aalberts integrated piping systems

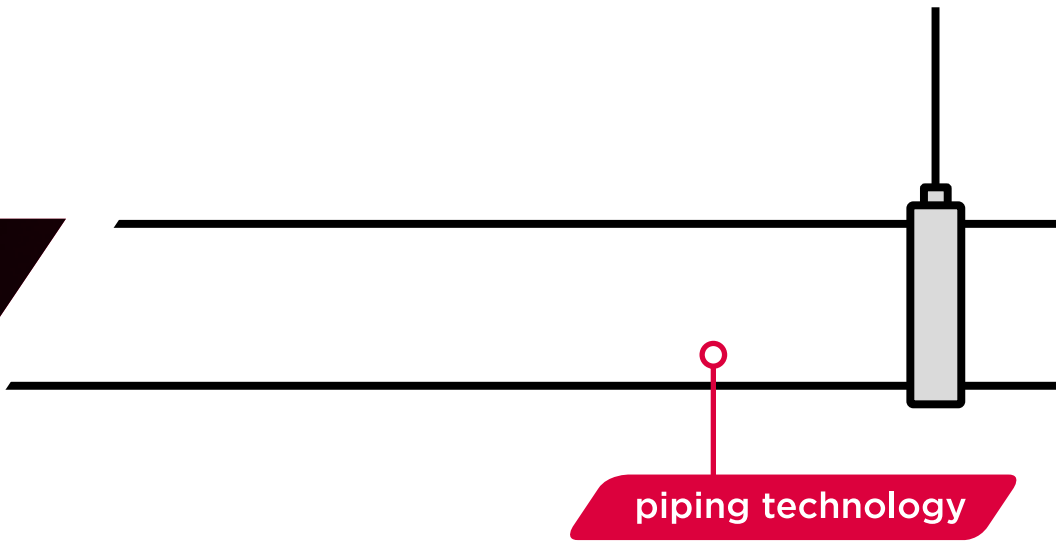
VSH Tectite

EN technical manual

contents

Aalberts integrated piping systems

don’t just buy products, buy solutions.



we are Aalberts integrated piping systems

Aalberts integrated piping systems engineers the most advanced integrated piping systems for the distribution and control of liquids and gases for key verticals, like industrial, utilities, commercial and residential. We offer fully integrated piping systems in valve, connection, fastening and piping technology. We work hand-in-hand with our customers to create the perfect integrated piping system, that meets their requirements. Our piping systems are easy to specify, install, control and maintain, saving important preparation and installation time. We meet the highest quality and industry standards needed in the selected verticals. We are the only business that truly offers its customers a single sourced and complete integrated piping solution, each and every time.
Don't just buy products, buy solutions.

our mission

With our integrated piping systems, supported by the unique Aips Digital Design Service, we ensure that you will always get the best and easiest solution for the installation of an integrated piping system. From the moment that your plan is being sketched out on the digital drawing board, you can get advice on complete and tailored solutions. With the Aips Revit Plug-in you have digital access to the complete product offering within Aalberts integrated piping systems. This information is always accessible and up to date, allowing the design of an optimal and economically attractive installation that will meet all your demands. So whether the task is project conception, installation, or on-going maintenance, we are the company that truly delivers a complete system and service offering. Our know-how, our can-do attitude, and our relentless innovation come as standard. We will sweat the small stuff in our quest to find the perfect solutions, even if we have to invent them.
This is how we deliver excellence.

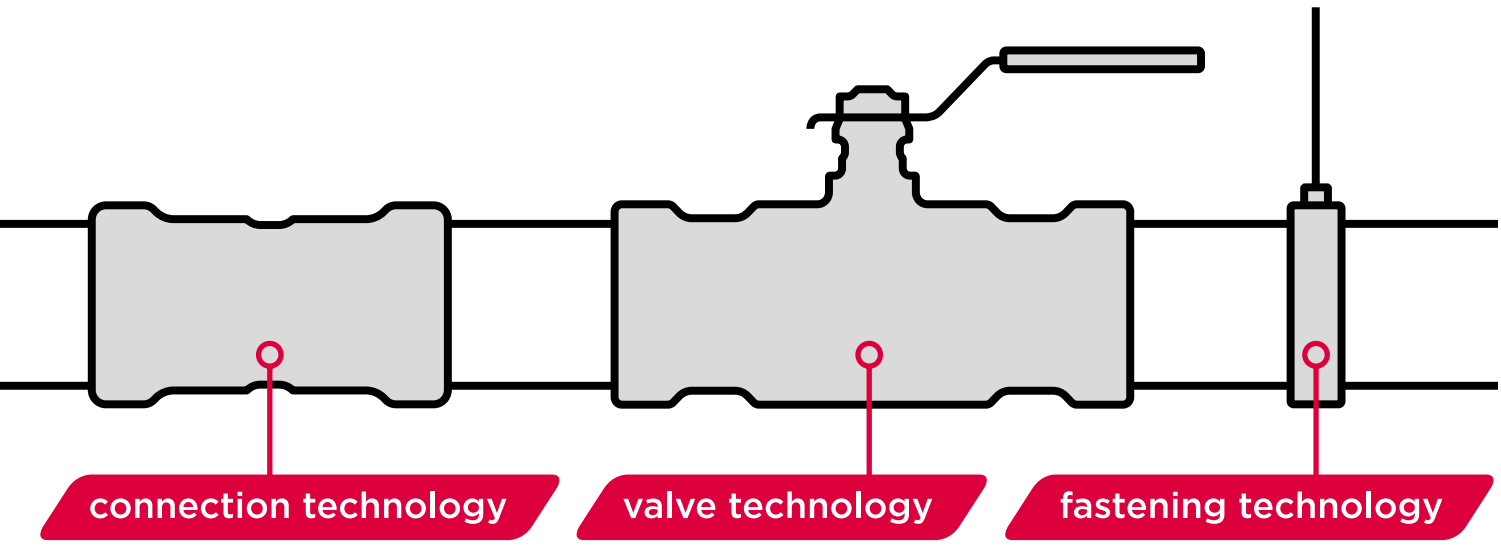
our way of working

We operate from various regions around the globe: America, United Kingdom, Middle East, Asia Pacific and Europe. As we have multiple locations in many countries, we are always close to our customers. More than 3500 mission critical employees are persistent to offer the best integrated piping system. They work on our products, solutions and services every day. No matter how big the opportunity is, when we say we've got this, we won't let go until there is nothing left to learn. We improve ourselves by exchanging knowledge and experience to stay ahead of our competitors.
Good is never good enough.

With our sustainable spirit we contribute to circularity every single day. This belief is strongly linked to the way we do business. Rethink, reduce and recycle. We are entrepreneurial and take ownership in everything we do. We are convinced that self-development and diversity is essential.
The Aalberts way, winning with people.

the strength of Aalberts integrated piping systems

- the perfect solution for every project
- smart, fast and efficient installation
- valuable advice from the drawing board to delivery
- a very wide product range



For more information about Aalberts integrated piping systems, go to www.aalberts-ips.eu

Aalberts integrated piping systems connect: our systems are easy to combine with each other

Aalberts integrated piping systems is the combination of different companies with a strong legacy in their markets. The individual brands are well-known and each represents a long history. Together they offer the best integrated piping system for now and in the future.

our product lines

We offer product ranges that:

- connect seamlessly
- are available in dimensions from 6 mm up to 104" (DN2600)
- can be used for thick-walled pipe and thin-walled metal or plastic tube
- have press, compression, groove and push connections
- can be expanded with valves and accessories
- are BIM ready

Connection technology

VSH

VSH has been supplying quality products for 90 years and delivers piping systems and fittings throughout the world. In the 1970's VSH brought the well-known VSH Super compression fitting on the market which is still a best-seller, followed by the VSH XPress pressfitting, a technology that makes it possible to realize a connection even faster and more reliable.

Shurjoint

The history of Shurjoint dates back to 1974, when the founders produced their first grooved couplings. These first couplings were produced from malleable iron, the casting material of choice at this time. Shurjoint is recognized as a world leader in the design and manufacture of mechanical piping components.

Valve technology

Apollo

Apollo Valves has been supplying the commercial and industrial valve markets since 1928. The valves, with their signature yellow handles, are designed and manufactured in their state-of-the-art facilities in the Carolinas, USA. Apollo's vertical manufacturing integration assures better quality control, better cost control, and the shortest delivery lead times possible for their range of ball valves, automation products, safety relief valves, backflow preventers and plumbing/heating products

VSH PowerPress®

material	carbon steel
suitable for	thick-walled steel
connection	press / DW-profile
dimensions	½" - 2" (DN15 – DN50)

VSH SudoPress

material	carbon steel / stainless steel / copper
suitable for	carbon steel / stainless steel / copper
connection	press / V-profile
dimensions	12 – 108 mm (DN10 – DN100)

VSH XPress

material	carbon steel / stainless steel / copper / cunifer
suitable for	carbon steel / stainless steel / copper / cunifer
connection	press / M-profile
dimensions	12 – 108 mm (DN10 – DN100)

VSH Shurjoint

material	ductile iron / stainless steel
suitable for	thick-walled steel / stainless steel / HDPE
connection	groove
dimensions	½" - 104" (DN15 – DN2600)

VSH Super

material	brass
suitable for	carbon steel / stainless steel / copper / plastic
connection	compression
dimensions	6 – 54 mm (DN4 – DN50)

VSH SmartPress

material	stainless steel
suitable for	stainless steel (schedule 5S/10S)
connection	press / V-profile (ASP)
dimensions	½" - 2" (DN15 – DN50)

Apollo Valves

material	brass / bronze / carbon steel / stainless steel
suitable for	steel / carbon steel / stainless steel / copper
connection	threaded / press / push / flange
dimensions	DN15 – DN300

Apollo ProFlow

material	brass / ductile iron
suitable for	carbon steel / stainless steel / copper / plastic
connection	threaded / press / flange
dimensions	DN15 – DN300

Seppelfricke

material	brass
suitable for	steel / carbon steel / stainless steel / copper
connection	press (V & M profile) / threaded
dimensions	10 – 54 mm (DN8 – DN50)

VSH MultiPress

material	PPSU / brass
suitable for	plastic
connection	press / U & TH profile
dimensions	14 – 63 mm (DN10 – DN50)

VSH UltraLine

material	PPSU / brass / PVDF
suitable for	plastic
connection	sliding sleeve
dimensions	14 – 32 mm (DN10 – DN25)

VSH Tectite

material	copper / brass / stainless steel
suitable for	copper / carbon steel / stainless steel
connection	push
dimensions	10 – 54 mm (DN8 – DN50)

VSH Tectite

All VSH Tectite fittings are produced in a fully automated factory. We maintain strict quality control in the production process, with all products subjected to an extremely precise test procedure. Our end-to-end process provides continuity of manufacturing and testing, ensuring the highest level of reliability and quality. Our complete range of VSH Tectite fittings technology and expertise, ensure the accuracy, flexibility and system efficiency essential to building applications.

This technical manual provides information on the complete product range of VSH Tectite which includes (demountable) push fittings, valves and tools. For compatible tubes, please see the tube section in this manual.

VSH Tectite advantages

- quick and clean installation without using tools
- low installation costs: fewer consumables required & no expensive tooling
- perfect installation in small and hard-to-reach spaces
- perfectly clean internal bore (less finishing/cleaning required)
- improved safety due to installation without tools with open flame heat source
- fully stress-free installation; fittings can be rotated and tubes can be realigned afterwards
- demountable and suitable for remounting
- strong and reliable
- improved installation time over traditional methods
- the system does not have to be dry for effective sealing

time saving and cost saving installation

VSH Tectite fittings makes jointing faster and more cost effective than other jointing methods. A fittings system which simply pushes together in seconds to create a perfect joint, every time.

Time saving and cost-saving installation for many types of plumbing and heating services. For commercial, domestic and public utility applications including:

- all above ground hot and cold domestic and commercial water services
- heating and chilled water services (potable and non-potable)
- low temperature, hot water and heating
- smallbore or minibore central heating systems
- pressurised, vented and unvented heating systems

After installation, the tube can be rotated in the fitting which makes it easy to align tubes at branches or bends. VSH Tectite provides flexibility in rigid piping systems. To install VSH Tectite fittings no tools are required and installation is performed manually without an external heat source. The result is unobstructed flow and a drastically reduced installation time compared to traditional methods.

benefits

VSH Tectite push fittings make installing a piping system quick and easy. VSH Tectite is a professional connection method that lowers your installation costs. VSH Tectite fittings are very stable and mechanically strong. The fittings also have a sleek, low-profile appearance, making them suitable for exposed installations and are provided with a stainless steel grab ring with ‘grab first’ design, removing the risk of full bore failure. The alignment ring enables centrering the tube while installing. VSH Tectite fittings are also easy to insulate.

a perfect solution for all situations

VSH Tectite is a strong and reliable piping system that can be installed without a heat source. Ideal for a wide variety of applications, such as maintenance or renovation of existing systems, as well as installation of complete systems in new builds and large commercial projects. Especially in combination with VSH XPress or VSH SudoPress, VSH Tectite offers many benefits, such as the ability to realign tubes and easy production of prefab installations. This allows you to add flexibility to rigid piping systems.

VSH Tectite push fittings are ideal in situations where:

- prefab installations need to be connected
- very fast installation is required
- tubes need to be aligned after installation
- work must be performed in confined spaces (e.g. in ducts)
- electrical tools are not allowed at the work site

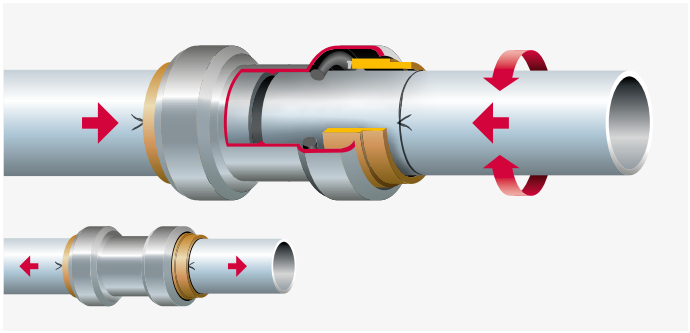
application areas

Using VSH Tectite fittings helps reducing installation costs for all types of installations, including:

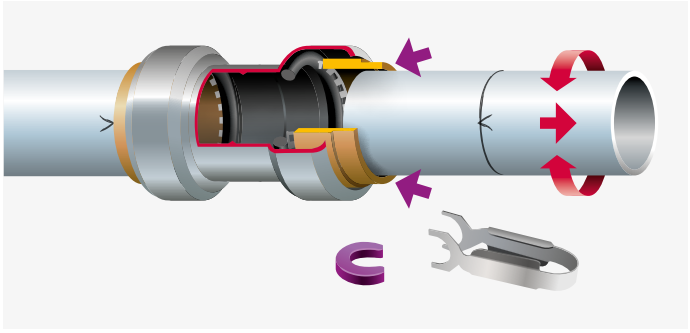
- sanitary and central heating installations for residential or commercial buildings
- heating and cooling systems (including potable water)
- heating and low-temperature hot water
- pressurised heating systems, either vented or unvented

mounting, demouting and remounting fittings

The VSH Tectite Classic, Pro, Air and 316 range fittings are demountable. After demounting these fittings are suitable for remounting. See more detailed information in the instruction guidelines on page 24



(re)mounting a connection. Push the fitting and tube slightly rotating into eachother with equal pressure up to the insertion depth mark. Check the connection by pulling the tube



demounting a connection. Depress in the plastic guiding collar with a demounting tool and remove the tube by pulling it out of the fitting with a twisting movement

versatility and choice

VSH Tectite offers a range of high-quality push fittings made of copper, brass or stainless steel. A wide range of fittings for use with many different types of tube materials, including copper tube, carbon steel tube, stainless steel tube and plastic multilayer barrier tube

choice of non-demountable or demountable fittings.

VSH Tectite

technical data

applications

potable water installations

VSH Tectite fittings are suitable for domestic hot and drinking water.

VSH Tectite Sprint copper pushfittings with copper tube that fulfill BS EN 1057

o-rings	EPDM
operating temperature	-24°C to 114°C
max. temperature	114°C (short term)
max. operating pressure	20 bar

VSH Tectite Sprint copper pushfittings with PEX tube with liner that fulfill BS 7291 Part 3

o-rings	EPDM
operating temperature	-20°C to 92°C
max. temp (short term)	92°C
max. operating pressure	12 bar

VSH Tectite Classic brass pushfittings with copper tube that fulfill BS EN 1057

o-rings	EPDM*
operating temperature	-24°C to 95°C
max. temperature	95°C (short term)
max. operating pressure	16 bar

VSH Tectite Classic brass pushfittings with PB tube with liner that fulfill BS 7291 Part 2

o-rings	EPDM
operating temperature	-20°C to 92°C
max. temperature	92°C (short term)
max. operating pressure	12 bar

VSH Tectite Classic brass pushfittings with PEX tube with liner that fulfill BS 7291: Part 3

o-rings	EPDM
operating temperature	-20°C to 92°C
max. temperature	92°C (short term)
max. operating pressure	12 bar

VSH Tectite Pro brass pushfittings (<28 mm) with copper tube that fulfill BS EN 1057

o-rings	EPDM
operating temperature	-24°C to 114°C
max. temperature	114°C (short term)
max. operating pressure	20 bar

VSH Tectite Pro brass pushfittings (>28 mm) with copper tube that fulfill BS EN 1057

o-rings	EPDM
operating temperature	-24°C to 90°C
max. temperature	90°C (short term)
max. operating pressure	16 bar

VSH Tectite 316 stainless pushfittings (<28 mm) with stainless tube that fulfill EN 10312

o-rings	EPDM
operating temperature	-24°C to 114°C
max. temperature	114°C (short term)
max. operating pressure	20 bar

VSH Tectite 316 stainless pushfittings (>35 mm) with stainless tube that fulfill EN 10312

o-rings	EPDM
operating temperature	-24°C to 90°C
max. temp (short term)	90°C
max. operating pressure	16 bar

heating installations

VSH Tectite Sprint copper pushfittings with copper tube that fulfill BS EN 1057

o-rings	EPDM
operating temperature	-24°C to 114°C
max. temperature	114°C (short term)
max. operating pressure	20 bar

VSH Tectite Sprint copper pushfittings with PEX tube with liner that fulfill BS 7291 Part 3

o-rings	EPDM
operating temperature	-20°C to 92°C
max. temperature	92°C (short term)
max. operating pressure	12 bar

VSH Tectite Classic brass pushfittings with copper tube that fulfill BS EN 1057

o-rings	NBR
operating temperature	-24°C to 95°C
max. temperature	92°C (short term)
max. operating pressure	12 bar

VSH Tectite Classic brass pushfittings with PB tube with liner that fulfill BS 7291 Part 2

o-rings	NBR
operating temperature	-20°C to 92°C
max. temperature	92°C (short term)
max. operating pressure	12 bar

VSH Tectite Classic brass pushfittings with PEX tube with liner that fulfill BS 7291: Part 3

o-rings	EPDM
operating temperature	-20°C to 92°C
max. temperature	92°C (short term)
max. operating pressure	12 bar

* Ethylene Propylene Diene Monomer

VSH Tectite Pro brass pushfittings (< 28 mm) with copper tube that fulfill BS EN 1057

o-rings	EPDM
operating temperature	-24°C to 114°C
max. temperature	114°C (short term)
max. operating pressure	20 bar

VSH Tectite Pro brass pushfittings (>28 mm) with copper tube that fulfill BS EN 1057

o-rings	EPDM
operating temperature	-24°C to 90°C
max. temp (short term)	90°C
max. operating pressure	16 bar

VSH Tectite 316 stainless pushfittings (<28 mm) with stainless tube that fulfill EN 10312

o-rings	EPDM
operating temperature	-24°C to 114°C
max. temperature	114°C (short term)
max. operating pressure	20 bar

VSH Tectite 316 stainless pushfittings (> 35 mm) with stainless tube that fulfill EN 10312

o-rings	EPDM
operating temperature	-24°C to 90°C
max. temperature	90°C (short term)
max. operating pressure	16 bar

cooling installations

VSH Tectite Sprint copper pushfittings with copper tube that fulfill BS EN 1057

o-rings	EPDM
operating temperature	-24°C to 114°C
max. temp (short term)	114°C
max. operating pressure	20 bar

VSH Tectite 316 stainless pushfittings (<28 mm) with stainless tube that fulfill EN 10312

o-rings	EPDM
operating temperature	-24°C to 114°C
max. temperature	114°C (short term)
max. operating pressure	20 bar

VSH Tectite 316 stainless pushfittings (>35 mm) with stainless tube that fulfill EN 10312

o-rings	EPDM
operating temperature	-24°C to 90°C
max. temperature	90°C (short term)
max. operating pressure	16 bar

compressed air installations

VSH Tectite Air brass pushfittings with copper tube that fulfill BS EN 1057

o-rings	EPDM
operating temperature	-20°C to 92°C
max. temperature	92°C (short term)
max. operating pressure	12 bar

VSH Tectite Air brass pushfittings with PB tube with liner that fulfill BS 7291: Part 2 and BS 7291: Part 3

o-rings	EPDM
operating temperature	-20°C to 92°C
max. temperature	92°C (short term)
max. operating pressure	12 bar

Compressed air systems must be properly tested as soon as the installation work is finished. The system designer and installation contractor must ensure that 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.

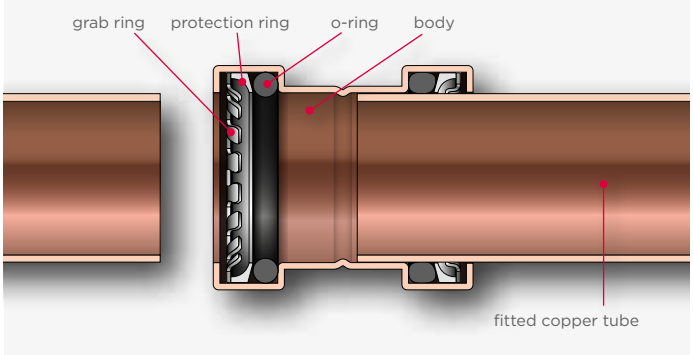
The provisions of Directive 2014/68 / EU (15 May 2014) of the European Parliament and Council, on harmonization of legal provisions apply in all Member States for offering pressure equipment to the market (Pressure Equipment Directive - PED). These must be observed during installation.

Please note that Article 3 (subsection 3) of the PED applies to Aalberts integrated piping systems. This means that only sound design and safe instructions for use and maintenance are required.

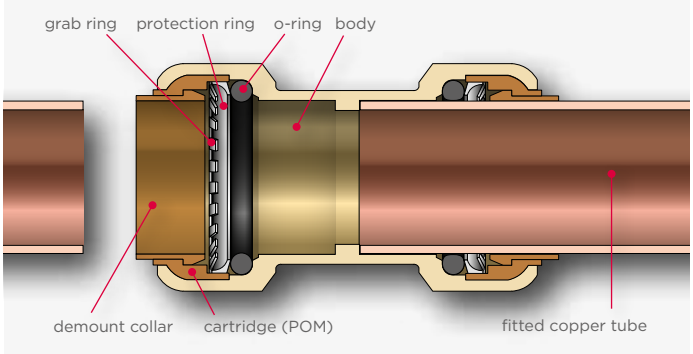
fittings

fittings construction

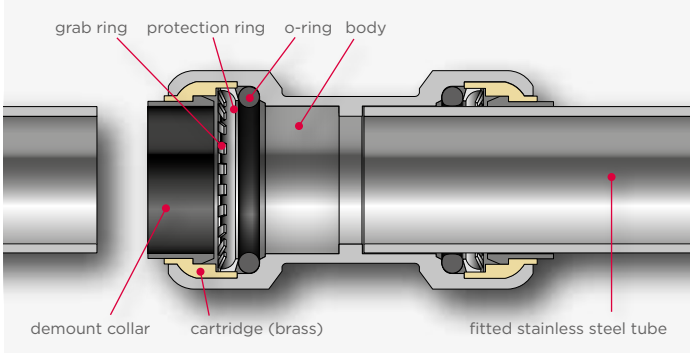
VSH Tectite Sprint



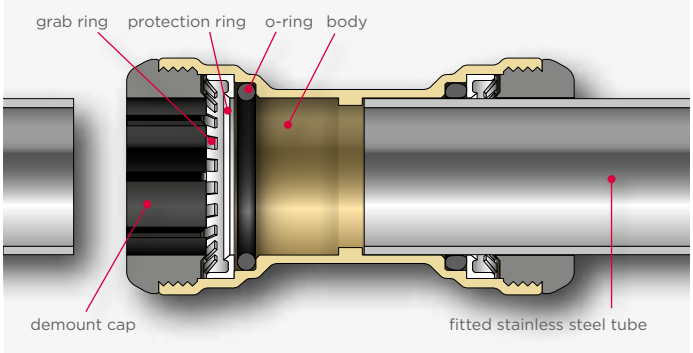
VSH Tectite Classic/Air



VSH Tectite 316



fitting construction VSH Tectite Pro & 316 (35-54 mm)



The VSH Tectite range

The complete VSH Tectite range consists of:

- VSH Tectite Sprint copper push fittings
- VSH Tectite Classic brass push fittings
- VSH Tectite Air brass push fittings
- VSH Tectite Pro brass push fittings
- VSH Tectite 316 stainless steel push fittings
- VSH Tectite valves

VSH Tectite Sprint copper fittings:

VSH Tectite Sprint non-demountable fittings are ideal for fast and efficient heat free jointing, offering a visually appealing, low profile design. They can be easily installed in confined spaces and are easy to insulate. VSH Tectite Sprint fittings are known for their quality and reliability.

features

- available in sizes 12 to 28 mm
- manufactured from copper or machined brass
- can be used with copper tube and PEX tube (with liners) or chrome plated copper tube
- provides electrical continuity
- suitable for use on hot and cold water services, heating and chilled water* applications and low temperature hotwater services
- provided with all relevant approvals

VSH Tectite Classic brass fittings:

The original VSH Tectite fitting has been proven in the field for over 25 years, VSH Tectite Classic can be used for applications where demountable fittings are required.

features

- demountable and suitable for remounting
- available in sizes 10 to 28 mm
- manufactured from brass or gunmetal
- can be used with copper tube, PB and PEX pipe (with liner) or chrome plated copper tube
- chrome plate version available on selected fittings
- recognizable by brown coloured demount collars
- easy to insulate
- suitable for use on hot and cold water services, heating applications and low temperature hot water services
- provided with all relevant approvals

* Brass adaptors are only suitable for chilled water when wrapped. Chrome plate version available on selected fittings

VSH Tectite Air brass fittings:

The Air range of products are designed specially to be used for compressed air (pneumatic) applications. they are not recommended for use with fuels, spirits, explosive gases and petroleum.

features

- specially adapted fittings for compressed air systems
- demountable and suitable for remounting
- available in sizes 15 to 28 mm
- silicone free
- oil resistant NBR o-ring providing complete impermeability even if the air contains oil
- suitable for connections to copper tube, PB tube (with liner) and PEX tube
- recognizable by black coloured demount collars

VSH Tectite Pro brass fittings:

VSH Tectite Pro demountable fittings have been specially developed to meet the rigorous demands of the mechanical services sector.

features

- demountable and suitable for remounting
- available in sizes 15 to 54 mm
- manufactured from brass or gunmetal
- provides electrical continuity
- can be used with copper tube, PB and PEX pipe, chrome plated copper tube or carbon steel tube
- sizes up to 28 mm are recognizable by black coloured demount collars, sizes 35 to 54 mm are supplied with black coloured demountable caps
- easy to insulate
- designed for use in the mechanical services sector on hot and cold services, heating applications and low temperature hot water services and chilled water applications
- provided with all relevant approvals

VSH Tectite 316 stainless steel fittings:

VSH Tectite 316 is a stainless steel option which has been developed for use with stainless tube for potable water applications where water quality and hygiene are key considerations.
The VSH Tectite 316 range incorporates a stainless steel grab ring which has been specifically developed to grip stainless steel tube without the need for it to be scribed.

features

- demountable and suitable for remounting
- available in sizes 15 to 54 mm
- manufactured from stainless steel 316
- provides electrical continuity
- easy to insulate
- can be used with stainless steel tube (1.4401 and 1.4521)
- sizes up to 28 mm are recognizable by black coloured demount collars, sizes 35 to 54 mm are supplied with black coloured demountable caps
- designed for hot and cold, chilled water applications and low temperature hot water services
- provided with all relevant approvals

overview

feature	VSH Tectite Sprint	VSH Tectite Classic	VSH Tectite Air	VSH Tectite Pro	VSH Tectite 316
size range	12 to 28 mm	10 to 28 mm	15 to 28 mm	15 to 54 mm	15 to 54 mm
demountable	no	yes	yes	yes	yes
electrical continuity	yes	no	no	yes	yes
applications	potable water, heating, hot water, cold water, gray/ rain water, chilled water	potable water, heating, hot water, cold water, gray/ rain water	compressed air	potable water, heating, hot water, cold water, gray/ rain water	potable water, heating, hot water, cold water, gray/ rain water, chilled water
tube compatability	copper, chrome plated copper, PEX, PB	copper, chrome plated copper, PEX, PB	copper, chrome plated copper, PEX, PB	carbon steel, copper, chrome plated copper, PEX, PB	stainless steel, carbon steel, copper, chrome plated copper, PEX, PB
material	copper or brass	brass / gunmetal	brass	brass	stainless steel 316

approvals

VSH Tectite fittings are tested and approved on below certifications in accordance with the table below.

approvals	VSH Tectite Sprint	VSH Tectite Classic	VSH Tectite Air	VSH Tectite Pro	VSH Tectite 316
BSI Kite mark	12-28 mm	10-28 mm	-	15-54 mm	15-54 mm
CSTBat	-	10-28 mm	-	35-54 mm	-
CSN	12-28 mm	10-28 mm	-	35-54 mm	15-54 mm
DVGW	12-28 mm	10-28 mm	-	35-54 mm	15-54 mm
ÈMI	-	10-28 mm	-	-	-
ETA	-	10-28 mm	-	-	15-28 mm
Kiwa	12-28 mm	10-28 mm	-	35-54 mm	15-54 mm
OVGW	-	10-28 mm	-	-	15-54 mm
SINTEF	-	10-28 mm	-	-	-
SITAC	-	10-28 mm	-	-	-
STF	-	10-28 mm	-	-	-
WRAS	12-28 mm	10-28 mm	-	15-54 mm	15-54 mm

VSH Tectite approvals

materials

VSH Tectite push fittings are produced in accordance with international standards.

VSH Tectite Sprint copper fittings are made of CU-DHP copper (CW024A), fitted with an EPDM o-ring. The end couplings and the fittings with internal or external threads are made of DZR brass and are also fitted with an EPDM o-ring.

VSH Tectite Classic and VSH Tectite Air brass fittings are made of brass (ranges from CW602N to CW511L), depending on the type of fitting and bronze. The fittings are fitted with an EPDM o-ring.

VSH Tectite Pro brass fittings are made of brass (CW602N - CW626N) and bronze and are fitted with an EPDM o-ring.

VSH Tectite 316 stainless steel fittings are made of stainless steel (316) and are fitted with an EPDM o-ring.

threaded fittings

male connectors

The tapered external thread (R) of VSH Tectite fittings with external thread conforms to ISO 7/EN 10226-1 (previously BS 21/ISO 7) or parallel BSP threads to BS EN ISO 228:2003. Inert jointing compounds or PTFE tape should be applied to taper threads and good quality jointing washers should be used with parallel threaded fittings.

female connectors

the cylindrical internal thread (G) of VSH Tectite fittings with internal thread conforms to BS EN ISO 228:2003 (previously BS 2779/ISO R228/1 or ISO 7/ EN 10226-1 for VSH Tectite 316 Stainless Steel fittings.

manufacturing standards

component	standard	jointing type
taper end thread	ISO 7/EN10226-1 (formerly BS 21/ ISO 7)	pipe-threads, where pressure-tight joints are made on the threads (metric dimensions)
parallel end thread	BS EN ISO 228:2003 (formerly BS 2779/ ISO R228/1)	pipe-threads, where pressure-tight joints are not made on the threads (metric dimensions)

markings

VSH Tectite fittings are carefully packaged in bags and then in boxes. The table below describes how the fittings and packaging are marked.

VSH Tectite Sprint

Marking	Packaging label
YF Dimension	Type ... Dimension Description EAN No. Art. No. Certificates Quantity

VSH Tectite Classic

Marking	Packaging label
Tectite	Type ... Dimension Description EAN No. Art. No. Certificates Quantity

VSH Tectite Air

Marking	Packaging label
Tectite	Type ... Dimension Description EAN No. Art. No. Certificates Quantity

VSH Tectite Pro

Marking	Packaging label
Tectite	Type ... Dimension Description EAN No. Art. No. Certificates Quantity

VSH Tectite 316

Marking	Packaging label
Tectite 316 Dimension	Type ... Dimension Description EAN No. Art. No. Certificates Quantity

protective cap

To prevent fittings from becoming stuck inside each other, they are fitted with special caps that can easily be removed before installation. This applies to reduced tees and reduction couplings, which could become stuck together during transport.

operating temperature and operating pressure

The maximum temperature and pressure range of a system are determined by the component with the lowest tolerance. Following installation, the piping system should be pressure-tested to check for leaks. VSH Tectite installations may be tested at a pressure of 1.5 times their normal operating pressure at the applicable ambient temperature.

low temperature range

In water installations, operating temperatures lower than 4°C can only be achieved if an antifreeze agent is added to the system.

maximum pressures depending on temperature

	min. temperature			max. temperature
VSH Tectite fitting	**-24°C***	**30°C**	**65°C**	**90°C**
VSH Tectite Sprint	20 bar	20 bar	16 bar	10 bar
VSH Tectite Classic	16 bar	16 bar	10 bar	6 bar
VSH Tectite Pro	16 bar	16 bar	10 bar	6 bar
VSH Tectite 316 15-28 mm	20 bar	20 bar	16 bar	10 bar
VSH Tectite 316 35-54 mm	16 bar	16 bar	10 bar	6 bar

All values are based on correct installation of the fittings and tubes as described in the installation instructions.

VSH Tectite fittings with an internal thread must be fitted with hemp, PTFE sealing tape or another suitable sealing material in order to achieve the maximum operating pressure/temperature. For push fittings with a threaded end, we recommend sealing the thread first before making the push fit connection, to avoid unnecessary stress on the push fit connector.

equipotential bonding

It is the installers duty to ensure that all metallic pipework systems should comply with the equipotential bonding requirements of the current edition of the IEE electrical wiring regulations (BS 7671 1992). After all plumbing work has been completed, always ensure continuity checks are conducted by a qualified electrician in accordance with regulations.

VSH SudoXPress Stainless, Carbon and copper tubes that fulfil EN 1057 R220/R250/R290 used in combination with the respective fittings provide guaranteed electrical continuity and, therefore, must be included in the equipotential bonding requirements.

VSH SudoXPress Carbon tube with polypropylene coating does not conduct electricity and therefore does not need to be included in the equipotential bonding checks.

compatibility with other Aalberts integrated piping systems

In situations where maximum flexibility is needed, VSH Tectite can provide a good solution. These include hard-to-reach spaces where access with a press tool is impossible, such as shafts, ducts or above a suspended ceiling, or for tight alignment of branch lines where it is difficult to make a fixed connection in advance. In such situations, VSH Tectite with VSH XPress or VSH SudoPress is the perfect combination. The main advantages of VSH Tectite push fittings are that the tube can always be rotated in the fitting and installation is very quick without using any tools. This allows you to add flexibility to a rigid piping system, and the result is that the installation looks neat and professional.

painting

Fittings can be painted with water-based paints. Oil-based or aggressive solvent paint should be avoided.

tubes

compatability

VSH Tectite fittings can be installed with metal tubes as well as plastic multilayer barrier tube.

tube type	standard	VSH Tectite Sprint	VSH Tectite Classic	VSH Tectite Air	VSH Tectite Pro	VSH Tectite 316
PE-Xc (with liner)	-	-	√	-	√	√
PE-X (with liner)	BS 7291: part 3	√	√	√	√	-
PB (with liner)	BS 7291: part 2	-	√	√	√	-
carbon steel	EN 10305-2	-	-	-	√	√
PP coated carbon steel	EN 10305-2	-	-	-	√	√
copper	BS EN 1057	√	√	√	√	√
stainless steel	EN 10312	-	-	-	-	√

VSH Tectite tube compatibilty

plastic tube

PE-Xc* flexible multilayer tube

You can use VSH Tectite Classic, Pro and 316 with PE-Xc tube (to use with with the TectSEAL™ 3PS support liner.).

PE-X Multilayer tube**

You can use VSH Tectite Sprint and Classic fittings on all PE-X plastic tubes which meet BS 7291: Part 3 (to use with appropriate manufacturers' liners).

VSH Tectite PB* tube**

VSH Tectite Sprint and Classic fittings can also be used with PB tube that conforms to BS 7921: Part 2 (use with appropriate manufacturers' liners).

* cross linked polyethylene manufactured with irradiation method
** cross linked polyethylene
*** Polybutylene

stainless steel tubes

VSH SudoXPress Stainless tubes are precision steel tubes. The outer and inner surfaces of the tubes are plain, free of discolouration and are supplied free of manufacturing residue that could 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 SudoXPress Stainless tubes.

insulation

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

- cold water piping systems 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 piping systems 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 SudoXPress Stainless tubes are considered as non-combustible tubes class A1 according EN 13501-1.

VSH SudoXPress Stainless tube 1.4401 (AISI 316)

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

applications

- all potable water installations in accordance with international potable water institutes, such as the German Potable Water Decree (TrinkwV) and EU Directive 98/83/EC, DIN 50930 - Part 6 and in compliance with EN 806 and DIN 1988
- water supply and rainwater 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

VSH SudoXPress Stainless tube 1.4401 (AISI 316)

technical characteristics	
material	X5CrNiMo 17 12 2 material no. 1.4401 in accordance with DIN-EN 10088
specifications	EN 10312 – DVGW work sheet GW541 (2004) table 2
approvals	DVGW, SVGW, ETA, ÖVGW, BYGGFORSK, STF, KIWA, PZH, SITAC, QB, WRAS, VdS, FM, FG, CNBOP, SBSC, SETSCO, LPCB, DNV-GL, RINA, UL, ULc, BV, LR, SPF
type of tubing	TIG or laser welded
welding seam	100% EDDY CURRENT in accordance with EN 10893-2:2011
weld slag removal	outside
tolerances	in accordance with EN 10312 - table 2
surface	matt silver
marking	SudoXPress stainless DN [dimension x wall thickness] Edelstahl/Stainless Steel/Sanitary-GAS 1.4401/AISI316 EN 10312 DVGW GW541 Reg.no. [DVGW registration number] SVGW ÖVGW W1.397 WRAS VA1.22/20294 VA1.12/18769 SINTEF PZH SITAC 0168/04 ATEC 14.1/15-2097_V1 QB 235-2097_V1 LPCB VdS G4080037 [operation pressure LPCB/VdS] bar <FM> [operation pressure FM] psi C(UL)US LISTED 4NB1 [operation pressure UL/cUL] psi KK NDE ATG 3057 [batch number or production date], [supplier code] [model designation, repeated every 60 cm]
smallest bending radius	3.5 x external tube diameter (max. 28 mm)
delivery	tubes, length 6 m +0/-50 mm, with protective caps (green)
heat expansion coefficient	0.0160 mm/m at ΔT= 1K
max. operating pressure	16 bar

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

dimensions, weight and capacity VSH SudoXPress Stainless tube 1.4401

VSH SudoXPress Stainless tube 1.4521 (AISI 444)

VSH SudoXPress Stainless tubes 1.4521 have been tested and approved for potable water installations in accordance with DVGW - Worksheet GW 541, Kiwa, WRAS, ETA, ÖVGW, QB and SVGW.

applications

- all potable water installations in accordance with international potable water institutes, such as the German Potable Water Decree (TrinkwV) and EU Directive 98/83/EC, DIN 50930 - Part 6 and in compliance with EN 806 and DIN 1988
- water supply and rainwater 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	X2CrMoTi 18 2 material no. 1.4521 in accordance with DIN-EN 10088
specifications	EN 10312 – DVGW work sheet GW541 (2004) table 2
approvals	DVGW, SVGW, ETA, ÖVGW, FM, FG, CNBOP, SBSC, SETSCO, LPCB, DNV-GL, RINA, QB, VdS, WRAS, Kiwa
type of tubing	laser welded
welding seam	100% EDDY CURRENT in accordance with EN 10893-2:2011
weld slag removal	outside
tolerances	in accordance with EN 10312 - table 2
surface	matt silver
marking	SudoXPress stainless DN [dimension x wall thickness] Edelstahl/Stainless steel 1.4521/AISI444 EN 10312 DVGW GW541 Reg.no. [DVGW registration number] SVGW ÖVGW W1.397 WRAS VA1.22/20294 VA1.12/18769 VdS G4080037 LPCB [operation pressure VdS/LPCB] bar <FM> [operation pressure FM] psi KK ATEC 14.1/15-2097_V1 QB 235-2097_V1 Tectite 316 ATG 3057 [batch number or production date] [supplier code] [model designation, repeated every 60 cm]
smallest bending radius	3.5 x external tube diameter (max. 28 mm)
delivery	tubes, length 6 m +0/-50 mm, with protective caps (green)
heat expansion coefficient	0.0104 mm/m at ΔT= 1K
max. operating pressure	16 bar

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

dimensions, weight and capacity VSH SudoXPress Stainless tube 1.4521

VSH SudoXPress Stainless tube 1.4301 (AISI 304)

VSH SudoXPress Stainless tube 1.4301 is an alternative to the stainless 1.4401 (AISI 316) tube, making it a cost-effective alternative for applications where potable water certification is not required.

applications

- heating installations in accordance with DIN EN 12828
- closed loop and return system cooling installations
- compressed air installations in accordance with DIN ISO 8573-1
- industrial installations

technical characteristics	
material	X5CrNi18-10 material n0. 1.4301 in accordance with DIN EN 10088
specifications	EN 10217-7
approvals	QB, WRAS
type of tubing	laser welded
welding seam	100% EDDY CURRENT in accordance with EN 10893-2:2011
weld slag removal	outside
tolerances	in accordance with EN 10312
surface	matt silver
marking	SudoXPress stainless DN [dimension x wall thickness] Stainless steel/Edelstahl 1.4301/AISI 304 Heating/Compressed air-Heizung/Druckluft ATEC 14.1/20-2297_V1 QB 235-2297_V1 NDE [batch number] [supplier code] [model designation, repeated every 60 cm]
smallest bending radius	3.5 x external tube diameter (max. 28 mm)
delivery	tubes, length 6 m +0/-50 mm, with protective caps (zwart)
heat expansion coefficient	0.0160 mm/m at ΔT= 1K
max. operating pressure	16 bar

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

dimensions, weight and capacity VSH SudoXPress Stainless tube 1.4301

carbon steel tube

VSH SudoXPress Carbon tubes are precision tubes protected against external corrosion by a coating of zinc plating 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 regulations apply to the insulation of potable water piping systems:

- cold water piping systems 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 piping systems 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

flammability

VSH SudoXPress Stainless tubes are considered as noncombustible tubes class A1 according EN 13501-1.

VSH SudoXPress Carbon tubes with a polypropylene (PP) coating are considered inflammable according to class D – s2, d2 building materials (thermoplast, limited smoke development, many drips/droplets).

VSH SudoXPress Carbon tube

VSH SudoXPress Carbon tubes are precision tubes manufactured in accordance with EN 10305 (formerly DIN 2394/ NEN 1982) from a special, very low carbon content steel, which results in a very easy to bend tube. The tubes are also leak tested in accordance with EN 10246.

applications

- closed heating installations in accordance with DIN 4751
- closed cooling installations with water/glycol mixture
- compressed air

technical characteristics	
material	unalloyed ULC ('Ultra Light Carbon') carbon steel, RSt 34-2 mat.-no. 1.0034 in accordance with EN 10305-3
specifications	EN 10305-3 (formerly DIN 2394)
approvals	QB, DNV-GL, RINA
type of tubing	HF-welded
welding seam	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 EN 10305-3
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	silver
marking	SudoXPress galvanized DN [dimension x wall thickness] EN 10305-3 QB 116-2059 ATEC 14/15-2059 ATG 3056 [batch number or production date] [supplier code] [model designation, repeated every 60 cm]
smallest bending radius	3.5 x external tube diameter (max. 28 mm)
delivery	tubes, length 6 m +0/-50 mm, with protective caps (red)
heat expansion coefficient	0.0108 mm/m at ΔT= 1K
max. operating pressure	16 bar

DN	outside Ø x s [mm]	inside Ø [mm]	weight [kg/m]	capacity [l/m]
10	12 x 1.2	9.6	0.271	0.045
12	15 x 1.2	12.6	0.420	0.125
15	18 x 1.2	15.6	0.494	0.191
20	22 x 1.5	19.0	0.761	0.284
25	28 x 1.5	25.0	0.980	0.491
32	35 x 1.5	32.0	1.241	0.804
40	42 x 1.5	39.0	1.542	1.195
50	54 x 1.5	51.0	1.999	2.043
65	66.7 x 1.5	63.7	2.411	3.187
65	76.1 x 2.0	72.1	3.503	4.083
80	88.9 x 2.0	84.9	4.412	5.661
100	108 x 2.0	104.0	5.382	8.495

dimensions, weight and capacity VSH SudoXPress Carbon tube

VSH SudoXPress Carbon tube with polypropylene coating

VSH SudoXPress Carbon tubes with a polypropylene coating (marked 'galvanized-polypropylene coated') can be used for the same applications as the VSH SudoXPress Carbon tubes. The polypropylene (PP) coating offers protection against outer corrosion, has a smooth surface and offers good resistance to tearing and impact. For safe press fitting connections, it is essential that, prior to any assembly, the PP coating must be removed from the tube using a stripper, up untill the insertion depth of the fitting. Only in this way a good press connection can be achieved.

technical characteristics	
material	unalloyed ULC ('Ultra Light Carbon') carbon steel, RSt 34-2 mat.-no. 1.0034 in accordance with EN 10305-3
specifications	EN 10305-3 (formerly DIN 2394)
approvals	QB, DNV-GL, RINA
type of tubing	HF-welded
welding seam	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 EN 10305-3
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	white coloured high-heat stabilized polypropylene PP(B2) thickness ±1 mm,
marking	SudoXPress galvanized DN [dimension x wall thickness] polypropylene coated EN 10305-3 QB 116-2059 ATEC 14/15-2059 [batch number or production date] [supplier code] [model designation, repeated every 60 cm]
smallest bending radius	3.5 x external tube diameter (max. 28 mm)
delivery	tubes, length 6 m +0/-50 mm, with protective caps (red)
heat expansion coefficient	0.0108 mm/m at ΔT= 1K
max. operating pressure	16 bar
thermal load	120˚C permanent
heat conuctivity	0.22 W/mK

DN	outside Ø x s [mm]	outside Ø incl. coating [mm]	weight [kg/m]	capacity [l/m]
12	15 x 1.2	17	0.420	0.125
15	18 x 1.2	20	0.494	0.191
20	22 x 1.5	24	0.761	0.284
25	28 x 1.5	30	0.980	0.491
32	35 x 1.5	37	1.241	0.804
40	42 x 1.5	44	1.542	1.195
50	54 x 1.5	56	1.999	2.043

dimensions, weight and capacity VSH SudoXPress Carbon tube with PP-coating

copper tubes

Copper tubes that may be used for the VSH Tectite system for water applications must comply with the EN 1057 R220/R250/R290 standard and DVGW-work sheet GW392.

EN 1057 is the standard for seamless copper and copper alloyed tubes for potable water, gas and heating installations.

flammability

Uninsulated copper tubes are considered to be non-combustible tubes class A1 in accordance with EN 13501-1.

insulation

Hot water piping systems 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 insulating materials do not contain any traces of ammonia or nitrates. To minimize the risk of corrosion, 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 'Waterwerkbladen' must be followed.

applications

- all potable water installations in accordance with the German Potable Water Decree (TrinkwV) and EU Directive 98/83/EG, DIN 50930, Part 6 and in accordance with EN 806 and SVGW-Directive W3
- cold and hot water installations
- heating installations
- district heating installations
- compressed air
- cooling water/industrial water installations
- industrial rainwater installations

technical characteristics for approved copper tubes

material	DHP copper material no. CW 024A in accordance with DIN EN 1412
outside Ø tolerance	EN 1057
tensile strength	R220 - soft - 220 N/mm² R250 - medium-hard - 250 N/mm² R290 - hard - 290 N/mm²
smallest bend radius	3.5 x external diameter of the tube (down to -10°C)

approved wall thickness per outside diameter

outside Ø [mm]	copper tubes in accordance with EN 1057		
	R220	R250	R290
12	1.0	0.8-1.0	1.0
14	1.0	0.8-1.0	1.0
15	1.0	0.8-1.0	1.0
16	1.0	0.8-1.0	1.0
18	1.0	0.8-1.0	1.0
22	1.0	1.0	1.0
28	-	-	1.0
35	-	-	1.0
42	-	-	1.0-1.2
54	-	-	1.2-1.5

installation guidelines

The jointing procedures are almost identical for every type of VSH Tectite fitting and compatible tube material. Where there are variations (such as inserting a liner into a 10 mm copper tube or PEX tube) these are shown on the following pages and in the fitting instructions. To ensure the fittings stay clean and the o-ring is protected from damage, never remove the fitting from its packaging until immediately prior to installation.

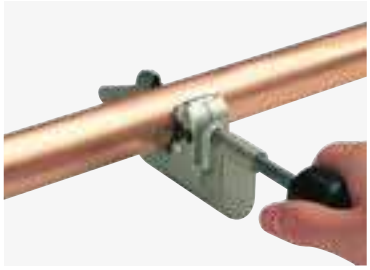
note: Although manufactured to a different design, jointing tubes in sizes from 35 to 54 mm fittings is basically the same as it is at smaller sizes.

The tube can be fully inserted by hand. A damaged tube end will require excessive force to be used. If this is the case you should check the tube is round and deburred before continuing.

VSH Tectite fittings with plain male ends must not be used directly with capillary fittings, since heating will damage the non-metallic parts. Neither should plain ends on capillary fittings be used with VSH Tectite.

Heat should not be applied to VSH Tectite fittings, directly or indirectly. They should be disconnected (where applicable) to avoid any possible damage to non-metallic parts if they are to be used on a system in conjunction with capillary fittings. Similarly, reconnection must not be considered until the heated tubes have been allowed to cool and have been flushed to remove any flux residues. Use tube clips to secure finished installations and prevent vibration or movement.

1. cut the tube to length



After measuring, the tube can be cut to length using a tube cutter (see picture), 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.

plastic multilayer tube

Cut the plastic multilayer tube with a hand tool. Use good quality cutters, ensuring the blade is sharp and the cut is square.

VSH SudoXPress Carbon tube with PP coating and coated copper tubes (Wicu)

To ensure the safe connection of the fitting, the tube's PP coating must be removed up to the insertion depth using a stripping tool before assembling the fitting. With Wicu copper tubes, a support sleeve must be used to maintain the rigidity of the connection. Special care must be taken not to scratch or damage the surface of the tube.

2. debur the tube end

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

copper tube

deburring copper tube can be done by using the purple coloured VSH Tectite T110 (VSH Tectite Classic and Pro) or the black coloured VSH Tectite T115 (VSH Tectite Sprint). Both are 3-in-1 tools for deburring, scribing and marking the insertion depth.

chrome-plated copper tube

When jointing chrome-plated copper tube with VSH Tectite fittings, scribe the tube using the VSH Tectite T110/T115 scribing tool to ensure positive grab ring location. This helps to accommodate any variance in chrome plate thickness.

Note: The scribing function is not suitable for stainless steel tube.

alternative deburring method for copper tube

An alternative method of preparing copper tube ends 35-54 mm before inserting into the fitting, is to use the appropriately-sized S122 percussion deburrer. Place the cup of the deburrer onto the end of the tube and strike it with a sharp blow from a copper-faced hammer. As well as removing burrs and sharp edges, it also creates a slight taper that aids insertion into the fitting. If 10 mm R220 annealed copper tube is being used, ensure a T67 support liner is fully inserted into the tube.

Note: Also, the S120 deburring tool from the VSH XPress accessories range can be used.

stainless steel tube

For deburring stainless steel tube ends a fine toothed file should be used. Then wipe clean the tube end to remove all swarf and debris.

3. calibrate

Always ensure the tube ends are rounded-off radial and evenly. The tube ends must be calibrated before making a connection, especially in case of coated copper tubes in accordance with DIN EN 1057 R220, e.g. Wicu tubes

Use VSH Tectite calibrating tools to provide a clean, square tube end with chamfered edges. Calibration re-rounds the tube after cutting to prepare it for push-fit and TectSEAL™ jointing.

depth gauge selection

tool	VSH Tectite Sprint	VSH Tectite Classic	VSH Tectite Air	VSH Tectite Pro	VSH Tectite 316
T115 black	≤ 28 mm	-	-	-	-
T110 purple	≤ 28 mm	≤ 28 mm	≤ 28 mm	≤ 28 mm	≤ 28 mm

4. marking insertion depth

The required insertion depth must be marked on the tube or the fitting (the latter for fittings with tube ends) in order to guarantee a safe and proper joint. Reliable jointing with the corresponding tensile strengths can only be achieved if the components are correctly installed. The marking on the tube must remain visible (but as close as possible to the fitting) to identify any movement before or after the connection.

	insertion depths [mm]				
tube Ø [mm]	VSH Tectite Sprint	VSH Tectite Classic	VSH Tectite Air	VSH Tectite Pro	VSH Tectite 316
10	15	23	23	23	-
15	16	23	23	23	-
18	16	23	23	23	-
22	18	27	27	27	-
28	20	31	31	31	-
35	40	-	-	57	57
42	42	-	-	62	62
54	45	-	-	68	68

plastic multilayer tube

The VSH Tectite T111 Tool is designed for marking plastic multilayer tube as well as copper tube. For 15 and 22 mm tube, ensure that you are using the correct side of the tool as the depth mark is shorter for VSH Tectite PE-Xc flexible multilayer tube to take into account of the depth of the TectSEAL™

5. check 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.

When using chrome-plated copper tube, the hard chrome layer must be grooved using the insertion depth marker for copper (T115). Due to this groove, the grab ring will be able to make an optimal connection between fitting and tube.

Caution: do not put your finger into the fitting. The grab ring can cause injuries.

6. assemble fitting and tube

Insert the tube carefully into the fitting up to the marked insertion depth, simultaneously rotating and pushing it in the axial direction. The insertion depth marking must remain visible, ensure it corresponds with the mouth of the fitting, then push firmly on the tube until it reaches the tube stop with a positive 'click' to ensure the fitting is secure.

When using soft copper tube R220 with or without plastic coating, it is recommended to use additional support sleeves (type S1283).

In 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 and is therefore not permitted. If assembly is difficult because of the permitted size tolerances, lubricants like water or soap may be used.

When using multilayer tube, ensure that the correct tube support liner is fully inserted into the tube before inserting the tube into the fitting as described.

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

disassembly and reassembly of demountable fittings

range	De-mountability
VSH Tectite Sprint	No
VSH Tectite Classic	Yes
VSH Tectite Air	Yes
VSH Tectite Pro	Yes
VSH Tectite 316	Yes

VSH Tectite de-mountability

disassembly and reassembly of 10-28 mm fittings

these fittings are disassembled using a special wrench or plastic clip. First make sure that the system is no longer pressurized and has been drained.

disassembling with fork tool

Place the arm with the small fork on the tube, against the plastic guiding collar. Place the large fork on the fitting end. Squeeze the fork with one hand until the plastic guiding collar is depressed into the fitting. With the other hand, twist out the tube using the thumb as a lever against the tool to assist disconnection.

disassembling with plastic clip

The clip simply slides on the tube up to the fitting and locates the plastic guiding collar. Push the clip so that the collar will be pushed into the fitting and is depressed and the tube can be disconnected.

reassembly

Check the fitting and tube for damage before reconnecting the joint and refer to step 6 on page 26.

disassembly and reassembly of 35-54 mm fittings

VSH Tectite PRO and 316 fittings in sizes 35-54 mm are produced with demountable black end caps and therefore disassemble in a slightly different way.

disassembly

Use a spanner on the fitting flats to prevent the fitting from rotating. Insert the forks of the tool into the slots of the end cap. Turn the wrench anti-clockwise to unscrew the end cap and slide it along the tube away from the fitting body. Pull the tube out of the fitting, remove and the o-ring and grab ring whilst retaining the alignment ring.

reassembly

Check the fitting and tube for damage before reconnecting the joint and refer to step 6 on page 26.

TDX cap for regular disassembly and reassembly

VSH Tectite Pro and 316 fittings in 35 to 54 mm are supplied with conventional black end caps. If you intend to demount the fitting on a regular basis, a TDX demounting end cap should be purchased separately and substituted for the standard end cap. The VSH Tectite DTX end cap tool will also be required.

Due to the potentially high frequency with which TX61/TS61 stop ends may be demounted, they are supplied with the TDX end caps fitted as standard.

Demounting the fitting from the tube is a simple process when TDX demounting end caps have been installed in the fittings. Ensure the system is de-pressurised and drained.

disassembling the TDX cap

To remove the tube from the fitting, insert the forks of the wrench in the recesses in the status indicator.
Turn anti-clockwise fully. The status indicator will withdraw into the fitting, indicating that the fitting is in the de-mountable position. Using a 'clockwise' twisting and pulling action the tube can now be removed.

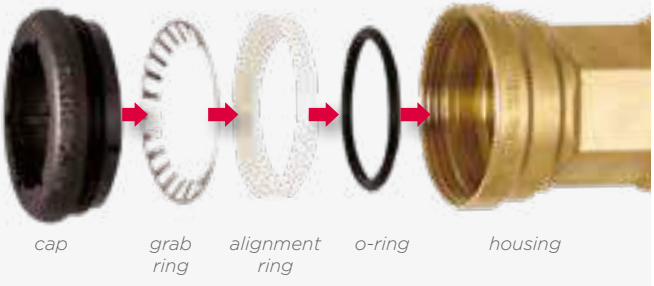
reassembling the TDX cap

Separate tube and fitting and inspect before reusing the fitting, the status indicator in the TDX cap must be returned to the mounted position (protruding), before a new connection is made.

Important:

If the status indicator is not in the protruding position, the assembly will not withstand full system pressure.

replacing parts



the cap, grab ring and o-ring and can easily be replaced when disassembling a connection. VSH Tectite TX100 replacement o-rings and VSH Tectite TX105/TS106 grab rings are available in the event that any are lost or damaged on-site. They are available in dimensions 35-54 mm

We recommend the use of S130 Silicone lubricant grease available from the VSH XPress range to aid insertion of the replacement o-ring into the fitting as these o-rings are supplied unlubricated.

dissassembly

1. see disassembling procedure on the previous page.
2. remove the tube from the fitting.
3. remove and discard the o-ring.
4. remove and retain the alignment ring.
5. snip off the grab ring with side cutters and discard.

reassembly

1. Clean the parts and lubricate the o-ring using S130 silicone lubricant. Replace the parts in the correct order, as shown, and check they are fully seated in the fitting body.

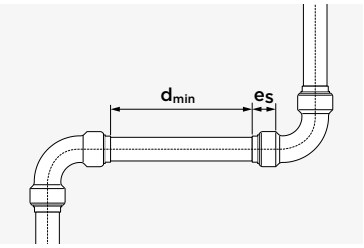
2 screw the end cap back into the fitting until hand tight. If resistance is felt and the end cap is not flush with the fitting body, remove the end cap and ensure the grab ring is fully located i.e. fully in contact with the alignment ring. Screw the end cap into the fitting again until hand tight. Temporarily insert a 300 mm length of deburred tube into the fitting but not through the grab ring to help locate the demount tool. Tighten the end cap a further 8 to 10 mm (radically). Remove the tube.

Note: the cap should be tightened seamlessly with the fitting body as the grab ring provides electrical continuity

3. before reinstalling the fitting back into the system, check the end of the tube for damage. If the tube is scored or damaged, remove the affected section with a tube cutter and prepare the tube end as described in preliminaries and tube preparation.

4. place the tube into the fitting again untill the stop, where the insertion depth meets the marking.

installation requirements

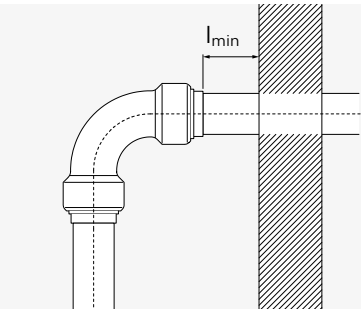


In order to optimize the installation time, a number of sections can be assembled first. After that the whole system can be connected.
The Insertion depth (e_S) marking is intended to check whether the tube is inserted far enough into the fitting. Before inserting the tubes, it is important to check the table below which shows the minimum required installation distances so that the tubes can be inserted correctly into the fittings.

	insertion depth		min. distance between wall and separate joints		minimal tube length		min. length between wall and tube end	
	e_S [mm]		d_{min} [mm]		2x e_s + d_{min} [mm]		[mm]	
dimension	VSH Tectite Sprint	VSH Tectite Classic, PRO & 316	VSH Tectite Sprint	VSH Tectite Classic, PRO & 316	VSH Tectite Sprint	VSH Tectite Classic, PRO & 316	VSH Tectite Sprint	VSH Tectite Classic, PRO & 316
10	15	23	-	10	-	56	-	40
12	17	23	5	10	37	56	21	40
15	16	23	5	10	37	56	21	40
18	-	23	5	10	39	56	22	40
22	19	27	5	10	41	64	23	50
28	20	31	5	10	45	72	25	100
35	-	57	5	10	-	124	-	100
42	-	62	5	10	-	134	-	100
54	-	68	5	10	-	146	-	100

insertion depth and minimal distances between joints

installation



minimal requirered installation distance [L_{min}] between fitting and wall.

When designing a VSH Tectite system, make sure that all connections can be made. Ensure minimum distance so that the necessary parts are sufficiently accessible with disassembly tools

mixed metal installation

Stainless fittings and tubes can easily be combined with stainless steel and non-ferrous components. However, connections with hot-dip galvanized steel, carbon steel or other non-stainless steel fittings or accessories can lead 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 the dedicated section on page 39. The table below shows the possible mixtures. The combinations mentioned in the table assume that the connection takes place by means of a mechanical, detachable connection (for example by means of a threaded or grooved connection).

tube material	**system**	VSH Tectite Sprint **copper**	VSH Tectite Classic/Air **bronze/brass**	VSH Tectite Pro **brass**	VSH Tectite 316 **stainless steel**
copper	closed	allowed	allowed	allowed	allowed
	open	allowed	allowed	allowed	allowed
carbon steel	closed	not allowed	not allowed	allowed	allowed
	open	not allowed	not allowed	allowed	allowed
stainless steel	closed	not allowed	not allowed	not allowed	allowed
	open	not allowed	not allowed	not allowed	allowed

combination possibilities

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 the VSH Tectite Sprint, Classic and PRO range.

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 SudoXPress Stainless and copper tubes may be bent cold in accordance with DIN EN 1057. The tube may not be bent warm due to the danger of corrosion.

The smallest bending radius is as follows:

stainless steel (12 - 28 mm)	r_{min} **= 3.5 x d**
copper tubes (12 - 54 mm)	r_{min} **= 3.5 x d**

in accordance with EN 1057 and DVGW-GW 392

- a smaller bend radius is not permitted.
- diameters larger than 28 mm (stainless steel) can be bent by machine.

painting

Fittings can be painted with water-based paints. Oil-based or aggressive solvent paint should be avoided.

general technical information

thermal expansion

The level of thermal expansion within piping systems depends on the tube material, tube length and temperature deviations. This 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 piping system itself.
More substantial changes in length need to be offset by other methods like installation of special expansion compensation devices, fixed anchoring points and brackets.

Expansion can also be compensated by the using tube segments or U-bends. The level of expansion to be compensated can be predetermined by calculating the changes in length using the following formula:

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

Δl = total thermal expansion [mm]
l = length of the segment in question [m]
ΔT = temperature difference [K]
α = thermal expansion coefficient, where:
for VSH SudoXPress Stainless tube 1.4401
α = 0.0166 mm/mK
for VSH SudoXPress Stainless tube 1.4521/1.4301
α = 0.0104 mm/mK
for VSH SudoXPress Carbon tube
α = 0.0108 mm/mK
for copper tube
α = 0.0170 mm/mK

The following tables show the expansion of various tubes depending on the length and the rise in temperature.

l [m]	ΔT [K]									
	10	20	30	40	50	60	70	80	90	100
1	0.10	0.21	0.31	0.42	0.52	0.62	0.73	0.83	0.94	1.04
2	0.21	0.42	0.62	0.83	1.04	1.25	1.46	1.66	1.87	2.08
3	0.31	0.62	0.94	1.25	1.56	1.87	2.18	2.50	2.81	3.12
4	0.42	0.83	1.25	1.66	2.08	2.50	2.91	3.33	3.74	4.16
5	0.52	1.04	1.56	2.08	2.60	3.12	3.64	4.16	4.68	5.20
6	0.62	1.25	1.87	2.50	3.12	3.74	4.37	4.99	5.62	6.24
7	0.73	1.46	2.18	2.91	3.64	4.37	5.10	5.82	6.55	7.28
8	0.83	1.66	2.50	3.33	4.16	4.99	5.82	6.66	7.49	8.32
9	0.94	1.87	2.81	3.74	4.68	5.62	6.55	7.49	8.42	9.36
10	1.04	2.08	3.12	4.16	5.20	6.24	7.28	8.32	9.36	10.40
12	1.25	2.50	3.74	4.99	6.24	7.49	8.74	9.98	11.23	12.48
14	1.46	2.91	4.37	5.82	7.28	8.74	10.19	11.65	13.10	14.56
16	1.66	3.33	4.99	6.66	8.32	9.98	11.65	13.31	14.98	16.64
18	1.87	3.74	5.62	7.49	9.36	11.23	13.10	14.98	16.85	18.72
20	2.08	4.16	6.24	8.32	10.40	12.48	14.56	16.64	18.72	20.80

total thermal expansion Δl [mm] VSH SudoXPress Stainless 1.4521/1.4301

l [m]	ΔT [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

total thermal expansion Δl [mm] VSH SudoXPress Carbon

l [m]	ΔT [K]									
	10	20	30	40	50	60	70	80	90	100
1	0.16	0.32	0.48	0.64	0.80	0.96	1.12	1.28	1.44	1.60
2	0.32	0.64	0.96	1.28	1.60	1.92	2.24	2.56	2.88	3.20
3	0.48	0.96	1.44	1.92	2.40	2.88	3.36	3.84	4.32	4.80
4	0.64	1.28	1.92	2.56	3.20	3.84	4.48	5.12	5.76	6.40
5	0.80	1.60	2.40	3.20	4.00	4.80	5.60	6.40	7.20	8.00
6	0.96	1.92	2.88	3.84	4.80	5.76	6.72	7.68	8.64	9.60
7	1.12	2.24	3.36	4.48	5.60	6.72	7.84	8.96	10.08	11.20
8	1.28	2.56	3.84	5.12	6.40	7.68	8.96	10.24	11.52	12.80
9	1.44	2.88	4.32	5.76	7.20	8.64	10.08	11.52	12.96	14.40
10	1.60	3.20	4.80	6.40	8.00	9.60	11.20	12.80	14.40	16.00
12	1.92	3.84	5.76	7.68	9.60	11.52	13.44	15.36	17.28	19.20
14	2.24	4.48	6.72	8.96	11.20	13.44	15.68	17.92	20.16	22.40
16	2.56	5.12	7.68	10.24	12.80	15.36	17.92	20.48	23.04	25.60
18	2.88	5.76	8.64	11.52	14.40	17.28	20.16	23.04	25.92	28.80
20	3.20	6.40	9.60	12.80	16.00	19.20	22.40	25.60	28.80	32.00

total thermal expansion Δl [mm] VSH SudoXPress Stainless 1.4401

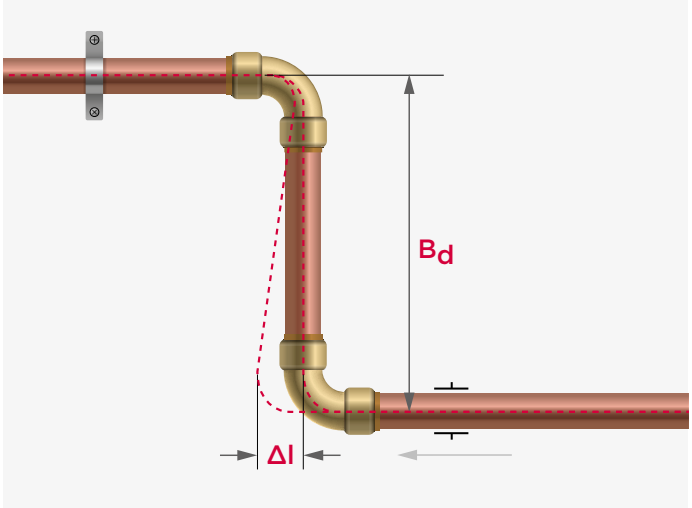
l[m]	ΔT [K]									
	10	20	30	40	50	60	70	80	90	100
1	0.17	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70
2	0.34	0.68	1.02	1.36	1.70	2.04	2.38	2.72	3.06	3.40
3	0.51	1.02	1.53	2.04	2.55	3.06	3.57	4.08	4.59	5.10
4	0.68	1.36	2.04	2.72	3.40	4.08	4.76	5.44	6.12	6.80
5	0.85	1.70	2.55	3.40	4.25	5.10	5.95	6.80	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

total thermal expansion Δl [mm] copper

required length of compensators to absorb thermal expansion
If the expansion is greater than the piping system is able to absorb without the tension becoming too high, additional measures must be taken, such as the use of expansion compensators, expansion loops or u-bends.

The length of the expansion joints can be calculated using the following formulas in different situations:

z-configuration



$$B_d = k \times \sqrt{(d \times \Delta l)}$$

B_d = length of the expansion compensator [mm]
k = material constant
= 45 for stainless and carbon steel tubes
= 35 for copper tubes
d = external diameter of the tube [mm]
Δl = thermal expansion to compensate [mm]

calculation examples

configuration	: see figure above
tube material	: stainless 1.4401
tube diameter (d)	: 22 mm
tube length (l)	: 16 m
temperature difference (ΔT)	: 60K

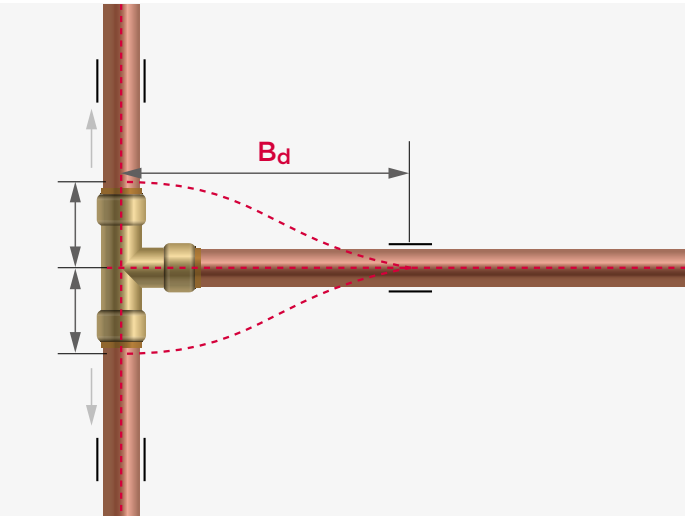
Calculation for compensating thermal expansion Δl

$$\Delta l = 16 \times 0.0166 \times 60 = 15.936 \text{ mm}$$

Calculation of the length of the expansion compensator B_d

$$B_d = 45 \times \sqrt{(22 \times 15.936)} = 843 \text{ mm}$$

t-configuration



$$B_d = 1.44 \times k \times \sqrt{(d \times \Delta l)}$$

B_d = length of the expansion compensator [mm]
k = material constant
= 45 for stainless and carbon steel tubes
= 35 for copper tubes
d = external diameter of the tube [mm]
Δl = thermal expansion to compensate [mm]

calculation examples

configuration	: see figure above
tube material	: stainless 1.4401
tube diameter (d)	: 22 mm
tube length (l)	: 16 m
temperature difference (ΔT)	: 60K

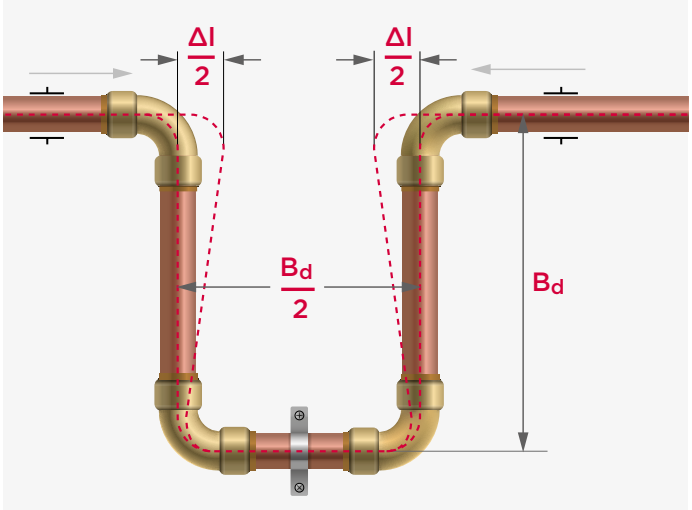
Calculation for compensating thermal expansion Δl

$$\Delta l = 16 \times 0.0166 \times 60 = 15.936 \text{ mm}$$

Calculation of the length of the expansion compensator B_d

$$B_d = 1.44 \times 45 \times \sqrt{(22 \times 15.936)} = 1.213 \text{ mm}$$

u-configuration



$$B_d = k \times \sqrt{(d \times \Delta l)} / 1.8$$

B_d = length of the expansion compensator [mm]
k = material constant
= 45 for stainless and carbon steel tubes
= 35 for copper tubes
d = external diameter of the tube [mm]
ΔI = thermal expansion to compensate [mm]

calculation examples

configuration	: see figure above
tube material	: stainless 1.4401
tube diameter (d)	: 22 mm
tube length (l)	: 16 m
temperature difference (ΔT)	: 60K

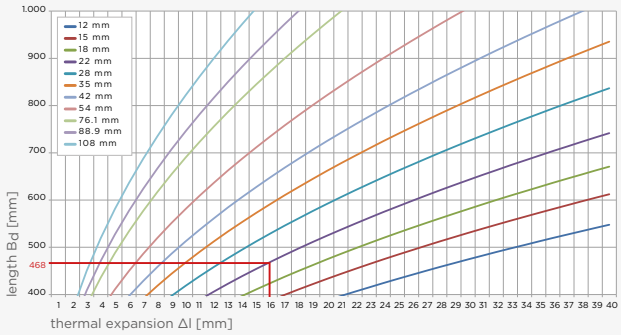
Calculation for compensating thermal expansion ΔI

$$\Delta l = 16 \times 0.0166 \times 60 = 15.936 \text{ mm}$$

Calculation of the length of the expansion compensator B_d

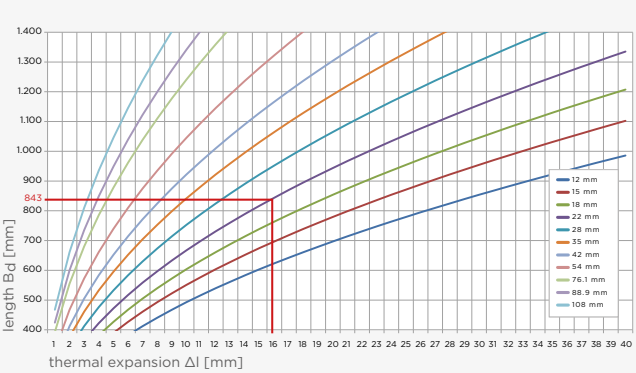
$$B_d = 45 \times \sqrt{(22 \times 15.936)} / 1.8 = 468 \text{ mm}$$

graph 1: to determine the length B_d of carbon and stainless steel tube shown in the z-configuration (page 31).



Note: In the figure shown in the t-configuration (page 31), multiply the B_d value from figure 1 by factor 1.44.

graph 2: to determine the B_d length of carbon steel and stainless steel tube shown in the u-configuration (page 32).



fixed points and sliding points

Piping systems must have fixed points and sliding points to ensure that pipe sections move in the correct direction, so that thermal expansion is absorbed by the sections provided for this purpose. i.e. the compensators. The following rules must be respected in this regard:

- never place fixed points on or right next to pipe connections
- sliding points can only allow pipe movements in the intended direction and cannot obstruct them
- if an axial compensator is used in a section, always place a fixed point at both ends capable of absorbing all the forces acting on it
- preferably use rubber-lined stirrups to reduce noise and vibration and to optimize distribution of tension

pressure loss

Every fluid that flows through a piping system experiences continuous and local flow resistances, the so-called 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

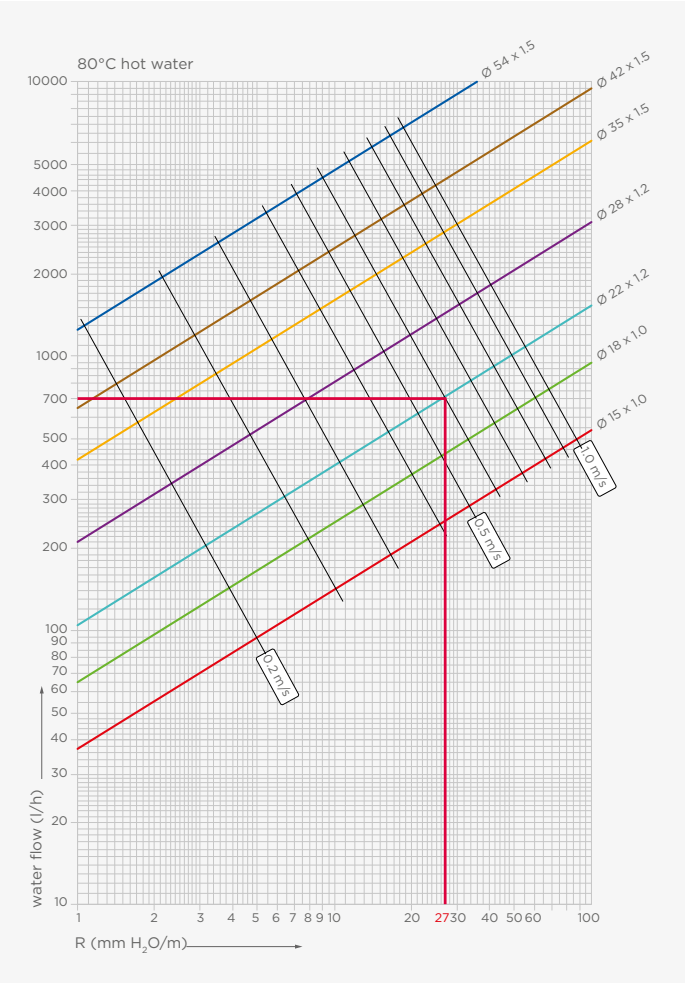
To calculate the resistance of a fluid flow in a straight section of a piping system, first determine the resistance in a unit of length and then multiply the total length by this value. This value can be determined analytically using the Hazen-Williams formula.

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

p = pressure loss in the tube [bar/m]
Q = flow through the tube [l/min]
di = mean internal diameter of the tube [mm]
C = constant for type and condition of the tube
= 140 for VSH SudoXPress Stainless and Carbon

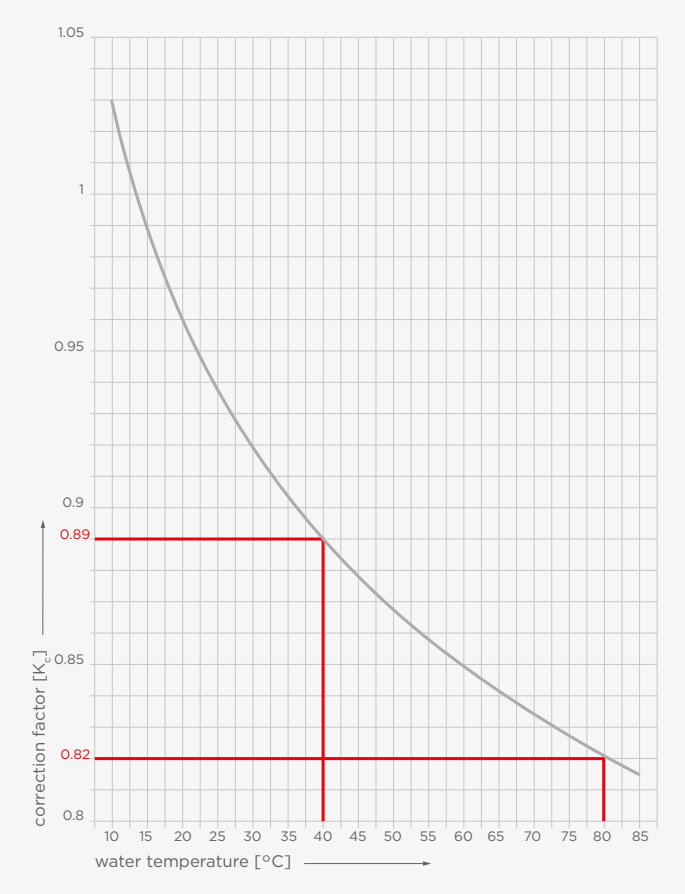
If there is the need to perform these calculations, please consult the relevant specialized literature. For the normal installation calculations, the appropriate values as given in the diagram below can be used. The pressure drop unit R and the flow velocity [m/s] for a given water flow rate can be determined simply and quickly in this way.

Once R and the actual or equivalent length of the piping system are known, the total pressure drop over the particular segment can be calculated. The diagram shows the values that apply to water with a temperature of 80°C. It can be seen that R changes with temperature, so a correction is needed. Graphs can be prepared for the different operating temperatures and various velocity ranges.



pressure drop on hot water with a temperature of 80°C

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



correction factor for different water temperature K_c

The following example explains the use of the diagram. 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 mm H_2O/m (± 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 K_c for a temperature of 40°C.

R = (27/0.82) x 0.89 = 29.3 mm H_2O/m 293 [Pa/m]

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. In general, there are 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 piping 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 piping system is added to all the equivalent lengths of the individual joints. 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 more quickly.

direct analytical method ζ / equivalent length method [m]

Ø	DN							
10	12	0.03	0.44	0.48	0.30	0.23	0.16	0.09
12	15	0.04	0.59	0.65	0.43	0.31	0.23	0.11
15	18	0.05	0.74	0.80	0.54	0.39	0.26	0.16
20	22	0.07	1.00	1.00	0.69	0.49	0.34	0.21
25	28	0.10	1.40	1.50	0.97	0.68	0.48	0.29
32	35	0.13	1.80	1.90	1.30	0.91	0.60	0.38
40	42	0.16	2.30	2.40	1.60	1.10	0.75	0.49
50	54	0.22	3.10	3.40	2.30	1.70	1.10	0.77

equivalent lengths and values of local pressure drops

direct analytical method

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

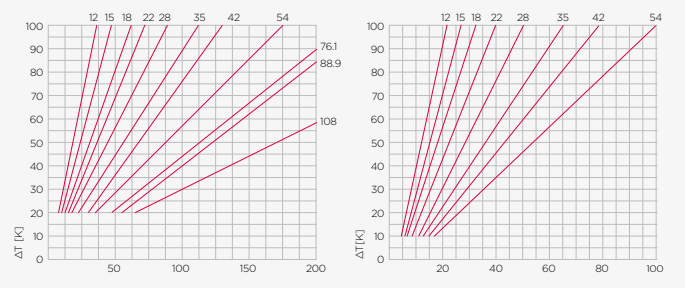
$$\Delta p_L = \Sigma\zeta \times v2 \times \gamma/2 \times 10^{-5} \text{ [bar]}$$

v = flow velocity of the fluid [m/s]
γ = specific density of the fluid [kg/m³]
ζ = local flow resistance coefficient

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

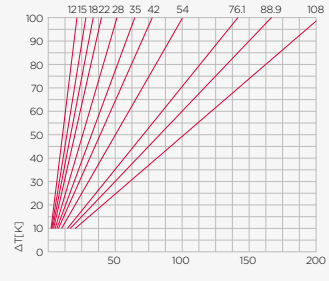
heat loss

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

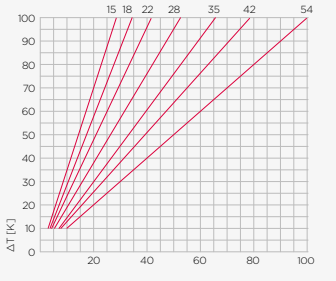


linear heat loss [W/m]
VSH SudoXPress Stainless tube

linear heat loss [W/m]
copper tube



linear heat loss [W/m]
VSH SudoXPress Carbon tube



linear heat loss [W/m]
VSH SudoXPress polypropylene coated carbon steel tube

The diagrams show the linear heat losses of the tube according to their diameter and temperature difference. The temperature difference is the difference between the temperature of the liquid inside the piping system and the surrounding air temperature. This applies to uninsulated tubing that is laid against the walls or partitions of the building.

friction loss

In fluid flow, friction loss is the loss of pressure that occurs in piping systems due to the effect of the fluid's viscosity near the surface of the tube. The following tables show the friction loss R in the tube with a flow rate Q and flow velocity at a temperature of 10°C for VSH SudoXPress Stainless tubes in accordance with DVGW - Worksheet GW 541 (2004), Series 2, with a wall roughness [k] of 0.0015 mm. The tables for VSH SudoXPress Carbon and copper tube, as well as the tables for different situations (other temperatures or applications), are available from Aalberts integrated piping systems or can be downloaded from: www.aalberts-ips.eu

	12 x 1 mm		15 x 1 mm		18 x 1 mm		22 x 1.2 mm		28 x 1.2 mm	
maximum flow-rate Qs [l/s]	R [mbar/m]	v [m/s]	R [mbar/m]	v [m/s]	R [mbar/m]	v [m/s]	R [mbar/m]	v [m/s]	R [mbar/m]	v [m/s]
0.01	0.5	0.1	0.2	0.1	0.1	-	-	-	-	-
0.02	1.6	0.3	0.5	0.2	0.2	0.1	0.1	0.1	-	-
0.03	3.2	0.4	0.9	0.2	0.4	0.1	0.1	0.1	0.1	-
0.04	5.3	0.5	1.5	0.3	0.6	0.2	0.2	0.1	0.1	0.1
0.05	7.7	0.6	2.2	0.4	0.8	0.2	0.3	0.2	0.1	0.1
0.10	25.4	1.3	7.3	0.8	2.7	0.5	1.0	0.3	0.3	0.2
0.15	51.5	1.9	14.8	1.1	5.5	0.7	1.9	0.5	0.7	0.3
0.20	85.4	2.5	24.5	1.5	9.1	1.0	3.3	0.6	1.1	0.4
0.25	126.6	3.2	36.2	1.9	13.5	1.2	4.8	0.8	1.6	0.5
0.30	175.0	3.8	49.9	2.3	18.5	1.6	6.5	1.0	2.1	0.6
0.35	230.3	4.5	65.8	2.8	24.3	1.7	8.6	1.1	2.8	0.7
0.40	292.2	5.1	83.1	3.0	30.8	2.0	10.8	1.3	3.5	0.8
0.45	360.8	5.7	102.4	3.4	37.9	2.2	13.4	1.4	4.4	0.9
0.50	435.8	6.4	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
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

friction loss values (VSH SudoXPress Stainless tubes)

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
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

friction loss values (VSH SudoXPress Stainless tubes)

maximum flow-rate Qs [l/s]	76.1 x 2 mm		88.9 x 2 mm		108 x 2 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
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

friction loss values (VSH SudoXPress Stainless tubes)

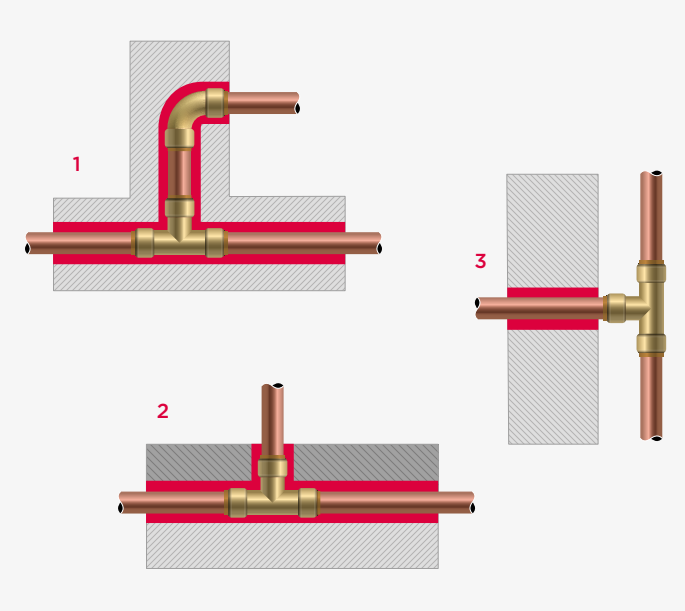
built-in

recommendations

For esthetical and practical reasons tubes are rarely installed uncovered in modern installations, other than in spaces such as cellars and garages. Several precautionary measures, depicted schematically in the figures 1, 2 and 3 below, are necessary if tubes are to be built-in/recessed in walls or floors. The following systems can be built-in/recessed:

- VSH Tectite 316 without corrosion protection*, avoid the concrete from getting moist after embedding
- VSH Tectite Sprint with corrosion protection (e.g. coated/ protective sleeve)
- VSH Tectite Classic with corrosion protection (e.g. tube with protective coating)

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 (in connection with noise issues).



1. wall built-in

The figure shows a cross-section of a tube installed inside a wall. Fittings and tubes 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. Prescribed by DIN1988, insulation materials are a good solution for this purpose and also provide heat insulation.

2. floor built-in

The horizontal stretches of piping systems installed inside floors and sprung floors, must be insulated by a protective sleeve, such as shown in the figure 2. An adequate elastic sleeve must be used where the tube exits the floor so it does not come into contact with the cement, when the tube should expand.

3. riser branch

The figure shows a classical situation of branching from an outside riser. In this situation, make sure the tee-fitting is not subjected to any stresses as a result of a change in axial direction. Mounting brackets, as fixed points and gliding points are very important in this context. In general, fittings and tubes in all installations, should always be enclosed in a soft material to allow expansion. We emphasize once again that great care must be taken when selecting insulation and surrounding materials for stainless steel piping sytems to ensure that they do not ever allow any chloride ions to come into contact with the piping system. In 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	1.00
14	1.25
16	1.25
15	1.25
18	1.50
22	2.00
28	2.25
35	2.75
42	3.00
54	3.50

distances between brackets in accordance with DIN1988, part 200

The distance values between the attachment points as shown above is insufficient. Heat expansion also needs to be appropriately compensated in horizontal stretches and, therefore, the distances above may need to be adjusted.

mounting tubes

When securing tubes, the following must be kept in mind: 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.

* stainless tubes that are built-in material which contain chloride must be protected accordingly.

pressure test

As soon as a piping system is 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 tested medium and the results of the test must be documented in a so-called pressure test report.

important: A pressure test of the piping system must be carried out in all cases. Before being covered up, insulated, painted or walled in, a piping system must first undergo a pressure test in order to be certain that there are no leaks. 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 an VSH SudoPress Carbon 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.

important: When testing water installations, always make sure to use clean, potable water.

pressure test of potable water systems

important: The pressure test with water in a potable water piping system that has already been installed is performed in accordance with the ZVSHK/BHKS tec hnical 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, potable water, the piping system must be properly bled.

pressure test with air

important: Pressure tests 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 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 is to 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.

pressure test for heating and cooling systems

important: As a rule, the pressure test for piping systems that have already been installed are 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 tight at high temperatures
- during the test no pressure drops should occur
- 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.

flushing the piping system

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

Potable water systems must be flushed as soon as possible after installing the tubes and after the pressure test. The cold and hot water tubes should be flushed separately, intermittently and under pressure with an air-water mixture (EN 806, Part 4). 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 water containing a disinfectant addition, special care must be taken to ensure that no chlorides remain in the piping system. Always make sure to flush with clean, potable water.

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_2)

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

It is of primary importance that VSH Tectite system components are installed only downstream of other, metallurgically inferior (less noble) components that are possibly present in these kinds of installations. For example, it is possible to install branches with VSH SudoXPress Stainless tubes from a piping system consisting of carbon steel tubes. In such cases, non-ferrous metal or synthetic connection pieces must be used (see DIN1988).

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. Therefore, it is recommended to avoid using carbon steel extensions and connection pieces and use stainless steel or brass fittings instead .

stray currents corrosion

Corrosion by stray currents rarely occurs in practice and is immediately recognisable as pitting occurs on the outside of the tube. 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 earth and from there into other neighbouring 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 piping system, earth current must have an entry point at a spot where the normal protective tube cover or connection is damaged or missing.

For this reason, metal piping systems must be earthed (see EU Regulations). Direct current installations are generally not used in domestic housing, so no serious problems occur with alternating current. Research has shown that problems with stray currents rarely occur and do not depend on the type of metal.

stainless steel

internal corrosion

VSH Tectite 316 stainless fittings and VSH SudoXpress stainless steel tubes are completely passive when in contact with potable water and, therefore, not at risk from corrosion. Potable water is considered to be water with properties that comply with current regulations on physical-chemical tolerances.

The fittings and tubes 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 Tectite 316 stainless system can also be used for all water treatment plants for domestic purposes (e.g. for water softeners). It is corrosion-resistant as regards demineralized and distilled water, and water containing glycol. Hygiene problems regarding heavy metal contamination do not occur with stainless steel. 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 Tectite 316 stainless fittings 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 fittings and tubes is continuous and that, if necessary, sufficient corrosion-protective insulation tape is applied. Correctly applied closed-cell insulation is an effective protection against corrosion.

carbon 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. We are always happy to answer enquiries about the use of additives. Please observe the applicable legislation, regulations and local rules regarding corrosion.

external corrosion

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

prevention of corrosion

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

internal corrosion

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 and the piping system is practically oxygen-free after this reaction.

stainless steel

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

carbon steel

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

copper

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 possible combinations

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.

(potable) water installations

stainless steel

VSH Tectite 316 fittings and VSH SudoXPress stainless steel tubes have the advantage of being passive in potable water. The physical and chemical properties of potable water are not affected by stainless steel. In this passive state, no internal corrosion will occur. The danger of heavy metal contamination and growth of bacteria is avoided by using stainless steel fittings and tubes.
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. VSH Tectite 316 stainless fittings are suitable for all water treatment methods (water softening) for potable water and are also corrosion-resistant regarding demineralized and distilled water and water containing glycol. VSH Tectite 316 stainless fittings and VSH SudoXPress stainless steel tubes are, however, not suitable for operation in dosing systems for e.g. disinfectants, which are added to the potable water. VSH Tectite 316 stainless fittings and VSH SudoXPress tubes are also suitable for all other open and closed-loop water systems (e.g. cooling water).
Combi-installations: The corrosion behaviour 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. Discolouration from a deposit of foreign corrosion products does not indicate corrosion on 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.

carbon steel

Carbon steel fittings and tubes are not permitted in potable water installations. Contact corrosion will occur with carbon steel if it enters into direct contact with stainless steel.
the possibility of contact corrosion is negligibly small when bronze, copper or brass fittings are used between the carbon steel tube and the stainless steel. Contact corrosion on a carbon steel tube can also be prevented by using 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 unfavourable 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 carbon steel: the following rule is important if copper and carbon 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	carbon steel
↓	copper
noble	stainless steel

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

external corrosion

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 undesired penetration of rain, humidity or dampness and this can lead to problems. Responsibility for taking relevant measures rests, however, 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.).

stainless steel

Outer corrosion can only occur in the following circumstances:

- if stainless steel heat-conducting piping systems (50°C) come into contact with building and insulating materials containing chlorides (as the result of humidity);
- if water vapour on stainless steel heat-conducting piping systems leads to local chloride concentration; and
- if VSH Tectite 316 stainless systems (including cold water) come into contact with chlorine gas, saltwater or brine or (oxygen-saturated) water with a high chlorine content.

If there is a risk of building materials coming into contact with highly chlorinated water over a long period, suitable corrosion protection must be taken care of. VSH SudoXPress Stainless tubes in cement floors will not be subject to electrolytic outer corrosion in connection with potential equalisation.

carbon steel

Special attention must be paid to preventing outer corrosion in environments that remain humid for longer periods. Only in case of sporadic short-term corrosion stress caused by humidity, carbon steel will be corrosion resistant for a longer period. Carbon steel connections must be protected in case of increased risk of corrosion due to electrolytic outer corrosion (or long humid periods). A polypropylene coating offers effective corrosion protection.

copper

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

impact of application and processing

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

cutting stainless steel

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

bending stainless steel tubes

Stainless steel tubes may not be bent warm. The heating of the stainless steel tubes alters the structure of the material (sensitisation) 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 cause pitting in critical concentrations.

connections

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

stainless - carbon - copper

With all three materials (stainless steel, carbon steel, copper), waterline corrosion can occur as a result of interaction between three actors (water – metal – gas (air)). This corrosion can be prevented if the piping system 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.

effect of insulation

Insulation does not, as a rule, offer any protection against corrosion except in 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.

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).

carbon steel

No corrosion can occur as long there's 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.

copper

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

warranty

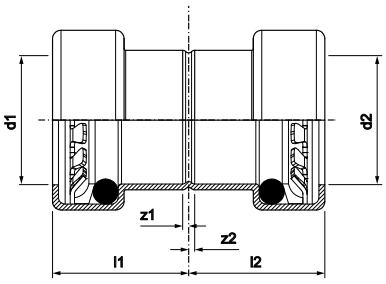
Please contact Aalberts integrated piping systems for the most recent warranty conditions that apply to VSH Tectite.

VSH Tectite

Sprint

TT1/TT270 straight coupling

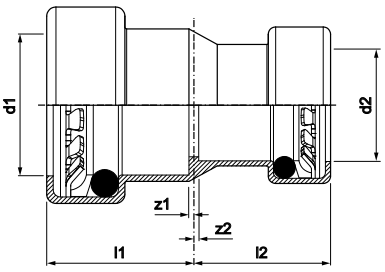
(2 x push-fit)



dimension	article no.	l1/l2	z1/z2
12	4758200	18	1
15	4758201	17	1
18	4758202	17	1
22	4758203	19	1
28	4758204	21	1

TT1R/TT240 reducer

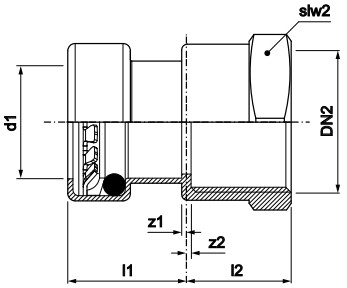
(2 x push-fit)



dimension	article no.	l1	l2	z1	z2
15 x 12	4758205	18	23	1	6
18 x 15	4758206	18	20	1	4
22 x 15	4758207	19	26	1	10

TT2/TT270G straight connector

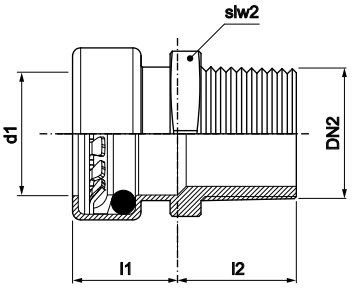
(push-fit x female thread)



dimension	article no.	l1	l2	slw2	z1	z2
12 x G½"	4758209	21	15	25	4	3
15 x G½"	4758210	17	15	25	1	3
22 x G¾"	4758212	36	17	30	1	3
28 x G1"	4758213	20	21	38	2	4

TT3/TT243G straight connector

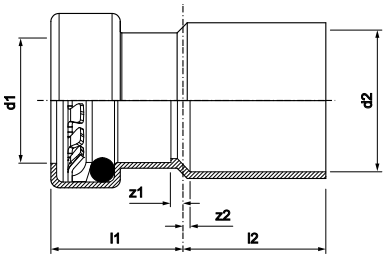
(push-fit x male thread)



dimension	article no.	l1	l2	slw2
12 x R⅜"	4758214	16	17	22
12 x R½"	4758215	16	19	25
15 x R½"	4758216	16	20	21
18 x R¾"	4758217	17	23	27
22 x R¾"	4758218	16	23	26
28 x R1"	4758219	18	21	32

TT6/TT243 reducer

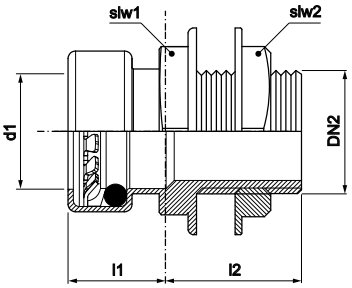
(male insert x push-fit)



dimension	article no.	l1	l2	z1	z2
Ø15 x 12	4758220	20	19	5	4
Ø22 x 15	4758222	18	26	6	2
Ø28 x 15	4758223	19	33	2	13
Ø28 x 22	4758224	20	27	2	7

TT5 tank connector

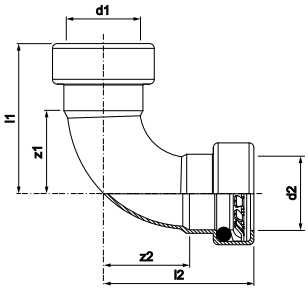
(push-fit x male thread and back nut)



dimension	article no.	l1	l2	slw1	slw2
15 x R½"	TT005G1512	16	26	22	26
22 x R¾"	TT005G2234	17	28	31	30

TT12/TT090 bend 90°

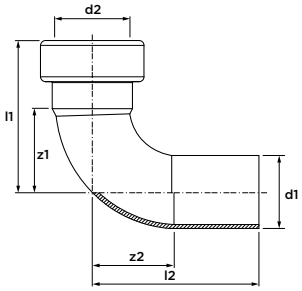
(2 x push-fit)



dimension	article no.	l1/l2	z1/z2
12	4758229	34	17
15	4758230	36	19
18	4758231	39	20
22	4758232	44	25
28	4758233	51	31

TT12S/TT092 street elbow 90°

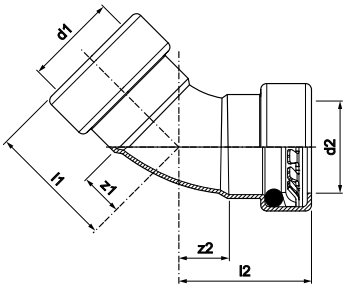
(push-fit x male insert)



dimension	article no.	l1	l2	z1
12	4758225	34	39	18
15	4758226	37	50	20
18	4758227	38	50	21
22	4758228	44	58	26

TT21/TT041 bend 45°

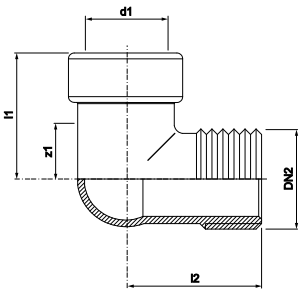
(2 x push-fit)



dimension	article no.	l1/l2	z1/z2
15	4758259	28	12
22	4758261	34	17
28	4758262	44	22

TT13/TT092G elbow 90°

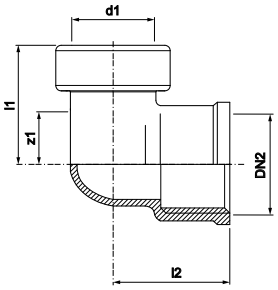
(push-fit x male thread)



dimension	article no.	l1	l2	z1
15 x R½"	4758272	24	29	9
22 x R¾"	TT092G2234	30	35	13

TT14/TT090G elbow 90°

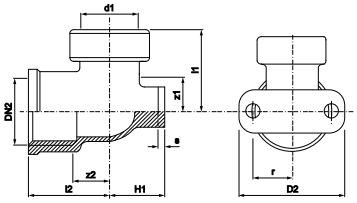
(push-fit x female thread)



dimension	article no.	l1	l2	z1	z2
15 x G½"	4758271	26	25	10	10
22 x G¾"	TT090G2234	32	34	13	18

TT15/TT471G wallplate 90°

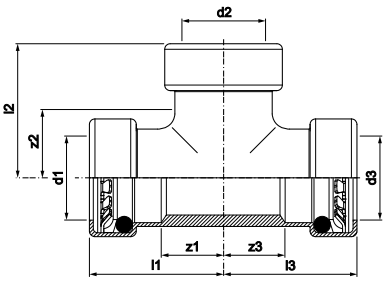
(push-fit x female thread)



dimension	article no.	l1	l2	l3	z1	z2
12 x G½"	4758273	27	26	17	10	14
15 x G½"	4758274	28	25	14	17	10

TT25/TT130 tee

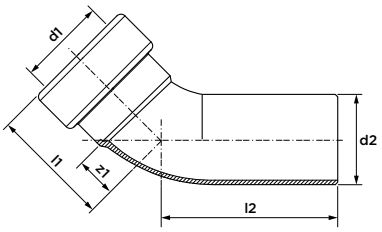
(3 x push-fit)



dimension	article no.	l1/l2/l3	z1/z2/z3
12	4758234	26	9
15	4758235	26	9
22	4758237	31	13
28	4758238	38	17

TT21S/TT040 street elbow 45°

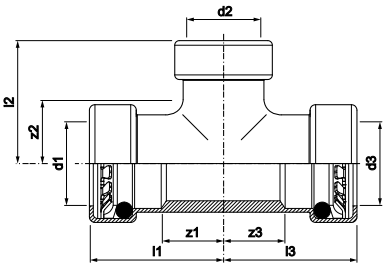
(push-fit x male insert)



dimension	article no.	l1/l2	z1
12	4758263	27	10
15	4758264	28	12
22	4758266	34	17
28	4758267	44	22

TT25/TT130 tee reduced

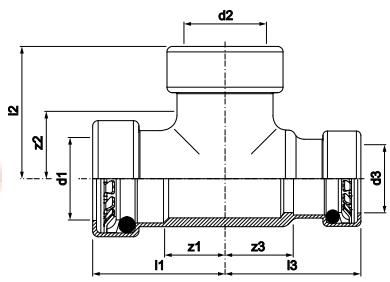
(3 x push-fit)



dimension	article no.	l1/l3	l2	z1/z2	z3
15 x 15 x 12	4758239	25	28	9	11
18 x 18 x 15	4758242	27	28	11	12
22 x 22 x 15	4758246	28	31	9	14
22 x 22 x 18	4758250	30	32	10	12
28 x 28 x 15	4758253	28	35	10	16
28 x 28 x 22	4758257	46	44	14	15

TT26/TT130 tee reduced

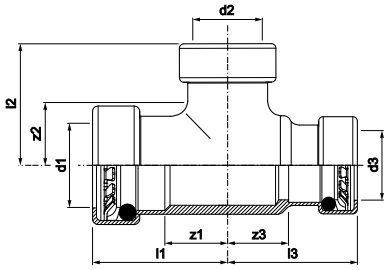
(3 x push-fit)



dimension	article no.	l1	l2	l3	z1	z2	z3
15 x 12 x 15	4758240	29	31	29	12	15	12
22 x 15 x 22	4758251	31	36	31	13	19	13
28 x 22 x 28	4758249	36	41	36	17	24	17

TT27/TT130 tee reduced

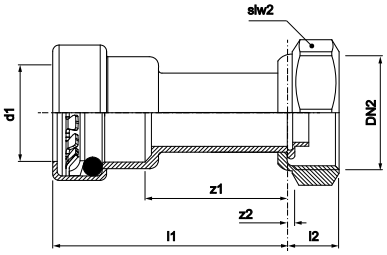
(3 x push-fit)



dimension	article no.	l1	l2	l3	z1	z2	z3
22 x 15 x 15	4758245	31	33	29	13	17	13
28 x 22 x 22	4758256	36	36	36	18	19	19

TT62/TT062 union coupling

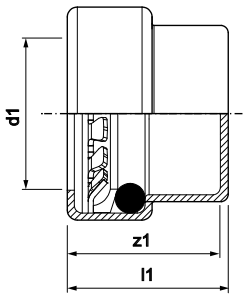
(push-fit x union nut)



dimension	article no.	l1	l2	z1	z2	slw2
12 x G⅜	4758278	33	11	16	2	21
12 x G½	4758279	35	13	18	2	24
15 x G½	4758280	36	13	16	2	24
22 x G¾"	4758283	39	13	17	2	31

TT61/TT301 stop end

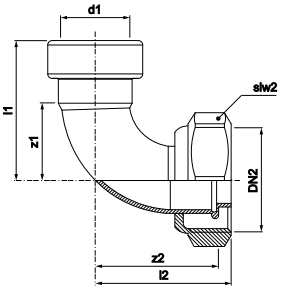
(1 x push-fit)



dimension	article no.	l1	z1
12	TT30112	18	3
15	TT30115	17	1
18	TT30118	19	3
22	TT30122	18	1
28	TT30128	19	1

TT63/TT063 angle adapter 90°

(push-fit x union nut)



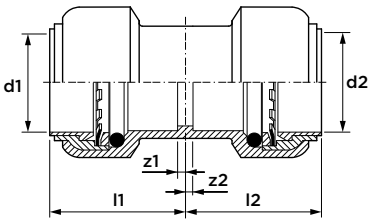
dimension	article no.	l1	l2	slw2	z1	z2
15 x G½"	4758276	44	45	24	28	32

VSH Tectite

Classic

T1/T240 straight coupling

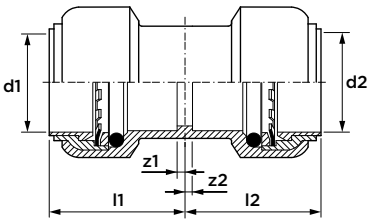
(2 x push fit)



dimension	article no.	l1/l2	z1/z2
10	4751560	25	1
12	4751582	25	1
14	4751564	25	1
15	4751604	25	1
16	4751568	25	1
18	4751626	25	1
20	4751572	30	1
22	4751637	30	1
28	4751648	33	1

T1CP/T240 straight coupling, chrome plated

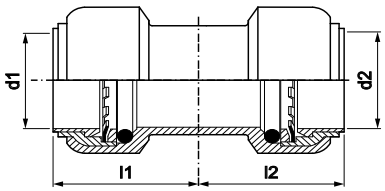
(2 x push-fit)



dimension	article no.	l1/l2	z1/z2
10	4751571	25	1
12	4751593	25	1
15	4751615	25	1

T1S/T270S slip coupling

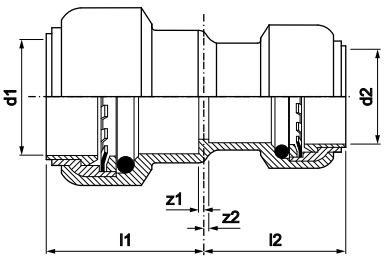
(2 x push-fit)



dimension	article no.	l1/l2
12	4751890	25
14	4751672	25
15	4751901	25
18	4751912	25
22	4751923	30
28	4751934	33

T1R/T240 reducer

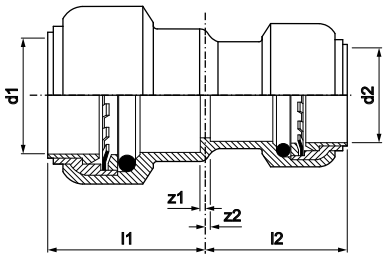
(2 x push-fit)



dimension	article no.	l1	l2	z1/z2
12 x 10	4751021	25	25	1
14 x 12	4753192	25	25	1
15 x 10	4751043	25	25	1
15 x 12	4751054	25	25	1
16 x 12	4751056	25	25	1
16 x 14	4751058	25	25	1
18 x 15	4751076	30	30	1
22 x 15	4751098	30	25	1
22 x 18	4751100	30	25	1
28 x 22	4751111	33	30	1

T1RCP/T240 reducer, chrome plated

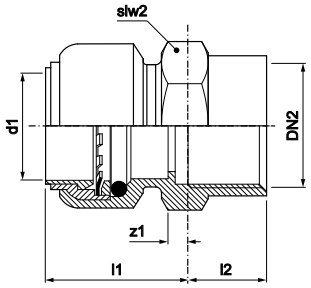
(2 x push-fit)



dimension	article no.	l1/l2	z1/z2
12 x 10	4751010	25	1
15 x 10	4751032	25	1
15 x 12	4751065	25	1

T2/T270G straight connector

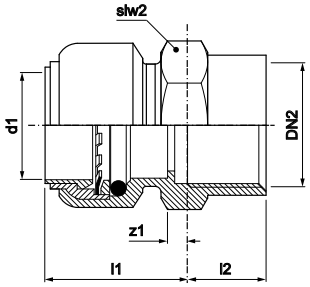
(push-fit x female thread)



dimension	article no.	l1	l2	slw2	z1/z2
12 x G⅜"	4751736	25	14	22	1
12 x G½"	4751725	25	16	25	1
14 x G⅜"	4751108	25	14	22	1
14 x G½"	4751110	25	16	25	1
15 x G⅜"	4751771	25	14	22	1
15 x G½"	4751758	25	16	25	1
16 x G½"	4751114	25	15	27	1
18 x G½"	4751791	25	16	25	1
18 x G¾"	4751802	25	19	32	1
22 x G½"	4751824	30	16	26	1
22 x G¾"	4751835	30	18	31	1
22 x G1"	4751813	30	20	38	1
28 x G¾"	4751857	33	18	32	1
28 x G1"	4751846	33	20	37	1

T2CP/T270G straight connector, chrome plated

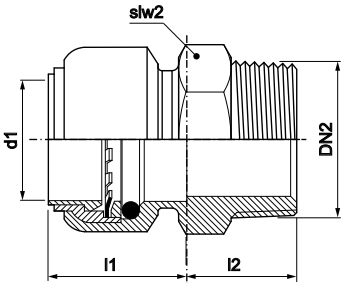
(push-fit x female thread)



dimension	article no.	l1	l2	slw2	z1
10 x G⅜"	4751681	25	14	22	1
12 x G⅜"	4751747	25	14	22	1
12 x G½"	123459880	25	16	25	1
15 x G⅜"	4751780	25	14	22	1
15 x G½"	123459881	25	16	25	1

T3T/T243G straight connector

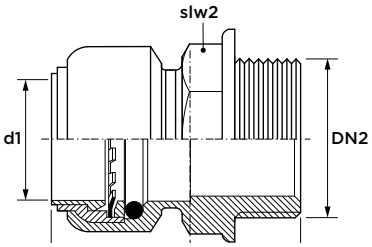
(push-fit x male thread)



dimension	article no.	l1	l2	slw2
10 x R⅜"	4751384	24	15	20
10 x R½"	4751406	24	18	23
12 x R½"	4751417	24	14	20
12 x R⅜"	4751428	24	16	25
15 x R½"	4751441	24	15	20
15 x R⅜"	4751461	24	16	22
18 x R½"	4751472	24	19	24
18 x R¾"	4751483	24	19	28
22 x R1"	4751494	29	15	28
22 x R½"	4751505	29	17	28
22 x R¾"	4751516	29	20	34
28 x R1"	4751527	32	21	37

T3P/T243G straight connector

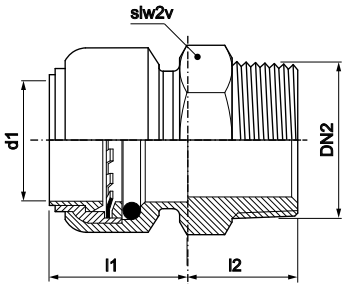
(push-fit x male thread)



dimension	code	l1	l2	slw2
14 x G⅜"	4751553	24	13	22
14 x G½"	4751555	24	13	24
16 x G⅜"	4751559	24	16	22
16 x G½"	4751557	24	23	42

T3TCP/T243G straight connector, chrome plated

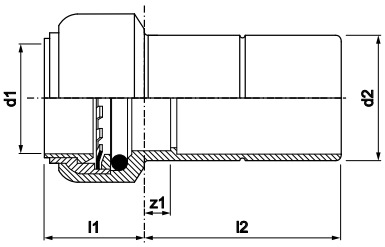
(push-fit x male thread)



dimension	article no.	l1	l2	slw2
10 x Rp⅜"	4751373	24	15	20
10 x Rp½"	4751395	24	18	23
12 x Rp⅜"	4751439	24	14	20
12 x Rp½"	123459882	24	16	25
15 x Rp⅜"	123459883	24	15	20
15 x Rp½"	4751450	24	16	22

T6/T243 reducer

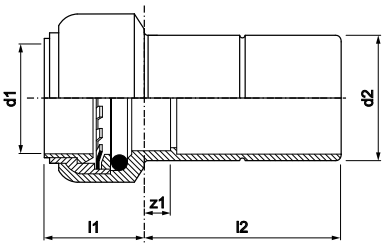
(male insert x push-fit)



dimension	article no.	l1	l2	z1
Ø12 x 10	4751131	24	21	0
Ø15 x 10	4751153	22	26	2
Ø15 x 12	4751164	24	22	0
Ø18 x 15	T2431815	24	30	6
Ø22 x 12	4751186	22	30	2
Ø22 x 15	4751197	22	30	2
Ø22 x 18	4751208	22	30	2
Ø28 x 15	4751221	22	33	2
Ø28 x 22	4751241	23	33	6

T6CP/T243 reducer, chrome plated

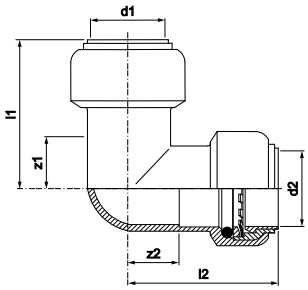
(male insert x push-fit)



dimension	article no.	l1	l2	z1
Ø12 x 10	4751120	24	21	0
Ø15 x 10	4751142	22	26	2
Ø15 x 12	4751175	24	22	0

T12/T090 elbow 90°

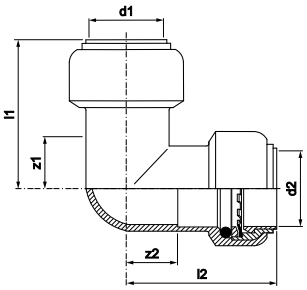
(2 x push-fit)



dimension	article no.	l1/l2	z1/z2
10	4750011	30	6
12	4750031	31	7
14	4750015	33	9
16	4750019	33	9
15	4750053	33	9
18	4750064	34	10
22	4750075	40	12
28	4750086	49	17

T12CP/T090 elbow, chrome plated

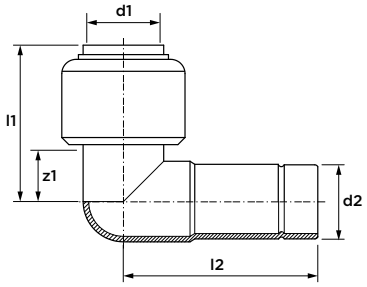
(2 x push-fit)



dimension	article no.	l1/l2	z1/z2
10	4750009	30	6
12	4750042	31	7
15	123459885	33	9

T12S/T092 street elbow 90°

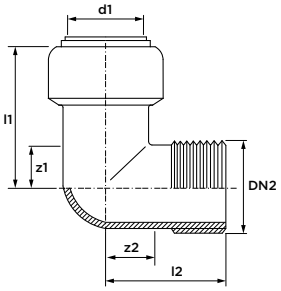
(push-fit x male insert)



dimension	article no.	l1	l2	z1
12 x Ø12	4750284	31	42	7
15 x Ø15	4750306	33	44	9
18 x Ø18	4750317	34	48	10
22 x Ø22	4750328	40	48	12
28 x Ø28	4750339	49	57	17
15 x Ø10	4750350	32	42	8

T13/T092G elbow 90°

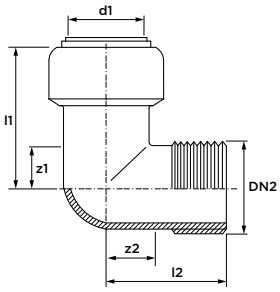
(push-fit x male tread)



dimension	article no.	l1	l2	z1
12 x R½"	4750405	33	29	12
14 x R½"	4750407	33	29	15
15 x R½"	4750438	33	29	14
18 x R½"	4750451	33	29	14
18 x R¾"	4750460	34	36	16
22 x R¾"	4750471	41	34	20
28 x R1"	4750482	49	42	26

T13CP/T092G elbow 90°, chrome plated

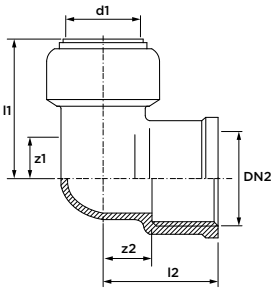
(push-fit x male tread)



dimension	article no.	l1	l2	z1
12 x R⅜"	4750427	29	30	8
12 x R½"	123459886	33	29	7
15 x R½"	4750449	33	29	14

T14/T090G elbow 90°

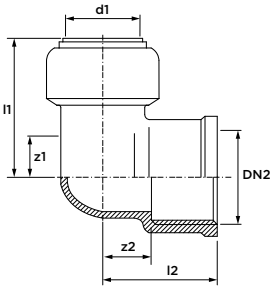
(push-fit x female tread)



dimension	article no.	l1	l2	z1	z2
12 x G⅜"	4750174	24	34	13	10
14 x G½"	4750178	25	34	11	10
12 x G½"	4750185	25	34	11	10
15 x G½"	4750207	25	34	11	10
16 x G½"	4750182	25	34	12	9
18 x G½"	4750229	25	36	11	12
18 x G¾"	4750231	33	40	18	16
22 x G¾"	4750240	33	42	18	13
28 x G1"	4750251	37	49	21	17

T14CP/T090G elbow 90°, chrome plated

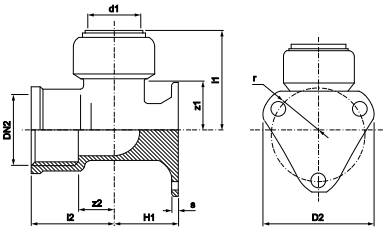
(push-fit x female thread)



dimension	article no.	l1	l2	z1	z2
10 x G⅜"	4750121	34	33	10	10
10 x G½"	4750152	34	25	11	10
12 x G½"	4750196	34	25	11	10
15 x G½"	4750218	34	25	11	10

T15/T471G wallplate 90°

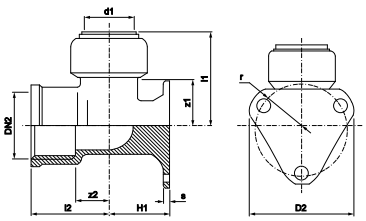
(push-fit x female thread)



dimension	article no.	l1	l2	l3	z1	z2	D2	r	s
12 x G½"	4752154	34	25	10	10	13	50	35	3
15 x G½"	4752176	35	25	11	10	13	50	35	3
22 x G¾"	4752211	40	32	13	11	18	47	35	3

T15CP/T471G wallplate 90°, chrome plated

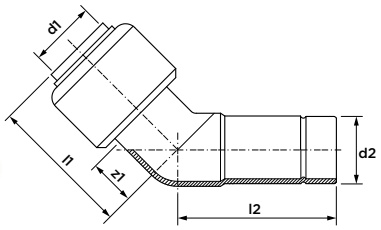
(push-fit x female thread)



dimension	article no.	l1	l2	l3	z1	z2
15 x G½"	4752187	35	25	11	10	13

T21S/T040 street elbow 45°

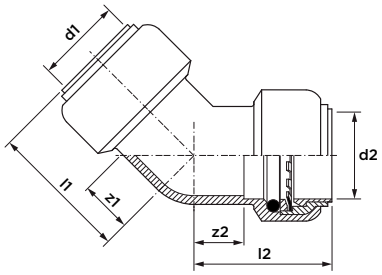
(push-fit x male insert)



dimension	article no.	l1	l2	z1
15 x Ø15	4753012	29	36	5
18 x Ø18	4753023	29	37	5
22 x Ø22	4753034	35	42	6
28 x Ø28	4753045	40	47	8

T21/T041 bend 45°

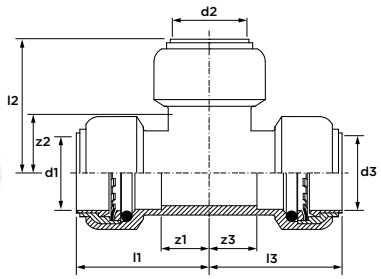
(2 x push-fit)



dimension	article no.	l1	l2	z1/z2
15	4753091	29	29	5
18	4753100	34	29	5
22	4753111	35	35	6
28	4753122	40	40	8

T24/T130 tee

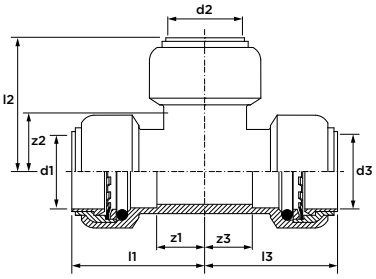
(3 x push-fit)



dimension	article no.	l1/l2/l3	z1/z2/z3
10	4750504	30	6
12	4750561	31	7
14	4750563	33	9
16	4750567	34	10
15	4750581	33	9
18	4750658	34	10
22	4750669	41	12
28	4750746	49	17

T24CP/T130 tee, chrome plated

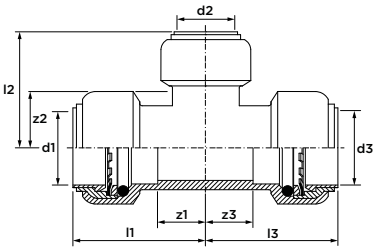
(3 x push-fit)



dimension	article no.	l1/l2/l3	z1/z2/z3
10	4750493	30	6
12	4750570	31	7
15	4750592	33	9

T25/T130 tee reduced

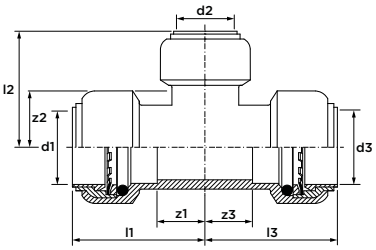
(3 x push-fit)



dimension	article no.	l1/l3	l2	z1/z3	z2
14 x 12 x 14	4750913	31	33	7	9
15 x 12 x 15	4750625	32	33	8	9
16 x 12 x 16	4750917	33	34	9	10
16 x 14 x 16	4750919	34	34	10	10
18 x 14 x 18	4750921	34	35	10	11
20 x 16 x 20	4750923	38	36	9	12
22 x 10 x 22	4750671	35	38	6	14
22 x 14 x 22	4750925	38	38	9	14
22 x 15 x 22	4750691	38	38	9	14
22 x 18 x 22	4750702	39	36	10	12
28 x 18 x 28	4750779	44	39	12	15
28 x 22 x 28	4750790	46	44	14	15

T25CP/T130 tee reduced, chrome plated

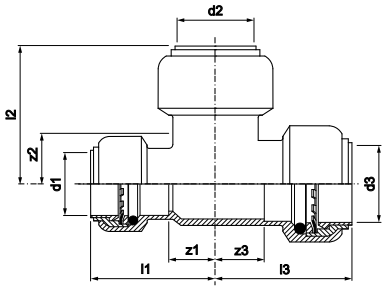
(3 x push-fit)



dimension	article no.	l1/l3	l2	z1/z2	z3
12 x 10 x 12	4750515	30	32	6	8
15 x 12 x 15	4750636	32	33	8	9

T26/T130 tee reduced

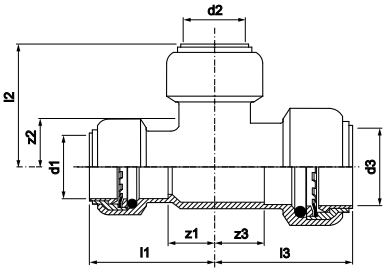
(3 x push-fit)



dimension	article no.	l1	l2	l3	z1	z2	z3
22 x 22 x 15	4750724	37	41	41	13	12	12
28 x 28 x 22	4750823	44	49	48	15	17	16

T27/T130 tee reduced

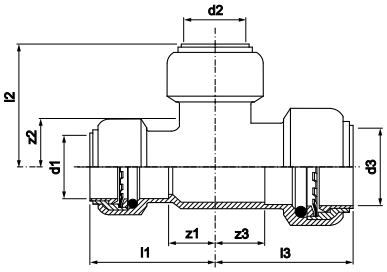
(3 x push-fit)



dimension	article no.	l1	l2	l3	z1	z2	z3
22 x 15 x 15	4750680	36	37	31	12	8	7
28 x 22 x 22	4750781	44	46	44	15	13	15

T27CP/T130 tee reduced, chrome plated

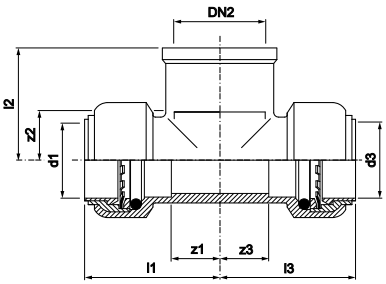
(3 x push-fit)



dimension	article no.	l1	l2	l3	z1	z2	z3
15 x 12 x 12	4750603	33	32	29	9	8	5

T30/T130G tee female branch

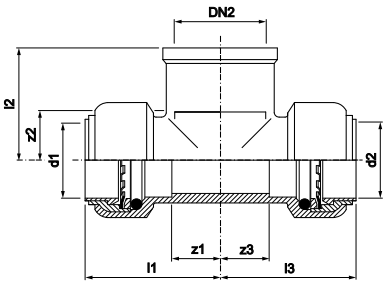
(push-fit x female branch x push-fit)



dimension	article no.	l1/l2	l3	z2/z2	z3
12 x G½" x 152	123459878	35	25	11	12
15 x G½" x 15	4750966	35	25	11	12
22 x G½" x 22	4750977	39	27	10	14
22 x G¾" x 22	4750988	41	30	12	12

T30/T130G tee female branch, chrome plated

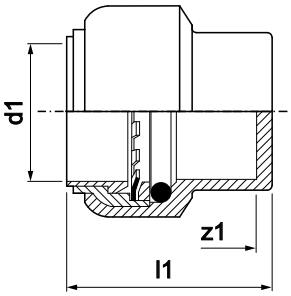
(push-fit x female branch x push-fit)



dimension	article no.	l1/l2	l3	z2/z2	z3
15 x 15 x ½"	123459887	35	25	11	12

T61/T301 stop end

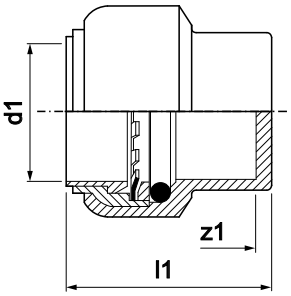
(1 x push-fit)



dimension	article no.	l1	z1
10	4751945	26	2
12	4751967	26	2
14	4751949	26	2
16	4751953	26	2
15	4751978	26	2
18	4751989	26	2
20	4751957	31	2
22	4751991	31	2
28	4752000	34	2

T61CP/T301 stop end, chrome plated

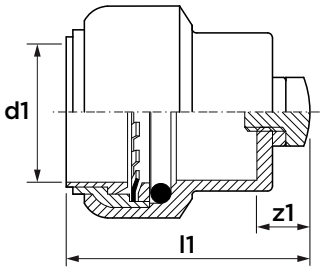
(1 x push-fit)



dimension	article no.	l1	z1
15	123459888	26	2

T61RV/T302 stop end with air vent

(push-fit x air vent)



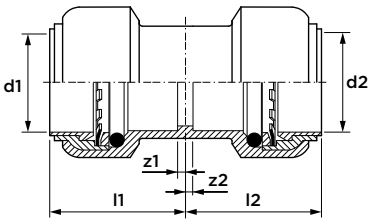
dimension	article no.	l1	z1
15	4752066	34	10
22	123459879	39	10

VSH Tectite

Air

TD1/T270 straight coupling

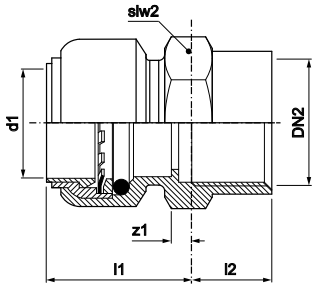
(2 x push-fit)



dimension	article no.	l1/l2	z1/z2
15	TD27015	25	1
18	TD27018	25	1
22	TD27022	30	1
28	TD27028	33	1

TD2/T270G straight connector

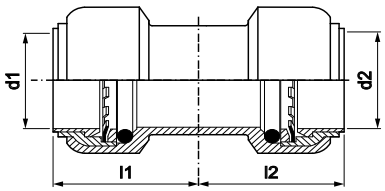
(push-fit x female thread)



dimension	article no.	l1	l2	slw2	z1
15 x G½"	TD270G1512	25	16	25	3
18 x G½"	TD270G1812	25	16	25	3
18 x G¾"	TD270G1834	25	19	32	4
22 x G½"	TD270G2212	30	16	26	3
22 x G¾"	TD270G2234	30	18	31	3
28 x G1"	TD270G281	33	20	37	4

TD1S/T270S slip coupling

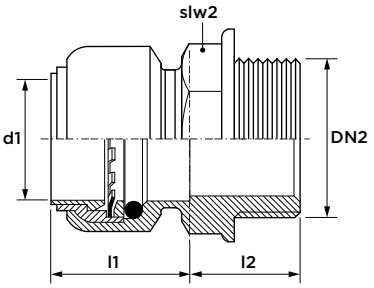
(2 x push-fit)



dimension	article no.	l1/l2
15	TD270S15	25
22	TD270S22	30
28	TD270S28	33

TD3P straight connector

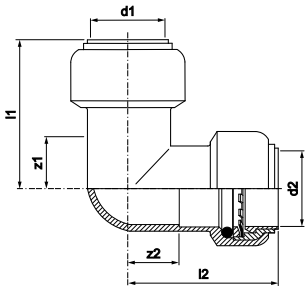
(push-fit x male thread)



dimension	article no.	l1	l2	slw2
15 x G½"	TD243G1512	24	16	22
18 x G½"	TD243G1812	24	19	24
18 x G¾"	TD243G1834	24	19	28
22 x G½"	TD243G2212	29	15	28
22 x G¾"	TD243G2234	29	17	28
28 x G1"	TD243G281	32	21	37

TD12/T090 elbow

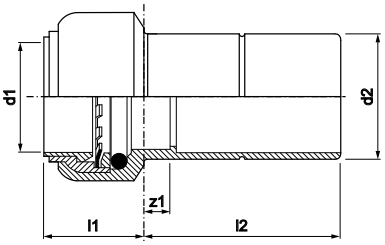
(2 x push-fit)



dimension	article no.	l1/l2	z1/z2
15	TD09015	33	9
18	TD09018	34	10
22	TD09022	40	12
28	TD09028	49	17

TD6/T243 reducer

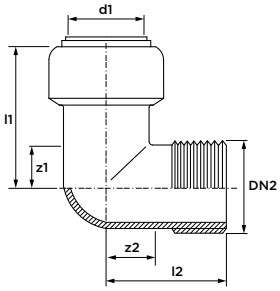
(male insert x push-fit)



dimension	article no.	l1	l2	z1
22 x 18	TD2432218	22	30	2
28 x 18	TD2432818	22	33	2
28 x 22	TD2432822	23	33	6

TD13/T092G elbow

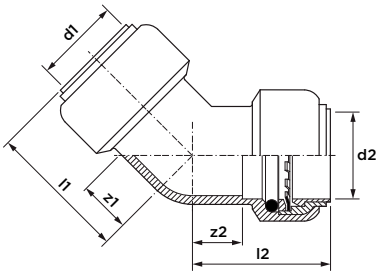
(push-fit x male thread)



dimension	article no.	l1	l2	z1
15 x R½"	TD092G1512	29	33	9
18 x R½"	TD092G1812	29	33	10
22 x R¾"	TD092G2234	34	41	12
28 x R1"	TD092G281	42	49	17

TD21/T041 bend 45°

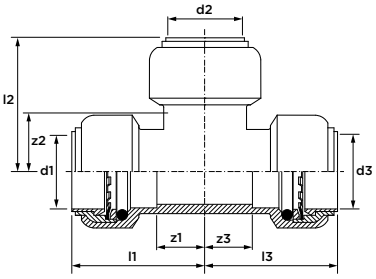
(2 x push-fit)



dimension	article no.	l1/l2	z1/z2
15	TD04115	29	5
18	TD04118	29	5
22	TD04122	35	6
28	TD04128	40	8

TD24/T130 tee

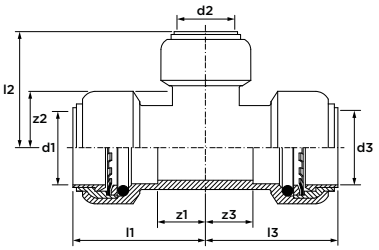
(3 x push-fit)



dimension	article no.	l1/l2/l3	z1/z2/z3
15	TD13015	33	9
18	TD13018	34	10
22	TD13022	41	12
28	TD13028	49	17

TD25/T130 tee reduced

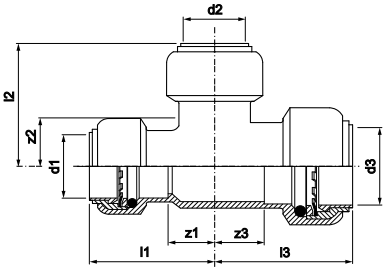
(3 x push-fit)



dimension	article no.	l1/l2	l3	z1/z3	z2
22 x 22 x 15	TD130221522	38	38	9	14
22 x 22 x 18	TD130221822	39	36	10	12
28 x 28 x 18	TD130281828	44	39	12	15
28 x 28 x 22	TD130282228	46	44	14	15

TD27/T130 tee reduced

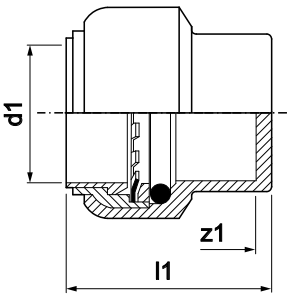
(3 x push-fit)



dimension	article no.	l1	l2	l3	z1	z2	z3
28 x 22 x 22	TD130282222	44	44	46	15	15	13

TD61/T301 stop end

(1 x push-fit)



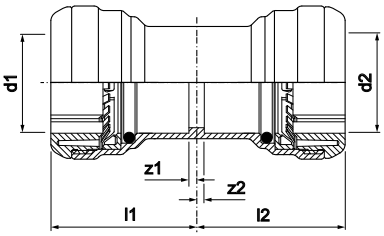
dimension	article no.	l1	z1
15	TD30115	26	2
18	TD30118	26	2
22	TD30122	31	2
28	TD30128	34	2

VSH Tectite

Pro

TX1/TX270 straight coupling

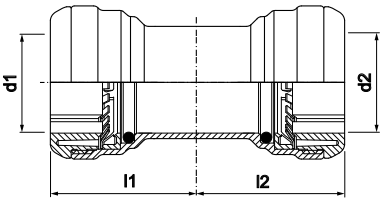
(2 x push-fit)



dimension	article no.	l1/l2	z1/z2
35	4751659	58	1
42	4751661	63	1
54	4751670	70	1

TX1 Slip/TX270S slip coupling

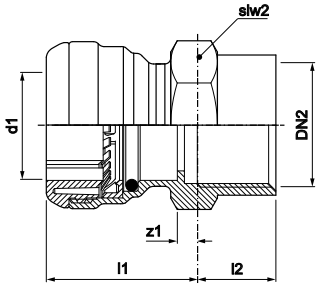
(2 x push-fit)



dimension	article no.	l1/l2
35	4753166	58
42	4753177	63
54	4753188	70

TX2/TX270G straight connector

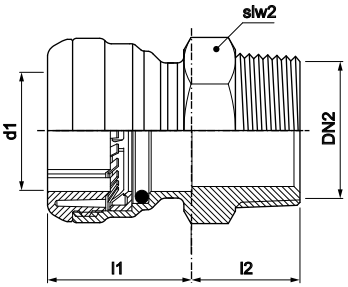
(push-fit x female thread)



dimension	article no.	l1	l2	slw2	z1	z2
35 x G1¼"	4751868	58	26	48	1	6
42 x G1½"	4751879	63	26	54	1	6
54 x G2"	4751881	70	30	66	1	6

TX3/TX2743G straight connector

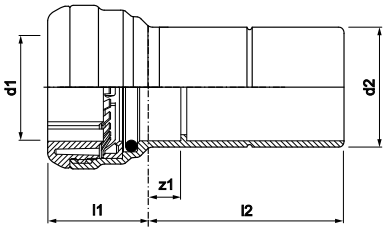
(push-fit x male thread)



dimension	article no.	l1	l2	slw2
35 x R1¼"	4751538	57	26	43
42 x R1½"	4751549	62	26	50
54 x R2"	4751551	69	31	61

TX6/TX243 reducer

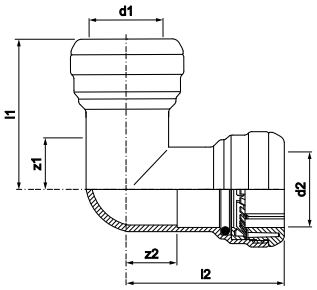
(male insert x push-fit)



dimension	article no.	l1	l2	z1
35 x 22	4751263	25	58	4
35 x 28	4751274	30	58	2

TX12/TX090 elbow 90°

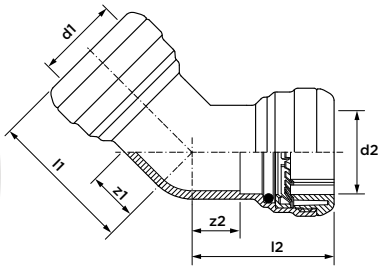
(2 x push-fit)



dimension	article no.	l1/l2	z1/z2
35	4750097	76	19
42	4750108	85	23
54	4750119	98	29

TX21/TX041 bend 45°

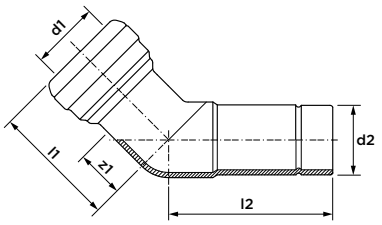
(2 x push-fit)



dimension	article no.	l1/l2	z1/z2
35	4753133	67	10

TX21S/TX040 street elbow 45°

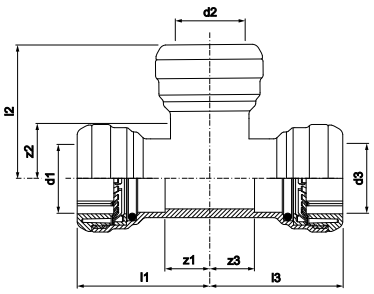
(push-fit x male insert)



dimension	article no.	l1	l2	z1
35	4753056	67	67	10

TX24/TX130 tee

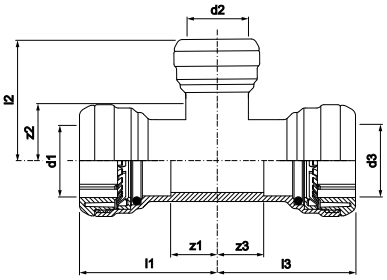
(3 x push-fit)



dimension	article no.	l1/l2/l3	z1/z2/z3
35	4750834	76	19
42	4750878	85	23
54	4750911	98	29

TX25/TX130 tee reduced

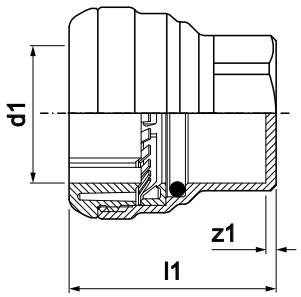
(3 x push-fit)



dimension	article no.	l1/l3	l2	z1/z3	z2
35 x 15 x 35	4750845	68	67	11	43
42 x 15 x 42	4750889	80	82	18	58
42 x 22 x 42	4750891	80	76	18	47

TX61/TX301 stop end

(1 x push-fit)



dimension	article no.	l1	z1
35	4752011	63	6
42	4752022	68	6
54	4752033	76	6

VSH Tectite

316

R2750 stainless 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

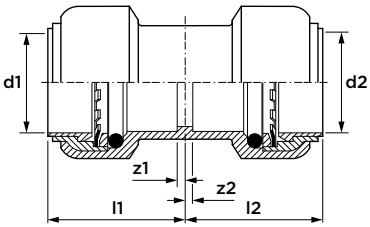
R2752 stainless tube 1.4521 (AISI 444)

(6 m length)

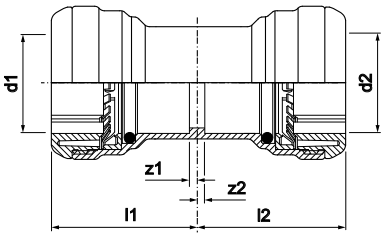
dimension	article no.	DN
15 x 1.0	6194001	12
18 x 1.0	6194012	15
22 x 1.2	6194023	20
28 x 1.2	6194034	25
35 x 1.5	6194045	32
42 x 1.5	6194056	40
54 x 1.5	6194067	50

TS1/TS270 straight coupling

(2 x push-fit)



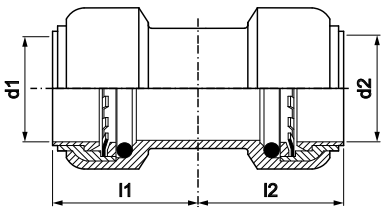
dimension	article no.	l1/l2	z1/z2
15	4755971	25	1
18	4755982	25	1
22	4755993	30	1
28	4756004	33	1



dimension	article no.	l1/l2	z1/z2
35	4756015	58	1
42	4756026	63	1
54	4756037	70	1

TS1S slip coupling

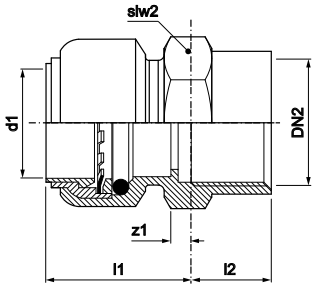
(push x push)



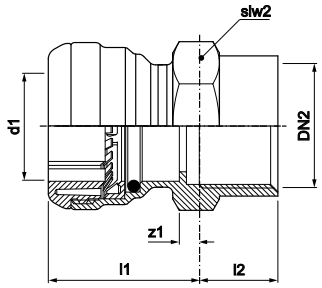
dimension	article no.	l1/l2
15	4756048	25
18	4756059	25
22	4756061	30
28	4756070	33

TS2/TS270G straight connector

(push-fit x female thread)



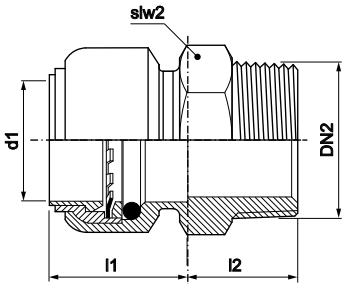
dimension	article no.	l1	l2	slw2	z1
15 x G½"	4756081	25	17	25	1
18 x G½"	4756092	25	17	280	1
18 x G¾"	4756103	27	17	32	3
22 x G½"	4756114	30	17	25	3
28 x G¾"	4756125	30	17	32	3
22 x G1"	4756136	28	23	38	1
28 x G¾"	4756147	32	17	32	1
28 x G1"	4756158	32	23	38	1



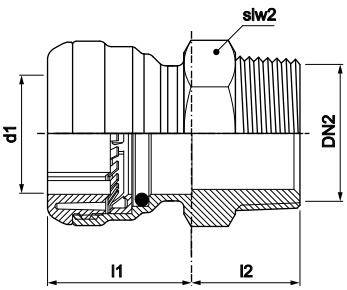
dimension	article no.	l1	l2	slw2	z1
35 x G1¼"	4756169	59	25	48	2
42 x G1½"	4756171	64	25	54	2
54 x G2"	4756180	70	30	65	1

TS3/TS243G straight connector

(push-fit x male thread)



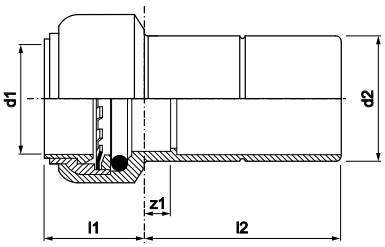
dimension	article no.	l1	l2	slw2
15 x R½"	4755740	23	19	25
18 x R½"	4755751	23	22	25
18 x R¾"	4755762	23	23	32
22 x R½"	4755773	27	19	28
22 x R¾"	4755784	27	20	32
28 x R¾"	4755795	31	20	32
28 x R1"	4755806	31	23	38



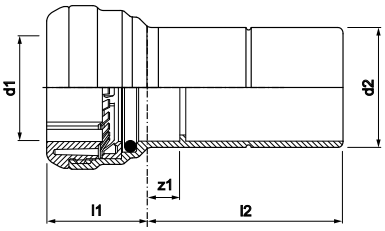
dimension	article no.	l1	l2	slw2
35 x R1¼"	4755817	57	27	43
42 x R1½"	4755828	62	26	50
54 x R2"	4755839	68	31	61

TS6/TS243 reducer

(male insert x push-fit)



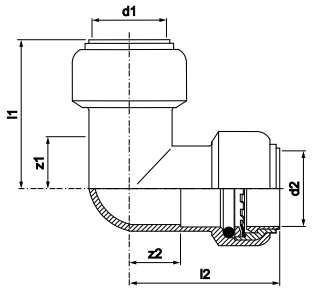
dimension	code	l1	l2	z1
Ø15 x 18	4755841	23	22	0
Ø15 x 22	4755850	23	30	0
Ø18 x 22	4755861	22	31	0
Ø15 x 28	4755872	22	33	0
Ø18 x 28	4755883	23	33	0
Ø22 x 28	4755894	23	33	6
Ø22 x 35	4755905	25	58	4
Ø22 x 42	4755927	25	63	4
Ø28 x 35	4755916	30	58	2
Ø28 x 42	4755938	29	63	3



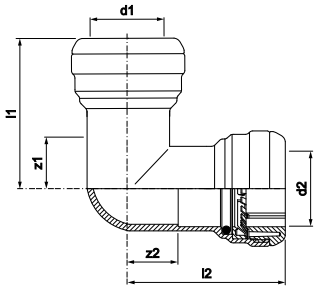
dimension	article no.	l1	l2	z1
Ø35 x 42	4755949	54	62	0
Ø35 x 54	4755951	54	70	3
Ø42 x 54	4755960	59	70	3

TS12/TS090 elbow 90°

(2 x push-fit)



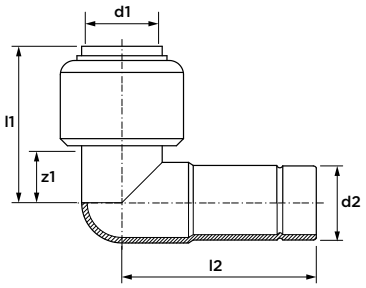
dimension	article no.	l1/l2	z1/z2
15	4755256	33	9
18	4755267	34	10
22	4755278	40	12
28	4755289	48	16



dimension	article no.	l1/l2	z1/z2
35	4755291	76	20
42	4755300	86	23
54	4755311	98	29

TS12S/TS092 street elbow 90°

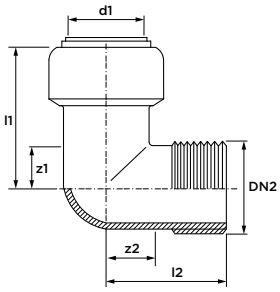
(push-fit x male insert)



dimension	article no.	l1	l2	z1
15	4755377	33	40	10
18	4755388	34	43	11
22	4755399	42	50	14
28	4755401	47	61	16

TS13/TS092G elbow 90°

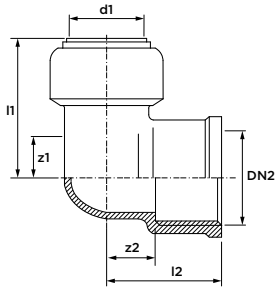
(push-fit x male thread)



dimension	article no.	l1	l2	z1
15 x R½"	4755410	32	31	9
18 x R½"	4755421	32	31	9
22 x R¾"	4755432	39	35	12
28 x R1"	4755443	47	41	17

TS14/TS090G elbow 90°

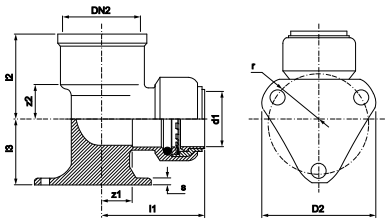
(push-fit x female thread)



dimension	article no.	l1	l2	z1	z2
15 x G½"	4755322	25	34	10	11
18 x G½"	4755333	27	36	10	12
18 x G¾"	4755344	29	39	10	16
22 x G¾"	4755355	32	40	14	13
28 x G1"	4755366	40	47	21	16

TS15/TS471G wallplate

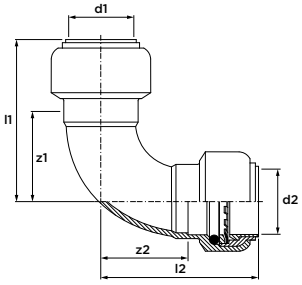
(push-fit x female thread)



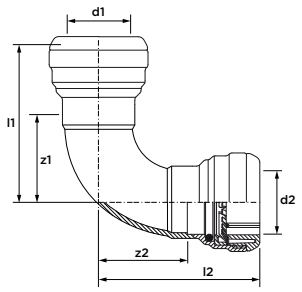
dimension	article no.	d2	l1	l2	l3	z1	z2
15 x G½"	4756268	45	34	27		11	13
18 x G½"	4756279	45	35	27		12	13
22 x G¾"	4756281	45	41	31		14	13

TS18/TS002A bend 90°

(2 x push-fit)



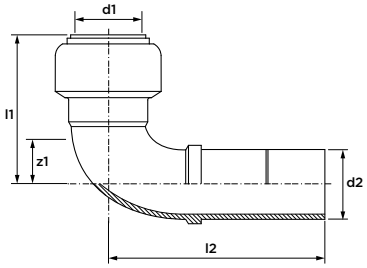
dimension	article no.	l1/l2	z1/z2
15	4755181	41	18
18	4755190	47	24
22	4755201	54	27
28	4755212	66	35



dimension	article no.	l1/l2	z1/z2
35	4755223	99	42
42	4755234	112	50
54	4755245	133	65

TS18S/TS001 bend 90°

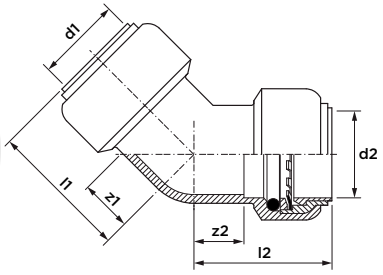
(push-fit x male insert)



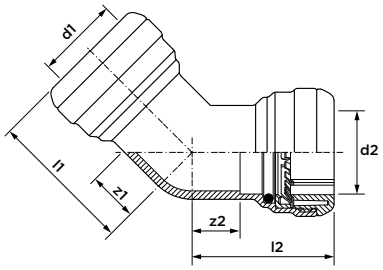
dimension	article no.	l1	l2	z1
15	4755146	41	52	18
18	4755157	45	53	22
22	4755168	53	62	27
28	4755179	66	74	35

TS21/TS041 bend 45°

(2 x push-fit)



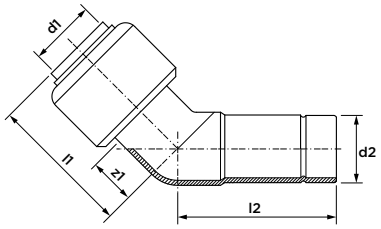
dimension	article no.	l1/l2	z1/z2
15	4755071	28	5
18	4755080	28	5
22	4755091	33	6
28	4755102	39	8



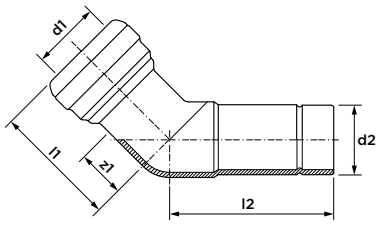
dimension	article no.	l1/l2	z1/z2
35	4755113	67	10
42	4755124	75	13
54	4755135	84	15

TS21S/TS040 bend 45°

(push-fit x male insert)



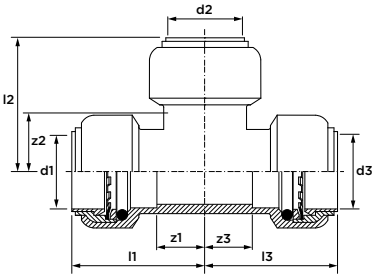
dimension	article no.	l1	l2	z1
15	4755003	28	36	5
18	4755014	28	37	5
22	4755025	33	42	6
28	4755036	38	48	7



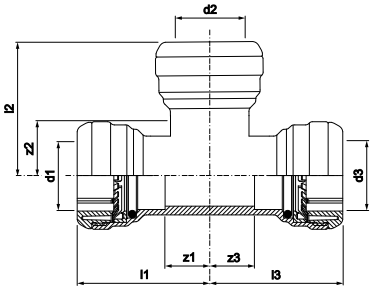
dimension	article no.	l1	l2	z1
35	4755047	66	94	10
42	4755058	75	106	13

TS24/TS030 tee

(3 x push-fit)



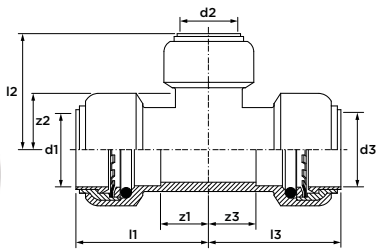
dimension	article no.	l1/l2/l3	z1/z2/z3
15	4755520	33	9
18	4755531	34	10
22	4755542	39	12
28	4755553	46	15



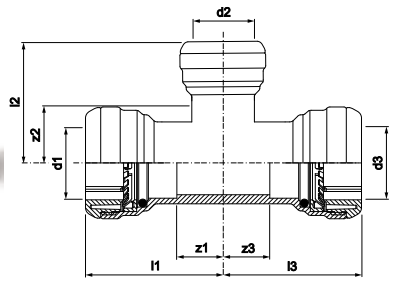
dimension	article no.	l1/l2/l3	z1/z2/z3
35	4755564	77	20
42	4755575	85	23
54	4755586	98	29

TS25/TS250G tee reduced

(3 x push fit)



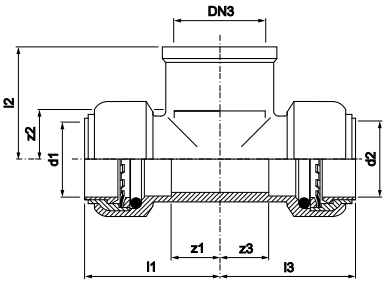
dimension	article no.	l1/l2	l3	z1/z2	z3
18 x 15 x 18	4755597	34	35	9	10
22 x 15 x 22	4755608	36	36	9	13
22 x 18 x 22	4755619	37	36	10	13
28 x 15 x 28	4755621	40	39	9	16
28 x 18 x 28	4755630	42	39	11	16
28 x 22 x 28	4755641	44	40	13	16



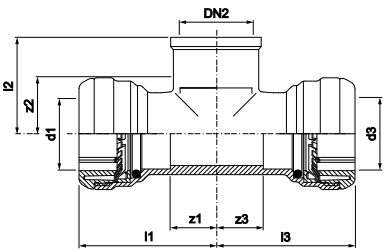
dimension	article no.	l1/l2	l3	z1/z2	z3
35 x 15 x 35	4755652	69	63	11	39
35 x 22 x 35	4755663	74	73	17	49
35 x 28 x 35	4755674	74	73	17	42
42 x 28 x 41	4755696	80	79	17	45
54 x 22 x 54	4755707	88	77	19	48
54 x 28 x 54	4755718	88	85	19	51

TS30/TS130G tee female branch

(push-fit x female thread x push fit)



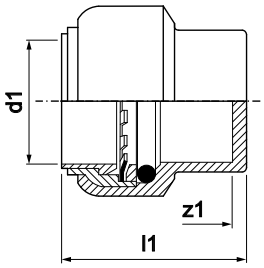
dimension	article no.	l1/l2	l3	z1/z2	z3
15 x G½" x 15	4755454	34	27	11	10
18 x G½" x 18	4755465	36	27	13	11
22 x G½" x 22	4755476	38	30	10	13
22 x G¾" x 22	4755487	41	32	13	15
28 x G½" x 28	4755498	41	32	10	15



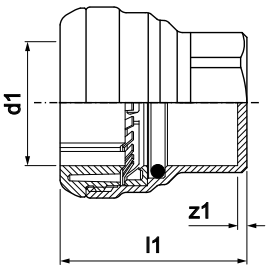
dimension	article no.	l1/l2	l3	z1/z2	z3
35 x G½" x 35	4755509	68	38	11	21
42 x G½" x 42	4755511	74	41	12	25

TS61/TS301 stop end

(1 x push-fit)



dimension	article no.	l1	z1
15	4756191	26	3
18	4756202	26	3
22	4756213	30	3
28	4756224	34	3



dimension	article no.	l1	z1
35	4756235	63	6
42	4756246	69	7
54	4756257	75	7

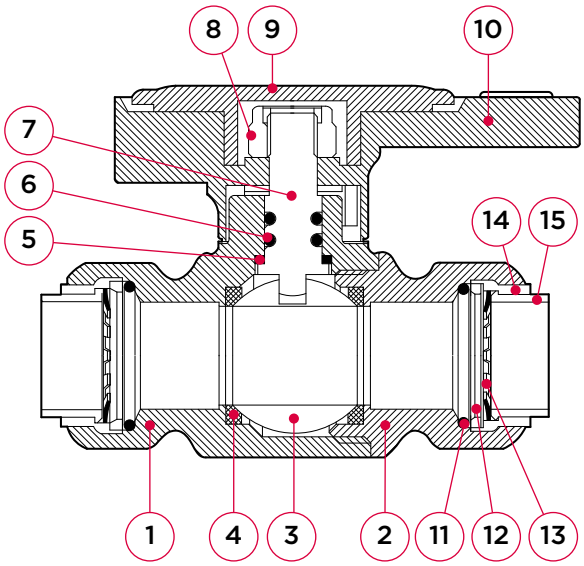
VSH Tectite valves

TX300 ball valve PN16

(2 x push-fit)

specifications

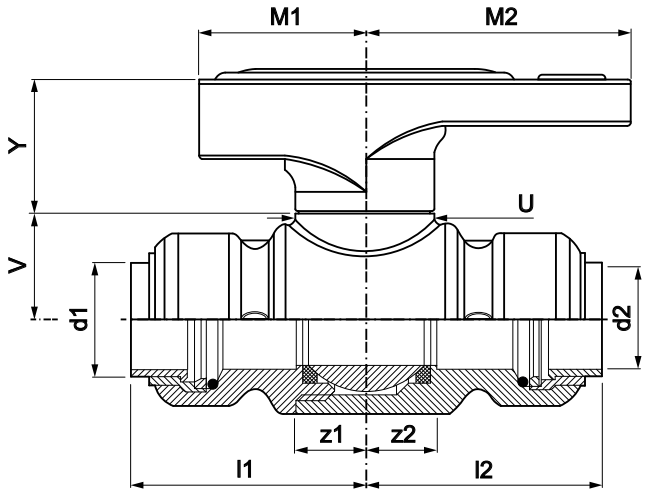
- demountable
- provides electrical continuity
- commercial performance up to 20 bar and 114°C
- max. pressure 16 bar
- full bore design
- quarter turn operation
- blow-out proof stem



no.	component	material
1	body	brass (CW625N-DW)
2	end cap	brass (CW625N-DW)
3	ball	brass, chrome plated
4	ball seal	PTFE
5	thrust washer	PTFE
6	stem o-ring	EPDM
7	stem	brass (CW617N)
8	lever nut	plated steel
9	lever	nylon (PA66) 30% glass filled
10	name plate	nylon (PA66) 30% glass filled
11	o-ring	EPDM
12	protection ring	nylon (PA66)
13	grabring	stainless (316L)
14	cartridge	POM
15	demount collar	POM

maximum pressure [bar]		
operating pressure	**test pressure body**	**test pressure seat**
16	24	17.6

categorie 'pressure equipment directive' (PED)	
all sizes	SEP

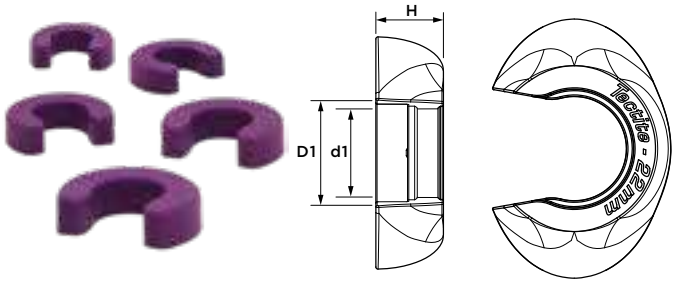


dimension	article no.	l1/l2	z1/z2	M1	M2	U	V	Y
15	66001	36	13	25	40	21	16	22
22	66004	44	15	30	47	23	21	26

VSH Tectite

tools and accessories

DTX/405 demount clip

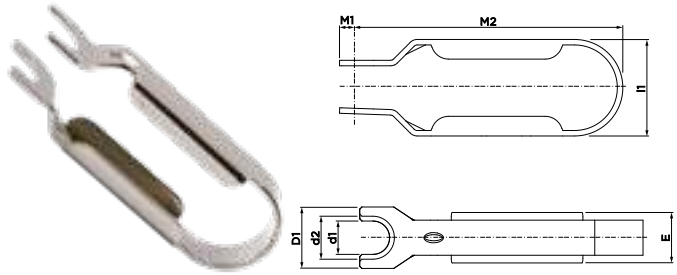


dimension	article no.	D1	d1	H
10	4752277	24	10	6.5
12	4752297	25.5	12	7
14	4752299	29.6	14	8
15	4752308	30	15	8.25
16	4752310	31	16	8
18	4752319	36	18	9
22	4752321	44	22	10.5
20	4752322	40	20	10.5
28	4752330	56	28	10.5

P2743 deburring tool

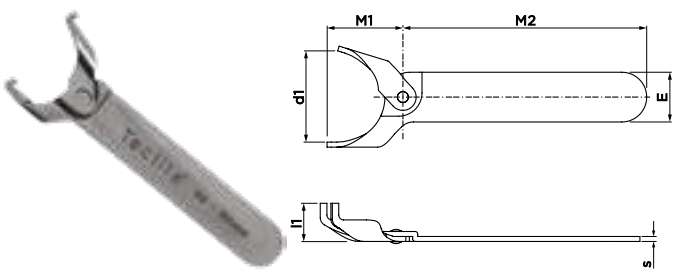
dimension	article no.
10-54	6211898

DT demount wrench



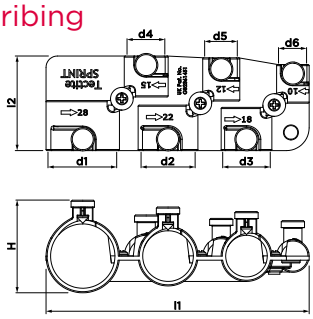
dimension	article no.	d1	d2	D1	l1	E	M1	M2
10	4752090	10	14	21	44	23	6	129
12	4752231	12	16	24	44	23	6	129
14	4752233	14	19	28	44	23	6.5	131
15	4752242	15	20	28	44	23	6	137
16	4752244	16	20	30	44	23	6.5	131
18	4752253	18	22	32	44	23	6	133
20	4752255	20	24	32	44	23	6	134
22	4752264	22	26	34	44	23	6	135
28	4752275	28	32	40	44	23	6	138

DTX/305 demount fork



dimension	article no.	d1	E	l1	M1	M2	S
35 - 54	4752352	35-54	30	23	46	147	3

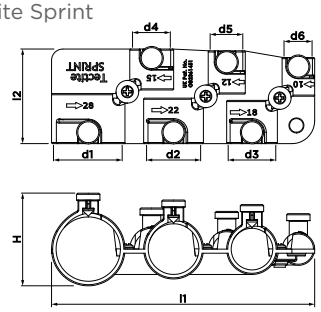
T110 multipurpose tool: deburring, depth gauge, scribing



dimension	article no.	d1	d2	d3	d4	d5	d6	H	l1	l2
10 - 28	4752407	28	22	18	15	12	10	38	116	42

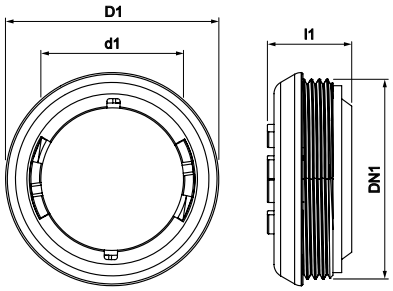
T115 multipurpose tool: deburring, depth gauge, scribing

for use with VSH Tectite Sprint



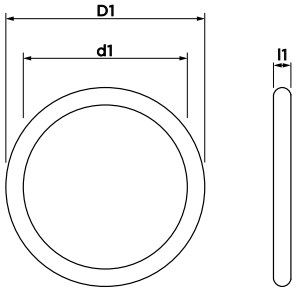
dimension	article no.	d1	d2	d3	d4	d5	d6	H	l1	l2
10 - 28	4758284	28	22	18	15	12	10	38	116	42

TDX demount end cap



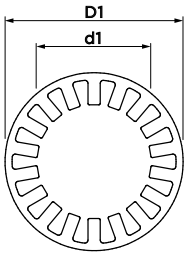
dimension	article no.	DN1	D1	d1	l1
35	TDX35	2″	59	35	27.5
42	TDX42	2½″	70	42	28
54	TDX54	3″	81	54	28

TX100 replacement o-ring



dimension	article no.	D1	d1	l1
35	4752374	44	34	5
42	4752385	52	41	5.5
54	4752396	65	53	6

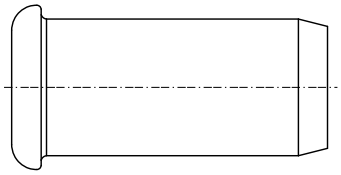
TX105/405 replacement grab ring



dimension	article no.		D1	d1	l1
35	TX10535	for VSH Tectite Pro	48	33	3.8
42	TX10542	for VSH Tectite Pro	58	40	4.5
54	TX10554	for VSH Tectite Pro	70	52	5
35	4753199	for VSH Tectite 316	43	33	2
42	4753201	for VSH Tectite 316	51	40	2.6
54	4753210	for VSH Tectite 316	64	52	2.7

0382 tube liner

for copper tube



dimension	code
12	4753221
16	4753232
20	4753243

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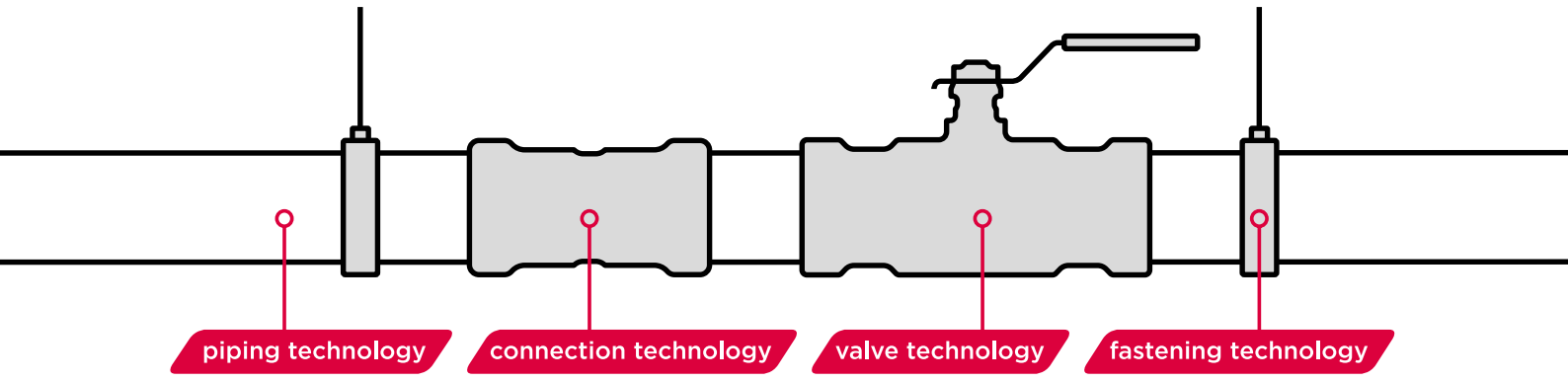
salessupport.emea@aalberts-ips.com



Aalberts integrated piping systems B.V.
Oude Amersfoortseweg 99 / 1212 AA Hilversum
P.O. Box 498 / 1200 AL Hilversum
The Netherlands
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