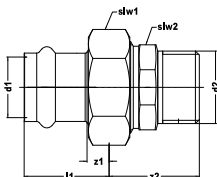
Dimension	Article No.	l1	l2	z1	z2	slw2	r
15 x Rp1/2	6560576	44	48	22	33	24	18
18 x Rp1/2	6560598	48	52	26	37	24	22
22 x Rp3/4	6560609	55	59	32	43	30	27
28 x Rp1	6563073	63	76	29	57	41	34

## SP8098GV 90° angle adapter (press x male thread)



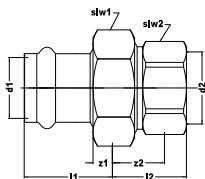
Dimension	Article No.	l1	z1	z2
15 x R3/8	6563084	44	22	22
15 x R1/2	6563095	44	22	28
18 x R1/2	6563106	45	23	28
22 x R3/4	6563117	48	25	32

## SP8331GV Three-part union, flat seal (press x male thread)



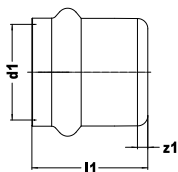
Dimension	Article No.	l1	z1	z2	slw1	slw2
15 x R1/2	6561445	34	12	35	30	25
18 x R1/2	6561456	35	13	35	30	25
22 x R3/4	6561467	37	14	40	36	32
28 x R1	6561478	38	14	44	46	39
35 x R1 1/4	6561489	40	15	48	52	49
42 x R1 1/2	6561491	47	11	47	58	51
54 x R2	6561500	53	12	54	75	65

## SP8330GV Three-part union, flat seal (press x female thread)



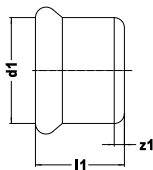
Dimension	Article No.	l1	l2	z1	z2	slw1	slw2
15 x Rp1/2	6561511	34	30	12	15	30	27
18 x Rp1/2	6561522	35	30	13	15	30	27
22 x Rp3/4	6561533	37	33	14	17	36	34
28 x Rp1	6561544	38	34	14	15	46	42
35 x Rp1 1/4	6561555	40	42	15	20	52	50
42 x Rp1 1/2	6561566	47	42	11	20	58	55
54 x Rp2	6561577	53	46	12	20	75	70

## SP8301V End coupling (1 x press)



Dimension	Article No.	l1	z1
15	6561379	25	3
18	6561381	25	3
22	6561390	26	3
28	6561401	27	3
35	6561412	29	4
42	6561423	43	7
54	6561434	48	7

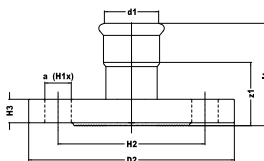
## SP8301VM End coupling (1 x press)



Dimension	Article No.	l1	z1
66.7	6562809	60	10
76.1	6562811	64	9
88.9	6562820	72	9
108	6562831	97	20

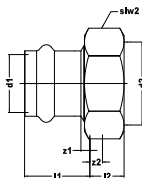
Diameters up to 54 mm have a V-profile. Diameters between 66.7-108 mm have an M-profile.

## SP8500VM Flanged connector PN10/16 (1 x press)



Dimension	Article No.	l1	z1	H1	H2	H3	a	Holes
66.7	6562732	89	39	4	145	16	18	4
76.1	6562743	112	57	4	145	16	18	4
88.9	6562754	118	55	8	160	18	18	8
108	6562765	114	37	8	180	18	18	8

## SP8359GV Coupling with nut (press x female thread)



Dimension	Article No.	l1	l2	z1	z2	slw2
18 x G3/4	6560114	35	8	13	2	25
22 x G1	6560125	37	10	14	2	32
28 x G1 1/4	6560136	38	10	14	2	39
35 x G1 1/2	6563051	40	11	15	2	52
42 x G1 3/4	6563062	47	11	11	2	52

## SP5501 O-ring\* (LBP) - EPDM black



Dimension	Article No.	
12	6569805	
15	6569816	
18	6569827	
22	6569838	
28	6569849	
35	6569851	
42	6569860	Only for galvanized steel and stainless steel
42	6673348	Only for copper
54	6569871	Only for galvanized steel and stainless steel
54	6673359	Only for copper

NB: 42 and 54 mm SudoPress EPDM O-rings are different for copper

## SP5501M O-ring - EPDM black



Dimension	Article No.	
66.7	6562919	
76.1	6562921	
88.9	6562930	
108	6562941	

*Diameters up to 54 mm have a V-profile. Diameters between 66.7-108 mm have an M-profile.*

SP8452 Flat seal - EPDM Black



Dimension	Article No.
15-18	6568122
22	6568133
28	6568144
35	6568155
42	6568166
54	6568177

R2767 Flat seal for special applications  
(green, FPM) for galvanized steel and stainless steel



Dimension	Article No.
15-18	6118301
22	6118310
28	6118321
35	6118332
42	6118343
54	6118354

## SP5501S O-ring (LBP) - FPM green



Dimension	Article No.	
15	6558519	
18	6558521	
22	6558530	
28	6558541	
35	6558552	
42*	6558563	Only for galvanized steel and stainless steel
42*	6673425	Only for copper
54*	6558574	Only for galvanized steel and stainless steel

\* NB: 42 and 54 mm SudoPress EPDM O-rings are different for copper

## SP5501SM O-ring - FPM green



Dimension	Article No.	
66.7	6562952	
76.1	6562963	
88.9	6562974	
108	6562985	

*Diameters up to 54 mm have a V-profile. Diameters between 66.7-108 mm have an M-profile.*



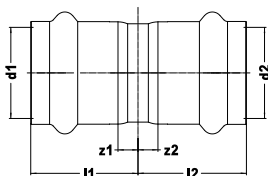


VSH 

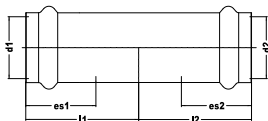


4.3 Copper

**VSH SudoPress**

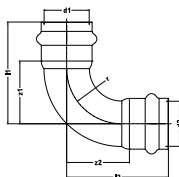
**SP5270V Straight coupling (2 x press)**

Dimension	Article No.	l1/l2	z1/z2
12	6671093	20	2
15	6671104	25	3
18	6671115	25	3
22	6671126	26	3
28	6671137	27	3
35	6671148	28	3
42	6671159	42	6
54	6671161	46	5

**SP5275V Slip coupling (2 x press)**

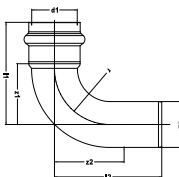
Dimension	Article No.	l1/l2	es1/es2
12	6671170	36	18
15	6671181	41	22
18	6671192	40	22
22	6671203	41	23
28	6671214	47	24
35	6671225	52	25
42	6671236	60	36
54	6671247	68	41

## SP5002V Bend 90° (2 x press)



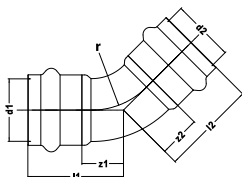
Dimension	Article No.	l1/l2	z1/z2	r
12	6670092	33	15	15
15	6670103	38	16	18
18	6670114	44	22	22
22	6670125	50	27	27
28	6670136	58	34	34
35	6670147	68	43	42
42	6670158	87	51	51
54	6670169	104	63	65

## SP5001V Bend 90° (press x male)



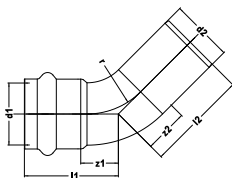
Dimension	Article No.	l1	l2	z1	z2	r
12	6670015	33	35	15	17	15
15	6670026	38	40	16	18	18
18	6670037	44	46	22	24	22
22	6670048	50	52	27	29	27
28	6670059	58	60	34	36	34
35	6670061	68	70	43	45	42
42	6670070	87	89	51	53	51
54	6670081	104	106	63	65	65

## SP5041V Bend 45° (2 x press)



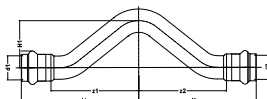
Dimension	Article No.	l1/l2	z1/z2	r
12	6670257	26	8	15
15	6670268	30	8	18
18	6670279	31	9	22
22	6670281	34	11	27
28	6670290	38	14	34
35	6670301	38	13	42
42	6670312	52	16	51
54	6670323	60	19	65

## SP5040V Bend 45° (press x male)



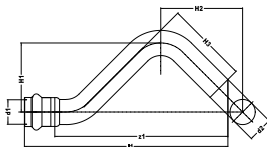
Dimension	Article No.	l1	l2	z1	z2	r
12	6670171	26	28	8	10	15
15	6670180	30	32	8	10	18
18	6670191	31	33	9	11	22
22	6670202	34	36	11	13	27
28	6670213	38	40	14	16	34
35	6670224	38	39	13	14	42
42	6670235	52	54	16	18	51
54	6670246	60	64	19	23	65

## SP5085V Crossover (2 x press)



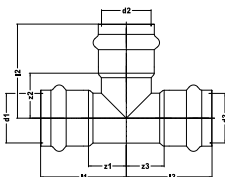
Dimension	Article No.	l1/l2	z1/z2	H1
15	6671456	69	47	27
18	6671467	73	51	29
22	6671478	81	58	31

## SP5086V Crossover (press x male)



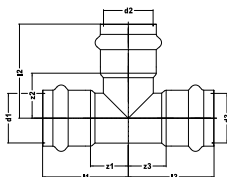
Dimension	Article No.	l1	z1	H1	H2	H3
12	6671489	118	100	26	57	14
15	6671491	128	106	28	61	19
18	6671500	135	113	31	65	20
22	6671511	154	131	35	75	23

## SP5130V Tee (3 x press)



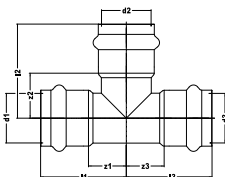
Dimension	Article No.	l1/l3	l2	z1/z3	z2
12	6670334	36	36	18	18
15	6670345	38	38	16	16
18	6670356	40	40	18	18
22	6670367	43	43	20	20
28	6670378	47	47	23	23
35	6670389	52	52	27	27
42	6670391	66	66	30	30
54	6670400	76	76	35	35

## SP5130RV T-reduced (3 x press)



Dimension	Article No.	l1/l2	l3	z1/z3	z2
12 x 15 x 12	6670411	37	38	19	16
15 x 12 x 12	6670422	38	37	16	19
15 x 12 x 15	6670433	38	37	16	19
15 x 15 x 12	6670444	38	38	16	16
15 x 18 x 15	6670455	40	40	18	18
15 x 22 x 15	6670466	43	43	21	20
18 x 12 x 18	6670477	39	39	17	21
18 x 15 x 15	6670488	40	40	18	18
18 x 15 x 18	6670499	40	40	18	18
18 x 18 x 15	6670501	40	40	18	18
18 x 22 x 18	6670510	43	43	21	20
22 x 12 x 22	6670521	39	42	16	24
22 x 15 x 15	6670532	41	45	18	23
22 x 15 x 18	6670543	41	45	18	23
22 x 15 x 22	6670554	41	45	18	23
22 x 18 x 15	6670565	42	45	19	23
22 x 18 x 18	6670576	42	45	19	23
22 x 18 x 22	6670587	42	45	19	23
22 x 22 x 15	6670598	43	43	20	20
22 x 22 x 18	6670609	43	43	20	20
22 x 28 x 22	6670611	50	47	27	23
28 x 15 x 22	6670620	45	49	21	27
28 x 15 x 28	6670631	45	49	21	27
28 x 18 x 22	6670642	45	47	21	25
28 x 18 x 28	6670653	45	47	21	25
28 x 22 x 22	6670664	45	49	21	26
28 x 22 x 28	6670675	45	49	21	26

## SP5130RV T-reduced (continuation) (3 x press)

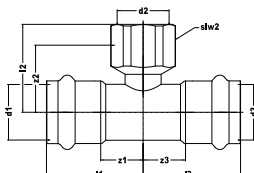


## SP5130RV T-reduced (3 x press)

Dimension	Article No.	l1/l2	l3	z1/z3	z2
28 x 28 x 15	6670686	47	47	23	23
28 x 28 x 18	6670697	47	47	23	23
28 x 28 x 22	6670708	47	47	23	23
35 x 15 x 35	6670719	49	58	24	36
35 x 18 x 35	6670721	49	56	24	34
35 x 22 x 28	6670730	49	53	24	30
35 x 22 x 35	6670741	49	53	24	30
35 x 28 x 28	6670752	49	51	24	27
35 x 28 x 35	6670763	49	51	24	27
42 x 22 x 42	6670774	59	64	23	41
42 x 28 x 42	6670785	59	60	23	36
42 x 35 x 35	6670796	58	56	22	31
42 x 35 x 42	6670807	59	56	23	31
54 x 22 x 54	6670818	64	67	23	44
54 x 28 x 54	6670829	64	65	23	41
54 x 35 x 54	6670831	64	61	23	36
54 x 42 x 42	6670840	69	71	28	35
54 x 42 x 54	6670851	69	71	28	35

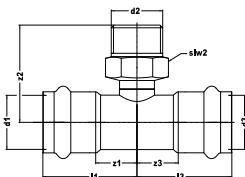


## SP4130GV Tee female branch (press x female thread x press)



Dimension	Article No.	l1/l3	l2	z1/z3	z2	slw2
12 x Rp1/2 x 12	6671764	41	21	23	8	26
15 x Rp1/2 x 15	6671775	44	22	22	9	27
18 x Rp1/2 x 18	6671786	44	24	22	11	26
22 x Rp1/2 x 22	6671797	44	26	21	13	26
22 x Rp3/4 x 22	6671808	47	29	24	14	32
28 x Rp1/2 x 28	6671819	44	29	20	16	26
28 x Rp3/4 x 28	6671821	47	32	23	17	32
35 x Rp1/2 x 35	6671830	44	33	19	19	26
42 x Rp1/2 x 42	6671841	54	36	18	23	27
54 x Rp1/2 x 54	6671852	57	42	16	29	27

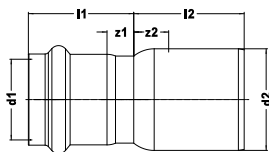
## SP4132GV Tee male branch (press x male thread x press)



Dimension	Article No.	l1/l3	z1/z3	z2	slw2
15 x R1/2 x 15	6671863*	44	22	36	
22 x R3/4 x 22	6671885*	47	24	41	27
28 x R3/4 x 28	6671896*	47	23	44	27

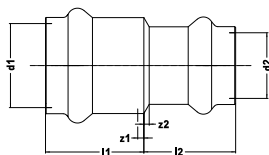
\* Terminating

## SP5243V Reducer (male x press)



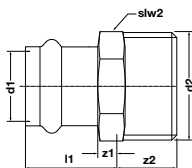
Dimension	Article No.	l1	l2	z1	z2
Ø15 x 12	6670950	24	25	3	3
Ø18 x 12	6670961	21	28	3	6
Ø18 x 15	6670972	27	27	5	5
Ø22 x 15	6670941	26	30	4	7
Ø22 x 18	6670983	25	28	3	5
Ø28 x 15	6670994	24	38	2	14
Ø28 x 18	6671005	24	35	2	11
Ø28 x 22	6671016	26	30	3	6
Ø35 x 22	6671027	26	38	3	13
Ø35 x 28	6671038	28	32	4	7
Ø42 x 22	6671049	23	56	0	20
Ø42 x 28	6671051	30	50	6	14
Ø42 x 35	6671060	27	44	2	8
Ø54 x 35	6671071	27	59	2	18
Ø54 x 42	6671082	38	33	2	12

## SP5240V Reducer (2 x press)



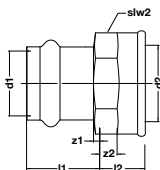
Dimension	Article No.	l1	l2	z1	z2
15 x 12	6670862	23	22	1	4
18 x 15	6670873	23	26	1	4
22 x 15	6670884	23	29	0	7
22 x 18	6670895	24	27	1	5
28 x 22	6670906	24	33	0	10
35 x 28	6670917	25	36	0	12
42 x 35	6670928	37	37	1	12
54 x 42	6670939	42	17	1	13

SP4243GV Straight connector (press x male thread)



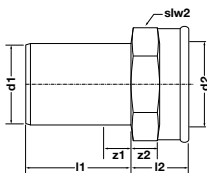
Dimension	Article No.	l1	z1	z2	slw2
12 x R3/8	6671907	23	5	11	19
12 x R1/2	6671918	25	7	15	22
15 x R3/8	6671929	28	6	11	19
15 x R1/2	6671931	28	6	15	22
15 x R3/4	6671940	29	7	16	24
18 x R1/2	6671951	28	6	15	22
18 x R3/4	6671962	29	7	16	24
22 x R1/2	6671973	29	6	15	27
22 x R3/4	6671984	29	6	16	27
22 x R1	6671995	30	7	20	30
28 x R3/4	6672006	30	6	16	32
28 x R1	6672017	30	6	19	34
28 x R1 1/4	6672028	31	7	22	43
35 x R1	6672039	31	6	19	41
35 x R1 1/4	6672041	31	6	21	41
35 x R1 1/2	6672050	33	8	21	49
42 x R1 1/4	6672061	41	5	21	48
42 x R1 1/2	6672072	41	5	21	49
54 x R1 1/2	6672083	47	6	21	60
54 x R2	6672094	48	7	26	68

## SP4270GV Straight connector (press x female thread)



Dimension	Article No.	l1	l2	z1	z2	slw2
12 x Rp3/8	6672105	20	13	2	2	20
12 x Rp1/2	6672116	20	15	2	2	24
15 x Rp3/8	6672127	24	13	2	2	20
15 x Rp1/2	6672138	24	15	2	2	24
15 x Rp3/4	6672149	25	16	3	2	30
18 x Rp1/2	6672151	24	15	2	2	24
18 x Rp3/4	6672160	24	16	2	2	30
22 x Rp1/2	6672171	24	14	1	1	27
22 x Rp3/4	6672182	25	16	2	2	30
22 x Rp1	6672193	26	19	3	2	41
28 x Rp3/4	6672204	25	16	1	1	32
28 x Rp1	6672215	26	19	2	2	41
28 x Rp1 1/4	6672226	27	21	3	2	46
35 x Rp1	6672237	28	18	3	1	41
35 x Rp1 1/4	6672248	28	21	3	2	46
42 x Rp1 1/4	6672259	37	19	1	0	48
42 x Rp1 1/2	6672261	38	21	2	2	52
54 x Rp2	6672270	43	26	2	2	68

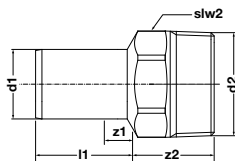
## SP4281GV Straight connector (male x female thread)



Dimension	Article No.	l1	l2	z1	z2	slw2
Ø12 x Rp1/2	6673062	26	15	8	2	24
Ø15 x Rp1/2	6673073	26	15	4	2	24
Ø18 x Rp1/2	6673084	26	15	4	2	24
Ø18 x Rp3/4	6673095	27	16	5	2	30
Ø22 x Rp1/2	6673106	27	13	4	-	24
Ø22 x Rp3/4	6673117	27	15	4	2	30
Ø28 x Rp3/4	6673128	29	15	5	0	30
Ø28 x Rp1	6673139	28	19	4	2	41
Ø35 x Rp1	6673141	33	17	8	0	40
Ø35 x Rp1 1/4	6673150	34	21	9	2	46
Ø42 x Rp1 1/2	6673161	44	21	8	2	52
Ø54 x Rp2	6673172	48	26	7	2	68

When pressing, make sure the jaws do not touch the wrench flats.

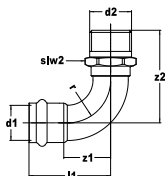
## SP4280GV Straight connector (male x male thread)



Dimension	Article No.	l1	z1	z2	slw2
Ø12 x R1/2	6672963	30	12	15	22
Ø15 x R1/2	6672974	33	11	15	22
Ø18 x R1/2	6672985	32	10	15	22
Ø18 x R3/4	6672996	33	11	16	27
Ø22 x R1/2	6673007	27	4	15	23
Ø22 x R3/4	6673018	35	12	17	28
Ø28 x R1	6673029	36	12	19	34
Ø35 x R1 1/4	6673031	30	5	21	41
Ø42 x R1 1/2	6673040	50	14	21	49
Ø54 x R2	6673051	57	16	26	68

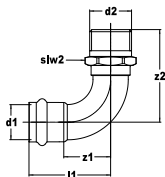
When pressing, make sure the jaws do not touch the wrench flats.

## SP4001GV Angle adapter 90° (press x male thread)



Dimension	Article No.	l1	z1	z2	slw2	r
15 x R3/8	6671533	46	24	42	21	19
15 x R1/2	6671544	45	23	48	21	19
18 x R1/2	6671555	47	25	43	24	20
18 x R3/4	6671566	47	25	47	27	20
22 x R3/4	6671577	53	30	55	28	24
28 x R1	6671588	58	34	65	34	29

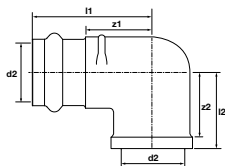
## SP4092GV Angle adapter 90° (press x male thread)



Dimension	Article No.	l1	z1	z2	slw2
15 x R1/2	6673293	43	21	35	22

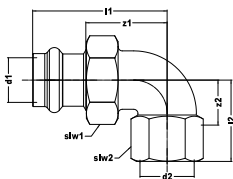


## SP4090GV Angle adapter 90° (press x female thread)



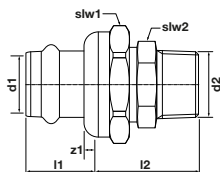
Dimension	Article No.	l1	l2	z1	z2	slw2
12 x Rp1/2	6671599	41	23	23	9	26
15 x Rp3/8	6671601	42	19	20	8	-
15 x Rp1/2	6671610	46	23	24	9	-
15 x Rp3/4	6671621	47	26	25	12	-
18 x Rp1/2	6671632	44	24	22	10	27
18 x Rp3/4	6671643	47	26	25	12	32
22 x Rp1/2	6671654	44	26	21	13	27
22 x Rp3/4	6671665	52	27	29	12	32
28 x Rp1	6671687	51	34	27	17	-

## SP4096GV Bend 90° (press x female thread)



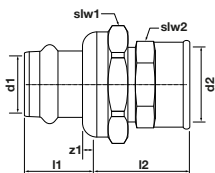
Dimension	Article No.	l1	l2	z1	z2	slw1	slw2
12 x Rp1/2	6671698	54	34	36	21	32	27
15 x Rp1/2	6671709	61	34	39	21	32	27
18 x Rp1/2	6671711	62	34	40	21	32	27
18 x Rp3/4	6671720	62	39	40	25	32	32
22 x Rp3/4	6671731	72	43	49	29	36	32
22 x Rp1	6671742	72	47	49	30	36	40

## SP4331GV Three-part union, flat seal (press x male thread)



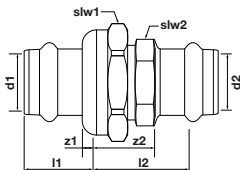
Dimension	Article No.	l1	z1	z2	slw1	slw2
12 x R3/8	6672479	28	10	28	32	24
12 x R1/2	6672481	28	10	32	32	27
15 x R1/2	6672490	30	8	32	32	27
15 x R3/4	6672501	30	8	33	32	28
18 x R1/2	6672512	37	15	32	32	27
18 x R3/4	6672523	37	15	33	32	28
22 x R1/2	6672534	32	9	35	41	30
22 x R3/4	6672545	32	9	37	41	34
22 x R1	6672556	32	9	39	41	34
28 x R1	6672567	33	9	39	50	38
35 x R1 1/4	6672578	36	11	43	55	46
42 x R1 1/2	6672589	61	25	46	60	50
54 x R2	6672591	50	9	51	75	72

## SP4330GV Three-part union, flat seal (press x female thread)



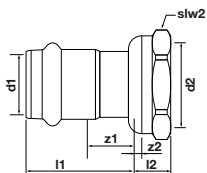
Dimension	Article No.	l1	l2	z1	z2	slw1	slw2
12 x Rp1/2	6672369	28	26	10	12	32	27
15 x Rp1/2	6672371	30	26	8	12	32	27
15 x Rp3/4	6672380	30	29	8	14	32	30
18 x Rp1/2	6672391	37	26	15	12	32	27
18 x Rp3/4	6672402	37	29	15	14	32	30
22 x Rp3/4	6672413	32	27	9	12	41	30
22 x Rp1	6672424	32	34	9	17	41	40
28 x Rp1	6672435	33	29	9	12	50	39
35 x Rp1 1/4	6672446	36	37	11	15	55	46
42 x Rp1 1/2	6672457	61	41	25	20	60	52
54 x Rp2	6672468	50	38	9	15	75	72

## SP4330V Three-part union, flat seal (press x press)



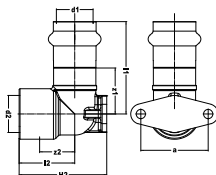
Dimension	Article No.	l1	l2	z1	z2	slw1	slw2
12	6672281	28	35	10	17	32	24
15	6672292	30	39	8	17	32	24
18	6672303	37	39	15	17	32	27
22	6672314	32	41	9	18	41	30
28	6672325	33	43	9	19	50	38
35	6672336	36	47	11	22	55	46
42	6672347	61	58	25	22	60	50
54	6672358	50	64	9	23	75	72

## SP5359GV Coupling with nut (press x female thread)



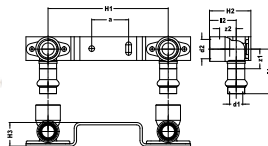
Dimension	Article No.	l1	l2	z1	z2	slw2
12 x G3/8	6671258	31	9	11	4	19
12 x G1/2	6671269	31	11	13	4	24
15 x G1/2	6671271	36	11	14	4	24
15 x G3/4	6671280	26	13	4	5	32
18 x G3/4	6671291	32	13	10	5	32
22 x G3/4	6671302	39	13	16	5	32
22 x G1	6671313	27	14	4	5	41
28 x G1 1/4	6671324	28	16	4	5	50
35 x G1 1/4	6671335	44	16	19	5	50
42 x G1 1/2	6671346	56	18	20	6	55
42 x G1 3/4	6671357	56	16	20	6	60
54 x G2	6671368	65	21	24	6	70
54 x G2 3/8	6671379	44	22	3	6	75

## SP4471GV Wall plate 90° (press x female thread)



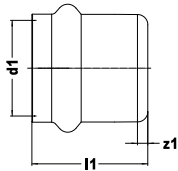
Dimension	Article No.	l1	l2	z1	z2	a	H2
12 x Rp1/2	6672600	41	23	23	9	40	35
15 x Rp1/2	6672611	46	22	24	9	40	35
18 x Rp1/2	6672622	44	24	22	10	40	39
22 x Rp3/4	6672633	47	27	24	14	50	49

## SP4976GV/SP4977GV Gemini bracket 90° (press x female thread)



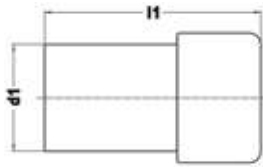
Dimension	Article No.	l1	l2	z1	z2	a	H1	H2	H3
15 x Rp1/2	6673260	44	23	22	11	50	150	14	25
15 x Rp1/2	6673271	44	23	22	11	50	150	39	0

## SP5301VW Stop end (1 x press)



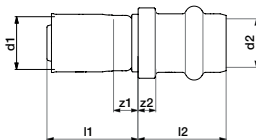
Dimension	Article No.	l1	z1
12	6671381	23.0	5.0
15	6671390	27.0	5.0
22	6671401	28.0	5.0
28	6671412	29.0	5.0
35	6671423	32.0	7.0
42	6671434	42.0	6.0
54	6671445	46.0	5.0

## SP5290V Stop end (1 x tube end)



Dimension	Article No.	l1
Ø12	6673183	24
Ø15	6673194	28
Ø18	6673205	29
Ø22	6673216	30
Ø28	6673227	33
Ø35	6673238	34
Ø42	6673249	44
Ø54	6673251	48

## P57270V Straight connector (SkinPress x SudoPress)



Dimension	Article No.	l1	l2	z1	z2
16 x 15	7011763	28	28	6	6
20 x 15	7011774	27	27	5	5
20 x 22	7011785	31	26	9	3
26 x 22	7011796	30	26	7	3

SkinPress: plastic piping system with TH-profile

## SP5501 O-ring (LBP) - EPDM black for copper



Dimension	Article No.
12	6569805
15	6569816
18	6569827
22	6569838
28	6569849
35	6569851
42	6673348
54	6673359

NB: 42 and 54 mm SudoPress EPDM O-rings are different for copper



## SP5501S O-ring (LBP) - FPM green for copper



Dimension	Article No.
15	6558519
18	6558521
22	6558530
28	6558541
35	6558552
42	6673425

NB: 42 mm SudoPress FPM O-ring is different for copper

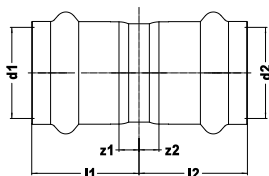




4.4 Copper Gas

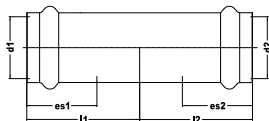
**VSH SudoPress**

## SPG5270V Straight coupling (2 x press)



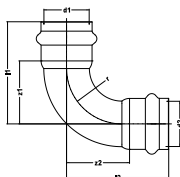
Dimension	Article No.	l1/l2	z1/z2
12	6674668	20	2
15	6674679	25	3
18	6674681	25	3
22	6674690	26	3
28	6674701	27	3
35	6674712	28	3
42	6674723	42	6
54	6674734	46	5

## SPG5275V Slip coupling (2 x press)



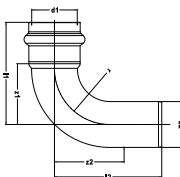
Dimension	Article No.	l1/l2	es1/es2
12	6674745	36	18
15	6674756	41	22
18	6674767	40	22
22	6674778	41	23
28	6674789	47	24
35	6674791	52	25
42	6674800	60	36
54	6674811	68	41

## SPG5002V Bend 90° (2 x press)



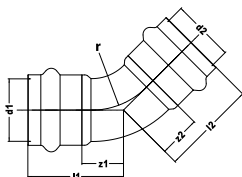
Dimension	Article No.	l1/l2	z1/z2	r
12	6674021	33	15	15
15	6674030	38	16	18
18	6674041	44	22	22
22	6674052	50	27	27
28	6674063	58	34	34
35	6674074	68	43	42
42	6674085	87	51	51
54	6674096	104	63	65

## SPG5001V Bend 90° (press x male)



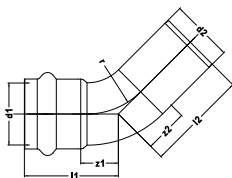
Dimension	Article No.	l1	l2	z1	z2	r
12	6673942	33	35	15	17	15
15	6673953	38	40	16	18	18
18	6673964	44	46	22	24	22
22	6673975	50	52	27	29	27
28	6673986	58	60	34	36	34
35	6673997	68	70	43	45	42
42	6674008	87	89	51	53	51
54	6674019	104	106	63	65	65

## SPG5041V Bend 45° (2 x press)



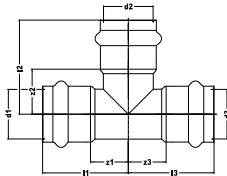
Dimension	Article No.	l1/l2	z1/z2	r
12	6674184	26	8	15
15	6674195	30	8	18
18	6674206	31	9	22
22	6674217	34	11	27
28	6674228	38	14	34
35	6674239	38	13	42
42	6674241	52	16	51
54	6674250	60	19	65

## SPG5040V Bend 45° (press x male)



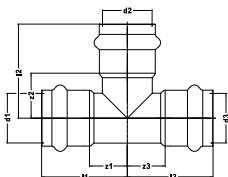
Dimension	Article No.	l1	l2	z1	z2	r
12	6674107	26	28	8	10	15
15	6674118	30	32	8	10	18
18	6674129	31	33	9	11	22
22	6674131	34	36	11	13	27
28	6674140	38	40	14	16	34
35	6674151	38	39	13	14	42
42	6674162	52	54	16	18	51
54	6674173	60	64	19	23	65

## SPG5130V Tee (3 x press)



Dimension	Article No.	l1/l3	l2	z1/z3	z2
12	6674437	36	36	18	18
15	6674448	38	38	16	16
18	6674459	40	40	18	18
22	6674461	43	43	20	20
28	6674470	47	47	23	23
35	6674481	52	52	27	27
42	6674492	66	66	30	30
54	6674503	76	76	35	35

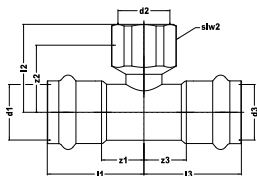
## SPG5130RV T-reduced (3 x press)



Dimension	Article No.	l1/l3	l2	z1/z3	z2
15 x 12 x 12	6674261	38	37	16	19
15 x 12 x 15	6674272	38	37	16	19
15 x 15 x 12	6674283	38	38	16	16
18 x 12 x 18	6674294	39	39	17	21
18 x 15 x 18	6674305	40	40	18	18
22 x 12 x 22	6674316	39	42	16	24
22 x 15 x 15	6674327	41	45	18	23
22 x 15 x 22	6674338	41	45	18	23
22 x 18 x 22	6674349	42	45	19	23
22 x 22 x 15	6674351	43	43	20	20
28 x 15 x 28	6674360	45	49	21	27
28 x 22 x 28	6674371	45	49	21	26
35 x 22 x 35	6674382	49	53	24	30
35 x 28 x 35	6674393	49	51	24	27
42 x 28 x 42	6674404	59	60	23	36
42 x 35 x 42	6674415	59	56	23	31
54 x 42 x 54	6674426	69	71	28	35

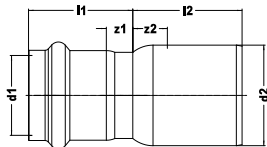


## SPG4130GV Tee female branch (press x female thread x press)



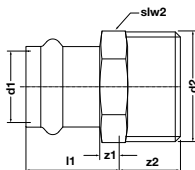
Dimension	Article No.	l1/l3	l2	z1/z3	z2	slw2
15 x Rp1/2 x 15	6673557	44	22	22	9	27
18 x Rp1/2 x 18	6673568	44	24	22	11	26
22 x Rp1/2 x 22	6673579	44	26	21	13	26
28 x Rp1/2 x 28	6673581	44	29	20	16	26
28 x Rp3/4 x 28	6673590	47	32	23	17	32
35 x Rp1/2 x 35	6673601	44	33	19	19	26
42 x Rp1/2 x 42	6673612	54	36	18	23	27
54 x Rp1/2 x 54	6673623	57	42	16	29	27

## SPG5243V Reducer (press x male)



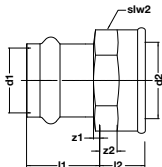
Dimension	Article No.	l1	l2	z1	z2
Ø15 x 12	6674514	24	25	3	3
Ø18 x 12	6674525	21	28	3	6
Ø18 x 15	6674536	27	27	5	5
Ø22 x 15	6674547	26	30	4	7
Ø22 x 18	6674558	25	28	3	5
Ø28 x 15	6674569	24	38	2	14
Ø28 x 18	6674571	24	35	2	11
Ø28 x 22	6674580	26	30	3	6
Ø35 x 22	6674591	26	38	3	13
Ø35 x 28	6674602	28	32	4	7
Ø42 x 22	6674613	23	56	0	20
Ø42 x 28	6674624	30	50	6	14
Ø42 x 35	6674635	27	44	2	8
Ø54 x 35	6674646	27	59	2	18
Ø54 x 42	6674657	38	33	2	12

## SPG4243GV Straight connector (press x male thread)



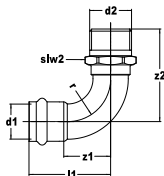
Dimension	Article No.	l1	z1	z2	slw2
15 x R1/2	6673678	50	9	15	72
15 x R3/4	6673689	28	10	17	24
18 x R1/2	6673691	28	10	12	27
18 x R3/4	6673700	30	8	12	27
22 x R1/2	6673711	37	15	12	27
22 x R3/4	6673722	37	15	14	30
22 x R1	6673634	30	8	14	30
28 x R3/4	6673733	32	9	12	30
28 x R1	6673645	32	9	17	40
28 x R1 1/4	6673744	31	7	22	43
35 x R1	6673656	33	9	12	39
35 x R1 1/4	6673766	36	11	15	46
35 x R1 1/2	6673755	33	8	21	49
42 x R1 1/4	6673788	41	5	21	48
42 x R1 1/2	6673777	41	5	21	49
54 x R1 1/2	6673799	47	6	21	60
54 x R2	6673667	48	7	26	68

## SPG4270GV Straight connector (press x female thread)



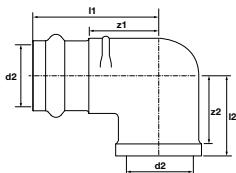
Dimension	Article No.	l1	l2	z1	z2	slw2
15 x Rp1/2	6673832	37	15	26	12	27
15 x Rp3/4	6673843	37	15	29	14	30
18 x Rp1/2	6673854	32	9	27	12	30
18 x Rp3/4	6673865	33	9	29	12	39
22 x Rp1/2	6673876	61	25	41	20	52
22 x Rp3/4	6673887	50	9	38	15	72
22 x Rp1	6673801	36	11	37	15	46
28 x Rp1	6673810	28	10	35	17	24
35 x Rp1 1/4	6673898	33	9	43	19	38
42 x Rp1 1/2	6673909	38	21	2	2	52
54 x Rp2	6673821	43	26	2	2	68

## SPG4001GV Bend 90° (press x male thread)



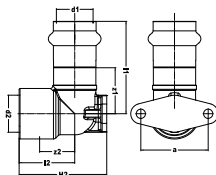
Dimension	Article No.	l1	z1	z2	slw2	r
15 x R1/2	6673447	45	23	48	21	19
18 x R1/2	6673458	47	25	43	24	20
18 x R3/4	6673469	47	25	47	27	20
22 x R3/4	6673471	53	30	55	28	24
28 x R1	6673436	58	34	65	34	29

## SPG4090GV Angle adapter 90° (press x female thread)



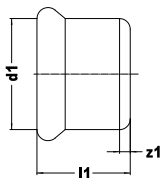
Dimension	Article No.	l1	l2	z1	z2	slw2
15 x Rp1/2	6673502	46	23	24	9	-
18 x Rp1/2	6673513	44	24	22	10	27
18 x Rp3/4	6673524	47	26	25	12	32
22 x Rp1/2	6673535	44	26	21	13	27
22 x Rp3/4	6673546	52	27	29	12	32
22 x Rp1	6673480	51	30	28	13	41
28 x Rp1	6673491	51	34	27	17	45

## SPG4471GV Wall plate 90° (press x female thread)



Dimension	Article No.	l1	l2	z1	z2	a	H2
15 x Rp1/2	6673911	46	22	24	9	40	35
18 x Rp1/2	6673920	44	24	22	10	40	39
22 x Rp3/4	6673931	47	27	24	14	50	49

SPG5301V Stop end (1 x press)



Dimension	Article No.	l1	z1
15	6674822	27	5
18	6674833	27	5
22	6674844	28	5
28	6674855	29	5
35	6674866	32	7
42	6674877	42	6
54	6674888	46	5

SPG5501 O-ring HNBR yellow for copper



Dimension	Article No.
12	6674899
15	6674901
18	6674910
22	6674921
28	6674932
35	6674943
42	6674954
54	6674965

VSH 



4.5 Tools and accessories

**VSH SudoPress**

## P5991/5999V Novopress V-profile pressing tools



	Dimension	Article No.
ACO102 + 2 x 1.5 Ah batteries + charger + case	12-35	6341302
ACO102 + 1 x 3.0 Ah battery + charger + case	12-35	6341324
PB1 'V' jaw	12	6580002
PB1 'V' jaw	15	6580013
PB1 'V' jaw	18	6580024
PB1 'V' jaw	22	6580035
PB1 'V' jaw	28	6580046
PB1 'V' jaw	35	6580057

## P6013/6014/6015 Novopress pressing tools



	Dimension	Article No.
ECO203 + case	12-54	6342094
ACO203BT + battery + charger + case	12-54	6342325
ACO203XL + 2 x 3.0 Ah batteries + charger + case	12-108	6342226
ACO203XL + slings + ZB221 and ZB222 adapt-ers + 2 x 3.0 Ah batteries + charger + cases	66.7-76.1-88.9-108	6342248



## P5989B/5990V/6016 Novopress V-profile pressing jaws/slings



	Dimension	Article No.
PB2 'V' jaw	12	6580068
PB2 'V' jaw	15	6580079
PB2 'V' jaw	18	6580081
PB2 'V' jaw	22	6580090
PB2 'V' jaw	28	6580101
PB2 'V' jaw	35	6580112
PB2 'V' jaw	42	6580123
PB2 'V' jaw	54	6580134
ZB203 Adapter	35-42-54	6580145
Snap-on 'V' sling	42	6580156
Snap-on 'V' sling	54	6580167
ZB221 Adapter	66.7-76.1-88.9-108	6341896
ZB222 Adapter	108	6341907
Snap-on 'M' sling	66.7	6341390
Snap-on 'M' sling	76.1	6341401
Snap-on 'M' sling	88.9	6341412
Snap-on 'M' sling	108	6341423

*Diameters up to 54 mm have a V-profile. Diameters between 66.7-108 mm have an M-profile.*

## P5997 Novopress pressing tools



	Dimension	Article No.
ECO301 + case	12-108	6205507
ECO301 + cases + ZB323 and ZB324 adapter + slings	76.1-88.9-108	6341764

## P5989B Novopress pressing jaws



	Dimension	Article No.
ZB323 Adapter	66.7-76.1-88.9-108	6341434
ZB324 Adapter	108	6341445
Snap-on 'M' sling	66.7	6341390
Snap-on 'M' sling	76.1	6341401
Snap-on 'M' sling	88.9	6341412
Snap-on 'M' sling	108	6341423
Snap-on 'M' sling + ZB323 adapter + case	76.1-88.9	6341456
Snap-on 'M' sling + ZB323 and ZB324 adapters + case	108	6341467
Snap-on 'M' sling + ZB324 adapter + case	108	6341478
Snap-on 'M' sling + ZB222 adapter + case	108	6342281
Snap-on 'M' sling + ZB221 and ZB222 adapters + case	108	6342292

## P5990/5991/5997/6013/6016 Cases



	Article No.
Case for ACO102	6342039
Case for ECO/ACO203 (XL)	6342028
Case for ECO301	6341533
Case for snap-on slings 42-54 + adapter	6342303
Case for snap-on slings 66.7-108 + adapters	6342261

## P5991/6002 Battery + charger



	Article No.
ACO102 (12V) 3.0 Ah battery	6341271
ACO102 (12V) 1.5 Ah battery	6341269
ACO102 (12V) charger	6341280
ACO202/203 (18V) 1.5 Ah battery	6340136
ACO202/203/401 (18V) 3.0 Ah battery	6340147
ACO202/203/401 charger	6340125

P2743 Deburring tool



Dimension	Article No.
12-54	6211898

P1440 Stripping tool for PP coating



Dimension	Article No.
15	6211843
18	6211854
22	6211865
28	6211876
35-54	6211887

## P1441 Blades for stripping tool P1440

Dimension	Article No. Snap-on
15-18	6212019
22-28	6212021
35-54	6212030

**VSH offers the best solutions for Integrated Piping Systems. Integrated Piping Systems consist of various product ranges for connection technology and valve technology that together create the ultimate solution for top quality integrated systems.**

## Connection technology

**The connection technology section contains a range of intelligent products using a variety of connection technologies in both metal and plastic. These products are designed to meet all of your connection requirements.**

### VSH XPress

Piping systems with M-profile press fittings in four types of material: carbon steel, copper, stainless steel and cunifer. Suitable for heating, cooling, water, gas, solar, compressed air and fire protection systems in residential and commercial buildings, shipbuilding and industry.

### VSH SudoPress

Piping systems with V-profile press fittings in copper, galvanised steel and stainless steel, suitable for heating, water, gas and solar systems.

### VSH MultiPress

A plastic piping system with multi-profile press fittings for applications in areas such as sanitary, gas and heating systems.

### VSH PowerPress

A piping system with DW-profile press fittings specially designed for thick-walled steel pipes; suitable for heating, cooling, compressed air and sprinkler systems.

### VSH Shurjoint

A piping system with grooved connectors suitable for heating, cooling, compressed air, sprinkler and potable water systems.

### VSH Super

Compression fittings for potable water, gas, heating and solar systems. Suitable for steel, copper, stainless and plastic tubes.

### VSH Tectite

Push fittings in copper, brass and stainless steel, suitable for potable water, heating and compressed air systems.

## Valve technology

**The connection technology product lines can seamlessly be combined with our valve technology products in order to create a single integrated system with consistently high quality. In this technology area, we offer various product ranges to enable you to find a suitable solution for every valve-related challenge imaginable.**

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