VSH

INTEGRATED PIPING SYSTEMS

Technical manual

Fire Protection

Disclaimer:

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

Contents

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

VSH Integrated Piping Systems

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

The right technology for the right application

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

VSH Fittings B.V.

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

VSH

1 Total solutions in Fire Protection

The market for fire protection has gained importance in the last years. With more and more dense cities the risks increase during fire situations and people are looking into minimizing risk for people and assets. This makes the fire protection market one of increasing importance for people worldwide and for VSH systems as a solution. VSH piping systems excel in the most varied circumstances. They are particularly suitable for use in fire protection systems in residential and non-residential buildings, shipbuilding and industry.

VSH Shurjoint, VSH XPress and VSH XPress ML can be used in the fire protection market in a number of applications in different surroundings:

- Wet or dry fire mains
- High pressure dry fire mains
- Wet or dry sprinkler installations
- Low pressure watermist-installations
- Hose reel connections

The plus of VSH fire protection systems:

+ BIM ready
+ Total solution with high flexibility
+ Personal VSH consultant for special advice; from design to delivery
+ Easy, fast connection technologies

2 VSH Shurjoint system

The VSH Shurjoint fire protection series numbers over 600 individual components, including grooved couplings, fittings, flanges, mechanical tees and more. Applicable products are listed and or approved by various domestic and international approval bodies including UL,FM, VdS, LPCB and others.

The advantages of the VSH Shurjoint system

+ Up to 70% reduction in installation time compared to welding
+ Improved jobsite safety, no welding required
+ Wide range of high quality products
+ Sizes from 1" to 12"
+ Technical support with 3D Design Modelling, BIM ready, cost comparisons and thermal movement analysis
+ Improve jobsite schedules, finish on-time, on-budget
+ Seamless transition to other VSH Press systems

2.1 Areas for using the VSH Shurjoint system

dry
fire mains

sprinkler

Sprinkler installations

VSH Shurjoint couplings and fittings with carbon or stainless steel pipe, which are VdS, FM, UL, ULc or LPCB approved.

Gasket:	EPDM Lube-E
Operating temperature:	-34°C to +65°C
Operating pressure:	Depending on coupling and approval type

2.2 VSH Shurjoint couplings and fittings

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	LPCB	LPCB Loss Prevention Certification Board LPS-1219
AWWA	ANSI/AWWA American Water Works Association C606 (latest edition)	NFPA	NFPA National Fire Protection Association NFPA 13
ASTM INTERNATIONAL	ASTM American Society of Testing and Materials F 1476-01 Couplings F 1548-01 Fittings F 1155 Shipbuilding	NSF	NSF NSF/ANSI 61 Drinking Water System Components - Health Effects NSF/ANSI 372 Drinking Water System Components - Lead Content
CNBOP-PIB	CNBOP-PIB Scientific and Research Centre for Fire Protection - National Research Institute	CE	PED Pressure Equipment Directory 97/23/EC
CANADIAN STANDARDS ASSOCIATION	CSA Canadian Standards Association B-242	c UL us LISTED	UL Underwriter's Laboratories, Inc. - UL213
FM APPROVED	FM Factory Mutual Research Corp. - Approved for Fire Protection Services	ULC	ULC Underwriter's Laboratories of Canada
IAPMO R&T	IAPMO R&T IAPMO Research and Testing, Inc.	TSUS	TSUS Technický a Skúšobný Ústav Stavebný, n. o.
LR	LLOYD Lloyd's Register Quality Assurance ISO 9001:2008	VdS	VdS VdS Schadenverhütung

Bolt dimensions

Pipe size		VSH Shurjoint coupling				
DN	mm	K9	7705	7707 - 7707N	Z05	Z07 - Z07N
25	33.7	M10 x 45	M10 x 45	-	-	-
32	42.4	M10 x 55	M10 x 55	-	M10 x 55	-
40	48.3	M10 x 55	M10 x 55	-	M10 x 55	-
50	60.3	M10 x 55	M10 x 55	-	M10 x 70	-
65	73.0	M10 x 55	M10 x 55	-	M10 x 70	-
65	76.1	M10 x 70	M10 x 55	-	M10 x 70	-
80	88.9	-	M12 x 75	-	M10 x 70	-
	108.0	M10 x 70	M12 x 75	-	M10 x 70	-
100	114.3	-	M12 x 75	-	M10 x 70	-
	133.0	M10 x 75	M16 x 90	-	M12 x 75	-
125	139.7	M10 x 75	M16 x 90	-	M12 x 75	-
	141.3	-	M16 x 90	-	M12 x 75	-
	159.0	M10 x 75	M16 x 90	-	M12 x 75	-
	165.1	M10 x 75	M16 x 90	-	M12 x 75	-
150	168.3	M16 x 90	M16 x 90	-	M12 x 75	-
200	219.1	M20 x 120 (K9H)	M16 x 90 M20 x 120 (7705H)	-	M16 x 135	-
250	273.0	-	M20 x 120	7/8 x 6 1/2	-	7/8 x 6 1/2
300	323.9	-	7/8 x 6 1/2	7/8 x 6 1/2	-	7/8 x 6 1/2

Pipe size		VSH Shurjoint coupling	
DN	mm	7706	7721 - 7722
25	33.7	-	-
32	42.4	M10 x 55	-
40	48.3	-	-
50	60.3	M10 x 55	M10 x 55
65	73.0	M10 x 55	M12 x 75
65	76.1	M10 x 55	M12 x 75
80	88.9	M12 x 75	M12 x 75
	108.0	-	-
100	114.3	M12 x 75	M12 x 75
	133.0	-	-

Pipe size		VSH Shurjoint coupling	
DN	mm	7706	7721 - 7722
125	139.7	M16 x 90	M16 x 90
	141.3	M16 x 90	M16 x 90
	159.0	-	-
	165.1	M16 x 90	M16 x 135
150	168.3	M16 x 90	M16 x 135
200	219.1	M20 x 120	M20 x 120
250	273.0	-	-
300	323.9	-	-

2.3 Gaskets

Over the past 50 years great advances have been made in synthetic elastomer technologies, allowing us to offer a full range of gasket materials for a wide variety of piping applications. VSH Shurjoint utilizes the finest materials available in our gaskets which are engineered and designed to meet and exceed industry standards such as ASTM D2000, AWWA C606, NSF61, IAPMO, etc. Our continual research, development and testing all serve to advance this field and to develop new and superior solutions for our changing industry. Selecting the proper gasket for the intended service application requires careful consideration of many factors to assure maximum gasket life. Those factors include temperature, fluid media and concentration, and continuity of service. The gaskets colour coding helps to identify the gasket grade and compound.

EPDM

EPDM is recognised as the most water resistant rubber available today. EPDM is not recommended for use with petroleum based oils and fuels, hydrocarbon solvents and aromatic hydrocarbons.

Compound	Grade	Colour code	General service recommendations	Maximum temp. 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.

2.4 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. For detailed information please visit the VSH website, www.vsh.eu or view the approval listing of the respective approval body.

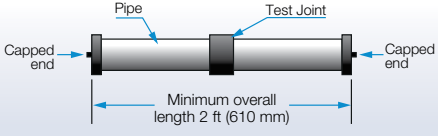
2.5 Hydrostatic Tests

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)

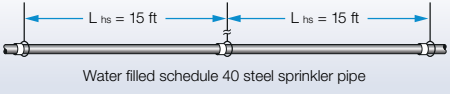
Nom. Size	UL	FM	VdS	LPCB
Up to 6/150	X5	X4	X4	X4
8-12/200-300	X4	X4	X4	X4
14 and above	X3	X4	NA	NA

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.

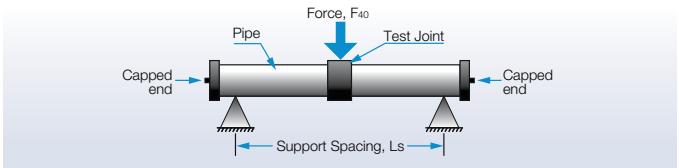


Water filled schedule 40 steel sprinkler pipe

See the table below 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 (inches)	UL		FM	
	Moment Nm	Moment Lbs-Ft	Moment Nm	Moment Lbs-Ft
1 1/2	1098	810	1100	810
2	1559	1150	1560	1150
2 1/2	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

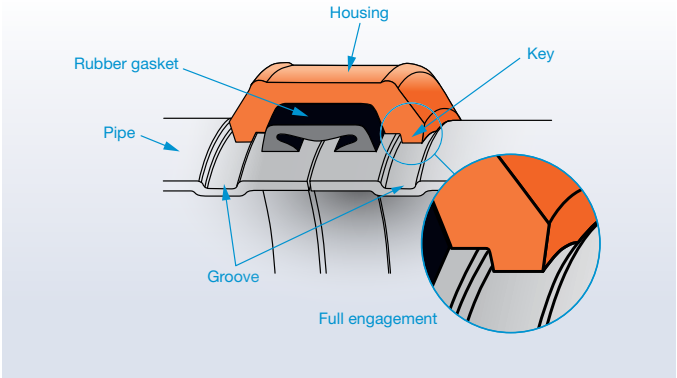
Standard cut and roll grooving connections have limitations of minimum pipe schedules. Special care is required for thin wall pipe. Factory Mutual Research Group (FM) outlines the minimum pipe schedules to be used for cut and roll grooving in their FM Class 1920 standard as follows:

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)

2.6 Pipe end preparation

How to groove pipes

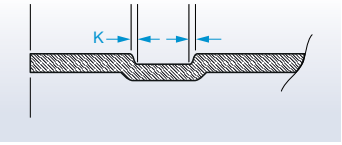


How to process roll-grooves

VSH Shurjoint grooved piping systems require the processing of a **roll or cut groove** to the pipe ends being connected. The engagement of the housing keys in the grooves is integral in providing a secure and leak-tight joint. It is essential that the grooves are properly processed for optimum joint performance.

Nominal pipe size

VSH Shurjoint couplings and fittings are identified by the nominal diameter of pipe (DN) in millimeters or size in inches. Always check the actual outside diameter (OD) of the pipe and fittings to be connected, as in some markets it is customary to refer to different OD pipes with the same nominal size.

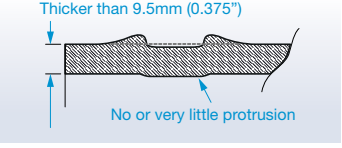


Roll groove profile

Roll grooves should be as defined as possible. To achieve optimum joint performance the 'K' dimension should be as small as possible. When processing a roll groove the machine operator should manage the feed pressure of the upper roll set so as to achieve the best possible groove profile.

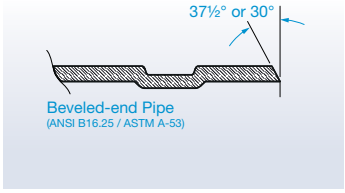
Applicable pipe wall thickness

Roll grooves are generally applicable to 9.5 mm thick or thinner wall carbon steel and stainless steel pipe depending on the type of roll-grooving machine and roll set being used. Different wall thicknesses, pipe materials and sizes require the use of different roll sets. Contact the roll groove machine manufacturer for additional information.



Heavy wall pipe

When attempting to roll-groove pipe thicker than 9.5 mm, the metal may deform and heap up on both sides of the groove rather than radially deforming and protruding on the inside of the pipe. The extra heaped metal could lead to joint failure. In such case, you should grind off any such extra metal to achieve a flat and smooth sealing surface. A rust preventative coating must be applied on the ground surface. VSH Shurjoint strongly recommends the processing of cut-grooves on heavy or thick wall pipe.



Plain-end pipe and beveled end pipe

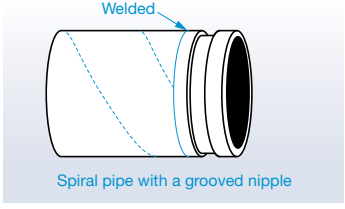
While plain-end pipe is preferred, the use of beveled end pipe is acceptable providing that the wall thickness is 9.5 mm or thinner and the bevel is 37 1/2 ±2 1/2° or 30° as specified in ANSI B16.25 and ASTM A-53 respectively.

Removing welding beads

Depending on the individual pipe and manufacturer, welding beads may remain on the surface (inside and outside) of the pipe. Always remove harmful weld beads near the pipe ends as they can cause rattling of the roll grooving machine resulting in inaccurate grooves.

Galvanized pipe

Galvanized pipe is acceptable as long as the gasket seating surface is smooth and free from scale and imperfections that could affect gasket sealing. Whenever you remove welding beads or projections from the sealing surface of galvanized pipe, use caution so as to not over-grind the surface. After grinding, always apply a proper rust- prevention coating to this area.



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 as shown. Whenever you remove weld beads or projections from the gasket seating surface, use caution so as to not over-grind the surface. After grinding, always apply a rust-prevention coating to this area.

Check pipe OD

Check to insure that the pipe to be prepared has the correct OD and wall thickness for the intended service. While VSH Shurjoint fittings are normally 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 refer to different OD pipes with the same nominal size.

For example: The nominal size DN65 (2-1/2") is referred to 73,0 mm pipe OD in IPS and 76.1 mm pipe OD in EN, AS, BS, DIN (ISO), JIS or KS pipes.

EN - European Standard (Metric)
ISO - ISO Standard (Metric)
BS - British Standard (Metric)
DIN - German Standard (Metric)
IPS - United States Standard (Inch)

Pipe size equivalents

Size inches		Size millimeters	
Nominal	Actual	Nominal	Actual
1/2	0.840	DN15	21.3
3/4	1.050	DN20	26.7
1	1.315	DN25	33.7
1 1/4	1.660	DN32	42.4
1 1/2	1.900	DN40	48.3
2	2.375	DN50	60.3
2 1/2	2.875	-	73.0
3 OD	3.000	DN65	76.1
3	3.500	DN80	88.9
3 1/2	4.000	-	101.6
4 1/4 OD	4.250	-	108.0
4	4.500	DN100	114.3
5	5.563	-	141.3
5 1/4 OD	5.250	-	133.0
5 1/2 OD	5.500	DN125	139.7

Size inches		Size millimeters	
Nominal	Actual	Nominal	Actual
6 1/4 OD	6.250	-	159.0
6 1/2 OD	6.500	-	165.1
6	6.625	DN150	168.3
8	8.625	DN200	219.1
10	10.750	DN250	273.0
12	12.750	DN300	323.9
14	14.000	DN350	355.6
16	16.000	DN400	406.4
18	18.000	DN450	457.2
20	20.000	DN500	508.0
22	22.000	DN550	558.8
24	24.000	DN600	609.6
28	28.000	DN700	711.2
30	30.000	DN750	762.0
32	32.000	DN800	812.8
36	36.000	DN900	914.4
40	40.000	DN1000	1016.0
42	42.000	DN1050	1066.8

What pipe can be roll or cut grooved?

VSH Shurjoint grooved piping systems require a roll or cut-groove to be applied to the pipe ends being connected. The groove dimensions and configurations may vary depending on several factors including pipe material, wall thickness and desired working pressures. Roll grooving is the most common practice and can be performed in the fabrication shop or in the field or the job site. Cut grooving on the other hand is primarily performed at the factory or fabrication shop, as cut grooving machines are not as common or portable as roll grooving machines. All roll 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) and ISO/FDIS 6182-12, refer to the relative groove specifications shown in this manual. When grooving pipe, it is preferable to start

with plain-end pipe, although in some cases the use of beveled pipe is acceptable providing that the wall thickness is standard or thinner and the bevel is 37 1/2° ± 2 1/2° (ANSI B16.25).

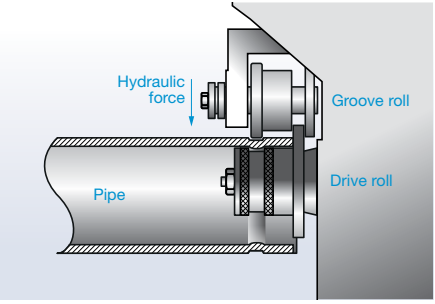
Roll and cut grooving applications

Pipe materials	Roll groove	Cut groove
Carbon steel pipe	Standard wall, Sch. 40 (10" and below), 30, 20, 10, 7, 5, BS1387 medium & light, JIS SGP	Sch. 80, 40, 30 BS1387 medium & heavy, JIS SGP
Stainless steel pipe	Sch. 40S, 20S, 10S, 5S	Sch. 80S, 40S

About roll-grooving

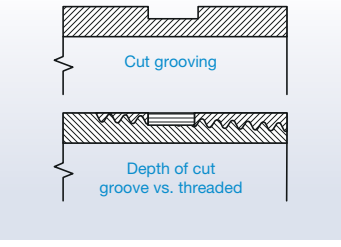
Roll grooving was first used with light or thin wall pipe, which had insufficient wall thickness for cut grooving. Today roll grooving is commonly used on standard and schedule 40 wall pipe (max. 9.5 mm thick) for sizes to 42" (DN1050) depending on the type of roll-grooving machine and roll sets used.

Roll grooving radially displaces the pipe material. Because roll grooving removes no material from the pipe itself, the integrity of the pipe remains intact when properly grooved. The inside protrusion or upset of roll groove is small and smooth at its entry and exit and thus has insignificant or negligible effect on both flow and/or line pressure. Roll grooving is limited to pipe having a hardness of HB180 or less.



To groove the pipe, the end is placed between a roll set when the roll set is compressed and rotated a groove is processed around the diameter of the pipe, recessed on the outside and protruding on the inside. Roll grooving can be processed on carbon steel and stainless steel. Care must be taken to use the correct equipment and roll sets for the piping material being grooved. Different materials can require the use of different roll sets as in the case with stainless steel and heavy wall (9.5 mm thick) carbon steel pipe. Consult your grooving machine / roll set instructions or operators manual or contact VSH Shurjoint for more information.

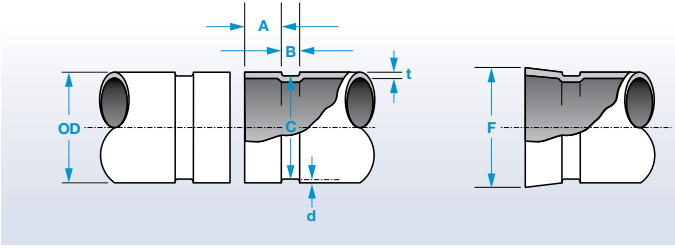
About cut-grooving



The cut grooving process actually removes material from the pipe OD to form a groove. Thus cut grooving is intended for use with standard and heavier wall pipe. Most all pipes that are designed to be threaded can be cut grooved, as the depth of a cut groove is typically 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 produces a square cut groove in the pipe, without any protrusion on the inside of the pipe. Cut grooving is commonly used on piping components such as 90° elbows, tees, grooved-end valves, etc. It is also good practice to process a cut groove into plastic-coated or cement-lined pipe as roll grooving may damage the internal coatings or linings of such pipe.

Groove dimensions

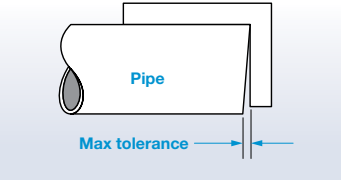


STANDARD ROLL GROOVE DIMENSIONS

Nominal size

VSH Shurjoint couplings and fittings are identified by the nominal pipe size in inches or nominal outside diameter of pipe in millimeters

OD: Pipe ends must be square cut



The maximum allowable tolerances from square ends are:
0.8 mm for sizes up to 3 1/2" (DN90),
1.2 mm for 4" thru 6" (DN100-150)
1.6 mm for 8" (DN200) and above.

Gasket seating surface ('A' dimension)

The exterior surface of the gasket seating area shall be free from any indentations, projections, roll marks or other harmful surface defects such as loose paint, scale, dirt, chips, grease and rust.

Groove Width ('B' dimension)

is to be measured between vertical flanks of the groove side walls, and is determined by the width of the upper roller as it is pressed into the pipe. Visually inspect the pipe groove to insure the groove has well defined edges for the coupling keys to engage properly. If they appear to be rounded with little or no vertical lip, they should be replaced as this could lead to reduced product performance or joint failure.

Groove diameter ('C' dimension)

The groove diameters are average values. The groove must be of uniform depth around the entire pipe circumference.

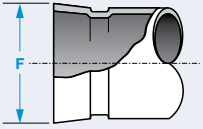
Minimum wall thickness ('t' dimension)

The 't' is the minimum allowable wall thickness that may be roll-grooved.

Groove depth ('d' dimension)

The values listed in the Groove Specification tables are for reference only.

Flare diameter ('F' dimension)



The pipe end that may flare when roll grooved shall measure within this limit when measured at the extreme end of the pipe.

Roll groove specifications

Pipe or tube			Dimensional specifications						
Nominal size	Outside diameter (OD)		Gasket seat A ±0.76	Gasket width B±0.76	Grooved diameter C		Groove depth d (ref.)	Wall thickness t Min. allow.	Flare F Max. dia.
	Actual size	Tolerance			Actual size	Tolerance			
25	33.7	+0.41/-0.68	15.88	7.14	30.23	0/-0.38	1.70	1.8	34.5
32	42.4	+0.50/-0.60	15.88	7.14	38.99	0/-0.38	1.70	1.8	43.3
40	48.3	+0.44/-0.52	15.88	7.14	45.09	0/-0.38	1.60	1.8	49.4
50	60.3	±0.61	15.88	8.74	57.15	0/-0.38	1.60	1.8	62.2
65	73	±0.74	15.88	8.74	69.09	0/-0.46	1.98	2.3	75.2
65	76.1	±0.76	15.88	8.74	72.26	0/-0.46	1.93	2.3	77.7
80	88.9	+0.89/-0.79	15.88	8.74	84.94	0/-0.46	1.98	2.3	90.6
90	101.6	+1.02/-0.79	15.88	8.74	97.38	0/-0.51	2.11	2.3	103.4
100	108	+1.07/-0.79	15.88	8.74	103.73	0/-0.51	2.11	2.3	109.7
100	114.3	+1.14/-0.79	15.88	8.74	110.08	0/-0.51	2.11	2.3	116.2
125	133.9	+1.32/-0.79	15.88	8.74	129.13	0/-0.51	1.93	2.9	134.9
125	139.7	+1.40/-0.79	15.88	8.74	135.48	0/-0.56	2.11	2.9	141.7
125	141.3	+1.42/-0.79	15.88	8.74	137.03	0/-0.56	2.13	2.9	143.5
150	159	+1.60/-0.79	15.88	8.74	154.50	0/-0.56	2.20	2.9	161.0
150	165.1	+1.60/-0.79	15.88	8.74	160.90	0/-0.56	2.16	2.9	167.1
150	168.3	+1.60/-0.79	15.88	8.74	163.96	0/-0.56	2.16	2.9	170.7
200	219.1	+1.60/-0.79	19.05	11.91	214.40	0/-0.64	2.34	2.9	221.5
250	277.4	+1.60/-0.79	19.05	11.91	268.28	0/-0.69	2.39	3.6	275.4
300	328.2	+1.60/-0.79	19.05	11.91	318.29	0/-0.76	2.77	4.0	326.2
350	355.6	+1.60/-0.79	23.83	11.91	350.04	0/-0.76	2.77	3.96	358.14

Pipe or tube			Dimensional specifications						
Nominal size	Outside diameter (OD)		Gasket seat A ±0.76	Gasket width B±0.76	Grooved diameter C		Groove depth d (ref.)	Wall thickness t Min. allow.	Flare F Max. dia.
	Actual size	Tolerance			Actual size	Tolerance			
400	406.4	+1.60/-0.79	23.83	11.91	400.84	0/-0.76	2.77	4.19	408.94
450	457.2	+1.60/-0.79	23.83	11.91	451.64	0/-0.76	2.77	4.19	461.26
500	508	+1.60/-0.79	23.83	11.91	502.44	0/-0.76	2.77	4.78	512.06
550	558.8	+1.60/-0.79	23.83	11.91	550.06	0/-0.76	4.37	4.78	563.88
600	609.6	+1.60/-0.79	23.83	12.70	600.86	0/-0.76	4.37	5.54	614.68

1. Pipe OD: Maximum allowable tolerances from square cut ends is 0,76 mm (0.03") for sizes up to 3 1/2"; 1,14 (0.045") for 4" thru 6"; and 1,54 (0.060") for sizes 8" and above.
2. The gasket seating surface 'A' shall be free from deep scores. marks. or ridges that would prevent a positive seal.
3. The 'C' dimensions are average values. The groove must be of uniform depth around the entire circumference. Use a Shurjoint groove gage or rule to check the groove diameter.
4. The 't' is the minimum allowable wall thickness that may be roll-grooved.
5. The 'd' is for reference use only. The groove depth shall be determined by the groove diameter 'C'.
6. Flare Diameter: The pipe end that may flare when the groove is rolled shall be within this limit when measured at the extreme end of the pipe.

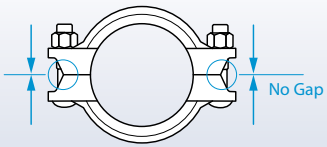
For a complete overview of all relevant roll- and cut grooving dimensions please refer to the 'VSH Shurjoint roll and cut grooving dimensions table', available as download via www.vsh.eu

Bolts & nut torque and assembly

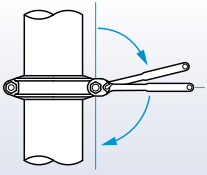
Helpful information to ensure proper assembly

Some couplings and components require the housing bolt pads to make metal-to-metal contact for correct assembly, while others require a specific bolt torque while maintaining equal bolt pad gaps. The icons and information below will help to identify those items to ensure correct assembly. Read and follow all installation instructions for the component being installed.

Metal-to-metal contact: Tighten bolts and nuts until bolt pads make metal-to-metal contact. After metal-to-metal contact is achieved, tighten nuts by another one quarter or one half turn to make sure the bolts and nuts are snug and secure. No torque wrench is required. Excessive torque may lead to bolt or joint failure.



Metal-to-metal contact



After metal-to-metal, further tighten one quarter or half turn

If bolt pad gaps are evident after installation, disassemble and reinstall the coupling after checking the following:

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

2.7 Installation guidelines

When installing VSH Shurjoint always make sure to take care in using protective gear on the building site. Safety shoes, hat and glasses should be the minimum of protection when installing VSH Shurjoint.

2.7.1 General installation steps for grooved couplings

Below you can find the different steps which need to be taken for installing grooved couplings. If, for certain models specific installation steps or requirements need to be taken, you can find them in the corresponding sections.

1. **Inspect and prepare pipe ends:** Make sure pipe ends have the right OD's and are properly roll- or cut grooved. For optimum sealing by the gasket, the exterior surface of the pipe ends must be free from any indentations, projections, roll marks or other harmful surface defects such as loose paint, scale, dirt, chips, grease and rust.

2. **Check gasket:** Verify the factory supplied gasket is correct for the intended service. The colour code identifies gasket grade.

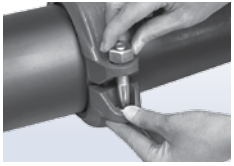
3. **Lubricate gasket:** To help insert pipe smoothly and mount couplings smoothly without pinching, apply a thin layer of VSH Shurjoint Lubricant to the sealing lips as well as to the exterior of the gasket. Other compatible lubricants may be used so long as they are not harmful to the gasket.

4. Install gasket: Install the gasket over one end of the pipe so that the pipe end is exposed. No part of the gasket should overhang this end of the pipe.

5. Bring the mating pipe together: align the two pipe ends to be joined. Slide the gasket over the ends and centre it between the grooves of the pipe to be joined. No part of the gasket should protrude into the groove of either pipe.

6. Assemble coupling: For a 'swing-over' assembly loosely install one bolt and nut on one side of the coupling. For a standard assembly start with the two housings separated.

7. install coupling halves: For a 'swing-over' installation, place one of the coupling halves around the bottom side of the gasket and swing over the other coupling half into position over the top side of the gasket. For a standard installation install the coupling halves one at a time. In both cases make sure the coupling keys are engaged in the grooves.



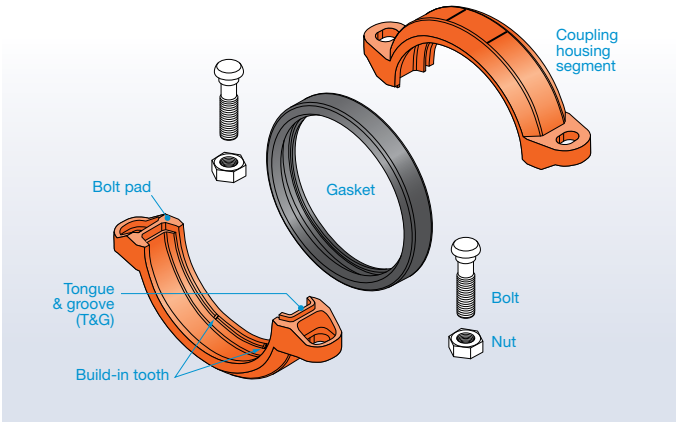
8. **Insert bolt & nut:** For a 'swing-over' installation, insert the remaining bolt and apply the nut hand tight. For standard installation, insert the bolts and apply the nuts hand tight. Make sure that the oval neck of the bolt engages into the bolt hole of the housing.
9. **Tighten nuts** alternately and equally until the bolt pads meet and make **metal-to-metal** contact. Tighten nuts by another one quarter to one half turn to make sure the bolts and nuts are snug and secure. The use of a torque wrench is not required.

Caution

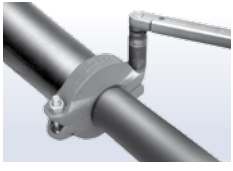
1. Uneven tightening of bolts and nuts may cause the gasket to be pinched, resulting in an immediate or delayed leak.
2. When using a power impact wrench, excessive tightening of nuts may cause a bolt or joint failure.

Note: Excessive torque may cause the **galling of stainless steel bolts and nuts**. Use of an anti-seize lubricant such as Loctite C5-A to lessen this problem with stainless steel bolts and nuts. The use of silicone bronze nuts is also a good option to avoid galling. Contact VSH for additional information.

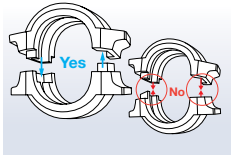
2.7.2 Installing tongue & groove coupling K9



Please refer to section 2.7.1. for preliminary steps 1 to 8.

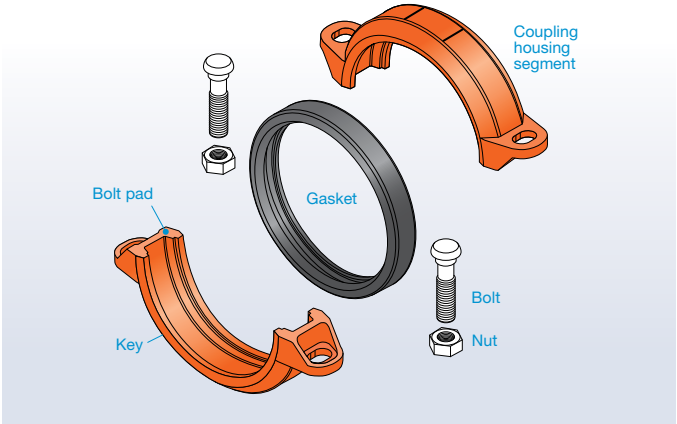


9. **tighten nuts** alternately and equally until the bolt pads meet and make metal-to-metal contact. tighten nuts by another one quarter to one half turn to make sure the bolts and nuts are snug and secure. the use of a torque wrench is not required.



Warning. The VSH Shurjoint models K-9 feature a tongue and groove design. These couplings must always be installed so that tongue and groove mate properly. Attempting to install tongue to tongue or groove to groove will result in joint failure, property damage or serious injury.

2.7.3 Installing rigid coupling 7705, 7705H & 7707



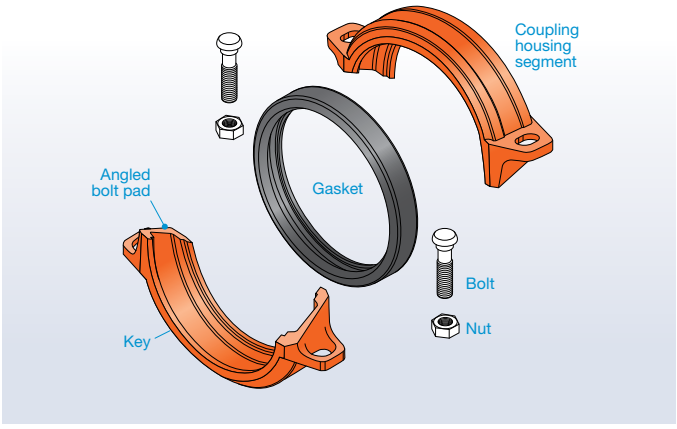
Please refer to section 2.7.1. for preliminary steps 1 to 8.

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

Caution

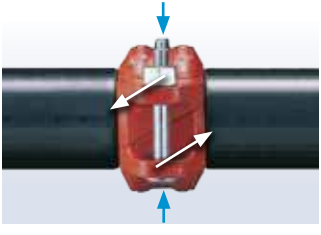
1. Uneven tightening of bolts and nuts may cause the gasket to be pinched, resulting in an immediate or delayed leak.
2. When using a power impact wrench, excessive tightening of nuts may cause a bolt or joint failure.

2.7.4 Installing angle pad rigid coupling Z07



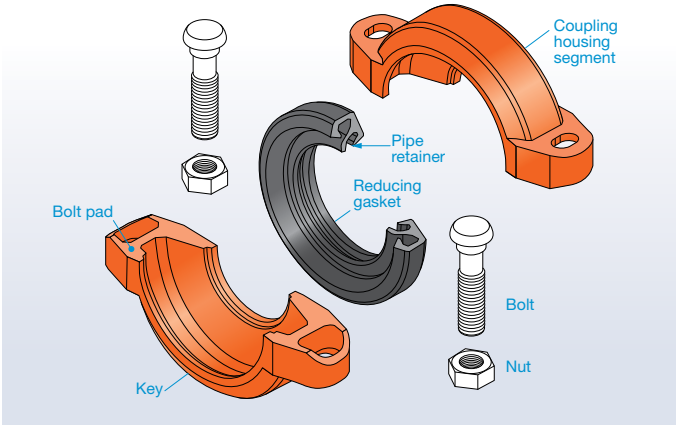
Please refer to section 2.7.1. for preliminary steps 1 to 8.

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



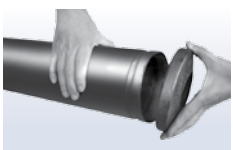
Note: As the coupling bolts are tightened, the angled bolt pads slide in opposite directions causing the coupling keys to tightly grip the pipe, while at the same time the pipe grooves are forced outward against the coupling keys. The bolt pads should always maintain metal-to-metal contact.

2.7.5 Installing reducing coupling 7706

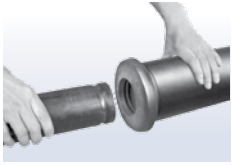


Please refer to section 2.7.1. for preliminary steps 1 to 3.

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



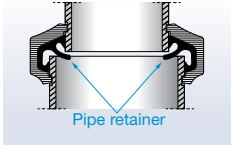
4. First mount gasket on larger pipe: Mount the larger opening of the gasket over the larger pipe end and align the two pipes to be mated. Insert the smaller pipe into the gasket. A slight twisting motion of the pipe will make for easier assembly. The gasket should not overhang the end of the pipe or the grooves of either pipe.



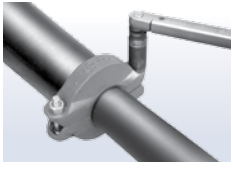
5. Insert smaller pipe: Bring together and align the two pipes to be mated. Insert the smaller pipe into the gasket. A slight twisting motion of the pipe will make for easier assembly. The gasket should not overhang the end of the pipe or the grooves of either pipe.

For steps 6 to 8, please refer to section 2.7.1.

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



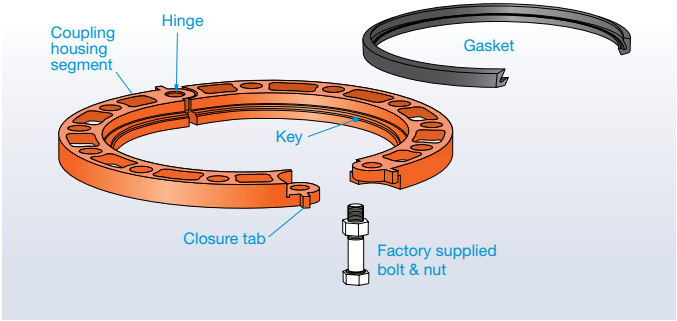
Note: No metal washer is required to prevent the smaller pipe from telescoping into the larger pipe. The built-in pipe stopper (or pipe retainer) inside the gasket will help prevent immediate telescoping of the smaller pipe. Nevertheless, careful and gentle insertion of the smaller pipe is required until housings are applied and installation is completed.



9 

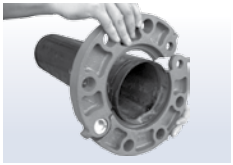
Tighten nuts: Tighten nuts alternately and equally until the bolt pads meet and make metal-to-metal contact. Tighten nuts by another one quarter to one half turn to make sure the bolts and nuts are snug and secure. The use of a torque wrench is not required.

2.7.6 Installing grooved flange adapter 7041 & 7043



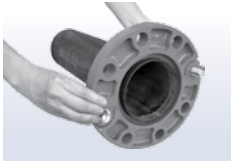
FLANGE ADAPTER

The VSH Shurjoint flange adapters are drilled to PN10/16, but are also available as ANSI Class 125/150 and Class 300.



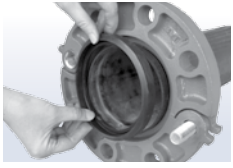
1. Mount hinged flange segments: Fully open the hinged flange segments. Place the flange segments around the groove of the pipe end and pull together until the mating bolt holes of the ends align.

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

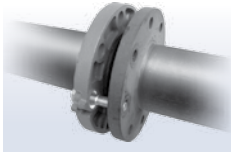


Insert the factory supplied bolt through the mating hole making sure that the flange is fully engaged in the pipe grooves.

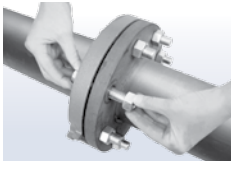
2. Check gasket grade & lubricate: Check the colour code of the gasket and make sure it's the correct one for the intended service. Then apply a thin layer of VSH Shurjoint Lubricant to the sealing lip of the gasket.



3. Install gasket: Place the gasket into the gasket cavity between the pipe OD, and flange recess. Make sure that the bottom of the gasket (the marking side) is positioned and seated against the bottom of the gasket pocket.

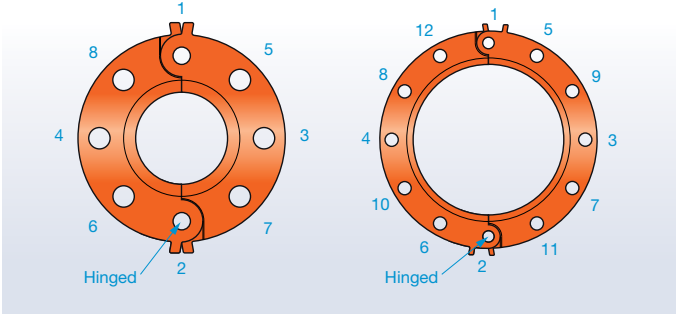


4. Mate adjoining flange (2-12"): Insert commercial flange bolt in the hinge hole (opposite side the factory supplied bolt) and tighten the nuts of the commercial flange bolt and the factory supplied bolt.



5. Add bolts: Add the remaining commercial flange bolts and apply nuts hand tight. All the bolts shall be inserted from one direction.

6. **Tighten nuts** alternately in the sequence of diagonally opposite pairs until the flange faces meet and make metal-to-metal contact. It is important to make flange faces contact parallel.



Required bolt torque

The tables hereafter provides the standard torque values for proper assembly 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 are not the maximum values and the bolts can be torqued for above the values listed. Attaining maximum torque value is not necessary as the VSH Shurjoint flange adapters are sealed with elastic (rubber) gaskets, which require a much lower torque than that of metallic gaskets.

Bolt torque requirements 7041 (ANSI Class 125/150)

Nom. size	Bolt size		Required torque	
inch	inch	No.	Lbs-Ft	Nm
2	5/8	4	110-140	149-190
2 1/2	5/8	4	110-140	149-190
3	5/8	4	110-140	149-190
4	5/8	8	110-140	149-190
5	3/4	8	220-250	298-339
6	3/4	8	220-250	298-339
8	3/4	8	220-250	298-339
10	7/8	12	320-400	434-542
12	7/8	12	320-400	434-542

Bolt torque requirements 7041 (PN 10/16)

Nom. size	Bolt size		Required torque	
inch	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

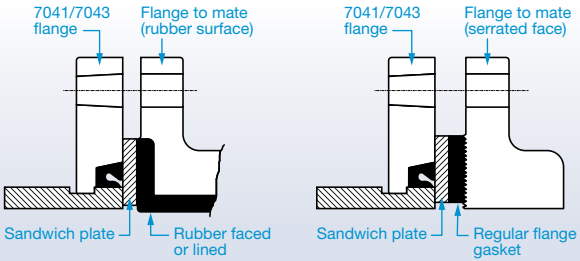
Bolt torque requirements 7043 (ANSI Class 300)

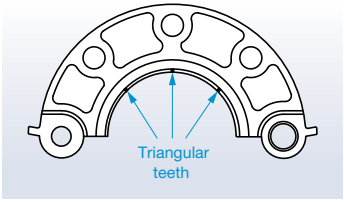
Nom. size	Bolt size		Required torque	
inch	inch	No.	Lbs-Ft	Nm
2	5/8	8	110-140	149-190
2 1/2	3/4	8	220-250	298-339
3	3/4	8	220-250	298-339
4	3/4	8	220-250	298-339
5	3/4	8	220-250	298-339
6	3/4	12	220-250	298-339
8	7/8	12	320-400	434-542
10	1	16	360-520	488-705
12	1 1/8	16	450-725	610-982

Installing a sandwich plate on models 7041 & 7043 flange adapters

Important notes

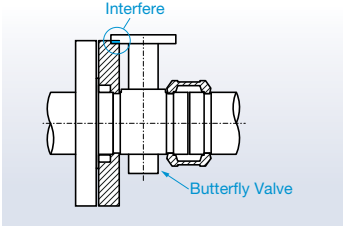
1. Models 7041 and 7043 flange adapters require a hard flat face for effective sealing. When the mating surface is not adequate as with the serrated faces of some valves or rubber-faced wafer valves, a sandwich plate (Model 49) must be used.





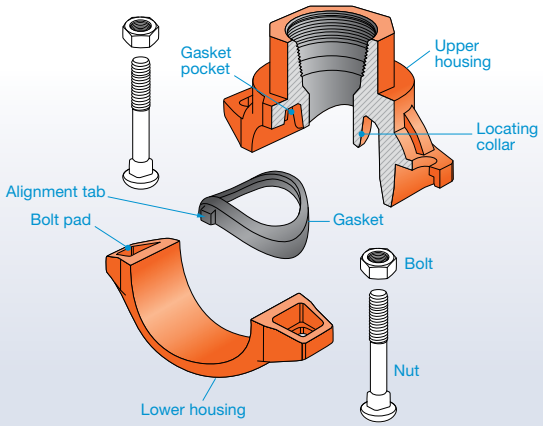
2. The Models 7041 and 7043 flange adapter has small triangular teeth inside the key shoulder to prevent the pipe from rotating. The teeth should be ground off when mating to a rubber-lined flange.

3. Models 7041 and 7043 flange adapters shall not be used as anchor points for tie-rods across non-restrained joints.

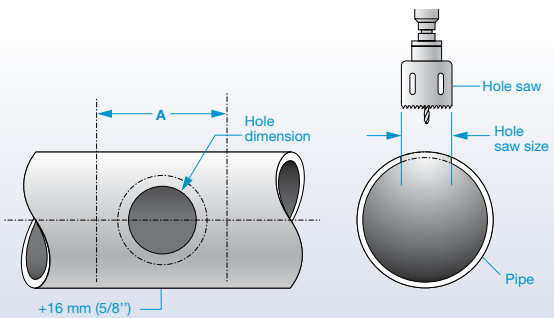


4. When assembling a models 7041 or 7043 flange adapter against a butterfly valve or ball valve, make sure that the outside diameter of the flange adapters do not interfere with the valve actuator or the mounting pad of the actuator.

2.7.7 Installing mechanical tees

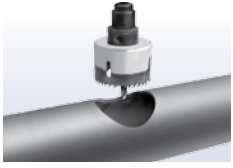


Hole-cut piping system



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.

Caution. The hole must be clearly cut and shall have a smooth edge. Never use a torch for cutting a hole as this could affect proper sealing.



1. **Hole cut:** Determine the location for the hole on the pipe. Use the correct size hole saw as specified in the table below for the required hole sizes.

2. **Remove burrs, rough edges** and clean the pipe surface within 16 mm around the hole where the gasket is to be seated. This area should be inspected to ensure a clean smooth surface, free of any indentations or projections that could affect the gasket sealing. The area within the 'A' dimension should also be inspected and must be free of dirt, scale or any imperfection that could affect seating or assembly of the fitting.

Hole sizes and 'A' surface specifications for mechanical tees

Mechanical tees run x branch		Hole dimensions				'A' surface preparation	
		Hole saw		Max diameter allowed			
inch	mm	inch	mm	inch	mm	inch	mm
2 x 1/2	50 x 15	1 1/2	38	1 5/8	41	31/2	89
2 x 3/4	50 x 20	1 1/2	38	1 5/8	41	31/2	89
2 x 1	50 x 25	1 1/2	38	1 5/8	41	31/2	89
2 x 1 1/4	50 x 32	1 3/4*	45	1 7/8*	47	4	102
2 x 1 1/2	50 x 40	1 3/4*	45	1 7/8*	47	4	102
2 1/2 x 1/2	65 x 15	1 1/2	38	1 5/8	41	3 1/2	89
2 1/2 x 3/4	65 x 20	1 1/2	38	1 5/8	41	3 1/2	89
2 1/2 x 1	65 x 25	1 1/2	38	1 5/8	41	3 1/2	89
2 1/2 x 1 1/4	65 x 32	2	51	2 1/8	54	4	102
2 1/2 x 1 1/2	65 x 40	2	51	2 1/8	54	4	102
3 x 1/2	80 x 15	1 1/2	38	1 5/8	41	3 1/2	89
3 x 3/4	80 x 20	1 1/2	38	1 5/8	41	3 1/2	89
3 x 1	80 x 25	1 1/2	38	1 5/8	41	3 1/2	89
3 x 1 1/4	80 x 32	2	51	2 1/8	54	4	102
3 x 1 1/2	80 x 40	2	51	2 1/8	54	4	102
3 x 2	80 x 50	2 1/2	64	2 1/8	67	4 1/2	114
4 x 1/2	100 x 15	1 1/2	38	1 5/8	41	3 1/2	89
4 x 3/4	100 x 20	1 1/2	38	1 5/8	41	3 1/2	89
4 x 1	100 x 25	1 1/2	38	1 5/8	41	3 1/2	89
4 x 1 1/4	100 x 32	2	51	2 1/8	54	4	102
4 x 1 1/2	100 x 40	2	51	2 1/8	54	4	102
4 x 2	100 x 50	21/2	64	2 5/8	67	4 1/2	114
4 x 2 1/2	100 x 65	23/4	70	2 7/8	73	4 3/4	121
4 x 3	100 x 80	31/2	89	3 5/8	92	5 1/2	140
5 x 2	125 x 50	21/2	64	2 5/8	67	4 1/2	114
5 x 2 1/2	125 x 65	2 3/4	70	2 7/8	73	4 3/4	121
6 x 1 1/4	150 x 32	2	51	2 1/8	54	4	102
6 x 1 1/2	150 x 40	2	51	2 1/8	54	4	102
6 x 2	150 x 50	2 1/2	64	2 5/8	67	4 1/2	114
6 x 2 1/2	150 x 65	2 3/4	70	2 7/8	73	4 3/4	121

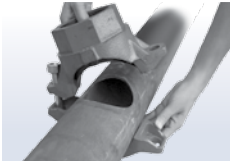
Mechanical tees run x branch		Hole dimensions				'A' surface preparation	
		Hole saw		Max diameter allowed			
inch	mm	inch	mm	inch	mm	inch	mm
6 x 3	150 x 80	31/2	89	3 5/8	92	51/2	140
6 x 4	150 x 100	4 1/2	114	4 5/8	118	6 1/2	165
8 x 2	200 x 50	2 3/4*	70	2 7/8*	73	4 3/4	121
8 x 2 1/2	200 x 65	2 3/4	70	2 7/8	73	4 3/4	121
8 x 3	200 x 80	3 1/2	89	3 5/8	92	5 1/2	140
8 x 4	200 x 100	4 1/2	114	4 5/8	118	6 1/2	165

*** Important:** Make special note of the hole saw size and maximum diameter allowed on these sizes, deviation could lead to joint failure.

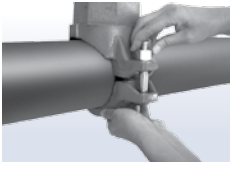
3. Check gasket grade and lubricate: Check the colour code of the gasket and make sure it's the correct one for the intended service. Then, apply a thin layer of VSH Shurjoint Lubricant to the sealing lip of the gasket. The standard factory supplied gasket is grade E (EPDM - green stripe) and is basically good for water services.

4. Insert gasket: Insert the gasket into the gasket pocket of the housing. The alignment tabs on the side of the gasket should properly fit into the recesses.

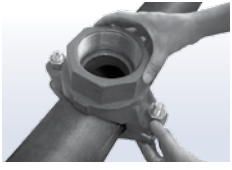
5. Prepare to assemble: Assemble the coupling housings loosely leaving one nut and bolt off to allow for a 'swing-over' installation.



6. Position upper housing: Place the upper housing on the pipe so that the locating collar engages properly into the hole. Then apply the lower housing from the opposite side of the pipe.

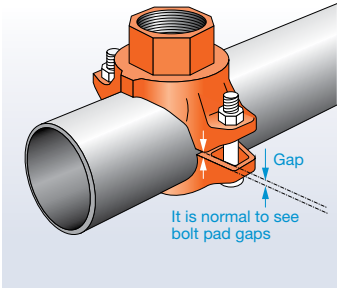


7. Insert bolt & nut: Insert the remaining bolt and apply the nut hand-tight. Make sure that the oval neck of the bolt engages into the bolt hole of the housing.



8. Check locating collar: Double check to ensure the locating collar is properly seated in the hole. This may be checked by rocking the upper housing in the hole. Also make sure that the oval neck of the bolts engages into the bolt hole of the housing.

9. **Tighten nuts** alternately and equally until the outlet housing makes metal-to-metal contact to the outer surface of the pipe. Gaps between bolts pads are acceptable but should be equal on both sides. Use a torque wrench and tighten the nuts to following torque values.



Models 7721 & 7722, M21 & M22 mechanical tees					
Nominal size		Bolt size		Required torque	
inch	mm	inch	No.	lbs-Ft	Nm
2	50	3/8	2	30	40
2 1/2	65	1/2	2	50	68
3	80	1/2	2		
4	100	1/2	2		
5	125	5/8	2		
6	150	5/8	2		
8	200	3/4	2		

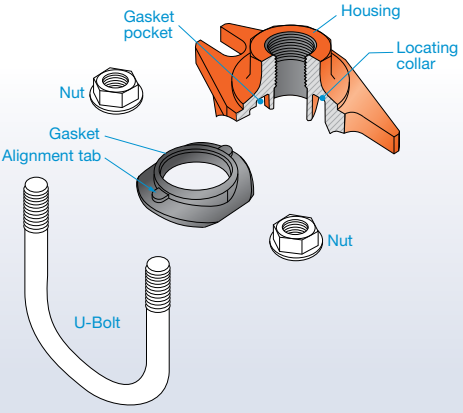
Caution. Do not exceed the above torque values by more than 25% as excessive torque could lead to bolt and/or joint failure.

Outlet flow characteristics for mechanical tees

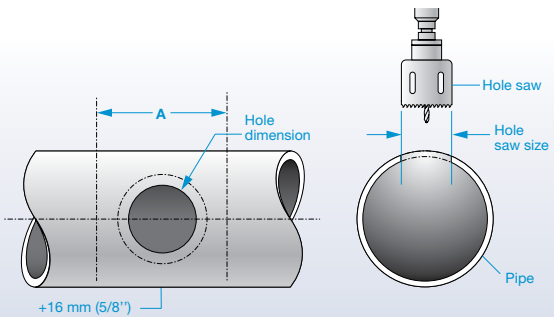
Outlet size		Equivalent length				Outlet size		Equivalent length			
		7721 / M21		7722 / M22				7721 / M21		7722 / M22	
inch	mm	feet	metre	feet	metre	inch	mm	feet	metre	feet	metre
1	25	3	0.9	3	0.9	2 1/2	65	15	4.6	15	4.6
1 1/4	32	6	1.8	6	1.8	3	80	16	4.9	16	4.9
1 1/2	40	8	2.4	8*	2.4	4	100	17	5.2	17	5.2
2	50	9	2.7	9	2.7						

Feet and metre of Schedule 40 steel outlet pipe with a Hazen-Williams coefficient of friction value of 120.
*Equivalent length for 7721/M21 with a 1 1/2" outlet and 2" or 2 1/2" main run size is 13 feet (4 metres)

2.7.8 Installing saddle let sprinkler outlet



Hole-cut piping system

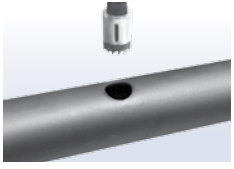


The hole-cut method of pipe preparation is required when installing mechanical tees, saddle-let and crosses. This method of pipe preparation requires the cutting or drilling of a specified hole size on the centerline of the pipe. Always use the correct hole saw size as shown in this handbook.

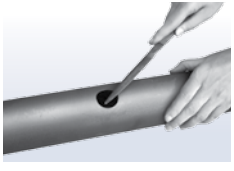
Caution. The hole must be clearly cut and shall have a smooth edge. Never use a torch for cutting a hole as this could affect proper sealing.

Hole sizes and 'A' surface specifications for mechanical tees 723 & SS723

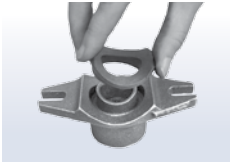
Model 723 Saddle let sprinkler outlet									
Header size		Branch size		Hole dimensions				Surface preparation* 'A'	
				Hole saw size		Max diameter allowed			
inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
1 1/4	32	1/2, 3/4, 1	15, 20, 25	1 3/16	30	1 1/4	32	3 1/2	89
1 1/2	40	1/2, 3/4, 1	15, 20, 25	1 3/16	30	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 location for the hole on the pipe. Use a 1 3/16" (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.

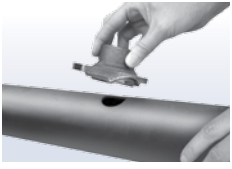


2. **Remove burrs, rough edges:** Remove burrs and clean the pipe surface within 5/8" (16 mm) around the hole where the gasket is to be seated

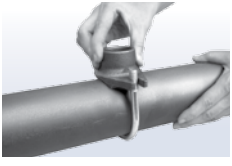


3. Insert gasket: insert the gasket into the gasket pocket of the housing using alignment tabs on side for proper positioning.

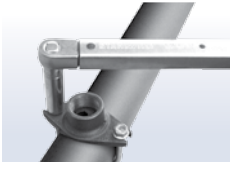
Caution. Do not use EPDM gaskets for hydrocarbons or petroleum services as this could result in a leak or joint failure.



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 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).

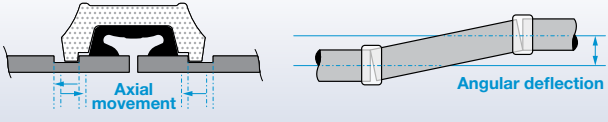
2.8 Design data rigid & flexible couplings

Grooved mechanical couplings (GMC) are available in both rigid and flexible models.

A rigid coupling is 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 would allow less than one degree of deflection or angular movement.

Flexible couplings are designed to accommodate axial displacement, rotation and a minimum one degree of angular movement. Flexible couplings are used in applications that call for curved or deflected layouts and or when systems are exposed to outside forces beyond normal static conditions, such as seismic events or where vibration and or noise attenuation are a concern.

Grooved couplings become less flexible as the pipe size increases. For sizes in excess of 18" (450 mm) couplings are very limited in their angular movement. The following table provides design data on the allowable axial movement and angular deflection for flexible couplings.



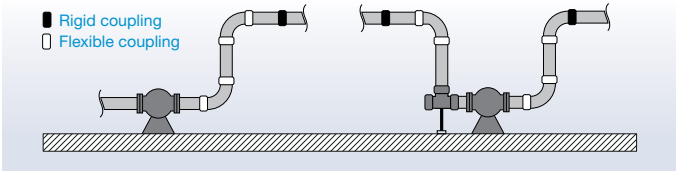
Axial movement and deflection roll and cut groove 7705, 7707 & 7707N

Size			Roll groove			Cut groove		
			Axial movement	Angular deflection		Axial movement	Angular deflection	
Inch	DN	mm	mm/ coupling	degrees	mm/m	mm/ coupling	degrees	mm/m
1	25	33,4	0 - 0,8	1,37°	24	0 - 1,6	2,74°	48
1 1/4	32	42,2	0 - 0,8	1,09°	19	0 - 1,6	2,17°	38
1 1/2	40	48,3	0 - 0,8	0,95°	17	0 - 1,6	1,90°	33
2	50	60,3	0 - 0,8	0,76°	14	0 - 1,6	1,52°	27
2 1/2	-	73	0 - 0,8	0,63°	11	0 - 1,6	1,26°	22
-	65	76,1	0 - 0,8	0,60°	1	0 - 1,6	1,20°	21
3	80	88,9	0 - 0,8	0,52°	9	0 - 1,6	1,03°	18
		101,6	0 - 0,8	0,45°	8	0 - 1,6	0,90°	16
		108	0 - 2,4	1,27°	23	0 - 4,8	2,54°	45
4	100	114,3	0 - 2,4	1,20°	21	0 - 4,8	2,40°	42
-	125	139,7	0 - 2,4	0,98°	17	0 - 4,8	1,97°	35
5		141,3	0 - 2,4	0,97°	17	0 - 4,8	1,95°	35
		159	0 - 2,4	0,86°	15	0 - 4,8	1,73°	30
		165,1	0 - 2,4	0,83°	15	0 - 4,8	1,67°	30
6	150	168,3	0 - 2,4	0,82°	14	0 - 4,8	1,63°	29
8	200	219,1	0 - 2,4	0,63°	11	0 - 4,8	1,26°	23
10	250	273	0 - 2,4	0,50°	9	0 - 4,8	1,01°	18
12	300	323,9	0 - 2,4	0,42°	8	0 - 4,8	0,85°	15
14	350	355,6	0 - 2,4	0,39°	7	0 - 4,8	0,77°	14
16	400	406,4	0 - 2,4	0,34°	6	0 - 4,8	0,68°	12
18	450	457,2	0 - 2,4	0,30°	5	0 - 4,8	0,60°	11
20	500	508	0 - 2,4	0,27°	5	0 - 4,8	0,54°	10
22	550	558,8	0 - 2,4	0,25°	4	0 - 4,8	0,49°	9
24	600	609,6	0 - 2,4	0,23°	4	0 - 4,8	0,45°	8
26	650	660,4	0 - 2,4	0,21°	4	0 - 4,8	0,42°	7

*Note: the values in the table above already include the safety factor for design purposes

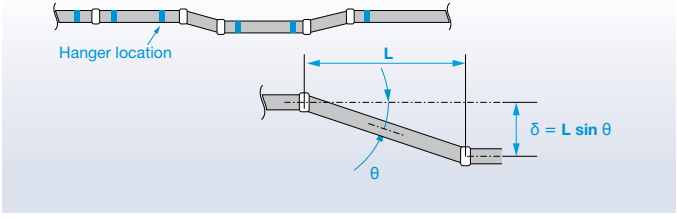
Absorption of vibration and noise

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 a large sway, referred to as sympathetic vibration, as a result of the frequent cycling. 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.



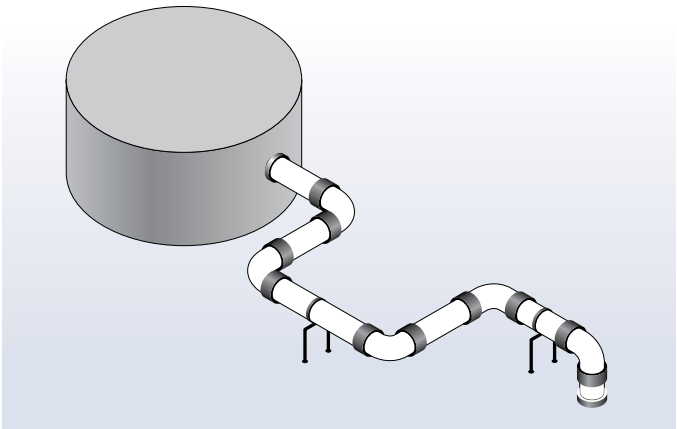
Adjustment of misalignment

When a straight run has need for a slight adjustment of alignment on the jobsite as shown in the diagram, you can accomplish this with the use of two flexible couplings. The following table shows the deflection value (θ) of the VSH Shurjoint 7705 flexible couplings.



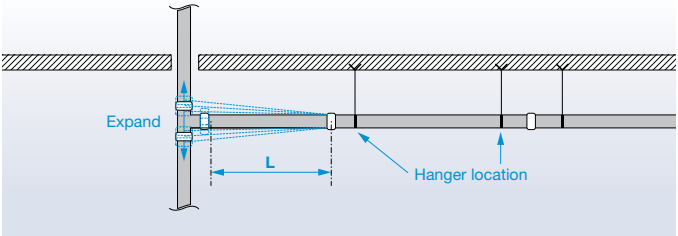
Absorption of distortion

With the use of an assembly as shown below, ground sinking or movement around a tank or reservoir can be effectively absorbed, avoiding damage to the tank, reservoir and or the piping system.



Absorption of misalignment

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

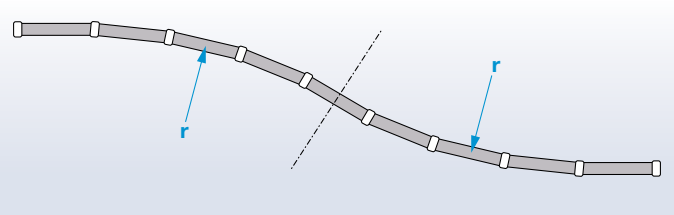


Curved layout

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 is radius of curvature, l is pipe length, and θ is max. allowed deflection of a coupling)



Example: when using model 7705 100 mm (4”) couplings for the layout as shown in the diagram, the max. allowed deflection (θ) of the coupling is 1.2°, and the pipe length (l) is 3 metres, the radius of curvature (R) will be 144.2 metres.

3 VSH XPress system

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 system offers installers a complete solution with great flexibility. VSH XPress 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 has been tested and certified for use in fixed wet (Galvanized Steel, Stainless Steel) and dry (Stainless Steel) sprinkler installations in accordance with international guidelines. The maximum operating pressure can go as high as 16 bar, depending on the dimensions and the approvals required.

The plus of VSH XPress:

+ BIM ready
+ Professional and appropriate pressure tools
+ Simple, fast connection technology
+ Complete piping systems in galvanized steel and stainless steel
+ Fittings and tubes from 22 to 108 mm
+ Systems galvanized, stainless, ML
+ Pre-marked insertion depth
+ Clear material and size identification
+ Leak Before Pressed function on Galvanized and Stainless Steel

Advantages of VSH XPress Galvanized and Stainless Steel

Product technology

All fittings are produced in The Netherlands. As a result VSH can guarantee consistent quality and supply. In order to ensure high-value manufacturing, we employ laser-welding technology and the welded fittings (100%) undergo leak testing. The leak testing is fully automated and incorporated in the laser-welding process. All straight connectors with a threaded end and reducers are made from a single piece so that there is no risk of leakage and it is more compact for recessed pipe work. Good performance is guaranteed. The smooth surface area of the pipes and fittings means that the flow characteristics are better than with traditional connection systems. The quality of our fittings is also evidenced by the large number of national and international approvals. A wide range of system and product approvals is available, with certificates for sprinkler systems.

Reliable

With VSH XPress systems, the quality of the connection is mainly determined by the tool and not the installer, thereby reducing the risk of errors during installation. All fittings are delivered with an LBP (Leak Before Pressed) function, which is achieved both by a special O-ring and the design of the fitting. 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 immediately identify any fittings that he forgot to press. Once pressed, the system is both air- and watertight.

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 stainless steel and galvanized steel male ended fittings supplied by VSH XPress 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 you. A smart plus 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 clamping techniques, time-consuming preparations and drying times. The 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 a compact and space-saving installation is possible

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

Safe

The installation of an VSH XPress system does not require any heat source (as, for example, with welding or soldering) or other heavy and potentially dangerous tools. This feature makes VSH XPress an ideal solution for repairs or renovation projects, since you can ensure 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 preparation times for the tube result in further considerable cost savings during installation. As the connection is achieved using only press tools, you do not need to purchase or hire any other materials, such as gases, adhesives, threading machines, etc.

References

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

3.1 Areas for using the VSH XPress system

Dry fire mains

Sprinkler

Sprinkler installations

VSH XPress Galvanized Steel fittings with VSH XPress Sendzimir Galvanized Steel precision tubes or VSH XPress Stainless Steel fittings with VSH XPress Stainless Steel 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 the application and dimensions)

VSH XPress Sprinkler Galvanized Steel is suitable for use in wet sprinkler installations. VSH XPress Sprinkler Stainless Steel is also suitable for use in dry sprinkler installations (with the exception of LPCB installations).

High-pressure dry fire mains

VSH XPress Stainless Steel fittings with VSH XPress Stainless steel tubes, which have been approved by KIWA for pressures up to 40 bar.

O-rings:	EPDM (black)
Operating temperature:	-35°C to +135°C
Dimensions:	22-35 mm (other dimensions available upon request)
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.

**Ethylene Propylene Diene Monomer*
***Always respect the temperature limits of the valid approval (see e.g. page 65 for UL/cUL limitations)*

Mains-fed sprinklers

VSH XPress Stainless Steel fittings with VSH XPress Stainless Steel tubes.

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

The objective of the water line sprinkler is to deliver fluid in case of fire 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 to do so.

Shipbuilding

VSH XPress Galvanized Steel and VSH XPress Stainless Steel, 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.

3.2 VSH XPress tubes

VSH XPress Sprinkler Stainless Steel and Galvanized Steel are easy to recognise by the model number that is printed several times on each tube length. The model number marked on the tube provides information regarding the tube material, its type, external diameter and wall thickness and is set out as follows:

- X: VSH XPress
- C: Galvanized Steel tube
- S: Stainless Steel tube
- 22/28/35/42/54/76/89/108: external diameter, wall thickness and nominal size

VSH XPress Stainless Steel tubes

VSH XPress Stainless steel tubes are thin-walled precision steel tubes. The outer and inner surfaces of the tubes are blank, free of discoloration and are supplied free of manufacturing residue that could otherwise cause corrosion. The possibility of any dirt or dust getting into the tubes during transport or when stored is avoided by caps on both ends of the tubes and correct packaging for distribution. This section gives you all technical parameters that are especially relevant when working with VSH XPress Stainless Steel tubes.

Flammability

VSH XPress Stainless Steel tubes are considered to be non-combustible tubes according to German Class A building materials – DIN 4102 Part 1.

VSH XPress Stainless Steel tube 1.4401 (AISI316)

VSH XPress Stainless Steel 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. VSH XPress Stainless Steel tubes have also been approved for gas installations inside buildings (with higher thermal capacity, proven over 30 minutes at 650°C and PN5) and outside buildings (without HTC) above ground (not under screed or under ground).

Applications

The installations must always comply with local regulations.

- Wet and dry fire sprinkler installations in accordance with DIN 1988 Part 6, VdS, FG, LPCB (wet only), CNBOP, SBSC, UL, cUL and FM
- Wet and dry extinguisher lines
- High-pressure dry risers
- Low-pressure water mist
- Shipbuilding

Technical characteristics	
Material	X5CrNiMo 17 12 2 material no. 1.4401 in accordance with DIN-EN 10088
Specifications	EN 10312 – DVGW - Worksheet GW541 (2004) table 2
Approvals	DVGW, SVGW, ETA, ÖVGW, BYGGFORSK, STF, KIWA, PZH, SITAC, CSTBat, WRAS, VdS, FM, FG, CNBOP, SBSC, SETSCO, LPCB, DNV-GL, RINA, UL, ULc, BV, LR, SPF
Type of tubing	TIG or laser-welded
Welding seam	100% EDDY CURRENT tested in accordance with wEN 10893-2:2011
Weld slag removal	Outside
Tolerances	In accordance with EN10312 - table 2
Surface finish	Matt silver
Marking	SudoXPress stainless [DN/dimension x wall thickness] Stainless steel/Edelstahl–Sanitary/Sanitär–GAS 1.4401/AISI316 EN10312 DVGW GW541 Reg.nr. [DVGW registration number] SVGW ÖVGW W1.397 WRAS VA1.22/20294 VA1.12/18769 SINTEF PZH SITAC 0168/04 ATEC 14/15-2097 CSTBat 116-1482 LPCB VdS G4080037 [operational pressure VdS/LPCB] bar <FM> [operational pressure FM] psi C(UL)US Listed 4NB1 [operational pressure UL/cUL] psi KK NDE [batch number], [supplier code] [model designation, repeated every 60 cm]
Smallest bend radius	3.5 x external diameter of the tube (max. 28 mm)
Form delivered	Tubes, length 6 m +0/-50 mm, with protective caps (green)
Heat expansion coefficient	0.0160 mm/m at ΔT= 1K
Max. working pressure	16 bar

TECHNICAL CHARACTERISTICS VSH XPRESS STAINLESS STEEL TUBE 1.4401

DN	Model	External Ø x s [mm]	Internal Ø [mm]	Wall thickness tolerance [mm]	Weight [kg/m]	Tube capacity [l/m]
DN 20	XS22	22 x 1.2	19.6	± 0.10	0.624	0.302
DN 25	XS28	28 x 1.2	25.6	± 0.10	0.790	0.515
DN 32	XS35	35 x 1.5	32.0	± 0.10	1.240	0.804
DN 40	XS42	42 x 1.5	39.0	± 0.10	1.503	1.195
DN 50	XS54	54 x 1.5	51.0	± 0.10	1.972	2.043
DN 65	XS76	76.1 x 2.0	72.1	± 0.15	3.550	4.548
DN 80	XS89	88.9 x 2.0	84.9	± 0.15	4.150	5.661
DN 100	XS108	108 x 2.0	104.0	± 0.15	5.050	8.495

WEIGHT AND DIMENSIONS VSH XPRESS STAINLESS STEEL TUBE 1.4401

VSH XPress Stainless Steel tube 1.4521 (AISI444)

The VSH XPress Stainless Steel tubes 1.4521 have been tested and approved for potable water installations, in accordance with DVGW – Worksheet GW 541, ETA, ÖVGW and SVGW.

Applications

- Wet and dry fire sprinkler installations in accordance with DIN 1988 Part 6, VdS, FM or LPCB (wet only).
- Low pressure water mist
- Shipbuilding

Technical characteristics	
Material	X2CrMoTi 18 2 material no. 1.4521 in accordance with DIN-EN 10088
Specifications	EN 10312 – DVGW - Work sheet GW541 (2004) Table 2
Approvals	DVGW, SVGW, ETA, ÖVGW, FM, FG, CNBOP, SBSC, SETSCO, LPCB, DNV, GL, RINA, KIWA, VdS
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 EN10312 - table 2
Surface finish	Matt silver
Marking	SudoXPress stainless [DN/dimension x wall thickness] Edelstahl/Stainless steel 1.4521/AISI444 EN10312 DVGW GW541 Reg.nr. [DVGW registration number] SVGW ÖVGW W1.397 WRAS VA1.22/20294 VA1.12/18769 VdS G4080037 LPCB [operational pressure LPCB] bar <FM> [operational pressure FM] psi KK ATEC 14/15-2097 CSTBat 235-2097 Tectite 316 [batch number] [supplier code] [model designation, repeated every 60 cm]
Smallest bend radius	3.5 x external diameter of the tube (max. 28 mm)
Form delivered	Tubes, length 6 m +0/-50 mm, with protective caps (green)
Heat expansion coefficient	0.0104 mm/m at ΔT= 1K
Max. working pressure	16 bar

TECHNICAL CHARACTERISTICS VSH XPRESS STAINLESS STEEL TUBE 1.4521

DN	Model	External Ø x s [mm]	Internal Ø [mm]	Wall thickness tolerance [mm]	Weight [kg/m]	Tube capacity [l/m]
DN 20	XS22	22 x 1.2	19.6	± 0.10	0.624	0.302
DN 25	XS28	28 x 1.2	25.6	± 0.10	0.790	0.515
DN 32	XS35	35 x 1.5	32.0	± 0.10	1.240	0.804
DN 40	XS42	42 x 1.5	39.0	± 0.10	1.503	1.195
DN 50	XS54	54 x 1.5	51.0	± 0.10	1.972	2.043

DIMENSIONS AND WEIGHT VSH XPRESS STAINLESS STEEL TUBE 1.4521

VSH XPress Stainless Steel tube 1.4520 (AISI439)

The VSH XPress Stainless Steel tube 1.4520 is an alternative to the stainless steel AISI304 tube, but without nickel, making it a cost-effective alternative for applications where potable water certification is not required. The tube has been tested and approved by FM and LPCB for the use in fixed sprinkler systems.

Applications

- Fixed sprinkler installations in accordance with FM or LPCB (wet only)
- Low pressure water mist
- Shipbuilding

Technical characteristics	
Material	X2CrTi 18 2 material no. 1.4520 in accordance with DIN-EN 10088,
Specifications	EN 10217-7
Approvals	FM, FG, LPCB, RINA
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 EN10217-7
Surface finish	Matt silver
Marking	SudoXPress stainless [DN/dimension x wall thickness] Stainless steel/Edelstahl 1.4520/AISI439 Heating/Compressed air-Heizung/Druckluft LPCB [operational pressure LPCB] bar <FM> [operational pressure FM] psi NDE [batch number] [supplier code] [model designation, repeated every 60 cm]
Smallest bend radius	3.5 x external diameter of the tube (max. 28 mm)
Form delivered	Tubes, length 6 m +0/-50 mm, with protective caps (black)
Heat expansion coefficient	0.0104 mm/m at ΔT= 1K
Max. working pressure	16 bar

TECHNICAL CHARACTERISTICS VSH XPRESS STAINLESS STEEL TUBE 1.4520

DN	Model	External Ø x s [mm]	Internal Ø [mm]	Wall thickness tolerance [mm]	Weight [kg/m]	Tube capacity [l/m]
DN 20	XS22	22 x 1.2	19.6	± 0.10	0.624	0.302
DN 25	XS28	28 x 1.2	25.6	± 0.10	0.790	0.515
DN 32	XS35	35 x 1.5	32.0	± 0.10	1.240	0.804
DN 40	XS42	42 x 1.5	39.0	± 0.10	1.503	1.195
DN 50	XS54	54 x 1.5	51.0	± 0.10	1.972	2.043

WEIGHT AND DIMENSIONS VSH XPRESS STAINLESS STEEL TUBE 1.4520

VSH XPress Galvanized Steel tubes

The VSH XPress Sprinkler Galvanized Steel tubes for wet sprinkler installations are thin-walled precision steel tubes. The tubes are manufactured from cold rolled steel, which is galvanized using the Sendzimir process. During the process the zinc is applied to the metal strip that runs through a zinc bath, so that both sides are coated at the same time. As a result the tube is galvanized both on the inner and the outer surface. The thickness of this layer is 15-27 µm (275 g/m^2). After welding the welding seam is zinc-plated separately. Good adhesion of the zinc layer and good corrosion resistance is achieved through the Sendzimir process.

This section gives you all the relevant technical parameters when working with VSH XPress Sprinkler Galvanized Steel tubes.

Flammability

VSH XPress Galvanized Steel tubes are considered to be non-combustible tubes according to German Class A building materials – DIN 4102 Part 1.

Applications

- Wet fixed sprinkler installations in accordance with DIN 1988 Part 6, VdS, FM, LPCB, FG, SBSC, UL, cUL and CNBOP
- Compressed air
- Shipbuilding

Technical characteristics	
Material	Non-alloyed ULC ('Ultra Light Carbon') Galvanized Steel, RSt 34-2 Mat. no. 1.0034 in accordance with EN 10305-3
Specifications	EN 10305-3 (formerly DIN 2394)
Approvals	CSTBat, DNV, GL, RINA
Type of tubing	HF-welded
Welding seam	100% EDDY CURRENT in accordance with EN 10893-2:2011
Weld slag removal	Outside flat, inside max. rise 0.5 mm
Tolerances	In accordance with EN10305-3
Finish	Zinc coating of 8-15µm. The tube welding seam is subsequently galvanized on the outside. The inside of the tube is protected by a thermally applied oil film
Surface finish	Silver
Marking	SudoXPress galvanized [DN/dimension x wall thickness] EN10305-3 CSTBat 116-1483 [batch number] [supplier code] [model designation, repeated every 60 cm]
Smallest bend radius	3.5 x external diameter of the tube (max. 28 mm)
Form delivered	Tubes, length 6 m +0/-50 mm, with protective caps (red)
Heat expansion coefficient	0.0108 mm/m at ΔT= 1K
Max. working pressure	16 bar

TECHNICAL CHARACTERISTICS VSH XPRESS SPRINKLER GALVANIZED STEEL TUBE

DN	Model	External Ø xs [mm]	Internal Ø [mm]	Wall thickness tolerance [mm]	Weight [kg/m]	Tube capacity [l/m]
DN 20	XC22	22 x 1.5	19.0	± 0.15	0.761	0.284
DN 25	XC28	28 x 1.5	25.0	± 0.15	0.980	0.491
DN 32	XC35	35 x 1.5	32.0	± 0.15	1.241	0.804
DN 40	XC42	42 x 1.5	39.0	± 0.15	1.542	1.195
DN 50	XC54	54 x 1.5	51.0	± 0.15	1.999	2.043
DN 65	XC76	76.1 x 2.0	72.1	± 0.20	3.503	4.083
DN 80	XC89	88.9 x 2.0	84.9	± 0.20	4.412	5.661
DN 100	XC108	108 x 2.0	104.0	± 0.20	5.382	8.495

TECHNICAL CHARACTERISTICS VSH XPRESS SPRINKLER GALVANIZED STEEL TUBE

3.3 VSH XPress Sprinkler system

Approvals

Approvals	VSH XPress Stainless Steel	VSH XPress Galvanized Steel
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	22-108 mm*
FM	22-108 mm	22-54 mm
KIWA	15-108 mm	
LPCB	22-54 mm	22-54 mm
Llloyd's Register	15-108 mm	12-108 mm
RINA	15-108 mm	15-108 mm*
SBSC	22-108 mm	22-108 mm*
UL/Ulc	22-108 mm	22-88,9 mm*
VdS	22-108 mm	22-108 mm*
WRAS	15-108 mm	

*66.7 is not approved

APPROVALS

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 above table.

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

Technical characteristics

VSH XPress Stainless Steel fittings are produced from material 1.4404 and fitted with a 'Leak Before Pressed' (LBP) function (for more detailed information see page 76). VSH XPress Stainless Steel fittings in sizes 22-54 are fitted with an LPB O-ring. Fittings in sizes 76.1 to 108 are fitted with a standard EPDM O-ring.

VSH XPress Galvanized Steel fittings are manufactured from RSt 34-2 steel and protected against corrosion by a layer of zinc that has been applied thermally. The zinc coating provides limited protection against short term exposure to moisture if the fittings are able to dry out again quickly afterwards. VSH XPress Galvanized Steel fittings are equipped with a 'Leak Before Pressed' (LBP) function. VSH XPress Galvanized Steel fittings in sizes 15-54 are fitted with an LPB O-ring. Fittings in sizes 76.1 to 108 are fitted with a standard EPDM O-ring.

When using VSH XPress for sprinkler installations, please make sure to follow the guidelines for installation and use approved tools.

Threaded fittings

The VSH XPress product range also includes male and female threaded fittings. VSH XPress Stainless Steel, Galvanized Steel and 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 Steel 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.

VSH XPress fittings markings

VSH XPress Stainless fittings

Marking	Packaging label
Green ring or sticker XPress 316l Certificates Dimension	Type R..... Dimension Description EAN No. Art. no. Number of Certificates

VSH XPress Galvanized fittings

Marking	Packaging label
Red ring or sticker XPress Galvanized Certificates Dimension	Type C..... Dimension Description EAN No. Art. no. Number of Certificates

O-rings

The standard fittings are equipped with EPDM O-rings.

O-ring black EPDM for VSH XPress Stainless and Galvanized steel (12-54 mm)

Temperature	Applications
-35°C to +135°C* For short period 150°C	KTW recommended. For all installations for potable water and conditioned water, hot water, circulation tubes, fire mains, etc.

O-ring black EPDM for VSH XPress Stainless and Galvanized steel (66,7-108 mm)

Temperature	Applications
-35°C to +135°C* For short period 150°C	KTW recommended. For all installations for potable water and conditioned water, hot water, circulation tubes, fire mains, etc.

See table on page 101 for details

VSH XPress 'Leak Before Pressed' function

VSH XPress Galvanized Steel and Stainless Steel fittings with a 'Leak Before Pressed' function have the advantage that as long as the connections have not been pressed, they will leak during a pressure test. This means that an incomplete press connection can easily be identified. If correctly assembled, the press fittings will be water- and airtight after being pressed. The LBP function is either incorporated into the O-ring (22-54 mm) or is achieved through the special geometry of the fitting (76.1-108 mm).

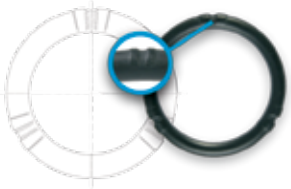
How the VSH XPress Galvanized Steel and Stainless Steel LBP O-rings operate

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

There are a pair of small bumps on the surface of the O-ring and the water will flow between these grooves so long as the fitting is not pressed. When the pressure is increased, the fitting will begin 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 water- and airtight connection.

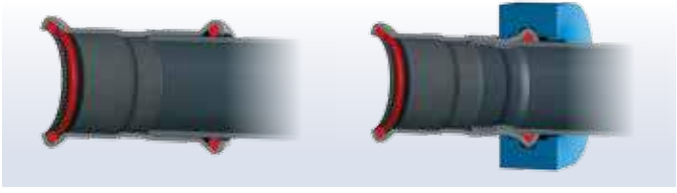
Advantages

- **Additional safety:** (installation) mistakes prevented, as the connection will leak until pressed.
- **Easy:** easy to recognise any non-pressed connections because of guaranteed water leakage during the pressure test.
- **Warranty:** guaranteed water- and airtight once fitting has been pressed.
- **Strength:** extra material for the leak function results in a strong O-ring in contrast to solutions where material is removed.



3.4 Press tools

An important part of the VSH XPress Sprinkler range is the press tools, which are used to make the press connection. The tools prescribed for the VSH XPress Sprinkler series consist of a press tool and the jaws and slings that come with it. Depending on the diameter of the tube, the corresponding jaw and sling must be chosen to create a good tight connection.



Before pressing | After pressing

VSH XPress Sprinkler Stainless Steel and Galvanized Steel

Only Novopress tools for sizes DN20 to DN100 (22-108 mm) or Klauke for stainless steel in sizes DN65 to DN100 (76.1-108 mm) (designed for M-profile) are approved for use with the VSH XPress Sprinkler system. Other brands of machines and press jaws and slings are currently not approved due to the certification of our sprinkler range. The machines, press jaws and slings from Novopress and Klauke set out below are certified (under UL/cUL, only machines fitted with battery are approved).

Approved press tools

You will find the list of approved press tools in the tables below. The most recent list of tools approved by VSH is available on our website **www.vsh.eu/presstool**

Press tools approved for VSH XPress Stainless Steel and Galvanized Steel

Dimension	Manufacturer	Press tool	Press jaws/slings
22-54 mm	Novopress	ECO201/202/203 (230V) EFP2 (230V) EFP201/202 (230V) ACO201 (14.4V) ACO202/203 (18V) ACO202XL/203XL (18V) AFP201 (12V) AFP202 (14.4V/18V)	PB2 ECOTEC jaws: 22-28 mm Slings and adapter (ZB201/203) 35-54 mm: - slings: HP35 (with adapter ZB201/ZB203) - Snap-on slings: HP35, HP42 and HP54 (with adapter ZB203)
22-54 mm	Novopress	ECO3(230V) ECO301(230V)	PB3 ECO3/301 jaws: 22-28 mm Slings and adapter (ZB302/303) 35-54 mm: - slings: HP35, HP42 and HP54 (ZB302) - Snap-on slings: HP35, HP42 and HP54 (ZB303)
76.1-108 mm	Novopress	ACO401 (18V)	Slings: HP401 76.1-108 mm
76.1-108 mm	Klauke	UAP100 (12V) UAP100L (18V)	Slings: KSP3 HP76.1-108 mm (only for Stainless Steel in combination with VdS)

Press jaws with a diameter of 35 mm or more are not permitted

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.

3.5 Installation guidelines VSH XPress

It is very simple to create a press connection, due to the low weight of the fittings and tube and the machine-controlled process that takes place when connecting the tube to the fitting. To guarantee the connection between the tube and the fitting, the installation instructions must be followed and approved tools must be used. These are set out below and are also printed on the packaging.

Transport and storage

When transporting and storing VSH XPress Sprinkler tubes and fittings, damage and contamination must be avoided. The optimal storage temperature for the tubes and fittings is between 10°C and 25°C. The products must be stored in a dry place (max. humidity 65%). The tubes must be stored horizontally and protected by wooden blocks. The tubes should not be stacked up too high, so as to prevent them from becoming oval (a maximum height of not more than six bundles, when they are stacked as follows: 2 x 2, 3 x 3 etc.). During storage the tube materials (galvanized and stainless steel) must not come in to contact with each other.

1. Cutting the tube to length

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

Warning: do not use oil-cooled saws, grinding wheels or flame cutters.

**Always respect the temperature limits of the valid approval (see e.g. page 65 for UL/cUL limitations)*

2. Deburring the tube

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

3. Marking insertion depth

The required insertion depth (see page 83) 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 Galvanized Steel and Stainless Steel fittings in sizes 12-54 mm with an insertion end already have the required insertion depth marked on them, thereby rendering any 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 connection behind the bead is of crucial importance for the tensile strength. The marking on the tube must remain visible (but close to the fitting) after the connection is pressed to identify any movement before or after pressing.

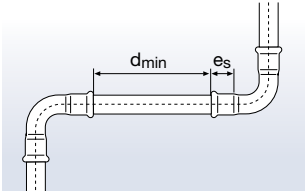
4. Checking the fitting and tube

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

5. Assembling the fitting and tube

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

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

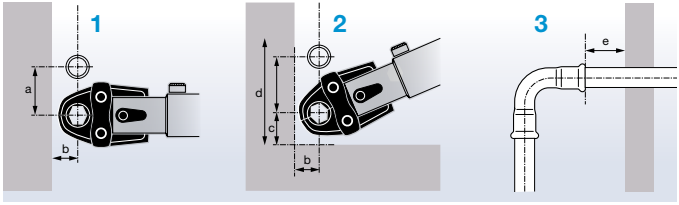


To optimise the installation time, you can first assemble a number of connections and then press the various tube connections one after the other. Marking the distance (e_S) provides a check that the tube has not been pushed out of the fitting during the pressing process. Before starting the final pressing process of the various tube connections, it is also important to check the minimum required distances for the installation (see table below).

	Insertion depth		Minimum distance	Minimum tube length	
Ø [mm]	e_S (mm)		d_{min} (mm)	2x e_S + d_{min} (mm)	
	VSH XPress Stainless Steel (GAS)	VSH XPress Galvanized Steel	VSH XPress Stainless Steel, Galvanized Steel	VSH XPress Stainless Steel	VSH XPress Galvanized steel
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 working space so that the fittings can be pressed correctly using the appropriate press tools. These distances relate to the general installation configurations that are schematically shown in Figures 1, 2 and 3.



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

NECESSARY INSTALLATION SPACE (*PRESS SLINGS)

Pressing

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

Also make sure that you are using the correct press jaws and slings for the application. To create a correctly pressed connection, the groove of the press tool must enclose the head of the press fitting. Once the pressing has started, always complete the press cycle. Under no circumstances interrupt the process. The approved tool, press jaws and press slings are listed on the VSH XPress Tool Schedule on our website, **www.vsh.eu/presstool.**

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



Bending the tube

It may be necessary to bend a tube in order to carry out the installation. Manual, hydraulic or electrically operated pipe benders with the corresponding bend formers can be used for this. The manufacturer will determine the suitability of the bending tool. VSH XPress Stainless Steel, Galvanized Steel and multi-layer tubes may be bent cold, in accordance with DIN EN 1057.

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

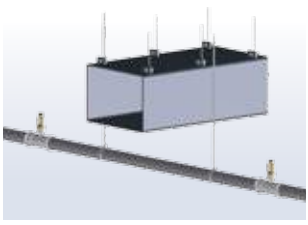
The smallest bending radius is calculated as follows:		
Stainless steel	22, 28 mm	r_{min} = 3.5 x d
Galvanized steel	22, 28 mm	r_{min} = 3.5 x d
Sprinkler ML	32 mm 40 mm 50 mm 63 mm	r_{min} = 98 mm r_{min} = 140 mm r_{min} = 160 mm r_{min} = 200 mm

*For bends in large diameter tubes, contact VSH in advance.

Applications

Sprinkler installations

Fixed sprinkler installations are permanently installed fire safety and extinguishing systems that independently detect a fire, signal the fire and automatically start the extinguishing process. The installation of the VSH XPress Sprinkler 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 'Water Spray Fixed Systems for Fire Protection'). Depending on the material installed (Stainless Steel or Galvanized Steel), the system can be used in wet or dry sprinkler systems. VSH XPress Sprinkler Galvanized Steel is only permitted in fixed wet sprinkler installations. VSH XPress Sprinkler Stainless Steel can be used in both wet and dry sprinkler installations (depending on the approval).



A range of hazard classes also apply for the various approvals, where VSH XPress Sprinkler is installed. For more information on the permitted hazard classes, please contact your VSH representative or contact VSH Fittings B.V. directly.
Where the VSH XPress Sprinkler 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 ducts 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 pipe network, this can be solved by securing the sprinkler tube on both sides of the load with sprinkler certified components (see illustration).

**Special O-rings are required (see section 2.1)*

Brackets

Pipe brackets must be fitted directly to the building or where necessary to machines, storage areas or other structures. Pipe brackets 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. No component of the brackets may be 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 Sprinklers, 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 Sprinkler. 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 diameter [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 XPRESS SPRINKLER TUBES

Extra points to note when installing brackets for VSH XPress Sprinkler are:

- 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

Corrosive environments

VSH XPress Sprinkler Stainless Steel 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, including the pharmaceutical, food and drink industries. Combined with shipbuilding certificates Germanische Lloyd, RINA, Lloyd's Register, Bureau Veritas and Det Norske Veritas, the VSH XPress Sprinkler Stainless Steel is also the right solution for marine sprinkler installations.

Pressure drop

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

Continuous pressure drop

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

$$p = \frac{6{,}05 \times 10^5}{C^{1,85} \times di^{4,87}} \times Q^{1,85}$$

p = pressure drop 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 Steel and Galvanized Steel

If you wish to perform these calculations, please consult the relevant specialised 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. There are, in general, two ways of calculating such flow resistances: the direct analytical method and the method that uses “equivalent lengths”.

Equivalent length method

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

ζ Direct analytical method / Equivalent length method (m)

OD	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	-	-	-	-

TABLE WITH EQUIVALENT LENGTHS AND VALUES FOR LOCAL PRESSURE DROPS

Putting the network into service

Flushing the network

Each tubing system must be flushed thoroughly before being put into use so that any foreign matter is removed from the inside of the tube surface and so that hygiene problems and corrosion damage are largely prevented. Potable water tubing must be flushed as soon as possible after installing the pipelines and after the pressure test. Installation regulations, such as the Potable Water Act and worksheets, must be followed. In exceptional cases, it may be necessary to flush the system with a disinfecting substance.

When flushing with a disinfectant substance, special care must be taken to ensure that no chlorides remain on the inside of the tubes. Always make sure to flush with clean potable water.

Filling and bleeding the tubes
After the tubes have been cleaned, they must be filled with potable water and bled 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 testing an VSH XPress Galvanized Steel installation, make sure that no water remains in the system afterwards, in order to avoid the risk of corrosion, unless the system is going to be put into service shortly afterwards.

Pressure testing of sprinkler systems
The tubes of the 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. 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.

3.6 Flexible hoses

The alignment of sprinklers with fixed tubes in suspended ceiling systems can be a time-consuming and expensive exercise. The use of VSH XPress flexible hoses for sprinkler installations ensures a quick and easy connection of the sprinkler within a radius determined by the length of the hose. With flexible sprinkler hoses it is possible to install the sprinklers in a suspended ceiling simply, with savings in time and costs. The mounting clamps provided ensure reliable and safe mounting of the sprinkler hose on the mounting points in the ceiling system.
The VSH XPress flexible hoses are a part of the VdS certification for the VSH XPress Sprinkler system in fixed sprinkler installations. VSH offers two versions, with a wire end or a 90° bend. The available sizes are DN20 and DN25 in lengths of 800, 1,000, 1,500 and 2,000 mm.

Application

The VSH XPress flexible hoses can be installed in:

- T-profile suspended ceilings with mineral wool panels and metal cassettes (main and sub-profiles)
- Mast profile ceiling systems
- Plasterboard ceiling systems
- False ceiling standard sprinklers
- Embedded or recessed sprinklers

The special feature of these hoses is the straight hose end that is 100% compatible with the VSH XPress Sprinkler system. The insertion end ensures a simple connection between the flexible hose and the VSH XPress Sprinkler system. Where the entire hose must be turned due to a threaded connection, only the hose end at the insertion end needs to be placed in the fitting. The connection now only needs to be pressed.

Technical Specifications of VSH XPress flexible hoses	
Sprinkler Hose	Type RS 339L92, DN20/DN25, flexible design with braided shielding, entirely stainless steel with welded fittings
Sprinkler connection (straight end)	Hexagonal from stainless steel with a female thread in accordance with DIN EN 10226 (ISO 7/1), Rp1/2“(SW27). Guide for simple vertical positioning. Can be recessed in areas of limited size. Mounting height (x), only 170 mm above the underside of the ceiling tile.
Sprinkler Connection (90° angle)	90° bend made from stainless steel in accordance with DIN EN 10226 (ISO 7/1), Rp1/2“(SW27). Guide for simple vertical positioning. Can be recessed in areas of limited size. Mounting height (x), only 170 mm above the underside of the ceiling tile.
Water Supply Connection	Straight tube end from stainless steel with an external diameter of 22 or 28 mm that is pressed with VSH XPress Sprinkler fittings.
Nominal length	800, 1,000, 1,500, 2,000 mm
Max. working pressure	16 bar, 100% leakage test

VSH XPRESS FLEXIBLE HOSES

Advantages

- Simple and fast installation of the flexible hose with standard tools
- The sprinkler hose is manufactured entirely from stainless steel
- It can be worked easily around other parts and structures
- As a result of the insertion end on the tube, the entire hose does not have to be turned
- Flexibility when installing the sprinkler on the ceiling tile
- Ceiling tiles do not have to be bent or lifted, as the flexible hose is mounted in the installation profile of the ceiling system.
- The sprinkler system does not have to be reinstalled when renovating or rebuilding. The hoses and mounting clamps can be removed and placed in a new location within a radius determined by the length of the hose without the entire installation needing to be drained.
- Simple vertical positioning of the sprinkler due to the scale on the threaded end of the hose

Length (mm)	Shape	Connection	Sprinkler Connection	Tube Connection (mm)	Equivalent length VdS (m)
1,000	Straight	Rp 1/2”	Ø22	0.9	8
1,500	Straight	Rp 1/2”	Ø22	1.3	12
2,000	Straight	Rp 1/2”	Ø22	1.7	14
1,000	Straight	Rp 1/2”	Ø28	0.5	8
1,500	Straight	Rp 1/2”	Ø28	0.8	11
2,000	Straight	Rp 1/2”	Ø28	1.0	12
800	90° bend coupling	Rp 1/2”	Ø22	0.8	8
1,000	90° bend coupling	Rp 1/2”	Ø22	0.9	8
1,500	90° bend coupling	Rp 1/2”	Ø22	1.3	12
800	90° bend coupling	Rp 1/2”	Ø28	0.5	8
1,000	90° bend coupling	Rp 1/2”	Ø28	0.5	8
1,500	90° bend coupling	Rp 1/2”	Ø28	0.8	11

EQUIVALENT LENGTHS OF FLEXIBLE HOSES

3.7 Dry risers

Introduction to 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 of which the fire brigade is more quickly in a position 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 residential area 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

A useful 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, VSH has developed a system for high-pressure dry risers in buildings. The connections implemented by VSH for high-pressure dry risers are also certified by KIWA and make up a complete system of lines, couplings, attachments and hoses designed for operating pressures up to 40 bar. Use of the VSH high-pressure dry riser system delivers important advantages for the fire service, building owner and installer.

Fire service:

- Fast delivery of water to the fire
- Connection and disconnection under pressure with swing couplings
- No time lost from checking the valves
- No extra communication with the pump operator necessary
- No heavy emergency crate that has to be taken up

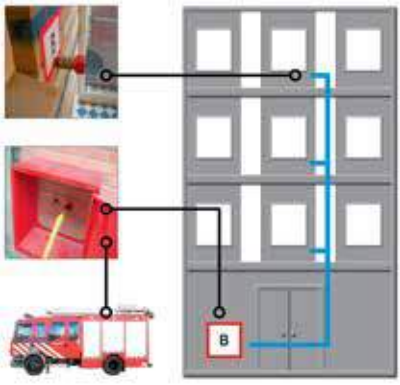
Building owner/End user:

- Much lower potential water damage as less water is used
- Lower construction costs
- Thinner pipelines that are easier to embed
- Aesthetic appearance, no reconstruction needed

Installer:

- Faster, cleaner and cheaper to install
- No flammable works
- Always watertight
- Greater flexibility due to the thin pipes and lower weight

The high-pressure dry riser system is comprised of VSH XPress Stainless Steel fittings and tubes, together with the hose connector and 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 fitting. The fire hose connection on the tap point is a swing coupling, which is also attached to the VSH XPress system with a thread. With a high-pressure fire hose with a length of 20 or 30 metres, which is fitted on one end with a hose connector and at the nozzle end with a swing coupling, this can be coupled to the to the fire hose connection and the extinguishing can begin immediately.

The high-pressure dry riser of the type that VSH provides consists of VSH XPress Stainless Steel fittings in combination with a stainless steel tube. The dimensions that VSH approves in stainless steel for use with high-pressure dry risers are tube 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 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 Steel fittings in sizes 22-35 mm
- VSH XPress Stainless Steel tubes in sizes 22-35 mm
- Swing couplings (from TST Tamsan - previously Oetiker)
- Hose connectors (from TST Tamsan - 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 in section 3.4 of this manual.

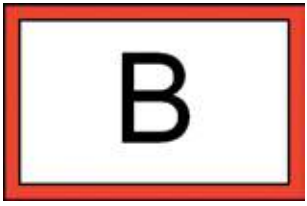
Distance between brackets

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, FM or UL approval and be designed for use with stainless steel (for example, they must be fitted with an approved rubber inlay).

Supply and drainage points

Drainage connection



The drainage 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 shown alongside.

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 is, 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

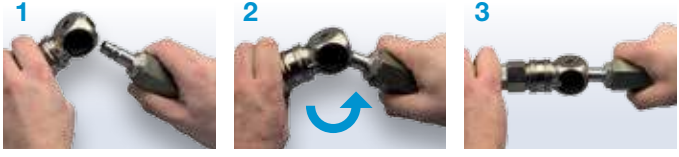
The high-pressure dry riser is fitted with a drainage plug for a swing coupling. The swing coupling is manufactured from nickel-plated brass with a polyurethane seal and aluminium roller. The maximum operating pressure is 40 bar.

The advantages of the swing coupling are:

- Connectable and disconnectable under pressure
- Light and compact construction
- Durable construction
- Completely free flow through

Connection:

Insert the appropriate hose connector into the swing coupling (1) and then rotate approximately 90° (2) until the ring locks in place (3).



Disconnection:

Pull the disconnection ring back (4) and tilt the hose connector back to the stop (5). The hose connector can now be withdrawn from the swing coupling.
To prevent dangerous backlash you must hold the hose connector in place until the hose is fully depressurised. Then put the hose on the ground or wall.

Technical data for the TST Tamsan SC Coupling Series HB

Specifications for the TST Tamsan SC 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
Max. working pressure	50 bar
Safety requirements for hydraulic-pneumatic systems and components	ISO 4414, EN 983

Maintenance of the swing coupling

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.

3.8 VSH XPress sprinkler approvals

Designs of sprinkler installations with VSH XPress Sprinkler Stainless Steel and Galvanized Steel

Sprinkler installations 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 table below provides the permitted pressures, if the system has been installed in accordance with VdS, FM, UL, cUL or LPCB.

VSH XPress Sprinkler operating pressures									
DN	External diameter (mm)	VdS		FM		UL		LPCB	
		Wet (Galvanized Steel)	Wet and dry (Stainless steel)	Wet (Galvanized Steel)	Wet and dry (Stainless steel)	Wet (Galvanized Steel)	Wet and dry (Stainless steel)	Wet (Galvanized Steel)	Wet (Stainless steel)
20	22	16 bar	16 bar	175 psi	175 psi	175 psi	175 psi	16 bar	16 bar
25	28	16 bar	16 bar	175 psi	175 psi	175 psi	175 psi	16 bar	16 bar
32	35	16 bar	16 bar	175 psi	175 psi	175 psi	175 psi	16 bar	16 bar
40	42	16 bar	16 bar	175 psi	175 psi	175 psi	175 psi	16 bar	16 bar
50	54	16 bar	16 bar	175 psi	175 psi	175 psi	175 psi	16 bar	16 bar
65	76.1	12.5 bar	16 bar	-	175 psi	175 psi	175 psi	-	-
80	88.9	10 bar	12.5 bar	-	175 psi	175 psi	175 psi	-	-
100	108	10 bar	10 bar	-	175 psi	-	175 psi	-	-

OPERATING PRESSURES FOR VSH XPRESS SPRINKLER STAINLESS STEEL/GALVANIZED STEEL

VdS certificate for Galvanized and Stainless Steel

VdS is a system approval which provides that the certificate is only valid when all of the components are used together:

- VSH XPress Sprinkler fittings
- VSH XPress Sprinkler tubes
- Press tools

The VSH XPress Sprinkler system has been tested and certified according to VdS standards for both Galvanized Steel and Stainless Steel for use in fixed sprinkler systems after the pipe valve. These standards apply to the VSH XPress Sprinkler system with a maximum operating pressure 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-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 the VSH XPress Sprinkler system 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 Sprinkler Galvanized Steel VdS (G4080007)

The VSH XPress Sprinkler Galvanized Steel 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 Sprinkler Galvanized Steel fittings are manufactured from non-alloy, galvanized steel in combination with a

galvanized tube specially produced for the VSH XPress Sprinkler Galvanized Steel 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 Sprinkler Stainless Steel VdS (G40800037)

The VSH XPress Sprinkler Stainless Steel 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 103. The VSH XPress Sprinkler Stainless Steel fittings are manufactured from material No. 1.4404 (AISI 316L) stainless steel. The tubes are manufactured from 1.4401 (AISI 316) stainless steel. The use is limited to areas after the alarm valve.

<FM> certificate

VSH XPress Sprinkler Galvanized Steel <FM>

The VSH XPress Sprinkler Galvanized Steel system has an 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 the VSH XPress Sprinkler system in sizes DN20 to DN50 (22-54 mm). In accordance with FM, the system is certified for use with VSH XPress Sprinkler galvanized steel Sendzimir tubes. In accordance with the FM certificate, no limitations apply to the VSH XPress Sprinkler Galvanized Steel with regards to the hazard classes.

VSH XPress Sprinkler Stainless Steel <FM>

The VSH XPress Sprinkler Stainless Steel system has an FM certificate for fittings and tubes in accordance with FM standards 1630 and 1920 for use in wet and dry sprinkler installations with a maximum operating pressure of 175 psi (12.1 bar). The certificate applies to the VSH XPress Sprinkler system in sizes DN20 to DN100 (22-108 mm). In accordance with FM the system is certified for use with VSH XPress Sprinkler Stainless Steel tubes with material No. 1.4401 (AISi 316),

1.4520 (AISI 439) and 1.4521 (AISI 444). In accordance with the FM certificate, no limitations apply to VSH XPress Sprinkler Stainless Steel with regards to the hazard classes.

Mounting and installation of FM-certified sprinkler installations

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 VSH Fittings B.V. 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 Sprinkler Galvanized Steel LPCB

The VSH XPress Sprinkler Galvanized Steel 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 Sprinkler galvanized steel Sendzimir tubes. Where VSH XPress Sprinkler Galvanized Steel 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 Sprinkler Galvanized Steel must be checked regularly for corrosion.

VSH XPress Sprinkler Stainless Steel LPCB

The VSH XPress Sprinkler Stainless Steel 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 Sprinkler Stainless Steel 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), 1.4520 (AISI 439) and 1.4521 (AISI 444). VSH XPress Sprinkler Stainless Steel is KIWA/WRAS approved (when installed with a 1.4401 tube).

Mounting and installation of LPCB-certified sprinkler installations

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 VSH XPress Sprinkler, the installer must ensure that sufficient measures are taken for wall penetration (conforming to the construction guidelines and the LPC Sprinkler standards).

When using VSH XPress Sprinkler Stainless Steel for embedded systems, no specific limitations apply to the use of insulation material other than those that are set out in the technical handbook from VSH XPress. During installation you should take into account that there is no empty space between the tube and the concrete. It is 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.

UL/cUL certificate

VSH XPress Sprinkler system has a UL/cUL certificate (VIZM/VIZY) for fittings and tubes for the use of VSH XPress Galvanized and Stainless Steel in above ground sprinkler installations with a maximum operating pressure as set out in the table on page 103 for sizes DN20 to DN80 (22-88.9 mm) forg alvanized steel and DN20 to DN100 (22-108 mm) for stainless steel. In accordance with NFPA13, at least DN25 (28 mm) should be used for steel branch and distributor lines. As a result DN20 (22 mm) is limited to use in “trim and drain” lines. The use of VSH XPress Sprinkler under UL requirements is limited to a maximum ambient temperature of 65.6ºC (150ºF) and to 48.9ºC (120ºF) under cUL. Only tools fitted with a battery are permitted under the UL/cUL certificate. Its use is only approved when the system components are used together. No limitations apply to VSH XPress Sprinkler when it is installed in accordance with NFPA13. For the UL/cUL certificate, a C-factor of 120 must be adhered to for VSH XPress Sprinkler Galvanized Steel tubes.

Under the UL/cUL certificate three-part couplings and threaded transition couplings are only approved for connecting accessoiries, such as valves. It is often these products that need maintenance during the operating life of a sprinkler installation. The maximum weights and associated distances between brackets can be found in the table below:

Maximum weight and distance between brackets for three-part- and threaded transition couplings			
DN	**External diameter (mm)**	**Max. weight (kg)**	**Max. distance [m]**
20	22	5.4	61
25	28	8.2	61
32	35	8.2	61
40	42	8.2	61
50	54	13.6	61

MAXIMUM WEIGHT AND DISTANCE BETWEEN BRACKETS FOR THREADED TRANSITION COUPLINGS

Under the UL/cUL certificate, T-pieces with a female thread may only be used to connect sprinklers or flexible hoses. The connection of a steel tube with a female thread is not permitted, with the exception of a 2" design, for which the bracketing and weight must comply with the requirements in the table above.

VSH XPress Sprinkler Galvanized Steel UL/cUL

VSH XPress Sprinkler Galvanized Steel has a UL/cUL certificate for fittings and tubes in accordance with the UL/cUL standards in the VIZM/VIZY category for use in wet sprinkler installations with a maximum operating pressure of 175 psi (12.1 bar). The certificate applies to the VSH XPress Sprinkler system in sizes DN20 to DN80 (22-88.9 mm). In accordance with UL/cUL, the system has been certified for use with VSH XPress Sprinkler galvanized steel Sendzimir tubes.

VSH XPress Sprinkler Stainless Steel UL/cUL

VSH XPress Sprinkler Stainless Steel has a UL/cUL certificate for fittings and tubes in accordance with the UL/cUL standards in the VIZM/VIZY category for use in wet and dry sprinkler installations with a maximum operating pressure of 175 psi (12.1 bar). The certificate applies to VSH XPress Sprinkler systems in sizes DN20 to DN100 (22-108 mm). In accordance with UL/cUL, the system has been certified for use with VSH XPress Sprinkler stainless steel tubes with material No. 1.4401 (AISi 316).

Mounting and Installation for UL/cUL-certified sprinkler installations

The mounting and installation of the VSH XPress Sprinkler system 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). Where a press to groove coupling is installed, the entire insertion depth of the fitting must be used. The minimum insertion depth for these fittings can be found in the table on page 106. The installer must ensure that the sizes of the VSH XPress press to groove transition coupling match the specifications for the grooved coupling used.

4 VSH XPress Sprinkler ML system

The VSH XPress Sprinkler ML system consists of a multilayer tube and high grade plastic fittings (PVDF). The system has been certified by VdS as an embedded system for wet sprinkler installations in the dimensions DN25 up to DN50 (diameters 22 up to 63 mm). The unique thing 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 put into the concrete to create space for the embedded sprinkler and used to pressure test 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 dimension the system 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 is perfect for high-rise buildings where the sprinkler piping is embedded in the floor/ceiling. This system is also suitable for pre-fab.

The plus of VSH XPress Sprinkler ML:

+ BIM ready
+ Simple, fast and safe connection technology
+ Resistant to be embedded in concrete
+ Insert depth control of tube in the fitting
+ VdS Approval
+ Fittings available in the size DN25 up to DN50 (32-63 mm)
+ Clear material and size identification

4.1 Areas for using the VSH XPress Sprinkler ML system

Dry fire mains

Sprinkler

Sprinkler installations

VSH XPress Sprinkler ML fittings with VSH XPress Sprinkler ML multi-layer tubes - VdS approved.

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 limits on its application 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 sprinklers

VSH XPress Sprinkler ML fittings with VSH XPress Sprinkler ML multi-layer tubes – VdS approved.

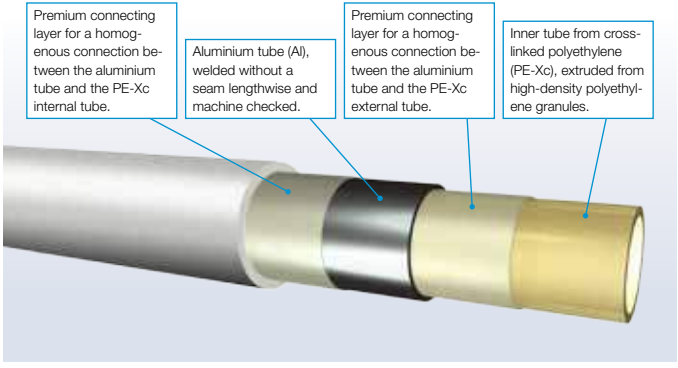
O-rings:	EPDM (black)
Operating temperature:	-35°C to +135°C
Operating pressure:	Max. 16 bar (depending on the application and dimensions)

The objective of the water line sprinkler is to deliver fluid in case of fire 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 to do so.

4.2 VSH XPress Sprinkler ML Multilayer tube

Composition of the VSH XPress Sprinkler ML tube: PE-Xc/Al/PE-Xc

The VSH XPress Sprinkler ML tube is composed of an aluminium tube that is longitudinally butt welded, which is coated on the inner and outer surface with a layer of cross-linked polyethylene. The individual layers are bonded together with a premium quality adhesive layer. The result is a tube that brings together all of the advantages of metal and plastic without the disadvantages of the individual metal components.



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.

Applications

- All potable water installations in accordance with the German Potable Water Decree (TrinkwV) and EU Directive 98, DIN 50930 Part 6 and in compliance with DIN 1988
- Cold- and hot water installations
- Heating systems
- Compressed air systems
- Cooling water/industrial water installations
- Industrial rainwater installations
- Sprinkler installations

DN	External Ø xs [mm]	Internal Ø [mm]	Wall thickness tolerance [mm]	Thickness of the aluminium layer [mm]	Weight [kg/m]	Tube capacity [l/m]
DN 25	32 x 3.0	26.0	± 0.15	0.7	0.390	0.530
DN 32	40 x 3.5	33.0	± 0.15	0.7	0.528	0.803
DN 40	50 x 4.0	42.0	± 0.15	0.9	0.766	1.320
DN 50	63 x 4.5	54.0	± 0.15	1.2	1.155	2.042

TECHNICAL CHARACTERISTICS OF THE VSH XPRESS SPRINKLER ML TUBE

4.3 VSH XPress Sprinkler ML system

Approvals

Approvals	VSH XPress Sprinkler ML
VdS	32-63 mm

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

Technical characteristics

VSH XPress ML fittings are manufactured from polyvinyl fluoride (PVDF) and are fitted with EPDM O-rings and stainless steel press sleeves.

VSH XPress fittings markings

VSH XPress Sprinkler ML fittings		
	Marking	Packaging label
	Red marking XPress Dimension VdS	Type ML..... Dimension Description EAN No. Art. no. Certificates Quantity

ML Sprinkler fittings with viewing window

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

4.4 Press tools VSH XPress Sprinkler ML system

An important part of the VSH XPress Sprinkler range is the press tools, which are used to make the press connection. The tools prescribed for the VSH XPress Sprinkler series consist of a press tool and the jaws and slings that come with it. Depending on the diameter of the tube, the corresponding jaw and sling must be chosen to create a good 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 brands of machines are also approved where these have satisfied the following specifications:

- Piston pressure: max. 38 kN
- Diameter: 15 mm
- Lever: 40 mm
- Electronic monitoring: None
- Jaw closure control: None

Approved press tools

You will find the list of approved press tools in the tables below. The most recent list of tools approved by VSH is available on our website.

Dimension	Manufacturer	Press tool	Press jaws/slings
32-63 mm	Novopress	ECO201/202/203 (230V) EFP2 (230V) ACO201 (12V) ACO202/203 (18V) EFP201/202 (230V) AFP201/202 (230V)	VSH XPress Sprinkler ML jaws: 32-63 mm
32-63 mm	Klauke	UAP2 (12V) UNP2 (230V)	VSH XPress Sprinkler ML jaws: 32-63 mm

TRESS TOOLS

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.

4.5 Installation guidelines VSH XPress Sprinkler ML

General instructions regarding transport and handling

- The pipes must be transported with care and stored in the original factory packaging and must be unpacked as 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 VSH XPress Sprinkler ML tube against direct sunlight and UV light. After the original packing material is removed, the tube must be covered during storage and transport.
- The unrolling of the tubes on a roll must happen from the tube end on the outside of the roll.
- Any piece with creases, bulges or damage may not be used in the installation.
- The tubes must be laid without any torsion.
- The tubes 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.
- The bare tube must not come into contact with sharp items during and after the 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 further. Where this installation technique is not possible, the tube should be held at the connection by hand.

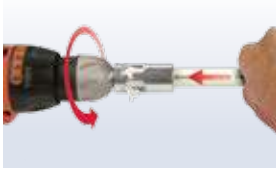
- The tubes should not be damaged after installation by other work taking place on site. To avoid this, the tubes should be fitted with a corrugated tube or insulation.
- During installation, brackets, expansion lengths and expansion loops should be fitted as prescribed.

Making a press connection

Making a press connection is very easy, as the fitting and tube are very light 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. Always cut the packaging on the rolls open with a safe cutter and never, for example, with a knife.

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



3. After the tube has been cut at an 90° angle a correct calibration tool must be used. Press the tube in properly for a 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. Slide the calibrated tube as far as the stop in the press coupling, so that the tube is fully visible in all of the control windows.

5. Open the press jaw. Place the coupling with the special guidance edge in the press sleeve in the slot in the press jaw provided for that purpose. Close the press jaw and start the press tool to make the press.

6. After the pressing, open the press jaw and make sure that the tube is still mounted at the stop using the control windows. The pressing leaves obvious marks on the press sleeve. This enables rapid visual checks for all the couplings that have not yet been pressed.

Embedding sprinkler in concrete

1. Sprinkler cup with rubber seal is screwed onto the fitting. It is important that the rubber seal is placed between the cup and the fitting.
Note: The rubber seal between the fitting and the sprinkler cup prevents internal pressure on the wooden formwork from the moisture in the concrete inside the installed unit.

2. Drill a Ø 6 mm hole through the wooden bulkhead.

3. Place the screws supplied in the holes drilled in the wooden bulkhead and screw the cup in place.

4. Install and press the tube and fitting.

5. After the concrete has been poured and set, remove the screws.

6. Remove the wooden bulkhead.

7. Unscrew the sprinkler cup.

NB: There is a chance that the pipe system will be contaminated. Until the sprinkler is installed and the sprinkler system is connected to the supply line, the pipe system must be protected against contamination.

Structure of the concrete layer

The following minimum dimensions for the concrete covering must be observed: 60 mm over and under the sprinkler line.

Mounting the sprinkler installation

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

General comments before embedding in concrete

During the process, space must be kept free for the pressure testing equipment with (for example) formwork, and space must also be kept free for the connection of the water mains to the sprinkler line. VdS compliance must be achieved before concreting works can be begun (see annex 3 of the certificate). This will be determined by VdS either during a visit when the concrete works are being carried out or VdS will be present at 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.

Unacceptable heating of the tubes

Sprinkler lines: risk of damaging the equipment! Unacceptable heating can lead to the tube and connection being damaged. Care must be taken in advance to ensure that the pipe system is not exposed to unacceptably high temperatures during construction due to other works taking place (for example from bitumen welding, welding and solder works in direct proximity to unprotected tubes).

Feeding through cutouts

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

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 a line is replaced by a new tube section with two fittings. After the repair a pressure test must be carried out again.

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. The application of paint is not, however, permitted.
Connecting the sprinkler installation to the fire extinguishing water supply (risers)
Connection to parts outside 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 coupling of the sprinkler 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 drop

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 = 150 for VSH XPress Sprinkler ML

Equivalent length method

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

Equivalent length method (m)

OD	DN	[m]	[m]	[m]	[m]	[m]	[m]	[m]
32	25	2.4	1.1	0.6	0.6	0.7	2.6	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 SPRINKLER ML

Putting the network into service

Flushing the network

After the installation is completed the entire sprinkler installation must be rinsed with filtered potable water. The rinsing of the installation is necessary to ensure that the system operates correctly and to prevent contamination of the installation. After the installation is rinsed, it must be drained. The sprinklers can be attached after all of the equipment that was attached when rinsing (plugs etc.) is removed.

Filling and bleeding the tubes

After the pipe framework is rinsed, it must be filled with filtered potable water and completely bled.

Pressure test

The tubes of the sprinkler installation 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.

4.6 Designing Sprinkler ML sprinkler installations

Sprinkler installations must be designed and installed in accordance with CEA 4001 (VdS) guideline 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 diameter (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 of the components are used together:

VSH XPress Sprinkler ML system

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

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 outside 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 of VdS-certified sprinkler installations

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.

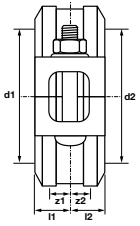
VSH

5.1 VSH Shurjoint Couplings

Fire Protection

K9 Rigid coupling

(with EPDM, pre-lubed gasket)



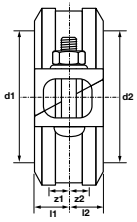
Dimension	Article No.		l1/l2	z1/z2	A.d.*
	Painted red	Galvanized			
42.4 (DN32)	100K90012E20	100K90012E21	22	0,8	0-1,6
48.3 (DN40)	100K90015E20	100K90015E21	22	0,8	0-1,6
60.3 (DN50)	100K90020E20	100K90020E21	22	0,8	0-1,6
73.0	100K90025E20	100K90025E21	22	0,8	0-1,6
76.1 (DN65)	100K90029E20	100K90029E21	22	0,8	0-1,6
88.9 (DN80)	100K90030E20	100K90030E21	22	0,8	0-1,6
114.3 (DN100)	100K90045E20	100K90045E21	25	1,6	0-3,2
139.7 (DN125)	100K90052E20	100K90052E21	26	1,6	0-3,2
141.3	100K90055E20	100K90055E21	25	1,6	0-3,2
165.1	100K90062E20	100K90062E21	25	1,6	0-3,2
168.3 (DN150)	100K90065E20	100K90065E21	28	1,6	0-3,2
219.1 (DN200)	100K90085E20	100K90085E21	31	1,6	0-3,2
219.1 (DN200)**	100K90085090	100K90085091	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.

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

Z07 Heavy duty rigid coupling

(angle pad design, with E gasket)

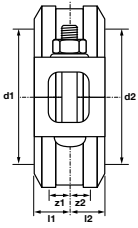


Dimension	Article No.		l1/l2	z1/z2	A.d.*
	Painted orange	Galvanized			
273,0 (DN250)	10Z0700A1001	10Z0700A1003	33	1.6	0-3.2
323.9 (DN300)	10Z0700A3001	10Z0700A3003	33	1.6	0-3.2

* 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.

7705 Flexible coupling

(with E gasket)



Dimension	Article No.		l1/l2	z1/z2
	Painted orange	Galvanized		
33.7 (DN25)	177050010E01	177050010E03	23	0.8
42.4 (DN32)	177050012E01	177050012E03	23	0.8
48.3 (DN40)	177050015E01	177050015E03	23	0.8
60.3 (DN50)	177050020E01	177050020E03	24	0.8
73.0	177050025E01	177050025E03	24	0.8
76.1 (DN65)	177050029E01	177050029E03	24	0.8
88.9 (DN80)	177050030E01	177050030E03	24	0.8
101.6	177050035E01	177050035E03	24	0.8
108.0	177050040E01	177050040E03	26	1.6
114.3 (DN100)	177050045E01	177050045E03	26	1.6
133.0	177050050E01	177050050E03	26	1.6
139.7 (DN125)	177050052E01	177050052E03	26	1.6
141.3	177050055E01	177050055E03	26	1.6
159.0	177050060E01	177050060E03	26	1.6
165.1	177050062E01	177050062E03	27	1.6

>>

7705 Flexible coupling

(bolt pad design, with E gasket)

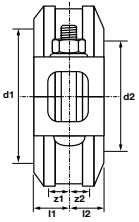
Dimension	Article No.		l1/l2	z1/z2
	Painted orange	Galvanized		
168.3 (DN150)	177050065E01	177050065E03	27	1.6
219.1 (DN200)	177050085E01	177050085E03	31	1.6
219.1 (DN200)*	177050085E92	177050085E91	31	1.6
273.0 (DN250)	1770500A1001	1770500A1003	33	1.6
323.9 (DN300)	1770500A3001	1770500A3003	33	1.6

* DN200 7705H coupling is VDS approved in addition to cULus and FM approval

- For design data on axial displacement and angular deflection see table on page 53
- For maximum allowable working pressures see chapter 2.4

7706 Reducing coupling

(with E gasket)



Dimension	Article No.		l1/l2	z1	z2
	Painted red	Galvanized			
48.3 x 42.4 (DN40 x DN32)	177061512E02	177061512E03	23	0.8	0.8
60.3 x 48.4 (DN50 x DN40)	177062015E02	177062015E03	24	0.8	0.8
73.0 x 60.3	177062520E02	177062520E03	24	0.8	0.8
76.1 x 60.3 (DN65 x DN50)	177062920E02	177062920E03	24	0.8	0.8
76.1 x 73.0	177062925E02	177062925E03	24	0.8	0.8
88.9 x 60.3 (DN80 x DN50)	177063020E02	177063020E03	24	0.8	0.8
88.9 x 73.0	177063025E02	177063025E03	24	0.8	0.8
88.9 x 76.1 (DN80 x DN65)	177063029E02	177063029E03	24	0.8	0.8
114.3 x 60.3 (DN100 x DN50)	177064520E02	177064520E03	25	1.6	0.8
114.3 x 73.0	177064525E02	177064525E03	25	1.6	0.8
114.3 x 76.1 (DN100 x DN65)	177064529E02	177064529E03	25	1.6	0.8
114.3 x 88.9 (DN100 x DN80)	177064530E02	177064530E03	26	1.6	0.8
139.7 x 114.3 (DN125 x DN100)	177065245E02	177065245E03	26	1.6	1.6
141.3 x 114.3	177065545E02	177065545E03	26	1.6	1.6

7706 Reducing coupling

(with E gasket)

Dimension	Article No.		l1/l2	z1	z2
	Painted red	Galvanized			
165.1 x 88.9	177066230E02	177066230E03	26	1.6	0.8
165.1 x 114.3 (DN150 x DN100)	177066245E02	177066245E03	26	1.6	1.6
168.3 x 114.3 (DN150 x DN100)	177066545E02	177066545E03	26	1.6	1.6
168.3 x 165.1	177066562E02	177066562E03	27	1.6	1.6
219.1 x 165.1	177068562E02	177068562E03	28	1.6	1.6
219.1 x 168.3 (DN200 x DN150)	177068565E02	177068565E03	27	1.6	1.6

- For design data on axial displacement and angular deflection see table on page 53
- For maximum allowable working pressures see chapter 2.4

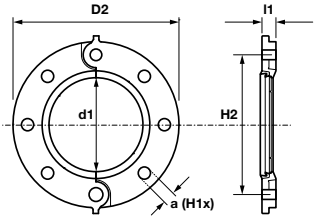
VSH

5.2 VSH Shurjoint Flange Adapters

Fire Protection

7041 Flange adapter - ANSI class 125/150

(2-12” hinged with E gasket)

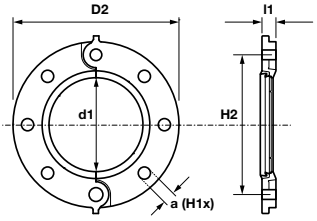


Dimension	Article No.		l1	D2	H1	H2	a
	Painted black	Galvanized					
60.3 (DN50)	1041A0020011	1041A0020003	19	152	4	121	5/8"
73.0	1041A0025011	1041A0025003	22	178	4	140	5/8"
88.9 (DN80)	1041A0030011	1041A0030003	24	191	4	152	5/8"
114.3 (DN100)	1041A0045011	1041A0045003	24	229	8	191	5/8"
141.3	1041A0055011	1041A0055003	25	254	8	216	3/4"
168.3 (DN150)	1041A0065011	1041A0065003	25	279	8	241	3/4"
219.1 (DN200)	1041A0085011	1041A0085003	29	343	8	298	3/4"
273.0 (DN250)	1041A00A1011	1041A00A1003	30	406	12	362	7/8"
323.9 (DN300)	1041A00A3011	1041A00A3003	32	483	12	432	7/8"

For maximum allowable working pressures see chapter 2.4

7041 Flange adapter - PN10/PN16

(DN50-300 hinged with E gasket)

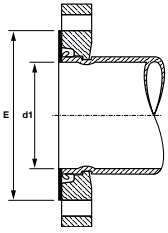


Dimension	Article No.		PN	l1/	D2	H1	H2	a
	Painted black	Galvanized						
60.3 (DN50)	1041B0020010	1041B0020006	10/16	22	165	4	125	M16
76.1 (DN65)	1041B0029010	1041B0029006	10/16	22	185	4	145	M16
88.9 (DN80)	1041B0030010	1041B0030006	10/16	24	200	8	160	M16
114.3 (DN100)	1041B0045010	1041B0045006	10/16	24	220	8	180	M16
139.7 (DN125)	1041B0052010	1041B0052006	10/16	25	250	8	210	M16
165.1	1041B0062010	1041B0062006	10/16	24	285	8	240	M20
168.3 (DN150)	1041A0065010	1041A0065006	10/16	24	285	8	240	M20
219.1 (DN200)	1041B0085010	1041B0085006	16	29	340	12	295	M20
273.0 (DN250)	1041B00A1010	1041B00A1006	16	30	405	12	355	M24
323.9 (DN300)	1041B00A3010	1041B00A3006	16	32	460	12	410	M24

For maximum allowable working pressures see chapter 2.4

49 Sandwich plate

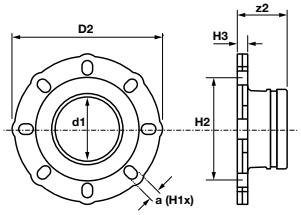
(steel, zinc plated)



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	z2	D2	H1	H2	H3	a
60.3 (DN50)	171800020001	64	165	4	114-125	16	M16
73.0	171800025001	76	185	4	127-145	16	M16
76.1 (DN65)	171800029001	76	185	4	127-145	16	M16
88.9 (DN80)	171800030001	75	200	4/8	146-160	16	M16
114.3 (DN100)	171800045001	75	225	8	175-191	16	M16
139.7 (DN125)	171800052001	75	254	8	210-216	16	M16/20
141.3	171800055001	75	254	8	210-216	22	M16/20
165.1	171800062001	75	272	8	235-241	16	M20
168.3 (DN150)	171800065001	75	272	8	240-241	16	M20
219.1 (DN200)	171800085001	102	343	8/12	290-298	22	M20

Dimension	Article No. Galvanized	z2	D2	H1	H2	H3	a
60.3 (DN50)	171800020003	64	165	4	114-125	16	M16
73.0	171800025003	76	185	4	127-145	16	M16
76.1 (DN65)	171800029003	76	185	4	127-145	16	M16
88.9 (DN80)	171800030003	75	200	4/8	146-160	16	M16
114.3 (DN100)	171800045003	75	225	8	175-191	16	M16
139.7 (DN125)	171800052003	75	254	8	210-216	16	M16/20
141.3	171800055003	75	254	8	210-216	22	M16/20

>>

7180 Universal flange adapter

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

Dimension	Article No. Galvanized	z2	D2	H1	H2	H3	a
165.1	171800062003	75	272	8	235-241	16	M20
168.3 (DN150)	171800065003	75	272	8	240-241	16	M20
219.1 (DN200)	171800085003	102	343	8/12	290-298	22	M20

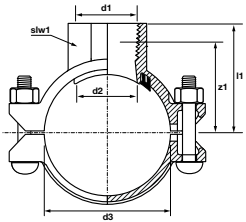
VSH

5.3 VSH Shurjoint Mechanical Tees

Fire Protection

7721 Mechanical tee

(ISO R7 Female outlet, with E gasket)



Dimension	Article No. Painted red	l1	z1	d1	d2*	d3	slw1
60.3 x Rp1/2	177212005E02	64	50	21.3	38	60.3	30
60.3 x Rp3/4	177212007E02	64	50	26.9	38	60.3	36
60.3 x Rp1	177212010E02	68	51	33.7	38	60.3	44
60.3 x Rp1 1/4	177212012E02	71	53	42.4	45	60.3	55
60.3 x Rp1 1/2	177212015E02	71	53	48.3	45	60.3	60
76.1 x Rp1/2	177212505E02	71	57	21.3	38	76.1	30
76.1 x Rp3/4	177212507E02	73	59	26.9	38	76.1	36
76.1 x Rp1	177212510E02	75	58	33.7	38	76.1	44
76.1 x Rp1 1/4	177212512E02	79	61	42.4	45	76.1	55
76.1 x Rp1 1/2	177212515E02	79	61	48.3	45	76.1	60
88.9 x Rp1/2	177213005E02	81	63	21.3	38	88.9	30
88.9 x Rp3/4	177213007E02	81	62	26.9	38	88.9	36
88.9 x Rp1	177213010E02	81	64	33.7	38	88.9	44
88.9 x Rp1 1/4	177213012E02	89	71	42.4	45	88.9	55
88.9 x Rp1 1/2	177213015E02	89	71	48.3	45	88.9	60
88.9 x Rp2	177213020E02	91	72	60.3	64	88.9	73
114.3 x Rp1/2	177214505E02	94	76	21.3	38	114.3	30
114.3 x Rp3/4	177214507E02	94	75	26.9	38	114.3	36
114.3 x Rp1	177214510E02	94	77	33.7	38	114.3	44
114.3 x Rp1 1/4	177214512E02	99	81	42.4	45	114.3	55

7721 Mechanical tee

(ISO R7 Female outlet, with E gasket)

Dimension	Article No. Painted red	l1	z1	d1	d2*	d3	slw1
114.3 x Rp1 1/2	177214515E02	99	81	48.3	45	114.3	60
114.3 x Rp2	177214520E02	105	86	60.3	64	114.3	73
114.3 x Rp2 1/2	177214525E02	111	82	76.1	70	114.3	89
114.3 x Rp3	177214530E02	112	82	88.9	89	114.3	107
139.7 x Rp2	177215520E02	124	105	60.3	64	139.7	73
139.7 x Rp2 1/2	177215525E02	127	99	76.1	70	139.7	89
168.3 x Rp1/2	177216505E02	128	114	21.3	51	168.3	30
168.3 x Rp1	177216510E02	127	110	33.7	51	168.3	44
168.3 x Rp1 1/4	177216512E02	127	109	42.4	45	168.3	55
168.3 x Rp1 1/2	177216515E02	127	109	48.3	45	168.3	60
168.3 x Rp2	177216520E02	132	113	60.3	64	168.3	72
168.3 x Rp2 1/2	177216525E02	140	111	76.1	70	168.3	88
168.3 x Rp3	177216530E02	140	110	88.9	89	168.3	108
219.1 x Rp1/2	177218505E02	148	135	21.3	70	219.1	30
219.1 x Rp1	177218510E02	152	135	33.7	70	219.1	44
219.1 x Rp1 1/4	177218512E02	152	135	42.4	70	219.1	55
219.1 x Rp1 1/2	177218515E02	152	135	48.3	70	219.1	60
219.1 x Rp2	177218520E02	166	135	60.3	64	219.1	73
219.1 x Rp2 1/2	177218525E02	166	137	76.1	70	219.1	89
219.1 x Rp3	177218530E02	166	136	88.9	89	219.1	107

Dimension	Article No. Galvanized	l1	z1	d1	d2*	d3	slw1
60.3 x Rp1/2	177212005E04	64	50	21.3	38	60.3	30
60.3 x Rp3/4	177212007E04	64	50	26.9	38	60.3	36
60.3 x Rp1	177212010E04	68	51	33.7	38	60.3	44
60.3 x Rp1 1/4	177212012E04	71	53	42.4	45	60.3	55
60.3 x Rp1 1/2	177212015E04	71	53	48.3	45	60.3	60
76.1 x Rp1/2	177212505E04	71	57	21.3	38	76.1	30
76.1 x Rp3/4	177212507E04	73	59	26.9	38	76.1	36
76.1 x Rp1	177212510E04	75	58	33.7	38	76.1	44
76.1 x Rp1 1/4	177212512E04	79	61	42.4	45	76.1	55

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7721 Mechanical tee

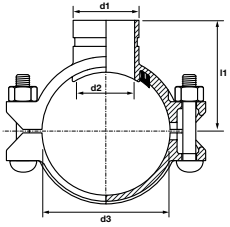
(ISO R7 Female outlet, with E gasket)

Dimension	Article No. Galvanized	l1	z1	d1	d2*	d3	slw1
76.1 x Rp1 1/2	177212515E04	79	61	48.3	45	76.1	60
88.9 x Rp1/2	177213005E04	81	63	21.3	38	88.9	30
88.9 x Rp3/4	177213007E04	81	62	26.9	38	88.9	36
88.9 x Rp1	177213010E04	81	64	33.7	38	88.9	44
88.9 x Rp1 1/4	177213012E04	89	71	42.4	45	88.9	55
88.9 x Rp1 1/2	177213015E04	89	71	48.3	45	88.9	60
88.9 x Rp2	177213020E04	91	72	60.3	64	88.9	73
114.3 x Rp1/2	177214505E04	94	76	21.3	38	114.3	30
114.3 x Rp3/4	177214507E04	94	75	26.9	38	114.3	36
114.3 x Rp1	177214510E04	94	77	33.7	38	114.3	44
114.3 x Rp1 1/4	177214512E04	99	81	42.4	45	114.3	55
114.3 x Rp1 1/2	177214515E04	99	81	48.3	45	114.3	60
114.3 x Rp2	177214520E04	105	86	60.3	64	114.3	73
114.3 x Rp2 1/2	177214525E04	111	82	76.1	70	114.3	89
114.3 x Rp3	177214530E04	112	82	88.9	89	114.3	107
139.7 x Rp2	177215520E04	124	105	60.3	64	139.7	73
139.7 x Rp2 1/2	177215525E04	127	99	76.1	70	139.7	89
168.3 x Rp1/2	177216505E04	128	114	21.3	51	168.3	30
168.3 x Rp1	177216510E04	127	110	33.7	51	168.3	44
168.3 x Rp1 1/4	177216512E04	127	109	42.4	45	168.3	55
168.3 x Rp1 1/2	177216515E04	127	109	48.3	45	168.3	60
168.3 x Rp2	177216520E04	132	113	60.3	64	168.3	72
168.3 x Rp2 1/2	177216525E04	140	111	76.1	70	168.3	88
168.3 x Rp3	177216530E04	140	110	88.9	89	168.3	108
219.1 x Rp1/2	177218505E04	148	135	21.3	70	219.1	30
219.1 x Rp1	177218510E04	152	135	33.7	70	219.1	44
219.1 x Rp1 1/4	177218512E04	152	135	42.4	70	219.1	55
219.1 x Rp1 1/2	177218515E04	152	135	48.3	70	219.1	60
219.1 x Rp2	177218520E04	166	135	60.3	64	219.1	73
219.1 x Rp2 1/2	177218525E04	166	137	76.1	70	219.1	89
219.1 x Rp3	177218530E04	166	136	88.9	89	219.1	107

* For hole cut specifications and installation instructions, please refer to the table on page 45

7722 Mechanical tee

(grooved end outlet, with E gasket)



Dimension	Article No.		l1/z1	d1	d2	d3
	Painted red	Galvanized				
60.3 x 42.4	177222012E02	177222012E03	71	42.4	45	60.3
60.3 x 48.3	177222015E02	177222015E03	71	48.3	45	60.3
76.1 x 42.4	177222512E02	177222512E03	79	42.4	45	76.1
76.1 x 48.3	177222515E02	177222515E03	79	48.3	45	76.1
88.9 x 33.7	177223010E02	177223010E03	84	33.7	38	88.9
88.9 x 42.4	177223012E02	177223012E03	89	42.4	45	88.9
88.9 x 48.3	177223015E02	177223015E03	89	48.3	45	88.9
88.9 x 60.3	177223020E02	177223020E03	91	60.3	64	88.9
114.3 x 33.7	177224510E02	177224510E03	94	33.7	38	114.3
114.3 x 42.4	177224512E02	177224512E03	99	42.4	45	114.3
114.3 x 48.3	177224515E02	177224515E03	99	48.3	45	114.3
114.3 x 60.3	177224520E02	177224520E03	105	60.3	64	114.3
114.3 x 73.0	177224525E02	177224525E03	111	73.0	70	114.3
114.3 x 76.1	177224529E02	177224529E03	111	76.1	70	114.3
114.3 x 88.9	177224530E02	177224530E03	112	88.9	89	114.3
139.7 x 60.3	177225520E02	177225520E03	124	60.3	64	139.7
139.7 x 73.0	177225525E02	177225525E03	127	73.0	70	139.7
139.7 x 76.1	177225529E02	177225529E03	127	76.1	70	139.7

>>

7722 Mechanical tee

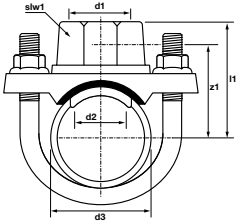
(grooved end outlet, with E gasket)

Dimension	Article No.		l1/z1	d1	d2	d3
	Painted red	Galvanized				
168.3 x 42.4	177226512E02	177226512E03	127	42.4	45	168.3
168.3 x 48.3	177226515E02	177226515E03	127	48.3	45	168.3
168.3 x 60.3	177226520E02	177226520E03	132	60.3	64	168.3
168.3 x 73.0	177226525E02	177226525E03	140	73.0	70	168.3
168.3 x 76.1	177226529E02	177226529E03	140	76.1	70	168.3
168.3 x 88.9	177226530E02	177226530E03	140	88.9	89	168.3
168.3 x 114.3	177226545E02	177226545E03	140	114.3	114	168.3
219.1 x 60.3	177228520E02	177228520E03	166	60.3	64	219.1
219.1 x 73.0	177228525E02	177228525E03	166	73.0	70	219.1
219.1 x 76.1	177228529E02	177228529E03	166	76.1	70	219.1
219.1 x 88.9	177228530E02	177228530E03	166	88.9	89	219.1
219.1 x 114.3	177228545E02	177228545E03	166	114.3	114	219.1

* For hole cut specifications and installation instructions, please refer to the table on page 45

723 Saddle-Let

(female outlet, with E gasket)



Dimension	Article No.		l1	z1	d1	d2*	d3	slw1
	Painted red	Galvanized						
42.4 x RP1/2	107231205V02	107231205V04	50	44	21,3	30	42,4	29
42.4 x RP3/4	107231207V02	107231207V04	50	44	26,9	30	42,4	34,5
42.4 x RP1	107231210V02	107231210V04	54	47	33,7	30	42,4	40,5
48.4 x RP1/2	107231505V02	107231505V04	53	46	21,3	30	48,3	29
48.4 x RP3/4	107231507V02	107231507V04	53	46	26,9	30	48,3	34,5
48.4 x RP1	107231510V02	107231510V04	58	49	33,7	30	48,3	40,5
60.3 x RP1/2	107232005V02	107232005V04	60	53	21,3	30	60,3	29
60.3 x RP3/4	107232007V02	107232007V04	60	53	26,9	30	60,3	34,5
60.3 x RP1	107232010V02	107232010V04	64	56	33,7	30	60,3	40,5
76.1 x RP1/2	107232505V02	107232505V04	66	58	21,3	30	76,1	29
76.1 x RP3/4	107232507V02	107232507V04	66	58	26,9	30	76,1	34,5
76.1 x RP1	107232510V02	107232510V04	70	61	33,7	30	76,1	40,5

* For hole cut specifications and installation instructions, please refer to the table on page 50

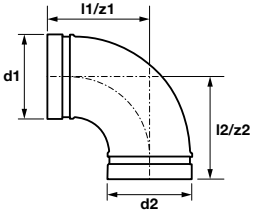
VSH

5.4 VSH Shurjoint Fittings

Fire Protection

901 Short Radius Elbow 90°

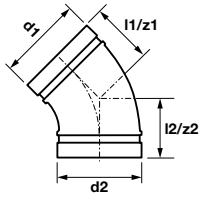
(2 x groove)



Dimension	Article No.		l1/l2	z1/z2
	Painted red	Galvanized		
60.3 (DN50)	109010020002	109010020003	70	70
73.0	109010025002	109010025003	76	76
76.1 (DN65)	109010029002	109010029003	76	76
88.9 (DN80)	109010030002	109010030003	86	86
114.3 (DN100)	109010045002	109010045003	102	102
139.7 (DN125)	109010052002	109010052003	124	124
141.3	109010055002	109010055003	124	124
165.1	109010062002	109010062003	140	140
168.3 (DN150)	109010065002	109010065003	140	140
219.1 (DN200)	109010085002	109010085003	176	176

7111 Elbow 45°

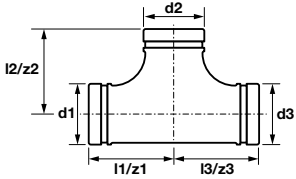
(2 x groove)



Dimension	Article No.		l1/l2	z1/z2
	Painted red	Galvanized		
33.7 (DN25)	171110010001	171110010003	45	45
42.4 (DN32)	171110012001	171110012003	45	45
48.3 (DN40)	171110015001	171110015003	45	45
60.3 (DN50)	171110020002	171110020003	51	51
73.0	171110025002	171110025003	57	57
76.1 (DN65)	171110029002	171110029003	57	57
88.9 (DN80)	171110030002	171110030003	57	57
108.0	171110040002	171110040003	76	76
114.3 (DN100)	171110045002	171110045003	76	76
139.7 (DN125)	171110052002	171110052003	83	83
141.3	171110055002	171110055003	83	83
159.0	171110060002	171110060003	89	89
165.1	171110062002	171110062003	89	89
168.3 (DN150)	171110065002	171110065003	89	89
219.1 (DN200)	171110085002	171110085003	108	108
273.0	1711100A1001	1711100A1003	121	121
323.9 (DN300)	1711100A3001	1711100A3003	133	133

903 Short Radius Tee

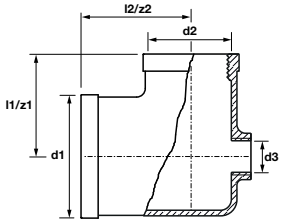
(3 x groove)



Dimension	Article No.		l1/l2/l3	z1/z2/z3
	Painted red	Galvanized		
60.3 (DN50)	109030020002	109030020003	70	70
73.0	109030025002	109030025003	76	76
76.1 (DN65)	109030029002	109030029003	76	76
88.9 (DN80)	109030030002	109030030003	86	86
114.3 (DN100)	109030045002	109030045003	102	102
139.7 (DN125)	109030055002	109030055003	124	124
141.3	109030052002	109030052003	124	124
165.1	109030062002	109030062003	140	140
168.3 (DN150)	109030065002	109030065003	140	140
219.1 (DN200)	109030085002	109030085003	176	176

7114 Hydrant Elbow with drain

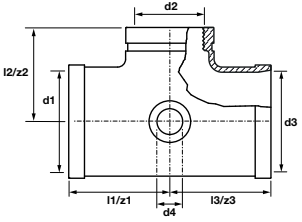
(Groove x groove/female outlet)



Dimension	Article No. (Galvanized)	l1/ l2	z1/z2	d3	d2
114.3 (DN100) x Rp2 1/2	171144530003	95	102	Rp1	Rp2 1/2

7122 Hydrant Tee with drain

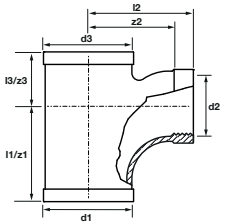
(2 x groove x groove/female outlet)



Dimension	Article No. (Galvanized)	l1/l2/l3	d4	d2
114.3 (DN100) x Rp2 1/2	171224530004	102	Rp1	Rp2 1/2
165.1 (DN150) x Rp2 1/2	171226230004	130	Rp1	Rp2 1/2

7133 Pitcher Tee

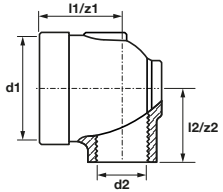
(2 x groove x groove/female outlet)



Dimension	Article No. Galvanized	l1/z1	l2	z2	l3/z3	d2
88.9 x Rp 2 1/2	171333029004	121	121	98	69	Rp2 1/2
114.3 x Rp 2 1/2	171334529004	121	133	110	69	Rp2 1/2

899 End-all fitting

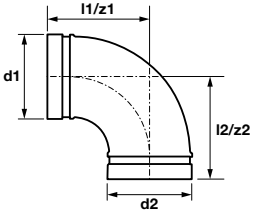
(2 x groove x groove/female outlet, with drain)



Dimension	Article No.		l1/z1	l2	z2	d2
	Painted red	Galvanized				
42,4 x Rp1/2	108991205004	108991205006	45	30	19	Rp 1/2
42,4 x Rp3/4	108991207004	108991207006	45	30	17	Rp 3/4
42,4 x Rp1	108991210004	108991210006	48	32	17	Rp 1
48,3 x Rp1/2	108991505004	108991505006	45	33	22	Rp 1
48,3 x Rp3/4	108991507004	108991507006	45	33	20	Rp 1
48,3 x Rp1	108991510004	108991510006	48	35	20	Rp 1
60,3 x Rp1/2	108992005004	108992005006	45	40	29	Rp 1
60,3 x Rp3/4	108992007004	108992007006	45	40	27	Rp 1
60,3 x Rp1/2	108992010004	108992010006	48	41	26	Rp 1
73,0 x Rp1/2	108992505004	108992505006	45	45	34	Rp 1
73,0 x Rp3/4	108992507004	108992507006	45	45	32	Rp 1
73,0 x Rp1/2	108992510004	108992510006	48	46	31	Rp 1
76,1 x Rp3/4	108992907004	108992907006	45	45	32	Rp 1

7110 Elbow 90°

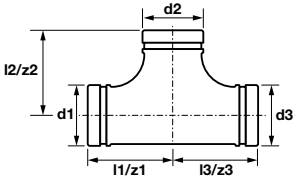
(2 x groove)



Dimension	Article No.		l1/l2	z1/z2
	Painted orange	Galvanized		
33.7 (DN25)	171100010001	171100010003	57	57
42.4 (DN32)	171100012001	171100012003	70	70
48.3 (DN40)	171100015001	171100015003	70	70
273.0	1711000A1001	1711000A1003	229	229
323.9 (DN300)	1711000A3001	1711000A3003	254	254

7120 Tee

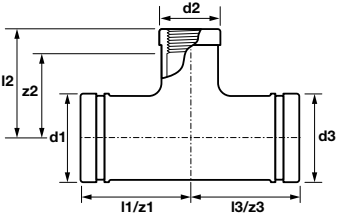
(3 x groove)



Dimension	Article No.		l1/l2/l3	z1/z2/z3
	Painted orange	Galvanized		
33.7 (DN25)	171200010001	171200010003	57	57
42.4 (DN32)	171200012001	171200012003	70	70
48.3 (DN40)	171200015001	171200015003	70	70
273.0 (DN250)	1712000A1001	1712000A1003	229	229
323.9 (DN300)	1712000A3001	1712000A3003	254	254

7121F Reducing tee

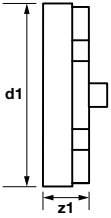
(groove x female thread x groove)



Dimension	Article No.		l1/ l2/l3/z1/z3	z2
	Painted orange	Galvanized		
60.3 x Rp1 1/2 x 60.3	1121F2015008	1121F2015003	83	72
76.1 x Rp1 x 76.1	1121F2910008	1121F2910003	95	80
76.1 x Rp1 1/4 x 76.1	1121F2912008	1121F2912003	95	78
76.1 x Rp1 1/2 x 76.1	1121F2915008	1121F2915003	95	77
76.1 x Rp2 x 76.1	1121F2920008	1121F2920003	95	75
88.9 x Rp 1/2 x 88.9	1121F3005008	1121F3005003	108	97
88.9 x Rp 3/4 x 88.9	1121F3007008	1121F3007003	108	95
88.9 x Rp1 x 88.9	1121F3010008	1121F3010003	108	93
88.9 x Rp1 1/4 x 88.9	1121F3012008	1121F3012003	108	91
88.9 x Rp1 1/2 x 88.9	1121F3015008	1121F3015003	108	90
88.9 x Rp2 x 88.9	1121F3020008	1121F3020003	108	88
88.9 x Rp2 1/2 x 88.9	1121F3025008	1121F3025003	108	85
114.3 x Rp1 1/2 x 114.3	1121F4515008	1121F4515003	127	109
114.3 x Rp2 x 114.3	1121F4520008	1121F4520003	127	107
114.3 x Rp2 1/2 x 114.3	1121F4525008	1121F4525003	127	104
139.7 x Rp2 x 139.7	1121F5220008	1121F5220003	140	120
165.1 x Rp2 x 165.1	1121F6220008	1121F6220003	165	145
168.3 x Rp2 x 168.3	1121F6520008	1121F6520003	165	145

7160 End cap

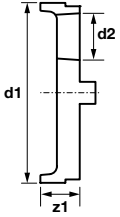
(Grooved)



Dimension	Article No.		z1
	Painted red	Galvanized	
33.7(DN25)	171600010002	171600010003	22
42.4 (DN32)	171600012002	171600012003	25
48.3 (DN40)	171600015002	171600015003	25
60.3 (DN50)	171600020002	171600020003	25
73.0	171600025002	171600025003	25
76.1 (DN65)	171600029002	171600029003	25
88.9 (DN80)	171600030002	171600030003	25
108.0	171600040002	171600040003	25
114.3 (DN100)	171600045002	171600045003	25
133.0	171600050002	171600050003	25
139.7 (DN125)	171600052002	171600052003	25
141.3	171600055002	171600055003	25
159.0	171600060002	171600060003	25
165.1	171600062002	171600062003	25
168.3 (DN150)	171600065002	171600065003	25
219.1 (DN200)	171600085002	171600085003	30
273.0 (DN250)	1716000A1002	1716000A1003	30
323.9 (DN300)	1716000A3002	1716000A3003	32

7160T Transition cap

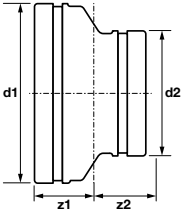
(Groove x female thread)



Dimension	Article No.		z1	d2
	Painted red	Galvanized		
60.3 x Rp1	1160T2010002	1160T2010004	24	Rp1
76.1 x Rp1	1160T2910002	1160T2910004	24	Rp1
76.1 x Rp1 1/4	1160T2912002	1160T2912004	24	Rp1 1/4
76.1 x Rp1 1/2	1160T2915002	1160T2915004	24	Rp1 1/2
88.9 x Rp1	1160T3010002	1160T3010004	25	Rp1
88.9 x Rp1 1/4	1160T3012002	1160T3012004	25	Rp1 1/4
88.9 x Rp1 1/2	1160T3015002	1160T3015004	25	Rp1 1/2
88.9 x Rp2	1160T3020002	1160T3020004	25	Rp2
114.3 x Rp1	1160T4510002	1160T4510004	25	Rp1
114.3 x Rp1 1/4	1160T4512002	1160T4512004	25	Rp1 1/4
114.3 x Rp1 1/2	1160T4515002	1160T4515004	25	Rp1 1/2
114.3 x Rp2	1160T4520002	1160T4520004	25	Rp2
139.7 x Rp2	1160T5220002	1160T5220004	25	Rp2
165.1 x Rp2	1160T6220002	1160T6220004	25	Rp2
168.3 x Rp2	1160T6520002	1160T6520004	25	Rp2
219.1 x Rp2	1160T8520002	1160T8520002	30	Rp2

7150 Concentric Reducer

(2 x groove)



Dimension	Article No.		l1/ l2	z1/z2
	Painted orange	Galvanized		
42.4 x 33.7	171501210001	171501210003	32	32
48.3 x 33.7	171501510001	171501510003	32	32
48.3 x 42.4	171501512001	171501512003	32	32
60.3 x 33.7	171502010001	171502010003	32	32
60.3 x 42.4	171502012001	171502012003	32	32
60.3 x 48.3	171502015001	171502015003	32	32
73.0 x 42.4	171502512001	171502512003	32	32
73.0 x 60.3	171502520001	171502520003	32	32
73.0 x 48.3	171502515001	171502515003	32	32
76.1 x 42.4	171502912001	171502912003	32	32
76.1 x 60.3	171502920001	171502920003	32	32
76.1 x 48.3	171502915001	171502915003	32	32
88.9 x 42.4	171503012001	171503012003	32	32
88.9 x 48.3	171503015001	171503015003	32	32
88.9 x 60.3	171503020001	171503020003	32	32
88.9 x 73.0	171503025001	171503025003	32	32
88.9 x 76.1	171503029001	171503029003	32	32
114.3 x 48.3	171504515001	171504515003	38	38
114.3 x 60.3	171504520001	171504520003	38	38

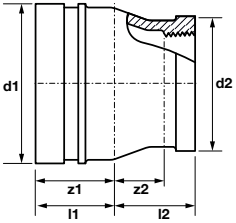
7150 Concentric Reducer

(2 x groove)

Dimension	Article No.		l1/ l2	z1/z2
	Painted orange	Galvanized		
114.3 x 73.0	171504525001	171504525003	38	38
114.3 x 76.1	171504529001	171504529003	38	38
114.3 x 88.9	171504530001	171504530003	38	38
139.7 x 88.9	171505230001	171505230003	45	45
139.7 x 114.3	171505245001	171505245003	45	45
141.3 x 88.9	171505530001	171505530003	45	45
141.3 x 114.3	171505545001	171505545003	45	45
165.1 x 60.3	171506220001	171506220003	51	51
165.1 x 76.1	171506229001	171506229003	51	51
165.1 x 88.9	171506230001	171506230003	51	51
165.1 x 114.3	171506245001	171506245003	51	51
165.1 x 139.7	171506252001	171506252003	51	51
168.3 x 60.3	171506520001	171506520003	51	51
168.3 x 73.0	171506525001	171506525003	51	51
168.3 x 76.1	171506529001	171506529003	51	51
168.3 x 88.9	171506530001	171506530003	51	51
168.3 x 114.3	171506545001	171506545003	51	51
168.3 x 139.7	171506552001	171506552003	51	51
168.3 x 141.3	171506555001	171506555003	51	51
219.1 x 88.9	171508530001	171508530003	64	64
219.1 x 114.3	171508545001	171508545003	64	64
219.1 x 165.1	171508562001	171508562003	64	64
219.1 x 168.3	171508565001	171508565003	64	64
273 x 114.3	17150A145001	17150A145003	76	76
273 x 141.3	17150A155001	17150A155003	76	76
273 x 165.1	17150A162001	17150A162003	76	76
273 x 168.3	17150A165001	17150A165003	76	76
273 x 219.1	17150A185001	17150A185003	76	76
324 x 168.3	17150A365001	17150A365003	79	79
324 x 219.1	17150A385001	17150A385003	79	79
324 x 273	17150A3A1001	17150A3A1003	79	79

7150F Reducing socket

(groove x female thread)



Dimension	Article No.		l1/l2	z1	z2
	Painted orange	Galvanized			
48.3 x Rp1	1150F1510007	1150F1510004	32	32	17
60.3 x Rp1	1150F2010007	1150F2010004	32	32	17
60.3 x Rp1 1/4	1150F2012007	1150F2012004	32	32	15
60.3 x Rp1 1/2	1150F2015007	1150F2015004	32	32	14
76.1 x Rp1	1150F2910007	1150F2910004	32	32	17
76.1 x Rp1 1/4	1150F2912007	1150F2912004	32	32	15
76.1 x Rp1 1/2	1150F2915007	1150F2915004	32	32	14
76.1 x Rp2	1150F2920007	1150F2920004	32	32	12
88.9 x Rp1	1150F3010007	1150F3010004	32	32	17
88.9 x Rp1 1/4	1150F3012007	1150F3012004	32	32	15
88.9 x Rp1 1/2	1150F3015007	1150F3015004	32	32	14
88.9 x Rp2	1150F3020007	1150F3020004	32	32	12
88.9 x Rp2 1/2	1150F3029007	1150F3029004	32	32	9
114.3 x Rp1 1/4	1150F4512007	1150F4512004	38	38	21
114.3 x Rp1 1/2	1150F4515007	1150F4515004	38	38	20
114.3 x Rp2	1150F4520007	1150F4520004	38	38	18
114.3 x Rp2 1/2	1150F4529007	1150F4529004	38	38	15
139.7 x Rp1 1/2	1150F5215007	1150F5215004	45	45	27
165.1 x Rp1 1/2	1150F6215007	1150F6215004	51	51	33

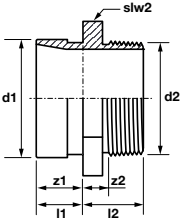
7150F Reducing socket

(groove x female thread)

Dimension	Article No.		l1/l2	z1	z2
	Painted orange	Galvanized			
165.1 x Rp2	1150F6220007	1150F6220004	51	51	31
165.1 x Rp2 1/2	1150F6229007	1150F6229004	51	51	28
165.1 x Rp3	1150F6230007	1150F6230004	51	51	26
165.1 x Rp4	1150F6245007	1150F6245004	51	51	23
168.3 x Rp1 1/2	1150F6515007	1150F6515004	51	51	33
168.3 x Rp2	1150F6520007	1150F6520004	51	51	31
168.3 x Rp2 1/2	1150F6529007	1150F6529004	51	51	28
168.3 x Rp3	1150F6530007	1150F6530004	51	51	26
168.3 x Rp4	1150F6545007	1150F6545004	51	51	23

55 Adapter nipple

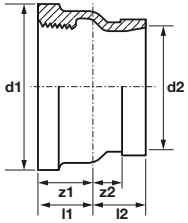
(groove x male thread)



Dimension	Article No.		l1/l2/z1	z2	slw
	Painted orange	Galvanized			
48.3 x R1 1/2	100551515007	100551515003	32	10	54
60.3 x R2	100552020007	100552020003	32	6	64
76.1 x R2 1/2	100552525007	100552525003	38	6	80
88.9 x R3	100553030007	100553030003	38	4	95

54 Adapter nipple

(groove x female thread)



Dimension	Article No.		l1/l2/z1	z2
	Painted orange	Galvanized		
48.3 x Rp1 1/2	100541515007	100541515004	30	12
60.3 x Rp2	100542020007	100542020004	32	12
76.1 x Rp 2 1/2	100542929007	100542929004	35	12
88.9 x Rp3	100543030007	100543030004	35	10
114.3 x Rp4	100544545007	100544545004	42	14

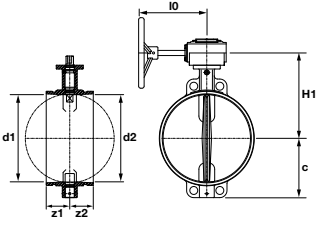
VSH

5.5 Valves

Fire Protection

SJ300F Butterfly valve with gear operator

(2 x groove, EPDM encapsulated disc)

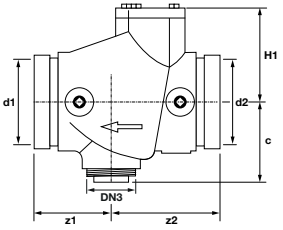


Max working pressure 20 bar/300 psi

Dimension	Article No. Black epoxy coated	z1/z2	H1	l0	c
60.3 (DN50)	1V30N0020001	41	137	163	63
73.0	1V30N0025001	49	142	163	68
76.1 (DN65)	1V30N0029001	49	142	163	68
88.9 (DN80)	1V30N0030001	49	157	163	76
114.3 (DN100)	1V30N0045001	58	166	163	89
139.7 (DN125)	1V30N0052001	74	199	163	102
141.3	1V30N0055001	74	199	163	102
165.1	1V30N0062001	74	215	163	114
168.3 (DN150)	1V30N0065001	74	215	163	114
219.1 (DN200)	1V30N0085001	67	239	163	140
273.0 (DN250)	1V30N00A1001	80	266	163	170
323.9 (DN300)	1V30N00A3001	83	291	163	205

RCV Riser check valve

(2 x groove)

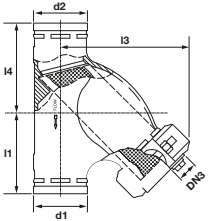


Max working pressure 20bar/300 psi

Dimension	Article No. Painted red	z1	z2	H1	c	DN3
73.0	1VRCV0025002	86	104	95	64	Rp1 1/4
76.1 (DN65)	1VRCV0029002	86	104	95	64	Rp1 1/4
88.9 (DN80)	1VRCV0030002	74	104	95	64	Rp1 1/4
114.3 (DN100)	1VRCV0045002	89	127	117	80	Rp2
139.7 (DN125)	1VRCV0052002	136	194	178	114	Rp2
141.3	1VRCV0055002	136	194	178	114	Rp2
165.1	1VRCV0062002	131	178	178	114	Rp2
168.3 (DN150)	1VRCV0065002	131	178	178	114	Rp2
219.1 (DN200)	1VRCV0085002	155	210	217	140	Rp2
273.0 (DN250)	1VRCV00A1002	254	254	273	184	Rp2
323.9 (DN300)	1VRCV00A3002	305	305	327	217	Rp2

726 Y-Strainer

(3 x groove)



Max working pressure DN50-150: 20 bar/300 psi
Max working pressure DN200: 16 bar/232 psi
Max working pressure DN250-750: 12 bar/175 psi

Dimension	Article No. Painted orange	l1/l2	l3	DN3
60.3 (DN50)	1V7260020E01	124	181	DN15
73.0	1V7260025E01	137	199	DN15
76.1 (DN65)	1V7260029E01	137	199	DN15
88.9 (DN80)	1V7260030E01	150	221	DN25
114.3 (DN100)	1V7260045E01	181	269	DN25
139.7 (DN125)	1V7260052E01	210	330	DN25
141.3	1V7260055E01	210	330	DN25
165.1	1V7260062E01	235	357	DN25
168.3 (DN150)	1V7260065E01	235	357	DN25
219.1 (DN200)	1V7260085E01	305	454	DN40
273.0 (DN250)	1V72600A1E01	343	522	DN40
323.9 (DN300)	1V72600A3E01	381	609	DN40

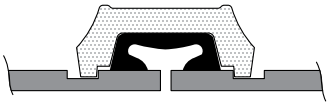
VSH

5.6 VSH Shurjoint Tools and accessoires

Fire Protection

Spare gaskets standard C-style

(for Z05, Z07, 7707, 7705 couplings)



Dimension	Article No. EPDM
33.7 (DN25)	SG05E0010
42.4 (DN32)	SG05E0012
48.3 (DN40)	SG05E0015
60.3 (DN50)	SG05E0020
73.0	SG05E0025
76.1 (DN65)	SG05E0029
88.9 (DN80)	SG05E0030
101.6	SG05E0035
108.0	SG05E0040
114.3 (DN100)	SG05E0045
133.0	SG05E0050
139.7 (DN125)	SG05E0052
141.3	SG05E0055
159.0	SG05E0060
165.1	SG05E0062
168.3 (DN150)	SG05E0065
219.1 (DN200)	SG05E0085
273.0 (DN250)	SG05E00A1
323.9 (DN300)	SG05E00A3
355.6 (DN350)	SG05E00A4

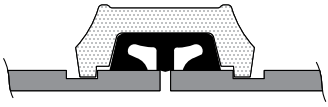
Spare gaskets standard C-style

(for Z05, Z07, 7707, 7705 couplings)

Dimension	Article No. EPDM
406.4 (DN400)	SG05E00A6
457.2 (DN450)	SG05E00A8
508.0 (DN500)	SG05E00B0
558.8 (DN550)	SG05E00B2
609.6 (DN600)	SG05E00B4

Spare gaskets gap seal type

(for Z05, Z07, 7707, 7705 couplings)



Dimension	Article No. EPDM-E
33.7 (DN25)	SGGSE0010
42.4 (DN32)	SGGSE0012
48.3 (DN40)	SGGSE0015
60.3 (DN50)	SGGSE0020
73.0	SGGSE0025
76.1 (DN65)	SGGSE0029
88.9 (DN80)	SGGSE0030
101.6	SGGSE0035
108.0	SGGSE0040
114.3 (DN100)	SGGSE0045
133.0	SGGSE0050
139.7 (DN125)	SGGSE0052
141.3	SGGSE0055
159.0	SGGSE0060
165.1	SGGSE0062
168.3 (DN150)	SGGSE0065
219.1 (DN200)	SGGSE0085
273.0 (DN250)	SGGSE00A1
323.9 (DN300)	SGGSE00A3
355.6 (DN350)	SGGSE00A4

Spare gaskets gap seal type

(for Z05, Z07, 7707, 7705 couplings)

Dimension	Article No. EPDM-E
406.4 (DN400)	SGGSE00A6
457.2 (DN450)	SGGSE00A8
508.0 (DN500)	SGGSE00B0
558.8 (DN550)	SGGSE00B2
609.6 (DN600)	SGGSE00B4

G223 Lubricant

Content	Article No.	Description
450 gr.	SLB100000	Standard lubricant
900 gr.	SLB200000	Standard lubricant
270 gr.	SLB800000	EHC high temperature silicone lubricant

96 Continuity Clip

(For electrical conductivity)

Dimension	Article No.	Description
33.7-88.9 (DN25-80)	S00960010	For coupling DN25-80
114.3-168.3 (DN100-150)	S00960045	For coupling DN100-150
219.1-323.9 (DN200-300)	S00960085	For coupling DN200-300

GR600 Pipe tape

Article No.	Description
SGR600124	Pipe Tape 1-24”

VSH

5.7 Stainless Steel sprinkler

Fire Protection

R2750 Stainless steel tube 1.4401 (AISI316)

(6 m length)

Dimension	Article No.	DN
22 x 1,2	6117936	20
28 x 1,2	6117947	25
35 x 1,5	6117958	32
42 x 1,5	6117969	40
54 x 1,5	6117971	50
76,1 x 2,0	6117980	65
88,9 x 2,0	6117991	80
108 x 2,0	6118002	100

VdS, UL/cUL and FM 22-108 mm, LPCB 22-54 mm

R2752 Stainless steel tube 1.4521 (AISI444)

(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

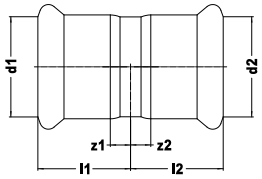
R2753 Stainless steel tube 1.4520 (AISI439)

(6 m length)

Dimension	Article No.	DN
22 x 1.2	6193022	20
28 x 1.2	6193033	25
35 x 1.5	6193044	32
42 x 1.5	6193055	40
54 x 1.5	6193066	50

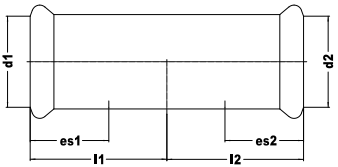
VdS, UL/cUL and FM 22-108 mm, LPCB 22-54 mm

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)

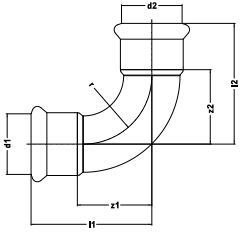


Dimension	Article No.	l1/l2	es1/es2
22	6191306	42	25
28	6191317	46	30
35	6191328	51	30
42	6191339	60	40
54	6191341	70	40
76.1	6204286	115	60
88.9	6204297	129	70
108	6204308	153	80

VdS, UL/cUL and FM 22-108 mm, LPCB 22-54 mm

R2708 90° bend

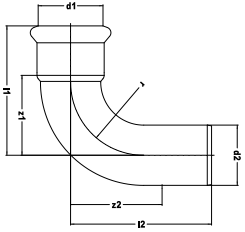
(2 x press)



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 90° bend

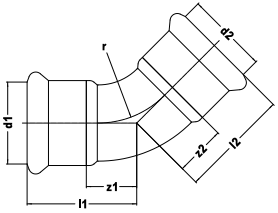
(press x male)



Dimension	Article No.	l1	l2	z1	z2	r
22	6190360	51	60	30	39	27
28	6190371	60	66	37	43	34
35	6190382	71	76	45	50	42
42	6190393	86	93	56	63	51
54	6190404	105	111	70	76	65
76.1	6230037	150	165	95	110	91
88.9	6230048	175	190	112	127	107
108	6230059	216	238	139	161	130

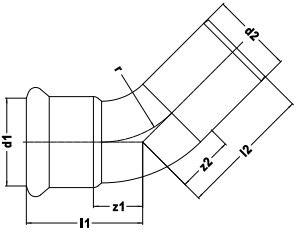
VdS, UL/cUL and FM 22-108 mm, LPCB 22-54 mm

R2713 45° elbow
(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 45° elbow
(press x male)

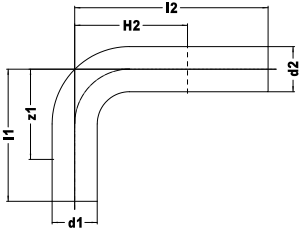


Dimension	Article No.	l1	l2	z1	z2	r
22	6190131	35	42	14	21	27
28	6190140	40	46	17	23	34
35	6190151	46	51	20	25	42
42	6190162	56	63	26	33	51
54	6190173	65	73	30	38	65
76.1	6230092	98	117	43	62	91
88.9	6230103	112	131	49	68	107
108	6230114	138	154	61	77	130

VdS, UL/cUL and FM 22-108 mm, LPCB 22-54 mm

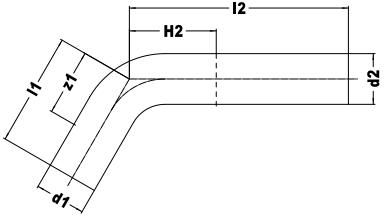
R2725 90° bend

(2 x male)



Dimension	Article No.	l1	l2	z1	H2
Ø22	6190294	72	120	51	70
Ø28	6190305	82	120	59	80
Ø35	6190316	120	200	94	100
Ø42	6190327	150	250	120	120
Ø54	6190338	200	300	165	145

R2724 60° bend
(2 x male)

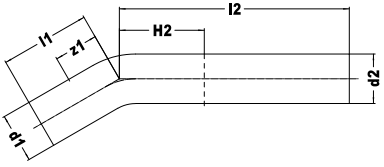


Dimension	Article No.	l1	l2	z1	H2
Ø28	6190184	63	121	40	66
Ø35	6190195	97	203	71	77
Ø42	6191878	102	256	72	90
Ø54	6191889	162	306	127	107

VdS, UL/cUL and FM 22-108 mm, LPCB 22-54 mm

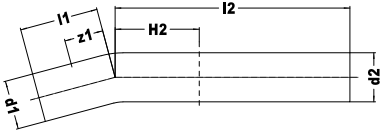
R2723 30° bend

(2 x male)



Dimension	Article No.	l1	l2	z1	H2
Ø28	6190021	51	130	28	54
Ø35	6190030	73	214	47	60
Ø42	6191856	99	272	69	69
Ø54	6191867	134	326	99	79

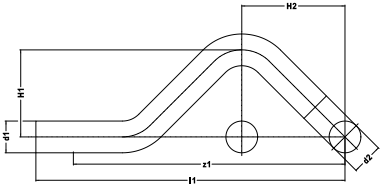
R2722 15° bend
(2 x male)



Dimension	Article No.	l1	l2	z1	H2
Ø28	6190008	45	134	22	48
Ø35	6190019	73	222	47	53
Ø42	6191834	89	280	59	59
Ø54	6191845	122	337	87	67

VdS, UL/cUL and FM 22-108 mm, LPCB 22-54 mm

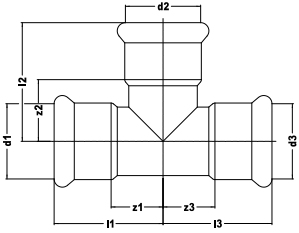
R2717 Crossover
(2 x male)



Dimension	Article No.	l1	z1	H1	H2
Ø22	6191108	178	157	44	65
Ø28	6191119	210	187	50	74

R2714 Tee

(3 x press)

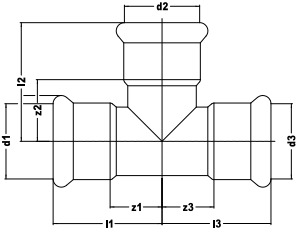


Dimension	Article No.	l1/l3	l2	z1/z3	z2
22	6191405	40	44	19	23
28	6191449	45	49	22	26
35	6191493	51	55	25	29
42	6191537	60	62	30	32
54	6191581	71	72	36	37
76,1	6204319	116	115	61	60
88,9	6204321	131	127	68	64
108	6204330	156	155	79	78

VdS, UL/cUL and FM 22-108 mm, LPCB 22-54 mm

R2715 T-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

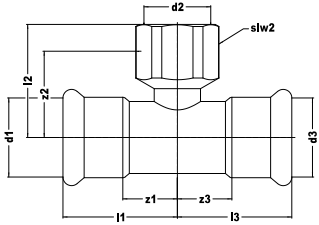
R2715 T-reduced

(3 x press)

Dimension	Article No.	l1/l3	l2	z1/z3	z2
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

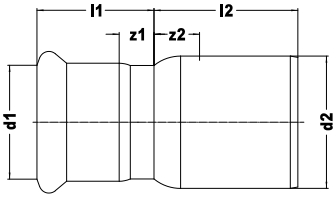
(press x female thread x press)



Dimension	Article No.	l1/l3	l2	z1/z3	z2	slw2
22 x Rp1/2 x 22	6191625	40	37	19	27	24
22 x Rp3/4 x 22	6191636	40	39	19	28	30
28 x Rp1/2 x 28	6191647	45	40	22	30	24
28 x Rp3/4 x 28	6191658	45	42	22	31	30
28 x Rp1 x 28	6198599	45	46	22	33	38
35 x Rp1/2 x 35	6191669	51	44	25	34	24
35 x Rp3/4 x 35	6191671	51	46	25	35	30
35 x Rp1 x 35	6198601	51	50	25	37	38
42 x Rp1/2 x 42	6191680	60	46	30	36	24
42 x Rp3/4 x 42	6191691	60	48	30	37	30
42 x Rp1 x 42	6198610	60	52	30	39	38
54 x Rp1/2 x 54	6191702	71	52	36	42	24
54 x Rp3/4 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 Rp3/4 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 Rp3/4 x 88,9	6204539	131	87	68	74	30
88,9 x Rp2 x 88,9	6204561	131	88	68	66	65
108 x Rp3/4 x 108	6204541	156	86	79	73	30
108 x Rp2 x 108	6204572	156	98	79	76	65

R2707 Reducer

(male x press)

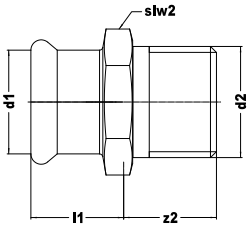


Dimension	Article No.	l1	l2	z1	z2
Ø28 x 22	6191174	29	34	8	11
Ø35 x 22	6191196	29	42	8	16
Ø35 x 28	6191207	31	38	8	12
Ø42 x 22*	6191218	33	53	12	23
Ø42 x 28	6191229	31	51	8	21
Ø42 x 35	6191231	34	42	8	12
Ø54 x 22*	6191240	33	66	12	31
Ø54 x 28*	6191251	34	62	11	27
Ø54 x 35	6191262	34	60	8	25
Ø54 x 42	6191273	40	55	10	20
Ø76,1 x 42	6204211	79	72	49	17
Ø76,1 x 54	6204220	42	98	7	43
Ø88,9 x 54	6204231	42	114	7	51
Ø88,9 x 76,1	6204242	68	88	13	25
Ø108 x 54	6204253	66	138	31	61
Ø108 x 76,1	6204264	69	127	14	50
Ø108 x 88,9	6204275	77	113	14	36

VdS, UL/cUL and FM 22-108 mm, LPCB 22-54 mm
**Not LPCB approved*

R2705 Straight connector

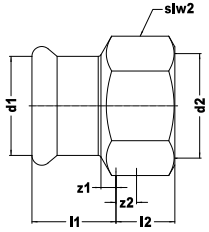
(press x male thread)



Dimension	Article No.	l1	z2	slw2
22 x R1/2	6190635	21	21	32
22 x R3/4	6190646	21	22	32
22 x R1	6190624	21	28	34
28 x R3/4	6190679	23	22	38
28 x R1	6190657	23	25	38
28 x R1 1/4	6190668	23	29	43
35 x R1	6190681	26	27	54
35 x R1 1/4	6190701	26	29	54
35 x R1 1/2	6190690	26	30	49
42 x R1 1/4	6190723	30	29	54
42 x R1 1/2	6190712	30	29	54
54 x R1 1/2	6190734	35	30	67
54 x R2	6190745	35	34	67
76,1 x R2 1/2	6204759*	55	42	82
88,9 x R3	6204761*	63	46	95

VdS, UL/cUL and FM 22-108 mm, LPCB 22-54 mm
**Not UL/cUL approved*

R2702 Straight connector
(press x female thread)

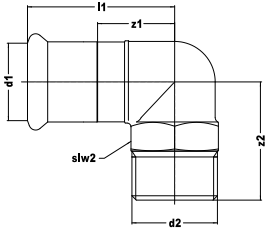


Dimension	Article No.	l1	l2	z1	z2	slw2
22 x Rp1/2	6190461	21	15	0	5	32
22 x Rp3/4	6190470	23	17	2	6	32
22 x Rp1	6190459	24	20	3	7	38
28 x Rp1/2	6193308	26	12	3	1	38
28 x Rp3/4	6190503	23	17	0	6	38
28 x Rp1	6190481	25	20	2	7	38
28 x Rp1 1/4	6190492	25	22	2	7	46
35 x Rp1	6190514	27	20	1	7	46
35 x Rp1 1/4	6190536	28	22	2	7	46
35 x Rp1 1/2	6190525	28	22	2	8	54
42 x Rp1 1/4	6190558	30	22	0	0	54
42 x Rp1 1/2	6190547	32	22	2	8	54
54 x Rp1 1/2	6190569	36	22	1	8	67
54 x Rp2	6190571	37	26	2	8	67

VdS, UL/cUL and FM 22-108 mm, LPCB 22-54 mm

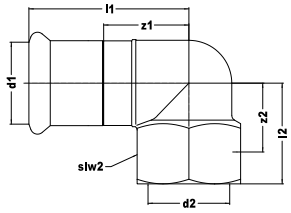
R2728 90° threaded elbow

(press x male thread)



Dimension	Article No.	l1	z1	z2	slw2
22 x R3/4	6190899	49	28	39	30
28 x R1	6190901	53	30	46	34
35 x R1 1/4	6190910	60	34	52	43
42 x R1 1/2	6190921	69	39	58	49
54 x R2	6190932	82	47	68	62

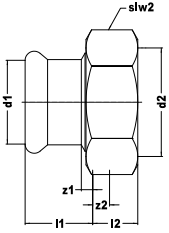
R2709 90° threaded elbow
(press x female thread)



Dimension	Article No.	l1	l2	z1	z2	slw2
22 x Rp1/2	6198456	45	31	24	16	24
22 x Rp3/4	6190844	49	33	28	17	30
28 x Rp1/2	6198467	48	35	25	20	24
28 x Rp3/4	6198478	51	35	28	19	30
28 x Rp1	6190855	55	37	32	24	38
35 x Rp1/2	6198489	56	35	30	20	24
35 x Rp3/4	6198491	58	37	32	21	30
35 x Rp1	6198500	58	41	32	28	38
35 x Rp1 1/4	6190866	62	42	36	27	46

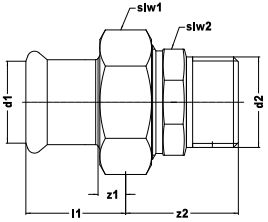
R2704 Coupling with nut

(press x female thread)



Dimension	Article No.	l1	l2	z1	z2	slw2
22 x G1	6191757	30	10	9	2	37
28 x G1 1/4	6191768	31	10	8	2	46
35 x G1 1/2	6191779	34	11	8	2	52
42 x G1 3/4	6191781	41	11	11	2	58
54 x G2 3/8	6191790	47	11	12	3	75

R2735 3-part union, angled flat seal
(press x male thread)

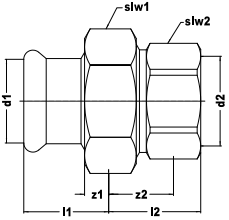


Dimension	Article No.	l1	z1	z2	slw1	slw2
22 x R1/2	6192164	30	9	33	37	25
22 x R3/4	6192175	30	9	29	37	32
22 x R1	6192186	30	9	42	37	39
28 x R1	6192197	31	8	42	46	39
35 x R1 1/4	6192208	34	8	44	52	49
42 x R1 1/2	6192219	41	11	44	58	51
54 x R2	6192296	47	12	53	75	65

VdS, UL/cUL and FM 22-108 mm, LPCB 22-54 mm

R2738 3-part union, flat seal

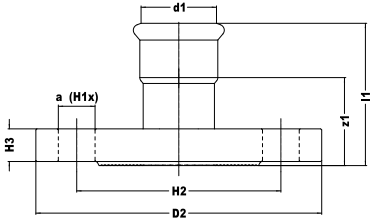
(press x female thread)



Dimension	Article No.	l1	l2	z1	z2	slw1	slw2
22 x Rp3/4	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 Rp1 1/4	6192098	34	39	8	24	52	46
42 x Rp1 1/2	6192109	41	41	11	27	58	54
54 x Rp2	6192111	47	44	12	26	75	67

R2726 Flanged connector PN 10/16

(1 x press)

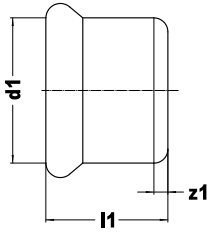


Dimension	DN	Article No.	l1	z1	H2	H3	D2	a	gaten
22	20	6190778	59	38	75	12	105	14	4
28	25	6190789	65	42	85	14	115	14	4
35	32	6190791	69	43	100	15	140	18	4
42	40	6190800	77	47	110	16	150	18	4
54	50	6190811	87	52	125	16	165	18	4
76,1	65	6204121	126	71	145	18	185	18	4
88,9	80	6204132	147	84	160	20	200	18	8
108	100	6204143	167	90	180	20	220	18	8

VdS, UL/cUL and FM 22-108 mm, LPCB 22-54 mm

R2729 Stop end

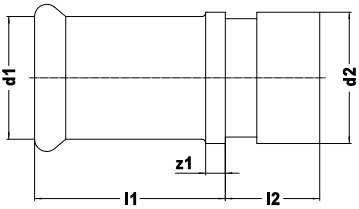
(1 x press)



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)

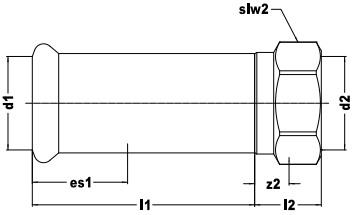


Dimension	Article No.	l1	l2	z1
28 x Ø33.7	6198555	49	24	26
35 x Ø42.4	6198566	54	24	28
42 x Ø48.3	6198577	61	24	31
54 x Ø60.3	6198588	73	24	38
76.1 x Ø73.0	6198841	76	37	21
76.1 x Ø76.1	6193319	76	24	21
88.9 x Ø88.9	6193321	86	24	23
108 x Ø114	6193330	84	26	7

VdS, UL/cUL and FM 22-108 mm, LPCB 22-54 mm

R2741 Slip coupling

(press x female thread)



Dimension	Article No.	l1	l2	z2	es1	slw2	Δl
22 x Rp1/2	6198511	70	19	15	21	28	40
22 x Rp3/4	6198522	70	24	17	21	32	40
28 x Rp1/2	6198533	70	21	15	23	34	40
28 x Rp3/4	6198544	70	21	17	23	34	40

C1451 O-ring Leak Before Pressed (LBP)

(black, EPDM) for Galvanized Steel and Stainless Steel

Dimension	Article No.
22	6222238
28	6222249
35	6222251
42	6222260
54	6222271

VdS, UL/cUL and FM 22-108 mm, LPCB 22-54 mm

R2760 O-ring, standard (black, EPDM)

for Galvanized Steel and Stainless Steel

Dimension	Article No.
76.1	6208015
88.9	6208026
108	6208037

C1452 Flat seal

(black, EPDM) for Galvanized Steel and Stainless Steel

Dimension	Article No.
22	6228024
28	6228035
35	6228046
42	6228057
54	6228068

Vds, UL/cUL and FM 22-108 mm, LPCB 22-54 mm

VSH

5.8 Galvanized Steel Sprinkler

Fire Protection

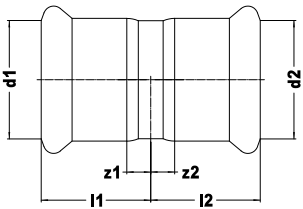
C1461 (Sendzimir) VSH XPress Sprinkler Galvanized Steel tube

(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

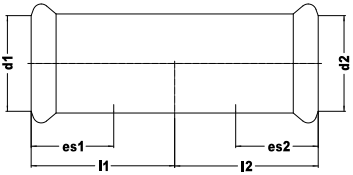
VdS 22-108 mm, LPCB and FM 22-54 mm, UL/cUL 22-88.9 mm

C1401 Straight coupling
(2 x press)



Dimension	Article No.	l1/l2	z1/z2
22	6201382	28	7
28	6201393	28	5
35	6201404	33	7
42	6201415	38	8
54	6201426	43	8
76.1	6206200	63	8
88.9	6206211	72	9
108	6206222	86	9

C1403 Slip coupling
(2 x press)

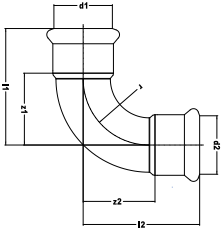


Dimension	Article No.	l1/l2	es1/es2
22	6201461	42	25
28	6201470	46	30
35	6201481	52	30
42	6201492	61	40
54	6201503	70	40
76.1	6206233	115	60
88.9	6206244	131	70
108	6206255	151	80

VdS 22-108 mm, LPCB and FM 22-54 mm, UL/cUL 22-88.9 mm

C1408 90° bend

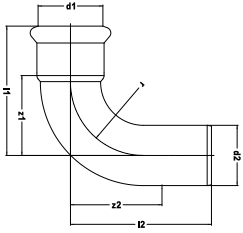
(2 x press)



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 90° bend

(press x male)

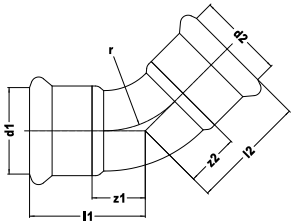


Dimension	Article No.	l1	l2	z1	z2	r
22 x Ø22	6201657	51	58	30	37	27
28 x Ø28	6201668	61	66	38	43	34
35 x Ø35	6201679	72	76	46	50	42
42 x Ø42	6201681	87	93	57	63	51
54 x Ø54	6201690	105	111	70	76	65
76.1 x Ø76.1	6208061	155	168	100	113	92
88.9 x Ø88.9	6208070	179	193	116	130	107
108 x Ø108	6208081	216	233	139	156	130

VdS 22-108 mm, LPCB and FM 22-54 mm, UL/cUL 22-88.9 mm

C1413 45° elbow

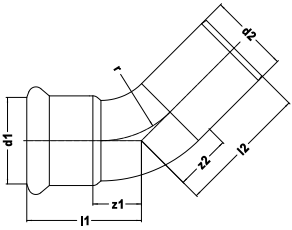
(2 x press)



Dimension	Article No.	l1/l2	z1/z2	r
22	6201723	35	14	27
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

C1412 45° elbow

(press x male)

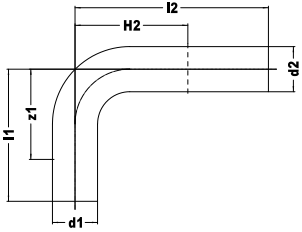


Dimension	Article No.	l1	l2	z1	z2	r
22 x Ø22	6201791	35	42	14	21	27
28 x Ø28	6201800	40	46	17	23	34
35 x Ø35	6201811	46	51	20	25	42
42 x Ø42	6201822	56	63	26	33	51
54 x Ø54	6201833	67	73	32	38	65
76.1 x Ø76.1	6208092	101	114	46	59	92
88.9 x Ø88.9	6208103	116	130	53	67	107
108 x Ø108	6208114	139	157	62	80	130

VdS 22-108 mm, LPCB and FM 22-54 mm, UL/cUL 22-88.9 mm

C1425 90° bend

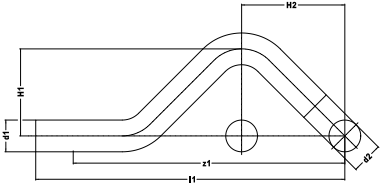
(2 x male)



Dimension	Article No.	l1	l2	z1	H2
Ø22	6201877	74	122	53	70
Ø28	6201888	84	122	61	80
Ø35	6201899	122	202	96	100
Ø42	6201901	152	252	122	120
Ø54	6201910	202	302	167	145

C1417 Crossover

(2 x male)

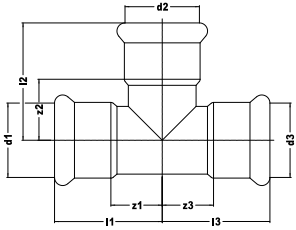


Dimension	Article No.	l1	z1	H1	H2
Ø22	6201954	178	157	44	65
Ø28	6201965	210	187	50	74

VdS 22-108 mm, LPCB and FM 22-54 mm, UL/cUL 22-88.9 mm

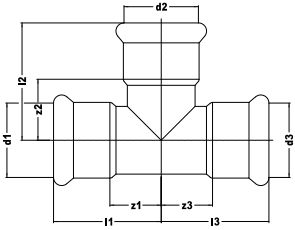
C1414 Tee

(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
66,7	6340334	99	99	49	49
76,1	6206442	115	110	60	55
88,9	6206453	130	128	67	65
108	6206464	155	153	78	76

C1415 T-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

VdS 22-108 mm, LPCB and FM 22-54 mm, UL/cUL 22-88.9 mm

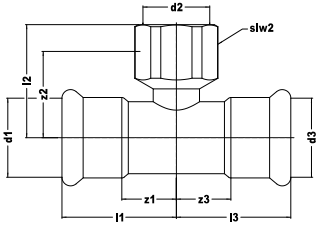
C1415 T-reduced

(3 x press)

Dimension	Article No.	l1/l3	l2	z1/z3	z2
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

(press x female thread x press)

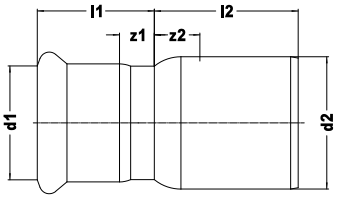


Dimension	Article No.	l1/l3	l2	z1/z3	z2	slw2
22 x Rp1/2 x 22	6202834	40	39	19	24	24
22 x Rp3/4 x 22	6206706	40	41	19	25	30
22 x Rp1 x 22	6341995	40	46	19	23	41
28 x Rp1/2 x 28	6202845	45	42	22	27	24
28 x Rp3/4 x 28	6207181	45	44	22	28	30
28 x Rp1 x 28	6209601	45	48	22	25	41
35 x Rp1/2 x 35	6202856	52	46	26	31	24
35 x Rp3/4 x 35	6207102	52	48	26	31	30
35 x Rp1 x 35	6209610	52	52	26	29	41
42 x Rp1/2 x 42	6202867	61	48	31	33	24
42 x Rp3/4 x 42	6207113	61	50	31	34	30
42 x Rp1 x 42	6209621	61	54	31	31	41
54 x Rp1/2 x 54	6202878	71	54	36	39	24
54 x Rp3/4 x 54	6207124	71	56	36	40	30
54 x Rp1 x 54	6207795	71	60	36	37	41
76,1 x Rp3/4 x 76,1	6206508	115	82	60	66	30
88,9 x Rp3/4 x 88,9	6206519	130	84	67	68	30
108 x Rp3/4 x 108	6206521	155	94	78	78	30

VdS 22-108 mm, LPCB and FM 22-54 mm, UL/cUL 22-88.9 mm
**Not LPCB approved*

C1407 Reducer

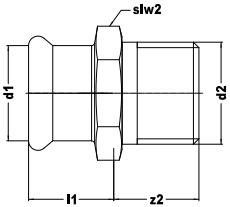
(male x press)



Dimension	Article No.	l1	l2	z1	z2
Ø28 x 22	6202196	33	33	12	10
Ø35 x 22	6202207	30	41	9	15
Ø35 x 28	6202218	36	34	13	8
Ø42 x 22*	6206651	32	51	11	21
Ø42 x 28	6206662	32	51	9	21
Ø42 x 35	6202229	39	41	13	11
Ø54 x 22*	6202231	34	63	13	28
Ø54 x 28*	6202240	33	58	10	23
Ø54 x 35	6206684	38	57	12	22
Ø54 x 42	6202251	44	52	14	17
Ø76.1 x 42	6206387	50	97	20	42
Ø76.1 x 54	6206398	55	86	20	31
Ø88.9 x 54	6206409	54	101	19	38
Ø88.9 x 76.1	6206411	68	90	13	27
Ø108 x 76.1	6206420	68	120	13	43
Ø108 x 88.9	6206431	77	110	14	33

C1405 Straight connector

(press x male thread)

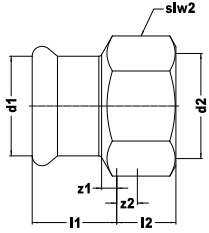


Dimension	Article No.	l1	z2	slw2
22 x R1/2	6206717	21	22	32
22 x R3/4	6202317	21	23	32
22 x R1	6206728	21	29	34
28 x R3/4	6209852	23	23	38
28 x R1	6202328	23	25	41
35 x R1	6341247	26	27	46
35 x R1 1/4	6202339	26	29	46
42 x R1 1/2	6202341	30	29	55
54 x R2	6202350	35	34	70
76.1 x R2 1/2*	6204781	55	64	80
88.9 x R3*	6204792	63	69	95

VdS 22-108 mm, LPCB and FM 22-54 mm, UL/cUL 22-88.9 mm
**Not UL/cUL approved*

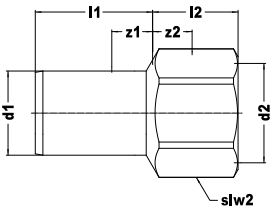
C1402 Straight connector

(press x female thread)



Dimension	Article No.	l1	l2	z1	z2	slw2
22 x Rp1/2	6340202	22	14	1	0	32
22 x Rp3/4	6202405	23	20	2	4	32
22 x Rp1	6341984	24	20	3	5	38
28 x Rp1/2	6207806	24	14	1	1	41
28 x Rp3/4	6209830	24	17	1	0	38
28 x Rp1	6202416	26	23	3	4	41
35 x Rp1/2	6340917	30	12	4	1	46
35 x Rp3/4	6340928	28	15	2	3	46
35 x Rp1	6340939	33	13	7	0	46
35 x Rp1 1/4	6206695	28	22	2	7	46
42 x Rp1 1/2	6341192	32	22	2	6	54
54 x Rp2	6341203	37	26	2	8	67

C1433 Straight connector
(male x female thread)



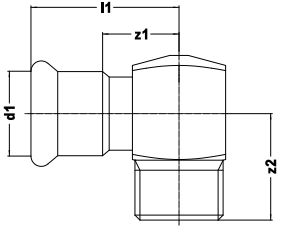
Dimension	Article No.	l1	l2	z1	z2	slw2
Ø22 x Rp1/2	6202460	39	21	8	6	24
Ø22 x Rp3/4	6202471	39	24	8	8	30

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

VdS 22-108 mm, LPCB and FM 22-54 mm, UL/cUL 22-88.9 mm

C1428 90° threaded elbow

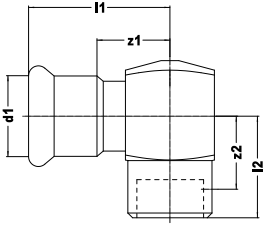
(press x male thread)



Dimension	Article No.	l1	z1	z2
22 x R3/4	6202108	45	24	32

C1409 90° threaded elbow

(press x female thread)

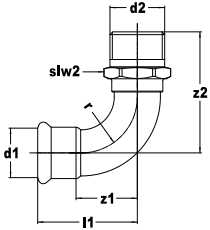


Dimension	Article No.	l1	l2	z1	z2
22 x Rp1/2	6341038	45	31	24	16
28 x Rp1/2	6341049	51	35	28	20
35 x Rp1/2	6341051	57	35	31	20

VdS 22-108 mm, LPCB and FM 22-54 mm, UL/cUL 22-88.9 mm

C1430 Transition bend coupling 90°

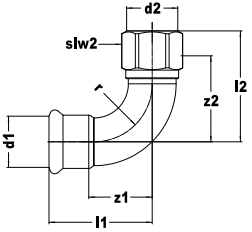
(press x male thread)



Dimension	Article No.	l1	z1	z2	slw2	r
22 x R3/4	6202011	51	30	62	30	27
28 x R1	6202020	61	38	74	36	34
35 x R1 1/4	6202031	72	46	86	46	42
42 x R1 1/2	6202042	87	57	96	50	51
54 x R2	6202053	105	70	116	60	65

C1438 Transition bend coupling 90°

(press x female thread)

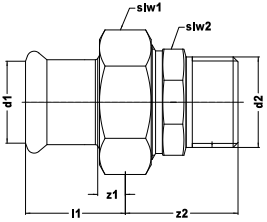


Dimension	Article No.	l1	l2	z1	z2	slw2	r
22 x Rp1/2	6209577	51	59	30	44	27	27
22 x Rp3/4	6200964	51	59	30	43	30	27
28 x Rp1/2	6207025	61	65	38	50	32	34
28 x Rp3/4	6200986	61	65	38	49	32	34
28 x Rp1	6209588	61	70	38	51	41	34
35 x Rp1/2	6201063	72	75	46	55	41	42
35 x Rp3/4	6201074	72	75	46	54	41	42
35 x Rp1	6209599	72	75	46	56	41	42

VdS 22-108 mm, LPCB and FM 22-54 mm, UL/cUL 22-88.9 mm

C1435 3-part union, flat seal

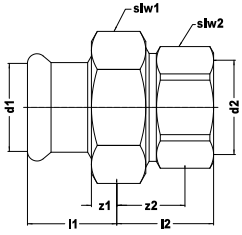
(press x male thread)



Dimension	Article No.	l1	z1	z2	slw1	slw2
22 x R3/4	6207201	30	9	40	36	32
28 x R1	6207212	31	8	44	46	39
35 x R1 1/4	6207223	34	8	48	52	49
42 x R1 1/2	6207234	41	11	47	58	51
54 x R2	6207245	47	12	53	75	65

C1444 3-part union, flat sealing

(press x female thread)

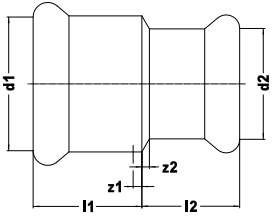


Dimension	Article No.	l1	l2	z1	z2	slw1	slw2
22 x Rp3/4	6208928	30	33	9	17	36	34
28 x Rp1	6208939	31	34	8	15	46	42
35 x Rp1 1/4	6208941	34	42	8	20	52	50
42 x Rp1 1/2	6208950	41	42	11	20	58	55
54 x Rp2	6208961	47	46	12	20	75	70

VdS 22-108 mm, LPCB and FM 22-54 mm, UL/cUL 22-88.9 mm

C1439 Reducer

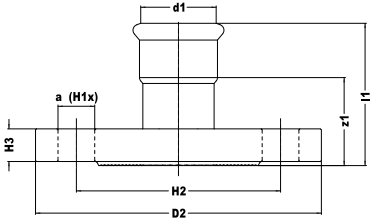
(2 x press)



Dimension	Article No.	l1	l2	z1/z2
28 x 22	6201131	25	23	2

C1426 Flanged connector PN 10/16

(1 x press)

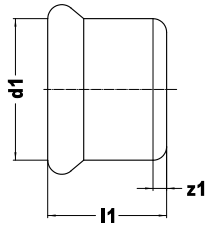


Dimension	Article No.	l1	z1	H2	H3	D2	a	holes
35	6341500	70	44	100	16	140	18	4
42	6341511	77	47	110	16	150	18	4
54	6341522	87	52	125	16	165	18	4
76,1	6206596	112	57	145	16	185	18	4
88,9	6206607	118	55	160	18	200	18	8
108	6206618	114	37	180	18	220	18	8

VdS 22-108 mm, LPCB and FM 22-54 mm, UL/cUL 22-88.9 mm

C1429 Stop end

(1 x press)

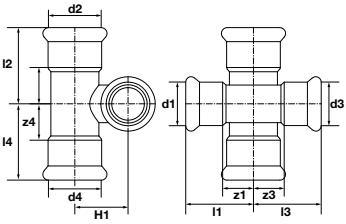


Dimension	Article No.	l1	z1
22	6202977	24	3
28	6202988	26	3
35	6202999	29	3
42	6203001	37	7
54	6203010	42	7
76.1	6206915	64	9
88.9	6206926	72	9
108	6206937	97	20

C1434 90° Pass

(4 x press)

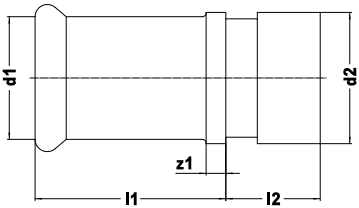
VdS



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

VdS 22-108 mm, LPCB and FM 22-54 mm, UL/cUL 22-88.9 mm
**Only VdS approved*

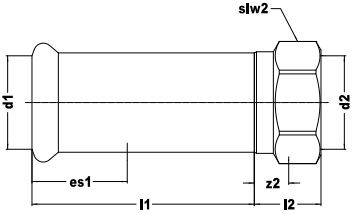
C1442 Transition for grooved couplings
(press x groove)



Dimension	Article No.	l1	l2	z1	d2
28 x 33,7	6241301	49	24	26	33,7
35 x 42,4	6241345	54	24	28	42,4
42 x 48,3	6241356	61	24	31	48,3
54 x 60,3	6241367	73	24	38	60,3
76,1 x 73	6341181	68	24	13	73
76,1 x 76,1	6340774	56	24	1	76,1
88,9 x 88,9	6340785	76	24	13	88,9
108 x 114	6340796	84	26	7	114

C1443 Slip coupling

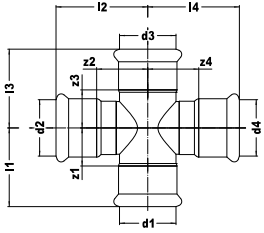
(press x female thread)



Dimension	Article No.	l1	l2	z2	es1	slw2
22 x Rp1/2	6241312	92	22	15	21	28
22 x Rp3/4	6241323	97	27	17	21	32
28 x Rp1/2	6241268	94	24	15	23	32
28 x Rp3/4	6241279	93	23	17	23	32

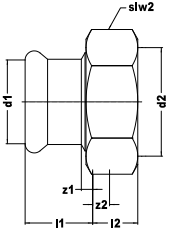
VdS 22-108 mm, LPCB and FM 22-54 mm, UL/cUL 22-88.9 mm

C1447 90° Cross (4 x press)



Dimension	Article No.	l1/l3	l2/l4	z1/z3	z2/z4
35 x 35 x 35 x 35	6340972	52	60	26	34
42 x 42 x 42 x 42	6340983	61	67	31	37
54 x 54 x 54 x 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 G1	6340554	30	10	9	2	36
28 x G1 1/4	6340565	31	10	8	2	46
35 x G1 1/2	6340576	34	11	8	2	52
42 x G1 3/4	6340587	41	11	11	2	52
54 x G2 3/8	6340598	47	11	12	3	75

VdS 22-108 mm, LPCB and FM 22-54 mm, UL/cUL 22-88.9 mm

C1451 O-ring Leak Before Pressed (LBP) (black, EPDM)

for galvanized and stainless steel

Dimension	Article No.
22	6222238
28	6222249
35	6222251
42	6222260
54	6222271

R2760 O-ring, standard

(black, EPDM) for Galvanized Steel and Stainless Steel

Dimension	Article No.
76.1	6208015
88.9	6208026
108	6208037

VdS 22-108 mm, LPCB and FM 22-54 mm, UL/cUL 22-88.9 mm

C1452 Flat seal ring

(black, EPDM) for galvanized and stainless steel

Dimension	Article No.
22	6228024
28	6228035
35	6228046
42	6228057
54	6228068

VSH

5.9 VSH XPress Sprinkler ML

Fire Protection

ML7901 XPress Sprinkler ML tube (roll)

VdS

Dimension	Article No.	DN	Length
32 x 3	6350003	25	50 m

ML7902 XPress Sprinkler ML tube

(5 m)

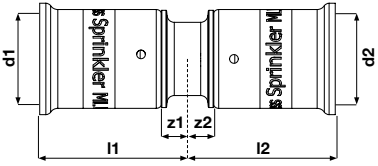
VdS

Dimension	Article No.	DN	Bundles
32 x 3.0	6350047	25	35 m
40 x 3.5	6350080	32	45 m
50 x 4.0	6350124	40	35 m
63 x 4.5	6350168	50	20 m

ML7101 Straight coupling

(2 x press)

VdS

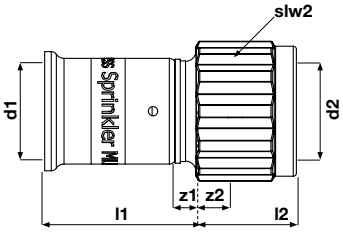


Dimensions	Article No.	l1/l2	z1/z2
32 x 32	6350674	52	10
40 x 40	6350685	53	11
50 x 50	6350696	71	13
63 x 63	6350707	86	16

ML7102 Straight connector

(press x female thread)

VdS

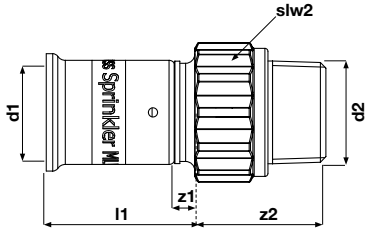


Dimensions	Article No.	l1	l2	z1	z2	slw2
32 x Rp1/2	6350828	48	38	6	15	44
32 x Rp1	6350839	49	33	7	15	44
32 x Rp1 1/4	6350841	53	37	11	16	55
40 x Rp1	6350850	48	37	6	19	44
40 x Rp1 1/4	6350861	42	32	0	11	55
50 x Rp1 1/2	6350872	62	49	4	24	67
63 x Rp2	6350883	77	55	7	25	89

ML7105 Straight connector

(press x male thread)

VdS

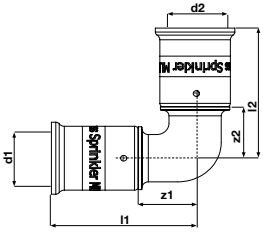


Dimensions	Article No.	l1	z1	z2	slw2
32 x R1	6350762	49	7	43	44
32 x R1 1/4	6350773	53	11	48	55
40 x R1	6350784	42	0	42	44
40 x R1 1/4	6350795	47	5	46	55
50 x R1 1/2	6350806	66	8	52	67
63 x R2	6350817	76	6	67	89

ML7108 90° bend

(2 x press)

VdS

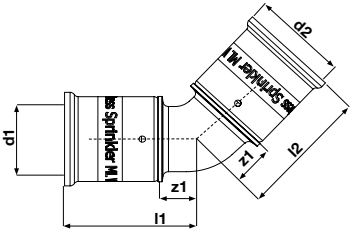


Dimension	Article No.	l1/l2	z1/z2
32 x 32	6350179	72	30
40 x 40	6350181	78	36
50 x 50	6350190	100	42
63 x 63	6350201	116	46

ML7113 45° bend

(2 x press)

VdS

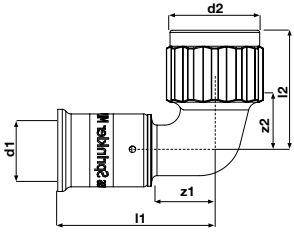


Dimensions	Article No.	l1/l2	z1/z2
40 x 40	6350894	63	21
50 x 50	6350905	84	26
63 x 63	6350916	102	32

ML7138 90° threaded elbow

(press x female thread)

VdS

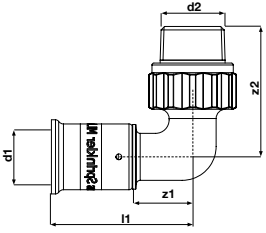


Dimensions	Article No.	l1	l2	z1	z2
32 x Rp1/2	6350267	75	64	33	41
32 x Rp1	6350278	75	59	33	41
40 x Rp1/2	6350289	81	77	39	51
40 x Rp1 1/4	6350291	81	72	39	51
50 x Rp1/2	6350300	101	82	43	60
50 x Rp1 1/4	6350311	101	77	43	56
50 x Rp1 1/2	6350322	101	82	43	57
63 x Rp1/2	6350333	126	109	56	74
63 x Rp2	6350344	126	104	56	79

ML7130 90° threaded elbow

(press x male thread)

VdS

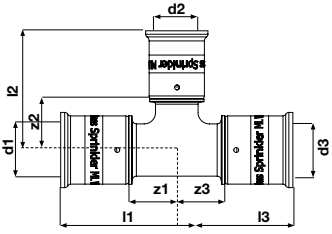


Dimensions	Article No.	l1	z1	z2
32 x R1	6350212	75	33	69
40 x R1 1/4	6350223	84	42	77
50 x R1 1/4	6350234	101	43	86
50 x R1 1/2	6350245	101	43	93
63 x R2	6350256	126	56	118

ML7115 Tee, reduced

(3 x press)

VdS

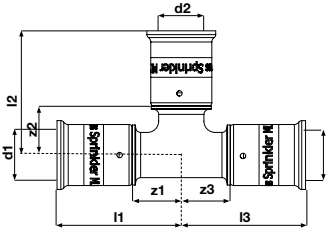


Dimensions	Article No.	l1/l3	l2	z1/z2/z3
40 x 32 x 40	6350399	72	75	30
50 x 32 x 50	6350401	84	77	26
50 x 40 x 50	6350410	92	81	34
63 x 32 x 63	6350421	97	84	27
63 x 40 x 63	6350432	106	87	36
63 x 50 x 63	6350443	110	103	40

ML7114 Tee

(3 x press)

VdS

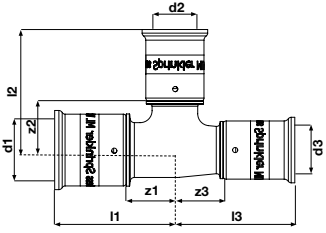


Dimensions	Article No.	l1/l2/l3	z1/z2/z3
32 x 32 x 32	6350355	70	28
40 x 40 x 40	6350366	76	34
50 x 50 x 50	6350377	96	38
63 x 63 x 63	6350388	116	46

ML7116 Tee, 2 x reduced

(3 x press)

VdS

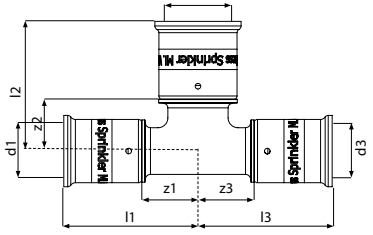


Dimensions	Article No.	l1	l2	l3	z1	z2	z3
40 x 32 x 32	6350454	71	71	72	29	29	30
50 x 32 x 40	6350476	84	68	77	26	26	35
50 x 40 x 40	6350487	88	73	77	30	31	35

ML7117 Tee, reduced

(3 x press)

VdS

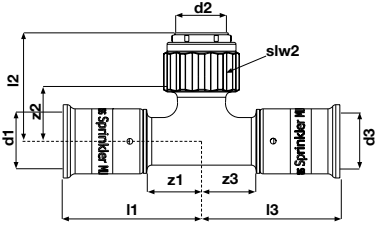


Dimensions	Article No.	l1/l3	l2	z1/z3	z2
32 x 40 x 32	6350498	73	69	31	27
40 x 50 x 40	6350509	77	88	35	30

ML7118 Tee

VdS

(press x female thread x press)

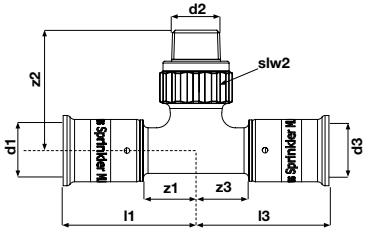


Dimensions	Article No.	l1/l3	l2	z1/z3	z2	slw2
32 x Rp1/2 x 32	6350511	73	58	31	37	39
32 x Rp3/4 x 32	6350520	73	53	31	37	39
32 x Rp1 x 32	6350531	75	56	33	38	44
32 x Rp1 1/4 x 32	6350542	81	66	39	45	55
40 x Rp1/2 x 40	6350553	77	68	35	45	44
40 x Rp1 x 40	6350564	77	63	35	45	44
40 x Rp1 1/4 x 40	6350575	79	69	37	48	55
50 x Rp1/2 x 50	6350586	101	89	43	55	67
50 x Rp3/4 x 50	6351070	101	95	50	61	61
50 x Rp1 1/2 x 50	6350597	101	84	43	59	67
63 x Rp1/2 x 63	6350608	121	109	51	69	89
63 x Rp2 x 63	6350619	121	104	51	74	89

ML7119 Tee

VdS

(press x female thread x press)

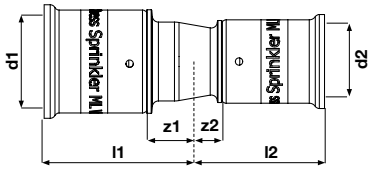


Dimensions	Article No.	l1/l3	z1/z3	z2	slw2
32 x R3/4 x 32	6350621	73	31	66	39
40 x R1 x 40	6350630	75	33	74	44
40 x R1 1/4 x 40	6350641	81	39	80	55
50 x R1 1/2 x 50	6350652	101	43	88	67
63 x R2 x 63	6350663	118	48	109	89

ML7107 Reducer

(2 x press)

VdS



Dimensions	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

VSH

5.10 VSH XPress Tools and accessoires

Fire Protection

P6013/6014/6015 Press tools Novopress ECO203/ACO203

	Dimension	Article No.
ECO203 + case	22-63	6342094
ACO203 BT + battery + charger + case	22-63	6242325
ACO203 BT + jaws, adapter and slings 22-54 + 2 batteries 3,0Ah + charger + case	22-54	6342347

P5990 Novopress press jaws/slings for ECO203/ACO203

	Dimension	Article No.
Jaw PB2	22	6205364
Jaw PB2	28	6205375
Adapter ZB203	35-42-54	6340829
Snap-on HP sling	35	6341060
Snap-on HP sling	42	6341071
Snap-on HP sling	54	6341082
Set: case + Snap-on HP slings	HP42-54+ZB203	6341225
Set: case + Snap-on HP slings	HP35-42-54+ZB203	6341775

ML5705 Sprinkler ML press jaw

	Dimension	Article No.
XPress Sprinkler ML jaw	32	6351004
XPress Sprinkler ML jaw	40	6351015
XPress Sprinkler ML jaw	50	6351026
XPress Sprinkler ML jaw	63	6351037

P5997 Novopress ECO301 Press Tools

	Dimension	Article No.
ECO301 + case	22-54	6205507

P5989 Novopress press jaws/slings for ECO301

	Dimension	Article No.
Jaw PB3	22	6205751
Jaw PB3	28	6205760
Adapter ZB303	35-42-54	6341115
Snap-on HP sling	35	6341060
Snap-on HP sling	42	6341071
Snap-on HP sling	54	6341082

P6000/6001 Novopress ACO401 Press tools and slings

	Dimension	Article No.
ACO401 + 2 batteries + charger + case	76,1-108	6340081
ACO401 + 2 batteries + charger + case + slings 76.1-108	76,1-108	6341236
HP401 sling + case	76,1	6340092
HP401 sling + case	88,9	6340103
HP401 sling + case	108	6340114

P5997/6002/6004 Case

	Dimension	Article No.
Case ECO/ACO203 (XL)		6342028
Case ECO301		6341533
Case ACO401		6341214
Case kettingen + adapter	35-42-54 + ZB2/303	6342303

P5991/6002/6004 Battery + charger

	Article No.
Battery ACO202/203 1.5Ah 18V	6340136
Battery ACO202/203/401 3.0Ah 18V	6340147
Charger ACO202/203/401	6340125

P2742 Insertion depth marker

Dimension	Article No.
12-108 (for VSH XPress Galvanized Steel and Stainless Steel)	6212646

P2743 Deburring tool

Dimension	Article No.
12-54	6211898

ML5701 Tube cutter

Dimension	Article No.
14-63	6350938

ML5702/5703/5704 Calibration tool

Dimension	Article No.
Handle for Kalispeed up to 40 mm	6350993
32	6350949
40	6350951
50	6350971
60	6350982

ML5707 Knife for packaging

	Article No.
Safecut	6351059

ML7120 Sprinkler cup

	Article No.
Sprinkler cup for embedded sprinklers	6351061

R2749 Stainless steel fire service coupling series HB

Dimensions	Article No.	d1
G3/4 (M)	6198731	3/4 (DN20)
3/4 FPT	6198632	3/4 (DN20)

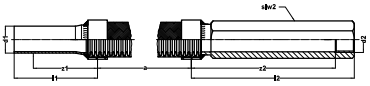
R2755 Stainless steel hose connector series HB

Dimensions	Article No.	d1
3/4 FPT	6198709	3/4 (DN20)
G3/4 (M)	6198676	3/4 (DN20)

R2758 Stainless steel Y-piece

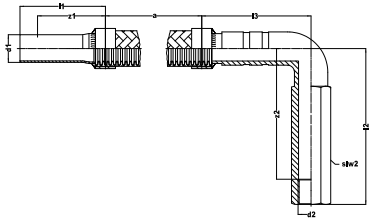
Dimensions	Article No.
G3/4	6192549

R2745 Stainless steel sprinkler hose, straight



Dim.	l	Article No.	a	l1	d1	z1	l2	d2	z2	slw2	sks2
22	1,000	6198005	804	60	22 (DN20)	39	125	Rp1/2 (DN15)	110	27	31
22	1,500	6198027	1304	60	22 (DN20)	39	125	Rp1/2 (DN15)	110	27	31
22	2,000	6198038	1804	60	22 (DN20)	39	125	Rp1/2 (DN15)	110	27	31
28	1,000	6198049	795	68	28 (DN25)	45	125	Rp1/2 (DN15)	110	27	31
28	1,500	6198060	1295	68	28 (DN25)	45	125	Rp1/2 (DN15)	110	27	31
28	2,000	6198071	1795	68	28 (DN25)	45	125	Rp1/2 (DN15)	110	27	31

R2746 Stainless steel sprinkler hose, 90° bend



Dim.	l	Article No.	a	l1	d1	z1	l2	d2	z2	slw2	sks2
22	800	6198082	683	60	22 (DN20)	39	145	Rp1/2 (DN15)	130	27	31
22	1,000	6198093	883	60	22 (DN20)	39	145	Rp1/2 (DN15)	130	27	31
22	1,500	6198115	1383	60	22 (DN20)	39	145	Rp1/2 (DN15)	130	27	31
28	800	6198137	681	68	28 (DN25)	45	145	Rp1/2 (DN15)	130	27	31
28	1,000	6198148	981	68	28 (DN25)	45	145	Rp1/2 (DN15)	130	27	31
28	1,500	6198161	1381	68	28 (DN25)	45	145	Rp1/2 (DN15)	130	27	31

VSH

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

Connection technology

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

VSH XPress	Piping systems with M-profile press fittings in four types of material: galvanized steel, copper, stainless steel and cunifer. Suitable for heating, cooling, water, gas, solar, compressed air and fire protection systems in residential and commercial buildings, shipbuilding and industry.
VSH SudoPress	Piping systems with V-profile press fittings in copper, galvanized steel and stainless steel, suitable for heating, water, gas and solar systems.
VSH MultiPress	A plastic piping system with multi-profile press fittings for applications in areas such as sanitary, gas and heating systems.
VSH PowerPress	A piping system with DW-profile press fittings specially designed for thick-walled steel pipes; suitable for heating, cooling, compressed air and sprinkler systems.
VSH Shurjoint	A piping system with grooved connectors suitable for heating, cooling, compressed air and sprinkler systems.
VSH Super	Compression fittings for potable water, gas, heating and solar systems. Suitable for steel, copper, stainless and plastic tubes.
VSH Tectite	Push fittings in copper, brass and stainless steel, suitable for potable water, heating and compressed air systems.

Valve technology

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

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