aalberts integrated piping systems

fire protection

EN technical manual

contents

Aalberts integrated piping systems

don’t just buy products, buy solutions.

piping technology

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 our unique 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 designed, you can get advice on complete and tailored solutions.
With our 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.

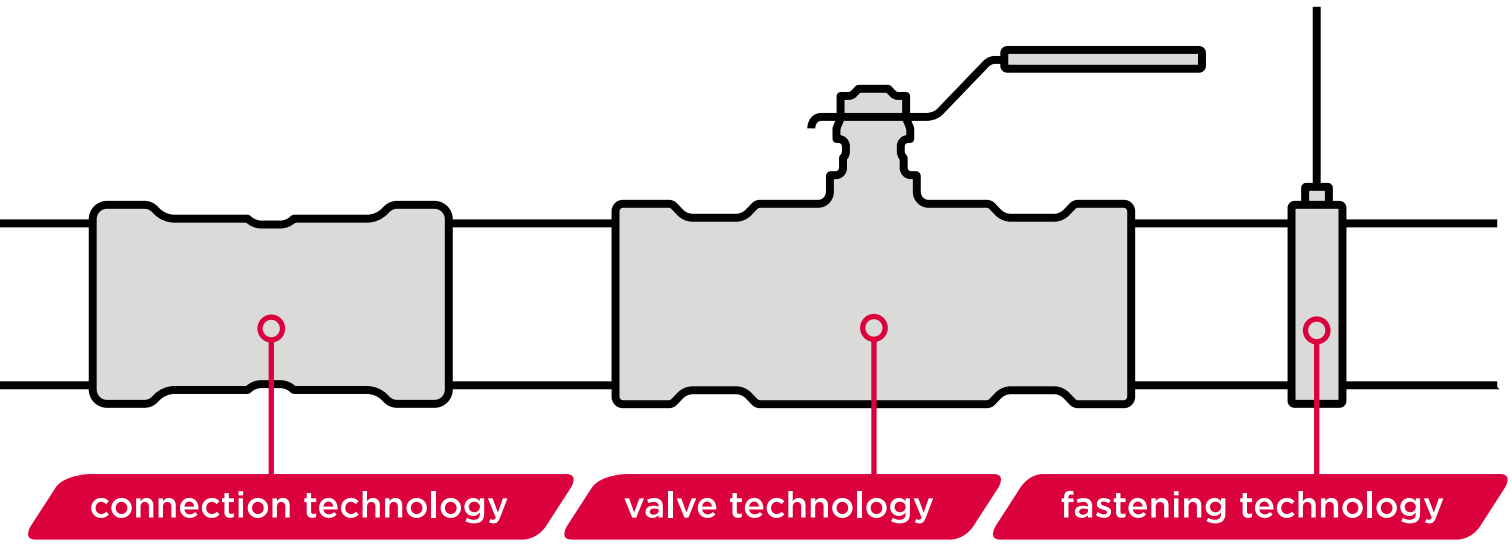
our way of working

We operate from various regions around the globe: America, EMEA and APAC. 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. We 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.com

our easy to connect product lines

Aalberts integrated piping systems is the combination of different companies with individual, well-known brands. 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 delivers piping systems throughout the world for over 90 years. In the 1970's VSH brought the well-known VSH Super compression fitting on the market. Nowadays the range consists of various press, compression and push systems for thin and thick walled metal as well as plastic.

Shurjoint history dates back to 1974 when they produced their first grooved couplings, produced from malleable iron. Shurjoint is recognized as a world leader in the design and manufacture of mechanical piping components.

valve technology

Pegler is a globally respected brand known for high-quality plumbing, heating, and engineering products. Since the 1890s, its reputation has been built on innovation, quality and strong customer service. Today, Pegler is still a key player in the valve industry, continuously designing new valve solutions.

fastening technology

The **FastFix** fastening range consists of brackets, rails and accessories for secure and efficient mounting. Designed for practical use across various applications, our products combine reliability with ease of installation. Whether for industrial setups or everyday solutions, we help you build with confidence.

FastFix

material	mild carbon steel / stainless steel
finishes	zinc plated / hot dip galvanised
suitable for	all types of piping systems
connection	¼" - 16" (DN8 – DN400)
options	with or without sound-absorbing insert & thermal insulation

VSH CoolPress

material	copper
suitable for	copper
connection	press / specific profile
Abmessungen	¼" - 1⅜" (DN8 – DN35)

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 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)

Pegler Valves

material	brass / bronze / carbon steel / stainless steel
suitable for	steel / carbon steel / stainless steel / copper
connection	threaded / press / push / flange
dimensions	½" – 12" (DN15 – DN300)

Pegler ProFlow

material	brass / ductile iron
suitable for	carbon steel / stainless steel / copper / plastic
connection	threaded / press / flange
dimensions	½" – 12" (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 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 UltraPress

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

VSH Tectite

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

total solutions in fire protection

The fire protection market has grown significantly in importance over recent years. As urban areas become increasingly dense, the risks associated with fire incidents rise, driving a greater focus on safeguarding people and assets.

With the rising global demand for reliable fire protection, Aalberts integrated piping systems is committed to providing dependable, effective solutions.

Our systems deliver outstanding performance across a wide range of conditions and are ideally suited for fire protection applications in residential and non-residential buildings, shipbuilding, and industrial environments.

Our systems

VSH Shurjoint, VSH XPress, VSH XPress Sprinkler ML, VSH PowerPress® and **VSH SmartPress** can be applied across a wide range of fire protection settings and are suitable for use in various environments:

- wet or dry fire mains
- high pressure dry fire mains
- wet or dry sprinkler installations
- low pressure watermist installations
- hose reel connections

the advantages of Aalberts integrated piping systems for fire protection:

- complete fire protection piping systems with high flexibility
- personal consultant from Aalberts integrated piping systems for special project advice; from design to delivery
- easy, fast connection technologies
- BIM ready
- seamless connection between various Aalberts ips systems

fire protection

VSH Shurjoint

VSH Shurjoint

VSH Shurjoint is recognised as a world-leading solution for grooved piping systems. With a wide range of high-quality grooved components and expertise in innovative mechanical piping system solutions, Aalberts integrated piping systems offers more value in the HVAC, sanitary and industrial markets. Reliable connections, easy installation and safety are our top priorities.

VSH Shurjoint products have been used in numerous piping applications: heating, cooling, compressed air, sanitary and sprinkler systems and form seamless transitions to other existing product ranges of Aalberts integrated piping systems. A complete piping system from Aalberts integrated piping systems will prevent compatibility issues with different manufacturers. One supplier for all your piping systems.

the advantages of VSH Shurjoint

- up to 70% reduction in installation time compared to welding
- improved job site safety, no welding required
- systems for steel, stainless steel, ductile iron, copper, PVC and PE piping
- wide range of high quality products
- sizes from ½" to 104"
- technical support with 3D design modelling, cost comparisons and thermal movement analysis
- BIM ready
- improve job site schedules, finish on-time, on-budget
- seamless transition to other Aalberts integrated piping systems

applications

sprinkler installations

VSH Shurjoint couplings and fittings for steel or stainless steel pipes, with VdS, FM, UL, ULc or LPCB approval.

gasket:	EPDM (grade Lube-E)
operating temperature:	-34°C to +65°C
max. temperature:	+65°C (short-term)

gasket:	silicone (grade L)
operating temperature:	-34°C to +177°C
max. temperature:	+177°C (short-term)

dry pipe or freezer systems

For dry lines for fire protection and freezer applications, Aalberts integrated piping systems recommends the use of GapSeal gaskets (grade E). The GapSeal gasket seals the space between the pipes or the gasket cavity. This prevents remaining liquid from entering the cavities and freezing when the temperature drops below 0˚C. Rigid couplings are preferred for dry pipe, freezer and vacuum applications. Reducing couplings are not recommended for these applications.

gasket:	EPDM (grade E)
operating temperature:	-34°C to +110°C
max. temperature:	+110°C (short-term)

note: Do not use standard VSH Shurjoint lubricant for dry pipe or freezer applications. Instead, use an oil-free silicone lubricant.

pressure performance data

VSH Shurjoint products are tested and approved by many Fire Protection approval bodies like UL, ULc, FM, VdS, LPCB, CNBOP, and TSUS. The approved pressure ratings vary from a minimum of 12.1 bar (175 psi) up to 34,5 bar (500 psi). This depends on the pipe size, pipe wall thickness and the approval body.

fittings and couplings

The VSH Shurjoint range consists of grooved fittings and couplings. The fittings and pipes are connected to each other by the couplings using a 'key and groove' connection with the key of the coupling fitting into the groove of the fitting or pipe. The couplings are assembled with bolts and nuts. VSH Shurjoint couplings and fittings are available in ductile iron, steel and stainless steel; the couplings and fittings are finished with an orange, red, or black coating or are galvanised.

rigid and flexible couplings

Rigid couplings are used in applications where a rigid joint is desired, similar to that of a traditional flanged, welded, and/or threaded connection. To be considered rigid, a coupling allows less than one degree of deflection or angular movement.

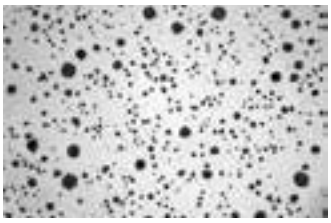
Flexible couplings are designed to accommodate axial displacement, rotation and angular deflections. Flexible couplings can be used in applications with curved pipe sections, for alignment, and/or when systems are exposed to external forces outside normal static conditions, such as seismic events, or where vibration and/or noise damping are a concern.

materials

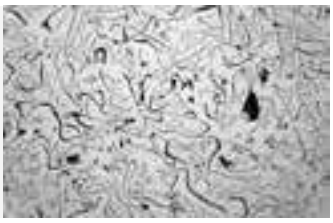
ductile Iron

Ductile iron is an ideal material for VSH Shurjoint components because it provides the same or greater strength than forged or cast steel pipe materials, such as forged steel flanges – ASTM A105, steel valves – ASTM A216 WCB, forged steel pipe – ASTM A53 grade B, etc. Most VSH Shurjoint parts are made of ductile iron and comply with ASTM A536 grade 65-45-12.

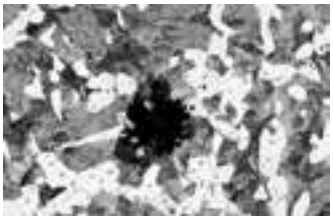
Ductile iron has superior strength and was invented in the late 1940s. Ductile iron, which is achieved by the crystallisation of graphite in the form of nodules which results in superior strength. It has tensile and yield strength properties equal to or greater than some steel castings. This strength combined with excellent castability helped to reduce weight and costs and resulted in many components previously made of grey iron, malleable iron or cast steel have been converted to ductile iron over the past 60 years.



ductile Iron
Superior tensile strength with good castability



grey iron
Excellent castability but brittle and not as strong



malleable Iron
Stronger than grey iron but poor castability

International specifications for ductile iron equivalent to ASTM A536 grade 65-45-12:

- SAE J434: D4512
- EN1563: EN-GJS-450-10 or EN-GJS-450-15
- JIS G5502: FCD450-10
- SABS 936/937: SG42

specifications for ductile iron, ASTM A536, grade 65-45-12 (UNS F33100)	
chemical composition*	
carbon	3 – 3.9%
silicon	2.5 – 3%
manganese	0.1 – 0.4%
phosphorus	<0.07%
sulphur	<0.02%
magnesium	0.03 – 0.05%
chromium	<0.1%
physical properties	
tensile strength	448 MPa
yield strength	310 MPa
elongation at fracture	12%

* Reference only as chemical requirements are not specified in ASTM A536.

stainless steel

VSH Shurjoint stainless steel couplings and fittings are available in AISI 304 and AISI 316 grades. The choice between these two variants depends on the application and customer requirements.

wrought fittings

Shurjoint wrought grooved fittings are available from 10" (DN250) to 42" (DN1050) in various types. The fittings are made of carbon steel pipe according to ASTM A234 grade WPB or equivalent quality, or assembled with welded grooved connections made of carbon steel pipe. C-E dimensions meet ANSI B16.9

approvals

VSH Shurjoint production facilities are certified to ISO 9001. Products are designed to conform and meet or exceed all applicable domestic and international standards and are listed, approved and/or certified by various approval bodies and registration authorities. VSH Shurjoint is also active in industry and environmental organisations.

Approvals	
ANSI	**ANSI** American National Standards Institute
	ANSI/AWWA American Water Works Association C606 (latest edition)
ASTM INTERNATIONAL	**ASTM** American Society of Testing and Materials F 1476–01 Couplings, F 1548–01 Fittings, F 1155 Shipbuilding
CNBOP-PIB	**CNBOP-PIB** Scientific and Research Centre for Fire Protection - National Research Institute
CANADIAN STANDARDS ASSOCIATION	**CSA** Canadian Standards Association B-242
FM APPROVED	**FM** Factory Mutual Research Corp. - Approved for Fire Protection Services
IAPMO R&T	**IAPMO R&T** IAPMO Research and Testing, Inc.
	LLOYD Lloyd's Register Quality Assurance ISO 9001:2008
LPCB	**LPCB** Loss Prevention Certification Board LPS-1219
NFPA	**NFPA** National Fire Protection Association NFPA 13
NSF WATER QUALITY	**NSF** NSF/ANSI 61 Drinking Water System Components - Health Effects NSF/ANSI 372 Drinking Water System Components - Lead Content
c UL us LISTED	**UL** Underwriter's Laboratories, Inc. - UL213
ULC	**ULC** Underwriter's Laboratories of Canada
TSUS	**TSUS** Technický a Skúýobný Ústav Stavebný, n. o.
VdS	**VdS** VdS Schadenverhütung

bolts and nuts

steel

VSH Shurjoint carriage bolts with oval necks comply with ASTM A449 or ASTM A183 grade 2, and nuts for heavy duty use comply with ASTM A563 grade B. Both are available with UNC thread or ISO metric thread. The carriage bolts and nuts are electrogalvanised. Hot-dip galvanized bolts and nuts are also available upon request.

specifications for hardened and tempered bolts*, ASTM A449	
chemical composition	
carbon	0.28 - 0.55%
manganese	>0.60%
phosphorus	<0.040%
sulphur	<0.050%
physical properties	
tensile strength	825 MPa
yield strength	635 MPa
elongation at fracture	14%

* Same as grade 8.8 bolts according to ISO 898.

specifications for steel carriage bolts, ASTM A183, grade 2	
chemical composition	
carbon	>0.3%
phosphorus	<0.05%
sulphur	<0.06%
physical properties	
tensile strength	760 MPa
yield strength	550 MPa
elongation at fracture	12%

specifications for alloy steel nuts for heavy-duty use, ASTM A563, grade B	
chemical composition (bolts)	
carbon	<0.55%
phosphorus	<0.12%
sulphur	<0.15%
physical properties	
hardness	B69 (C32 Rockwell)

coupling bolt dimensions

			coupling type								
	pipe size	**[mm]**	**K9**	**F09**	**7705**	**7707/7707N**	**Z05**	**M07**	**Z07/Z07N**	**7706**	**7721 - 7722**
1"	(DN25)	33.7	M10 x 45	-	M10 x 45	M10 x 55	-	-	-	-	-
1¼"	(DN32)	42.4	M10 x 55	M10 x 55	M10 x 55	M12 x 75	M10 x 55	-	M10 x 55	M10 x 55	-
1½"	(DN40)	48.3	M10 x 55	M10 x 55	M10 x 55	M12 x 60	M10 x 55	-	M10 x 55	-	-
2"	(DN50)	60.3	M10 x 55	M10 x 65	M10 x 55	M12 x 75	M10 x 70	M12 x 97	M10 x 70	M10 x 55	M10 x 55
2½"		73	M10 x 55	M10 x 65	M10 x 55	M12 x 75	M10 x 70		M10 x 70	M10 x 55	M12 x 75
2½"	(DN65)	76.1	M10 x 70	M10 x 65	M10 x 55	M12 x 75	M10 x 70	M12 x 97	M10 x 70	M10 x 55	M12 x 75
3"	(DN80)	88.9	-	M10 x 65	M12 x 75	M12 x 75	M10 x 70	M12 x 97	M12 x 75	M12 x 75	M12 x 75
4"		108	M10 x 70	M10 x 65	M12 x 75	-	M10 x 70	-	-	-	-
4"	(DN100)	114.3	-	M10 x 65	M12 x 75	M16 x 90	M10 x 70	M12 x 97	M12 x 75	M12 x 75	M12 x 75
5"		133	M10 x 75	-	M16 x 90	-	M12 x 75	-	-	-	-
5"	(DN125)	139.7	M10 x 75	-	M16 x 90	M16 x 90	M12 x 75	M16 x 102	M16 x 90	M16 x 90	M16 x 90
5"		141.3	-	-	M16 x 90	M16 x 90	M12 x 75	-	M16 x 90	M16 x 90	M16 x 90
6"		159	M10 x 75	-	M16 x 90	-	M12 x 75	-	M16 x 90	-	-
6"		165.1	M10 x 75	-	M16 x 90	M20 x 120	M12 x 75	-	M16 x 90	M16 x 90	M16 x 135
6"	(DN150)	168.3	M16 x 90	-	M16 x 90	M20 x 120	M12 x 75	M16 x 102	M16 x 90	M16 x 90	M16 x 135
8"	(DN200)	219.1	M20 x 120 (K9H)	-	M16 x 90 M20 x 120 (7705H)	M20 x 120	M16 x 135	M20 x 120	M20 x 120	M20 x 120	M20 x 120
10"	(DN250)	273		-	M20 x 120	⅞ x 6½	-		⅞ x 6½	-	-
12"	(DN300)	323.9		-	⅞ x 6½	⅞ x 6½	-		⅞ x 6½	-	-

gaskets

Over the past 50 years there has been a lot of progress in the field of synthetic elastomers, allowing us to offer a wide range of gasket materials for a wide variety of applications. For gaskets, VSH Shurjoint uses the best materials developed to meet or exceed industry standards such as ASTM D2000, AWWA C606, NSF61, IAPMO, etc. We're always researching, developing and testing to further improve the quality of this material and develop new, superior solutions for our fast-changing industry. Selecting the proper gasket for the intended application requires careful consideration of many factors to ensure maximum gasket life. These factors include temperature, media type and concentration, and continuity of service. The colour coding of the gaskets helps to quickly and easily identify the material type.

gasket materials

EPDM

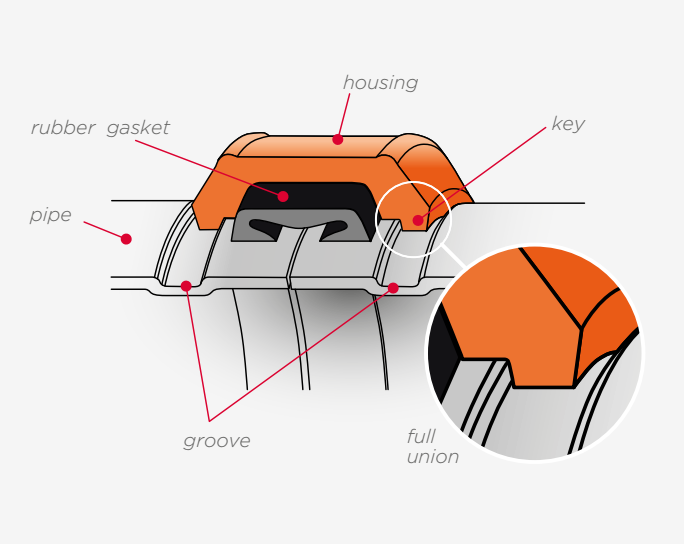
EPDM is recognised as the most water resistant rubber available today. EPDM is suitable for cold and hot water up to 110˚C, wastewater, acidic water, deionised water and seawater. EPDM is not to be used with petroleum based oils and fuels, hydrocarbon solvents or aromatic hydrocarbons.

material	grade	colour code	recommendations for use	temperature range
EPDM	Lube-E	 violet stripe	pre-lubricated gasket designed specifically only for the fire protection industry	-34°C to +65°C

VSH Shurjoint EPDM (Grade E) is compounded per ASTM D2000 designation 2CA615A25B24F17Z. Peroxide curing and post curing give a higher crosslink density, which provides a higher aging resistance than required in AWWA C606.

installation preparation

pipe preparation

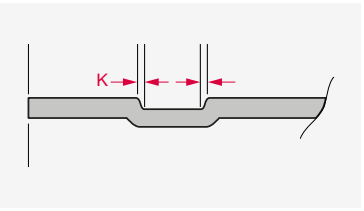


grooving pipes

In order to use VSH Shurjoint couplings, a rolled or cut groove (see page 18) must be made on the ends of the pipes to be connected. The engagement of the housing key in the groove is essential to achieve a secure and leak-tight joint. It is important that the grooves are made properly to ensure optimal joint performance.

nominal pipe size

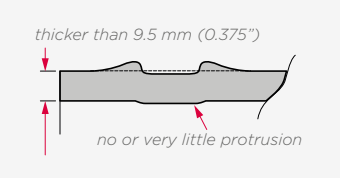
VSH Shurjoint couplings and fittings can be identified by the nominal pipe diameter [DN] in millimetres or size in inches. Always check the actual outside diameter [OD] of the pipes and fittings to be connected. In some markets, pipes with different outside diameters have the same nominal size.



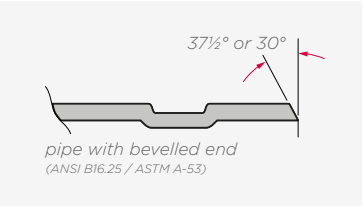
rolled groove profile

The rolled groove profile must be made as accurately as possible. To achieve optimum joint performance, the 'K' dimension should be as small as possible. When making a rolled groove, the machine operator must adjust the contact force of the upper roll set to achieve the best possible groove profile.

suitable pipe wall thickness
Rolled grooves are generally made on steel or stainless steel pipes with a wall thickness of 9.5 mm or less, depending on the type of roll grooving machine and the roll set used. Different roll sets are required to process different pipe diameters and wall thicknesses. Contact the roll grooving machine manufacturer for additional information.



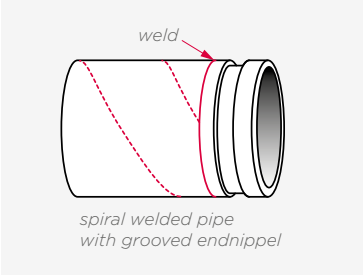
pipe with very large wall thickness
When attempting to roll groove pipes thicker than 9.5 mm, the metal may deform and rise up on both sides of the groove instead of radially deforming and protruding into the inside of the pipe.
The additional pushed-up metal may lead to a leaky joint. In such case, you should grind off the additional metal to obtain a flat and smooth gasket seating surface. An anti-corrosion coating must be applied to the ground surface. Aalberts integrated piping systems strongly recommend that you make cut grooves on pipes with very large wall thickness, or that you use the VSH Shurjoint Ring-Joint system.



pipe with plain end and pipe with weld bevel
Although pipes with plain ends are preferred, pipes with bevelled ends can be used if the wall thickness is 9.5 mm or less and the bevel is 37½ ±2½° or 30° as specified in ANSI B16.25 or ASTM A-53 respectively.

grinding off weld beads
Depending on the specific pipe and manufacturer, weld beads may be present on the surface (inside and outside) of the pipe. Weld beads on the ends of the pipe must always be ground off because they can cause shuddering of the roll grooving machine, resulting in inaccurate grooves.

hot-dip galvanised pipes
A galvanised pipe is acceptable as long as the gasket seating surface('A', drawing p. 53) is smooth and free from imperfections that could affect the gasket seal. When grinding off weld beads or imperfections on the gasket seating surface, work carefully to avoid grinding away too much material. After grinding, always apply a good anti-corrosion coating.



spiral welded pipe
Spiral welded pipe may be used as long as the weld beads are removed from the gasket seating surface. It is also acceptable and recommended to weld a grooved end nipple to the pipe end (see illustration).
When grinding off weld beads or imperfections on the gasket seating surface, work carefully to avoid grinding away too much material. After grinding, always apply a rust-prevention coating to this area.

check pipe outside diameter
Check that the pipe has the correct outside diameter and wall thickness for the intended use. While VSH Shurjoint fittings can normally be identified by the nominal size, always check the actual OD of the pipe and fittings to be connected, as in some markets it is customary to use the same nominal size to refer to pipes with different ODs.

Example: The nominal size DN65 (2½") refers to a pipe OD of 73 mm according to ANSI (IPS) and to a pipe OD of 76.1 mm according to EN, AS, BS, DIN (ISO), JIS or KS pipe standards.

EN - European standard (metric)
ISO - ISO standard (metric)
BS - British standard (metric)
DIN - German standard (metric)
IPS - United States standard (Inch)

VSH Shurjoint couplings and fittings are available for both 73 and 76.1 mm.

equivalent pipe sizes

pipe size		actual OD [mm]	actual OD [inch]
½"	(DN 15)	21.3	0.84
¾"	(DN 20)	26.7	1.05
1"	(DN 25)	33.7	1.315
1¼"	(DN 32)	42.4	1.66
1½"	(DN 40)	48.3	1.9
2"	(DN 50)	60.3	2.375
2½"	(DN 65)	73	2.875
3 OD		76.1	3
3"	(DN 80)	88.9	3.5
3½"	(DN 80)	101.6	4
4¼ OD		108	4.25
4"	(DN 100)	114.3	4.5
5"		141.3	5.563
5¼ OD		133	5.25
5½ OD	(DN 125)	139.7	5.5
6¼ OD		159	6.25
6½ OD		165.1	6.5
6"	(DN 150)	168.3	6.625
8"	(DN 200)	219.1	8.625
10"	(DN 250)	273	10.75
12"	(DN 300)	323.9	12.75
14"	(DN 350)	355.6	14
16"	(DN 400)	406.4	16
18"	(DN 450)	457.2	18
20"	(DN 500)	508	20
22"	(DN 550)	558.8	22
24"	(DN 600)	609.6	24
28"	(DN 700)	711.2	28
30"	(DN 750)	762	30
32"	(DN 800)	812.8	32
36"	(DN 900)	914.4	36
40"	(DN 1.000)	1016	40
42"	(DN 1.050)	1066.8	42

VSH Shurjoint couplings are available up to DN2600/104"

on which pipe can a rolled or cut groove be made?
In order to use VSH Shurjoint grooved couplings, a rolled or cut groove must be made on the pipe ends to be connected. The groove dimensions and configurations may vary depending on several factors, including pipe material, wall thickness and desired working pressure. Roll grooving is the most common practice and can be performed in the shop, in the field or at the job site. Cut grooving, on the other hand, is primarily performed in the factory or shop because as cut grooving machines are not as common or portable as roll grooving machines.

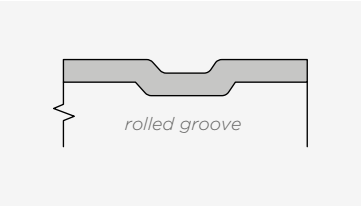
All rolled and cut grooves must meet the specifications and requirements of ANSI/AWWA C606 (latest edition) and ISO/FDIS 6182-12. For other pipe sizes not specified in ANSI/AWWA C606 (latest edition) or ISO/FDIS 6182-12, refer to the respective groove specifications in this manual. When grooving pipes, it is preferable to use plain-end pipes, although in some cases the use of bevelled pipes is acceptable providing that the wall thickness is equal to or less than 9.5 mm and the bevel is 37½° ± 2½° (ANSI B16.25).

When using thin-walled stainless steel pipes, make sure that the ends of the pipes are not pressed in as a result of using a pipecutter. This deformation can lead to an incomplete rolled groove and reduced tensile strength of the joint

rolled groove and cut groove applications

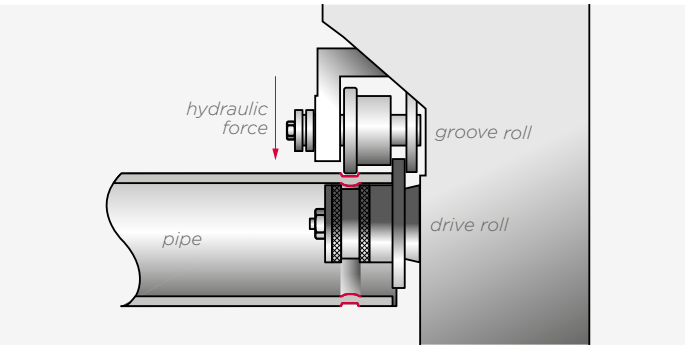
pipe material	rolled groove	cut groove
steel	standard wall (ANSI B36.10) schedule 40 (10" or less), 30, 20, 10, 7, 5, BS1387 normal and light, JIS SGP	schedule 80, 40. 30 BS1387 normal and heavy, JIS SGP
stainless steel	schedule 40S, 20S, 10S, 5S	schedule 80S, 40S

applying rolled grooves



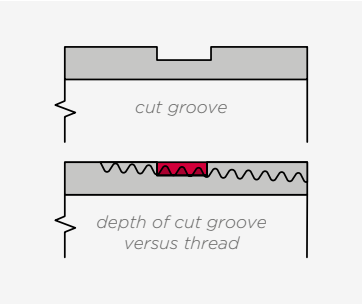
Roll grooving was first used with light or thin wall pipes, which had insufficient wall thickness for cut grooving. Today roll grooving is commonly used on pipes with a maximum wall thickness of 9.5 mm and sizes up to 42" (DN1050). This depends on the type of roll groove machine used and the roll sets.

Roll grooving radially deforms the pipe material. As roll grooving does not remove any material from the pipe, the integrity of the pipe remains intact when properly grooved. The indentation of the groove is also visible on the inside of the pipe. This edge has a low height and runs smoothly to the inlet and outlet of the pipe. The effect of this edge on the flow resistance and/or pressure is therefore negligible. Roll grooving is limited to pipes with a hardness of HB180 or less.



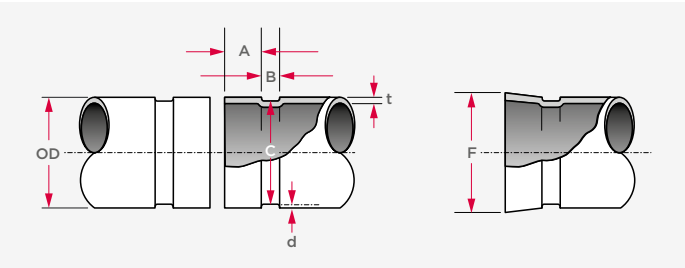
During the roll grooving process, the end of the pipe is placed between a roll set. The roll set is pressed against the pipe and then the pipe is rotated. This creates a groove that is recessed on the outside and protrudes on the inside. Rolled grooves can be made on steel and stainless steel pipes. It is important to use the correct equipment and roll sets for the pipe material being grooved. Different materials may require the use of different roll sets. This is the case, for example, with stainless steel and heavy steel pipes (9.5 mm thick). Consult the instructions for the grooving machine or roll set or the operation manual, or contact Aalberts integrated piping systems for more information.

applying cut grooves



The cut grooving process removes material from the pipe OD to form a groove. Cut grooving is therefore intended for standard wall pipes (ANSI B36.10) or pipes with larger wall thickness. Most pipes suitable for thread cutting can also be used for groove cutting. This is because the depth of a cut groove is usually less than that of a standard thread. Please refer to the minimum wall thickness shown in the published standard cut groove specifications. Unlike roll grooving, cut grooving cuts a groove in the pipe wall. This removes material, so no rim is formed on the inside of the pipe. Cut grooves are often made on piping system components such as bends, tees, valves, etc. Groove cutting is also better on coated or cement coated pipes, as these can be damaged by roll grooving.

groove dimensions



standard roll and groove dimensions

VSH Shurjoint couplings and fittings can be identified by the nominal pipe size in inches or outside diameter in millimetres.

gasket seating surface (A)
The outside of the gasket seating surface must be free of deep scratches, projections, rolling marks and other harmful surface defects such as loose paint, galvanising residue, soiling, chips, grease and corrosion.

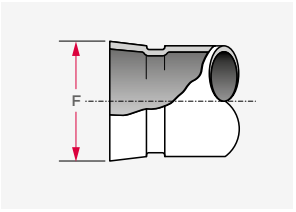
groove width (B)
The groove width is measured between vertical flanks of the groove side walls and is determined by the width of the upper roll as it is pressed into the pipe. Visually check the groove of the pipe to see if the groove has clearly defined edges in which the coupling key can grip properly. If the groove shape looks very rounded or has little or no vertical side walls, it must be replaced because this could lead to reduced product performance or damage to the joint.

groove diameter (C)
The groove diameters are average values. The groove must have uniform depth around the entire circumference of the pipe.

minimum wall thickness (t)
't' is the minimum allowable wall thickness for roll grooving.

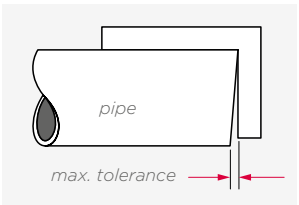
groove depth (d)
The values listed in the tables are for reference only.

flare diameter (F)



Pipe ends can be flared by the roll grooving process. This increase in diameter must remain within the specified tolerances when measured at the outer end of the pipe.

trimming pipe ends (OD) square



The maximum allowable tolerances for square ends are:
0.8 mm for 3½" (DN90) and smaller
1.2 mm for 4" through 6" (DN100-150)
1.6 mm for 8" (DN200) and larger.

For a complete overview of all relevant rolled and cut groove dimensions, please contact Aalberts integrated piping systems.

roll groove specifications

pipe			dimension specifications						
pipe size	outside Ø (OD)		gasket seating surface (A) ±0.76 [mm]	gasket width (B) ±0.76 [mm]	groove Ø (C)		groove depth (d) (ref.) [mm]	min. permitted wall thickness (t) [mm]	flare dimension (F) max. diameter [mm]
	actual dimension [mm]	tolerance [mm]			actual dimension [mm]	tolerance [mm]			
1" (DN 25)	33.7	+0.41/-0.68	15.88	7.14	30.23	0/-0.38	1.7	1.8	36.3
1¼" (DN 32)	42.4	+0.5/-0.60	15.88	7.14	38.99	0/-0.38	1.7	1.8	45.0
1½" (DN 40)	48.3	+0.44/-0.52	15.88	7.14	45.09	0/-0.38	1.6	1.8	51.1
2" (DN 50)	60.3	±0.61	15.88	8.74	57.15	0/-0.38	1.6	1.8	63.0
2½"	73	±0.74	15.88	8.74	69.09	0/-0.46	1.98	2.3	75.7
2½" (DN 65)	76.1	±0.76	15.88	8.74	72.26	0/-0.46	1.93	2.3	78.7
3" (DN 80)	88.9	+0.89/-0.79	15.88	8.74	84.94	0/-0.46	1.98	2.3	91.4
3½"	101.6	+1.02/-0.79	15.88	8.74	97.38	0/-0.51	2.11	2.3	104.1
4" (DN 100)	108	+1.07/-0.79	15.88	8.74	103.73	0/-0.51	2.11	2.3	110.5
4" (DN 100)	114.3	+1.14/-0.79	15.88	8.74	110.08	0/-0.51	2.11	2.3	116.8
4¼ OD	133.9	+1.32/-0.79	15.88	8.74	129.13	0/-0.51	1.93	2.9	135.9
5¼ OD	139.7	+1.40/-0.79	15.88	8.74	135.48	0/-0.56	2.11	2.9	142.2
5" (DN 125)	141.3	+1.42/-0.79	15.88	8.74	137.03	0/-0.56	2.13	2.9	143.8
6¼ OD	159	+1.60/-0.79	15.88	8.74	154.50	0/-0.56	2.2	2.9	161.3
6½ OD	165.1	+1.60/-0.79	15.88	8.74	160.90	0/-0.56	2.16	2.9	167.6
6" (DN 150)	168.3	+1.60/-0.79	15.88	8.74	163.96	0/-0.56	2.16	2.9	170.9
8" (DN 200)	219.1	+1.60/-0.79	19.05	11.91	214.40	0/-0.64	2.34	2.9	223.5
10" (DN 250)	273	+1.60/-0.79	19.05	11.91	268.28	0/-0.69	2.39	3.6	277.4
12" (DN 300)	323.9	+1.60/-0.79	19.05	11.91	318.29	0/-0.76	2.77	4	328.2
14" (DN 350)	355.6	+1.60/-0.79	23.83	11.91	350.04	0/-0.76	2.77	3.96	358.1
16" (DN 400)	406.4	+1.60/-0.79	23.83	11.91	400.84	0/-0.76	2.77	4.19	408.9
18" (DN 450)	457.2	+1.60/-0.79	23.83	11.91	451.64	0/-0.76	2.77	4.19	461.3
20" (DN 500)	508	+1.60/-0.79	23.83	11.91	502.44	0/-0.76	2.77	4.78	512.1
22" (DN 550)	558.8	+1.60/-0.79	23.83	11.91	550.06	0/-0.76	4.37	4.78	563.9
24" (DN 600)	609.6	+1.60/-0.79	23.83	12.7	600.86	0/-0.76	4.37	5.54	614.7

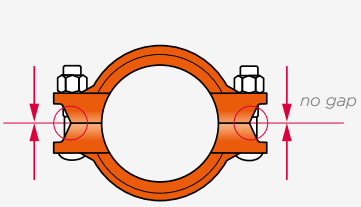
1. pipe outside diameter: the maximum allowable tolerance on the squareness of the saw cut is 0.76 mm for sizes up to 3½", 1.14 mm for sizes from 4" through 6", and 1.52 mm for sizes 8" and larger.
2. the gasket seating surface (A) must be free of scratches, soiling, corrosion, etc. that prevent proper sealing.
3. (C) dimensions are average values. The groove must have uniform depth around the entire pipe circumference. Use a Shurjoint groove measuring tape or sliding caliper to check the groove diameter.
4. dimension (t) is the minimum allowable wall thickness for roll grooving.
5. dimension (d) is for reference only. The groove depth is determined by the groove diameter (C).
6. flare diameter: pipe ends can be flared during the roll grooving process. This increase in diameter must remain within the specified tolerances when measured at the outer end of the pipe.

bolts and nuts installation and torques

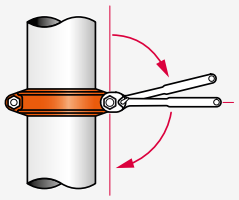
helpful information for proper installation

For some coupling types, it is necessary that the bolt pads make metal-to-metal contact for correct installation. For other coupling types, a specific torque is required with a uniform gap between the bolt pads. The icons and information below will help to identify those items to ensure correct installation. Read and follow all installation instructions from page 59 for the component being installed.

metal-to-metal contact: Tighten the bolts and nuts until the bolt pads make metal-to-metal contact. After metal-to-metal contact is achieved, tighten the nuts by another quarter or half turn to make sure the bolts and nuts are snug and secure. The use of a torque wrench is not required. Excessive torque may lead to bolt or joint failure.



metal-to-metal contact

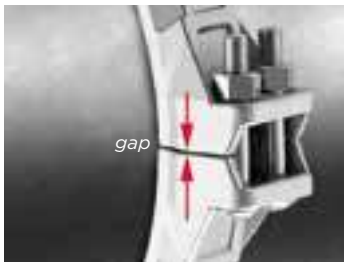


after metal-to-metal contact, tighten another quarter or half turn

If there are any gaps between the bolt pads after installation, check the following points before dismounting and remounting the coupling:

- the coupling, pipe and/or fitting being connected are the correct size.
- the coupling edges are fully engaged in the grooves of the pipes and/or components.
- the gasket is not pinched.
- the grooves conform to the applicable groove dimension specifications.
- the pipe end flare is within the specification tolerance.

torque required! The bolts and nuts must always be tightened to the required torque using a torque wrench. Normally there will a gap visible between the bolt pads after the bolts and nuts are fully tightened. The couplings that require torque tightening of the bolts and nuts are the 2" through 4" couplings of model XH-1000 and all sizes of the XH-70EP, SS-7X and type 79 couplings.



recommended torques

Always use factory supplied bolts and nuts for installation of VSH Shurjoint couplings. The generally recommended torque ranges for common sizes of steel bolts are shown on the following page. Never exceed the recommended torque range by more than 25%, as excessive torque can lead to joint failure, personal injury and/or property damage. Always depressurise and drain the piping system before attempting disassembly, adjustment or removal of any piping component. Follow the installation instructions for correct installation of all VSH Shurjoint components.

always use a torque wrench

torque specifications

bolt size		torque range	
metric	imperial	[lbs-ft]	[Nm]
M8	5⁄16" - 18"	15 - 25	20 - 34
M10	3⁄8" - 16"	30 - 45	40 - 61
M12	1⁄2" - 13"	90 - 105	120 - 140
M16	5⁄8" - 11"	100 - 130	135 - 175
M20	3⁄4" - 10"	150 - 200	200 - 270
M22	7⁄8" - 9"	180 - 220	240 - 300
M24	1" - 8"	200 - 225	270 - 305
M29	1 1⁄8" - 7"	250 - 300	340 - 400
M32	1 1⁄4" - 7"	375 - 500	510 - 680

for stainless steel bolts, the torque must be reduced by 20%.

installation instructions

When installing VSH Shurjoint always make sure to take care in using protective gear on the building site. Always wear at minimum safety shoes, a safety helmet and safety glasses when installing VSH Shurjoint.

general installation steps for grooved couplings

The step-by-step procedure for installation of grooved couplings is described below. If specific installation steps or requirements are applicable for specific models, you can find them in the corresponding sections.

1. inspect pipe ends

Ensure that the pipe is of the correct outside diameter and that rolled or cut grooves have been made correctly, according to instructions on pages 16-20. For optimum sealing, the outside of the gasket seating surface must be free of scratches, projections, rolling marks and other harmful defects such as loose paint, galvanising residue, soiling, chips, grease and corrosion.

2. check gasket

Check that the gasket supplied is correct for the intended use. The colour code indicates the gasket grade. For gasket details and selection, please check pages 16-16.

3. lubricate gasket

To enable easy fitting and avoid pinching the gasket in the coupling, apply a thin coat of VSH Shurjoint lubricant to the gasket lips and the outside of the gasket. Other compatible lubricants may be used as long as they are not harmful to the gasket.

4. fit gasket

Fit the gasket on one end of the pipe so that the pipe end is visible. The gasket should never extend beyond the end of the pipe.

5. bring pipe ends together

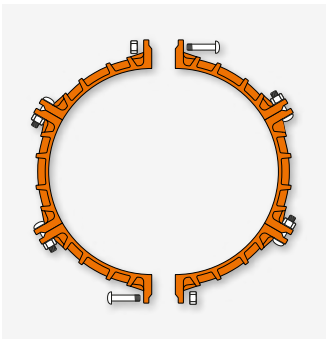
Bring the pipe ends to be joined together and align them. Slide the gasket over the ends and centre it between the grooves of both pipes. The gasket should never be positioned over the grooves of the pipes, once joined.

6. install coupling

For 'swing-over' installation, loosely fit one bolt and nut on one side of the coupling. For standard installation, start with the two housings fully separated.

7. install coupling housings

For 'swing-over' installation, place one of the coupling housings over the bottom of the gasket and swing the other coupling housing into position over the top of the gasket. For standard installation, fit the coupling housings over the gasket one at a time. In both cases make sure the coupling edges are fully engaged in the grooves.



large diameter couplings:
Couplings larger than 24" consist of multiple segments. To prepare for installation, assemble the segments loosely into two or three equal groups, depending on the size. Fit these assemblies over the gasket in the same manner as described above.

8. fit bolt and nut

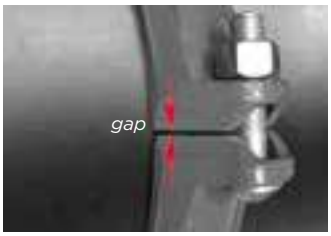
For 'swing-over' installation, insert the remaining bolt and turn the nut hand tight. For standard installation, insert both bolts and turn the nuts hand tight. Make sure that the oval neck of the bolt is entirely countersunk in the bolt hole of the housing.

9. tighten nuts

metal-to-metal contact

Tighten the nuts alternately and equally until the bolt pads meet and make metal-to-metal contact. Tighten the nuts by another quarter to half turn to make sure the bolts and nuts are snug and secure. The use of a torque wrench is not required.

torque required!



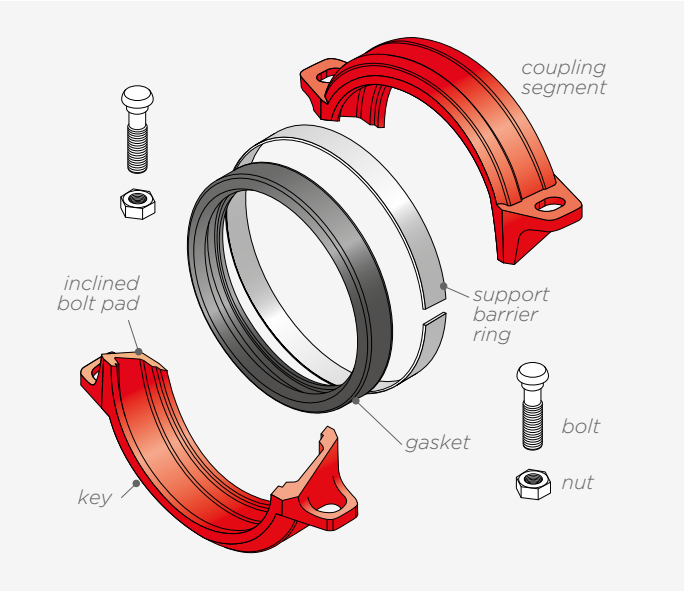
Turn with a torque wrench to the required torque. Normally there will a gap visible between the bolt pads after the bolts and nuts are fully tightened. The gap must be equal on both sides of the coupling.

NOTE:

1. If the bolts and nuts are not tightened evenly, the gasket may be pinched and leaks may occur.
2. Excessive tightening of nuts may cause bolt or joint failure.

Note: Excessive torque may cause seizing of stainless steel bolts and nuts. Use an anti-seize lubricant such as Loctite C5-A to lessen this problem with stainless steel bolts and nuts. The use of silicon bronze nuts is also a good option to avoid seizing. Contact Aalberts integrated piping systems for more information.

installation instructions quick install rigid coupling F09 with inclined bolt pads



WARNING!

Do not disassemble the coupling!

1. Do not disassemble the coupling!

the F09 Quick Install Couplings (QIC) should not be disassembled prior to installation. The F09 coupling is designed to directly place onto the grooved pipe end or fitting. The housings are held open by a support barrier ring (stainless 304 SS component) that sits between the rubber gasket and the housings and is not to be tampered with during installation

2. inspect pipe ends

Ensure that the pipe is of the correct outer diameter and that rolled or cut grooves have been made correctly, according to instructions on page 16 For optimum sealing, the outside of the gasket seating surface must be free of scratches, projections, rolling marks and other harmful defects such as loose paint, galvanising residue, soiling, chips, grease and corrosion.

3. check gasket

Check that the gasket supplied is suitable for the intended use. Gasket material is identified by a single or multi-stripe color code located on the sealing lip. The standard E2-A gasket is identified by a violet stripe.

NOTE:
The VSH Shurjoint F09 gasket is prelubricated and therefore does not need to be lubricated

extra lubrication required conditions
Apply lubricant in the following situations:
- when working temperatures are below –18°C
- the gasket has been exposed to liquids before installation
- in case of dry piping systems
- when the systems' post installation test uses air instead of water as test media

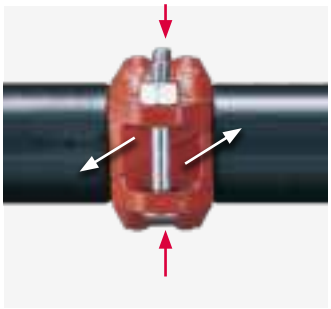
Do not apply an excessive amount of lubricant to the gasket sealing area. Other lubricants may be used as long as they are not harmful to the gasket and are compatible for the intended application. Using a NOT compatible lubricant for EPDM gaskets materials may cause gasket damage, resulting in joint leakage and property damage.

4. install coupling:

Install the coupling on to the grooved pipe end/fitting. Align the center axis of the gasket with the grooved fitting and apply equal pressure on the coupling until the gasket is seated onto the pipe/fitting. Install the other mating pipe end into the coupling. The gasket is designed with a center leg that will stop the coupling when fully seated onto the pipe/fitting. Visually check to make sure the coupling keys are aligned with the grooves.

5. tighten nut evenly

once engaging the coupling onto the pipe ends, immediately tighten the bolts and nuts, using deep-well sockets with impact tools or standard socket wrenches. (Refer to torque specifications on page 21). Tighten each side evenly and alternating until the angled bolt pads make metal to metal contact. Ensure that the oval neck of each bolt seats properly in the bolt holes prior to and after installation.



As the bolts are tightened, the angled bolt pads slide in opposite directions causing the coupling keys to tightly grip the pipe, while at the same time the pipe grooves are forced against the coupling keys.
The bolt pads should always maintain metal-to-metal contact and should not have positive or negative offsets once reaching contact. When there is over-tightened harware and any visible damage occurs to components, disassemble the coupling immediately and replace it with a new one!

WARNING!
keep hands away from coupling openings during tightening.

- always tighten nuts alternately and equally
- excessive bolt torque compromises bolt integrity

the above can cause increased loading of the coupling housings that can lead to joint failure, leakage, injury and/or property damage

bolts and nuts

pipe dimensions		pipe OD	
[DN]	[inch]	[mm]	[inch]
32 - 100	1¼ - 4	42.4 - 114.3	1660 - 4500

nut size		socket size		max. torque	
[UNC]	[ISO]	[mm]	[inch]	[Nm]	[Lbs-Ft]
⅜	M10	17	11⁄16	40-55	12 - 25

The VSH Shurjoint F09 bolts are supplied with a torque resistant adhesive, strategically placed to provide the installer with touch feedback, when tightening the nuts. The installer will be able to notice slight resistance when the nut makes contact with the adhesive, which will slow down speed of which the bolt pads will make metal-to-metal contact.

disassembly and re-installation instructions rigid, quick install coupling F09

WARNING:
before disassembly, adjustment or removal of any component, always depressurize and drain the piping system. Failure may lead to joint damage, leakage, injury and/or property damage.

NOTE:
after initial disassembly, the gasket and housings can be assembled onto the mating component ends by following the steps below. The stainless support barrier ring should be removed and discarded.

1. loosen the nuts:

Loosen the nuts of the coupling until gaps appear between the bolt pads. Loosen further so that the keys can be removed over the pipe or fitting. Remove the coupling from the mating components.

2. remove nuts, bolts and gasket
Remove the nuts, bolts, and gasket from the housings. Also remove and discard the stainless support barrier ring. Inspect all components for any damage or wear. If any damage or wear is present, use a new VSH Shurjoint supplied F09 coupling assembly.

3. inspect pipe ends:
Check mating components, as described on page 22

4. lubricate gasket:

For a smooth insertion of the pipe ends and mounting of the couplings without pinching, apply a thin layer of lubricant to the sealing lips and the exterior of the gasket. Other compatible lubricants may be used as long as they are not harmful to the gasket. Best piping practices call for a new gasket to be used during reassembly.

5. install gasket

Install the gasket over one of the pipe ends The gasket center leg will be allowed to mate against the pipe end.

2. fit opposite pipe:

Bring the pipe ends together and align them. Push the pipe end into the gasket until it touches the central lip. The gasket must not be in contact with the grooves in the pipes/ fittings.

6. install coupling

Install the couplings housings over the gasket. For a 'swing-over installation, place one of the coupling housings around the bottom side of the gasket and swing over the other coupling half into position over the top side of the gasket. In tight areas where a swing-over is not possible, install the coupling housings one at a time. In both cases, make sure the coupling keys are engaged into the grooves.

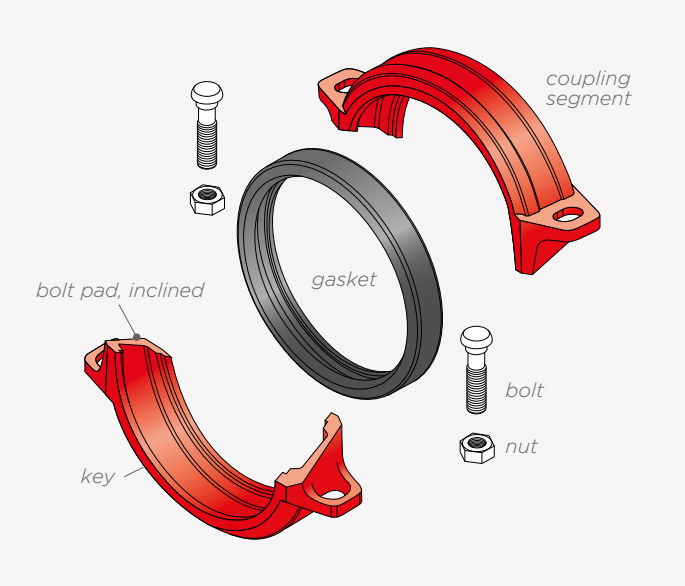
8. fit bolt and nut

Insert bolts and nuts and tighten the nut by hand-tight. Make sure that the oval neck of the bolt engages into the bolt hole of the housing.

9. tighten nuts
metal-to-metal contact

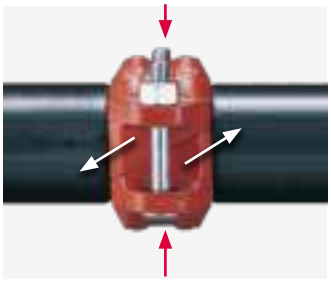
Tighten the nuts alternately and equally until the bolt pads meet and make metal-to-metal contact. Tighten the nuts by another quarter to half turn to make sure the bolts and nuts are snug and secure. The use of a torque wrench is not required.

installation instructions rigid couplings Z07 and Z07N with inclined bolt pads



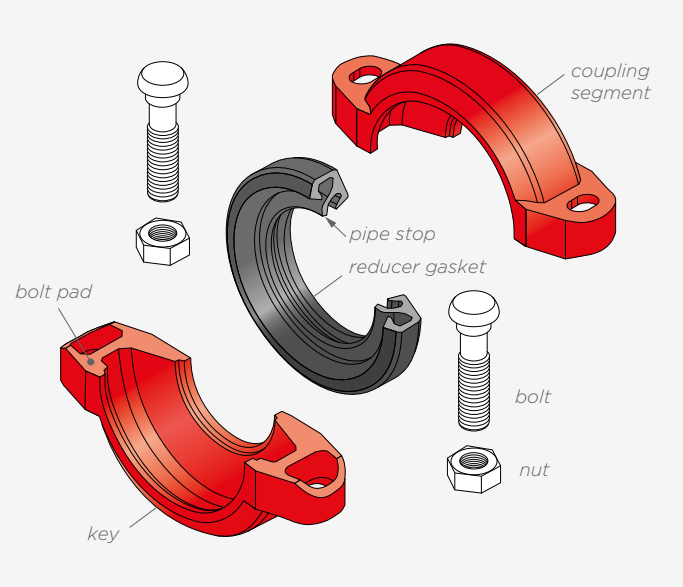
see preparatory steps **1 to 8** on page 22

9. **Tighten the nuts alternately and equally** until the bolt pads meet and make metal-to-metal contact. Tighten the nuts by another quarter to half turn to make sure the bolts and nuts are snug and secure. It is not necessary to use a torque wrench.



Note: When the coupling bolts are tightened, the inclined bolt pads slide in opposite directions. This allows the coupling edges to grip the pipe firmly while at the same time pushing the grooves out against the coupling edges. The bolt pads must always make metal-to-metal contact.

installation instructions reducing coupling 7706



see preparatory steps **1 to 3** on page 22

When installing reducing couplings, always make sure to fit the gasket on the larger pipe first. All other installation steps will remain as described.

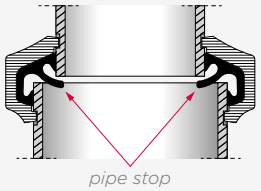
4. **fit the gasket on the larger pipe first**

Fit the larger opening of the gasket over the larger pipe end and align the pipe ends to be coupled.

5. **fit smaller pipe**

Insert the smaller pipe into the gasket. A slight twisting motion of will make assembly easier. The gasket must not extend beyond the pipe end or beyond the grooves of both pipes.

NOTE:
Reducing couplings (such as model 7706) must not be used with an end cap, as the end cap may be sucked into the pipe when draining the system.

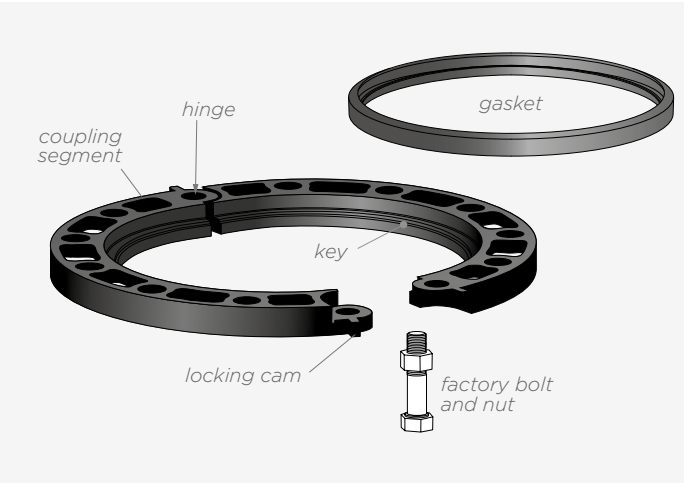


Note: A metal washer is not required to prevent the smaller pipe from sliding into the larger pipe. The built-in pipe stopper (or pipe holder) in the gasket prevents the smaller pipe from sliding. However, the smaller pipe must be carefully pushed in until the coupling is in place and installation is complete.

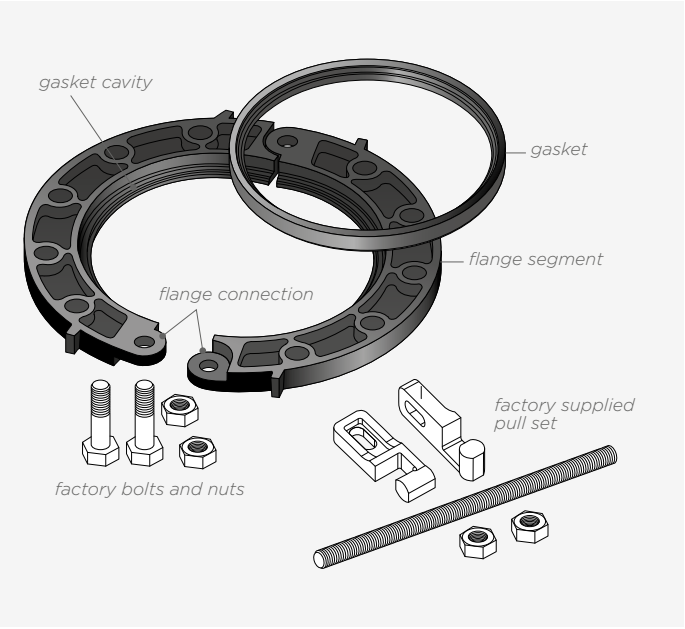
see steps **6 to 8** on page 22

9. **tighten nuts alternately and equally** until the bolt pads meet and make metal-to-metal contact. Tighten the nuts by another quarter to half turn to make sure the bolts and nuts are snug and secure. The use of a torque wrench is not required.

installation instructions grooved flange adapters SJ-7041, 7041N, 7043



hinged flange adapter (2-12")



two-segment flange adapter (14-24")

VSH Shurjoint flange adapters are in accordance with PN10/16, but are also available as ANSI grade 125/150 and grade 300.

1ª. installing hinged flange segments (2-12")

Fully open the hinged flange segments. Fit the flange segments around the groove of the pipe end and pull the segments together until the holes are aligned.

pull together flange segments
Use a wrench, C-clamp or other similar tool to draw the closure tabs together until the bolt holes are aligned.

insert bolt
Insert the bolt through the coupling hole and make sure that the flange is fully engaged in the pipe groove.

1ᵇ. installing two-part flange segments (14-24")

Fit the half flange segment on the pipe, making sure that the edge of the segment is engaged in the groove.

insert bolt
Fit the other half flange segment and insert the bolts through the coupling holes in the flange joints and make sure that they are fully engaged in the pipe groove.

Note: Shurjoint 7041N 14-24" flange adapters are provided with mounting bolts for use in joining the segments. Use of any bolts other than those supplied by the factory with the flange adapter could result in leaks or joint damage.

pull together flange segments
If it is difficult to align the holes in the flange joint, use the factory supplied puller kit to draw the closure tabs together until the mating holes are aligned.

insert bolt
Insert the bolt through the coupling hole and make sure that the flange is fully engaged in the pipe groove.

2. check gasket grade and lubricate

Check the colour code of the gasket and check that the gasket supplied is suitable for the intended use. Then apply a thin coat of VSH Shurjoint lubricant to the entire gasket surface.

3. fit gasket

Place the gasket in the gasket cavity between the outside of the pipe and the flange recess. Ensure that the bottom of the gasket (the side with marking strip) is against the bottom of the gasket cavity.

4ª. coupling adjoining flange (2-12")

Insert the long bolt of the assembled flange from step 3, into an opposing hole in the mating flange. Insert a commercial bolt through the hinge hole and hand tighten the nuts of each.

4ᵇ. coupling adjoining flange (14-24")

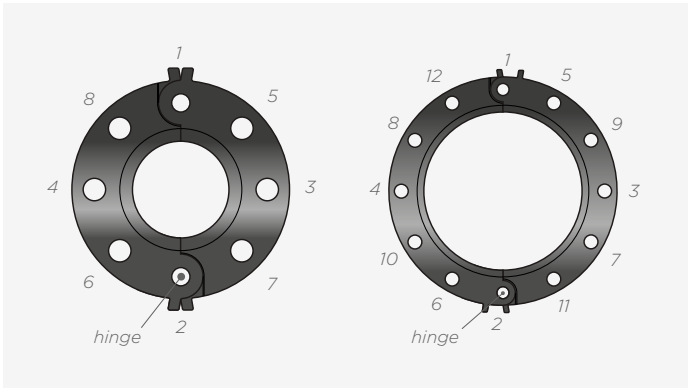
Align the adjoining flange face to face with the flange adapter and insert the two factory supplied bolts through the mating holes in the opposing flange. Hand tighten the nuts to hold the flange in place.

5. fitting bolts and nuts

Fit the remaining commercial flange bolts and turn the nuts hand tight. All the bolts shall be inserted from one direction.

6. tighten nuts

Tighten the nuts alternately in diagonally opposite pairs until the flange faces make metal-to-metal contact. It is important to make flange faces contact parallel.



required bolt torque

The following tables provides the standard torque values for proper installation of VSH Shurjoint flange adapters. Use a torque wrench so that all the nuts are tightened equally with a same torque value.

These torque values provide a range and bolts are required to be tightened to a torque within this range. The maximum torque value does not have to be reached, as VSH Shurjoint flange adapters are sealed with elastic (rubber) gaskets. These flange adapters have a much lower torque than usual for metal gaskets.

required torques

bolts SJ-7041 (ANSI grade 125/150) and SS41

pipe size	bolt size		required torque	
[inch]	[inch]	no.	[lbs-ft]	[Nm]
2	⅝	4	110–140	149–190
2½	⅝	4	110–140	149–190
3	⅝	4	110–140	149–190
4	⅝	8	110–140	149–190
5	¾	8	220–250	298–339
6	¾	8	220–250	298–339
8	¾	8	220–250	298–339
10	⅞	12	320-400	434-542
12	⅞	12	320-400	434-542
14	1	12	360-520	488-705
16	1	16	360-520	488-705
18	1⅛	16	450-725	610-982
20	1⅛	20	450-725	610-982
24	1¼	20	620-1000	841-1356

bolts SJ-7041 (PN10/16)

pipe size	bolt size		required torque	
[inch]		no.	[lbs-ft]	[Nm]
50	M16	4	110–140	149–190
65	M16	4	110–140	149–190
80	M16	8	110–140	149–190
100	M16	8	110–140	149–190
125	M20	8	220–250	298–339
150	M20	8	220–250	298–339
200	M20	12	220–250	298–339
250	M24	12	320-400	434-542
300	M24	12	320-400	434-542
350	M24	16	320-400	434-542
400	M27	16	360-520	488-705
450	M27	20	360-520	488-705
500	M30	20	450-725	610-982
600	M33	20	620-1000	841-1356

bolts 7043 (ANSI grade 300)

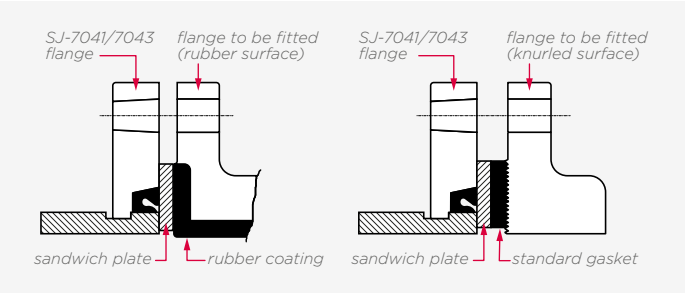
pipe size	bolt size		required torque	
[inch]	[inch]	No.	[lbs-ft]	[Nm]
2	⅝	8	110–140	149–190
2½	¾	8	220–250	298–339
3	¾	8	220–250	298–339
4	¾	8	220–250	298–339
5	¾	8	220–250	298–339
6	¾	12	220–250	298–339
8	⅞	12	320-400	434-542
10	1	16	360-520	488-705
12	1⅛	16	450-725	610-982

installing sandwich plate on flange adapter (model SJ-7041 and 7043)

Take the following into account during installation:

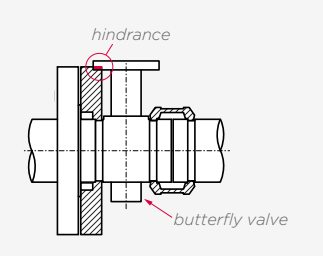
1. The flange adapters (models SJ-7041 and 7043) require a hard flat surface for effective sealing.

Some surfaces of adjoining flanges are not suitable for direct sealing. This is the case with the ribbed flange surface of some valves or with the rubber coated flange surface of wafer valves. In this case a sandwich plate (model 49) must be used.



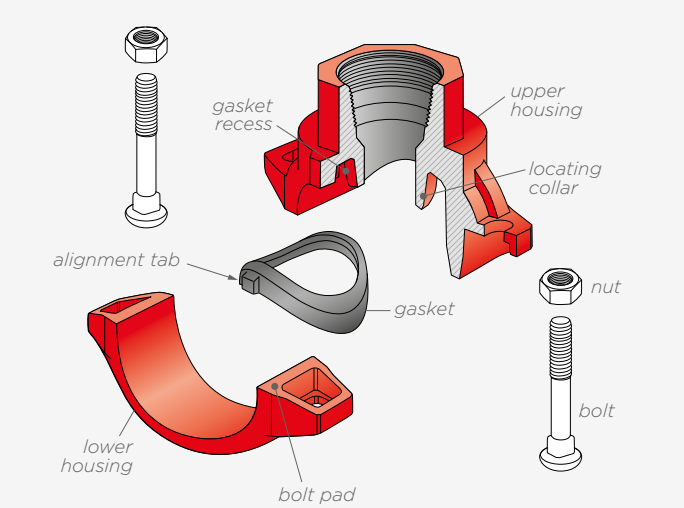
2. The flange adapter (model SJ-7041 and 7043) has small triangular teeth in the adapter edge. These engage in the groove to prevent the pipe from rotating. The teeth should be ground off when mating to a rubber-coated flange.

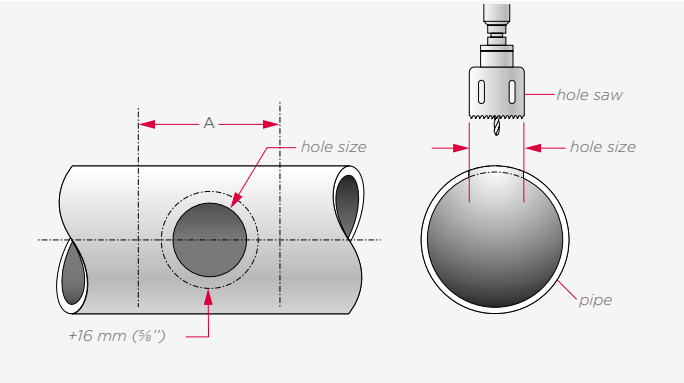
3. The flange adapters (models SJ-7041 and 7043) must not be used as anchor points for draw rods. For example, to anchor a connection that cannot resist tensile force.



4. When installing a flange adapter (model SJ-7041 or 7043) against a butterfly valve or ball valve, make sure that the outside diameter of the flange adapter does not interfere with the valve actuator or the mounting surface of the actuator. When using two model 7041 flange adapters to mate pipe, or wafer / lug valves, the hinge point locations must be staggered 90° to each other, a model 49 sandwich plate must be used where appropriate, and flange adapter segment housings must remain parallel during nut tightening sequence.

installation instructions mechanical tees





mechanical tee system

The hole-cut method of pipe preparation is required when installing mechanical tees, saddle-let and crosses. This method requires sawing a hole of a specified size on the centreline of the pipe. Always use the correct size as stated in this manual.

NOTE:

The hole must be neatly cut and have a smooth edge. Never use a torch for cutting a hole, as this could prevent proper sealing.

1. saw hole

Determine the location for the hole on the pipe. Use the correct holesaw size as stated in table on the next page.

2. deburring and cleaning

Clean the pipe surface within 16 mm around the hole where the gasket is to be fitted. This area must be inspected to ensure a clean, smooth surface, free of any scratches or projections that could affect gasket sealing. The area inside the dimension [A] must also be inspected and must be free of soiling, galvanising residue and any imperfections that could affect the seating or installation of the fitting.

hole sizes and [A] surface specifications for mechanical tees

mechanical tees pipe x branch		hole dimensions				surface [A] preparation	
		hole saw		max. allowed diameter			
[inch]	[DN]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]
2 x ½	50 x 15	1½	38	1⅝	41	3½	89
2 x ¾	50 x 20	1½	38	1⅝	41	3½	89
2 x 1	50 x 25	1½	38	1⅝	41	3½	89
2 x 1¼	50 x 32	1¾*	45	1⅞*	47	4	102
2 x 1½	50 x 40	1¾*	45	1⅞*	47	4	102
2½ x ½	65 x 15	1½	38	1⅝	41	3½	89
2½ x ¾	65 x 20	1½	38	1⅝	41	3½	89
2½ x 1	65 x 25	1½	38	1⅝	41	3½	89
2½ x 1¼	65 x 32	2	51	2⅛	54	4	102
2½ x 1½	65 x 40	2	51	2⅛	54	4	102
3 x ½	80 x 15	1½	38	1⅝	41	3½	89
3 x ¾	80 x 20	1½	38	1⅝	41	3½	89
3 x 1	80 x 25	1½	38	1⅝	41	3½	89
3 x 1¼	80 x 32	2	51	2⅛	54	4	102
3 x 1½	80 x 40	2	51	2⅛	54	4	102
3 x 2	80 x 50	2½	64	2⅛	67	4½	114
4 x ½	100 x 15	1½	38	1⅝	41	3½	89
4 x ¾	100 x 20	1½	38	1⅝	41	3½	89
4 x 1	100 x 25	1½	38	1⅝	41	3½	89
4 x 1¼	100 x 32	2	51	2⅛	54	4	102
4 x 1½	100 x 40	2	51	2⅛	54	4	102
4 x 2	100 x 50	2½	64	2⅝	67	4½	114
4 x 2½	100 x 65	2¾	70	2⅞	73	4¾	121
4 x 3	100 x 80	3½	89	3⅝	92	5½	140
5 x 2	125 x 50	2½	64	2⅝	67	4½	114
5 x 2½	125 x 65	2¾	70	2⅞	73	4¾	121
6 x 1¼	150 x 32	2	51	2⅛	54	4	102
6 x 1½	150 x 40	2	51	2⅛	54	4	102
6 x 2	150 x 50	2½	64	2⅝	67	4½	114
6 x 2½	150 x 65	2¾	70	2⅞	73	4¾	121
6 x 3	150 x 80	3½	89	3⅝	92	5½	140
6 x 4	150 x 100	4½	114	4⅝	118	6½	165
8 x 2	200 x 50	2¾*	70	2⅞*	73	4¾	121
8 x 2½	200 x 65	2¾	70	2⅞	73	4¾	121
8 x 3	200 x 80	3½	89	3⅝	92	5½	140
8 x 4	200 x 100	4½	114	4⅝	118	6½	165

* Important: Pay special attention to the hole saw size and the maximum allowed diameter for these sizes. Any deviation can lead to joint damage.

3. check gasket grade and lubricate

Check the colour code and make sure it is suitable for the intended use. Then apply a thin coat of VSH Shurjoint lubricant to the sealing lip of the gasket. The gasket supplied as standard is grade E (EPDM – green stripe), suitable for water applications.

4. fit gasket

Insert the gasket into the gasket cavity of the housing. The alignment tabs on the side of the gasket must fit properly into the recesses.

5. installation preparation

Fit the coupling housings loosely. Leave out one nut and bolt to allow for ‘swing-over’ installation.

6. fitting top housing

Fit the top housing on the pipe so that the locating collar clicks firmly into the hole. Then fit the lower housing from the opposite side of the pipe.

7. fit bolt and nut

Fit the remaining bolt and turn the nut hand tight. Make sure that the oval neck of the bolt is entirely countersunk in the bolt hole of the housing.

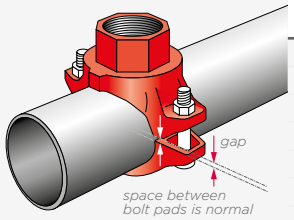
8. check locating collar

Check again to ensure the locating collar is properly positioned in the hole. This may be checked by rocking the upper housing in the hole. Also make sure that the oval necks of the bolts are fully engaged in the bolt holes of the housing.

9. tighten nuts

Tighten the nuts alternately and evenly until the housing inner diameter makes metal-to-metal contact with the pipe. Some clearance between the bolt pads is acceptable, but it must be identical on both sides. Tighten the nuts with a torque wrench using the values from the table below.

dimensions and torques for mechanical tees 7721 and 7722, M21 and M22



nominal size	bolt size		required torque	
	[inch]	No.	[lbs-ft]	[Nm]
2" (DN 50)	⅜	2	30	40
2½" (DN 65)	½	2	50	68
3" (DN 80)	½	2	50	68
4" (DN 100)	½	2	50	68
5" (DN 125)	⅝	2	50	68
6" (DN 150)	⅝	2	50	68
8" (DN 200)	¾	2	50	68

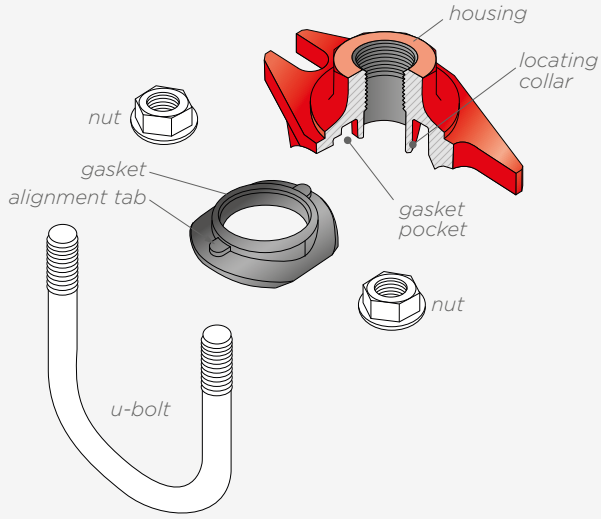
Note: Do not exceed the above torque values by more than 25% as this may result in damage to bolts and/or connections.

dimensions and equivalent lengths of mechanical tees

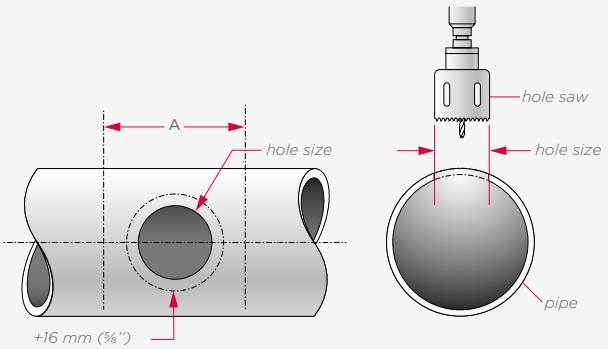
outlet size	equivalent length			
	7721/M21		7722/M22	
	[ft]	[m]	[ft]	[m]
1" (DN 25)	3	0.9	3	0.9
1¼" (DN 32)	6	1.8	6	1.8
1½" (DN 40)	8	2.4	8*	2.4
2" (DN 50)	9	2.7	9	2.7
2½" (DN 65)	15	4.6	15	4.6
3" (DN 80)	16	4.9	16	4.9
4" (DN 100)	17	5.2	17	5.2

number of feet and metres of steel branch pipe (Schedule 40) with a Hazen-Williams coefficient of friction of 120. * The equivalent length of 7721/M21 with 1½" outlet and key pipe size of 2" or 2½" is 13 feet (4 metres)

installation instruction saddle let sprinkler outlet



hole-cut piping system



The hole-cut method of pipe preparation is required when installing mechanical tees, saddle-let and crosses. This method of pipe preparation requires the cutting or drilling of a specified hole size on the centerline of the pipe. Always use the correct hole saw size as shown in this handbook.

NOTE:
The hole must be neatly cut and have a smooth edge. Never use a torch for cutting a hole, as this could prevent proper sealing.

Hole sizes and 'A' surface specifications for saddle let sprinkler outlets

Model 723 Saddle let sprinkler outlet

Header size		Branch size		Hole dimensions				Surface preparation* 'A'	
				Hole saw size		Max diameter allowed			
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
1 1/4	32	1/2, 3/4, 1	15, 20, 25	1 3/16	30	1 1/4	32	3 1/2	89
1 1/2	40	1/2, 3/4, 1	15, 20, 25	1 3/16	30	1 1/4	32	3 1/2	89
2	50	1/2, 3/4, 1	15, 20, 25	1 3/16	30	1 1/4	32	3 1/2	89
2 1/2	65	1/2, 3/4, 1	15, 20, 25	1 3/16	30	1 1/4	32	3 1/2	89

1. Hole cut

Determine the hole location on the centre pipe. Use a 1³⁄₁₆" (30 mm) hole saw and cut a hole at the desired location. The hole must be directly positioned in the center of the pipe. Any offset can cause the hole to be obround and cause leakage.

2. remove burrs, rough edges

Remove burrs and clean the pipe surface within ⅝" (16 mm) around the hole where the gasket is to be seated

3. Insert gasket

insert the gasket into the gasket pocket of the housing using the alignment tabs on the side for proper positioning.

NOTE:
Do not use EPDM gaskets for hydrocarbons or petroleum services as this could result in a leak or joint failure.

4. Position locating collar

Position the upper housing on the pipe so that the built-in locating collar fits properly within the hole.

5. Insert u-bolt

Insert the U-bolt from the opposite side of the pipe and apply the nuts hand tight.

6. Tighten nuts

Check to make sure the locating collar is properly seated in the hole.Tighten the nuts alternately and equally to an approximate torque value of 22 Lbs-Ft (30 Nm).

general technical information

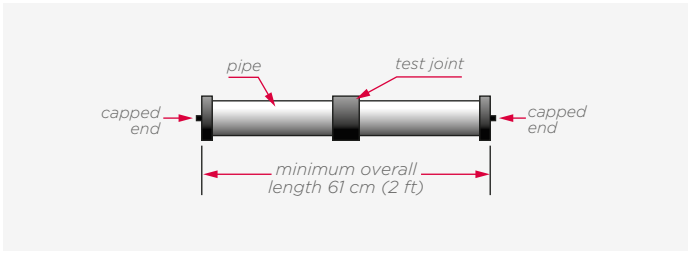
hydrostatic Tests

Approved products are rated in cold water pressure (CWP) tested with a 3 to 5 times test pressure depending on the approval body and pipe size. The minimum working pressure (CWP) shall be 175 psi (12.3 Bar) in accordance with NFPA 13. Approval testing of a coupling is conducted on all different pipe schedules as enrolled and approved working pressures (CWP) are assigned to each individual combination of the coupling and test pipe. Refer to the Approved Pressure Ratings by UL and FM.

hydrostatic test pressures (= multiple of CWP)

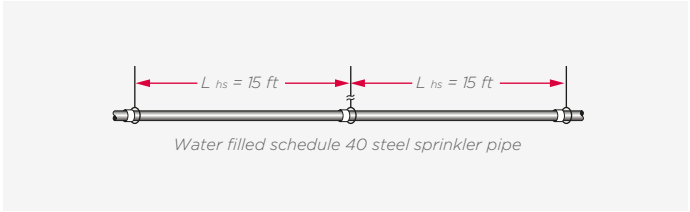
Nom. Size	UL	FM	VdS	LPCB
Up to 6/150	X5	X4	X4	X4
8-12/200-300	X4	X4	X4	X4
14 and above	X3	X4	NA	NA

Contact Shurjoint for other approvals.



bending moment tests

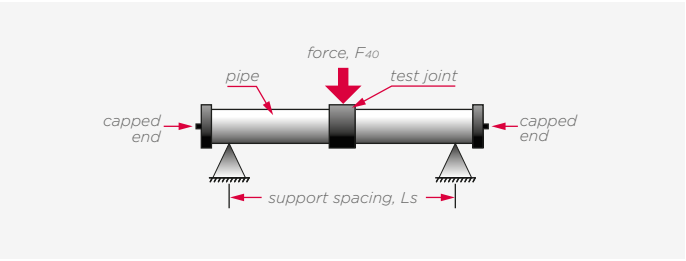
The required bending moment per UL and FM is calculated based on twice the weight of water filled pipe over twice, the maximum distance between pipe supports as specified in NFPA 13.



See the table hereafter for the bending moments per UL and FM on Sch. 40 pipe. This bending moment is twice that required by ASTM F1476

required bending moment by UL & FM

nom. size [inch]	UL bending moment [Nm]	UL bending moment [Lbs-Ft]	FM bending moment [Nm]	FM bending moment [Lbs-Ft]
1½	1098	810	1100	810
2	1559	1150	1560	1150
2½	2400	1770	2400	1770
3	3289	2426	3290	2425
4	4942	3645	4975	3670
5	7102	5238	7105	5240
6	9606	7085	9615	7090
8	15326	11304	15335	11310
10	22757	16785	22790	16805
12	31116	22950	31145	22970
14	37217	27450	-	-
16	48597	35843	-	-



In addition to the hydrostatic and bending moment tests, couplings must meet other requirements including gasket performance tests.

flexible couplings

NFPA 13 defines a flexible coupling as 'a listed coupling or fitting that allows axial displacement, rotation, and at least 1 degree of angular movement of the pipe without inducing harm on the pipe. For pipe diameters of 8 inch and larger, the angular movement shall be permitted to be less than 1 degree but not less than 0.5 degrees.' (NFPA 13 - 2007 3.5.4).

For sprinkler systems, NFPA 13 specifies the use of flexible couplings to protect the system against damage from earthquakes and lists some specific examples of how and where they should be used. Designers and installers should design their fire protection systems in compliance with this standard.

minimum pipe schedules

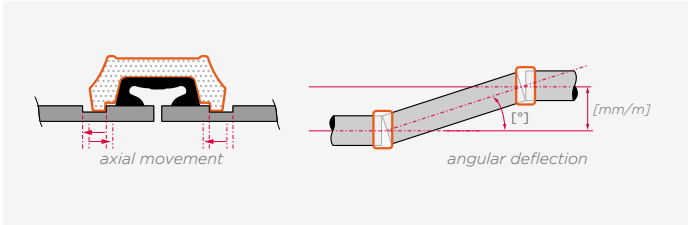
Standard cut and roll grooving connections have limitations of minimum pipe schedules. Special care is required for thin wall pipe. Factory Mutual Research Group (FM) outlines the minimum pipe schedules to be used for cut and roll grooving in their FM Class 1920 standard as follows:

Nominal pipe size (inch)	Grooving method	Minimum pipe schedule
6 or smaller	Cut	Schedule 40
8 or larger	Cut	Schedule 30
2 or smaller	Rolled	Schedule 5
6 or smaller	Rolled	Schedule 10, thinwall, lightwall
8 or larger	Rolled	0.188 in. (4.8 mm) wall
8 or 10	Rolled	0.188 in. (4.8 mm) wall
12	Rolled	0.250 in. (6.4 mm) wall

(FM Class 1920 -2007, Table 3.2.2)

axial movement and angular deflection

Grooved couplings become less flexible as the pipe size increases. Couplings larger than 18" (450 mm) allow only very limited angular deflection. The following table provides design data regarding the allowed axial movement and angular deflection of flexible couplings.



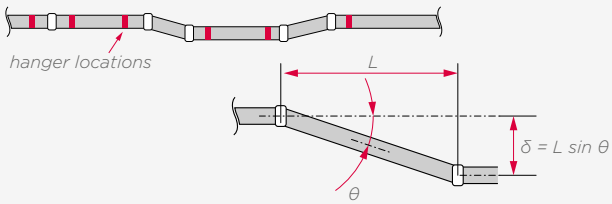
axial movement and angular deflection for rolled groove and cut groove flexible couplings 7705, 7707 and 7707N

size		[mm]	rolled groove			cut groove		
			axial movement	angular deflection		axial movement	angular deflection	
			[mm]	[°]	[mm]/[m]	[mm/m]	[°]	[mm]/[m]
1"	(DN25)	33.4	0 - 0.8	1.37	24	0 - 1.6	2.74	48
1¼"	(DN32)	42.2	0 - 0.8	1.09	19	0 - 1.6	2.17	38
1½"	(DN40)	48.3	0 - 0.8	0.95	17	0 - 1.6	1.90	33
2"	(DN50)	60.3	0 - 0.8	0.76	14	0 - 1.6	1.52	27
2½"	(DN50)	73	0 - 0.8	0.63	11	0 - 1.6	1.26	22
2½"	(DN65)	76.1	0 - 0.8	0.60	1	0 - 1.6	1.20	21
3"	(DN80)	88.9	0 - 0.8	0.52	9	0 - 1.6	1.03	18
4"	(DN80)	101.6	0 - 0.8	0.45	8	0 - 1.6	0.90	16
4"	(DN100)	108	0 - 2.4	1.27	23	0 - 4.8	2.54	45
5"	(DN125)	114.3	0 - 2.4	1.20	21	0 - 4.8	2.40	42
5"	(DN125)	139.7	0 - 2.4	0.98	17	0 - 4.8	1.97	35
5"	(DN125)	141.3	0 - 2.4	0.97	17	0 - 4.8	1.95	35
6"	(DN125)	159	0 - 2.4	0.86	15	0 - 4.8	1.73	30
6"	(DN125)	165.1	0 - 2.4	0.83	15	0 - 4.8	1.67	30
6"	(DN150)	168.3	0 - 2.4	0.82	14	0 - 4.8	1.63	29
8"	(DN200)	219.1	0 - 2.4	0.63	11	0 - 4.8	1.26	23
10"	(DN250)	273	0 - 2.4	0.5	9	0 - 4.8	1.01	18
12"	(DN300)	323.9	0 - 2.4	0.42	8	0 - 4.8	0.85	15
14"	(DN350)	355.6	0 - 2.4	0.39	7	0 - 4.8	0.77	14
16"	(DN400)	406.4	0 - 2.4	0.34	6	0 - 4.8	0.68	12
18"	(DN450)	457.2	0 - 2.4	0.30	5	0 - 4.8	0.60	11
20"	(DN500)	508	0 - 2.4	0.27	5	0 - 4.8	0.54	10
22"	(DN550)	558.8	0 - 2.4	0.25	4	0 - 4.8	0.49	9
24"	(DN600)	609.6	0 - 2.4	0.23	4	0 - 4.8	0.45	8
26"	(DN650)	660.4	0 - 2.4	0.21	4	0 - 4.8	0.42	7

* Note: The safety factor for design purposes is already included in the values in the above table.

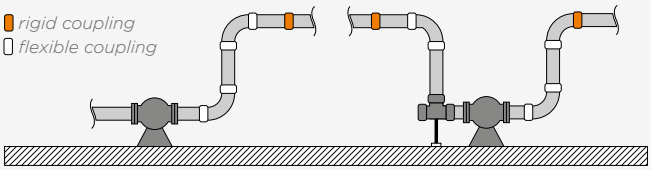
accommodating pipe alignment

If the alignment of a straight length of pipe has to be adjusted on site (see illustration), this can be done using two flexible couplings. The table opposite shows the angular deflection [θ].



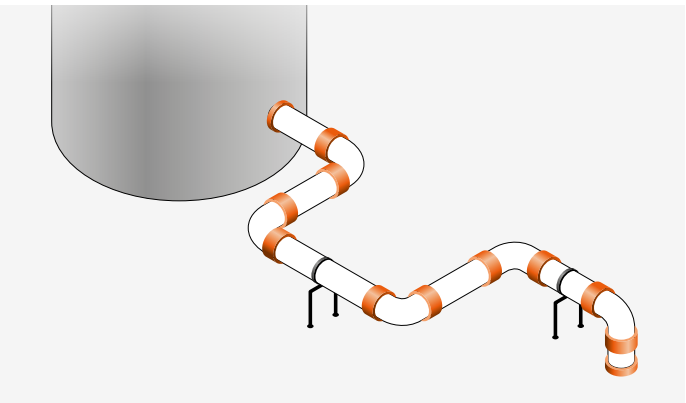
absorption of vibration and noise

When a pump operates with frequent starts and stops, the piping system is affected by the noise and vibration of the equipment. The entire system may develop strong vibration as a result of frequent start-stop cycling. This is also called resonance. VSH Shurjoint flexible couplings will help reduce such vibration and noise. The system should always be properly designed with steel angle sway braces to protect the system from large sways.



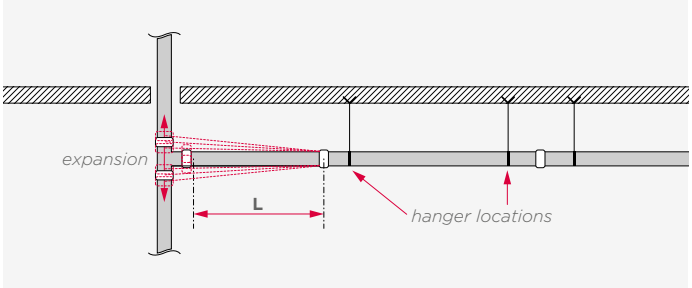
absorption of distortion

A setup as shown below allows ground settlement or movement around a tank or reservoir to be effectively absorbed, avoiding damage to the tank, reservoir and/or the piping system.



compensation of displacement

As shown in the illustration, each branch connection to the free riser will be subjected to serious shearing forces as pressure thrusts or thermal movement increases. You can solve this issue by using two flexible couplings.

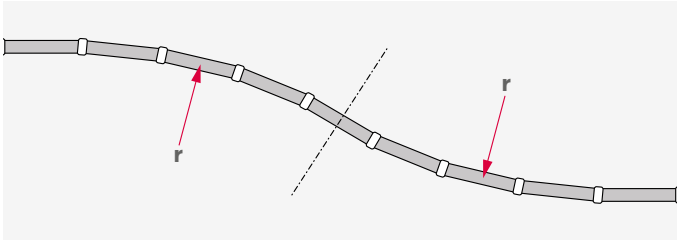


bending pipe sections

With VSH Shurjoint flexible couplings you can design a slowly curved layout for a system along a curved tunnel, winding road or curved building.

$$R = \frac{L}{2 \times \sin(\theta/2)}$$

(where: R = radius of curvature, L = pipe length, and θ = maximum allowed angular deflection of a coupling)



Example: If model 7705 DN100 (4") couplings are used for the installation (see diagram), the maximum allowed angular deflection [θ] of the coupling is 1.2°. A pipe length [L] of 3 metres gives a radius [R] of 144.2 metres.

absorption of thermal stress

Thermal stress is caused by changes in temperature, resulting in either expansion or contraction. With the use of VSH Shurjoint flexible couplings you can design your system to accommodate such movement without the need for costly expansion joints. The thermal expansion or contraction [μ] is determined by the length of the pipe [L] and the temperature difference (ΔT).

$$\mu = \alpha \times L \times \Delta T$$

thermal expansion [mm]

temperature difference ΔT [K]	pipe length l [m]						
	1	3	6	10	20	30	40
1	0.012	0.04	0.08	0.12	0.24	0.36	0.48
5	0.06	0.18	0.36	0.6	1.2	1.8	2.4
10	0.12	0.36	0.72	1.2	2.4	3.6	4.8
20	0.24	0.71	1.42	2.4	4.8	7.2	9.6
30	0.36	1.09	2.18	3.6	7.2	11	15
40	0.48	1.42	2.84	4.8	9.6	14	20
50	0.6	1.8	3.6	6	12	18	24
60	0.72	2.18	4.36	7.2	14	22	29
70	0.84	2.51	5.02	8.4	17	25	34
80	0.96	2.89	5.78	9.6	19	29	39

As the linear expansion coefficient of steel (α) is 1.2 x 10^{-5}, you can use the table above to determine the thermal expansion. Example:

- pipe size: DN100 (4")
- max. pipe end separation [E]: 2.4 mm
- pipe length [l]: 3000 mm
- temperature difference (ΔT) : 40 K (+5°C to +45°C)
- α = 1.2 x 10^{-5}/K

$$\mu = \alpha \times l \times \Delta T = 1.2 \times 10\text{-}5/K \times 3000\ mm \times 40\ K = 1.44\ mm$$

The thermal expansion of a 3 metre length of pipe [μ] is within the permitted value (max. pipe end separation) of a flexible coupling. In other words, if you fit a coupling for each pipe length of 3 metres, the coupling will accommodate the expected thermal expansion or contraction with a 40 K temperature change. When calculating the required number of couplings [N] for an anchored system, you should observe a clearance of N x E x ½ as a safety factor.

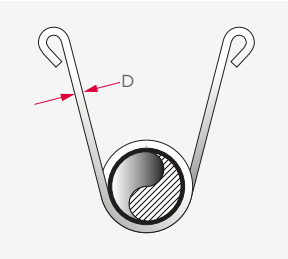
Whether it is thermal expansion, contraction, or a combination of the two, the system must be provided with suitable fixed and sliding support points. Where and when larger thermal movement is anticipated, you should use supplementary expansion joint(s).

anchoring, suspension and supporting

VSH Shurjoint grooved couplings are designed to resist axial forces 4 to 5 times greater than the nominal working pressure, but the allowed bending stress is lower than with steel pipes. The joint can be damaged if the angular deflection is greater than the allowed angle as stated in the table on page 107. System designers should provide fixing-point anchors (main and intermediate) and correct spacing between the sliding supports to protect the system against unexpected large angular displacements. These illustrations are examples only, and are not intended to be used for all installations as conditions and requirements vary from job to job. Reliance on general data or information contained herein shall be at the user's sole risk and without obligation to VSH Shurjoint.

The supports must be designed to be able support five times the weight of the water-filled pipe plus 250 lb (115 kg) at each pipe support point (NFPA 13 9.1.1.1.). The following illustrations are examples of acceptable hanger types and sizes per NFPA 13.

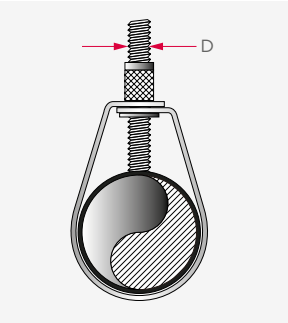
U-bracket dimensions



U-bracket

pipe size	dimension D	
[inch]	[inch]	[DN]
< 4	5⁄16″	7.9
2½″ - 6″	⅜″	9.5
8″	½″	12.7

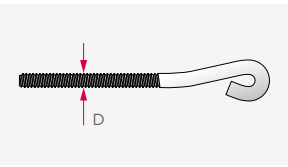
threaded rod dimensions



bracket with adjustable ring, clamping on pipe

pipe size	dimension D	
[inch]	[inch]	[DN]
< 4	⅜″	9.5
5″ - 8″	½″	12.7
10″ - 12″	⅝	15.9

eye rod dimensions



pipe size	dimension D	
[inch]	[inch]	[DN]
< 4	⅜″	9.5
5 - 6	½″	12.7
10 - 12	¾″	15.1

support for straight pipes

Both flexible and rigid couplings can be used to connect straight pipes. When rigid couplings are used, the same hanger spacing as for other piping methods can be used. You can refer to the hanger spacing standards of ANSI B31.1 Power Piping Code, B31.9 Building Services Piping Code, NFPA 13 Sprinkler Systems, or the Mechanical Equipment Construction Guide (Japan). See the following table.

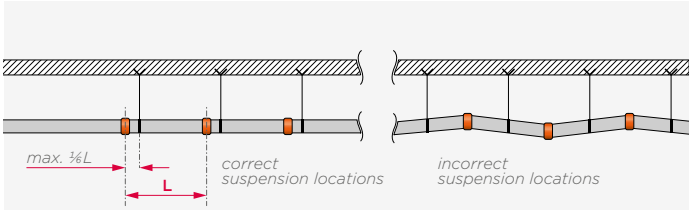
recommended max. distance between supports (steel pipe)

pipe size		[mm]	water application [m]				gas or air application [m]		
			1)	2)	3)	4)	1)	2)	3)
1″	(DN25)	33.4	2.1	2.7	3.7	2	2.7	3	3.7
1¼″	(DN32)	42.2	2.1	3.4	3.7	2	2.7	3.7	3.7
1½″	(DN40)	48.3	2.1	3.7	4.6	2	2.7	4	4.6
2″	(DN50)	60.3	3	4	4.6	2	4	4.6	4.6
2½″	(DN65)	76.1	3.4	4.6	4.6	2	4.3	5.2	4.6
3″	(DN80)	88.9	3.7	4.9	4.6	2	4.6	5.8	4.6
4″	(DN100)	108	4.3	5.5	4.6	2	5.2	6.4	4.6
5″	(DN125)	114.3	4.9	6.1	4.6	2	6.1	7.3	4.6
6″	(DN150)	168.3	5.2	6.4	4.6	3	6.4	7.9	4.6
8″	(DN200)	219.1	5.8	7	4.6	3	7.3	8.8	4.6
10″	(DN250)	273	5.8	7.6	4.6	3	7.3	10.1	4.6
12″	(DN300)	323.9	7	7.9	4.6	3	9.1	11	4.6
14″	(DN350)	355.6	7	7.9	4.6		9.1	11.3	4.6
16″	(DN400)	406.4	8.2	7.9	4.6		10.7	12.2	4.6
18″	(DN450)	457.2	8.2	8.2	4.6		10.7	13.1	4.6
20″	(DN500)	508	9.1	8.2	4.6		11.9	14	4.6
24″	(DN600)	609.6	9.8	7.9	4.6		12.8	15.2	4.6

1) ANSI B31.1 Power Piping Code
2) ANSI B31.9 Building Services Piping Code
3) NFPA 13 Sprinkler Systems
4) Japanese Ministry of Land and Transport: Mechanical Equipment Construction Guide

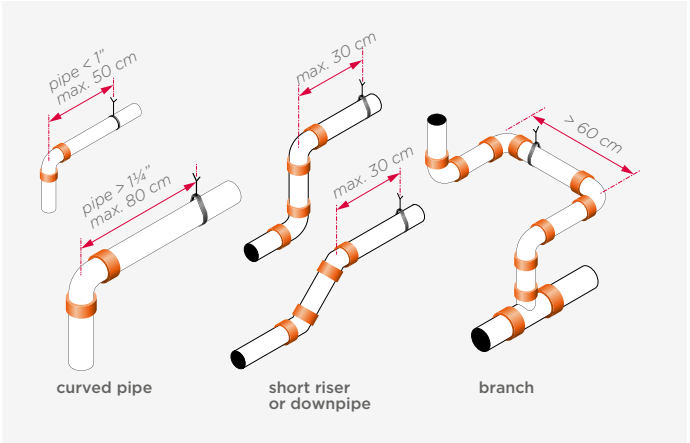
support locations on straight pipes where flexible couplings are used

When flexible couplings are used on straight pipes, the support points must be located as close to each coupling as possible or within a distance of less than 1/6 the span.



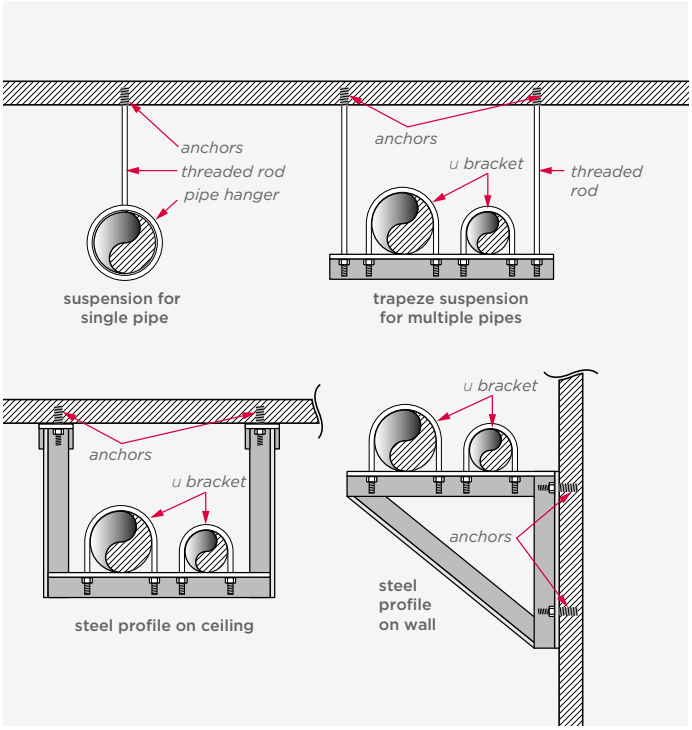
support locations for bends and branch lines

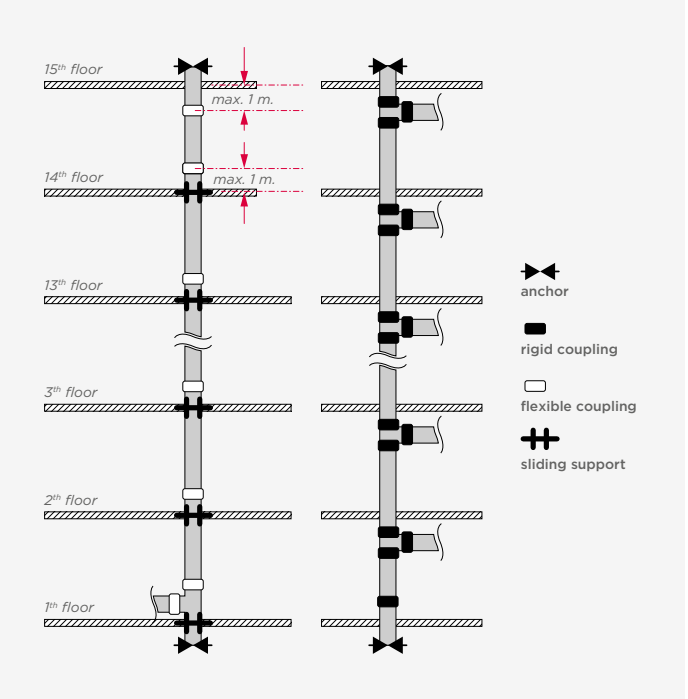
Additional support points must be provided for bends and branch lines, or on short risers or downpipes.



typical suspension and support designs

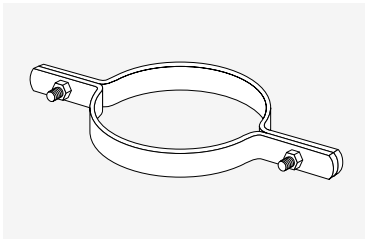
Pipes must be adequately suspended by rod hangers or on installation profiles directly attached to the building structure to restrict the movement of the piping. Hangers and associated parts shall be made of steel. The maximum distance between supports must not exceed that specified in the table on page 37.



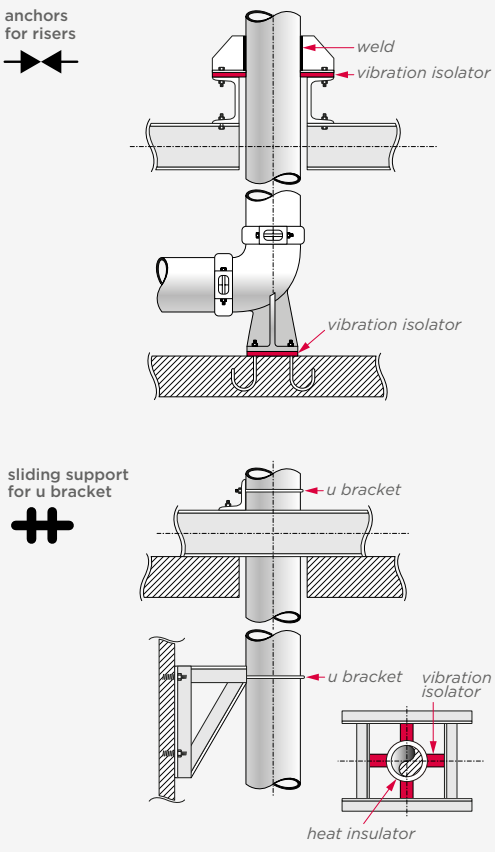


- Anchors must be strong enough to hold the weight of water-filled pipes and withstand pressure forces.
- Sliding supports must prevent lateral movement of the system.

support for risers



In multi-storey buildings, risers must be anchored at the lowest and highest level and secured to each storey with sliding supports to prevent lateral movement. If the riser is supported at the floor penetration, the number of fastening points may be reduced to one per three storeys. Both flexible and rigid couplings can be used with risers as long as proper anchoring and support are provided.



fire protection

VSH XPress

VSH XPress

the VSH XPress sprinkler system product range consists of press fittings, tubes, valves and tools, available in two different materials: stainless steel and carbon steel fittings that incorporate an M-profile.

VSH XPress products are manufactured using unique, modern machinery. Our completely automated factories guarantees safe and high-quality products. All welded products undergo a leak test in order to avoid any problems afterwards when installed.

VSH XPress system offers installers a complete solution with great flexibility. Tubes from other manufacturers may also be used under certain circumstances. Furthermore, VSH XPress fittings can also be pressed using various brands of press tools.

With the increasing requirements for fire safety on one hand and lack of time on the building site on the other, VSH XPress is a logical choice. The VSH XPress systems offer installers a complete solution with great flexibility and can be used for:
- wet or dry fire mains
- high pressure dry fire mains
- wet or dry sprinkler installations
- low pressure watermist-installations
- hose reel connections

VSH XPress sprinkler products have been tested and certified for use in fixed wet (carbon and stainless steel) and dry (stainless) sprinkler installations in accordance with international guidelines. The maximum operating pressure can go as high as 16 bar, depending on the dimensions and required approvals.

advantages of the VSH XPress system

- simple, fast connection technology
- complete sprinkler piping system available in 3 different systems: VSH XPress Stainless, Carbon & Sprinkler ML
- fittings and tubes from 22 to 108 mm
- pre-marked insertion depth on Carbon and Stainless
- clear identification of materials and dimensions
- Leak Before Pressed function
- professional and appropriate press tools
- BIM ready

advantages

performance guaranteed:
We guarantee a consistent quality and supply, with all fittings being manufactured in Europe. In order to ensure high-value manufacturing, we employ laser-welding technology and all fittings (100%) undergo leak testing. The leak testing is fully automated and incorporated in the laser-welding process. All reducers and straight connectors with threaded ends are made from a single piece so there is no risk of leakage and are more compact which has benefits for recessed piping work. The smooth surface of the fittings and tubes means that flow characteristics are better than traditional piping systems. The quality of our fittings is also testified by the large number of national and international approval bodies. A wide range of system and product tests are available, with certificates for potable water, gas installations, shipbuilding and sprinkler systems.

reliable:
With VSH XPress systems, the quality of the connection is mainly determined by the tool and not the installer, thereby considerably reducing the risk of errors during installation. All fittings are fitted with a Leak Before Pressed (LBP) function, which reduces the risk even further. This LBP function ensures that fittings, which have not been pressed, will leak during the initial pressure test. The installer can immediately identify which

fittings are not pressed. Once pressed, the system is guaranteed airtight and watertight.

insertion depth marking
Safe and secure connections depend on correct insertion depths. However, marking the insertion depth is a very time-consuming task and for that reason, all stainless steel and carbon steel fittings with tube ends supplied by Aalberts integrated piping systems are marked with a clearly visible insertion depth mark (12 to 54 mm). This means that 25% of all VSH XPress fittings no longer have to be marked by the installer. A smart benefit from VSH XPress, which makes installations much easier, saves a lot of time and results in greater safety.

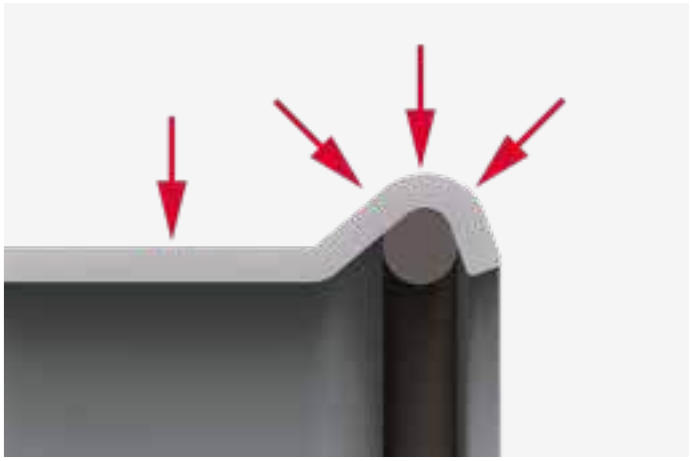
easy and clean:
Compared to other 'cold' connection methods, VSH XPress is an extremely user-friendly solution:
- the use of VSH XPress dispenses with the need for complicated fastening techniques, time-consuming preparations and drying times – installation is faster and cleaner.
- no need to thread the tubes.
- no lubrication needed for installation.
- easy insertion of the tube into the fitting due to the special design of the fittings.
- short radius bends ensure compact and space-saving installation.

the above features ensure that no special skills are required for installation and can be carried out in a pleasant and safe environment.

safe:
The installation of the VSH XPress system does not require any heat source (for example welding or soldering) or other heavy and potentially dangerous tools. This feature makes VSH XPress the ideal solution for repairs or renovation projects, as it ensures a minimum of disturbances at the site. Moreover, the light weight of the precision steel tubes means labour conditions are still further improved and a contribution is made to a healthier way of working.

fast:
This simple, fast connection technology and the short tube preparation time result in further considerable savings in the installation costs. As the connection is only achieved using press tools, no other materials, such as gases, adhesives, threading machines, etc., need to be purchased or hired.

advantages of the M-profile:
- the o-ring is pressed perpendicularly into the tube. This results in a seamless transition between fitting and tube that prevents leakages and any dust or dirt from getting into the joint.
- the o-ring bead creates an extra mechanical connection between fitting and tube.
- during pressing, pressure is applied to the o-ring from three angles, which results in a robust deformation of the o-ring bead and an extremely secure connection.
- due to the positioning of the o-ring at the beginning of the fitting, the o-ring can be clearly seen by the installer. This results in a safer installation process as any damage can be immediately spotted; the same is the case if the ring is wrongly placed.
- no chances of leakage due to the very accurate press profile (M-profile).



more VSH XPress benefits

The VSH XPress system is a complete range of fittings, tubes, valves and tools, easily recognisable due to laser markings. The correct VSH XPress jaws and slings are recognized by the 'X' symbol that is left on the surface of the fitting after pressing.

Major benefits are to be gained by using the complete VSH XPress system (fittings, tubes, valves and tools).

- the combination of fittings, tubes, valves and tools is an optimal match and ensures high quality connections.
- the 'X' immediately shows that the jaws and slings used are the correct choice for the job. It is a 100% guarantee that those jaws and slings match the VSH XPress system.
- it offers the possibility of having higher working pressures depending on the application (25 bar or even higher).
- the application areas of VSH XPress are very extensive: sprinkler systems, shipbuilding, high-pressure applications, etc.
- all VSH XPress Stainless and Carbon steel tubes are delivered with plastic end-caps in order to prevent dirt from getting into the tubes. The cap colour specifies the type of tube material.

references

VSH XPress is being used all over the world in the widest range of applications and types of buildings.

applications

sprinkler installations

VSH XPress Carbon fittings with VSH XPress Carbon Sendzimir precision tubes that fulfil EN 10305-3 which are VdS and LPCB approved or VSH XPress Stainless fittings with VSH SudoXPress Stainless tubes, which are VdS, FM and LPCB approved.

o-rings:	EPDM (black)
operating temperature:	-35°C to +135°C
operating pressure:	Max. 16 bar (depending on application and dimensions)

VSH XPress Sprinkler is suitable for both wet and dry fixed sprinkler systems.

mains-fed sprinkler installations

VSH XPress Stainless steel fittings with VSH SudoXPress Stainless tubes.

O-rings:	EPDM (black)
Operating temperature:	-35°C to +135°C
Operating pressure:	Max. 16 bar (depending on application and dimensions)

the objective of the water line sprinkler is - in case of fire - to deliver water in residential environments in the Netherlands. The water line sprinkler can be made up of a hybrid system and a separate system, which form the components of the water line installation. Installers who wish to utilise a water line sprinkler will first have to obtain a licence from Aalberts integrated piping systems to do so.

high-pressure dry fire mains

VSH XPress Stainless fittings with VSH SudoXPress Stainless tubes, which have been approved by Kiwa for pressures up to 40 bar.

dimensions:	22-35 mm (other dimensions available upon request)
o-rings:	EPDM (black)
operating temperature:	-35°C to +135°C
operating pressure:	40 bar

High-pressure dry fire mains are an application where swing couplings can be combined with the VSH XPress sprinkler system as an alternative to standard dry fire mains.

shipbuilding

VSH XPress Carbon and VSH XPress Stainless, in addition to the necessary national approvals for sprinkler installations, also have the requisite approvals for their installation on board ships. In this case it is important to follow such provisions as those that appear in the classification documentation precisely.

VSH XPress Carbon fittings with VSH XPress Carbon precision tubes that fulfil EN 10305-3 or VSH XPress Stainless fittings with VSH SudoXPress Stainless tubes that fulfil EN 10312, certified by Bureau Veritas, DNV-GL, Lloyd's Register and RINA.

o-rings:	EPDM (black)
operating temperature:	-35°C to +135°C
max. operating pressure:	16 bar (operating pressures depending on application and dimensions)

o-rings:	FPM (green)
operating temperature:	-20°C to +200°C
operating pressure:	max. 16 bar

The shipbuilding applications are valid only if the pressing machines, jaws and slings used are in accordance with the VSH XPress Sprinkler range (with the exception of VSH XPress Copper). Please contact Aalberts integrated piping systems for further information on VSH XPress in shipbuilding applications.

fittings

VSH XPress Stainless
Produced from 1.4404 materials, fittted with an EPDM o-ring.

VSH XPress Carbon
Produced from RSt 34-2 steel and protected against corrosion by a zinc coating which provides limited protection against short-term exposure to moisture if the fittings are able to dry out quickly afterwards.

note

VSH XPress Stainless and Carbon fittings in sizes 12-54 mm are fitted with an EPDM 'Leak Before Pressed' (LBP) o-ring (see page 49 for more detailed information). Fittings in sizes 76.1-108 mm are fitted with a standard EPDM o-ring.

note

All approved press tools to fit the right product are found in our online tool selector: www.aalberts-ips.eu/tool-selector

approvals

Fixed sprinkler installations are permanently installed fire safety and extinguishing systems that independently detect fire, signal the fire and automatically start the extinguishing process. The installation of a VSH XPress system in sprinkler installations is carried out in accordance with the applicable directives (for example VdS-CEA 4001, EN 12845, ANSI/NFPA 1 'Installation of Sprinkler Systems', ANSI/NFPA 14 'Installation of Standpipe and Hose Systems' or ANSI/NFPA 15 'Fixed Water Spray Systems for Fire Protection'). Depending on the material installed (stainless steel or carbon steel), the system can be used in wet or dry sprinkler systems. VSH XPress Carbon is only permitted in fixed wet sprinkler installations. VSH XPress Stainless can be used in both wet and dry sprinkler installations (depending on the approval).

hazard classes
A range of hazard classes also apply for the various approvals, where VSH XPress is installed. For more information on the permitted hazard classes, please contact Aalberts integrated piping systems. Where a VSH XPress system is used, it is necessary to ensure that under normal conditions or in case of fire, no mechanical load can fall on the tubing; for example, ventilation and cable ducts may not be placed above the sprinkler system. Where, due to the limitations of the building structure, a load could fall on the piping network, this can be solved by securing the sprinkler tube on both sides of the load with sprinkler certified components (see illustration above).

VSH XPress fittings are tested and approved for sprinkler applications and many more. The sprinkler and marine applications for which VSH XPress fittings are currently approved are listed in the following table.

approval body	VSH XPress Stainless	VSH XPress Carbon
ATG	12-108 mm	12-108 mm
Bureau Veritas	15-108 mm	12-108 mm
CNBOP	22-108 mm	22-54 mm
DNV-GL	15-108 mm	12-108 mm*
DVGW	12-108 mm	-
FG	22-108 mm	-
FM	22-108 mm	-
Kiwa	15-108 mm	-
LPCB	22-54 mm	22-54 mm
Lloyd's Register	15-108 mm	12-108 mm
RINA	15-108 mm	15-108 mm*
SBSC	22-108 mm	22-108 mm*
VdS	22-108 mm	22-108 mm*
WRAS	15-108 mm	-

*66.7 is not approved

note

For these approvals a system approval is always issued: VSH XPress fitting, valve, tube and tool.

sprinkler approvals

VSH XPress Stainless & Carbon sprinkler systems

Sprinkler systems must be designed and installed in accordance with the standards CEA 4001 (VdS), EN12845, NFPA13 and/ or local regulations. The following steps must be carried out: planning, installation, maintenance

All bodies that have been involved in the last test before commissioning the system must take part in the entire process from project planning to delivery. Depending on the approvals, a range of different operating pressures is permitted. The following table provides the permitted pressures, if the system has been installed in accordance with VdS, FM or LPCB.

VSH XPress sprinkler system operating pressures [bar]

		VdS		FM	LPCB	
DN	Ø external [mm]	wet (Carbon)	wet and dry (Stainless)	wet and dry (Stainless)	wet (Carbon)	wet (Stainless)
20	22	16	16	12.1	16	16
25	28	16	16	12.1	16	16
32	35	16	16	12.1	16	16
40	42	16	16	12.1	16	16
50	54	16	16	12.1	16	16
65	76.1	12.5	16	12.1	-	-
80	88.9	10	16	12.1	-	-
100	108	10	10	12.1	-	-

operating pressures for VSH XPress sprinkler systems

VdS certificate

VdS is a system approval. The certificate is only valid when all system components are used together: **fittings, valves, tubes and press tools**

VSH XPress sprinkler systems have been tested and certified according to VdS standards for both VSH XPress Carbon and Stainless for use in fixed sprinkler systems after the pipe valve. These standards apply to VSH XPress sprinkler systems with maximum operating pressures of 16 bar for sizes DN20 to DN100 (22-108 mm) for all products from the VSH XPress sprinkler range. Its use is only approved when the system components are used together. The connection of non-VSH XPress system components is only approved where this occurs by means of a connection that can be mechanically removed. The addition of additives to the extinguisher water is not approved. Exceptions to this are anti-corrosion additives after the approval of the manufacturer and in consultation with VdS Schadenverhütung GmbH. The distance between brackets for copper tubes in accordance with VdS CEA4001 apply (see section 3.5, page 88).

The mounting and installation of VSH XPress sprinkler systems may only be carried out by trained and qualified technicians. For example, the CEA 4001 (VdS) guideline includes requirements for the installation of a fixed sprinkler installation. The company that carries out the installation must always adhere to these guidelines.

VSH XPress Carbon VdS (G4080007)

The VSH XPress Carbon sprinkler system may be used in accordance with the VdS certificate in fixed wet sprinkler installations for hazard classes LH to OH3 and parts of OH4 (exhibition halls, cinemas, theatres, concert halls). The certificate applies to sizes DN20 to DN100 (22-108 mm) with an operating pressure as set out in the table on the previous page.
VSH XPress Carbon sprinkler fittings are manufactured from non-alloy, galvanized steel in combination with a galvanized tube specially produced for the VSH XPress Carbon sprinkler system. The inner and outer surface of the tubes are galvanized (by the Sendzimir process). This use is limited to locations after the alarm valve in branch and distribution lines and must be regularly checked for corrosion.

VSH XPress Stainless VdS (G40800037)

The VSH XPress Stainless sprinkler system may be used in fixed wet and dry sprinkler installations in accordance with the VdS certificate for hazard classes LH to OH3 and parts of OH4 (exhibition halls, cinemas, theatres, concert halls). The certificate applies to sizes DN20 to DN100 (22-108 mm) with an operating pressure as set out in the table on page 45. The VSH XPress Stainless fittings are manufactured from material No. 1.4404 (AISI 316L) stainless steel. The tubes are manufactured from stainless 1.4401 (AISI 316). The use is limited to areas after the alarm valve.

FM certificate

VSH XPress Stainless

The VSH XPress Stainless sprinkler system has a FM certificate for fittings and tubes in accordance with FM standards 1630 and 1920 for use in wet sprinkler installations with a maximum operating pressure of 175 psi (12.1 bar). The certificate applies to VSH XPress Stainless in sizes DN20 to DN100 (22-108 mm). In accordance with FM the system is certified for use with VSH SudoXPress Stainless tubes with material No. 1.4401 (AISI 316) and 1.4521 (AISI 444).
In accordance with the FM certificate, no limitations apply to VSH XPress Stainless regarding the hazard classes.

mounting and installation

The mounting and installation of VSH XPress sprinkler systems may only be carried out by trained and qualified technicians. If there is a transition from traditional thick-walled tubes to the VSH XPress sprinkler system in sizes DN20 to DN100 (22-108 mm), it is necessary to use a press to groove transition coupling (product group C1442 and R2748).

DN	External diameter (mm)	Insertion depth (mm)
25	28	46
32	35	52
40	42	60
50	54	70
65	76.1	54
80	88.9	64
100	108	74

Minimum insertion depth of press to groove couplings

Where a press to groove coupling is installed, the entire insertion depth of the fitting must be used. The minimum insertion depth of these fittings can be found in the table above.

LPCB certificate

With the exception of installations where the correct transition coupling for ISO65 or EN10255 pipe systems is used, the VSH XPress sprinkler system components must not be used with other press pipe systems. The connection of non-system components is only approved where this occurs by means of a connection that can be mechanically removed. It is not permitted to add additives to the extinguisher water unless dispensation has been granted in consultation with Aalberts integrated piping systems. Painting of the installation is permitted as long as this takes place after the connections have been pressed and the paint is water-based.

VSH XPress Carbon

The VSH XPress Carbon sprinkler system has an LPCB certificate for fittings and tubes in accordance with LPCB standards (TS1599 draft 5) for use in wet above ground sprinkler installations with a maximum operating pressure of 16 bar for sizes DN20 to DN50 (22-54 mm and for hazard classes LH to OH3).
In accordance with LPCB, the system is certified for use with VSH XPress Carbon sprinkler Sendzimir tubes. Where VSH XPress Carbon sprinkler is connected to the potable water network, it is necessary to make sure that a potable-water-approved (Kiwa, WRAS) backflow preventer is used. Installations built with VSH XPress Carbon sprinkler must be checked regularly for corrosion.

VSH XPress Stainless

The VSH XPress Stainless sprinkler system has an LPCB certificate for fittings and tubes in accordance with LPCB standards (TS1599 draft 5) for use in wet above ground sprinkler installations with a maximum operating pressure of 16 bar for sizes DN20 to DN50 (22-54 mm and for hazard classes LH to OH3). The use of VSH XPress Stainless sprinkler is permitted in embedded sprinkler lines. In accordance with LPCB, the system is certified for use with VSH XPress stainless steel tubes with material No. 1.4401 (AISI 316) and 1.4521 (AISI 444). VSH XPress Stainless sprinkler is Kiwa/WRAS approved (when installed with a 1.4401 tube).

mounting and installation

The mounting, installation and maintenance of the VSH XPress sprinkler system may only be carried out by trained and qualified technicians. For example, the guideline “LPC Rules for Automatic Sprinkler installation”, in which EN12845 is incorporated, provides requirements for the mounting and maintenance of a sprinkler installation. The installation firm must follow these guidelines at all times. When installing a VSH XPress sprinkler system, you must ensure that sufficient measures are taken for wall penetration (conforming the construction guidelines and the LPC Sprinkler standards).

When using VSH XPress Stainless for embedded systems, no specific limitations apply to the use of insulation material other than those that are set out in the VSH XPress technical manual. During installation you should take into account that there are no empty spaces between the tube and the concrete. It's very important that the concrete contains no chlorides or other substances that can have a negative influence on the stainless steel. The pressure test must be carried out before the pipes are covered in concrete. All problems that are observed, such as continued deformation, rupture or leakage, must be solved. The pressure test must then be carried out again.

threaded fittings

The VSH XPress product range also includes male and female threaded fittings. VSH XPress Stainless, Carbon and Sprinkler ML fittings with inner and outer threads are manufactured in accordance with DIN 2999/ISO 7/1. Hemp or other chloride-free sealants are suitable for the threads of VSH XPress Stainless fittings. PTFE sealing tape may not be used in conjunction with stainless steel due to the water-soluble chloride ions it contains. With threaded couplings, we recommend that the sealing be carried out before pressing, so as not to stress the press connection.

markings

VSH XPress Stainless fittings

marking	packaging label
VSH XPress green ring or sticker 316L approvals dimension	type R..... dimension description EAN no. art. no. approvals quantity

VSH XPress Carbon fittings

marking	packaging label
VSH XPress red ring or sticker galvanized approvals dimension	type C..... dimension description EAN no. art. no. approvals quantity

o-rings

The standard fittings are fitted with EPDM o-rings. The type of o-ring which has to be used depends on the application and the medium.

EPDM ‘leak before pressed’ (LBP) - black

temperature	applications
-35°C to +135°C	KTW recommended. For all installations for potable water and conditioned water, hot water, circulation tubes, fire mains, etc. Suitable for VSH XPress Carbon, Stainless up to 54 mm.

EPDM - black

temperature	applications
-35°C to +135°C	KTW recommended. For all installations for potable water and conditioned water, hot water, circulation tubes, fire mains, etc. Suitable for VSH XPress Carbon, Stainless larger than 54 mm.

Leak Before Pressed function

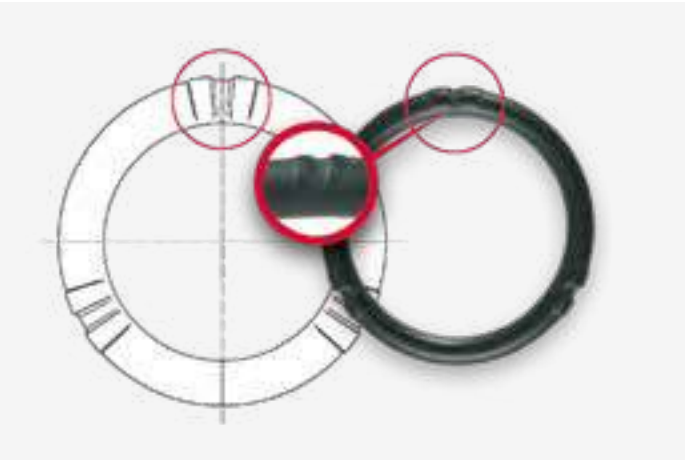
VSH XPress Stainless and Carbon fittings are delivered with a Leak Before Pressed function (LBP) for all dimensions. Fittings with a Leak Before Pressed function have the advantage that connections that have not been pressed will leak water during pressure testing. This means that an incomplete press connection can easily be identified. If correctly assembled, the press fittings will be water and air tight after being pressed.

advantages Leak Before Pressed

- additional safety: (installation) mistakes are prevented, as it will leak until pressed.
- easy: easy to recognize non pressed connections because of guaranteed water leakage during pressure test.
- warranty: guaranteed watertight and airtight once the fitting has been pressed.
- strength: extra material for leak function results in a strong o-ring in contrast to solutions where material is removed.

how the VSH XPress Carbon and Stainless LBP o-rings (22-54 mm) works

The design of the VSH XPress LBP o-ring is based upon the creation of a leak path on the o-ring itself. Small grooves have been created at 3 strategic points on the surface of the o-ring by adding additional material. This results in an exceptionally strong o-ring without any weak points.



A pair of small bumps on the surface of the o-ring create a small opening where water will flow through as long as the fitting is not pressed. When pressure is increased, the fitting will start to leak. When pressed, the o-ring is deformed and, as a result, the rubber from the raised surfaces fills the gaps between them. This creates a fully watertight and airtight connection.

how the VSH XPress Carbon and Stainless LBP function (76.1-108 mm) works

The use of the LBP-o-rings for these dimensions is based on the tolerance between the diameter of the o-rings and the inner diameter of the fitting, which will cause the fitting to leak as long as it has not been pressed.

dry risers

A dry riser acts as an aid to extinguishing for the fire brigade in bridging large horizontal and vertical distances. With a dry riser the number of fire hoses that need to be linked together is reduced, as a result, the fire brigade can be in a position more rapidly to begin fighting the fire in the upper floors of a building.

In accordance with the Building Code of 2003, a dry riser is required where the uppermost floor in a building is more than 20 metres above ground level. In addition, the number of dry risers is determined by the walking distance between the fire hose connection on a dry riser and the entrance to sub-fire compartments and smoke compartments in both residential accommodation and utility buildings. (Low-pressure) dry risers are required in both new constructions and in existing buildings and must be implemented in accordance with NEN 1594.

low-pressure dry risers

The common diameter for installing a low-pressure dry riser is 3” (88.9 mm). For a low-pressure dry riser installed according to NEN 1594, the static pressure and water flow rate required where two fire hose connections are in use at the same time is at least 500 kPa (5 bar) and 0.01 m^3/s (10 l/s) respectively. A static pressure at the connection point of 1,400 kPa (14 bar) applies in this instance. Requirements for pressure resistance, fireproof pipelines, couplings, fire hoses and mains connections are set down in NEN 1594.

A fire hose connection must consist of a valve, which is fitted with a fixed pressure coupling without a ring seal with a 2.5” female thread that is designed for connection to a fire hose. When using low-pressure dry risers, the connection for the fire hose to the pipe system is usually situated using Storz couplings. Each connection point is fitted with a valve.

Except where the water transport is arranged over longer distances, a great amount of equipment needs to be installed to bring water to the fire. In this case expect an emergency crate that is provided with four 2” hoses, three nozzles and one manifold with a total weight of about 60 kg. Except when raising equipment, before the water can be attached to the dry riser it is necessary to ensure that all of the valves are closed. This means in practice that all of the valves need to be checked on each floor. Water extraction needs to be built beforehand. Only afterwards can a fire be fought with low pressure. It is a method of extinguishing that costs a lot of time and causes quite a lot of water damage.

high-pressure dry risers

In collaboration with the fire service and Oetiker, Aalberts integrated piping systems has developed a system for high-pressure dry risers in buildings. The VSH XPress sprinkler connections for high-pressure dry risers are also certified by Kiwa and make up a complete piping system with couplings, valves and hoses, designed for operating pressures up to 40 bar. Use of the VSH XPress sprinkler high-pressure dry riser system delivers important advantages for the fire service, building owner and installer.

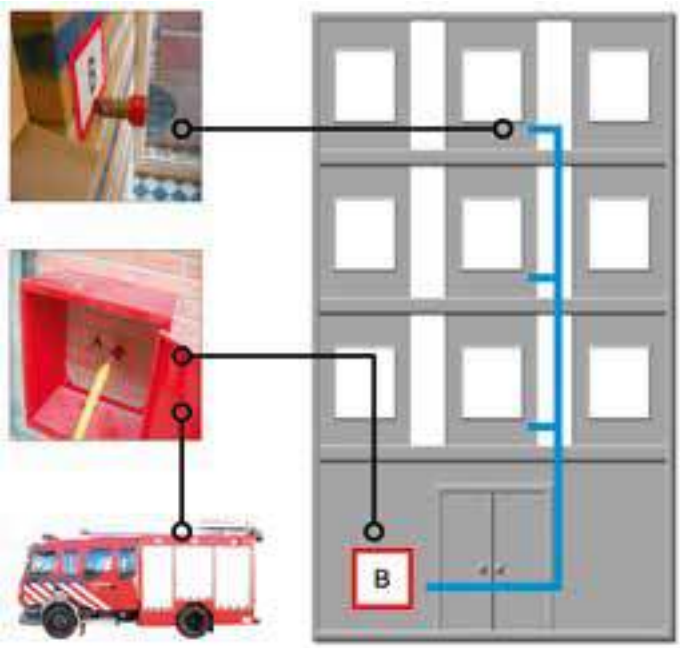
advantages for the fire service:

- very fast water delivery
- swing couplings with fast under pressure connection and disconnection
- no time loss with checking the valves
- no communicating neede with with pump operator
- no heavy emergency crate needed

advantages for the building owner/end user:
- much lower potential water damage as less water is used
- less construction costs
- thinner tubes that are easier to embed
- aesthetic appearance, no reconstruction needed

advantages for the installer:
- faster, cleaner and cheaper installation
- no fire-hazardous work
- always watertight
- great flexibility due to the thin tubes and lower weight

The high-pressure dry riser system is comprised of VSH XPress stainless steel fittings and tubes, together with the hose connector, swing coupling and the matching light-weight fire hose.



With the VSH XPress high-pressure dry riser, the water connection is made up of a hose connector with a threaded connection.

The fire hose connection on the tap point is a swing coupling, which is also connected with a threaded connection to the VSH XPress system. With a 20 or 30 metres long high-pressure fire hose, which is fitted with a hose connector on one end and a swing coupling at the nozzle end, this can be coupled to the to the fire hose connection and the fire extinguishing can begin immediately.

The high-pressure dry riser consists of VSH XPress Stainless fittings in combination with stainless steel tubes. The dimensions that Aalberts integrated piping systems approves in stainless steel to use with high-pressure dry risers are diameters 22 to 35 mm. The maximum approved operating pressure is 40 bar.

The use of a high-pressure dry riser is particularly intended for applications where extra fire protection from the fire service is desired, but in instances where the application does not come directly under NEN 1594. In this case one should, for example, consider buildings that are difficult to access. The installation of a high-pressure dry riser in a building is only possible if the fire service vehicles are fitted with the correct equipment for a high-pressure dry riser. In this case one should consider the swing coupling connection on the water tender and the correct hoses with a hose connector and a swing coupling.

A number of fire brigades in the Netherlands have now equipped their vehicles in such a way that high-pressure dry risers can be installed, such as the communities/regions of Amersfoort, Oost-Gelre, Zutphen, Leerdam, Maarssen, Arnhem and Zwolle.

With traditional connection techniques the products that are used in the risers are often certified as a separate product. The VSH XPress range is a complete certified system comprised of the following parts:
- VSH XPress Stainless fittings 22-35 mm
- VSH SudoXPress Stainless tubes 22-35 mm
- swing couplings (from RTC - previously Oetiker)
- hose connectors (from RTC - previously Oetiker)
- high-pressure fire hoses

The VSH XPress fittings and stainless steel tubes designed for high-pressure dry risers are part of our complete range of VSH XPress tubes and fittings manufactured from galvanized steel and stainless steel, which we can provide in tube diameters from 12 to 108 mm for use in potable water, heating, compressed air, refrigeration, industrial and sprinkler installations.

To use VSH XPress stainless steel tubes for a high-pressure dry riser you must use press tools, such as those that are specified for use in our VdS certificate and and on our website using the tool selector www.aalberts-ips.eu/tool-selector.

brackets

For the maximum distances between brackets for VSH XPress stainless steel in high-pressure dry risers, the following bracket distances apply: For a pipe diameter smaller than or equal to DN32, the maximum distance between clamps is 2 metres. All clamps must be of the so-called 'fixed' type and must have a VdS or FM approval and be designed for use with stainless steel (for example, they must be fitted with an approved rubber inlay).

supply and drainage connections

drain connection

The drain connections must be located in such a way that the connected fire hoses do not obstruct the escape routes. Fire hose indicators must be shown clearly with the indicator as shown.

supply connection

Supply connections must be situated on the building façade. The locations of the high-pressure hose connector for the fire service must be such that the fire hose with a high-pressure fire service press coupling can be connected without obstruction. It is recommended that the supply connection be placed at a height between 500 mm and 1,000 mm above the surrounding area.

note

The standard lock, often in accordance with annex B of the NEN-EN 81-1, a recessed mounted barrel in the form of an equilateral triangle with a height of around 8 mm.

The case in which the supply connection is fitted must normally be able to be opened and closed with a standard key. The location of the pressure coupling for a supply connection must be such that unhindered use of the swing coupling for high-pressure and possibly a coupling key for low-pressure connections is possible.

swing coupling

The high-pressure dry riser is fitted with a swing coupling connection. The swing coupling is manufactured from nickel-plated brass with a polyurethane seal and aluminium roller. The maximum operating pressure is 40 bar.

advantages

- under pressure connection and disconnection
- light, compact and durable construction
- completely free flow through

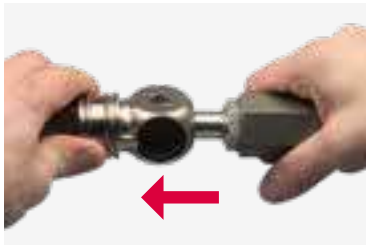
connection:

1. insert the hose connector into the swing coupling.

2. rotate approximately 90°

3. until the ring locks in place

disconnection:



1. pull back the disconnection ring

2. tilt the connector back to the stop. It can now be withdrawn from the coupling. To prevent dangerous backlash, hold the connector in place until the hose is fully depressurised. T

tubes

technical data for the RTC coupling series HB

specifications for the RTC series HB swing coupling	
housing material	nickel-plated brass
decoupling ring material	nickel-plated brass
threaded end material	nickel-plated brass
hose connector material	stainless steel 1.4305
sealing ring (inside the housing)	TPU thermoplastic polyurethane
DN/Ø	11 mm
temperature range	-15°C to 200°C
working pressure	max. 50 bar
safety requirements for hydraulic-pneumatic systems and components	ISO 4414, EN 983

maintenance

Strong contamination, incorrect use and external mechanical stress can have a negative impact on the coupling and shorten its operating life. Regular testing of the couplings and accessories for external wear, tightness and correct operation is advised. Depending on the operating environment, we recommend that you carry out a maintenance programme, in which the following is observed:

- regularly grease the couplings with a little low-viscosity silicon-free grease
- visually inspect the coupling-hose connector combination; if the coupling or the hose connector is contaminated, they must be cleaned

In the following situations, the coupling should be replaced:

- cracked, damaged, heavily contaminated or corroded parts and leakages in the couplings and hose connectors
- the replacement intervals for quick couplings must, where they are used, conform to the legal or technical standards. However, your experiences with regards to the safety requirements can also be taken into account, as a result of the environment of the installation.

The guarantee and responsibility of the manufacturer lapses in the event that you carry out your own repairs and replacements.

stainless steel tubes

VSH SudoXPress Stainless tubes are stainless steel precision tubes. The inner and outer surfaces of the tubes are blank, free of discolouration and are supplied free of manufacturing residue that could cause corrosion. The possibility of any dirt or dust getting into the tubes during transport or when stored is avoided by plastic protection caps on both ends of the tube. This section describes all technical information that is elevant when working with VSH SudoXPress Stainless tubes.

insulation

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

- cold water lines must be protected against condensation and overheating in accordance with DIN 1988, Part 200. For installations in the Netherlands, the ‘Water Work Sheets’ must be followed
- hot water lines must be insulated to prevent heat loss in accordance with the Energy-Conservation Act (EnEG). For installations in the Netherlands, the ‘Water Work Sheets’ must be followed
- the soluble chloride content in the insulation materials used must not exceed 0.05% by weight in accordance with DIN 1988, Part 7

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

fire characteristics

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, for example, they comply 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 EN806 and DIN 1988
- water supply and rainwater installations
- potable water for industrial applications
- for fire fighting and fire protection installations in accordance with DIN 1988-600, SVGW W3
- wet and dry sprinkler installations in accordance with VdS, FG, LPCB, CNBOP, SBSC and FM
- conditioned water, such as decalcinated/softened water, partially and completely desalinated water, distilled water, water with glycol
- compressed air

technical characteristics	
material	X5CrNiMo 17 12 2 material no. 1.4401 in accordance with EN 10088-2
specifications	EN 10312 – DVGW GW541
approvals	DVGW, SVGW, ETA, ÖVGW, SINTEF, STF, KIWA, PZH, SITAC, QB, WRAS, VdS, FM, FG, CNBOP, SBSC, SETSCO, LPCB, DNV-GL, RINA, 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 colour	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 XXX-2097_V1 LPCB VdS G4080037 [operation pressure LPCB/VdS] bar <FM> [operation pressure FM] psi KK NDE ATG 3057 [batch number or production date], [supplier code] [model designation, repeated every 60 cm]
smallest bend radius	3.5 x external tube diameter (max. 28 mm)
delivery	tubes, length 6 m +0/-50 mm, with protective caps (dark green)
heat expansion coefficient	0.0160 mm/m at ΔT= 1K
max. working pressure	16 bar

DN	outside Ø x s [mm]	inside Ø [mm]	weight [kg/m]	capacity [l/m]
20	22 x 1.2	19.6	0,624	0.302
25	28 x 1.2	25.6	0,805	0.515
32	35 x 1.5	32	1,258	0.804
40	42 x 1.5	39	1,521	1.195
50	54 x 1.5	51	1,972	2.043
65	76.1 x 2.0	72.1	3,71	4.548
80	88.9 x 2.0	84.9	4,351	5.661
100	108 x 2.0	104	5,308	8.495

dimensions, weight and capacity

VSH SudoXPress Stainless tube 1.4521 (AISI 444)

The 1.4521 VSH SudoXPress Stainless tube has 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 EN806 and DIN 1988
- water supply and rainwater installations
- potable water for industrial applications
- for fire fighting and fire protection installations in accordance with DIN 1988-600, SVGW W3
- wet and dry sprinkler installations in accordance with DIN 14462
- 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 EN 10088-2
specifications	EN 10312 – DVGW GW541
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 colour	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 XXX-2097_V1 Tectite 316 ATG 3057 [batch number or production date] [supplier code] [model designation, repeated every 60 cm]
smallest bend radius	3.5 x external tube diameter (max. 28 mm)
delivery	tubes, length 6 m +0/-50 mm, with protective caps (light green)
heat expansion coefficient	0.0104 mm/m at ΔT= 1K
max. working pressure	16 bar

DN	outside Ø x s [mm]	inside Ø [mm]	weight [kg/m]	capacity [l/m]
20	22 x 1.2	19.6	0,624	0.302
25	28 x 1.2	25.6	0,805	0.515
32	35 x 1.5	32	1,258	0.804
40	42 x 1.5	39	1,521	1.195
50	54 x 1.5	51	1,972	2.043

dimensions, weight and capacity

carbon steel tubes

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.

The VSH SudoXPress Carbon tubes for sprinkler applications are made from cold rolled steel, which is galvanized using the Sendzimir process.

insulation

The following must be observed when insulating VSH SudoXPress Carbon piping systems:

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

fire characteristics

VSH SudoXPress Stainless tubes are considered as non-combustible tubes class A1 according to EN 13501-1.

VSH XPress Carbon sprinkler tube

The VSH XPress Carbon sprinkler tubes for wet sprinkler systems are precision tubes made from cold rolled steel, galvanized using the Sendzimir process which guarantees good adhesion of the zinc layer and high corrosion resistance. In this process, the metal strip is simultaneously coated on both sides in a zinc bath. The tube is protected on both the inside and outside with a zinc layer with a thickness of 15-27 µm (275 g/m^2). After welding, the welding seam is then zinc-plated.

applications

- wet fixed sprinkler installations in accordance with DIN 1988, Part 6, VdS, LPCB, SBSC and CNBOP
- compressed air
- shipbuilding

technical characteristics	
material	non-alloyed ULC ('Ultra Light Carbon') carbon steel, E190 mat. no. 1.0031 in accordance with EN 10305-3
specifications	EN 10305-3 (formerly DIN 2394)
approvals	VdS, LPCB, CNBOP, SETSCO, SBSC, DNV-GL, LR, 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. raise 0.5 mm, >54 mm 0.8 mm
tolerances	in accordance with EN10305-3
finish	zinc coating of 15-27µm (275g/m^2). The tube welding seam is subsequently galvanized on the outside.
surface colour	matt silver
marking	XPress Sprinkler galvanized DN [dimension x wall thickness LPCB VdS G4080007 [operational pressure VdS/LPCB] bar psi NDE [batch number or production date] [supplier code] [model designation, repeated every 60 cm]
smallest bend radius	3.5 x external diameter of the tube (max. 28 mm)
delivery	tubes, length 6 m +0/-50 mm, with protective caps (Lilac)
heat expansion coefficient	0.0108 mm/m at ΔT= 1K
max. working pressure	16 bar

DN	outside Ø x s [mm]	inside Ø [mm]	weight [kg/m]	capacity [l/m]
20	22 x 1.5	19	0.761	0.284
25	28 x 1.5	25	0.98	0.491
32	35 x 1.5	32	1.241	0.804
40	42 x 1.5	39	1.542	1.195
50	54 x 1.5	51	1.999	2.043
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	5.382	8.495

dimensions, weight and capacity

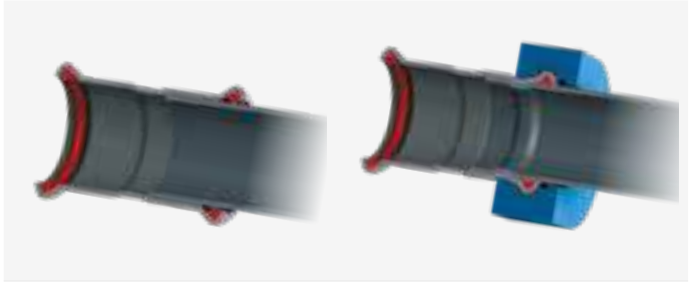
press tools

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

All VSH XPress fittings with diameter from 22 to 108 mm can be pressed using the appropriate press tools listed in our product range. Please use the M-profile jaws or slings that correspond to the diameter to be installed. A special adapter may also be required for diameters of 35 to 108 mm, in addition to the press slings.

note
VSH XPress fittings for sprinkler applications may only be pressed with press jaws and slings stated in the certificate or found in our tool selector:
www.aalberts-ips.eu/tool-selector

The illustrations show a cross-section of the press profile before and after pressing.



before pressing *after pressing*

approved press tools

All approved press tools to fit the right product are found in our online tool selector, available on our website:
www.aalberts-ips.eu/tool-selector

maintenance and correct usage

Correct pressing is guaranteed when the press tools are used correctly. Regular maintenance and lubrication of the press jaws, slings and tools are necessary. Please take notice of the manufacturer's instructions for usage and maintenance.

note

care must be taken to avoid any contact between lubricant and o-rings. Badly maintained and/or damaged press jaws pose a potential risk. Damaged jaws can damage the fittings, leaving metal particles behind in the jaw as a result. If the same jaw is then used to press a stainless steel fitting, these metal particles will be pressed into the fitting, which could lead to pitting corrosion. Therefore, always make sure that press jaws and slings are properly cleaned when switching between materials.

installation guidelines

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.

VSH SudoXPress Carbon tubes with PP coating

To ensure the safe connection of a press fitting, the tube's PP coating must be removed up to the insertion depth using a stripper before assembling the press fitting.

2. deburring the tube

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 press fitting. Deburring the inside of tubes prevents pitting and corrosion. A hand deburrer suitable for the material or an electrical tube deburrer may be used for both inside and outside of the tube. Burrs sticking to the tube must be removed.

3. calibration

Always ensure the tube ends are cut off radially and rounded off evenly. The tube ends must be calibrated before pressing.

4. marking insertion depth

The required insertion depth (see table page 59) must be marked on the tube or the press fitting (the latter for fittings with tube ends) in order to guarantee a safe and proper joint. VSH XPress Carbon and Stainless Steel 12-54 mm fittings with male end, already have the required insertion depth marked on them, which makes any manual marking unnecessary. Mark the insertion depth using the insertion depth marker for VSH XPress.

Reliable pressing with the corresponding tensile strengths can only be achieved if the elements are correctly installed. The pressing operation behind the bead is of crucial importance for the tensile strength. The marking on the tube must remain visible (but as close as possible to the fitting) to identify any movement before or after pressing.

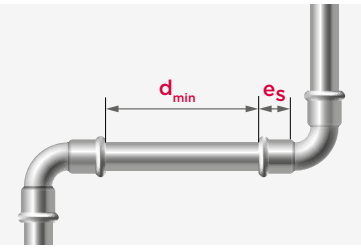
5. check the fitting and tube

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

6. assembly of fitting and tube

Insert the tube carefully into the fitting up to the marked insertion depth, simultaneously rotating and pushing it in the direction of the axis. The insertion depth marking must remain visible. In 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. Under no circumstances oils, fats or grease may be used as lubricants.



To optimize installation, time may be saved by assembling a number of connections first and then pressing the various connections one by one afterwards. Marking the distance (e_S) provides a check that the tube has not been pushed out of the fitting during pressing. Before starting the final pressing process of the various connections, it is also important to check the minimum required installation distances (see table).

	insertion depth		minimum distance	minimum tube length	
	e_S [mm]		d_{min} [mm]	2x e_S + d_{min} [mm]	
Ø [mm]	VSH XPress Stainless	VSH XPress Carbon	VSH XPress Stainless / Carbon	VSH XPress Stainless	VSH XPress Carbon
22	21	21	10	52	52
28	23	23	10	56	56
35	26	26	10	62	62
42	30	30	20	80	80
54	35	35	20	90	90
76.1	55	55	55	165	165
88.9	63	63	65	191	191
108	77	77	80	234	234

minimum distances between pressings

The table below gives the minimum required installation space so that pressing can be carried out correctly using the appropriate press tools. These distances relate to the general installation configurations that are schematically depicted in figures 1, 2 and 3.

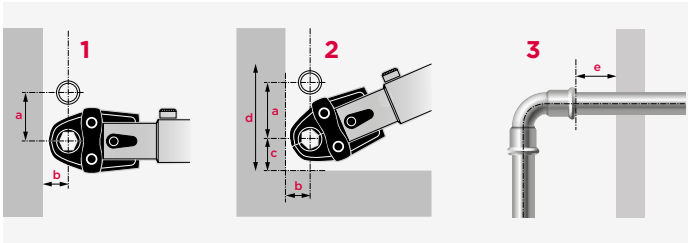


	fig. 1		fig. 2				fig. 3
outside [Ø mm]	a	b	a	b	c	d	e (tube depth) [mm]
22	65	25	80	31	35	150	40
28	75	25	80	31	35	150	60
35	75	30	80	31	44	170	70
42	140/115*	60/75*	140/115*	60/75*	75	265	70
54	140/120*	60/85*	140/120*	60/85*	85	290	70
76.1	140*	110*	165*	115*	115	395	80
88.9	150*	120*	185*	125*	125	435	90
108	170*	140*	200*	135*	135	470	100

minimal needed installation space (slings)*

7. pressing

Before pressing, the press jaws and slings must be checked for dirt, which must be removed if present. Furthermore, the press machine must be in good condition and the manufacturer's instructions for operating the device, maintenance must be observed. Also make sure that the correct press jaws and slings for the application are used. In order to create a correctly pressed connection, the groove of the press tool must enclose the press fitting o-ring bead. Once pressing has started, always complete the press cycle and under no circumstances interrupt the process. All the approved machines, press jaws and slings to fit the right product are available in our online tool selector on our website: www.aalberts-ips.eu/tool-selector

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

bending tubes

It may be necessary to bend a tube in order to carry out the installation. Manual, hydraulic or electrical-operated pipe benders with the corresponding bend formers can be used for this. The tube manufacturer will determine the suitability of the bending tool. VSH XPress Stainless and Carbon tubes may be bent cold, in accordance with DIN EN 1057.
The tube may not be bent when warm due to the danger of corrosion.

The smallest bending radius is as follows:

stainless steel (12 - 28 mm)	r_{min} = 3.5 x d
carbon steel (12 - 28 mm)	r_{min} = 3.5 x d

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

corrosive environments

A VSH XPress Stainless sprinkler system is the right solution for sprinkler installations in aggressive environmental conditions, such as in a paper mill, or where high standards of hygiene are required, like pharmaceutical and food industries.
Combined with shipbuilding certificates as Germanische Lloyd, RINA, Lloyd's Register, Bureau Veritas and Det Norske Veritas, the VSH XPress Stainless sprinkler system is also the right solution for marine sprinkler installations.

putting the piping system into service

flushing the network

Before putting into servce, each piping system must be flushed and rinsed thoroughly so that any foreign matter is removed from the tube surface, so that contamination and corrosion is prevented. The system must be flushed as soon as possible after installation and pressure testing is done.
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. In that case, special care must be taken to ensure that no chlorides remain in the piping system. Always make sure to flush with clean potable water.

filling and deaerating the piping system

After the tubes have been cleaned, they must be filled with clean potable water and deaerated completely.

pressure test

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

important

When pressure testing an VSH XPress Carbon sprinkler system, make sure no water remains in the system afterwards, in order to avoid the risk of corrosion, unless the system is going to be put into service shortly afterwards.

pressure testing sprinkler piping systems

Sprinkler piping systems must be subjected to a pressure test in accordance with the applicable standards, such as CEA 4001, No. 17.1.1. (VdS) for at least two hours. A pressure (measured at the alarm valves) corresponding to 1.5 times the permitted positive operating pressure - but of at least 15 bar - must be maintained during the test. This pressure test is a check of both the strength and tightness of the system. Dry sprinkler systems must also be tested pneumatically to a pressure of not less than 2.5 bar for at least 24 hours. Any leakage, which occurs and results in a pressure drop of more than 0.15 bar over the 24 hours, must be corrected. Any faults identified, such as permanent deformations, ruptures or leakages must be corrected and the pressure test repeated.

general technical information

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 XPress stainless and carbon steel

If there is the need to perform these calculations, please consult the relevant specialized literature.

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]

		W90		W45		TA[b]		TD[b]		K		RED		W90	
Ø	DN	ζ	[m]	ζ	[m]	ζ	[m]	ζ	[m]	ζ	[m]	ζ	[m]	ζ	[m]
22	20	0.44	0.35	0.38	0.30	0.15	0.12	1.05	0.84	0.11	0.08	0.73	0.59	1.29	1.04
28	25	0.35	0.38	0.28	0.32	0.13	0.28	0.93	1.01	0.05	0.06	0.65	0.72	0.82	0.92
35	32	0.31	0.43	0.29	0.40	0.08	0.11	0.93	1.34	0.03	0.04	0.53	0.79	1.47	2.19
42	40	0.25	0.48	0.22	0.42	0.11	0.20	1.20	2.27	0.06	0.11	0.46	0.85	-	-
54	50	0.30	0.79	0.19	0.49	0.09	0.24	1.15	3.06	0.06	0.14	0.36	1.43	-	-
76.1	65	0.25	1.04	0.15	0.62	0.08	0.31	1.07	4.42	0.04	0.17	0.32	1.68	-	-
88.9	80	0.24	1.22	0.13	0.66	0.07	0.36	1.06	5.38	0.04	0.20	0.27	2.10	-	-
108	100	0.23	1.51	0.12	0.76	0.07	0.43	1.05	6.90	0.03	0.20	-	-	-	-

equivalent lengths and values of local pressure drops

brackets

Brackets must be fitted directly to the building walls or, where necessary to machines, storage areas or other structures and may not be used to support other installations. Pipe brackets must be adjustable to ensure an even weight distribution. Brackets must fully enclose the lines and may not be welded to the lines or attachments.

Headers and risers must be sufficiently anchored to resist axial forces. Bracket components shall not made of flammable materials. The use of nails is not permitted. Brackets for stainless steel pipes must be fitted with a suitable coating of sufficient electrical insulation to prevent contact corrosion (for example, a steel Munsen ring and/or clip with an elastomer or fabric insert). Ensure that the correct brackets for sprinkler applications are used, which are also suitable for external diameters of VSH XPress fittings, and that brackets are not mounted onto the fittings. Wherever a reducer is installed, a bracket must be placed next to the fitting on the larger tube diameter.

Depending on the system and certification used, which is applicable to fixed sprinkler systems, a range of distances between brackets will apply. For steel press systems in VdS sprinkler installations, the distance between the brackets is derived from the values for copper tubes. FM, LPCB and UL prescribe specific distances between brackets when using VSH XPress. Always follow any applicable local directives and make sure that the appropriate distance between the brackets is observed. It is important to always use the right brackets designed for sprinkler applications so that the external diameter and the material used are compatible with the VSH XPress system.

DN	external Ø [mm]	maximum distance between brackets [m]			
		CEA4001 (VdS)	NFPA13/FM	LPCB	DIN1988-200
20	22	2.0	3.66	2.5	2.00
25	28	2.0	3.66	2.5	2.25
32	35	2.0	3.66	3.5	2.75
40	42	2.0	3.66	3.5	3.00
50	54	2.0	3.66	3.5	3.50
65	76.1	2.0	3.66	-	4.25
80	88.9	2.0	3.66	-	4.75
100	108	2.0	3.66	-	5.00

distances between brackets for VSH SudoXPress tubes

extra notes:

- at a max. distance of 1 m of each connection
- at least 1 bracket for each pipe section
- the distance between the last sprinkler on a sprinkler line and a bracket may not be more than:
  - 0.9 m for DN25/28 mm diameter
  - 1.2 m for sizes larger than DN25/28 mm diameter
- extra brackets must be used on vertical pipes in the following cases:
  - Pipes longer than 2 m
  - Pipes longer than 1 m that feed a single sprinkler
- Pipes that are fitted at a low height or that are in some other way vulnerable to physical damage must be supported separately, except in the following cases:
  - Horizontal pipes shorter than 0.45 m that only feed one sprinkler
  - Risers or drop lines shorter than 0.6 m that only feed one sprinkler

mounting tubes

When securing the 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 placed and assembled correctly. Attachment points may only be fitted onto straight tube sections. Mounting directly onto fittings is not allowed.

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 XPress 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 technical bulletins.
The medium used for the pressure test with water must be of potable water quality (free of oil and other impurities) in order to avoid any contamination of the piping system. After being filled with pure, 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. This maximum test pressure also applies for gas piping systems.

pressure test of sprinkler systems

The tubes of a sprinkler piping system must undergo a pressure test in accordance with valid guidelines, such as CEA 4001, no. 17.1.1. (VdS) for at least two hours. A pressure corresponding to 1.5 times (measured at the alarm valves) the permitted positive operating pressure – but of at least 15 bar – must be maintained during the test. This pressure test is a check of both the strength and tightness of the system. The system must be monitored for 24 hours for any pressure drop due, for example, temperature changes. Dry sprinkler systems must also be tested pneumatically to a pressure not less than 2.5 bar for at least 24 hours. Any leakage, which occurs and results in a pressure drop of more than 0.15 bar over the 24 hours, must be corrected. Any faults identified, such as permanent deformations, ruptures or leakages must be corrected, and the pressure test must be repeated.

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.

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 XPress 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 XPress 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 DIN 1988).

Another important factor is the ratio between the surface of the noble metal and that of the less noble metal. The higher this ratio, the greater the corrosion rate may be. Therefore, recommended that you 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 and 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 XPress stainless fittings and 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 XPress 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. Pitting or stress 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 XPress Stainless components can only occur when wet potable water tubes come into contact with mortar, droplets or covering materials that contain or cause chlorides to be created. Ensure that the outer insulating layer of the 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 XPress Carbon tubes must, however, not be permanently exposed to moisture. VSH XPress 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 XPress Carbon fittings and 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.

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 XPress Stainless fittings and 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 stress corrosion can only occur if the chloride content of the water is significantly higher than the maximum level allowed under current regulations. VSH XPress Stainless components 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 XPress Stainless fittings and tubes are, however, not suitable for operation in dosing systems for e.g. disinfectants, which are added to the potable water. VSH XPress Stainless fittings and 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.

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 fittings 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) comes 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 a local chloride concentration; and
- if stainless steel piping systems (including cold water) comes into contact with chlorine gas, saltwater or brine or (oxygen-saturated) water with a high chlorine content.

If there is the danger of building materials coming into contact over a long period with highly chlorinated water, suitable corrosion protection must be used. VSH XPress 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 where an environment remains humid for longer periods. Only in case of sporadic short-term exposure to humidity, carbon steel will be resistant against corrosion for a longer period. VSH XPress Carbon connections must be protected in case of increased risk of corrosion due to electrolytic outer corrosion (or longer periods of humidity). A polypropylene coating offers carbon steel tubes 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 with a grinding tool 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 steel – carbon steel – 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 the case of 'closed cell insulation' (sealed watertight), which offers effective protection against corrosion. The installation instructions of the supplier of the insulation material must always be followed carefully. Remove dust, dirt, oil or water from the tubing prior to insulating.

The different sections of the insulation material must be carefully joined, taking care that no moisture or water can enter the material. Also take care that the water barrier of the insulation material is not damaged during installation, as moisture could otherwise penetrate under the insulation material.

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.

warranty

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

fire protection

VSH XPress Sprinkler ML

VSH XPress Sprinkler ML applications

The VSH XPress Sprinkler ML system consists of a multilayer tube and high grade plastic (PVDF) fittings. The system is certified by VdS as an embedded system for wet sprinkler installations in the dimensions DN25 up to DN50 (diameters 22 - 63 mm). The unique selling proposition about this system is, that it can be embedded in concrete without special protection (e.g. Denso tape). A special cup has been developed that can be installed into the concrete to create space for the embedded sprinkler and used for pressure testing the system. The cup can be removed and re-used.

The fittings and tubes of VSH XPress Sprinkler ML can be identified by the specific VdS marking on the tube and fitting. Depending on the systems piping diameter, it is suitable for a maximum operating pressure of 12,5 bar (diameter 32 and 40 mm) and 10 bar (50 and 63 mm). VSH XPress Sprinkler ML is perfect for high-rise buildings where the sprinkler piping system is embedded in the floor or ceiling. The system is also suitable for pre-fab installations.

the advantages VSH XPress Sprinkler ML

- simple, fast and safe connection technology
- resistant to be embedded in concrete
- insert depth control of tube in the fitting
- VdS Approval
- available in dimensions DN25 up to DN50 (32-63 mm)
- clear material and size identification
- BIM ready

sprinkler installations

VSH XPress Sprinkler ML fittings with VdS approved VSH XPress Sprinkler ML multilayer tubes.

o-rings:	EPDM (black)
operating temperature:	10°C to 49°C
operating pressure:	max. 12.5 bar (depending on dimensions)

VSH XPress Sprinkler ML has the following limitations under the VdS approval:

- an ambient temperature of +10°C to +49°C.
- only in combination with hanging sprinklers with a K-factor of 80 and a response temperature of 68°C.
- the system must be fed by filtered, potable water according to the DIN 2000 potable water standard applicable at that time, the European Drinking Water Directive 98/83/EC of 3 november 1998 on the quality of water intended for human consumption.
- no addition of chemicals before water treatment.
- main, dividing, ring and sprinkler connection pipes embedded in concrete.
- risers and open installations are not permitted.
- applicable to hazard classes LH and OH in accordance with CEA 4001.

VSH XPress Sprinkler ML is also suitable for use in wet sprinkler installations.

mains-fed sprinkler installations

VSH XPress Sprinkler ML fittings with VdS approved VSH XPress Sprinkler ML multilayer tubes.

o-rings:	EPDM (black)
operating temperature:	10°C to 49°C
operating pressure:	max. 12.5 bar (depending on the application and dimensions)

the objective of the sprinkler water piping system is - in case of fire - to deliver fast water in residential buildings in the Netherlands to save time. The sprinkler piping system can be made up of a hybrid system or a separate system. Installers who wish to utilise a water line sprinkler will first have to obtain a licence from Aalberts integrated piping systems to do so.

fittings

technical characteristics
VSH XPress Sprinkler ML fittings are manufactured from polyvinyl fluoride (PVDF) and are fitted with EPDM o-rings and stainless steel press connections.

markings

VSH XPress Stainless fittings

	marking	packaging label
	red marking VSH XPress dimension VdS	type ML..... dimension description EAN No. art. no. certificates quantity

inspection window

Any connection can simply be checked for the correct insertion depth and placement before pressing by means of the three inspection windows in the fitting.

approvals

VdS The sprinkler and marine applications for which VSH XPress Sprinkler ML fittings in dimensions 32 - 63 mm are currently VdS approved.

note

For these approvals a system approval is always issued: VSH XPress fitting, tube and too mm are fitted with a standard EPDM o-ring.

press tools

to connect the VSH XPress Sprinkler ML components, press tools are used. The tools prescribed for the VSH XPress Sprinkler ML series consist of a press tool and the jaws and slings that come with it. Depending on the tube diameter, the correct jaw and sling must be chosen to create a proper, tight connection.

Tools from Novopress and Klauke are approved in combination with the VSH XPress sprinkler system for sizes DN25 to DN50 (32-63 mm). Other tool brands are also approved when apply to the following specifications:

- piston pressure: max. 38 kN
- diameter: 15 mm
- lever: 40 mm
- electronic monitoring: none
- jaw closure control: none

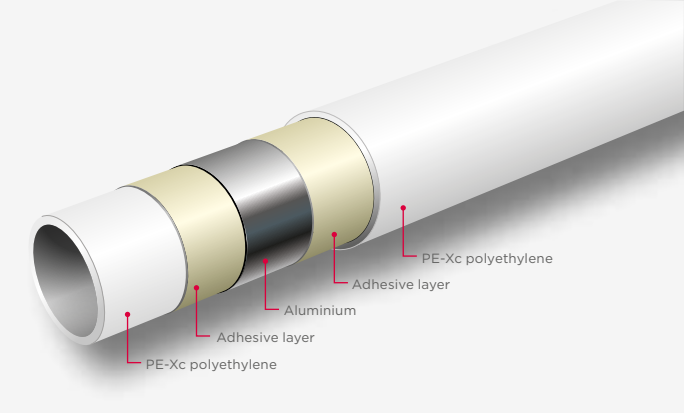
approved press tools
The most recent list of approved tools is available on our website www.vsh.eu/presstool

maintenance and correct usage of press tools
Correct pressing with the VSH XPress systems is guaranteed when the press tools listed in the tables above are used correctly. Regular maintenance and lubrication of the press jaws, slings and tools is necessary. Please observe the manufacturer‘s instructions for use and maintenance.
Poor maintenance and/or damaged press jaws pose a potential risk. Damaged jaws can damage the fittings, leaving metal particles behind in the jaw as a result. If the same jaw is then used to press a stainless steel fitting, these metal particles will be pressed into the fitting, which could lead to pitting and further corrosion. Therefore, always make sure that press jaws and slings are properly cleaned when switching between materials.

multilayer tube

composition

The VSH XPress Sprinkler ML multilayer tube is made up of an inner and outer layer of cross-linked PE-Xc polyethylene and a butt-welded aluminium core. These three basic layers are bonded by two adhesive layers to form a stable tube wall. Thanks to this wall construction, the advantages of the plastic (light weight and corrosion resistant) and the metal (high mechanical strength, 100% oxygen diffusion tight, low expansion coefficient and dimensionally stable) are ideally combined in one tube and the mechanical properties, temperature resistance and life span are improved considerably.



VSH XPress Sprinkler ML multilayer tube

The internal and external layers are produced from high-density polyethylene (HDPE) and then cross-linked by treatment with high-energy electrical currents. As a result of the cross-linking the natural strength of the polyethylene is greatly increased. This improves the pressure and temperature resistance of the tube, among other things. The tube complies with the standards for strength in potable water and sprinkler applications.

The aluminium tube ensures that the tube is absolutely oxygen tight and retains its shape. As the tube is butt welded lengthwise, the aluminium layer has a consistent thickness overall. The result is that the cross-linked synthetic outer layer, which is glued to the aluminium tube, has the same strength and thickness throughout. This provides the greatest advantage when pressing the fitting, because the pressure generated as a result is perfectly distributed throughout the tube. For each tube diameter the strength of the aluminium layer is dimensioned in such a way that the tube has lasting optimal flexibility and resistance to pressure.

DN	external Ø xs [mm]	internal Ø [mm]	wall thickness tolerance [mm]	aluminium layer thickness [mm]	weight [kg/m]	capacity [l/m]
DN 25	32 x 3.0	26	± 0.15	0.7	0.390	0.531
DN 32	40 x 3.5	33	± 0.15	0.7	0.528	0.855
DN 40	50 x 4.0	42	± 0.15	0.9	0.766	1.385
DN 50	63 x 4.5	54	± 0.15	1.2	1.155	2.29

technical characteristics VSH XPress Sprinkler ML tube

general instructions regarding tube transport and handling

- tubes must be transported with care and stored in the factory packaging and must be unpacked when they are used. The tube must be used within 5 years of being unpacked
- when opening the bundles, ensure that the tube is not damaged (do not use sharp items).
- protect the tube against direct sunlight and UV light. After the packing material is removed, the tube must be covered during storage and transport.
- always unroll a tube bundle with the tube end from the outside of the roll.
- tube with creases, bulges or damage may not be used in the installation.
- the tubes must be stored without any torsion and must be safeguarded from any distortion, contamination and/or damage.
- the tubes must be processed using VSH XPress Sprinkler ML tools.
- the tubes must be cut off square, calibrated and chamfered on both the inner and outer side in accordance with the instructions.
- avoid contact to the bare tube with sharp items during and after installation. In this way, for example, the lines that run through ceiling recesses are not bent around sharp edges due to the risk of buckling.
- tubes on which couplings have already been mounted may not be bent any further. If this installation technique is not possible, the tube should be held at the connection by hand.
- avoid tube damage after installation by other working activities taking place on site. To minimize damage risk, the tubes should be fitted with a corrugated tube or insulation.
- during installation, brackets, expansion lengths and expansion loops should be fitted as prescribed.

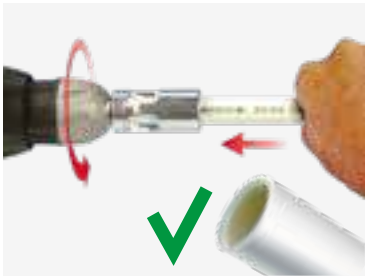
installation guidelines

making connections

Making a press connection is very easy, as the fitting and tube are very lightweight and the press tool carries out the press cycle automatically, whereby a perfect connection is made between the tube and the fitting. To obtain the perfect press connection, follow the steps set out below.

1. unpack the tube roll
Always cut the packaging on the tube rolls with a safe cutter and never, for example, with a knife.

2. cut the tube to length
Always cut the tube at an 90° angle. A tube cutter is the best tool for this job



3. calibration
A suitable calibration tool must be used for correct calibration. Centre the tube and make sure it is chamfered well on both the internal and external surfaces. Keep levelling off until the milling shavings are visible. With a calibration tool this happens in one turn by hand.

4. assembly of fitting and tube
Slide the calibrated tube as far as the stop in the fitting, so that the tube is fully visible in the control windows.

5. pressing
Open the press jaw. Place the fitting with the special guiding edge in the press sleeve in the slot of the press jaw. Close the press jaw and start the press tool to make the connection.

6. check the connection
After pressing, open the jaw and check if the tube end is still mounted at the stop using the control windows. The pressing leaves obvious marks on the sleeves which enables a rapid visual check for all connections that not have been pressed yet.

bending tubes

It may be necessary to bend a tube in order to carry out the installation. Manual, hydraulic or electrical-operated pipe benders with the corresponding bend formers can be used for this. The tube manufacturer will determine the suitability of the bending tool. The tube may not be bent when warm.

The smallest bending radius is as follows:

Sprinkler ML tube	32 mm	**r_{min} = 98 mm**
	40 mm	**r_{min} = 140 mm**
	50 mm	**r_{min} = 160 mm**
	63 mm	**r_{min} = 200 mm**

concrete embedding

concrete layer covering

The minimum dimensions for the concrete cover layer must be 60 mm on top and under the sprinkler line.

mounting the sprinkler installation

The sprinkler connection to be mounted (fitting, rubber seal and sprinkler cup) is attached to the wooden bulkhead with a screw. The tubes must be fastened by thread, brackets or clamps to the reinforcement of the concrete layer that is going to be poured in order to prevent sagging or bending.

note

There is a possibility that the piping system will be contaminated. Until the sprinkler cups are installed and the system is connected to the main supply line, the piping system must be protected against contamination.

general comments before embedding

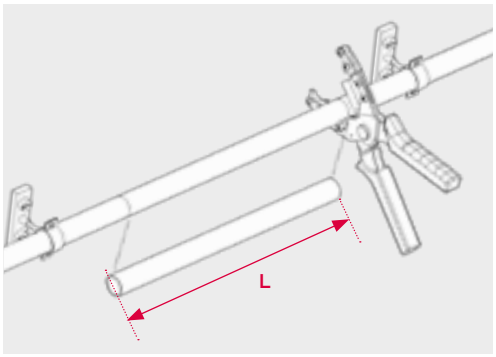
During installation, space must be kept free for the pressure testing equipment with formwork for example. Also, space must be kept free for the water mains connection to the sprinkler line. VdS compliance must be achieved before the concrete embedding starts (see annex 3 of the VdS certificate). This will be determined by VdS either during the installation proces or during the pressure test. Damage to the sprinkler installation can occur when the concrete is being poured. For that reason the sprinkler installation should be under pressure during the pouring of the concrete.

repairs to VSH XPress Sprinkler ML

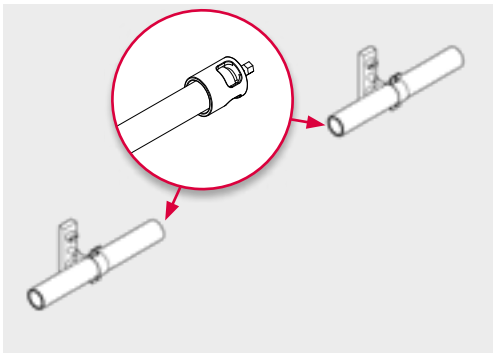
It is possible to carry out repairs on the installation. In that case it is important that the entire section of is replaced by a new tube section with two fittings. After the repair a pressure test must be carried out again.

carrying out a repair

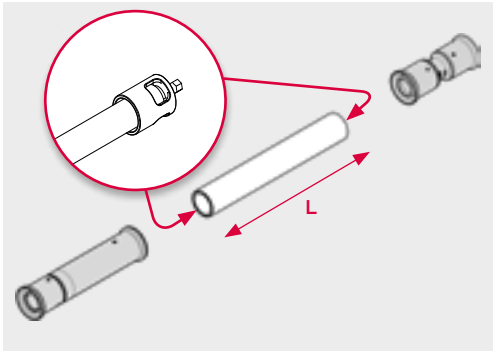
If tubees or fittings have been damaged after installation and embedding, they can be repaired using the repair couplings ML7103 and ML7103M. The procedure to follow is given below.



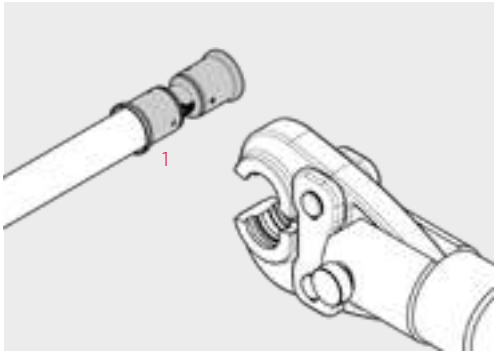
1. cut out tube section to repair and cut a similar length of repair tube (**L**)



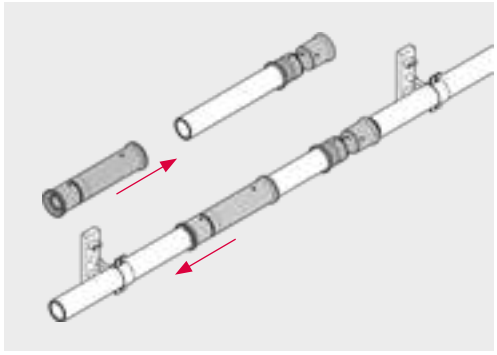
2. calibrate tube ends on piping system



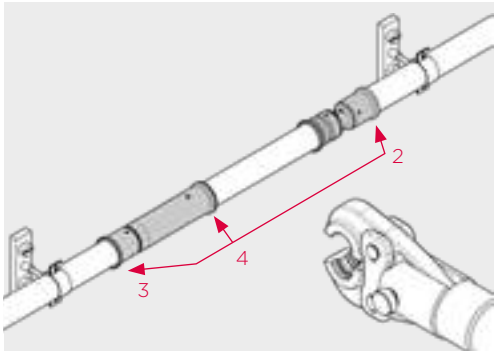
3. calibrate tube ends on repair tube (**L**)



4. assemble regular fitting onto repair tube (**L**). Press fitting (**1**)



5. assemble repair fitting on tube end. Assemble repair section into piping system



6. pressing. Numbers indicate the order of pressing

high temperature damage

Care must be taken in advance to ensure that the piping system is not exposed to extreme high temperatures during construction due to other on site activities (for example from bitumen welding, regular welding and solder works in direct proximity to unprotected tubes). Overexposure of high temperature can damage tubes, connections and equipment.

feeding through cutouts

Feeding tubes through cutouts must be avoided. In exceptional circumstances when this is not possible, care must be taken to ensure that the relative movements of the tubes have no damaging effect on the sprinklerpiping system, for example, by installing a steel protective pipe. This must be installed over a length of at least 1 metre centrally over the joint. To prevent concrete and water entering between the tube and the protective pipe, the pipe ends must be sealed off with waterproof tape.

insulation materials

No instability is known of in any of the recognised brands of insulation materials, both the environmental materials available on the market and those already in use respectively. However, the application of paint is not permitted.

connecting the VSH Sprinkler ML system to the fire extinguishing water supply (risers)

Connection to outside parts of the system is only approved when using removable metal connections. It is important that these connections remain easily accessible. After removing the protective parts from the sprinkler coupling, installation to the water supply (riser), the resulting space must be filled with protective material. This filling must conform to F90 (for example, quartz sand with a seal on the underside to prevent it falling through) and must cover all parts.

pressure loss

Every fluid that flows through a piping system experiences continuous and local flow resistances, known as pressure drops.

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. For VSH XPress Sprinkler ML, the following applies:

C = constant for type and condition of the tube
= 140 for VSH XPress Sprinkler ML

equivalent length method

The table provides the equivalent lengths applicable to VSH XPress Sprinkler ML.

equivalent length method [m]

		W90	W45	K	RED	TA[b]	TA[b]	TA[b]
								
OD	DN	[m]	[m]	[m]	[m]	[m]	[m]	[m]
32	25	2.4	1.1	0.6	0.6	0.7	2.3	2.3
40	32	3.1	1.3	0.6	1.0	0.8	2.8	2.8
50	40	3.9	1.5	0.7	1.3	0.9	4.4	4.2
63	50	5.0	1.8	1.0	1.6	1.0	5.7	5.4

equivalent lengths for VSH XPress Sprinkler ML tube

putting the system into service

flushing and rinsing

After the installation is completed the installation must be rinsed with filtered potable water. This is necessary to prevent contamination and to ensure that the system operates correctly. After rinsing the installation must be drained. The sprinklers can be attached after all of the rinsing equipment (plugs etc.) is removed. After that the system must be filled with filtered potable water and completely deaerated.

pressure test

The sprinkler piping system must be subjected to a pressure test in accordance with applicable guidelines, such as CEA 4001, No. 17.1. (VdS), for at least two hours. During the test a pressure (as measured at the alarm valves) of 1.5 times the permitted positive operating pressure – at least 15 bar – must be maintained. The strength and tightness of the system is checked with this test. The pressure drop, for example due to temperature variations, must be tested for 24 hours. All faults that are observed, such as continued deformation, rupture or leakage, must be remedied. The pressure test must then be carried out again.

designing VSH XPress Sprinkler ML installations

Sprinkler installations must be designed and installed in accordance with CEA 4001 (VdS) guidelines and/or local regulations. The following steps must be carried out: planning, installation, maintenance.

All bodies that have been involved in the last test before commissioning the system must take part in the entire process from project planning to delivery. Depending on the approvals, a range of different operating pressures is permitted. The table below provides the approved pressures, where the installation is in accordance with VdS.

VSH XPress Sprinkler ML operating pressures

DN	external Ø [mm]	pressure [bar]
25	32	12.5
32	40	12.5
40	50	10
50	63	10

operating pressures for Sprinkler ML

VSH XPress Sprinkler ML VdS certificate

VdS is a system approval which provides that the certificate is only valid when all VSH XPress Sprinkler ML system components are used together:

- VSH XPress Sprinkler ML fittings
- VSH XPress Sprinkler ML multilayer tube (PE-Xc/AL/PE-Xc)
- VSH XPress Sprinkler ML tools

VSH XPress Sprinkler ML

The VdS certificate for the VSH XPress Sprinkler ML system was received in 2011. The certificate is valid for wet sprinkler installations with a diameter of Ø32 and Ø40 mm with a maximum operating pressure of 12.5 bar. For diameters of 50 and 60 mm, a maximum operating pressure of 10 bar applies. The VSH XPress Sprinkler ML system can be used in accordance with the VdS certificate in fixed wet sprinkler installations for hazard classes LH to OH3.

The VSH XPress Sprinkler ML system has been tested and certified in accordance with VdS guidelines for synthetic materials used in fixed sprinkler systems with sprinklers with a K-factor of 80, as set out in annex 3 of the certificate. For installations certified by VdS, VSH XPress Sprinkler ML is approved for branch and distribution lines. This applies to the mutual connection of parts of the VSH XPress Sprinkler ML system. Connection to other components than the VSH XPress Sprinkler ML system is only possible with dismountable metal connections. It is important that these connections are easy to access, for example through establishing a transition space in a sand box, so that the fire protection is maintained at this transition spot.

mounting and installation

The mounting and installation of the VSH XPress Sprinkler ML system may only be carried out by trained specialists, who are qualified for work on sprinkler installations. The CEA4001 (VdS) guideline contains, for example, the requirements for the mounting of fixed sprinkler installations.

fire protection

VSH PowerPress®

VSH PowerPress®

The VSH PowerPress® product range is a press system designed for thick wall carbon steel pipes according to the EN 10255, EN 10220 (EN 10216-1 and EN 10217-1) and ASTMA53, A106, A135, A795 (schedule 10 to 40) standards. Using the VSH PowerPress® system significantly reduces installation times and ensures a clean working environment.

the advantages of VSH PowerPress®

- complete range of fittings and valves from ½" to 2"
- Visu-Control® ring: visual press indicator
- Leak Before Press (LBP) function
- simple, fast connection technology
- clear identification of material and dimensions
- professional press tools

The VSH PowerPress® system offers installers a complete solution with high flexibility. The VSH PowerPress® consists of fittings, valves and tools and can be used on standard carbon steel pipes. VSH PowerPress® fittings can be installed with various press tool brands.

performance guaranteed

VSH PowerPress® products are produced using specially developed, ultra-modern machinery, which enables VSH to guarantee a consistent supply and quality. The completely automated factory supplies safe, high-quality products. All welded products undergo a 'leak test' to avoid any problems after installation. All straight connectors with a threaded end are made from a single piece so there is no risk of leakage on the weld and the installation measurements are compact.

reliable

With the VSH PowerPress® the quality of the joint is primarily determined by the tool and not by the installer. This reduces the risk of installation errors considerably. All fittings are delivered with an LBP function. As a result, the risk of errors during installation is further reduced. This LBP function ensures that fittings, which have not been pressed, will leak during the initial pressure test. The installer can see immediately which fitting has not yet been pressed.

high-tech production location for VSH PowerPress®

In addition to the LBP function, all fittings are equipped with a patented Visu-Control® ring. During pressing, the Visu-Control® ring will snap from the fitting, immediately showing which fitting has been pressed. This eliminates the need to check already pressed fittings afterwards, which offers additional safety and saves time.

cheaper

This connection technology is easy, fast and highly cost effective. As the connection is achieved using press tools alone, no other materials, such as gases, adhesives, threading machines, etc. need to be purchased or hired.

easy and clean

Compared to other 'cold' connection methods, VSH PowerPress® is an extremely user-friendly solution:

- the use of VSH PowerPress® dispenses with the need for complicated clamping techniques, time-consuming preparations and drying time, making installation faster and cleaner.
- no need to thread the pipes.
- no lubrication needed for installation.
- easy insertion of the pipe into the fitting due to the special design of the fittings combined with the Visu-Control® ring.
- short radius bends ensure a compact, space-saving installation.

The above features ensure that no special skills are required for installation and that the work can be carried out in a clean, safe environment.

safe

The installation of the VSH PowerPress® does not require any heat source (as is the case for welding or soldering) or other heavy and potentially dangerous tools. This feature makes VSH PowerPress® the ideal solution for repairs or renovation projects, since it ensures minimal disturbance at the site.

applications

sprinkler installations

VSH PowerPress fittings with carbon steel pipes that meet the EN 10255 (medium and heavy classification), ASTMA53, A106, A135 or A795 (schedule 10 to 40) standard.

o-ring:	EPDM (black)
operating temperature:	-40 to +107°C
max. temperature:	150°C (short-term)
max. operating pressure:	12.1 bar (175 psi)
application:	wet sprinkler installations in accordance with FM

fittings

technical characteristics

VSH PowerPress® are made of E235 carbon steel and protected against corrosion by a zinc-nickel coating of 3-5 µm. The zinc-nickel coating provides protection from exposure to condensation, which can form on cooling installations.
VSH PowerPress® fittings are fitted with an EPDM o-ring.

threaded fittings

The VSH PowerPress® range also contains components with female and male threads and is produced in accordance with ISO7-1 or ISO228. With threaded couplings, we recommend that the sealing be performed before pressing in order not to stress the press connection.

markings

VSH PowerPress® fittings

marking	packaging label
VSH PowerPress® dimension certificates traceability code country of origin	VSH PowerPress® type dimension EAN no. certificates art. no. quantity

o-rings

The VSH PowerPress® fittings are fitted with an EPDM profiled o-ring. The type of o-ring which has to be used depends on the application and the medium. That is why VSH PowerPress® Gas fittings are fitted with HNBR o-rings. If your application is not listed in the table below, please contact us to find out whether the medium is suitable for use in combination with the type of fitting you are using. The o-ring has been designed so that a leak-tight connection is always guaranteed, even with uneven surfaces.

pipes

o-ring EPDM - black

	temperature	applications
	-40 to +135°C For a short period +150°C	For all installations for hot and cold water, circulation, compressed air, sprinklers, etc.

Leak Before Press (LBP) function

VSH PowerPress® is equipped with an LBP function. Fittings with an LBP function have the advantage that connections that have not been pressed will leak water during pressure testing. This means that an incomplete press connection can easily be identified. If correctly assembled, the fittings will be water and air tight after being pressed.

alternative applications

The choice of fittings and pipes depends on what the purpose of the system is, the medium to be transported and the operating conditions. Please contact us regarding approval for the use of VSH PowerPress® fittings for applications other than for heating, cooling, natural gas, sprinkler and compressed air. Installations must always comply with local regulations.

electrical heat tracing

VSH PowerPress® may be used with electrical heat tracing in order to maintain the pipe temperature. Sealed pipes must not be heated because of the danger posed by the excessive and inadmissible increase in pressure in the pipes.

equipotential bonding

All metal piping systems using equipotential bonding must comply with the requirements. Continuity checks must be conducted by a qualified electrician in accordance with the regulations, once the installation work has been finished. In combination with the associated pipes, VSH PowerPress® is an electrically conductive piping system and must therefore be included in the equipotential bonding.

carbon steel pipes for VSH PowerPress®

VSH PowerPress® fittings and accessories in the dimensions ½" up to and including 2" must be combined with carbon steel pipes in accordance with EN 10220 (EN 10216-1 and EN 10217-1), EN 10255 and ASTMA53, A106, A135 and A795. These pipes can be supplied as black steel, industrially painted, galvanized or epoxy coated. Special care should be taken when installing coated pipes. This section gives you all technical parameters that are especially relevant when working with VSH PowerPress® and carbon steel pipes.

insulation

The following must be observed when insulating steel piping systems:

- cold water lines must be protected against condensation in line with DIN4140.
- hot water lines must be insulated to prevent heat loss in accordance with the Energy Conservation Act (EnEG).

pipe surfaces

Pipe surfaces for each type of must be smooth, free of indentations, pits and deformations and must be clean and free of debris, rust, scale, oil and grease.

It is not necessary to completely remove protective coatings or to expose the bare steel material. To avoid leak paths, engraved or stamped pipes shall not be used with VSH PowerPress® fittings or valves (removing the engraving or stamping through the use of a grinder or other tool does not change this).

painted black (and lacquered) pipe

The pipes must be inspected for uneven layers of paint. If excessive paint runs are existing, the surface of the pipe shall be smoothed by means of fine grit sand paper.

epoxy coated carbon steel pipe

Epoxy coatings on carbon steel pipe increase the external dimensions. The thickness of the coating should be reduced to allow the installation of the VSH PowerPress® products. The maximum permitted thickness of the epoxy coating is 300 µm. The surface of the pipe should be smoothed by means of fine grit sand paper.

pipes according EN 10220

VSH PowerPress® can be used in combination with the EN 10220 pipe series 1. Series 2 and 3 are not released in combination with VSH PowerPress®.

dimension	DN	external diameter [mm]			wall thickness [mm]
		d	min.	max.	
½"	15	21.3	21.0	21.8	2.0 - 5.4
¾"	20	26.9	26.5	27.3	2.0 - 8.0
1"	25	33.7	33.3	34.2	2.0 - 8.8
1¼"	32	42.4	42.0	42.9	2.0 - 10.0
1½"	40	48.3	47.9	48.8	2.0 - 12.5
2"	50	60.3	59.7	60.8	2.0 - 16.0

pipes in line with EN 10220 (series 1)

pipes in line with EN 10255

VSH PowerPress® can be used in combination with pipes in line with EN 10255. EN 10255 differentiates between heavy pipe (series H), medium type (series M) and type L, l1 and l2. Within these series, there are both longitudinal welded and seamless pipe types.

dimension	DN	external diameter [mm]			wall thickness M- medium [mm]	wall thickness H - heavy [mm]
		d	min.	max.		
½"	15	21.3	21.0	21.8	2.6	3.2
¾"	20	26.9	26.5	27.3	2.6	3.2
1"	25	33.7	33.3	34.2	3.2	4.0
1¼"	32	42.4	42.0	42.9	3.2	4.0
1½"	40	48.3	47.9	48.8	3.2	4.0
2"	50	60.3	59.7	60.8	3.6	4.5

pipes in line with EN 10255 (series M and H)

dimension	DN	external diameter [mm]			wall thickness [mm]
		d	min.	max.	
½"	15	21.3	21.0	21.7	2.3
¾"	20	26.9	26.4	27.1	2.3
1"	25	33.7	33.2	34.0	2.9
1¼"	32	42.4	41.9	42.7	2.9
1½"	40	48.3	47.8	48.6	2.9
2"	50	60.3	59.6	60.7	3.2

pipes in line with EN 10255 (series l and l1)

dimension	DN	external diameter [mm]			wall thickness [mm]
		d	min.	max.	
½"	15	21.3	21.0	21.3	2.0
¾"	20	26.9	26.4	26.9	2.3
1"	25	33.7	33.2	33.8	2.6
1¼"	32	42.4	41.9	42.5	2.6
1½"	40	48.3	47.8	48.4	2.9
2"	50	60.3	59.6	60.2	2.9

pipes in line with EN 10255 (series l2)

pipes according ASTM

VSH PowerPress® can be used in combination with carbon steel pipes in line with ASTMA53, A106, A135 and A795. Within these series, there are both longitudinal welded and seamless pipe types.

dimension	DN	external diameter [mm]	schedule	wall thickness [mm]
½"	15	21.3	10	2.11
			40	2.77
¾"	20	26.7	10	2.11
			40	2.87
1"	25	33.4	10	2.77
			40	3.38
1¼"	32	42.2	10	2.77
			40	3.56
1½"	40	48.3	10	2.77
			40	3.68
2"	50	60.3	10	2.77
			40	3.91

dimensions of the pipes in line with ASTM

black steel

galvanized steel

epoxy coated

press tools

Press tools consist of a press machine and the corresponding press jaw or sling. The press machine can be either battery or electrically powered. The corresponding press slings must be used for each diameter of pipe in the system in order to achieve a perfect connection. The figure below shows a cross-section of the VSH PowerPress® profile before and after pressing.

before pressing

after pressing

All VSH PowerPress® products with a diameter of ½" to 2" can be pressed using the appropriate press tools. Use the DW profile that matches the diameter for installation of VSH PowerPress® (VSH XPress and VSH SudoPress jaws and slings cannot be used for VSH PowerPress® with the exception of the transition fittings to VSH XPress and VSH SudoPress). A special adaptor may be required in addition to the press slings.

maintenance and correct usage of press tools

Aalberts integrated piping systems guarantees an excellent press connection, provided the tools are used correctly. Regular maintenance and lubrication of the press jaws, slings and tools is necessary. Please observe the manufacturer's instructions for use and maintenance. Poorly maintained and/or damaged press jaws pose a risk.

approved press tools

Use the online tool selector to find the right tool for the right material. Visit www.aalberts-ips.eu/tool-selector.

installation guidelines

When installing VSH PowerPress®, always make sure to take proper care in using protective gear on the building site. Safety shoes, a safety helmet and safety glasses should be worn at the minimum when installing VSH PowerPress®.

1. transport and storage

When transporting and storing VSH PowerPress® fittings or valves, damage and contamination must be avoided. The optimal storage temperature is between 10°C and 25°C. The products should be stored in their original packaging in a dry place (max. humidity 65%). It is advised to not remove the product from the packaging before installing.

2. cut the pipe to length

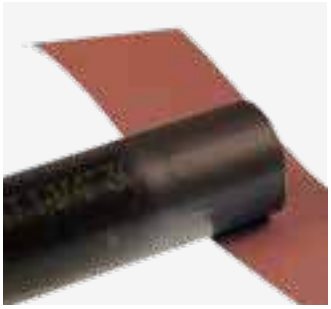
After measuring, the pipes can be cut to length using a pipe cutter, a fine-toothed handsaw or an electrical mechanical saw suitable for the pipe material. The pipe must always be cut completely through. Do not partially cut the pipe and break it off, as this could cause leakage. When cutting already installed pipes, always take into account a minimum distance to welds and bends of 3 x d (minimum 100 mm).

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

3. deburring the pipe

Pipe ends must be thoroughly deburred on the inside and the outside once they have been cut to length. This is necessary to avoid any damage to the o-ring when inserting the pipe into the press fitting. A file or hand deburrer or an electrical pipe deburrer suitable for the material may be used to deburr both the inside and outside of the pipe. Any burrs on the pipe should be removed.

4. cleaning the outside of the pipe



Always ensure that any dirt, scale, excessive paint or corrosion particles are removed from the surface of the pipe. This can be done with a wire brush or fine grit sand paper. The surface of the pipe must be smooth, free of indentations, pits and deformations and must be free of oil and grease.

5. marking insertion depth

The required insertion depth (see page 82) must be marked on the pipe or the press fitting (for fittings with pipe ends) in order to guarantee a safe and proper joint.

The marking on the pipe must remain visible (close to the union) after the connection is pressed to identify any movement before or after pressing.

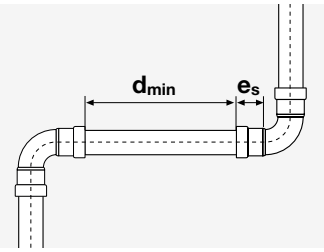
6. check the fitting and pipe

Remove he protective cap before assembly. Then check whether the o-rings are present and firmly seated. Ensure that both are clean, in good condition and free from damage and imperfections. Make sure that the Visu-Control® ring is properly aligned before pressing.

7. fitting the pipe

Insert the pipe carefully into the press fiiting while turning it and pushing it in the direction of the axis until it comes to a stroke stop in the union. The insertion depth marking must remain visible. In the case of fittings without a stop the fittings should be inserted at least as far as the marked insertion depth. Rough and careless insertion of the pipe into the fitting may result in damage to the o-ring. This is therefore not permitted.

If assembly is difficult because of the permitted tolerances in size, a lubricant, such as water or soap, may be used. Under no circumstances may oils, fats or grease be used as lubricants.



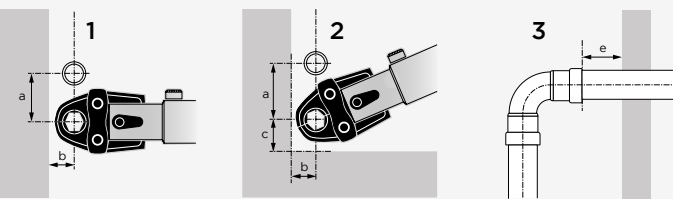
To optimise the installation time, time may be saved by first assembling a number of connections and then pressing the various pipe connections one after the other.

Marking the insertion depth (e_S) makes it possible to check whether the pipe was pressed out of the union during the pressing process. Prior to installation of the various pipe connections, it is important to check the minimum desired clearances (see table).

dimension	insertion depth e_s [mm]	minimum distance d_{min} [mm]	minimum pipe length $2 \times e_s + d_{min}$ [mm]
½″	29	5	63
¾″	32	5	69
1″	37	5	79
1¼″	49	10	108
1½″	50	10	110
2″	54	10	118

insertion depth and minimum distances between joints

The table gives the minimum required working space so that the fittings/valves can be pressed correctly using Novopress press tools. These distances relate to the general installation configurations as schematically depicted in figures 1, 2 and 3 below. Consult the relevant user manual when using another type of press tool.



dimension	figure 1		figure 2			figure 3
	a	b	a	b	c	e
½″	70	30	70	30	50	30
¾″	80	40	90	40	60	30
1″	90	40	95	40	65	30
1¼″	100	75	100	75	75	30
1½″	115	80	115	80	85	30
2″	125	80	125	80	90	30

required installation space when using Novopress press tools

8. pressing

Before starting to press, the press jaws and slings must be checked for dirt, which should be removed if present. To create a correctly pressed connection, the press tool should enclose the collar of the fitting. Once the pressing cycle starts, it should be completed before releasing. Under no circumstances interrupt the process. Please consult our online tool selector for the most recent overview of approved machines, press jaws and slings: aalberts-ips.eu/tool-selector.

it is not permitted to press a connection more than once.

The pressing process can cause deflection (angular displacement). This behaviour can be corrected by adapting the position of the press jaw/sling on each connection. As an example, you could choose to place the machine on the left side first of all; then, for the next connection, the machine would be placed on the right side. The deflection of the joint is not something that can be prevented, but it can be minimized using the above method.

corrosion protection

If VSH PowerPress® fittings are used in an application where full corrosion protection is needed, always take care to protect the pipe surface.

general technical information

thermal expansion

The level of thermal expansion within piping systems depends on the type of materials used. This linear expansion needs to be taken into account during the installation. Minor changes in length can be accommodated by having adequate space for expansion as well as by the elastic properties of the piping system itself. More substantial changes in length need to be offset by other means, e.g. installation of special expansion compensation devices, fixed anchoring points and sliding points.

Expansion can be offset by the use of a pipe segment, U-bend or compensators. The level of expansion to be offset can be determined beforehand by calculating the changes in length.

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

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

Δl	= total linear expansion in [mm]
l	= length of the segment in question [m]
ΔT	= temperature difference [K]
α	= linear coefficient of expansion

pressure loss

Every fluid that flows through a piping system experiences continuous and local flow resistance. This is called pressure loss. There is a difference between continuous and local pressure losses. A continuous pressure loss is primarily caused by the flow resistance in straight pipe sections, which is essentially the result of the friction between the fluid and the pipe wall. Local pressure loss, on the other hand, are caused by the flow resistance at a number of places on the circulation system, such as a change in the internal diameter, a pipe branch, an elbow, etc.

continuous pressure loss

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 pipe [bar/m]
Q	= flow [l/m]
di	= internal diameter of the pipe [mm]
C	= constant for type and condition of the pipe

If you wish to perform these calculations, please consult the relevant specialised literature.

built-in

local pressure loss

A local pressure loss is the flow resistance that is the result of changes in the flow direction, changes in diameter, flow splitting over multiple channels, etc. There are, in principle, two ways of calculating such flow resistance: the direct analytical method and the method that uses “equivalent lengths”.

equivalent length method

This method assumes that pressure loss 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 loss that is equal to the real pressure loss. In other words, the equivalent lengths of the individual joints are added to the actual length of the piping system (see below).
The actual length is then multiplied by the pressure loss per unit length to be able to calculate the total system pressure drop. This method is not as accurate as the direct method but has the advantage that the calculation can be carried out faster.

direct analytical method [ζ] / equivalent length method [m]

dimension		W90		W45		TA[b]		TD[b]		K		RED	
	DN	ζ	[m]	ζ	[m]	ζ	[m]	ζ	[m]	ζ	[m]	ζ	[m]
¾″	20	0.61	0.37	0.51	0.32	0.38	0.24	0.96	0.59	0.32	0.20	-	-
1″	25	0.64	0.53	0.54	0.46	0.42	0.35	1.06	0.89	0.29	0.24	0.32	0.20
1¼″	32	0.51	0.62	0.38	0.47	0.32	0.39	0.93	1.13	0.26	0.31	0.35	0.29
1½″	40	0.45	0.65	0.32	0.47	0.29	0.42	0.83	1.22	0.22	0.33	0.26	0.31
2″	50	0.48	0.94	0.35	0.69	0.29	0.57	0.93	1.82	0.22	0.44	0.26	0.38

equivalent lengths and zeta values

direct analytical method

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

$$\Delta p_L = \Sigma\zeta \times v^2 \times \gamma/2 \times 10^{-5}$$

Δp_L = pressure loss in fitting [bar]
v = flow velocity of the fluid [m/s]
γ = specific density of the fluid [kg/m³]
ζ = local flow resistance coefficient

The table above shows the zeta [ζ] value for each type of fitting. We can assume that this value is independent for velocities that occur in domestic installations or in other normal applications; this is supported by the fact that the change in zeta as a function of the Reynolds number in these velocity ranges is only minimal. Once the zeta value is known, you can calculate the corresponding local pressure drop-off using the formula above.

heat loss

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

welding requirements

The following requirements have to be considered when welding in the same vicinity as VSH PowerPress® products.

welding adjacent to already installed VSH PowerPress® fittings/valves

When welding close to an installed VSH PowerPress® connection, the installer must remain at least 10 cm away from the connection to prevent damage to the o-ring. The installer should take the following precautions to protect the VSH PowerPress® connections while welding:

- make the welded connections before the press connections are made. The pipe must have cooled down before the fitting/valve is installed.
- wrap the connection in a cold, wet rag.
- protect the connection with a weld blanket.
- use spray as a coolant.

welding in an installation with VSH PowerPress® fittings/valves

When welding a pipe with an installed VSH PowerPress® connection, the installer must remain at least 90 cm away from the connection to prevent damage to the o-ring. The installer should take the following precautions to keep the VSH PowerPress® connections cool while welding:

- make the welded connections before the press connections are made. The pipe must have cooled down before the fitting/valve is installed.
- wrap the connection in a cold, wet rag.
- protect the connection with a weld blanket.
- use spray as a coolant.

guidelines for distances of mounting brackets

Always make sure to have hangers and supports conform to local requirements. All parts of the hangers and supports must be designed and installed so that they support the piping. Always make sure to place sliding hangers so that they do not become rigid hangers by accident.

dimension	max. distance [m]
½″	2.75
¾″	3.00
1″	3.50
1¼″	3.75
1½″	4.25
2″	4.75

distance between mounting brackets in accordance with EN806, part 4

When using VSH PowerPress® in sprinkler installations, different guidelines for distances of mounting brackets might apply.

Observance of the above distances between attachment points is not sufficient in itself. Heat expansion also needs to be appropriately compensated for in horizontal stretches The distances stated above will possibly have to be adapted for this purpose.

mounting pipes
When securing the pipes, the following should be kept in mind: The load-bearing capacity of the mounting brackets must correspond to the weight of the (filled) pipes and 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 pipe sections. Mounting brackets on fittings and valves is not permitted.

pressure test

Once a piping system has been installed it must be checked for leaks before being built in and concealed. With heating and cooling installations, the pressure test can be carried out with water, air or inert gases. The test medium and the results of the pressure test should be documented in a pressure test report.

Important: The piping system must be pressure-tested in all cases for VSH PowerPress®. Before being covered up, insulated, painted or walled in, a piping system must first undergo a pressure test 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 a VSH PowerPress® installation, make sure no water remains in the system afterwards, in order to avoid the risk of corrosion, unless the system is going to be put into service shortly afterwards.

pressure test for heating systems and cooling systems
Important: As a rule, the pressure test for piping that has already been laid is carried out with water in accordance with DIN-VOB 18380.

- the test pressure at each point of the system must be 1.3 times the operating pressure with overpressure of at least 1 bar
- 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 watertight at high temperatures
- there must be no drop in pressure during the pressure test
- the pressure test must be adequately documented

pressure test with air
Important: The pressure test with air or inert gases can be carried out in accordance with the ZVSHK/BHKS technical bulletins, “Pressure Test with Air or Inert Gases”, (at 100 l pipe 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: max. 3 bar up to and including DN50). For safety reasons, the maximum test pressure is set at 3 bar.

pressure testing of sprinkler systems
The pipes of a sprinkler system must be subjected to a pressure test in accordance with the applicable standards such as CEA 4001, no. 17.1.1 (VdS) for at least two hours. A pressure (measured at the alarm valves) corresponding to 1.5 times the permitted positive operating pressure – but of at least 15 bar – must be maintained during the test. This pressure test is a check of both the strength and tightness of the system. The system must be monitored for 24 hours for any pressure drop due, for example, to temperature changes. Any faults identified, such as permanent deformations, ruptures or leakages must be corrected and the pressure test repeated.

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 pipe surface so that hygiene problems and corrosion damage are largely prevented.
Installation regulations 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:

- electrochemical potential difference between both parts.
- presence of a conductive fluid (electrolyte), such as water.
- presence of oxygen.

If heating installations are installed and used properly, they will not contain a substantial amount of oxygen, making the risk of corrosion small. It is critical that the VSH PowerPress® system components be installed only downstream of other, metallurgically inferior (lower quality) components that may be present in these kinds of installations. A branch can, for example, be made with VSH XPress stainless steel. In such a case, a non-ferrous metal or synthetic connection piece 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.

stray currents

Corrosion by stray currents rarely occurs in practice and is immediately recognisable as it starts on the outside of the pipe with a cone-shaped crater to the inside. Stray current corrosion requires a direct current that turns the metal into an anode. The current which in practice – in spite of insulation measures – penetrates into the earth and other metal structures in the vicinity goes through part of the system first of all and only then back to earth. To penetrate into the piping system, the earth current must have an entry point at a spot where the normal protective cover of the pipe 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 households and no real problems occur with alternating current.

carbon steel pipes

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 pipe 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 pleased to answer any enquiries about the use of additives. Please observe the applicable legislation, regulations and local rules regarding corrosion.

external corrosion

Steel piping systems are generally installed in such a way that the outer surfaces do not come into contact with corrosive media. If this does nevertheless occur, appropriate measures must be taken.

prevention of corrosion

Instructions will be found in the following paragraphs on how to prevent corrosion problems in the most usual places. A distinction is made between inner and outer corrosion, and the area of application.

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 pipe surface, in the process of which a thin layer of iron oxide is formed and after which there is no longer any possibility of corrosion. The loss in wall thickness can be disregarded. The loss in wall thickness is negligible. The heating water is virtually free of oxygen following this reaction.

carbon steel pipes

Internal corrosion is normally impossible in closed-loop heating installations as oxygen from outside cannot penetrate the installation.

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.

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 piping in situations where corrosion is likely to occur (damp room, crawl spaces, etc.).

carbon steel pipes

Special attention must be paid to preventing outer corrosion where an environment remains humid for longer periods.

In addition, piping systems should be properly sized to minimise the risk of erosion and corrosion resulting from excessive velocities.

impact of application and processing

underground installations

VSH PowerPress® and black carbon steel pipes are approved for underground installations (with the exception of sprinkler installations). All installations must, however, comply with local regulations. Proper authorisation must be obtained prior to underground installation from the local authority having jurisdiction.

galvanized carbon steel pipe

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

insulation

Insulation does not, as a rule, offer any protection against corrosion, except in the case of 'closed cell insulation' (sealed and 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 piping 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.

insulating carbon steel

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

warranty

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

fire protection

VSH SmartPress

VSH SmartPress

The VSH SmartPress product range is a press system designed for joining stainless steel pipes according to ASTM A312 (schedule 5S and 10S) standards. Using the VSH SmartPress system significantly reduces installation times and ensures a clean working environment.

the advantages of VSH SmartPress

- complete range of fittings and valves from ½" to 2"
- Visu-Control® foil: visual press indicator
- Smart sealing element detection due to patented design
- Leak Before Pressed (LBP) function
- simple, fast connection technology
- clear identification of application, material and dimensions
- professional press tools

The VSH SmartPress system offers installers a complete solution with high flexibility. VSH SmartPress consists of fittings, valves and tools and can be used on standard stainless steel pipes according to ASTM A312 in AISI 304/304L or 316/316L. VSH SmartPress fittings can be installed with various press tool brands.

high-tech production location for VSH SmartPress

performance guaranteed

VSH SmartPress products are produced using specially developed, ultra-modern machinery, which enables Aalberts integrated piping systems to guarantee a consistent supply and quality. The completely automated factory supplies safe, high-quality products. All welded products undergo a 'leak test' to avoid any problems after installation.

reliable

With VSH SmartPress the quality of the joint is primarily determined by the tool and not by the installer. This reduces the risk of installation errors considerably. All fittings are delivered with an LBP function. As a result, the risk of errors during installation is further reduced. This LBP function ensures that fittings, which have not been pressed, will leak during the initial pressure test. The installer can see immediately which fitting has not yet been pressed.

In addition to the LBP function, all fittings are equipped with a Visu-Control® foil. During pressing, the Visu-Control® foil will be compressed, after which you can take it of, immediately showing your fitting has been pressed. This eliminates the need to check already pressed fittings afterwards, which offers additional safety and saves time.

insertion depth marking

Safe and secure connections depend on the insertion depth being correct. However, marking the insertion depth is a very time-consuming task and for that reason, all VSH SmartPress couplings with pipe ends supplied are marked with a clearly visible insertion depth mark. This means that 25% of all installed VSH SmartPress fittings no longer have to be marked.
A smart plus which makes installations much easier, saves a lot of time and results in greater safety.

easy and clean

Compared to other 'cold' connection methods, VSH SmartPress is an extremely user-friendly solution:

- the use of VSH SmartPress dispenses with the need for complicated clamping techniques, time-consuming preparations and drying time, making installation faster and cleaner.
- no need to thread the pipes.
- no lubrication needed for installation.
- easy insertion of the pipe into the fitting due to the special design of the fittings.
- short radius bends ensure a compact, space-saving installation.

The above features ensure that no special skills are required for installation and that the work can be carried out in a clean, safe environment.

safe

The installation of VSH SmartPress does not require any heat source (as is the case for welding) or other heavy and potentially dangerous tools. This feature makes VSH SmartPress the ideal solution for repairs or renovation projects, since it ensures minimal disturbance at the site.

cost effective

This connection technology is easy, fast and highly cost effective. As the connection is achieved using press tools alone, no other materials, such as gases, adhesives, threading machines, etc. need to be purchased or hired.

applications

sprinkler installations

VSH SmartPress fittings with stainless steel pipes that meet ASTM A312 (schedule 5S or 10S). Application: wet and dry sprinkler installations in accordance with UL, FM.

sealing elements:	HNBR (black with yellow marking)
Visu-Control® foil:	yellow
operating temperature:	-30°C to +107°C
max. temperature (short term):	110°C
max. operating pressure:	12.1 bar for 5S
300 psi (20.7 bar) for 10S	

sealing elements:	EPDM (black)
Visu-Control® foil:	green
operating temperature:	-35°C to +107°C
max. temperature (short term):	150°C
max. operating pressure:	12.1 bar for 5S
300 psi (20.7 bar) for 10S	

fittings

technical characteristics

VSH SmartPress fittings are produced from AISI 316L stainless steel and fitted with a patented 'Leak Before Pressed' (LBP) function. The VSH SmartPress fittings are fitted with an HNBR (black with yellow marking) or EPDM (black) sealing element.

threaded fittings

The VSH SmartPress range also contains components with inner and outer threads and is produced in accordance with ANSI/ASME B1.20.1 or ISO 7/1. With threaded couplings, we recommend that the sealing be performed before pressing in order not to stress the press connection.

markings

VSH SmartPress fittings

marking	packaging label
VSH SmartPress VSH technology dimension certificates traceability code country of origin	VSH SmartPress VSH technology type dimension (compound) GTIN no. certificates art. no. number

sealing elements

The fire protection fittings are fitted with an HNBR or EPDM sealing element. The sealing elements have been designed so that a leak-tight connection is always guaranteed, even with uneven surfaces.

HNBR (black with yellow marking)

temperature	applications
-30 to +100°C for a short period +110°C	For all installations for hot and cold water, circulation pipes, compressed air, fuel oil, mineral oil, fuels, sprinkler, etc.

EPDM (black)

temperature	applications
-40 to +135°C for a short period +150°C	For all installations for hot and cold water, circulation pipes, compressed air, sprinkler, etc.

Leak Before Pressed (LBP) function

All VSH SmartPress fttings and valves come equipped with Leak Before Pressed® technology, a built-in safety feature that allows media to slowly leak for detection of unpressed connections during initial pressure testing. This means that an incomplete press connection can easily be identified. If correctly assembled, the fittings will be water and air tight after being pressed.

pipes

Visu-Control® foil (VCF)

All VSH SmartPress fittings and valves come equipped with Visu-Control® foil, a plastic sleeve on each press-end for ease of material identification and visual press indication. Prior to installation, the color-coded VCF indicates the size and sealing element compound within the press fitting or valve to reduce the risk of misapplication. During the pressing operation, the VCF splits and can easily be removed thereafter; this ensures that un-pressed connections stand out and are easily recognizable prior to system pressurization.

alternative applications

The choice of fittings and pipes depends on what the purpose of the system is, the medium and the operating conditions. Please contact us regarding approval for the use of VSH SmartPress fittings for applications other than for heating, cooling, sprinkler and compressed air. Installations must always comply with local regulations.

electrical heat tracing

VSH SmartPress may be used with electrical heat tracing in order to maintain the pipe temperature. Sealed pipes must not be heated because of the danger posed by the excessive and inadmissible increase in pressure in the pipes.

equipotential bonding

All metal piping systems using equipotential bonding must comply with the requirements. Continuity checks must be conducted by a qualified electrician in accordance with the regulations, once the installation work has been finished. In combination with the associated pipes, VSH SmartPress is an electrically conductive piping system and must therefore be included in the equipotential bonding.

stainless steel pipes for VSH SmartPress

VSH SmartPress products in the dimensions ½" up to and including 2" must be combined with stainless steel pipes in accordance with ASTM A312. This section shows technical parameters that are especially relevant when working with VSH SmartPress and stainless steel pipes.

insulation

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

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

The soluble chloride content in insulation materials 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.

pipe surface

for each type of pipe, the surface must be smooth, free of indentations, pits and deformations and must be clean and free of debris, rust, scale, oil and grease.

pipes according ASTM A312 (Schedule 5S)

VSH SmartPress can be used in combination with the ASTM A312 pipe in materials AISI 304/304L and AISI 316/316L Schedule 5S.

		external diameter [mm]			
dimension	DN	d	min.	max.	wall thickness [mm]
½"	15	21.3	20.55	21.72	1.65
¾"	20	26.9	25.88	27.05	1.65
1"	25	33.7	32.61	33.78	1.65
1½"	40	48.3	47.47	48.64	1.65
2"	50	60.3	59.54	61.11	1.65

pipes in line with ASTM A312 (schedule 5S)

pipes according ASTM A312 (Schedule 10S)

VSH SmartPress can be used in combination with the ASTM A312 pipe in materials AISI 304/304L and AISI 316/316L Schedule 10S.

		external diameter [mm]			
dimension	DN	d	min.	max.	wall thickness [mm]
½"	15	21.3	20.55	21.72	2.11
¾"	20	26.9	25.88	27.05	2.11
1"	25	33.7	32.61	33.78	2.11
1½"	40	48.3	47.47	48.64	2.11
2"	50	60.3	59.54	61.11	2.11

pipes in line with ASTM A312 (schedule 10S)

press tools

Press tools consist of a press machine and the corresponding press jaw or sling. The press machine can be either battery or electrically powered. The corresponding press slings must be used for each diameter of pipe in the system in order to achieve a perfect connection. The figure below shows a cross-section of the SmartPress profile before and after pressing.

before pressing

after pressing

All VSH SmartPress products with a diameter of ½" to 2" can be pressed using the appropriate press tools. Use the SmartPress profile that matches the diameter for installation of VSH SmartPress. A special adapter may be required in addition to the press slings.

maintenance and correct usage of press tools

Aalberts integrated piping systems guarantees an excellent press connection, provided the tools are used correctly. Regular maintenance and lubrication of the press jaws, slings and tools is necessary. Please observe the manufacturer's instructions for use and maintenance. Poorly maintained and/or damaged press jaws pose a risk.

approved press tools for VSH SmartPress

dimension	make	press tool	press saws/slings
½"–2"	Novopress	ACO202/203(XL) ACO203BT(XL) (18V)	VSH SmartPress ASP jaws or Novopress jaws: ½"- 1" Slings: 1½"–2" with adapter ZB221
½"–2"	Milwaukee™	M18 (18V) M18 Long Throw	Milwaukee™ M18 ASP jaws: ½"–1" Milwaukee™ M18 ASP slings: 1½"–2" with adapter ring jaw 2
½"–2"	Victaulic	PFT510	Victaulic PFT510 jaws: ½"–1" Victaulic PFT510 slings: 1½"–2" with Vic-Press adapter jaw

installation guidelines

When installing VSH SmartPress, always make sure to take proper care in using protective gear on the building site. Safety shoes, a safety helmet and safety glasses should be worn at the minimum when installing VSH SmartPress.

1. transport and storage

When transporting and storing VSH SmartPress fittings or valves, damage and contamination must be avoided. The optimal storage temperature is between 10°C and 25°C. The products should be stored in their original packaging in a dry place (max. humidity 65%). It is advised to not remove the product from the packaging before installing.

2. cutting the pipe to length

After measuring, the pipes can be cut to length using a pipe cutter designed for stainless steel, a fine-toothed handsaw or an electrical mechanical saw suitable for the pipe material. The pipe must always be cut completely through. Do not partially cut the pipe and break it off, as this could cause leakage. When cutting already installed pipes, always take into account a minimum distance to welds and bends of 3 x d (minimum of 100 mm).

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

3. deburring the pipe end

Pipe ends must be thoroughly deburred on the inside and the outside once they have been cut to length. This is necessary to avoid any damage to the sealing ring when inserting the pipe into the press fitting. A file or hand deburrer or an electrical pipe deburrer suitable for the material may be used to deburr both the inside and outside of the pipe. Any burrs on the pipe should be removed.

4. cleaning the outside of the pipe

Always ensure that any dirt or particles are removed from the surface of the pipe. This can be done with a stainless steel wire brush or fine grit sand paper. The surface of the pipe must be smooth, free of indentations, pits and deformations and must be free of oil and grease.

5. marking insertion depth

The required insertion depth (table in step 7 of installation guidelines) must be marked on the pipe in order to guarantee a safe and proper joint. The fittings with pipe ends already have a pre-marked insertion depth, thereby rendering any marking unnecessary. The marking on the pipe must remain visible (close to the union) after the connection is pressed to identify any movement before or after pressing.

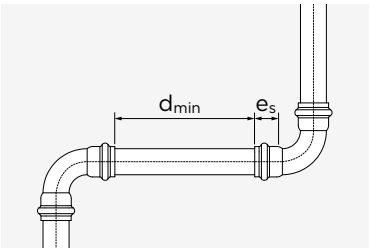
6. check the fitting

Before connecting the pipe into the fitting, check if the fitting is thecorrect one for the intended use and the required sealing ring is present.

7. fitting the pipe end into the fitting

Insert the pipe end carefully into the fitting while turning and pushing it in the direction of the axis until it comes to a stroke stop in the socket. The patented sealing element design also functions as an sealing ring detection solution. This means that there will always be some friction between the sealing ring and pipe during insertion. The insertion depth marking must remain visible. In the case of fittings without a stop, the fittings should be inserted at least as far as the marked insertion depth. Rough and careless insertion may result in damage to the sealing ring and is therefore not permitted.

If assembly is difficult because of the permitted tolerances in size, a lubricant, such as water or soap, may be used. Under no circumstances may oils, fats or grease be used as lubricants.



To optimise installation time, you may assemble a number of connections first and then press the various pipe connections, one after the other.

Marking the insertion depth (e_S) makes it possible to check whether the pipe was pressed out of the socket during the pressing process. Prior to installation of the various connections, it is important to check the minimum desired clearances (see table).

dimension	insertion depth e_s [mm]	minimum distance d_{min} [mm]	minimum pipe length $2e_s + d_{min}$ [mm]
½"	29	25	83
¾"	29	25	83
1"	32	42	106
1½"	37	19	93
2"	43	20	106

insertion depth and minimum distances between joints when using Milwaukee™ and Novopress press tools

The table gives the minimum required working space so that the fittings/valves can be pressed correctly using Milwaukee™ and Novopress press tools. These distances relate to the general installation configurations as schematically depicted in figures 1, 2 and 3 below. Consult the relevant user manual when using another type of press tool.

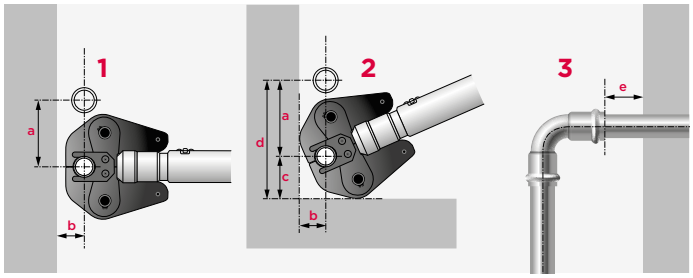


	figure 1		figure 2			figure 3
dimension	a [mm]	b [mm]	a [mm]	b [mm]	c [mm]	e [mm]
½"	102	44	146	57	70	40
¾"	102	44	159	64	70	40
1"	102	44	178	76	70	40
1½"	127	121	159	121	127	40
2"	133	121	171	121	133	40

required installation space for Milwaukee™ and Novopress press tools

8. pressing

Before pressing, the press jaws and slings must be checked for dirt, which should be removed if present. To make a correctly pressed connection, the press tool should enclose the collar of the fitting. Once the pressing cycle starts, it should be completed before releasing. Under no circumstances interrupt the process. Please consult our online tool selector for the most recent overview of approved machines, press jaws and slings: www.aalberts-ips.eu/presstool.

it is not permitted to press a connection more than once.

The pressing process can cause deflection (angular displacement). This behaviour can be corrected by adapting the position of the press jaw/sling on each connection. As an example, you could choose to place the machine on the left side first of all; then, for the next connection, the machine would be placed on the right side. The deflection of the joint is not something that can be prevented, but it can be minimized using the above method.

9. Visu-Control®

As a visual indication that the connection has been pressed, the Visu-Control® foil should be damaged. Remove the foil as an indication that the connection has been pressed and checked.

general installation information

thermal expansion

The level of thermal expansion within piping systems depends on the type of materials used. This linear expansion needs to be taken into account during the installation. Minor changes in length can be accommodated by having adequate space for expansion as well as by the elastic properties of the piping system itself. More substantial changes in length need to be offset by other means, e.g. installation of special expansion compensation devices, fixed anchoring points and sliding points.
Expansion can be offset by the use of a pipe segment, U-bend or compensators. The level of expansion to be offset can be determined beforehand by calculating the changes in length. The equation for calculating the changes in length is as follows:

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

Δl	= total linear expansion in [mm]
l	= length of the segment in question [m]
ΔT	= temperature difference [K]
α	= linear coefficient of expansion

pressure drop

Every fluid that flows through a piping system experiences continuous and local flow resistance. This is called a pressure drop. There is a difference between the continuous and the local pressure drop. A continuous pressure drop is primarily caused by the flow resistance in straight pipe sections, which is essentially the result of the friction between the fluid and the pipe wall. Local pressure drops, on the other hand, are caused by the flow resistance at a number of places on the circulation system, such as a change in the internal diameter, a pipe 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.

$$p = \frac{6.05 \times 105}{C^{1.85} \times di^{4.87}} \times Q1.85$$

p	= pressure drop in the pipe [bar/m]
Q	= flow [l/m]
di	= internal diameter of the pipe [mm]
C	= constant for type and condition of the pipe

If you wish to perform these calculations, please consult the relevant specialised literature.

built-in

local pressure drops

A local pressure drop is the flow resistance that is the result of changes in the flow direction, changes in diameter, flow splitting over multiple channels, etc. There are, in principle, two ways of calculating such flow resistance: 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 equivalent lengths of the individual joints are added to the actual length of the piping system (see below).
The actual length is then multiplied by the pressure drop per unit length to be able to calculate the total system pressure drop. This method is not as accurate as the direct method but has the advantage that the calculation can be carried out faster.

direct analytical method [ζ] / equivalent length method [m]

		W90		W45		TA[b]		TD[b]		K		RED	
Ø	DN	ζ	[m]	ζ	[m]	ζ	[m]	ζ	[m]	ζ	[m]	ζ	[m]
½″	15												
¾″	20	0.61	0.37	0.51	0.32	0.38	0.24	0.96	0.59	0.32	0.20	-	-
1″	25	0.64	0.53	0.54	0.46	0.42	0.35	1.06	0.89	0.29	0.24	0.32	0.20
1½″	40	0.45	0.65	0.32	0.47	0.29	0.42	0.83	1.22	0.22	0.33	0.26	0.31
2″	50	0.48	0.94	0.35	0.69	0.29	0.57	0.93	1.82	0.22	0.44	0.26	0.38

equivalent lengths and zeta values

direct analytical method

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

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

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

The table above shows the zeta [ζ] value for each type of fitting. We can assume that the zeta value 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 zeta as a function of the Reynolds number in these velocity ranges is only minimal. Once the zeta value is known, you can calculate the corresponding local pressure drop-off using the formula above.

heat loss

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

welding requirement

The following requirements have to be considered when welding in the same vicinity as VSH SmartPress products.

welding adjacent to already installed VSH SmartPress fittings/valves

When welding close to an installed VSH SmartPress connection, the pressed joint must remain at least 10 cm away from the connection to prevent damage to the sealing element. The installer should take the following precautions to protect the VSH SmartPress connections while welding:

- make the welded connections before the press connections are made. The pipe must have cooled down before the fitting/valve is installed.
- wrap the connection in a cold, wet rag.
- protect the connection with a weld blanket.
- use spray as a coolant.

welding in an installation with VSH SmartPress fittings/valves

When welding a pipe with an installed VSH SmartPress connection, the installer must remain at least 90 cm away from the connection to prevent damage to the sealing element.
The installer should take the following precautions to keep the VSH SmartPress connections cool while welding:

- make the welded connections before the press connections are made. The pipe must have cooled down before the fitting/valve is installed.
- wrap the connection in a cold, wet rag.
- protect the connection with a weld blanket.
- use spray as a coolant.

guidelines for distances of mounting brackets

Always make sure to have hangers and supports conform to local requirements. All parts of the hangers and supports must be designed and installed so that they support the piping. Always make sure to place sliding hangers so that they do not become rigid hangers by accident.

Ø pipe	max. distance [m]				
	B31.1	B31.3	B31.9	FM	NFPA13
½″	2.0	2.0	2.1	n.a.	n.a.
¾″	2.3	2.3	2.4	n.a.	n.a.
1″	2.4	2.4	2.9	n.a.	n.a.
1½″	2.9	2.9	3.4	n.a.	n.a.
2″	3.2	3.2	3.5	n.a.	n.a.

distance between mounting brackets for schedule 5S (water)

Ø pipe	max. distance [m]				
	B31.1	B31.3	B31.9	FM	NFPA13
½″	2.0	2.0	2.1	3.66	3.66
¾″	2.3	2.3	2.4	3.66	3.66
1″	2.6	2.6	3.1	3.66	3.66
1½″	3.1	3.1	3.8	3.66	3.66
2″	3.6	3.6	4.0	3.66	3.66

distance between mounting brackets for schedule 10S (water)

Ø pipe	max. distance [m]		
	B31.1	B31.3	B31.9
½″	2.1	2.1	2.3
¾″	2.4	2.4	2.7
1″	2.7	2.7	3.2
1½″	3.4	3.4	4.3
2″	3.8	3.8	4.7

distance between mounting brackets for schedule 5S (air/gas)

Ø pipe	max. distance [m]		
	B31.1	B31.3	B31.9
½″	2.1	2.1	2.3
¾″	2.4	2.4	2.7
1″	2.7	2.7	3.2
1½″	3.6	3.6	4.1
2″	3.8	3.8	4.7

distance between mounting brackets for schedule 10S (air/gas)

Observance of the above distances between attachment points is not sufficient in itself. Heat expansion also needs to be appropriately compensated for in horizontal stretches The distances stated above will possibly have to be adapted for this purpose.

mounting pipes

When securing the pipes, the following should be kept in mind: The load-bearing capacity of the mounting brackets must correspond to the weight of the (filled) pipes and 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 pipe sections. Mounting brackets on fittings and valves is not permitted.

pressure test

Once a piping system has been installed it must be checked for leaks before being built in and concealed. With heating and cooling installations, the pressure test can be carried out with water, air or inert gases. The test medium and the results of the pressure test should be documented in a pressure test report.

Important: The piping system must be pressure-tested in all cases for VSH SmartPress. Before being covered up, insulated, painted or walled in, a piping system must first undergo a pressure test 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 a VSH SmartPress installation, make sure no water remains in the system afterwards, in order to avoid the risk of corrosion, unless the system is going to be put into service shortly afterwards.

pressure test for heating systems and cooling systems

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

- the test pressure at each point of the system must be 1.3 times the operating pressure with overpressure of at least 1 bar
- 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 watertight at high temperatures
- there must be no drop in pressure during the pressure test
- the pressure test must be adequately documented

pressure test with air

Important: The pressure test with air or inert gases can be carried out in accordance with the ZVSHK/BHKS technical bulletins, “Pressure Test with Air or Inert Gases”, (at 100 l pipe 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: max. 3 bar up to and including DN50). For safety reasons, the maximum test pressure is set at 3 bars.

pressure testing of sprinkler systems

The pipes of a sprinkler system must be subjected to a pressure test in accordance with the applicable standards such as NFPA 13 for at least two hours. A pressure (measured at the alarm valves) corresponding to 1.5 times the permitted positive operating pressure – but of at least 15 bars – must be maintained during the test. This pressure test is a check of both the strength and tightness of the system. The system must be monitored for 24 hours for any pressure drop due, for example, to temperature changes. Any faults identified, such as permanent deformations, ruptures or leakages must be corrected and the pressure test repeated.

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 therefor very little corrosion. In potable water installations, however, oxygen contents are very high, nearly reaching the saturation point. It is of primary importance that VSH SmartPress 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 SmartPress stainless steel pipes from a piping system consisting of carbon steel pipes. 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. It is, therefore, recommended that you 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 pipe. 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 pipe 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 and 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 SmartPress stainless fittings 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 pipes 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. VSH SmartPress 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 SmartPress stainless steel components can only occur when wet potable water pipes 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 pipes is continuous and that, if necessary, sufficient corrosion-protective insulation tape is applied. Correctly applied closed-cell insulation is an effective protection against corrosion.

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.

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 pipe 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 pipes 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.

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 SmartPress has 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 pipes.
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 SmartPress components 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 SmartPress fittings are, however, not suitable for operation in dosing systems for e.g. disinfectants, which are added to the potable water. VSH SmartPress fittings 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.

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

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

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 pipes is not allowed due to the amount of heat developed.

bending stainless steel pipes
Stainless steel pipes may not be bent warm. The heating of the stainless steel pipes 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 pipe wall. This film can cause an increase in the concentration of chloride ions, which cause pitting in critical concentrations.

connections
Welding of stainless steel pipes 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 pipe, can only be removed by staining, which is not practical with a piping systems that has already been installed.

stainless steel – carbon steel – 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 pipes 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 the case of 'closed cell insulation' (sealed watertight), which offers effective protection against corrosion. The installation instructions of the supplier of the insulation material must always be followed carefully. Remove dust, dirt, oil or water from the piping system 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 pipes may not exceed 0.05% (AS quality).

warranty

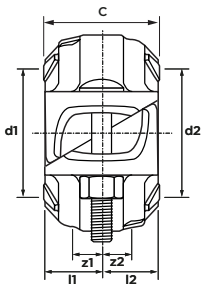
Please contact Aalberts integrated piping systems for the most recent warranty conditions that apply to VSH SmartPress.

product range

VSH Shurjoint couplings

F09 rigid, quick install coupling

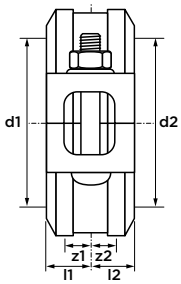
(with pre-lubed EPDM gasket)



dimension	article no. painted red	max. pressure [bar]	tensile strength* [kN]	l1/l2	z1/z2
42.4 (DN32)	10F090012002	25	3.51	24.5	2.0
48.3 (DN40)	10F090015002	25	4.60	24.5	2.2
60.3 (DN50)	10F090020002	25	7.19	24.5	2.4
73.0	10F090025002	25	10.54	24.5	2.5
76.1 (DN65)	10F090029002	25	11.00	24.5	2.5
88.9 (DN80)	10F090030002	25	15.62	24.5	2.5
114.3 (DN100)	10F090045002	25	25.82	25.5	2.9
	article no. galvanized				
42.4 (DN32)	10F090012M03	25	3.51	24.5	2.0
48.3 (DN40)	10F090015M03	25	4.60	24.5	2.2
60.3 (DN50)	10F090020M03	25	7.19	24.5	2.4
73.0	10F090025M03	25	10.54	24.5	2.5
76.1 (DN65)	10F090029M03	25	11.00	24.5	2.5
88.9 (DN80)	10F090030M03	25	15.62	24.5	2.5
114.3 (DN100)	10F090045M03	25	25.82	25.5	2.9

K9 rigid coupling

(with pre-lubed EPDM gasket)



dimension	article no. painted red	max. pressure* [bar]	tensile strength* [kN]	l1/l2	z1/ z2	A.d.**
42.4 (DN32)	100K90012E20	35	4.82	22	0,8	0-1,6
48.3 (DN40)	100K90015E20	35	6.32	22	0,8	0-1,6
60.3 (DN50)	100K90020E20	35	9.85	22	0,8	0-1,6
73.0	100K90025E20	35	14.43	22	0,8	0-1,6
76.1 (DN65)	100K90029E20	35	15.68	22	0,8	0-1,6
88.9 (DN80)	100K90030E20	35	21.40	22	0,8	0-1,6
114.3 (DN100)	100K90045E20	24	24.72	25	1,6	0-3,2
139.7 (DN125)	100K90052E20	24	36.92	26	1,6	0-3,2
141.3	100K90055E20	24	37.77	25	1,6	0-3,2
165.1	100K90062E20	24	51.57	25	1,6	0-3,2
168.3 (DN150)	100K90065E20	24	53.59	28	1,6	0-3,2
219.1 (DN200)	100K90085E20	24	90.82	31	1,6	0-3,2
219.1 (DN200)***	100K90085090	24	90.82	31	1,6	0-3,2
	article no. galvanized					
42.4 (DN32)	100K90012E21	35	4.82	22	0,8	0-1,6
48.3 (DN40)	100K90015E21	35	6.32	22	0,8	0-1,6
60.3 (DN50)	100K90020E21	35	9.85	22	0,8	0-1,6
73.0	100K90025E21	35	14.43	22	0,8	0-1,6
76.1 (DN65)	100K90029E21	35	15.68	22	0,8	0-1,6
88.9 (DN80)	100K90030E21	35	21.40	22	0,8	0-1,6
114.3 (DN100)	100K90045E21	24	24.72	25	1,6	0-3,2
139.7 (DN125)	100K90052E21	24	36.92	26	1,6	0-3,2
141.3	100K90055E21	24	37.77	25	1,6	0-3,2
165.1	100K90062E21	24	51.57	25	1,6	0-3,2
168.3 (DN150)	100K90065E21	24	53.59	28	1,6	0-3,2
219.1 (DN200)	100K90085E21	24	90.82	31	1,6	0-3,2
219.1 (DN200)***	100K90085091	24	90.82	31	1,6	0-3,2

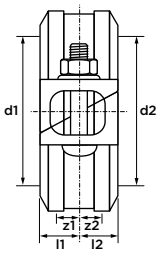
* Axial displacement. For field installation only on roll grooved pipe or cut grooved pipe. Rigid couplings do not permit expansion/contraction. For maximum allowable working pressures please visit www.vsh.eu or view the approval listing at the required approval body.

** maximum operating pressure and tensile strength depend on the used pipe material and wall thickness

*** K9H DN200 coupling is VdS approved in addition to cULus, FM and LPCB

Z07 heavy duty rigid coupling

(with E gasket)

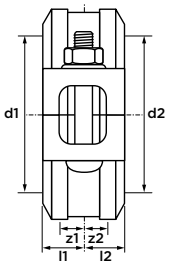


dimension		article no. painted red	max. pressure* [bar]	tensile strength* [kN]	l1/l2	z1/z2
273	(DN250)	10Z0700A1001	35	204.77	33	1.6
323.9	(DN300)	10Z0700A3001	28	230.59	33	1.6
		article no. galvanized				
273	(DN250)	10Z0700A1003	35	204.77	33	1.6
323.9	(DN300)	10Z0700A3003	28	230.59	33	1.6

* maximum operating pressure and tensile strength depend on the used pipe material and wall thickness

7705 flexible coupling

(with E gasket)



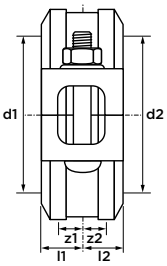
dimension		article no. painted red	max. pressure* [bar]	tensile strength* [kN]	l1/l2	z1/z2
42.4	(DN32)	177050012036	35	4.94	23	0.8
48.3	(DN40)	177050015036	35	6.41	23	0.8
60.3	(DN50)	177050020036	35	9.99	24	0.8
76.1	(DN65)	177050029036	35	15.91	24	0.8
88.9	(DN80)	177050030036	35	21.71	24	0.8
114.3	(DN100)	177050045036	35	35.89	26	1.6
168.3	(DN150)	177050065036	31	68.93	27	1.6
219.1	(DN200)	177050085036	20	75.37	31	1.6
		article no. galvanized				
42.4	(DN32)	177050012E03	35	4.94	23	0.8
48.3	(DN40)	177050015E03	35	6.41	23	0.8
60.3	(DN50)	177050020E03	35	9.99	24	0.8
76.1	(DN65)	177050029E03	35	15.91	24	0.8
88.9	(DN80)	177050030E03	35	21.71	24	0.8
114.3	(DN100)	177050045E03	35	35.89	26	1.6
168.3	(DN150)	177050065E03	31	68.93	27	1.6
219.1	(DN200)	177050085E03	20	75.37	31	1.6

• see table on page 35 for design data on axial displacement and angular deflection.

* maximum operating pressure and tensile strength depend on the used pipe material and wall thickness

7706 flexible reduced coupling

(with E gasket)



dimension	article no. painted red	max. pressure* [bar]	tensile strength* [kN]	l1/l2	z1	z2
48.3 x 42.4 (DN40 x DN32)	177061512E02	35	6.23	23	0.8	0.8
60.3 x 48.4 (DN50 x DN40)	177062015E02	35	9.7	24	0.8	0.8
73 x 60.3	177062520E02	35	14.22	24	0.8	0.8
76.1 x 60.3 (DN65 x DN50)	177062920E02	35	15.46	24	0.8	0.8
76.1 x 73	177062925E02	35	15.46	24	0.8	0.8
88.9 x 60.3 (DN80 x DN50)	177063020E02	35	21.09	24	0.8	0.8
88.9 x 73	177063025E02	35	21.09	24	0.8	0.8
88.9 x 76.1 (DN80 x DN65)	177063029E02	35	21.09	24	0.8	0.8
114.3 x 60.3 (DN100 x DN50)	177064520E02	35	34.87	25	1.6	0.8
114.3 x 73	177064525E02	35	34.87	25	1.6	0.8
114.3 x 76.1 (DN100 x DN65)	177064529E02	35	34.87	25	1.6	0.8
114.3 x 88.9 (DN100 x DN80)	177064530E02	35	34.87	26	1.6	0.8
139.7 x 114.3 (DN125 x DN100)	177065245E02	28	42.90	26	1.6	1.6
141.3 x 114.3	177065545E02	28	43.88	26	1.6	1.6
165.1 x 88.9	177066230E02	28	59.91	26	1.6	0.8
165.1 x 114.3 (DN150 x DN100)	177066245E02	28	59.91	26	1.6	1.6
168.3 x 88.9	177066530E02	28	62.26	26	1.6	1.6
168.3 x 114.3 (DN150 x DN100)	177066545E02	28	62.26	26	1.6	1.6
168.3 x 165.1	177066562E02	28	42.80	27	1.6	1.6
219.1 x 165.1	177068562E02	28	105.51	28	1.6	1.6
219.1 x 168.3 (DN200 x DN150)	177068565E02	28	105.51	27	1.6	1.6
	article no. galvanized					
48.3 x 42.4 (DN40 x DN32)	177061512E03	35	6.23	23	0.8	0.8
60.3 x 48.4 (DN50 x DN40)	177062015E03	35	9.7	24	0.8	0.8
73 x 60.3	177062520E03	35	14.22	24	0.8	0.8
76.1 x 60.3 (DN65 x DN50)	177062920E03	35	15.46	24	0.8	0.8
76.1 x 73	177062925E03	35	15.46	24	0.8	0.8
88.9 x 60.3 (DN80 x DN50)	177063020E03	35	21.09	24	0.8	0.8
88.9 x 73	177063025E03	35	21.09	24	0.8	0.8
88.9 x 76.1 (DN80 x DN65)	177063029E03	35	21.09	24	0.8	0.8
114.3 x 60.3 (DN100 x DN50)	177064520E03	35	34.87	25	1.6	0.8
114.3 x 73	177064525E03	35	34.87	25	1.6	0.8
114.3 x 76.1 (DN100 x DN65)	177064529E03	35	34.87	25	1.6	0.8
114.3 x 88.9 (DN100 x DN80)	177064530E03	35	34.87	26	1.6	0.8
139.7 x 114.3 (DN125 x DN100)	177065245E03	28	42.90	26	1.6	1.6
141.3 x 114.3	177065545E03	28	43.88	26	1.6	1.6
165.1 x 88.9	177066230E03	28	59.91	26	1.6	0.8
165.1 x 114.3 (DN150 x DN100)	177066245E03	28	59.91	26	1.6	1.6
168.3 x 88.9	177066530E03	28	62.26	26	1.6	1.6
168.3 x 114.3 (DN150 x DN100)	177066545E03	28	62.26	26	1.6	1.6
168.3 x 165.1	177066562E03	28	42.80	27	1.6	1.6
219.1 x 165.1	177068562E03	28	105.51	28	1.6	1.6
219.1 x 168.3 (DN200 x DN150)	177068565E03	28	105.51	27	1.6	1.6

• see table on page 35 for design data on axial displacement and angular deflection.

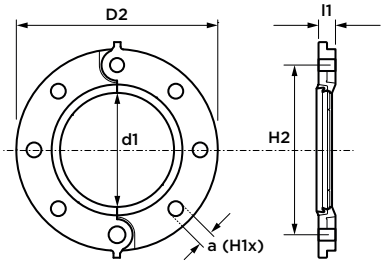
* maximum operating pressure and tensile strength depend on the used pipe material and wall thickness

product range

VSH Shurjoint flange adapters

SJ-7041 flange adapter - PN10/PN16

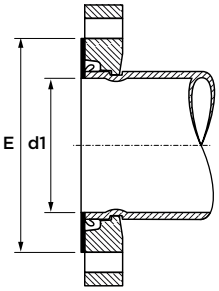
(DN50-300 hinged. DN350-600 two segments.
with E gasket)



dimension		article no. painted black	PN	max. pressure [bar]	tensile strength [kN]	l1	D2	H1	H2	a
60.3	(DN50)	1041B0020010	10/16	20	4.6	22	165	4	125	M16
76.1	(DN65)	1041B0029010	10/16	20	7.3	22	185	4	145	M16
88.9	(DN80)	1041B0030010	10/16	20	9.9	24	200	8	160	M16
114.3	(DN100)	1041B0045010	10/16	20	16.4	24	220	8	180	M16
139.7	(DN125)	1041B0052010	10/16	20	24.5	25	250	8	210	M16
165.1		1041B0062010	10/16	20	34.2	24	285	8	240	M20
168.3	(DN150)	1041A0065010	10/16	20	35.6	24	285	8	240	M20
219.1	(DN200)	1041B0085010	16	20	60.3	29	340	12	295	M20
273	(DN250)	1041B00A1010	16	20	93.6	30	405	12	355	M24
323.9	(DN300)	1041B00A3010	16	20	131.8	32	460	12	410	M24
		article no. galvanized								
60.3	(DN50)	1041B0020006	10/16	20	4.6	22	165	4	125	M16
76.1	(DN65)	1041B0029006	10/16	20	7.3	22	185	4	145	M16
88.9	(DN80)	1041B0030006	10/16	20	9.9	24	200	8	160	M16
114.3	(DN100)	1041B0045006	10/16	20	16.4	24	220	8	180	M16
139.7	(DN125)	1041B0052006	10/16	20	24.5	25	250	8	210	M16
165.1		1041B0062006	10/16	20	34.2	24	285	8	240	M20
168.3	(DN150)	1041A0065006	10/16	20	35.6	24	285	8	240	M20
219.1	(DN200)	1041B0085006	16	20	60.3	29	340	12	295	M20
273	(DN250)	1041B00A1006	16	20	93.6	30	405	12	355	M24
323.9	(DN300)	1041B00A3006	16	20	131.8	32	460	12	410	M24

49 sandwich plate

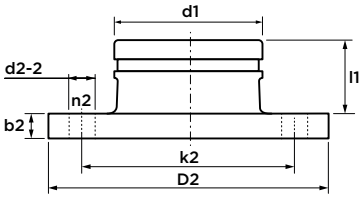
(steel, zinc plated)



dimension	article no.	E	d1
DN50	S00490020	95	54
DN65	S00490025	118	67
DN80	S00490030	130	81
DN100	S00490045	158	105
DN125	S00490055	188	128
DN150	S00490065	216	155
DN200	S00490085	271	205
DN250	S004900A1	326	258
DN300	S004900A3	381	305

7180 universal flange adapter

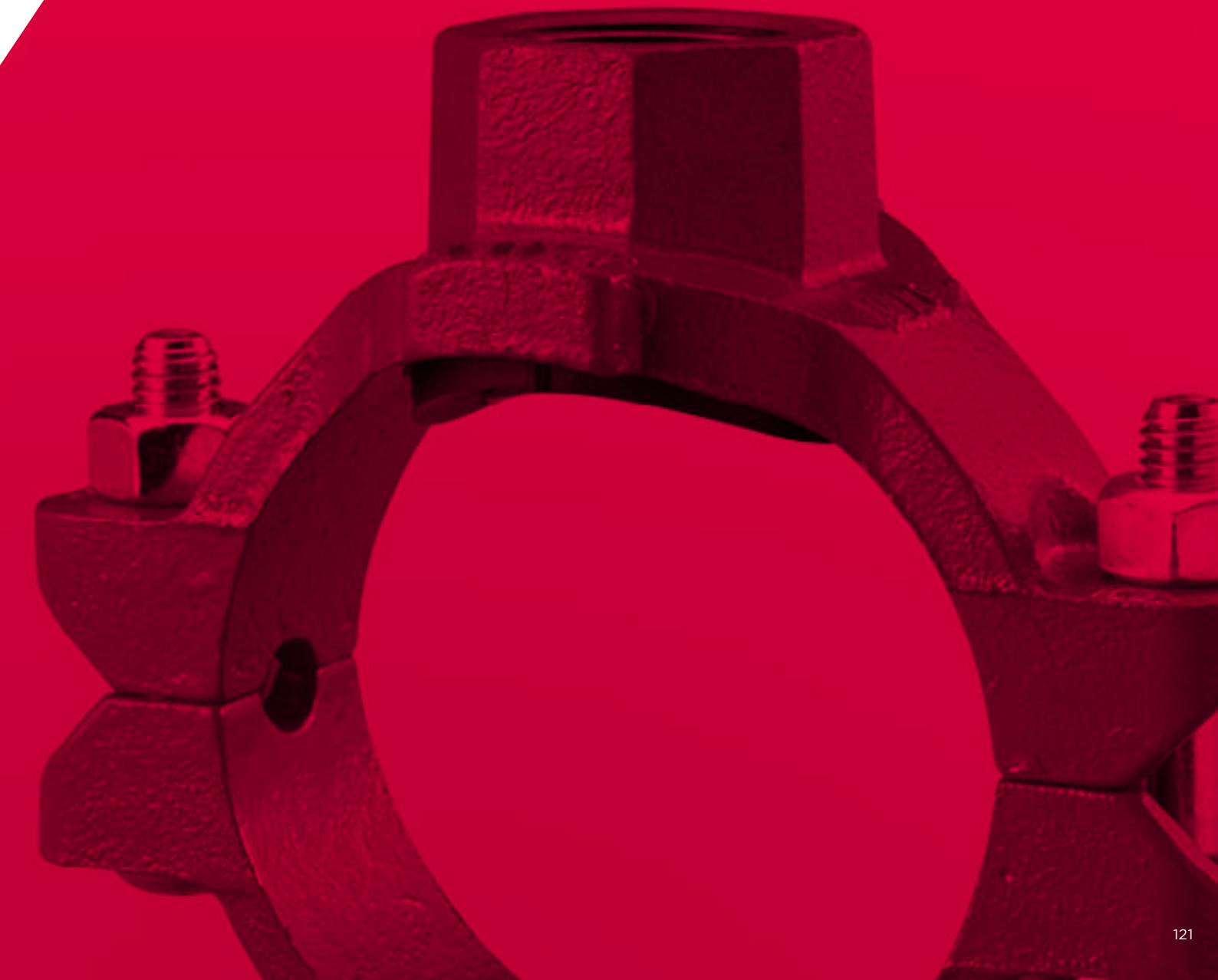
(PN 10/16, ANSI class 125/150, BS10E)



dimension	article no. painted orange	l1	D2	n2	k2	b2	d2-2
60.3 (DN50)	171800020001	48	165	4	114-125	16	M16
73	171800025001	60	185	4	127-145	16	M16
76.1 (DN65)	171800029001	60	185	4	127-145	16	M16
88.9 (DN80)	171800030001	59	200	8	146-160	16	M16
114.3 (DN100)	171800045001	59	225	8	175-191	16	M16
139.7 (DN125)	171800052001	59	254	8	210-216	16	M20
141.3	171800055001	53	254	8	210-216	22	M20
165.1	171800062001	59	272	8	235-241	16	M20
168.3 (DN150)	171800065001	59	272	8	240-241	16	M20
219.1 (DN200)	171800085001	80	343	12	290-298	22	M20
	article no. galvanized						
60.3 (DN50)	171800020003	48	165	4	114-125	16	M16
73	171800025003	60	185	4	127-145	16	M16
76.1 (DN65)	171800029003	60	185	4	127-145	16	M16
88.9 (DN80)	171800030003	59	200	8	146-160	16	M16
114.3 (DN100)	171800045003	59	225	8	175-191	16	M16
139.7 (DN125)	171800052003	59	254	8	210-216	16	M20
141.3	171800055003	53	254	8	210-216	22	M20
165.1	171800062003	59	272	8	235-241	16	M20
168.3 (DN150)	171800065003	59	272	8	240-241	16	M20
219.1 (DN200)	171800085003	80	343	12	290-298	22	M20

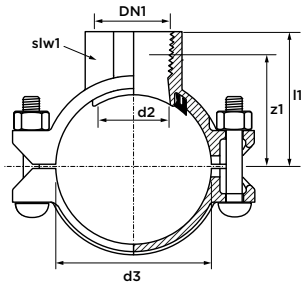
product range

VSH Shurjoint mechanical tees



7721 mechanical tee

(ISO 7-1 female thread, with E gasket)

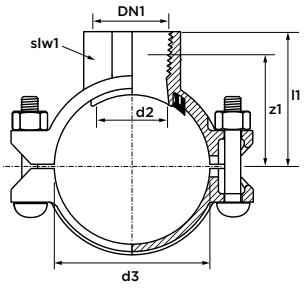


dimension	article no. painted red	max. pressure [bar]	l1	z1	DN1	d2*	d3	slw1
60.3 x Rc½	177212005E02	20	64	50	21.3	38	60.3	30
60.3 x Rc¾	177212007E02	20	64	50	26.9	38	60.3	36
60.3 x Rc1	177212010E02	20	68	51	33.7	38	60.3	44
60.3 x Rc1¼	177212012E02	20	71	53	42.4	45	60.3	55
60.3 x Rc1½	177212015E02	20	71	53	48.3	45	60.3	60
76.1 x Rc½	177212505E02	20	71	57	21.3	38	76.1	30
76.1 x Rc¾	177212507E02	20	73	59	26.9	38	76.1	36
76.1 x Rc1	177212510E02	20	75	58	33.7	38	76.1	44
76.1 x Rc1¼	177212512E02	20	79	61	42.4	45	76.1	55
76.1 x Rc1½	177212515E02	20	79	61	48.3	45	76.1	60
88.9 x Rc½	177213005E02	20	81	63	21.3	38	88.9	30
88.9 x Rc¾	177213007E02	20	78	62	26.9	38	88.9	36
88.9 x Rc1	177213010E02	20	81	64	33.7	38	88.9	44
88.9 x Rc1¼	177213012E02	20	89	71	42.4	45	88.9	55
88.9 x Rc1½	177213015E02	20	89	71	48.3	45	88.9	60
88.9 x Rc2	177213020E02	20	91	72	60.3	64	88.9	73
114.3 x Rc½	177214505E02	20	94	76	21.3	38	114.3	30
114.3 x Rc¾	177214507E02	20	91	75	26.9	38	114.3	36
114.3 x Rc1	177214510E02	20	94	77	33.7	38	114.3	44
114.3 x Rc1¼	177214512E02	20	99	81	42.4	45	114.3	55
114.3 x Rc1½	177214515E02	20	99	81	48.3	45	114.3	60
114.3 x Rc2	177214520E02	20	105	86	60.3	64	114.3	73
114.3 x Rc2½	177214525E02	20	111	82	76.1	70	114.3	89
114.3 x Rc3	177214530E02	20	112	82	88.9	89	114.3	107
139.7 x Rc2	177215520E02	20	124	105	60.3	64	139.7	73
139.7 x Rc2½	177215525E02	20	127	99	76.1	70	139.7	89
168.3 x Rc½	177216505E02	20	126	114	21.3	51	168.3	30
168.3 x Rc1	177216510E02	20	127	110	33.7	51	168.3	44
168.3 x Rc1¼	177216512E02	20	127	109	42.4	45	168.3	55
168.3 x Rc1½	177216515E02	20	127	109	48.3	45	168.3	60
168.3 x Rc2	177216520E02	20	132	113	60.3	64	168.3	72
168.3 x Rc2½	177216525E02	20	140	111	76.1	70	168.3	88
168.3 x Rc3	177216530E02	20	140	110	88.9	89	168.3	108
219.1 x Rc½	177218505E02	20	148	135	21.3	70	219.1	30
219.1 x Rc1	177218510E02	20	152	135	33.7	70	219.1	44
219.1 x Rc1¼	177218512E02	20	152	135	42.4	70	219.1	55
219.1 x Rc1½	177218515E02	20	152	135	48.3	70	219.1	60
219.1 x Rc2	177218520E02	20	166	135	60.3	64	219.1	73
219.1 x Rc2½	177218525E02	20	166	137	76.1	70	219.1	89
219.1 x Rc3	177218530E02	20	166	136	88.9	89	219.1	107

* see table on page 31 for hole cut specifications and installation instructions.

7721 mechanical tee

(ISO 7-1 female thread, with E gasket)

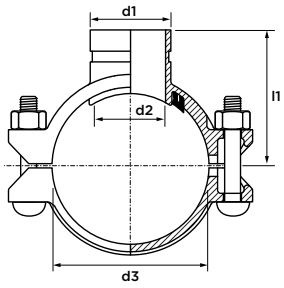


dimension	article no. galvanized	max. pressure [bar]	l1	z1	DN1	d2*	d3	slw1
60.3 x Rc½	177212005E04	20	64	50	21.3	38	60.3	30
60.3 x Rc¾	177212007E04	20	64	50	26.9	38	60.3	36
60.3 x Rc1	177212010E04	20	68	51	33.7	38	60.3	44
60.3 x Rc1¼	177212012E04	20	71	53	42.4	45	60.3	55
60.3 x Rc1½	177212015E04	20	71	53	48.3	45	60.3	60
76.1 x Rc½	177212505E04	20	71	57	21.3	38	76.1	30
76.1 x Rc¾	177212507E04	20	73	59	26.9	38	76.1	36
76.1 x Rc1	177212510E04	20	75	58	33.7	38	76.1	44
76.1 x Rc1¼	177212512E04	20	79	61	42.4	45	76.1	55
76.1 x Rc1½	177212515E04	20	79	61	48.3	45	76.1	60
88.9 x Rc½	177213005E04	20	81	63	21.3	38	88.9	30
88.9 x Rc¾	177213007E04	20	78	62	26.9	38	88.9	36
88.9 x Rc1	177213010E04	20	81	64	33.7	38	88.9	44
88.9 x Rc1¼	177213012E04	20	89	71	42.4	45	88.9	55
88.9 x Rc1½	177213015E04	20	89	71	48.3	45	88.9	60
88.9 x Rc2	177213020E04	20	91	72	60.3	64	88.9	73
114.3 x Rc½	177214505E04	20	94	76	21.3	38	114.3	30
114.3 x Rc¾	177214507E04	20	91	75	26.9	38	114.3	36
114.3 x Rc1	177214510E04	20	94	77	33.7	38	114.3	44
114.3 x Rc1¼	177214512E04	20	99	81	42.4	45	114.3	55
114.3 x Rc1½	177214515E04	20	99	81	48.3	45	114.3	60
114.3 x Rc2	177214520E04	20	105	86	60.3	64	114.3	73
114.3 x Rc2½	177214525E04	20	111	82	76.1	70	114.3	89
114.3 x Rc3	177214530E04	20	112	82	88.9	89	114.3	107
139.7 x Rc2	177215520E04	20	124	105	60.3	64	139.7	73
139.7 x Rc2½	177215525E04	20	127	99	76.1	70	139.7	89
168.3 x Rc½	177216505E04	20	126	114	21.3	51	168.3	30
168.3 x Rc1	177216510E04	20	127	110	33.7	51	168.3	44
168.3 x Rc1¼	177216512E04	20	127	109	42.4	45	168.3	55
168.3 x Rc1½	177216515E04	20	127	109	48.3	45	168.3	60
168.3 x Rc2	177216520E04	20	132	113	60.3	64	168.3	72
168.3 x Rc2½	177216525E04	20	140	111	76.1	70	168.3	88
168.3 x Rc3	177216530E04	20	140	110	88.9	89	168.3	108
219.1 x Rc½	177218505E04	20	148	135	21.3	70	219.1	30
219.1 x Rc1	177218510E04	20	152	135	33.7	70	219.1	44
219.1 x Rc1¼	177218512E04	20	152	135	42.4	70	219.1	55
219.1 x Rc1½	177218515E04	20	152	135	48.3	70	219.1	60
219.1 x Rc2	177218520E04	20	166	135	60.3	64	219.1	73
219.1 x Rc2½	177218525E04	20	166	137	76.1	70	219.1	89
219.1 x Rc3	177218530E04	20	166	136	88.9	89	219.1	107

* see table on page 31 for hole cut specifications and installation instructions.

7722 mechanical tee

(grooved end outlet, with E gasket)

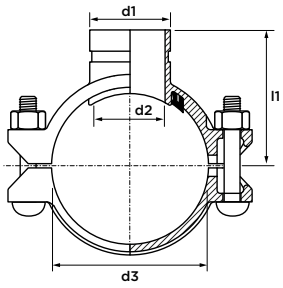


dimension	article no. painted red	max. pressure [bar]	l1/z1	d1	d2	d3
60.3 x 42.4	177222012E02	20	71	42.4	45	60.3
60.3 x 48.3	177222015E02	20	71	48.3	45	60.3
76.1 x 42.4	177222512E02	20	79	42.4	45	76.1
76.1 x 48.3	177222515E02	20	79	48.3	45	76.1
88.9 x 33.7	177223010E02	20	84	33.7	38	88.9
88.9 x 42.4	177223012E02	20	89	42.4	45	88.9
88.9 x 48.3	177223015E02	20	89	48.3	45	88.9
88.9 x 60.3	177223020E02	20	91	60.3	64	88.9
114.3 x 33.7	177224510E02	20	94	33.7	38	114.3
114.3 x 42.4	177224512E02	20	99	42.4	45	114.3
114.3 x 48.3	177224515E02	20	99	48.3	45	114.3
114.3 x 60.3	177224520E02	20	105	60.3	64	114.3
114.3 x 73	177224525E02	20	111	73	70	114.3
114.3 x 76.1	177224529E02	20	111	76.1	70	114.3
114.3 x 88.9	177224530E02	20	112	88.9	89	114.3
139.7 x 60.3	177225520E02	20	124	60.3	64	139.7
139.7 x 73	177225525E02	20	127	73	70	139.7
139.7 x 76.1	177225529E02	20	127	76.1	70	139.7
168.3 x 42.4	177226512E02	20	127	42.4	45	168.3
168.3 x 48.3	177226515E02	20	127	48.3	45	168.3
168.3 x 60.3	177226520E02	20	132	60.3	64	168.3
168.3 x 73	177226525E02	20	140	73	70	168.3
168.3 x 76.1	177226529E02	20	140	76.1	70	168.3
168.3 x 88.9	177226530E02	20	140	88.9	89	168.3
168.3 x 114.3	177226545E02	20	140	114.3	114	168.3
219.1 x 60.3	177228520E02	20	166	60.3	64	219.1
219.1 x 73	177228525E02	20	166	73	70	219.1
219.1 x 76.1	177228529E02	20	166	76.1	70	219.1
219.1 x 88.9	177228530E02	20	166	88.9	89	219.1
219.1 x 114.3	177228545E02	20	166	114.3	114	219.1

* see table on page 31 for hole cut specifications and installation instructions.

7722 mechanical tee

(grooved end outlet, with E gasket)

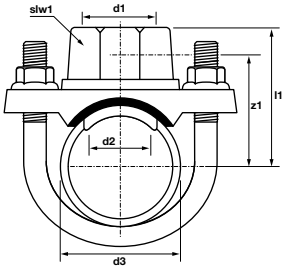


dimension	article no. galvanized	max. pressure [bar]	l1/z1	d1	d2	d3
60.3 x 42.4	177222012E03	20	71	42.4	45	60.3
60.3 x 48.3	177222015E03	20	71	48.3	45	60.3
76.1 x 42.4	177222512E03	20	79	42.4	45	76.1
76.1 x 48.3	177222515E03	20	79	48.3	45	76.1
88.9 x 33.7	177223010E03	20	84	33.7	38	88.9
88.9 x 42.4	177223012E03	20	89	42.4	45	88.9
88.9 x 48.3	177223015E03	20	89	48.3	45	88.9
88.9 x 60.3	177223020E03	20	91	60.3	64	88.9
114.3 x 33.7	177224510E03	20	94	33.7	38	114.3
114.3 x 42.4	177224512E03	20	99	42.4	45	114.3
114.3 x 48.3	177224515E03	20	99	48.3	45	114.3
114.3 x 60.3	177224520E03	20	105	60.3	64	114.3
114.3 x 73	177224525E03	20	111	73	70	114.3
114.3 x 76.1	177224529E03	20	111	76.1	70	114.3
114.3 x 88.9	177224530E03	20	112	88.9	89	114.3
139.7 x 60.3	177225520E03	20	124	60.3	64	139.7
139.7 x 73	177225525E03	20	127	73	70	139.7
139.7 x 76.1	177225529E03	20	127	76.1	70	139.7
168.3 x 42.4	177226512E03	20	127	42.4	45	168.3
168.3 x 48.3	177226515E03	20	127	48.3	45	168.3
168.3 x 60.3	177226520E03	20	132	60.3	64	168.3
168.3 x 73	177226525E03	20	140	73	70	168.3
168.3 x 76.1	177226529E03	20	140	76.1	70	168.3
168.3 x 88.9	177226530E03	20	140	88.9	89	168.3
168.3 x 114.3	177226545E03	20	140	114.3	114	168.3
219.1 x 60.3	177228520E03	20	166	60.3	64	219.1
219.1 x 73	177228525E03	20	166	73	70	219.1
219.1 x 76.1	177228529E03	20	166	76.1	70	219.1
219.1 x 88.9	177228530E03	20	166	88.9	89	219.1
219.1 x 114.3	177228545E03	20	166	114.3	114	219.1

* see table on page 31 for hole cut specifications and installation instructions.

723 saddle-let

(female outlet, with E gasket)



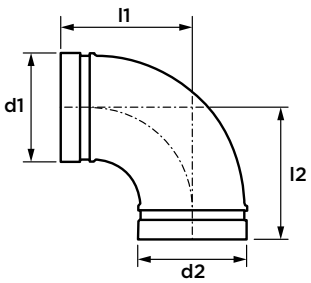
dimension	article no. painted red	l1	z1	d1	d2	d3	slw1
42.4 x RP½	107231205V02	50	44	21.3	30	42.4	29
42.4 x RP¾	107231207V02	50	44	26.9	30	42.4	34.5
42.4 x RP1	107231210V02	54	47	33.7	30	42.4	40.5
48.4 x RP½	107231505V02	53	46	21.3	30	48.3	29
48.4 x RP¾	107231507V02	53	46	26.9	30	48.3	34.5
48.4 x RP1	107231510V02	58	49	33.7	30	48.3	40.5
60.3 x RP½	107232005V02	60	53	21.3	30	60.3	29
60.3 x RP¾	107232007V02	60	53	26.9	30	60.3	34.5
60.3 x RP1	107232010V02	64	56	33.7	30	60.3	40.5
76.1 x RP½	107232505V02	66	58	21.3	30	76.1	29
76.1 x RP¾	107232507V02	66	58	26.9	30	76.1	34.5
76.1 x RP1	107232510V02	70	61	33.7	30	76.1	40.5
	article no. galvanized						
42.4 x RP½	107231205V04	50	44	21.3	30	42.4	29
42.4 x RP¾	107231207V04	50	44	26.9	30	42.4	34.5
42.4 x RP1	107231210V04	54	47	33.7	30	42.4	40.5
48.4 x RP½	107231505V04	53	46	21.3	30	48.3	29
48.4 x RP¾	107231507V04	53	46	26.9	30	48.3	34.5
48.4 x RP1	107231510V04	58	49	33.7	30	48.3	40.5
60.3 x RP½	107232005V04	60	53	21.3	30	60.3	29
60.3 x RP¾	107232007V04	60	53	26.9	30	60.3	34.5
60.3 x RP1	107232010V04	64	56	33.7	30	60.3	40.5
76.1 x RP½	107232505V04	66	58	21.3	30	76.1	29
76.1 x RP¾	107232507V04	66	58	26.9	30	76.1	34.5
76.1 x RP1	107232510V04	70	61	33.7	30	76.1	40.5

product range

VSH Shurjoint grooved fittings

7110 & 901 bend 90°

(2 x groove)

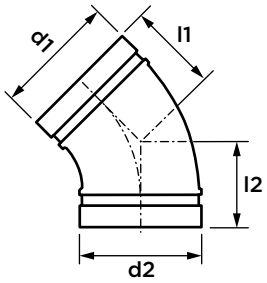


dimension		model	article no. painted red	l1/l2 z1/z2
42.4	(DN32)	7110	171100012002	70
48.3	(DN40)	7110	171100015002	70
60.3	(DN50)	901 (short radius)	109010020002	70
73.0		901 (short radius)	109010025002	76
76.1	(DN65)	901 (short radius)	109010029002	76
88.9	(DN80)	901 (short radius)	109010030002	86
114.3	(DN100)	901 (short radius)	109010045002	102
139.7	(DN125)	901 (short radius)	109010052002	124
141.3		901 (short radius)	109010055002	124
165.1		901 (short radius)	109010062002	140
168.3	(DN150)	901 (short radius)	109010065002	140
219.1	(DN200)	901 (short radius)	109010085002	176
273	(DN250)	7110	1711000A1002	229
323.9	(DN300)	7110	1711000A3002	254

dimension		model	article no. galvanized	l1/l2 z1/z2
42.4	(DN32)	7110	171100012003	70
48.3	(DN40)	7110	171100015003	70
60.3	(DN50)	901 (short radius)	109010020003	70
73.0		901 (short radius)	109010025003	76
76.1	(DN65)	901 (short radius)	109010029003	76
88.9	(DN80)	901 (short radius)	109010030003	86
114.3	(DN100)	901 (short radius)	109010045003	102
139.7	(DN125)	901 (short radius)	109010052003	124
141.3		901 (short radius)	109010055003	124
165.1	1711100	901 (short radius)	109010062003	140
168.3	(DN150)	901 (short radius)	109010065003	140
219.1	(DN200)	901 (short radius)	109010085003	176
273	(DN250)	7110	1711000A1003	229
323.9	(DN300)	7110	1711000A3003	254

7111 bend 45°

(2 x groove)

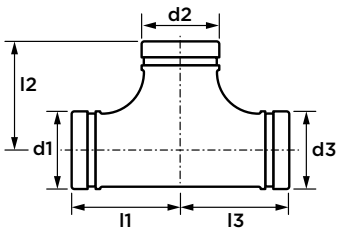


dimension		article no. painted red	l1/l2
33.7	(DN25)	171110010002	45
42.4	(DN32)	171110012002	45
48.3	(DN40)	171110015002	45
60.3	(DN50)	171110020002	51
73		171110025002	57
76.1	(DN65)	171110029002	57
88.9	(DN80)	171110030002	57
108		171110040002	76
114.3	(DN100)	171110045002	76
139.7	(DN125)	171110052002	83
141.3		171110055002	83
159		171110060002	89
165.1		171110062002	89
168.3	(DN150)	171110065002	89
219.1	(DN200)	171110085002	108
273	(DN250)	1711100A1002	121
323.9	(DN300)	1711100A3002	133

dimension		article no. galvanized	
33.7	(DN25)	171110010003	45
42.4	(DN32)	171110012003	45
48.3	(DN40)	171110015003	45
60.3	(DN50)	171110020003	51
73		171110025003	57
76.1	(DN65)	171110029003	57
88.9	(DN80)	171110030003	57
108		171110040003	76
114.3	(DN100)	171110045003	76
139.7	(DN125)	171110052003	83
141.3		171110055003	83
159		171110060003	89
165.1		171110062003	89
168.3	(DN150)	171110065003	89
219.1	(DN200)	171110085003	108
273	(DN250)	1711100A1003	121
323.9	(DN300)	1711100A3003	133

7120 & 903 tee

(3 x groove)

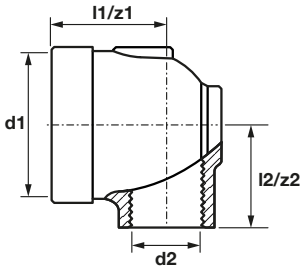


dimension		model	article no. painted red	l1/l2/l3 z1/z2/z3
42.4	(DN32)	7120	171200012002	70
48.3	(DN40)	7120	171200015002	70
60.3	(DN50)	903 (short radius)	109030020002	70
73.0		903 (short radius)	109030025002	76
76.1	(DN65)	903 (short radius)	109030029002	76
88.9	(DN80)	903 (short radius)	109030030002	86
114.3	(DN100)	903 (short radius)	109030045002	102
139.7	(DN125)	903 (short radius)	109030052002	124
141.3		903 (short radius)	109030055002	124
165.1	1711100	903 (short radius)	109030062002	140
168.3	(DN150)	903 (short radius)	109030065002	140
219.1	(DN200)	903 (short radius)	109030085002	176
273	(DN250)	7120	1712000A1002	229
323.9	(DN300)	7120	1712000A3002	254

dimension		model	article no. galvanized	L1/L2
42.4	(DN32)	7120	171200012003	70
48.3	(DN40)	7120	171200015003	70
60.3	(DN50)	903 (short radius)	109030020003	70
73.0		903 (short radius)	109030025003	76
76.1	(DN65)	903 (short radius)	109030029003	76
88.9	(DN80)	903 (short radius)	109030030003	86
114.3	(DN100)	903 (short radius)	109030045003	102
139.7	(DN125)	903 (short radius)	109030052003	124
141.3		903 (short radius)	109030055003	124
165.1	1711100	903 (short radius)	109030062003	140
168.3	(DN150)	903 (short radius)	109030065003	140
219.1	(DN200)	903 (short radius)	109030085003	176
273	(DN250)	7120	1712000A1003	229
323.9	(DN300)	7120	1712000A3003	254

899 end-all fitting

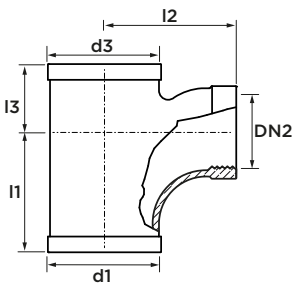
(2 x groove/female outlet with drain)



dimension	article no. painted red	l1/l2	l2	z2
42,4 x Rp½	108991205004	45	30	19
42,4 x Rp¾	108991207004	45	30	17
42,4 x Rp1	108991210004	48	32	17
48,3 x Rp½	108991505004	45	33	22
48,3 x Rp¾	108991507004	45	33	20
48,3 x Rp1	108991510004	48	35	20
60,3 x Rp½	108992005004	45	40	29
60,3 x Rp¾	108992007004	45	40	27
60,3 x Rp½	108992010004	48	41	26
73,0 x Rp½	108992505004	45	45	34
73,0 x Rp¾	108992507004	45	45	32
73,0 x Rp½	108992510004	48	46	31
76,1 x Rp¾	108992907004	45	45	32
	article no. galvanized			
42,4 x Rp½	108991205006	45	30	19
42,4 x Rp¾	108991207006	45	30	17
42,4 x Rp1	108991210006	48	32	17
48,3 x Rp½	108991505006	45	33	22
48,3 x Rp¾	108991507006	45	33	20
48,3 x Rp1	108991510006	48	35	20
60,3 x Rp½	108992005006	45	40	29
60,3 x Rp¾	108992007006	45	40	27
60,3 x Rp½	108992010006	48	41	26
73,0 x Rp½	108992505006	45	45	34
73,0 x Rp¾	108992507006	45	45	32
73,0 x Rp½	108992510006	48	46	31
76,1 x Rp¾	108992907006	45	45	32

7133 pitcher tee

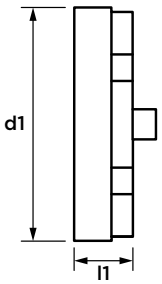
(3 x groove)



dimension	article no. (galvanized)	l1/z1	l2	z2	l3/z3	d2
88.9 x Rp2½	171333029007	121	121	98	69	Rp2½
114.3 x Rc2½	171334529004	121	133	110	69	Rp2½

7160 end cap

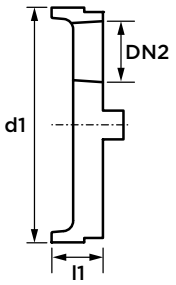
(groove)



dimension		article no. painted red	l1
33.7	(DN25)	171600010002	22
42.4	(DN32)	171600012002	25
48.3	(DN40)	171600015002	25
60.3	(DN50)	171600020002	25
73		171600025002	25
76.1	(DN65)	171600029002	25
88.9	(DN80)	171600030002	25
108		171600040002	25
114.3	(DN100)	171600045002	25
133		171600050002	25
139.7	(DN125)	171600052002	25
141.3		171600055002	25
159		171600060002	25
165.1		171600062002	25
168.3	(DN150)	171600065002	25
219.1	(DN200)	171600085002	30
273	(DN250)	1716000A1002	30
323.9	(DN300)	1716000A3002	32
		article no. galvanized	
33.7	(DN25)	171600010003	22
42.4	(DN32)	171600012003	25
48.3	(DN40)	171600015003	25
60.3	(DN50)	171600020003	25
73		171600025003	25
76.1	(DN65)	171600029003	25
88.9	(DN80)	171600030003	25
108		171600040003	25
114.3	(DN100)	171600045003	25
133		171600050003	25
139.7	(DN125)	171600052003	25
141.3		171600055003	25
159		171600060003	25
165.1		171600062003	25
168.3	(DN150)	171600065003	25
219.1	(DN200)	171600085003	30
273	(DN250)	1716000A1003	30
323.9	(DN300)	1716000A3003	32

7160T end cap with eccentric drain

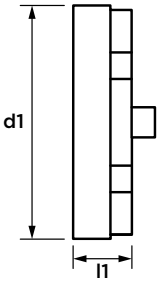
(groove x female thread)



dimension	article no. painted red	l1	DN2
60.3 x Rc1	1160T2010002	24	Rc1
76.1 x Rc1	1160T2910002	24	Rc1
76.1 x Rc1¼	1160T2912002	24	Rc1¼
76.1 x Rc1½	1160T2915002	24	Rc1½
88.9 x Rc1	1160T3010002	25	Rc1
88.9 x Rc1¼	1160T3012002	25	Rc1¼
88.9 x Rc1½	1160T3015002	25	Rc1½
88.9 x Rc2	1160T3020002	25	Rc2
114.3 x Rc1	1160T4510002	25	Rc1
114.3 x Rc1¼	1160T4512002	25	Rc1¼
114.3 x Rc1½	1160T4515002	25	Rc1½
114.3 x Rc2	1160T4520002	25	Rc2
139.7 x Rc2	1160T5220002	25	Rc2
165.1 x Rc2	1160T6220002	25	Rc2
168.3 x Rc2	1160T6520002	25	Rc2
219.1 x Rc2	1160T8520002	30	Rc2
	article no. galvanized		
60.3 x Rc1	1160T2010004	24	Rc1
76.1 x Rc1	1160T2910004	24	Rc1
76.1 x Rc1¼	1160T2912004	24	Rc1¼
76.1 x Rc1½	1160T2915004	24	Rc1½
88.9 x Rc1	1160T3010004	25	Rc1
88.9 x Rc1¼	1160T3012004	25	Rc1¼
88.9 x Rc1½	1160T3015004	25	Rc1½
88.9 x Rc2	1160T3020004	25	Rc2
114.3 x Rc1	1160T4510004	25	Rc1
114.3 x Rc1¼	1160T4512004	25	Rc1¼
114.3 x Rc1½	1160T4515004	25	Rc1½
114.3 x Rc2	1160T4520004	25	Rc2
139.7 x Rc2	1160T5220004	25	Rc2
165.1 x Rc2	1160T6220004	25	Rc2
168.3 x Rc2	1160T6520004	25	Rc2
219.1 x Rc2	1160T8520002	30	Rc2

7160T end cap with concentric drain

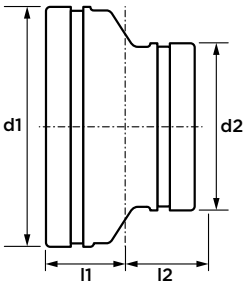
(groove x female thread)



dimension	article no. painted red	l1
60.3 x Rc1	1160C2010002	24
76.1 x Rc1	1160C2910002	24
76.1 x Rc1½	1160C2915002	24
88.9 x Rc1	1160C3010002	25
88.9 x Rc2	1160C3020002	25
114.3 x Rc1	1160C4510002	25
114.3 x Rc2	1160C4520002	25
139.7 x Rc2	1160C5220002	25
165.1 x Rc2	1160C6220002	25
168.3 x Rc2	1160C6520002	25
219.1 x Rc2	1160C8520002	30
	article no. galvanized	
60.3 x Rc1	1160C2010003	24
76.1 x Rc1	1160C2910003	24
76.1 x Rc1½	1160C2915003	24
88.9 x Rc1	1160C3010003	25
88.9 x Rc2	1160C3020003	25
114.3 x Rc1	1160C4510003	25
114.3 x Rc2	1160C4520003	25
139.7 x Rc2	1160C5220003	25
165.1 x Rc2	1160C6220003	25
168.3 x Rc2	1160C6520003	25
219.1 x Rc2	1160C8520003	30

7150 reducer

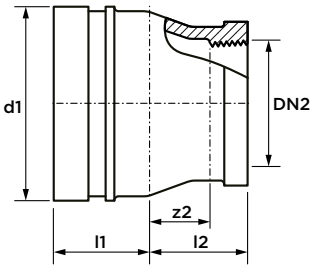
(2 x groove)



dimension	article no. painted red	l1/l2
48.3 x 42.4	171501512002	32
60.3 x 42.4	171502012002	32
60.3 x 48.3	171502015002	32
76.1 x 42.4	171502912002	32
76.1 x 48.3	171502915002	32
76.1 x 60.3	171502920002	32
88.9 x 48.3	171503015002	32
88.9 x 60.3	171503020002	32
88.9 x 76.1	171503029002	32
114.3 x 60.3	171504520002	38
114.3 x 76.1	171504529002	38
114.3 x 88.9	171504530002	38
168.3 x 88.9	171506530002	51
168.3 x 114.3	171506545002	51
168.3 x 139.7	171506552002	51
219.1 x 168.3	171508565002	64
dimension	**article no. galvanized**	**l1/l2**
48.3 x 42.4	171501512003	32
60.3 x 42.4	171502012003	32
60.3 x 48.3	171502015003	32
76.1 x 42.4	171502912003	32
76.1 x 48.3	171502915003	32
76.1 x 60.3	171502920003	32
88.9 x 48.3	171503015003	32
88.9 x 60.3	171503020003	32
88.9 x 76.1	171503029003	32
114.3 x 60.3	171504520003	38
114.3 x 76.1	171504529003	38
114.3 x 88.9	171504530003	38
168.3 x 88.9	171506530003	51
168.3 x 114.3	171506545003	51
168.3 x 139.7	171506552003	51
219.1 x 168.3	171508565003	64

7150F adapter

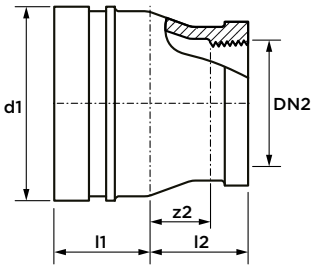
(groove x female thread)



dimension	article no. painted orange	l1/l2	z2
48.3 x Rp1	1150F1510013	32	17
60.3 x Rp1	1150F2010013	32	17
60.3 x Rp1¼	1150F2012013	32	15
60.3 x Rp1½	1150F2015013	32	14
76.1 x Rp1	1150F2910013	32	17
76.1 x Rp1¼	1150F2912013	32	15
76.1 x Rp1½	1150F2915013	32	14
76.1 x Rp2	1150F2920013	32	12
88.9 x Rp1	1150F3010013	32	17
88.9 x Rp1¼	1150F3012013	32	15
88.9 x Rp1½	1150F3015013	32	14
88.9 x Rp2	1150F3020013	32	12
88.9 x Rp2½	1150F3025013	32	9
114.3 x Rp1¼	1150F4512013	38	21
114.3 x Rp1½	1150F4515013	38	20
114.3 x Rp2	1150F4520013	38	18
114.3 x Rp2½	1150F4525013	38	15
139.7 x Rp1½	1150F5215013	45	27
165.1 x Rp1½	1150F6215013	51	33
165.1 x Rp2	1150F6220013	51	31
165.1 x Rp2½	1150F6225013	51	28
165.1 x Rp4	1150F6245013	51	23
168.3 x Rp1½	1150F6515013	51	33
168.3 x Rp2	1150F6520013	51	31
168.3 x Rp2½	1150F6525013	51	28
168.3 x Rp4	1150F6545013	51	23

7150F adapter

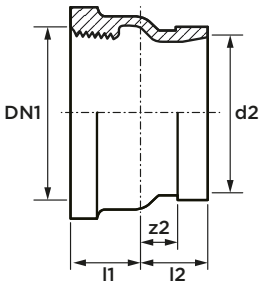
(groove x female thread)



dimension	article no. galvanized	l1/l2	z2
48.3 x Rp1	1150F1510014	32	17
60.3 x Rp1	1150F2010014	32	17
60.3 x Rp1¼	1150F2012014	32	15
60.3 x Rp1½	1150F2015014	32	14
76.1 x Rp1	1150F2910014	32	17
76.1 x Rp1¼	1150F2912014	32	15
76.1 x Rp1½	1150F2915014	32	14
76.1 x Rp2	1150F2920014	32	12
88.9 x Rp1	1150F3010014	32	17
88.9 x Rp1¼	1150F3012014	32	15
88.9 x Rp1½	1150F3015014	32	14
88.9 x Rp2	1150F3020014	32	12
88.9 x Rp2½	1150F3025014	32	9
114.3 x Rp1¼	1150F4512014	38	21
114.3 x Rp1½	1150F4515014	38	20
114.3 x Rp2	1150F4520014	38	18
114.3 x Rp2½	1150F4525014	38	15
139.7 x Rp1½	1150F5215014	45	27
165.1 x Rp1½	1150F6215014	51	33
165.1 x Rp2	1150F6220014	51	31
165.1 x Rp2½	1150F6225014	51	28
165.1 x Rp4	1150F6245014	51	23
168.3 x Rp1½	1150F6515014	51	33
168.3 x Rp2	1150F6520014	51	31
168.3 x Rp2½	1150F6525014	51	28
168.3 x Rp4	1150F6545014	51	23

54 adapter

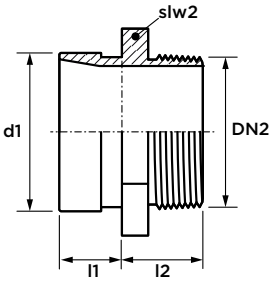
(groove x female thread)



dimension	article no. painted orange	l1/l2	z2
48.3 x Rp1½	100541515006	30	12
60.3 x Rp2	100542020006	32	12
76.1 x Rp2½	100542929006	35	12
88.9 x Rp3	100543030006	35	10
114.3 x Rp4	100544545006	42	14
	article no. galvanized		
48.3 x Rp1½	100541515007	30	12
60.3 x Rp2	100542020007	32	12
76.1 x Rp2½	100542929007	35	12
88.9 x Rp3	100543030007	35	10
114.3 x Rp4	100544545007	42	14

55 adapter

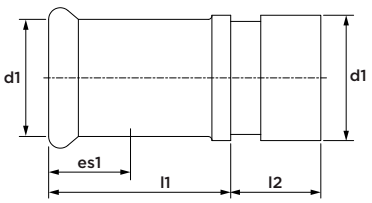
(groove x male thread)



dimension	article no. painted orange	l1/l2	slw2
48.3 x R1½	100551515007	32	54
60.3 x R2	100552020007	32	64
76.1 x R2½	100552925007	38	80
88.9 x R3	100553030007	40	90
	article no. galvanized		
48.3 x R1½	100551515003	32	54
60.3 x R2	100552020003	32	64
76.1 x R2½	100552925003	38	80
88.9 x R3	100553030003	40	90

C1442 adapter to VSH XPress

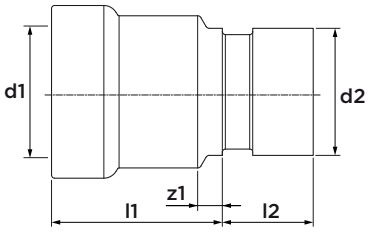
(press x groove)



dimension	artikelnr.	l1	l2	es1
28 x 33.7	6241301	49	24	23
35 x 42.4	6241345	54	24	26
42 x 48.3	6241356	61	24	30
54 x 60.3	6241367	73	24	35
76.1 x 73	6341181	68	24	50
76.1 x 76.1	6340774	66	24	55
88.9 x 88.9	6340785	76	24	63
108 x 114	6340796	84	26	77

C9448 adapter to VSH PowerPress®

(press x groove)



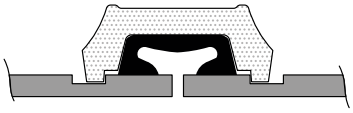
dimension	artikelnr.	l1	l2	z1
1" x 33.7	PWR9401095	45	24	8
1¼" x 42.4	PWR9401106	58	24	9
1½" x 48.3	PWR9401117	58	24	9
2" x 60.3	PWR9401128	63	24	9

product range

VSH Shurjoint gaskets and accessories

gasket type C (standard)

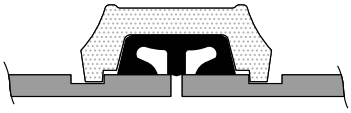
(for couplings Z05, Z07, 7707, 7705)



dimension		article no.			
		EPDM (grade E)	nitrile (grade T)	silicone (grade L)	fluoro-elastomer (grade O)
33.7	(DN25)	SG05E0010	SG05T0010	SG05L0010	SG05V0010
42.4	(DN32)	SG05E0012	SG05T0012	SG05L0012	SG05V0012
48.3	(DN40)	SG05E0015	SG05T0015	SG05L0015	SG05V0015
60.3	(DN50)	SG05E0020	SG05T0020	SG05L0020	SG05V0020
73		SG05E0025	SG05T0025	SG05L0025	SG05V0025
76.1	(DN65)	SG05E0029	SG05T0029	SG05L0029	SG05V0029
88.9	(DN80)	SG05E0030	SG05T0030	SG05L0030	SG05V0030
101.6		SG05E0035	SG05T0035	SG05L0035	SG05V0035
108		SG05E0040	SG05T0040	SG05L0040	SG05V0040
114.3	(DN100)	SG05E0045	SG05T0045	SG05L0045	SG05V0045
133		SG05E0050	SG05T0050	SG05L0050	SG05V0050
139.7	(DN125)	SG05E0052	SG05T0052	SG05L0052	SG05V0052
141.3		SG05E0055	SG05T0055	SG05L0055	SG05V0055
159		SG05E0060	SG05T0060	SG05L0060	SG05V0060
165.1		SG05E0062	SG05T0062	SG05L0062	SG05V0062
168.3	(DN150)	SG05E0065	SG05T0065	SG05L0065	SG05V0065
219.1	(DN200)	SG05E0085	SG05T0085	SG05L0085	SG05V0085
273	(DN250)	SG05E00A1	SG05T00A1	SG05L00A1	SG05V00A1
323.9	(DN300)	SG05E00A3	SG05T00A3	SG05L00A3	SG05V00A3
355.6	(DN350)	SG05E00A4	SG05T00A4	SG05L00A4	SG05V00A4
406.4	(DN400)	SG05E00A6	SG05T00A6	SG05L00A6	SG05V00A6
457.2	(DN450)	SG05E00A8	SG05T00A8	SG05L00A8	SG05V00A8
508	(DN500)	SG05E00B0	SG05T00B0	SG05L00B0	SG05V00B0
558.8	(DN550)	SG05E00B2	SG05T00B2	SG05L00B2	SG05V00B2
609.6	(DN600)	SG05E00B4	SG05T00B4	SG05L00B4	SG05V00B4

gasket type ‘gap-seal’

(for couplings Z05, Z07, 7707, 7705)



dimension		article no.			
		EPDM (grade E)	nitrile (grade T)	silicone (grade L)	fluoro-elastomer (grade O)
33.7	(DN25)	SGGSE0010	SGGST0010	SGGSL0010	SGGSV0010
42.4	(DN32)	SGGSE0012	SGGST0012	SGGSL0012	SGGSV0012
48.3	(DN40)	SGGSE0015	SGGST0015	SGGSL0015	SGGSV0015
60.3	(DN50)	SGGSE0020	SGGST0020	SGGSL0020	SGGSV0020
73		SGGSE0025	SGGST0025	SGGSL0025	SGGSV0025
76.1	(DN65)	SGGSE0029	SGGST0029	SGGSL0029	SGGSV0029
88.9	(DN80)	SGGSE0030	SGGST0030	SGGSL0030	SGGSV0030
101.6		SGGSE0035	SGGST0035	SGGSL0035	SGGSV0035
108		SGGSE0040	SGGST0040	SGGSL0040	SGGSV0040
114.3	(DN100)	SGGSE0045	SGGST0045	SGGSL0045	SGGSV0045
133		SGGSE0050	SGGST0050	SGGSL0050	SGGSV0050
139.7	(DN125)	SGGSE0052	SGGST0052	SGGSL0052	SGGSV0052
141.3		SGGSE0055	SGGST0055	SGGSL0055	SGGSV0055
159		SGGSE0060	SGGST0060	SGGSL0060	SGGSV0060
165.1		SGGSE0062	SGGST0062	SGGSL0062	SGGSV0062
168.3	(DN150)	SGGSE0065	SGGST0065	SGGSL0065	SGGSV0065
219.1	(DN200)	SGGSE0085	SGGST0085	SGGSL0085	SGGSV0085
273	(DN250)	SGGSE00A1	SGGST00A1	SGGSL00A1	SGGSV00A1
323.9	(DN300)	SGGSE00A3	SGGST00A3	SGGSL00A3	SGGSV00A3
355.6	(DN350)	SGGSE00A4	SGGST00A4	SGGSL00A4	SGGSV00A4
406.4	(DN400)	SGGSE00A6	SGGST00A6	SGGSL00A6	SGGSV00A6
457.2	(DN450)	SGGSE00A8	SGGST00A8	SGGSL00A8	SGGSV00A8
508	(DN500)	SGGSE00B0	SGGST00B0	SGGSL00B0	SGGSV00B0
558.8	(DN550)	SGGSE00B2	SGGST00B2	SGGSL00B2	SGGSV00B2
609.6	(DN600)	SGGSE00B4	SGGST00B4	SGGSL00B4	SGGSV00B4

G223 lubricant

inhoud	article no.	description
450 g	SLB100000	standard lubricant
900 g	SLB200000	standard lubricant

GR600 pipe tape

article no.	description
SGR600724	pipe tape ¾ - 24”

product range

VSH XPress Stainless

R2750 stainless steel tube 1.4401 (AISI 316)

(3 and 6 m length)

dimension	article no.	DN
22 x 1.2 (3 m)	6118081	20
22 x 1.2 (6 m)	6117936	20
28 x 1.2 (3 m)	6118090	25
28 x 1.2 (6 m)	6117947	25
35 x 1.5 (3 m)	6118101	32
35 x 1.5 (6 m)	6117958	32
42 x 1.5 (3 m)	6118112	40
42 x 1.5 (6 m)	6117969	40
54 x 1.5 (3 m)	6118123	50
54 x 1.5 (6 m)	6117971	50
76.1 x 2.0 (6 m)	6117980	65
88.9 x 2.0 (6 m)	6117991	80
108 x 2.0 (6 m)	6118002	100

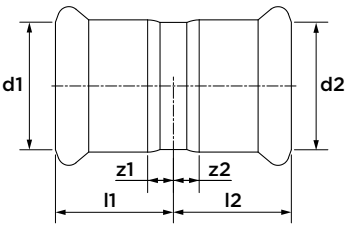
R2752 stainless steel tube 1.4521 (AISI 444)

(6 m length)

dimension	article no.	DN
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

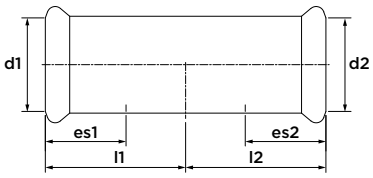
R2701 straight coupling

(2 x press)



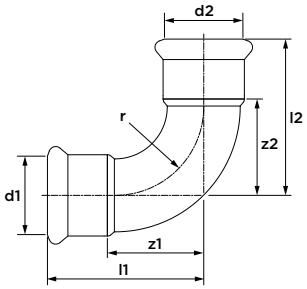
dimension	article no.	l1/l2	z1/z2
22	6190965	26	5
28	6190976	28	5
35	6190987	31	5
42	6190998	36	6
54	6191009	41	6
76.1	6204154	71	16
88.9	6204165	82	19
108	6204176	96	19

R2703 slip coupling
(2 x press)



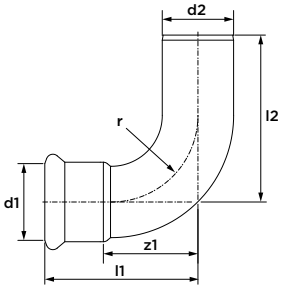
dimension	article no.	l1/l2	es1/es2
22	6191306	42	21
28	6191317	46	23
35	6191328	51	26
42	6191339	60	30
54	6191341	70	35
76.1	6204286	115	55
88.9	6204297	129	62
108	6204308	153	77

R2708 bend 90°
(2 x press)



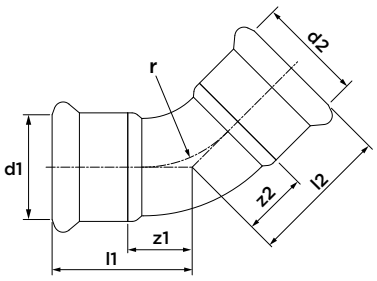
dimension	article no.	l1/l2	z1/z2	r
22	6190228	51	30	27
28	6190239	60	37	34
35	6190241	71	45	42
42	6190250	86	56	51
54	6190261	105	70	65
76.1	6230004	150	95	91
88.9	6230015	174	111	107
108	6230026	215	138	130

R2711 bend 90°
(press x male)



dimension	article no.	l1	l2	z1	r
22	6190360	51	60	30	27
28	6190371	60	66	37	34
35	6190382	71	76	45	42
42	6190393	86	93	56	51
54	6190404	105	111	70	65
76.1	6230037	150	165	95	91
88.9	6230048	175	190	112	107
108	6230059	216	238	139	130

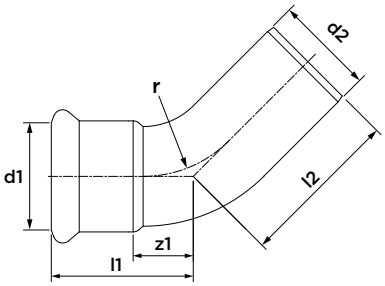
R2713 bend 45°
(2 x press)



dimension	article no.	l1/l2	z1/z2	r
22	6190063	35	14	27
28	6190074	40	17	34
35	6190085	47	21	42
42	6190096	56	26	51
54	6190107	67	32	65
76.1	6230061	98	43	91
88.9	6230070	112	49	107
108	6230081	138	61	130

R2712 bend 45°

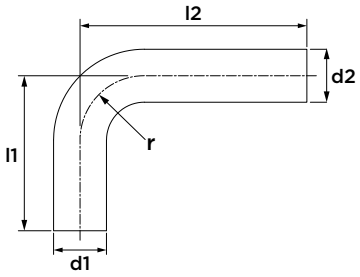
(press x male)



dimension	article no.	l1	l2	z1	r
22	6190131	35	42	14	27
28	6190140	40	46	17	34
35	6190151	46	51	20	42
42	6190162	56	63	26	51
54	6190173	65	73	30	65
76.1	6230092	98	117	43	91
88.9	6230103	112	131	49	107
108	6230114	138	154	61	130

R2725 bend tube 90°

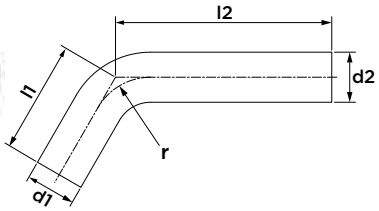
(2 x male)



dimension	article no.	l1	l2	r
Ø22	6190294	72	120	27
Ø28	6190305	82	120	34
Ø35	6190316	120	200	42
Ø42	6190327	150	250	51
Ø54	6190338	200	300	65

R2724 bend tube 60°

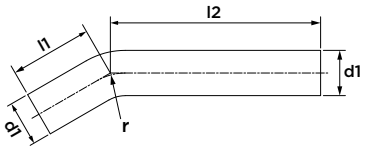
(2 x male)



dimension	article no.	l1	l2	r
Ø28	6190184	63	121	34
Ø35	6190195	97	203	42
Ø42	6191878	102	256	51
Ø54	6191889	162	306	65

R2723 bend tube 30°

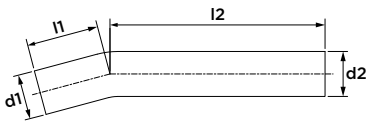
(2 x male)



dimension	article no.	l1	l2	r
Ø28	6190021	51	130	34
Ø35	6190030	73	214	42
Ø42	6191856	99	272	51
Ø54	6191867	134	326	65

R2722 bend tube 15°

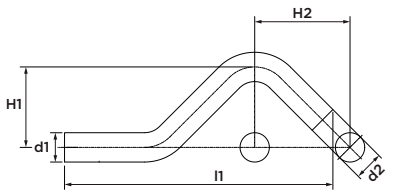
(2 x male)



dimension	article no.	l1	l2	r
Ø28	6190008	45	134	34
Ø35	6190019	73	222	42
Ø42	6191834	89	280	51
Ø54	6191845	122	337	65

R2717 crossover

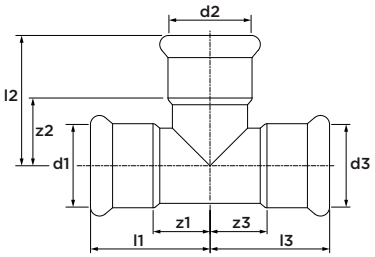
(2 x male)



dimension	article no.	l1	H1	H2
Ø22	6191108	163	44	65
Ø28	6191119	195	50	74

R2714 tee

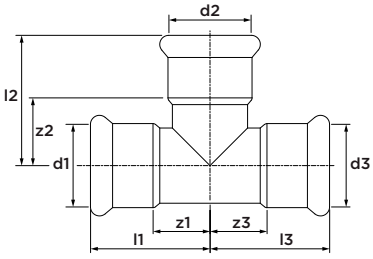
(3 x press)



dimension	article no.	l1/l3	l2	z1/z3	z2
22	6191405	40	44	19	23
28	6191449	45	49	22	26
35	6191493	51	55	25	29
42	6191537	60	62	30	32
54	6191581	71	72	36	37
76.1	6204319	116	115	61	60
88.9	6204321	131	127	68	64
108	6204330	156	155	79	78

R2715 tee reduced

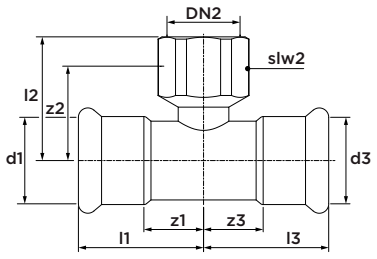
(3 x press)



dimension	article no.	l1/l3	l2	z1/z3	z2
28 x 22 x 28	6191438	45	47	22	26
35 x 22 x 35	6191471	51	50	25	29
35 x 28 x 35	6191482	51	52	25	29
42 x 22 x 42	6191504	60	53	30	32
42 x 28 x 42	6191515	60	55	30	32
42 x 35 x 42	6191526	60	58	30	32
54 x 22 x 54	6191548	71	59	36	38
54 x 28 x 54	6191559	71	61	36	38
54 x 35 x 54	6191561	71	64	36	38
54 x 42 x 54	6191570	71	58	36	28
76.1 x 22 x 76.1	6204341	116	68	61	45
76.1 x 28 x 76.1	6204352	116	71	61	47
76.1 x 35 x 76.1	6204363	116	75	61	48
76.1 x 42 x 76.1	6204374	116	79	61	47
76.1 x 54 x 76.1	6204385	116	80	61	43
88.9 x 22 x 88.9	6204396	131	76	68	53
88.9 x 28 x 88.9	6204407	131	76	68	52
88.9 x 35 x 88.9	6204418	131	83	68	56
88.9 x 42 x 88.9	6204429	131	85	68	53
88.9 x 54 x 88.9	6204431	131	93	68	56
88.9 x 76.1 x 88.9	6204440	131	116	68	61
108 x 22 x 108	6204451	156	85	79	62
108 x 28 x 108	6204462	156	88	79	64
108 x 35 x 108	6204473	156	94	79	67
108 x 42 x 108	6204484	156	96	79	64
108 x 54 x 108	6204495	156	102	79	65
108 x 76.1 x 108	6204506	156	125	79	70
108 x 88.9 x 108	6204517	156	135	79	72

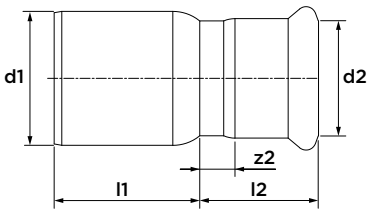
R2718 tee female branch

(press x female thread x press)



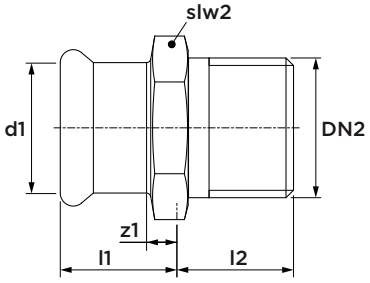
dimension	article no.	l1/l3	l2	z1/z3	z2	slw2
22 x Rp½" x 22	6191625	40	37	19	27	24
22 x Rp¾" x 22	6191636	40	39	19	28	30
28 x Rp½" x 28	6191647	45	40	22	30	24
28 x Rp¾" x 28	6191658	45	42	22	31	30
28 x Rp1" x 28	6198599	45	46	22	33	38
35 x Rp½" x 35	6191669	51	44	25	34	24
35 x Rp¾" x 35	6191671	51	46	25	35	30
35 x Rp1" x 35	6198601	51	50	25	37	38
42 x Rp½" x 42	6191680	60	46	30	36	24
42 x Rp¾" x 42	6191691	60	48	30	37	30
42 x Rp1" x 42	6198610	60	52	30	39	38
54 x Rp½" x 54	6191702	71	52	36	42	24
54 x Rp¾" x 54	6191724	71	54	36	43	30
54 x Rp1" x 54	6198621	71	58	36	45	38
54 x Rp2" x 54	6191713	71	65	36	47	67
76.1 x Rp¾" x 76.1	6204528	116	68	61	55	30
76.1 x Rp2" x 76.1	6204550	116	81	61	59	65
88.9 x Rp¾" x 88.9	6204539	131	87	68	74	30
88.9 x Rp2" x 88.9	6204561	131	88	68	66	65
108 x Rp¾" x 108	6204541	156	86	79	73	30
108 x Rp2" x 108	6204572	156	98	79	76	65

R2707 reducer
(male x press)



dimension	article no.	l1	l2	z2
Ø28 x 22	6191174	34	29	8
Ø35 x 22	6191196	42	29	8
Ø35 x 28	6191207	38	31	8
Ø42 x 22	6191218	53	33	12
Ø42 x 28	6191229	51	31	8
Ø42 x 35	6191231	42	34	8
Ø54 x 22	6191240	66	33	12
Ø54 x 28	6191251	62	34	11
Ø54 x 35	6191262	60	34	8
Ø54 x 42	6191273	55	40	10
Ø76.1 x 42	6204211	72	79	49
Ø76.1 x 54	6204220	98	42	7
Ø88.9 x 54	6204231	114	42	7
Ø88.9 x 76.1	6204242	88	68	13
Ø108 x 54	6204253	138	66	31
Ø108 x 76.1	6204264	127	69	14
Ø108 x 88.9	6204275	113	77	14

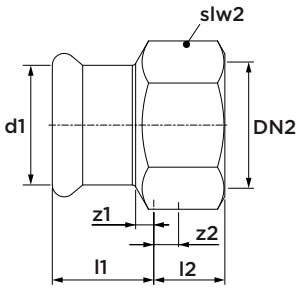
R2705 straight connector
(press x male thread)



dimension	article no.	l1	l2	z1	slw2
22 x R½"	6190635	27	15	6	32
22 x R¾"	6190646	27	16	6	32
22 x R1"	6190624	29	20	8	34
28 x R¾"	6190679	28	17	5	38
28 x R1"	6190657	28	20	5	38
28 x R1¼"	6190668	31	21	8	43
35 x R1"	6190681	33	20	7	45
35 x R1¼"	6190701	33	22	7	49
35 x R1½"	6190690	34	22	8	49
42 x R1¼"	6190723	37	22	7	54
42 x R1½"	6190712	37	22	7	54
54 x R1½"	6190734	43	22	8	67
54 x R2"	6190745	43	26	8	67
76.1 x R2½"	6204759	64	33	9	82
88.9 x R3"	6204761	73	36	10	95

R2702 straight connector

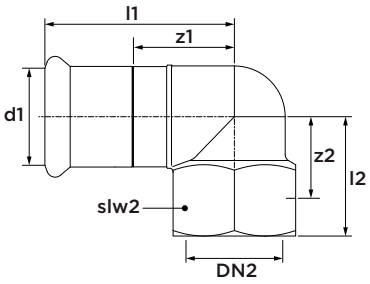
(press x female thread)



dimension	article no.	l1	l2	z1	z2	slw2
22 x Rp½"	6190461	21	15	0	5	32
22 x Rp¾"	6190470	23	17	2	6	32
22 x Rp1"	6190459	24	20	3	7	38
28 x Rp½"	6193308	26	12	3	1	38
28 x Rp¾"	6190503	23	17	0	6	38
28 x Rp1"	6190481	25	20	2	7	38
28 x Rp1¼"	6190492	25	22	2	7	46
35 x Rp1"	6190514	27	20	1	7	46
35 x Rp1¼"	6190536	28	22	2	7	46
35 x Rp1½"	6190525	28	22	2	8	54
42 x Rp1¼"	6190558	30	22	0	0	54
42 x Rp1½"	6190547	32	22	2	8	54
54 x Rp1½"	6190569	36	22	1	8	67
54 x Rp2"	6190571	37	26	2	8	67

R2709 angle adapter 90°

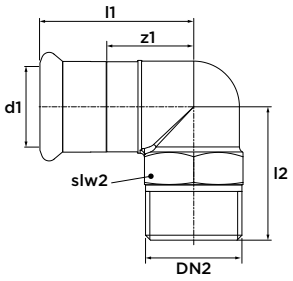
(press x female thread)



dimension	article no.	l1	l2	z1	z2	slw2
22 x Rp½"	6198456	45	31	24	16	24
22 x Rp¾"	6190844	49	33	28	17	30
28 x Rp½"	6198467	48	35	25	20	24
28 x Rp¾"	6198478	51	35	28	19	30
28 x Rp1"	6190855	55	37	32	24	38
35 x Rp½"	6198489	56	35	30	20	24
35 x Rp¾"	6198491	58	37	32	21	30
35 x Rp1"	6198500	58	41	32	28	38
35 x Rp1¼"	6190866	62	42	36	27	46

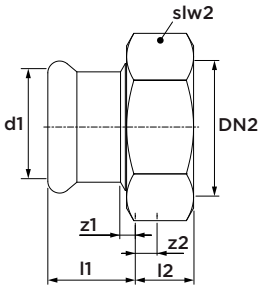
R2728 angle adapter 90°

(press x male thread)



dimension	article no.	l1	l2	z1	slw2
22 x R¾"	6190899	49	39	28	30
28 x R1"	6190901	53	46	30	34
35 x R1¼"	6190910	60	52	34	43
42 x R1½"	6190921	69	58	39	49
54 x R2"	6190932	82	68	47	62

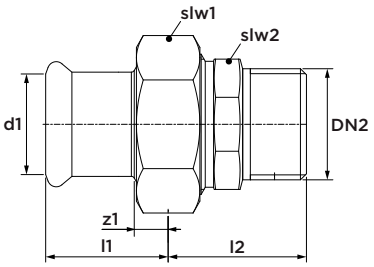
R2704 coupling with nut



dimension	article no.	l1	l2	z1	z2	slw2
22 x G1"	6191757	30	10	9	2	37
28 x G1¼"	6191768	31	10	8	2	46
35 x G1½"	6191779	34	11	8	2	52
42 x G1¾"	6191781	41	11	11	2	58
54 x G2⅜"	6191790	47	11	12	3	75

including flat seal

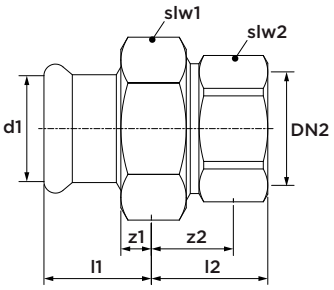
R2735 straight union
(press x male thread)



dimension	article no.	l1	z1	l2	slw1	slw2
22 x R½"	6192164	30	9	33	37	25
22 x R¾"	6192175	30	9	29	37	32
22 x R1"	6192186	30	9	42	37	39
28 x R1"	6192197	31	8	42	46	39
35 x R1¼"	6192208	34	8	44	52	49
42 x R1½"	6192219	41	11	44	58	51
54 x R2"	6192296	47	12	53	75	65

including flat seal

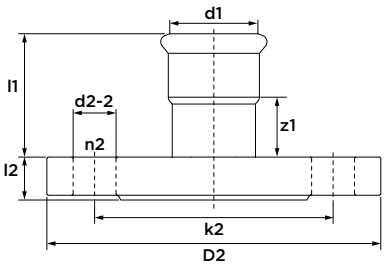
R2738 straight union
(press x female thread)



dimension	article no.	l1	l2	z1	z2	slw1	slw2
22 x Rp¾"	6192065	30	33	9	22	37	30
22 x Rp1"	6192076	30	36	9	23	37	38
28 x Rp1"	6192087	31	34	8	21	46	38
35 x Rp1¼"	6192098	34	39	8	24	52	46
42 x Rp1½"	6192109	41	41	11	27	58	54
54 x Rp2"	6192111	47	44	12	26	75	67

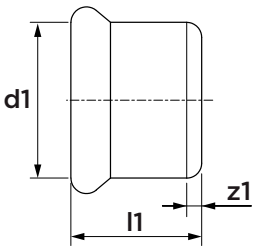
including flat seal

R2726 flanged connector PN 10/16
(1 x press)



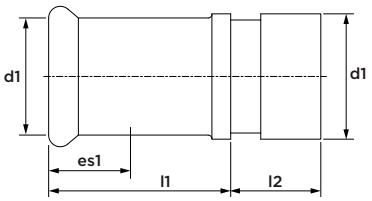
dimension	DN	article no.	l1	l2	z1	k2	D2	d2-2	n2
22	20	6190778	45	14	24	75	105	14	4
28	25	6190789	49	16	26	85	115	14	4
35	32	6190791	51	17	26	100	140	18	4
42	40	6190800	59	18	29	110	150	18	4
54	50	6190811	69	18	34	125	165	18	4
76.1	65	6204121	108	18	53	145	185	18	4
88.9	80	6204132	127	20	64	160	200	18	8
108	100	6204143	147	20	70	180	220	18	8

R2729 stop end
(1 x press)



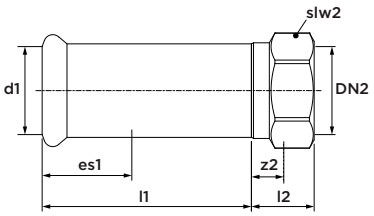
dimension	article no.	l1	z1
22	6191031	24	3
28	6191042	26	3
35	6191053	29	3
42	6191064	37	7
54	6191075	42	7
76.1	6204187	95	40
88.9	6204198	107	44
108	6204209	127	50

R2748 transition for grooved couplings
(press x groove)



dimension	article no.	l1	l2	es1
28 x Ø33.7	6198555	49	24	23
35 x Ø42.4	6198566	54	24	26
42 x Ø48.3	6198577	61	24	30
54 x Ø60.3	6198588	73	24	35
76.1 x Ø73	6198841	68	24	50
76.1 x Ø76.1	6193319	66	24	55
88.9 x Ø88.9	6193321	76	24	63
108 x Ø114	6193330	84	26	77

R2741 slip coupling
(press x female thread)



dimension	article no.	l1	l2	z2	es1	slw2
22 x Rp½"	6198511	70	19	15	21	28
22 x Rp¾"	6198522	70	24	17	21	32
28 x Rp½"	6198533	70	21	15	23	34
28 x Rp¾"	6198544	70	21	17	23	34

R2749 fire service coupling series HB
(coupling x male thread)

dimension	article no.	d1
G¾ [m]	6198731	¾ (DN20)
¾ FPT	6198632	¾ (DN20)

R2755 hose connector series HB
(hose connector x male thread)

dimension	article no.	d1
¾ FPT	6198709	3/4 (DN20)
G¾ [m]	6198676	3/4 (DN20)

R2758 y-piece
(3 x female thread)

dimension	article no.
G¾	6192549

C1451 o-ring Leak Before Pressed (LBP)
(black, EPDM) for carbon steel and stainless steel

dimension	article no.
22	6222238
28	6222249
35	6222251
42	6222260
54	6222271

R2760 o-ring
(black, EPDM) for carbon steel and stainless steel

dimension	article no.
76.1	6208015
88.9	6208026
108	6208037

C1452 flat seal
(black, EPDM) for carbon steel and stainless steel

dimension	article no.
22	6228024
28	6228035
35	6228046
42	6228057
54	6228068

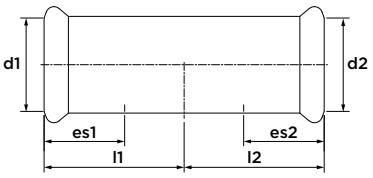
product range

VSH XPress Carbon

C1461 VSH XPress sprinkler carbon tube
(6 m length)

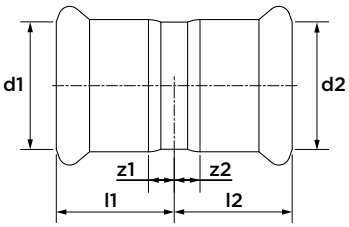
dimension	article no.	DN
22 x 1.5	6241114	20
28 x 1.5	6241125	25
35 x 1.5	6241136	32
42 x 1.5	6241147	40
54 x 1.5	6241158	50
76.1 x 2.0	6241378	65
88.9 x 2.0	6241389	80
108 x 2.0	6241391	100

C1403 slip coupling
(2 x press)



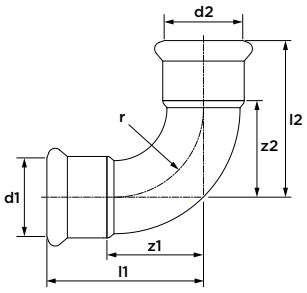
dimension	article no.	l1/l2	es1/es2
22	6201461	42	21
28	6201470	46	23
35	6201481	52	26
42	6201492	61	30
54	6201503	70	35
76.1	6206233	115	55
88.9	6206244	131	63
108	6206255	151	77

C1401 straight coupling
(2 x press)



dimension	article no.	l1/l2	z1/z2
22	6201382	26	5
28	6201393	28	5
35	6201404	31	5
42	6201415	37	7
54	6201426	41	6
76.1	6206200	63	8
88.9	6206211	72	9
108	6206222	86	9

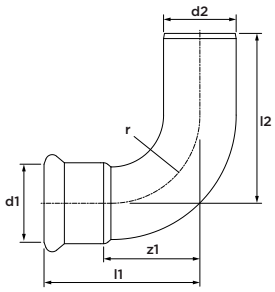
C1408 bend 90°
(2 x press)



dimension	article no.	l1/l2	z1/z2	r
22	6201571	51	30	27
28	6201580	61	38	34
35	6201591	72	46	42
42	6201602	87	57	51
54	6201613	105	70	65
76.1	6208004	155	100	92
88.9	6208048	179	116	107
108	6208059	216	139	130

C1411 bend 90°

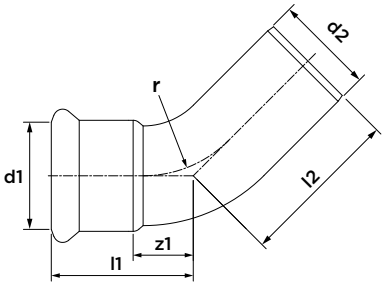
(press x male)



dimension	article no.	l1	l2	z1	r
22 x Ø22	6201657	51	58	30	27
28 x Ø28	6201668	61	66	38	34
35 x Ø35	6201679	72	76	46	42
42 x Ø42	6201681	87	93	57	51
54 x Ø54	6201690	105	111	70	65
76.1 x Ø76.1	6208061	155	168	100	92
88.9 x Ø88.9	6208070	179	193	116	107
108 x Ø108	6208081	216	233	139	130

C1412 bend 45°

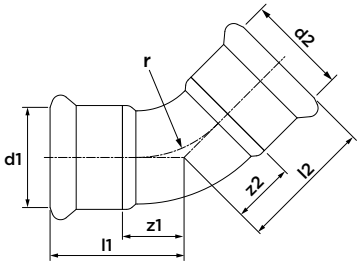
(press x male)



dimension	article no.	l1	l2	z1	r
22 x Ø22	6201791	35	42	14	27
28 x Ø28	6201800	40	46	17	34
35 x Ø35	6201811	46	51	20	42
42 x Ø42	6201822	56	63	26	51
54 x Ø54	6201833	67	73	32	65
76.1 x Ø76.1	6208092	101	114	46	92
88.9 x Ø88.9	6208103	116	130	53	107
108 x Ø108	6208114	139	157	62	130

C1413 bend 45°

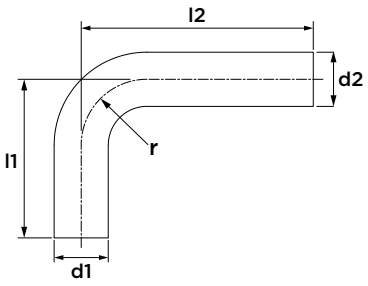
(2 x press)



dimension	article no.	l1/l2	z1/z2	r
28	6201734	40	17	34
35	6201745	46	20	42
42	6201756	56	26	51
54	6201767	67	32	65
76.1	6208125	101	46	92
88.9	6208136	116	53	107
108	6208147	139	62	130

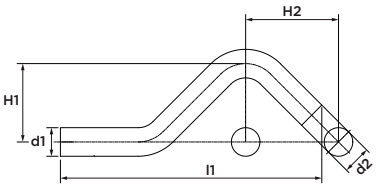
C1425 bend 90°

(2 x male)



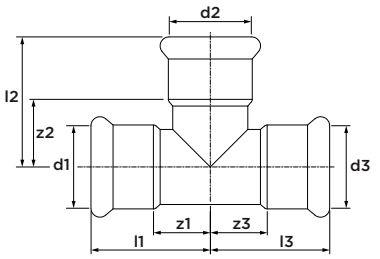
dimension	article no.	l1	l2	r
Ø22	6201877	74	122	27
Ø28	6201888	84	122	34
Ø35	6201899	122	202	42
Ø42	6201901	152	252	51
Ø54	6201910	202	302	65

C1417 crossover
(2 x male)



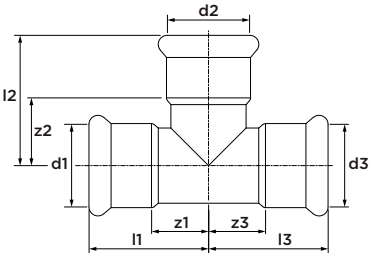
dimension	article no.	l1	H1	H2
Ø22	6201954	163	44	65
Ø28	6201965	194	50	74

C1414 tee
(3 x press)



dimension	article no.	l1/l3	l2	z1/z3	z2
22	6202515	40	49	19	28
28	6202526	45	54	22	31
35	6202537	52	60	26	34
42	6202548	61	67	31	37
54	6202559	71	78	36	43
76.1	6206442	115	110	60	55
88.9	6206453	130	128	67	65
108	6206464	155	153	78	76

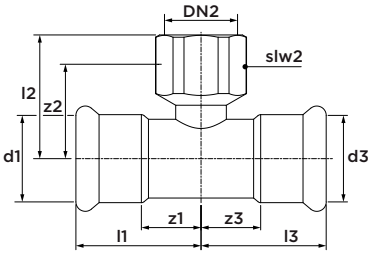
C1415 tee reduced
(3 x press)



dimension	article no.	l1/l3	l2	z1/z3	z2
22 x 28 x 22	6202801	40	52	19	29
28 x 22 x 28	6202647	45	52	22	31
35 x 22 x 35	6202671	52	55	26	34
35 x 28 x 35	6202680	52	57	26	34
42 x 22 x 42	6202691	60	58	30	37
42 x 28 x 42	6202702	60	60	30	37
42 x 35 x 42	6202713	60	63	30	37
54 x 22 x 54	6202724	71	64	36	43
54 x 28 x 54	6202735	71	66	36	43
54 x 35 x 54	6202746	71	69	36	43
54 x 42 x 54	6202757	71	73	36	43
76.1 x 22 x 76.1	6207047	115	68	60	47
76.1 x 28 x 76.1	6207058	115	85	60	62
76.1 x 35 x 76.1	6207069	115	87	60	61
76.1 x 42 x 76.1	6207071	115	97	60	67
76.1 x 54 x 76.1	6206475	115	110	60	75
88.9 x 22 x 88.9	6209654	130	76	67	55
88.9 x 28 x 88.9	6209665	130	92	67	69
88.9 x 35 x 88.9	6209676	130	97	67	71
88.9 x 42 x 88.9	6209687	130	105	67	75
88.9 x 54 x 88.9	6209698	130	117	67	82
88.9 x 76.1 x 88.9	6206486	130	117	67	62
108 x 22 x 108	6209711	155	85	78	64
108 x 28 x 108	6209720	155	102	78	79
108 x 35 x 108	6209731	155	107	78	81
108 x 42 x 108	6209742	155	115	78	85
108 x 54 x 108	6209753	155	128	78	93
108 x 76.1 x 108	6209764	155	128	78	73
108 x 88.9 x 108	6206497	155	137	78	82

C1418 tee branch female

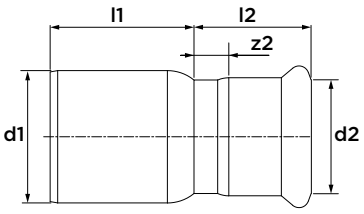
(press x female thread x press)



dimension	article no.	l1/l3	l2	z1/z3	z2	slw2
22 x Rp½" x 22	6202834	40	39	19	24	24
22 x Rp¾" x 22	6206706	40	41	19	25	30
22 x Rp1" x 22	6341995	40	46	19	23	41
28 x Rp½" x 28	6202845	45	42	22	27	24
28 x Rp¾" x 28	6207181	45	44	22	28	30
28 x Rp1" x 28	6209601	45	48	22	25	41
35 x Rp½" x 35	6202856	52	46	26	31	24
35 x Rp¾" x 35	6207102	52	48	26	31	30
35 x Rp1" x 35	6209610	52	52	26	29	41
42 x Rp½" x 42	6202867	61	48	31	33	24
42 x Rp¾" x 42	6207113	61	50	31	34	30
42 x Rp1" x 42	6209621	61	54	31	31	41
54 x Rp½" x 54	6202878	71	54	36	39	24
54 x Rp¾" x 54	6207124	71	56	36	40	30
54 x Rp1" x 54	6207795	71	60	36	37	41
76.1 x Rp¾" x 76.1	6206508	115	82	60	66	30
88.9 x Rp¾" x 88.9	6206519	130	84	67	68	30
108 x Rp¾" x 108	6206521	155	94	78	78	30

C1407 reducer

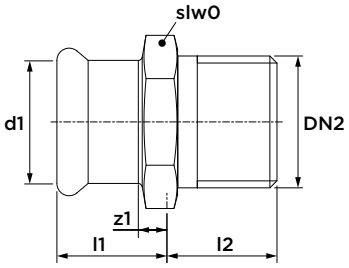
(male x press)



dimension	article no.	l1	l2	z2
Ø28 x 22	6202196	33	33	12
Ø35 x 22	6202207	41	30	9
Ø35 x 28	6202218	34	36	13
Ø42 x 22	6206651	51	32	11
Ø42 x 28	6206662	51	32	9
Ø42 x 35	6202229	41	39	13
Ø54 x 22	6202231	63	34	13
Ø54 x 28	6202240	58	33	10
Ø54 x 35	6206684	57	38	12
Ø54 x 42	6202251	52	44	14
Ø76.1 x 42	6206387	97	50	20
Ø76.1 x 54	6206398	86	55	20
Ø88.9 x 54	6206409	101	54	19
Ø88.9 x 76.1	6206411	90	68	13
Ø108 x 76.1	6206420	120	68	13
Ø108 x 88.9	6206431	110	77	14

C1405 straight connector

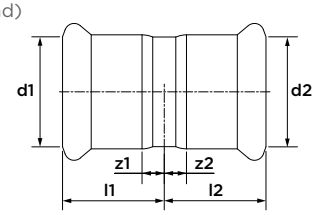
(press x male thread)



dimension	article no.	l1	l2	z1	slw2
22 x R½"	6206717	26	17	5	32
22 x R¾"	6202317	26	18	5	32
22 x R1"	6206728	28	22	7	34
28 x R¾"	6209852	28	22	5	38
28 x R1"	6202328	28	20	5	41
35 x R1"	6341247	33	20	7	46
35 x R1¼"	6202339	33	22	7	46
42 x R1½"	6202341	35	24	5	55
54 x R2"	6202350	41	28	6	70
76.1 x R2½"	6204781	64	33	9	80
88.9 x R3"	6204792	73	36	10	95

C1402 straight connector

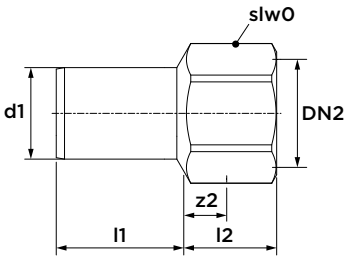
(press x female thread)



dimension	article no.	l1	l2	z1	z2	slw2
22 x Rp½"	6340202	22	14	1	0	32
22 x Rp¾"	6202405	23	20	2	4	32
28 x Rp½"	6207806	24	14	1	1	41
28 x Rp¾"	6209830	24	17	1	0	38
28 x Rp1"	6202416	26	23	3	4	41
35 x Rp½"	6340917	30	12	4	1	46
35 x Rp¾"	6340928	28	15	2	3	46
35 x Rp1"	6340939	33	13	7	0	46
35 x Rp1¼"	6206695	28	22	2	7	46
42 x Rp1½"	6341192	32	22	2	6	54
54 x Rp2"	6341203	37	26	2	8	67

C1433 straight connector

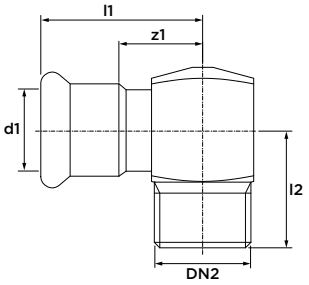
(male x female thread)



dimension	article no.	l1	l2	z2	slw2
Ø22 x Rp½"	6202460	29	21	6	24
Ø22 x Rp¾"	6202471	29	24	8	30

when pressing, take care that the jaws do not interfere with the wrench flats!

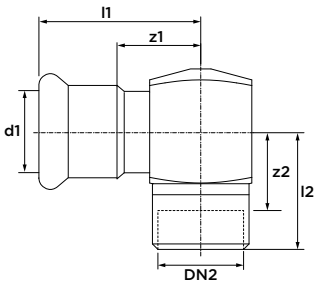
C1428 angle adapter 90°



dimension	article no.	l1	l2	z1
22 x R¾"	6202108	45	32	24

C1409 angle adapter 90°

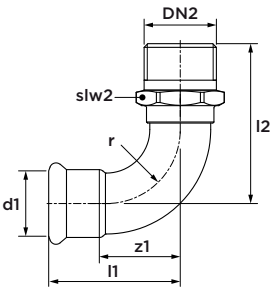
(press x female thread)



dimension	article no.	l1	l2	z1	z2
22 x Rp½"	6341038	45	31	24	16
28 x Rp½"	6341049	51	35	28	20
35 x Rp½"	6341051	57	35	31	20

C1430 bend 90°

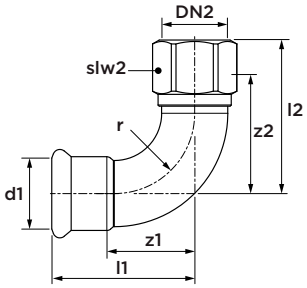
(press x male thread)



dimension	article no.	l1	z1	l2	slw2	r
22 x R¾"	6202011	51	30	62	30	27
28 x R1"	6202020	61	38	74	36	34
35 x R1¼"	6202031	72	46	86	46	42
42 x R1½"	6202042	87	57	96	50	51
54 x R2"	6202053	105	70	116	60	65

C1438 bend 90°

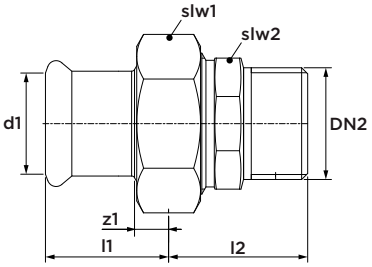
(press x female thread)



dimension	article no.	l1	l2	z1	z2	slw2	r
22 x Rp½"	6209577	51	59	30	44	27	27
22 x Rp¾"	6200964	51	59	30	43	30	27
28 x Rp½"	6207025	61	65	38	50	32	34
28 x Rp¾"	6200986	61	65	38	49	32	34
28 x Rp1"	6209588	61	70	38	51	41	34
35 x Rp½"	6201063	72	75	46	55	41	42
35 x Rp¾"	6201074	72	75	46	54	41	42
35 x Rp1"	6209599	72	75	46	56	41	42

C1435 straight union

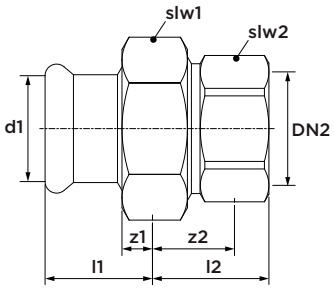
(press x male thread)



dimension	article no.	l1	z1	l2	slw1	slw2
22 x R¾"	6207201	30	9	40	36	32
28 x R1"	6207212	31	8	44	46	39
35 x R1¼"	6207223	34	8	48	52	49
42 x R1½"	6207234	41	11	47	58	51
54 x R2"	6207245	47	12	53	75	65

including flat seal

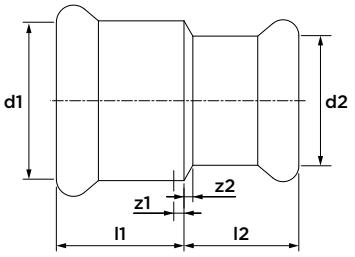
C1444 straight union
(press x female thread)



dimension	article no.	l1	l2	z1	z2	slw1	slw2
22 x Rp¾"	6208928	30	33	9	17	36	34
28 x Rp1"	6208939	31	34	8	15	46	42
35 x Rp1¼"	6208941	34	42	8	20	52	50
42 x Rp1½"	6208950	41	42	11	20	58	55
54 x Rp2"	6208961	47	46	12	20	75	70

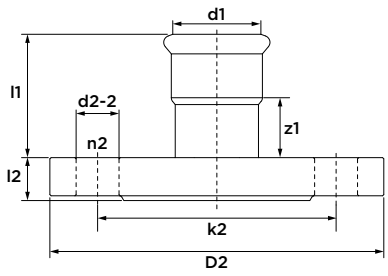
including flat seal

C1439 reducer
(2 x press)



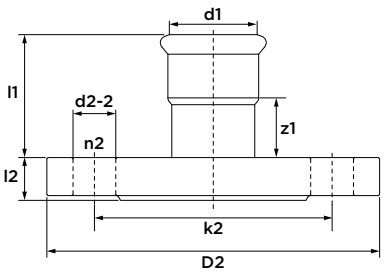
dimension	article no.	l1	l2	z1/z2
28 x 22	6201131	25	23	2

C1426 flanged connector PN 10/16
(1 x press)



dimension	DN	article no.	l1	l2	z1	k2	D2	d2-2	n2
35	32	6341500	52	18	26	100	140	18	4
42	40	6341511	59	18	29	110	150	18	4
54	50	6341522	69	18	34	125	165	18	4
76.1	65	6206596	94	18	39	145	185	18	4
88.9	80	6206607	98	20	35	160	200	18	8
108	100	6206618	94	20	17	180	220	18	8

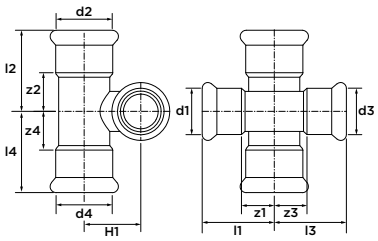
C1427 flanged connector PN6
(1 x press)



dimension	DN	article no.	l1	l2	z1	k2	D2	d2-2	n2
76.1	65	6206629	94	14	39	130	160	14	4
88.9	80	6206631	98	16	35	150	190	18	4
108	100	6206640	94	16	17	170	210	18	4

C1434 crossing 90°

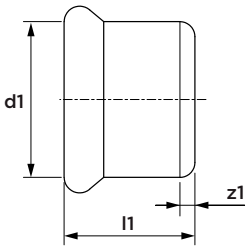
(4 x press)



dimension	article no.	l1/l3	l2/l4	z1/z3	z2/z4	H1
28 x 22 x 28 x 22	6207157	45	40	22	19	31

C1429 stop end

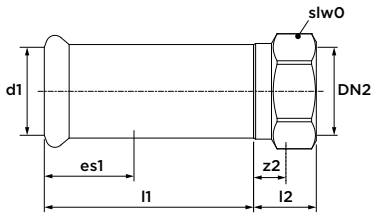
(1 x press)



dimension	article no.	l1	z1
22	6202977	24	3
28	6202988	26	3
35	6202999	29	3
42	6203001	37	7
54	6203010	42	7
76.1	6206915	64	9
88.9	6206926	72	9
108	6206937	97	20

C1443 slip coupling

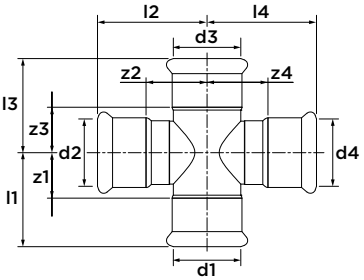
(press x female thread)



dimension	article no.	l1	l2	z2	es1	slw2
22 x Rp½"	6241312	92	22	15	21	28
22 x Rp¾"	6241323	97	27	17	21	32
28 x Rp½"	6241268	94	24	15	23	32
28 x Rp¾"	6241279	93	23	17	23	32

C1447 crossing 90°

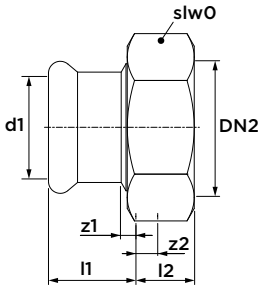
(4 x press)



dimension	article no.	l1/l3	l2/l4	z1/z3	z2/z4
35	6340972	52	60	26	34
42	6340983	61	67	31	37
54	6340994	71	78	36	43
35 x 28 x 35 x 28	6341005	52	57	26	34
42 x 28 x 42 x 28	6341016	61	60	31	37
54 x 28 x 54 x 28	6341027	71	66	36	43

C1446 coupling with nut

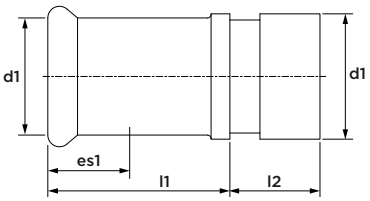
(press x female thread)



dimension	article no.	l1	l2	z1	z2	slw2
22 x G¾"	6342479	44	8	23	2	30
22 x G1"	6340554	30	10	9	2	36
28 x G5/4"	6340565	31	10	8	2	46
35 x G3/2"	6340576	34	11	8	2	52
42 x G1¾"	6340587	41	11	11	2	52
54 x G2⅜"	6340598	47	11	12	3	75
including flat seal						

C1442 transition for grooved couplings

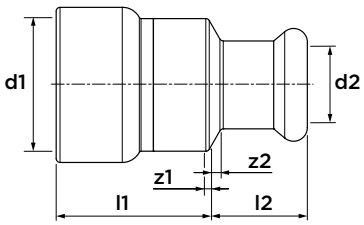
(press x groove)



dimension	article no.	l1	l2	es1
28 x 33.7	6241301	49	24	23
35 x 42.4	6241345	54	24	26
42 x 48.3	6241356	61	24	30
54 x 60.3	6241367	73	24	35
76.1 x 76.1	6340774	66	24	55
88.9 x 88.9	6340785	76	24	63
108 x 114	6340796	84	26	77

C9441 transition to VSH PowerPress

(VSH PowerPress x VSH XPress)



dimension	article no.	l1	l2	z1	z2
¾" x 22	PWR9401227	39	24	3	4
1" x 28	PWR9401251	38	25	1	2
1¼" x 35	PWR9401260	51	29	2	3
1½" x 42	PWR9401271	52	33	2	3
2" x 54	PWR9401282	56	38	2	3

C1451 o-ring Leak Before Pressed (LBP)

(black, EPDM) for carbon steel and stainless steel

dimension	article no.
22	6222238
28	6222249
35	6222251
42	6222260
54	6222271

R2760 o-ring

(black, EPDM) for carbon steel and stainless steel

dimension	article no.
76.1	6208015
88.9	6208026
108	6208037

C1452 flat seal

(black, EPDM) for carbon steel and stainless steel

dimension	article no.
22	6228024
28	6228035
35	6228046
42	6228057
54	6228068

product range

VSH XPress Sprinkler ML

ML7901 VSH XPress Sprinkler ML tube

dimension	article no.	DN	roll length [m]
32 x 3	6350003	25	50

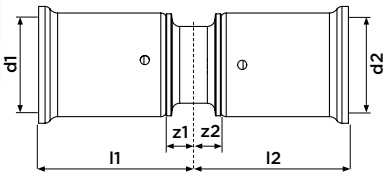
ML7902 VSH XPress Sprinkler ML tube

(length 5 m)

dimension	length [m]	DN	article no.	bundle
32 x 3.0	5	25	6350047	35 m
40 x 3.5	4	32	123460940	36 m
40 x 3.5	5	32	6350080	45 m
50 x 4.0	5	40	6350124	35 m
63 x 4.5	5	50	6350168	20 m

ML7101 straight coupling

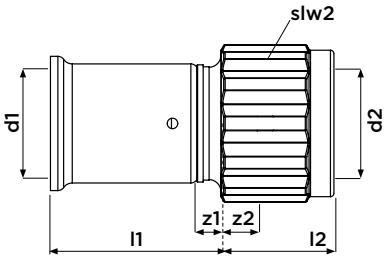
(2 x press)



dimension	article no.	l1/l2	z1/z2
32 x 32	6350674	52	10
40 x 40	6350685	53	11
50 x 50	6350696	71	13
63 x 63	6350707	86	16

ML7102 straight connector

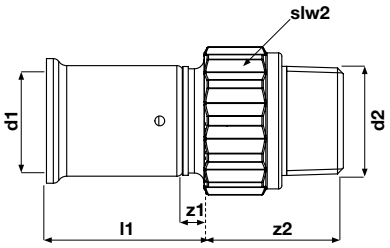
(press x female thread)



dimension	article no.	l1	l2	z1	z2	slw2
32 x Rp½	6350828	48	38	6	15	44
32 x Rp1	6350839	49	33	7	15	44
32 x Rp1¼	6350841	53	37	11	16	55
40 x Rp1	6350850	48	37	6	19	44
40 x Rp1¼	6350861	42	32	0	11	55
50 x Rp1½	6350872	62	49	4	24	67
63 x Rp2	6350883	77	55	7	25	89

ML7105 straight connector

(press x male thread)

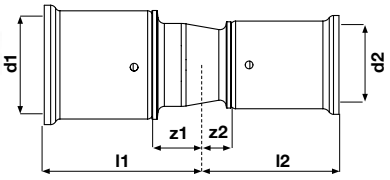


VdS

dimension	article no.	l1	z1	z2	slw2
32 x R1	6350762	49	7	43	44
32 x R1¼	6350773	53	11	48	55
40 x R1	6350784	42	0	42	44
40 x R1¼	6350795	47	5	46	55
50 x R1½	6350806	66	8	52	67
63 x R2	6350817	76	6	67	89

ML7107 reducer

(2 x press)

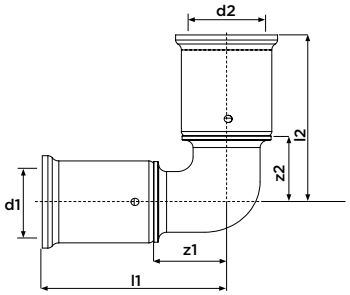


VdS

dimension	article no.	l1	l2	z1	z2
40 x 32	6350718	62	53	20	11
50 x 32	6350729	87	59	29	17
50 x 40	6350731	81	55	23	13
63 x 40	6350740	108	66	38	24
63 x 50	6350751	93	74	23	16

ML7108 bend 90°

(2 x press)

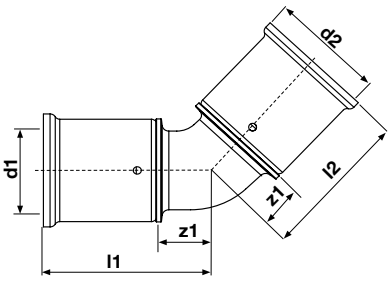


VdS

dimension	article no.	l1/l2	z1/z2
32 x 32	6350179	72	30
40 x 40	6350181	78	36
50 x 50	6350190	100	42
63 x 63	6350201	116	46

ML7113 bend 45°

(2 x press)

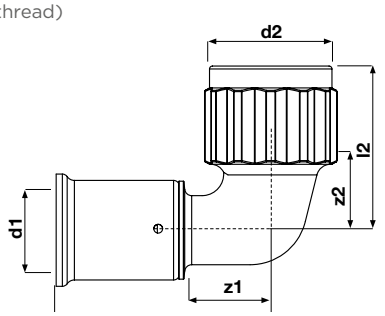


VdS

dimension	article no.	l1/l2	z1/z2
32 x 32	123459905	56	14
40 x 40	6350894	63	21
50 x 50	6350905	84	26
63 x 63	6350916	102	32

ML7138 threaded elbow 90°

(press x female thread)

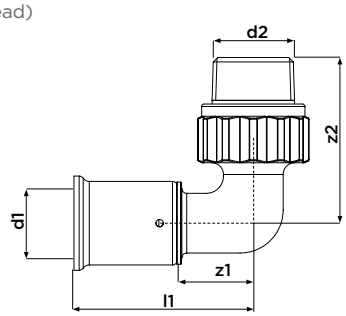


VdS

dimension	article no.	l1	l2	z1	z2
32 x Rp½	6350267	75	64	33	41
32 x Rp1	6350278	75	59	33	41
40 x Rp½	6350289	81	77	39	51
40 x Rp1¼	6350291	81	72	39	51
50 x Rp½	6350300	101	82	43	60
50 x Rp1¼	6350311	101	77	43	56
50 x Rp1½	6350322	101	82	43	57
63 x Rp½	6350333	126	109	56	74
63 x Rp2	6350344	126	104	56	79

ML7130 threaded elbow 90°

(press x male thread)

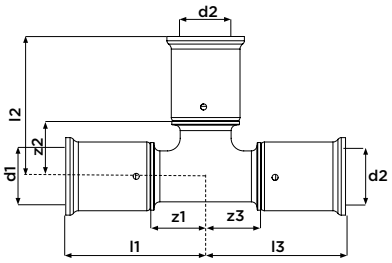


VdS

dimension	article no.	l1	z1	z2
32 x R1	6350212	75	33	69
40 x R1¼	6350223	84	42	77
50 x R1¼	6350234	101	43	86
50 x R1½	6350245	101	43	93
63 x R2	6350256	126	56	118

ML7114 tee

(3 x press)

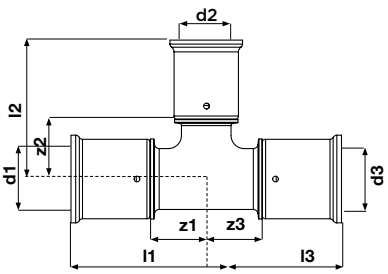


VdS

dimension	article no.	l1/l2/l3	z1/z2/z3
32 x 32 x 32	6350355	70	28
40 x 40 x 40	6350366	76	34
50 x 50 x 50	6350377	96	38
63 x 63 x 63	6350388	116	46

ML7115 tee reduced

(3 x press)

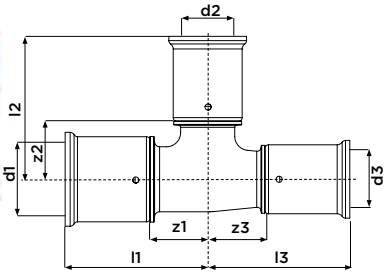


VdS

dimension	article no.	l1/l3	l2	z1/z2/z3
40 x 32 x 40	6350399	72	75	30
50 x 32 x 50	6350401	84	77	26
50 x 40 x 50	6350410	92	81	34
63 x 32 x 63	6350421	97	84	27
63 x 40 x 63	6350432	106	87	36
63 x 50 x 63	6350443	110	103	40

ML7116 tee reduced

(3 x press)

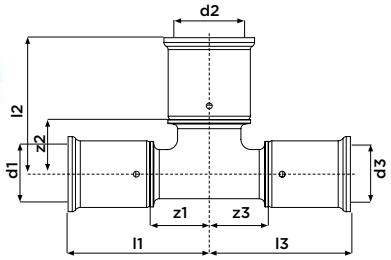


VdS

dimension	article no.	l1	l2	l3	z1	z2	z3
40 x 32 x 32	6350454	71	71	72	29	29	30
50 x 32 x 40	6350476	84	68	77	26	26	35
50 x 40 x 40	6350487	88	73	77	30	31	35

ML7117 tee reduced

(3 x press)

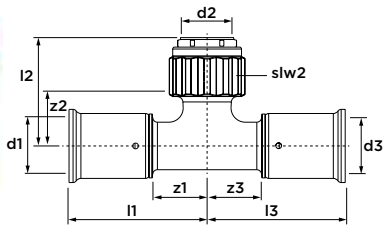


VdS

dimension	article no.	l1/l3	l2	z1/z3	z2
32 x 40 x 32	6350498	73	69	31	27
40 x 50 x 40	6350509	77	88	35	30

ML7118 tee branch female

(press x female thread x press)

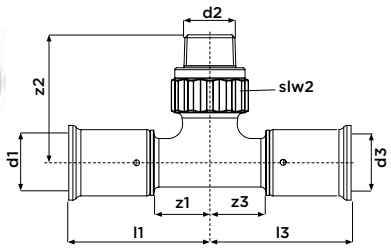


VdS

dimension	article no.	l1/l3	l2	z1/z3	z2	slw2
32 x Rp½ x 32	6350511	73	58	31	37	39
32 x Rp¾ x 32	6350520	73	53	31	37	39
32 x Rp1 x 32	6350531	75	56	33	38	44
32 x Rp1¼ x 32	6350542	81	66	39	45	55
40 x Rp½ x 40	6350553	77	68	35	45	44
40 x Rp1 x 40	6350564	77	63	35	45	44
40 x Rp1¼ x 40	6350575	79	69	37	48	55
50 x Rp½ x 50	6350586	101	89	43	55	67
50 x Rp¾ x 50	6351070	101	95	50	61	61
50 x Rp1½ x 50	6350597	101	84	43	59	67
63 x Rp½ x 63	6350608	121	109	51	69	89
63 x Rp2 x 63	6350619	121	104	51	74	89

ML7119 tee branch male

(press x female thread x press)



VdS

dimension	article no.	l1/l3	z1/z3	z2	slw2
32 x R¾ x 32	6350621	73	31	66	39
40 x R1 x 40	6350630	75	33	74	44
40 x R1¼ x 40	6350641	81	39	80	55
50 x R1½ x 50	6350652	101	43	88	67
63 x R2 x 63	6350663	118	48	109	89

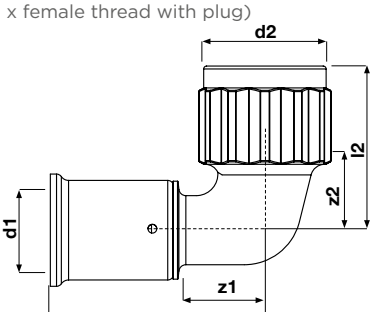
ML7120 sprinkler prefab cup, high

(male end x female thread)

dimension	article no.
½"	50P43-320604

6PKS-3206OP bend 90° with plug

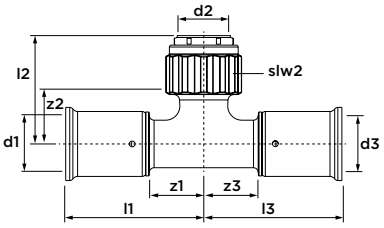
(press x female thread with plug)



dimension	article no.	l1	l2	z1	z2
32 x G1"	123459931	75	59	33	41

13PKS-320632OP tee with plug

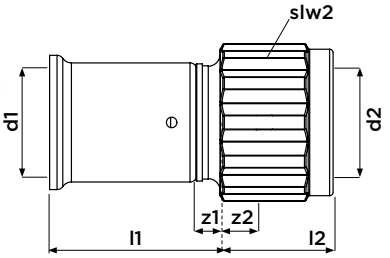
(2 x press x female thread with plug)



dimension	article no.	l1/l3	l2	z1/z3	z2	slw2
32 x 32 x G1"	123459932	75	56	33	38	44

18PKS-3206OP straight connector with plug

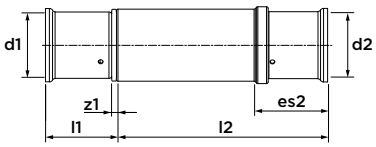
(press x female thread with plug)



dimension	article no.	l1	l2	z1	z2	slw2
32 x G1"	123459933	49	33	7	15	44

ML7103 repair slip coupling PPSU

(2 x press)

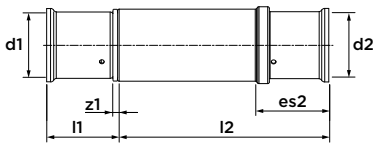


VdS

dimension	article no.	l1	l2	z1	e_S2
40	123459902	45	134	3	44
50	123459903	58	153	3	59
63	123459904	71	166	3	72

ML7103M repair slip coupling brass

(2 x press)



VdS

dimension	article no.	l1	l2	z1	e_S2
32 x 32	123459901	44	134	2	37

SPR-OP06 plug with o-ring

sprinkler fitting

dimensions	article no.
1"	123459934

SPR-CBLOCK concrete sprinkler block

for embedding in concrete

dimensions	article no.
100 x 100 x 85	123459935

SPR-CBLOCK80 concrete sprinkler block

for embedding in concrete, heigth 80 mm

dimensions	article no.
100 x 100 x 98	123459936

SPR-CBLOCK80-WS concrete sprinkler block, wide slab

with isolation, 80 mm heigth

dimensions	article no.
100 x 100 x 98	123459937

SPR-CBLOCK-TF concrete sprinkler block

for tunnelforming with glue

dimensions	article no.
100 x 100 x 83	123459938

SPR-MAGNET26 magnet 26 mm

for SPR-CBLOCK

dimensions	article no.
Ø64 x 26	123459939

SPR-MAGNET31 magnet 31 mm

for SPR-CBLOCK80 & SPR-CBLOCK80-WS

dimensions	article no.
Ø64 x 31	123459940

SPR-ISO isolation cap wood/metal

for glue and screw fixatiion

dimensions	article no.
Ø64 x 30	123459941

SPR-ISO-MAGNET2631 isolation cup

for magnet 26 & 31 mm

dimensions	article no.
Ø64 x 30	123459942

SPR-FIXSCREW screw fixation cup

for embedding in concrete

dimensions	article no.
Ø64 x 30	123459943

SPR-FIXGLUE glue fixation cup

for embedding in concrete

dimensions	article no.
Ø64 x 30	123459944

SPR-ISO-WS protection cap, wide plate

for SPR-CBLOCK80

dimensions	article no.
120 x 120 x 80	123459945

SPR-N0604IDL reducer M 1" x F ½"

(male thread x female thread)

dimensions	article no.	type*
Ø45 x 17	123459952	L30H45
Ø45 x 21	123459951	L25H40
Ø45 x 26	123459950	L20H35
Ø45 x 31	123459949	L15H30
Ø45 x 36	123459948	L10H25
Ø45 x 41	123459947	L05H20
Ø45 x 46	123459946	L00H15
Ø45 x 51	1234561704	LXXH10
Ø45 x 56	1234561703	LXXH05
Ø45 x 61	1234561702	LXXH00

*images in order from top left to bottom right

product range

VSH XPress & Sprinkler ML tools & accessories

P6013/6014/6015 press tools Novopress ECO203/ACO203(XL)

	dimension	article no.
ECO203 + case	12-54	6342094
ACO203 BT + battery 2.0Ah + charger + case	12-54	6342490
ACO203 BT + jaws 12-35 + 2 batteries 5.0Ah + charger + case	12-35	6342534
ACO203 BT + jaws 22-28 + adapter + HP slings 35-54 + 2 batteries 5.0Ah + charger + cases	22-54 (sprinkler)	6342545

P6000/6001 press tools and slings Novopress ACO401/403

	dimension	article no.
ACO403 + 2 batteries 5.0Ah + charger + case	76.1-108	6342424
HP401/403 sling + case	76.1	6340092
HP401/403 sling + case	88.9	6340103
HP401/403 sling + case	108	6340114

P5990/6016 /6017/6019 press jaws and slings Novopress for ECO203/ ACO203(XL)

	dimension	article no.
snap-on sling HP	35	6341060
snap-on sling HP	42	6341071
snap-on sling HP	54	6341082
ECOTEC PB2 jaw	22	6205364
ECOTEC PB2 jaw	28	6205375
ZB203 adapter	35-42-54	6340829
set: snap-on slings HP 35-54 + ZB203 adapter + case	35-42-54	6341775
set: snap-on slings HP 42-54 + ZB203 adapter + case	42-54	6341225
MoS_2 lubricant for copper	42-108	6342567

P5991/6002/6004 battery + charger

	article no.
ACO202/203 battery 2.0Ah 18V	6341588
ACO202/203/401/403 battery 5.0Ah 18V	6342446
ACO202/203/401/403 charger	6340125

P5990/5991/5997/6000/6013/6016 case

	dimension	article no.
case ECO/ACO203XL		6342028
case ACO403		6342468
case slings + adapter	35-42-54 + ZB2/3 series	6342303

P2743 deburring tool

dimension	article no.
12-54	6211898

P2742 insertion depth marker

dimension	article no.
12-108 (for VSH XPress Carbon and Stainless)	6212646

ML5705 press jaws and sling

dimension	article no.
32	6351004
40	6351015
50	6351026
63	6351037

ML5702/5703/5704 calibration tool

dimension	article no.
handle for Kalispeed up to 40 mm	6350993
32	6350949
40	6350951
50	6350971
60	6350982

ML5701 tube cutter

dimension	article no.
14-63	6350938

ML5707 knife for packaging

description	article no.
safecut knife	6351059

SPR-PULLTOOL remove tool

for removing fixation cups

dimensions	article no.
500 x 80 x 60	123459954

SPR-PLUGTOOL remove tool

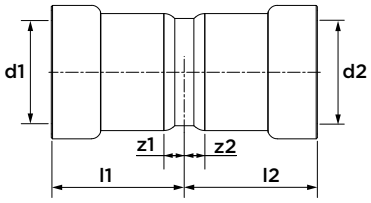
for plugs and mount inserts

dimensions	article no.
101 x 52 x 46	123459953

product range

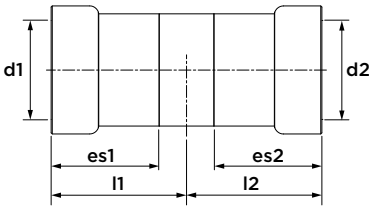
VSH PowerPress® fittings

C9401 straight coupling
(2 x press)



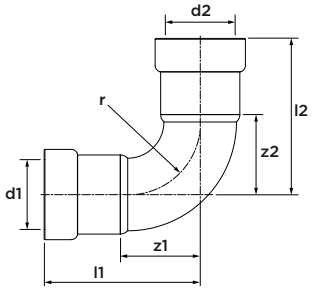
dimension	article no.	l1/l2	z1/z2
½″	PWR9400809	34	5
¾″	PWR9400811	37	6
1″	PWR9400820	42	5
1¼″	PWR9400831	56	7
1½″	PWR9400842	57	8
2″	PWR9400853	61	7

C9403 slip coupling
(2 x press)



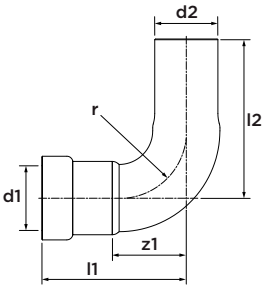
dimension	article no.	l1/l2	es1/es2
½″	PWR9400864	39	29
¾″	PWR9400875	42	32
1″	PWR9400886	47	37
1¼″	PWR9400897	59	49
1½″	PWR9400908	63	49
2″	PWR9400919	65	54

C9408 bend 90°
(2 x press)



dimension	article no.	l1/l2	z1/z2	r
½″	PWR9400006	55	26	25
¾″	PWR9400017	63	32	30
1″	PWR9400028	76	40	38
1¼″	PWR9400039	97	48	45
1½″	PWR9400041	103	54	50
2″	PWR9400050	122	68	65

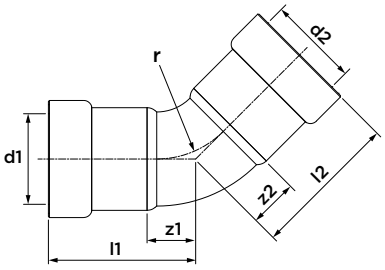
C9411 bend 90°
(press x male)



dimension	article no.	l1	l2	z1	r
½″ x Ø½″	PWR9400061	55	69	26	25
¾″ x Ø¾″	PWR9400072	63	75	32	30
1″ x Ø1″	PWR9400083	76	91	40	38
1¼″ x Ø1¼″	PWR9400094	97	109	48	45
1½″ x Ø1½″	PWR9400105	114	114	64	50
2″ x Ø2″	PWR9400116	122	140	68	65

C9413 bend 45°

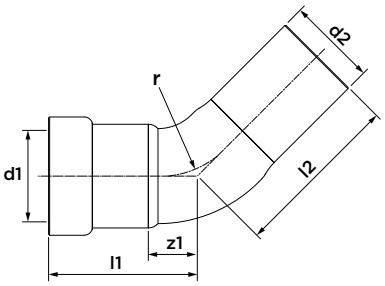
(2 x press)



dimension	article no.	l1/l2	z1/z2	r
½"	PWR9400127	41	12	25
¾"	PWR9400138	46	14	30
1"	PWR9400149	54	17	38
1¼"	PWR9400151	71	22	45
1½"	PWR9400160	74	25	50
2"	PWR9400171	84	30	65

C9412 bend 45°

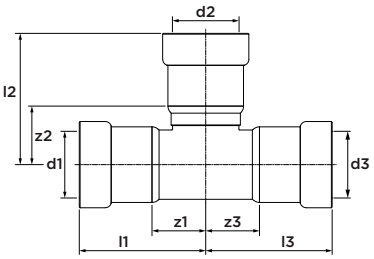
(press x male)



dimension	article no.	l1	l2	z1	r
½" x Ø½"	PWR9400182	41	54	12	25
¾" x Ø¾"	PWR9400193	46	58	15	30
1" x Ø1"	PWR9400204	54	68	18	38
1¼" x Ø1¼"	PWR9400215	71	80	22	45
1½" x Ø1½"	PWR9400226	84	85	35	50
2" x Ø2"	PWR9400237	84	98	30	65

C9414 tee

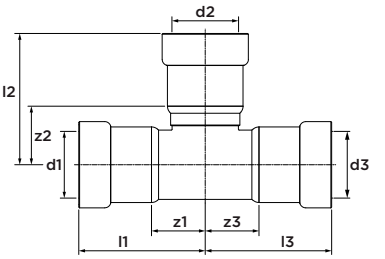
(3 x press)



dimension	article no.	l1/l3	l2	z1/z3	z2
½"	PWR9400248	52	53	23	24
¾"	PWR9400259	57	59	26	27
1"	PWR9400261	66	68	30	31
1¼"	PWR9400270	82	85	33	36
1½"	PWR9400281	89	89	39	40
2"	PWR9400292	96	100	42	46

C9415 tee reduced

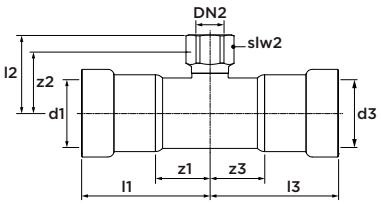
(3 x press)



dimension	article no.	l1/l3	l2	z1/z3	z2
¾" x ½" x ¾"	PWR9400303	57	56	26	26
1" x ½" x 1"	PWR9400314	66	60	30	30
1" x ¾" x 1"	PWR9400325	66	63	30	30
1¼" x ½" x 1¼"	PWR9400336	82	56	33	33
1¼" x ¾" x 1¼"	PWR9400347	82	63	33	33
1¼" x 1" x 1¼"	PWR9400358	82	72	33	33
1½" x ½" x 1½"	PWR9400369	89	66	39	39
1½" x ¾" x 1½"	PWR9400371	89	68	39	39
1½" x 1" x 1½"	PWR9400380	89	74	39	39
1½" x 1¼" x 1½"	PWR9400391	89	87	39	39
2" x ½" x 2"	PWR9400402	96	73	42	42
2" x ¾" x 2"	PWR9400413	96	76	42	42
2" x 1" x 2"	PWR9400424	96	81	42	42
2" x 1¼" x 2"	PWR9400435	96	95	42	42
2" x 1½" x 2"	PWR9400446	96	97	42	42

C9418 tee

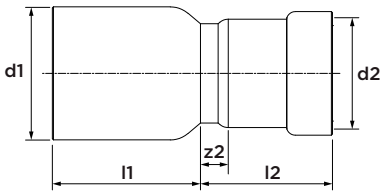
(press x female thread x press)



dimension	article no.	l1/l3	l2	z1/z3	z2	slw2
½" x Rp½" x ½"	PWR9400457	52	36	23	36	27
¾" x Rp½" x ¾"	PWR9400468	57	42	26	42	27
1" x Rp½" x 1"	PWR9400479	66	46	30	46	27
1" x Rp¾" x 1"	PWR9400481	66	47	30	47	32
1¼" x Rp½" x 1¼"	PWR9400490	82	50	33	50	27
1¼" x Rp¾" x 1¼"	PWR9401700	82	48	33	36	32
1¼" x Rp1" x 1¼"	PWR9401711	82	50	33	37	41
1½" x Rp½" x 1½"	PWR9400501	89	52	39	52	27
1½" x Rp¾" x 1½"	PWR9400512	89	53	39	53	32
1½" x Rp1" x 1½"	PWR9400523	89	57	39	57	41
2" x Rp½" x 2"	PWR9400534	96	60	42	60	27
2" x Rp¾" x 2"	PWR9400545	96	61	42	61	32
2" x Rp1" x 2"	PWR9400556	96	65	42	65	41

C9407 reducer

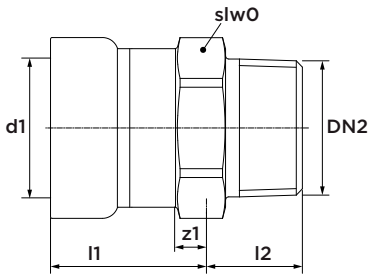
(press x male)



dimension	article no.	l1	l2	z2
Ø¾" x ½"	PWR9400921	29	35	1
Ø1" x ½"	PWR9400930	29	40	1
Ø1" x ¾"	PWR9400941	32	37	1
Ø1¼" x ½"	PWR9400952	29	55	1
Ø1¼" x ¾"	PWR9400963	32	53	1
Ø1¼" x 1"	PWR9400974	37	48	1
Ø1½" x ½"	PWR9400985	43	65	15
Ø1½" x ¾"	PWR9400996	46	63	15
Ø1½" x 1"	PWR9401007	37	49	1
Ø1½" x 1¼"	PWR9401018	49	48	1
Ø2" x ½"	PWR9401029	43	74	15
Ø2" x ¾"	PWR9401031	46	72	15
Ø2" x 1"	PWR9401040	50	69	14
Ø2" x 1¼"	PWR9401051	49	48	1
Ø2" x 1½"	PWR9401062	50	50	1

C9405 straight connector

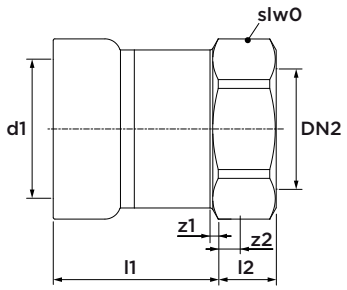
(press x male thread)



dimension	article no.	l1	l2	slw0
½" x R½"	PWR9400567	35	15	28
¾" x R¾"	PWR9400578	36	16	36
1" x R1"	PWR9400589	41	23	41
1¼" x R1¼"	PWR9400591	54	20	50
1½" x R1½"	PWR9400600	54	20	57
2" x R2"	PWR9400611	59	20	70

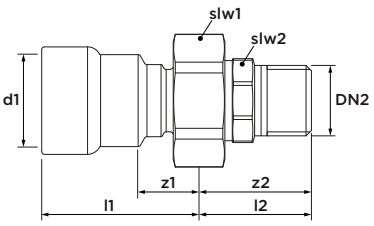
C9402 straight connector

(press x female thread)



dimension	article no.	l1	l2	z1	z2	slw02
½" x Rp½"	PWR9400622	32	14	3	6	28
¾" x Rp¾"	PWR9400633	33	16	1	7	36
1" x Rp1"	PWR9400644	39	18	3	8	41
1¼" x Rp1¼"	PWR9400655	50	21	1	8	50
1½" x Rp1½"	PWR9400666	51	20	2	8	57
2" x Rp2"	PWR9400677	56	20	2	5	70

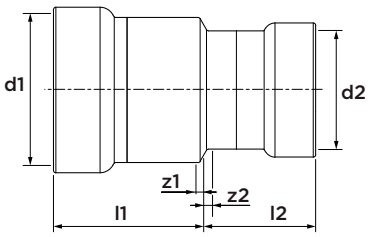
C9435 straight union
(press x male thread)



dimension	article no.	l1	l2	z1	slw1	slw2
½" x R½"	PWR9401436	48	33	19	36	25
¾" x R¾"	PWR9401447	53	38	22	41	32
1" x R1"	PWR9401458	59	42	23	50	39
1¼" x R1¼"	PWR9401469	73	46	24	57	45

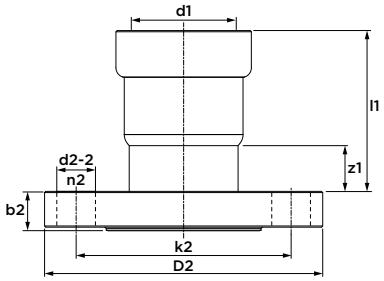
the maximum operating temperature is limited to 120°C

C9439 reducer
(2 x press)



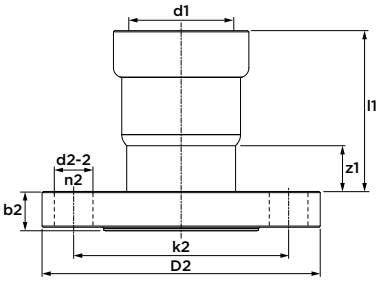
dimension	article no.	l1	l2	z1	z2
¾" x ½"	PWR9401073	34	29	3	1
1" x ½"	PWR9401084	41	29	5	1
1" x ¾"	PWR9401755	39	31	3	0
1¼" x ¾"	PWR9401766	55	31	7	0
1¼" x 1"	PWR9401777	53	36	5	0
1½" x 1¼"	PWR9401788	53	50	4	2
2" x 1¼"	PWR9401799	61	50	8	2
2" x 1½"	PWR9401801	59	51	6	2

C9427 flanged connector PN6
(1 x press)



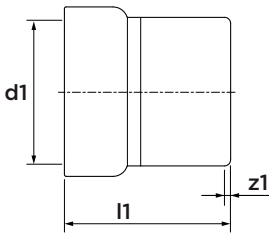
dimension	article no.	l1	z1	k2	b2	D2	d2-2	n2
1¼" (DN32)	PWR9400688	76	40	90	12	120	14	4
1½" (DN40)	PWR9400699	81	44	100	12	130	14	4
2" (DN50)	PWR9400701	82	41	110	12	140	14	4

C9426 flanged connector PN 10/16
(1 x press)



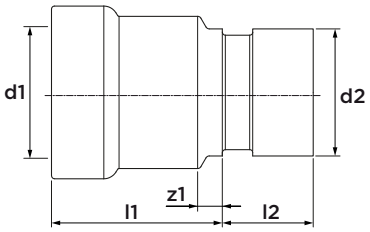
dimension	article no.	l1	z1	k2	b2	D2	d2-2	n2
1¼" (DN32)	PWR9400710	76	44	100	16	140	18	4
1½" (DN40)	PWR9400721	81	48	110	16	150	18	4
2" (DN50)	PWR9400732	82	45	125	16	165	18	4

C9429 stop end
(1 x press)



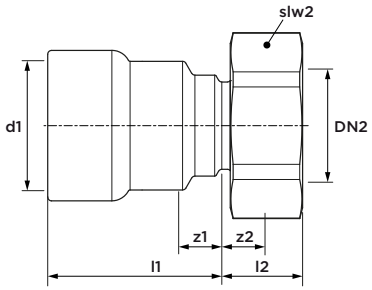
dimension	article no.	l1	z1
½"	PWR9400743	35	6
¾"	PWR9400754	38	6
1"	PWR9400765	43	7
1¼"	PWR9400776	56	7
1½"	PWR9400787	57	8
2"	PWR9400798	62	8

C9448 transition for grooved couplings
(press x groove)



dimension	article no.	l1	l2	z1
1" x 33.7	PWR9401095	45	24	8
1¼" x 42.4	PWR9401106	58	24	9
1½" x 48.3	PWR9401117	58	24	9
2" 60.3	PWR9401128	63	24	9

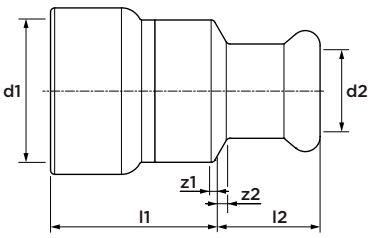
C9446 coupling with nut
(press x female thread)



dimension	article no.	l1	l2	z1	z2	slw2
½" x G¾"	PWR9401359	46	9	17	0	36
¾" x G1"	PWR9401361	51	12	20	1	41
1" x G1¼"	PWR9401370	57	12	21	1	50
1" x G1½"	PWR9401381	54	12	17	1	57
1¼" x G1½"	PWR9401392	71	12	22	1	57
1¼" x G2"	PWR9401403	53	16	4	1	70
1½" x G2"	PWR9401414	75	16	25	1	70
2" x G2½"	PWR9401425	83	20	29	1	85

the maximum operating temperature is limited to 120°C

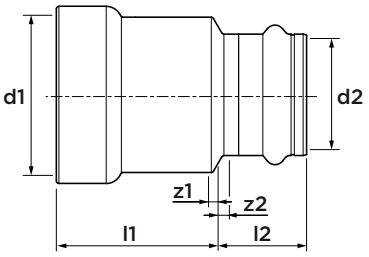
C9441 transition to VSH XPress
(2 x press)



dimension	article no.	l1	l2	z1	z2
½" x 15	PWR9401216	30	22	1	2
¾" x 15	PWR9401238	32	23	1	2
¾" x 22	PWR9401227	39	24	3	4
1" x 15	PWR9401249	33	23	2	3
1" x 28	PWR9401251	38	25	1	2
1¼" x 35	PWR9401260	51	29	2	3
1½" x 42	PWR9401271	52	33	2	3
2" x 54	PWR9401282	56	38	2	3

C9440 transition to VSH SudoPress

(2 x press)



dimension	article no.	l1	l2	z1	z2
½″ x 15	PWR9401139	32	24	3	2
¾″ x 15	PWR9401141	35	25	4	3
1″ x 15	PWR9401150	41	26	5	4
¾″ x 22	PWR9401161	34	25	3	2
1″ x 28	PWR9401172	39	26	3	2
1¼″ x 35	PWR9401183	52	27	3	2
1½″ x 42	PWR9401194	53	39	4	3
2″ x 54	PWR9401205	57	45	3	4

C9452 flat seal

(black, EPDM)

dimension	article no.
suitable for G¾″	PWR9401722
suitable for G1″	PWR9401471
suitable for G1¼″	PWR9401480
suitable for G1½″	PWR9401491
suitable for G2″	PWR9401733
suitable for G2½″	PWR9401502

the maximum operating temperature is limited to 120°C

product range

VSH PowerPress® tools and accessories

P6100 press tools Novopress

version	dimension	article no.
ACO203BT + 2 batteries 5.0Ah + charger 220V + case	½" - 2"	6342556

P6101 press jaws and slings Novopress

version	dimension	article no.
PB2 ECOTEC jaw - DW	½"	6360002
PB2 ECOTEC jaw - DW	¾"	6360013
PB2 ECOTEC jaw - DW	1"	6360024
ZB203 adapter	1¼" - 2"	6580145
snap-on sling - DW	1¼"	6360035
snap-on sling - DW	1½"	6360046
snap-on sling - DW	2"	6360057
set: case + snap-on slings	1¼" + 1½" - 2" + ZB203	6360090
set: jaws ½" - 1" + case	½" - 1"	6360167
set: jaws and slings ½" - 2" + ZB203 adapter + case	½" - 2"	6360178

P6102 case

version	dimension	article no.
case for jaws + snap-on sling + adapter	½" - 2"	6360145

P6002 battery + charger

version	article no.
battery ACO203 2.0 Ah 18V	6341588
battery ACO203 5.0 Ah 18V	6342446
charger ACO203 230V	6340125

P6103 insertion depth marker

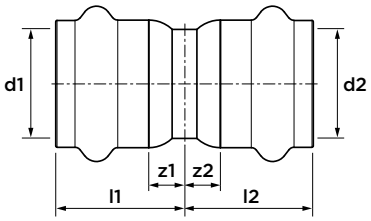
version	dimension	article no.
insertion depth marker for VSH PowerPress®	½" - 2"	PWR9401744

product range

VSH SmartPress fittings HNBR & EPDM

500H straight coupling HNBR

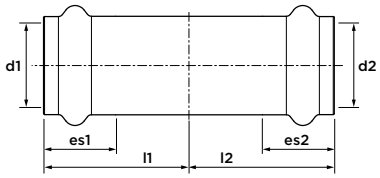
(2 x press)



dimension	article no.	l1/l2	z1/z2
½″	123460159	35	8
¾″	123460160	35	8
1″	123460161	40	10
1½″	123460162	44	9
2″	123460163	50	9

501H slip coupling HNBR

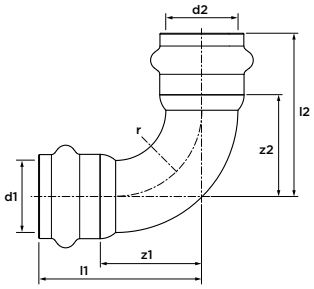
(2 x press)



dimension	article no.	l1/l2	es1/es2
½″	123460164	48	27
¾″	123460165	50	27
1″	123460166	58	30
1½″	123460167	68	35
2″	123460168	79	41

507H bend 90° HNBR

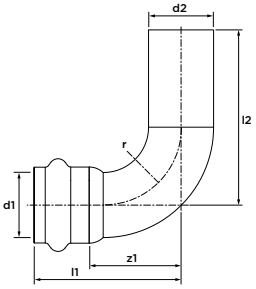
(2 x press)



dimension	article no.	l1/l2	z1/z2	r
½″	123460190	57	30	26
¾″	123460191	63	36	32
1″	123460192	76	46	40
1½″	123460193	98	63	58
2″	123460194	118	77	72

507-2H bend 90° HNBR

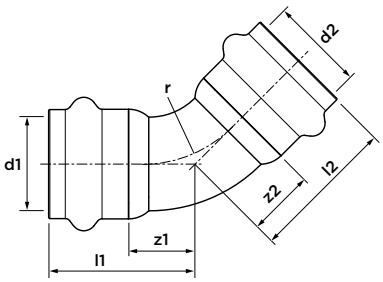
(press x male)



dimension	article no.	l1	l2	z1	r
½″ x Ø½″	123460195	57	72	30	26
¾″ x Ø¾″	123460196	63	76	36	32
1″ x Ø1″	123460197	76	90	46	40
1½″ x Ø1½″	123460198	98	111	63	58
2″ x Ø2″	123460199	118	133	77	72

506H bend 45° HNBR

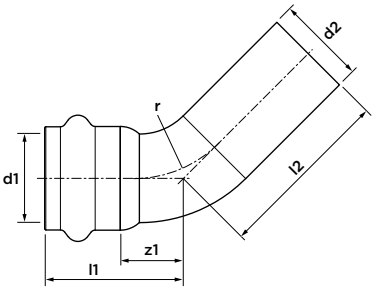
(2 x press)



dimension	article no.	l1/l2	z1/z2	r
½"	123460200	42	16	26
¾"	123460201	44	17	32
1"	123460202	52	22	40
1½"	123460203	64	29	58
2"	123460204	76	35	72

506-2H bend 45° HNBR

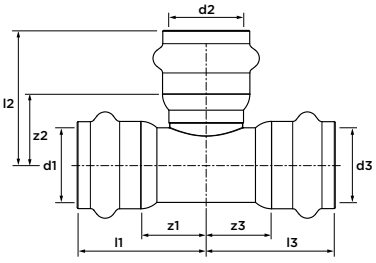
(press x male)



dimension	article no.	l1	l2	z1	r
½" x Ø½"	123460205	42	57	16	26
¾" x Ø¾"	123460206	44	57	17	32
1" x Ø1"	123460207	52	67	22	40
1½" x Ø1½"	123460208	64	77	29	58
2" x Ø2"	123460209	76	91	35	72

511H tee HNBR

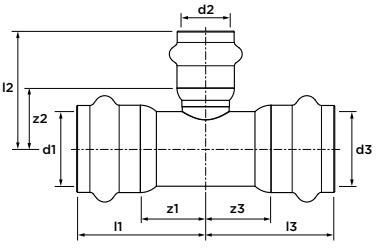
(3 x press)



dimension	article no.	l1/l3	l2	z1/z3	z2
½"	123460210	44	49	17	22
¾"	123460211	51	49	24	22
1"	123460212	58	57	28	27
1½"	123460213	69	69	34	34
2"	123460214	82	85	41	44

511RH tee reduced HNBR

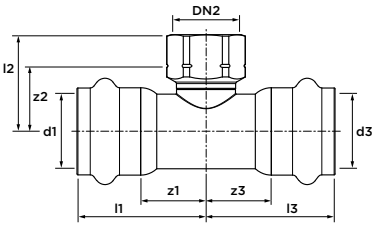
(3 x press)



dimension	article no.	l1/l3	l2	z1/z3	z2
¾" x ¾" x ½"	123460215	51	51	24	24
1" x 1" x ½"	123460216	58	55	28	28
1" x 1" x ¾"	123460217	58	53	28	26
1½" x 1½" x ½"	123460218	69	62	34	35
1½" x 1½" x ¾"	123460219	69	60	34	33
1½" x 1½" x 1"	123460220	69	64	34	34
2" x 2" x ½"	123460221	82	68	41	41
2" x 2" x ¾"	123460222	82	66	41	39
2" x 2" x 1"	123460223	82	70	41	40
2" x 2" x 1½"	123460224	82	76	41	41

5712H tee female thread HNBR

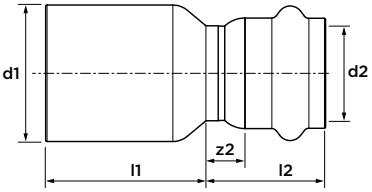
(press x female thread x press)



dimension	article no.	l1/l3	l2	z1/z3	z2	slw2
½" x ½" x FPT½"	123460225	44	37	17	29	28
¾" x ¾" x FPT½"	123460226	51	40	24	32	28
¾" x ¾" x FPT¾"	123460227	51	39	24	31	32
1" x 1" x FPT½"	123460228	58	43	28	35	28
1" x 1" x FPT¾"	123460229	58	43	28	35	32
1" x 1" x FPT1"	123460230	58	47	28	34	41
1½" x 1½" x FPT½"	123460231	69	51	34	43	28
1½" x 1½" x FPT¾"	123460232	69	51	34	42	32
1½" x 1½" x FPT1"	123460233	69	54	34	44	41
2" x 2" x FPT½"	123460234	82	57	41	49	28
2" x 2" x FPT¾"	123460235	82	57	41	48	32
2" x 2" x FPT1"	123460236	82	60	41	50	41

518H reducer HNBR

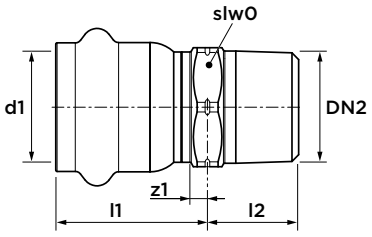
(press x male)



dimension	article no.	l1	l2	z2
Ø¾" x ½"	123460237	42	41	14
Ø1" x ½"	123460238	50	41	14
Ø1" x ¾"	123460239	47	39	12
Ø1½" x ½"	123460240	64	40	13
Ø1½" x ¾"	123460241	61	38	11
Ø1½" x 1"	123460242	57	42	12
Ø2" x ½"	123460243	76	40	13
Ø2" x ¾"	123460244	73	38	11
Ø2" x 1"	123460056	69	42	12
Ø2" x 1½"	123460057	60	47	12

504H straight connector HNBR

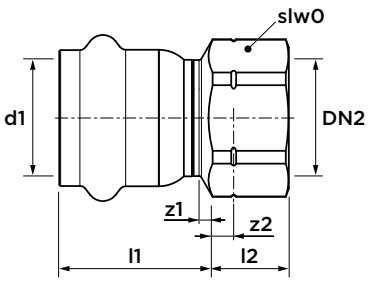
(press x male thread)



dimension	article no.	l1	l2	z1	slw0
½" x MPT½"	123460169	36	31	9	22
¾" x MPT½"	123460170	34	32	7	28
¾" x MPT¾"	123460171	34	32	7	32
¾" x MPT1"	123460172	34	36	7	36
1" x MPT¾"	123460173	38	32	8	36
1" x MPT1"	123460174	38	36	8	36
1½" x MPT¾"	123460175	43	38	8	50
1½" x MPT1½"	123460176	43	42	8	55
2" x MPT2"	123460177	52	43	11	65

503H straight connector HNBR

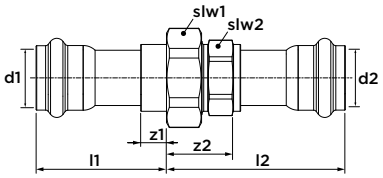
(press x female thread)



dimension	article no.	l1	l2	z1	z2	slw0
½" x FPT½"	123460178	36	24	9	16	28
¾" x FPT½"	123460179	34	24	7	16	28
¾" x FPT¾"	123460180	34	25	7	16	32
1" x FPT½"	123460181	38	22	8	14	36
1" x FPT¾"	123460182	38	22	8	14	36
1" x FPT1"	123460183	38	28	8	18	41
1½" x FPT1"	123460184	43	26	8	16	50
1½" x FPT1¼"	123460185	43	26	8	15	50
1½" x FPT1½"	123460186	43	29	8	19	60
2" x FPT1¼"	123460187	52	30	11	19	65
2" x FPT1½"	123460188	52	30	11	19	65
2" x FPT2"	123460189	52	35	11	24	70

5733H straight union HNBR

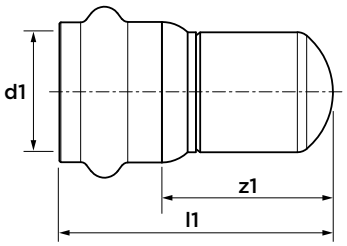
(2 x press)



dimension	article no.	l1	l2	z1	z2	slw1	slw2
½"	123460068	80	84	53	57	41	28
¾"	123460069	86	88	59	61	46	36
1"	123460070	90	96	60	66	55	41
1½"	123460071	99	104	64	69	75	60
2"	123460072	102	104	61	63	93	74

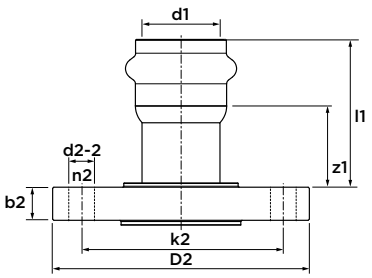
517H stop end HNBR

(1 x press)



dimension	article no.	l1	z1
½"	123460073	61	34
¾"	123460074	59	32
1"	123460075	76	46
1½"	123460076	81	46
2"	123460077	90	49

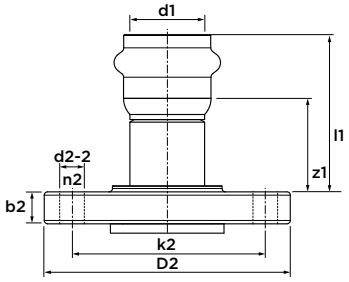
5771H flanged connector class 150 HNBR (1 x press)



dimension	article no.	l1	z1	b2	d2-2	k2	D2	n2
½"	123460058	58	31	11	16	60	90	4
¾"	123460059	58	31	13	16	70	100	4
1"	123460060	63	33	14	16	79	110	4
1½"	123460061	67	32	17	16	98	125	4
2"	123460062	66	25	19	19	121	150	4

5772H van stone class 150 HNBR

(1 x press)



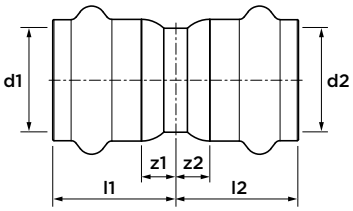
dimension	article no.	l1	z1	b2	d2-2	k2	D2	n2
½"	123460063	69	42	11	16	60	90	4
¾"	123460064	68	41	13	16	70	100	4
1"	123460065	70	40	14	16	79	110	4
1½"	123460066	72	37	17	16	98	125	4
2"	123460067	89	48	19	19	121	150	4

599H HNBR sealing element

dimension	article no.
½"	123460361
¾"	123460362
1"	123460363
1½"	123460364
2"	123460365

500E straight coupling EPDM

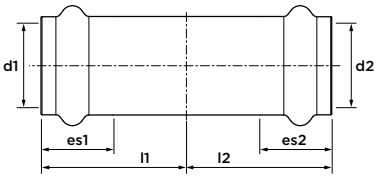
(2 x press)



dimension	article no.	l1/l2	z1/z2
½"	123459957	35	8
¾"	123459958	35	8
1"	123459959	40	10
1½"	123459960	44	9
2"	123459961	50	9

501E slip coupling EPDM

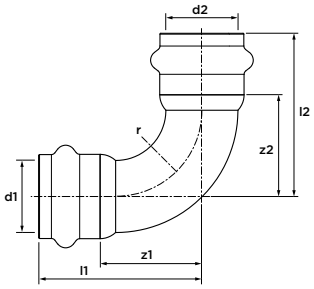
(2 x press)



dimension	article no.	l1/l2	es1/es2
½"	123459962	48	27
¾"	123459963	50	27
1"	123459964	58	30
1½"	123459965	68	35
2"	123459966	79	41

507E bend 90° EPDM

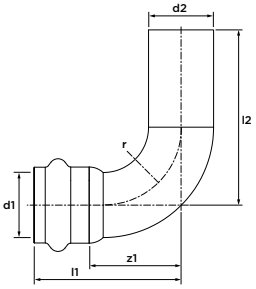
(2 x press)



dimension	article no.	l1/l2	z1/z2	r
½"	123459988	57	30	26
¾"	123459989	63	36	32
1"	123459990	76	46	40
1½"	123459991	98	63	58
2"	123459992	118	77	72

507-2E bend 90° EPDM

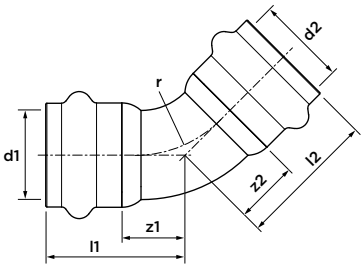
(press x male)



dimension	article no.	l1	l2	z1	r
½" x Ø½"	123459993	57	72	30	26
¾" x Ø¾"	123459994	63	76	36	32
1" x Ø1"	123459995	76	90	46	40
1½" x Ø1½"	123459996	98	111	63	58
2" x Ø2"	123459997	118	133	77	72

506E bend 45° EPDM

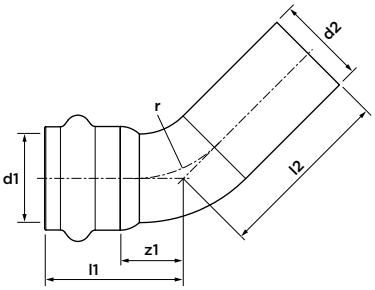
(2 x press)



dimension	article no.	l1/l2	z1/z2	r
½"	123459998	42	16	26
¾"	123459999	44	17	32
1"	123460000	52	22	40
1½"	123460001	64	29	58
2"	123460002	76	35	72

506-2E bend 45° EPDM

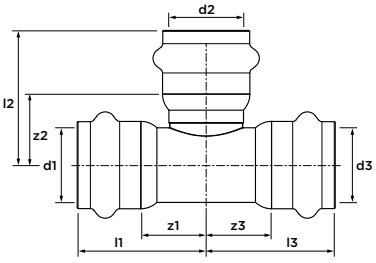
(press x male)



dimension	article no.	l1	l2	z1	r
½" x Ø½"	123460003	42	57	16	26
¾" x Ø¾"	123460004	44	57	17	32
1" x Ø1"	123460005	52	67	22	40
1½" x Ø1½"	123460006	64	77	29	58
2" x Ø2"	123460007	76	91	35	72

511E tee EPDM

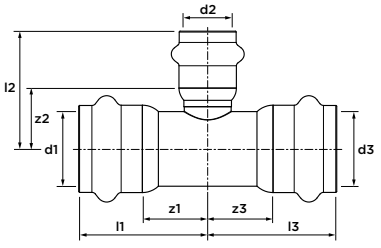
(3 x press)



dimension	article no.	l1/l3	l2	z1/z3	z2
½"	123460008	44	49	17	22
¾"	123460009	51	49	24	22
1"	123460010	58	57	28	27
1½"	123460011	69	69	34	34
2"	123460012	82	85	41	44

511RE tee reduced EPDM

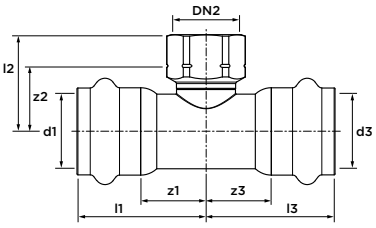
(3 x press)



dimension	article no.	l1/l3	l2	z1/z3	z2
¾" x ¾" x ½"	123460013	51	51	24	24
1" x 1" x ½"	123460014	58	55	28	28
1" x 1" x ¾"	123460015	58	53	28	26
1½" x 1½" x ½"	123460016	69	62	34	35
1½" x 1½" x ¾"	123460017	69	60	34	33
1½" x 1½" x 1"	123460018	69	64	34	34
2" x 2" x ½"	123460019	82	68	41	41
2" x 2" x ¾"	123460020	82	66	41	39
2" x 2" x 1"	123460021	82	70	41	40
2" x 2" x 1½"	123460022	82	76	41	41

5712E tee female thread EPDM

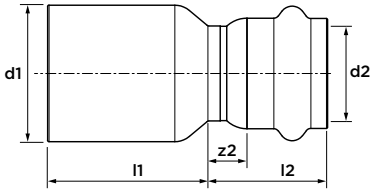
(press x female thread x press)



dimension	article no.	l1/l3	l2	z1/z3	z2	slw2
½" x ½" x FPT½"	123460023	44	37	17	29	28
¾" x ¾" x FPT½"	123460024	51	40	24	32	28
¾" x ¾" x FPT¾"	123460025	51	39	24	31	32
1" x 1" x FPT½"	123460026	58	43	28	35	28
1" x 1" x FPT¾"	123460027	58	43	28	35	32
1" x 1" x FPT1"	123460028	58	47	28	34	41
1½" x 1½" x FPT½"	123460029	69	51	34	43	28
1½" x 1½" x FPT¾"	123460030	69	51	34	42	32
1½" x 1½" x FPT1"	123460031	69	54	34	44	41
2" x 2" x FPT½"	123460032	82	57	41	49	28
2" x 2" x FPT¾"	123460033	82	57	41	48	32
2" x 2" x FPT1"	123460034	82	60	41	50	41

518E reducer EPDM

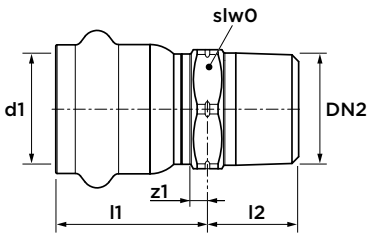
(press x male)



dimension	article no.	l1	l2	z2
Ø¾" x ½"	123460035	42	41	14
Ø1" x ½"	123460036	50	41	14
Ø1" x ¾"	123460037	47	39	12
Ø1½" x ½"	123460038	64	40	13
Ø1½" x ¾"	123460039	61	38	11
Ø1½" x 1"	123460040	57	42	12
Ø2" x ½"	123460041	76	40	13
Ø2" x ¾"	123460042	73	38	11
Ø2" x 1"	123460043	69	42	12
Ø2" x 1½"	123460044	60	47	12

504E straight connector EPDM

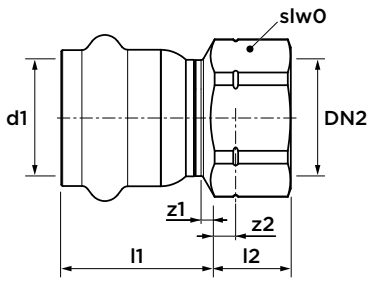
(press x male thread)



dimension	article no.	l1	l2	z1	slw0
½" x MPT½"	123459967	36	31	9	22
¾" x MPT½"	123459968	34	32	7	28
¾" x MPT¾"	123459969	34	32	7	32
¾" x MPT1"	123459970	34	36	7	36
1" x MPT¾"	123459971	38	32	8	36
1" x MPT1"	123459972	38	36	8	36
1½" x MPT¾"	123459973	43	38	8	50
1½" x MPT1½"	123459974	43	42	8	55
2" x MPT2"	123459975	52	43	11	65

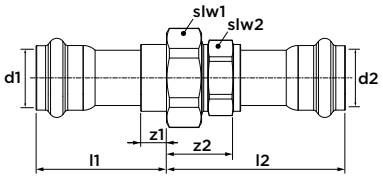
503E straight connector EPDM

(press x female thread)



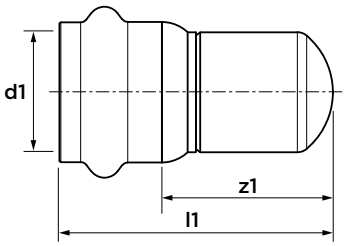
dimension	article no.	l1	l2	z1	z2	slw0
½" x FPT½"	123459976	36	24	9	16	28
¾" x FPT½"	123459977	34	24	7	16	28
¾" x FPT¾"	123459978	34	25	7	16	32
1" x FPT½"	123459979	38	22	8	14	36
1" x FPT¾"	123459980	38	22	8	14	36
1" x FPT1"	123459981	38	28	8	18	41
1½" x FPT1"	123459982	43	26	8	16	50
1½" x FPT1¼"	123459983	43	26	8	15	50
1½" x FPT1½"	123459984	43	29	8	19	60
2" x FPT1¼"	123459985	52	30	11	19	65
2" x FPT1½"	123459986	52	30	11	19	65
2" x FPT2"	123459987	52	35	11	24	70

5733E straight union EPDM
(2 x press)



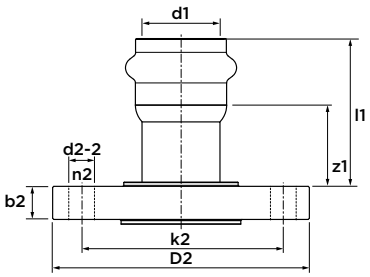
dimension	article no.	l1	l2	z1	z2	slw1	slw2
½"	123460055	80	84	53	57	41	28
¾"	123460150	86	88	59	61	46	36
1"	123460151	90	96	60	66	55	41
1½"	123460152	99	104	64	69	75	60
2"	123460153	102	104	61	63	93	74

517E stop end EPDM
(1 x press)



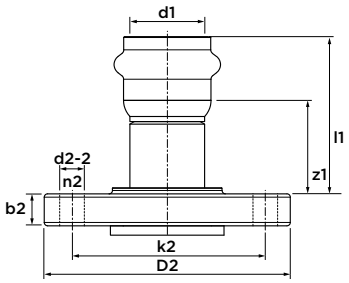
dimension	article no.	l1	z1
½"	123460154	61	34
¾"	123460155	59	32
1"	123460156	76	46
1½"	123460157	81	46
2"	123460158	90	49

5771E flanged connector class 150 EPDM (1 x press)



dimension	article no.	l1	z1	b2	d2-2	k2	D2	n2
½"	123460045	58	31	11	16	60	90	4
¾"	123460046	58	31	13	16	70	100	4
1"	123460047	63	33	14	16	79	110	4
1½"	123460048	67	32	17	16	98	125	4
2"	123460049	66	25	19	19	121	150	4

5772E van stone class 150 EPDM
(1 x press)



dimension	article no.	l1	z1	b2	d2-2	k2	D2	n2
½"	123460050	69	42	11	16	60	90	4
¾"	123460051	68	41	13	16	70	100	4
1"	123460052	70	40	14	16	79	110	4
1½"	123460053	72	37	17	16	98	125	4
2"	123460054	89	48	19	19	121	150	4

599E EPDM sealing element

dimension	article no.
½″	123460351
¾″	123460352
1″	123460353
1½″	123460354
2″	123460355

product range

VSH SmartPress tools and accessories

P6015 press tools Novopress

article	dimension	article nr.
ACO203BT XL + 2 batteries + charger 230V + case	½"–2"	6342556

P6201/P6016 pressjaws/-slings Novopress

article	dimension	article nr.
SmartPress jaw PB2	½"	123459889
SmartPress jaw PB2	¾"	123459890
SmartPress jaw/snap-on sling PB2	1"	123459891
SmartPress adapter ZB221	1"–2"	6341896
SmartPress snap-on sling	1½"	123459892
SmartPress snap-on sling	2"	123459893

P6002 battery + charger

article	article nr.
battery ACO203 5,0Ah 18V	6342446
charger ACO203 230V	6340125

P6202 insertion depth marker

article	dimension	article nr.
insertion depth marker for VSH SmartPress	½"–2"	123460336

integrated
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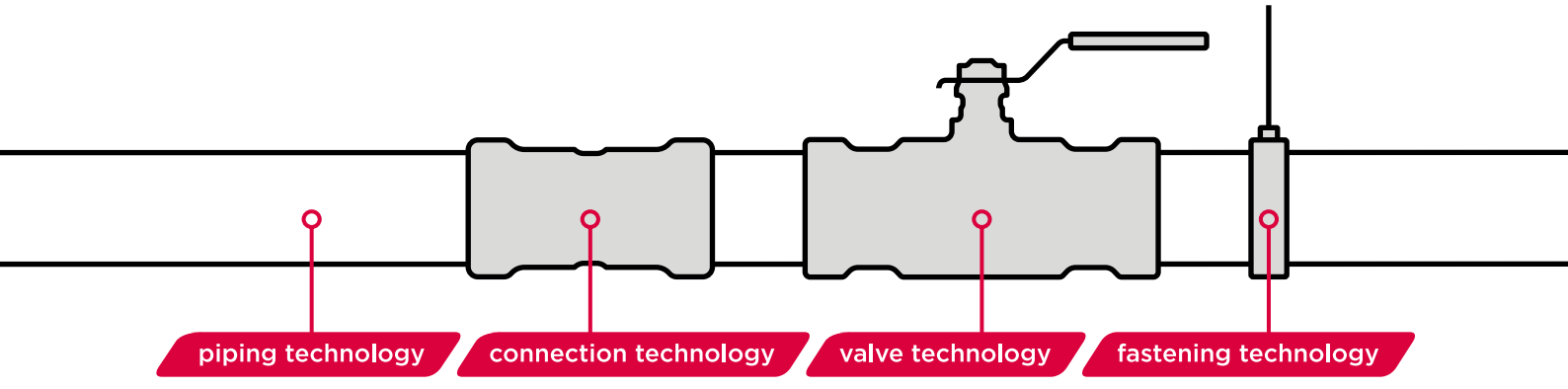

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