

## VSH XPress Carbon



# Environmental Product Declaration

in accordance with  
ISO 14044, ISO 14040 and EN 15804

## 1 general information

### 1.1 note on this document

The original document was written in English, all other versions are a translation of the original document.

### 1.2 declaration holder

#### **Aalberts integrated piping systems B.V.**

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Aalberts integrated piping systems develops the most advanced integrated piping systems for distribution and control of liquids and gases. These systems are used in various markets such as industry, utility and residential construction. We offer fully integrated piping systems in valve, connection, fastening and piping technology. In close cooperation with our customers, we build the perfect integrated piping system that meets all their requirements. Our piping systems are easy to specify, install, check and maintain, saving you considerable time on preparation and installation. We meet the highest quality and industry standards required in our markets. The Aalberts integrated systems production locations mentioned in this document, Hilversum and Zeewolde, are certified acc. ISO 9001, ISO 14001 and ISO 45001.

### 1.3 declared Product

This document applies to the VSH XPress Carbon fittings listed in the appendix -chapter 5- of this document. Articles with brass or gunmetal components are not covered in this declaration. A VSH XPress Carbon bend 90° FF 22, article number: 6190228, has been used as a reference article.

### 1.4 verification

The European standard EN15804:2012 +A2:2019 has been used as the core PCR. Environmental product declarations for construction products may not be comparable if they do not comply with the EN15804. It is only possible to make a limited comparison between life cycle assessment results when different background databases are used and/or different assumptions as described in chapter 3.3.

This is a Self-Declared Environmental Product Declaration acc. NEN-EN ISO 14025.

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Production data: 2021

Hilversum, February 2023  
Aalberts integrated piping systems B.V.

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Roland Voermans  
COO

## 2 product

### 2.1 description and application purpose

VSH XPress Carbon is a complete piping system suitable for a wide variety of applications, from heating and cooling to solar, sprinkler installations and compressed air systems. The VSH XPress Carbon range consists of press fittings, valves, tubes and pressing tools. The VSH XPress Carbon fittings have a M-profile (12 mm to 108 mm).

- VSH XPress Carbon fittings are manufactured from E195 (No. 1.0034) material and protected against corrosion by a layer of zinc that has been applied by electroplating.
- VSH SudoXPress Carbon tubes are available in different steel alloys according to EN 10305-3.
- VSH XPress Sprinkler Galvanised tube is available in E190 (No. 1.0031) material according to EN 10305-3.

The o-ring has decisive influence on the performance of the system in different applications, with different media and parameters. Depending on the application, different o-rings can be inserted in the fittings:

- EPDM (Ethylene Propylene Diene Monomer / black)
  - standard
- FPM (Fluoroelastomer / green)
  - for use in specific applications

The VSH XPress "Leak Before Pressed" (LBP) function is achieved using a special designed o-ring up to dimension 54 mm. For the dimensions 66.7 to 108 mm, the LBP-function is based on the tolerance between the diameter of the o-rings and the inner diameter of the fitting. Fittings with a LBP function have the advantage that connections which have not been pressed will leak water during pressure testing.

### 2.2 VSH XPress Carbon fittings

All VSH XPress Carbon fittings are produced in our modern, automated factory in the Netherlands. The VSH XPress Carbon product range includes fittings, valves, tubes and tools. VSH XPress Carbon fittings are compatible with various press tool brands. Use our online tool selector to find the right tool for the right material. During the pressing process, bead, socket and tube are deformed to form a leak-tight and mechanically strong, permanent connection



1. fitting bead
2. fitting body
3. colour coding
4. insertion socket
5. o-ring

For the composition of the components, see chapter 3.2 "product composition"

### 2.3 range and conversion factors

The reference product for this declaration is the VSH XPress Carbon bend 90° FF 22. This article was chosen as a reference because it is the most common product in the VSH XPress Carbon article range. The life cycle assessment results in chapter 4 can be converted to other articles listed in the appendix of this document. This can be done by multiplying the results with the conversion factor for a specific product. For products and their corresponding conversion factors, see the appendix -chapter 5-.

## 3 life cycle assessment scope

### 3.1 system boundaries

This EPD can be regarded as a Cradle-to-Gate with options, module C2 and D. The following phases are considered not relevant for this product range: A5, B, C1, C3 and C4.

### 3.2 declared unit composition

The reference article, VSH XPress Carbon 90° bend FF 22, consists of the following raw materials:

|               |             |
|---------------|-------------|
| carbon steel: | 79 gram     |
| elastomers:   | 2 gram      |
| zinc coating: | 7 milligram |
| Total:        | 81 gram     |

### 3.3 assumptions and background information

**A1:** For the raw material supply 100% of the materials on the bill of materials were modelled using data from the Ecoinvent database.

**A2:** For transport of materials to Aalberts integrated piping systems in Hilversum specific transport distances from materials suppliers were used. Class Euro5 trucks are used as the main means of transport and were used for calculation.

**A3:** VSH XPress products are manufactured in the factory of Aalberts integrated piping systems located in Hilversum, Netherlands. This factory makes use of green electricity for manufacturing the VSH XPress products. Therefore the green electricity Netherlands mix, was used for calculating the electricity consumption. Water and auxiliary materials were considered negligible.

Assembly of products is done at a separate Aalberts integrated piping systems warehouse located in Zeewolde, Netherlands. This warehouse also uses green electricity. The electricity consumption for this process was estimated and modelled at 10% of the electricity consumed for manufacturing.

**A4:** Transport from the factory in Hilversum to production partners and the warehouse is done by Aalberts integrated piping systems and logistical partners. The main means of transport is by Class Euro5 trucks. The transportation distance is calculated at 715km. Transportation to customers within Europe is done by logistical partners. The main means of transport in Europe is by Class Euro5 trucks. The average transportation distance is calculated at 730 km.

**A5:** The installation is done by use of a press tool which uses a considered negligible amount of energy.

**B1-B7:** A VSH XPress Carbon fitting is designed for a lifetime of 50+ years of service. A VSH XPress Carbon fitting needs no maintenance, repair, replacement or refurbishment and has no operational water or energy use during its lifetime.

**C1-C4:** The piping system is assumed to be stripped as a whole from a building in the demolition process and separate energy used for the fitting de-construction is considered negligible in this process. Transportation to a waste processing site is assumed at 30km and modelled by use of Class Euro5 trucks. The waste processing is assumed to be done at a material level rather than component level since the fittings are permanently fitted onto piping. Therefore energy consumption for the waste processing of fittings was considered negligible. Partial disposal was considered to happen at a recycler rather than a waste processor and is therefore calculated in phase D.

**D:** Average recycling rates for building materials in Europe were used to calculate the amount of material that went for recycling, incineration and landfill. 90% of steel will be recycled, the O-ring incinerated and remainder of the product was calculated to go to landfill.

### 3.4 quality of life cycle assessment, data and reporting

This Environmental Product Declaration is based on a life cycle assessment conducted according to the ISO 14040 and ISO 14044 and meets further requirements from the EN 15804:2012 + A2:2019. The modelling and calculation was done in the Ecochain software tool "Helix", which uses the Ecoinvent database. Inventory data was mainly provided by Aalberts integrated piping systems b.v. and was peer reviewed by several internal partners. The Environmental Product Declaration report is automatically generated to prevent human errors and ensure its quality. Improved quality of the life cycle assessment will be achieved when it would get externally verified according to ISO 14025.

Because of the nature of a life cycle assessment and accompanying assumptions, the environmental impact of a product will remain an underestimate. Care must be taken when comparing EPDs from different sources. Aalberts integrated piping systems B.V. is committed to providing the most accurate environmental impact possible to its customers and will continue to improve the quality of the data, model and results.

## 4 life cycle assessment results

The following environmental profile shows the results of the life cycle assessment of a single unit of the declared product.

### Environmental Profile

This LCA is calculated according to: ISO 14044, ISO 14040 and EN 15804  
Ecochain v3.5.71



Product: XPress C bend 90° 22mm EPDM  
Unit: 1 units  
Manufacturer: Aalberts integrated piping systems

LCA standard: EN15804+A2 (2019)  
Standard database: Dutch - Nationale Milieudatabase v3.3 (obv Ecoinvent 3.6)  
Externally verified: No  
Export date: 10-02-2023



The LCA background information and project dossier have been registered in the online Ecochain application in the account Aalberts integrated piping systems (2021). (☑ = module declared, MND = module not declared).

| A1                                              | A2           | A3               | A4 | A5  | B1                        | B2                       | B3        | B4             | B5               | B6  | B7  | C1                                                     | C2           | C3                  | C4  | D |
|-------------------------------------------------|--------------|------------------|----|-----|---------------------------|--------------------------|-----------|----------------|------------------|-----|-----|--------------------------------------------------------|--------------|---------------------|-----|---|
| ☑                                               | ☑            | ☑                | ☑  | MND | MND                       | MND                      | MND       | MND            | MND              | MND | MND | MND                                                    | ☑            | MND                 | MND | ☑ |
| <b>Product stage</b>                            |              |                  |    |     | <b>Use stage</b>          |                          |           |                |                  |     |     | <b>End-of-Life stage</b>                               |              |                     |     |   |
| A1 Raw material supply                          | A2 Transport | A3 Manufacturing |    |     | B1 Use                    | B2 Maintenance           | B3 Repair | B4 Replacement | B5 Refurbishment |     |     | C1 De-construction demolition                          | C2 Transport | C3 Waste processing |     |   |
| <b>Construction process stage</b>               |              |                  |    |     | B6 Operational energy use | B7 Operational water use |           |                |                  |     |     | <b>Benefits and loads beyond the system boundaries</b> |              |                     |     |   |
| A4 Transport gate to site                       |              |                  |    |     |                           |                          |           |                |                  |     |     | D Reuse- Recovery- Recycling- potential                |              |                     |     |   |
| A5 Assembly / Construction installation process |              |                  |    |     |                           |                          |           |                |                  |     |     |                                                        |              |                     |     |   |

#### environmental impacts and parameters

GWP-total = EF Climate Change [kg CO<sub>2</sub> eq]; GWP-f = EF Climate change - Fossil [kg CO<sub>2</sub> eq]; GWP-b = EF Climate Change - Biogenic [kg CO<sub>2</sub> eq];  
GWP-luluc = EF Climate Change - Land use and LU change [kg CO<sub>2</sub> eq]; ODP = EF Ozone depletion [kg CFC11 eq]; AP = EF Acidification [mol H<sup>+</sup> eq];  
EP-fw = EF Eutrophication, freshwater [kg P eq]; EP-m = EF Eutrophication, marine [kg N eq]; EP-T = EF Eutrophication, terrestrial [mol N eq]; POCP  
= EF Photochemical ozone formation [kg NMVOC eq]; ADP-mm = EF Resource use, minerals and metals [kg Sb eq]; ADP-f = EF Resource use, fossils  
[MJ]; WDP = EF Water use [m<sup>3</sup> depriv.]; PM = EF Particulate matter [disease inc.]; IR = EF Ionising radiation [kBq U-235 eq]; ETP-fw = EF Ecotoxicity,  
freshwater [CTUe]; HTP-c = EF Human toxicity, cancer [CTUh]; HTP-nc = EF Human toxicity, non-cancer  
[CTUh]; SQP = EF Land use [Pt]; PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials  
[MJ]; PERM = Use of renewable primary energy resources used as raw materials [MJ]; PERT = Total use of renewable primary energy resources [MJ];  
PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials [MJ]; PENRM = Use of non-  
renewable primary energy resources used as raw materials [MJ]; PENRT = Total use of non-renewable primary energy resources [MJ]; PET = Total  
energy [MJ]; SM = Use of secondary material [kg]; RSF = Use of renewable secondary fuels [MJ]; NRSF = Use of non-renewable secondary fuels [MJ];  
FW = Use of net fresh water [m<sup>3</sup>]; HWD = Hazardous waste disposed [kg]; NHWD = Non-hazardous waste disposed [kg]; RWD = Radioactive waste  
disposed [kg]; CRU = Components for re-use [kg]; MFR = Materials for recycling [kg]; MER = Materials for energy recovery [kg]; EE = Exported energy  
[MJ]; EET = Exported energy thermic [MJ]; EEE = Exported energy electric [MJ]

#### statement of confidentiality

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## results

| Environmental impact              | Unit         | A1        | A2        | A3        | A1-A3     | A4        | C2        | D          | Total     |
|-----------------------------------|--------------|-----------|-----------|-----------|-----------|-----------|-----------|------------|-----------|
| GWP-total                         | kg CO2 eq    | 2.316E-1  | 3.154E-3  | 6.552E-3  | 2.413E-1  | 1.649E-2  | 2.703E-4  | -8.785E-2  | 1.702E-1  |
| GWP-f                             | kg CO2 eq    | 2.307E-1  | 3.151E-3  | 5.587E-3  | 2.395E-1  | 1.647E-2  | 2.700E-4  | -8.850E-2  | 1.677E-1  |
| GWP-b                             | kg CO2 eq    | 7.710E-4  | 1.681E-6  | 9.408E-4  | 1.714E-3  | 7.605E-6  | 1.441E-7  | 6.079E-4   | 2.329E-3  |
| GWP-luluc                         | kg CO2 eq    | 9.855E-5  | 1.101E-6  | 2.501E-5  | 1.247E-4  | 6.036E-6  | 9.439E-8  | 2.902E-5   | 1.598E-4  |
| ODP                               | kg CFC11 eq  | 4.469E-9  | 7.158E-10 | 7.789E-10 | 5.964E-9  | 3.636E-9  | 6.134E-11 | -2.920E-9  | 6.741E-9  |
| AP                                | mol H+ eq    | 3.100E-3  | 1.288E-5  | 9.867E-5  | 3.211E-3  | 9.554E-5  | 1.103E-6  | -3.803E-4  | 2.928E-3  |
| EP-fw                             | kg P eq      | 2.259E-6  | 2.474E-8  | 2.043E-7  | 2.488E-6  | 1.662E-7  | 2.121E-9  | -2.273E-6  | 3.830E-7  |
| EP-m                              | kg N eq      | 2.294E-4  | 3.820E-6  | 2.048E-5  | 2.537E-4  | 3.367E-5  | 3.274E-7  | -6.151E-5  | 2.262E-4  |
| EP-T                              | mol N eq     | 1.212E-2  | 4.225E-5  | 3.390E-4  | 1.250E-2  | 3.712E-4  | 3.620E-6  | -7.180E-4  | 1.216E-2  |
| POCP                              | kg NMVOC eq  | 5.486E-4  | 1.293E-5  | 6.348E-5  | 6.250E-4  | 1.060E-4  | 1.108E-6  | -5.428E-4  | 1.893E-4  |
| ADP-mm                            | kg Sb eq     | 3.760E-4  | 8.527E-8  | 5.680E-7  | 3.767E-4  | 4.174E-7  | 7.308E-9  | 1.217E-7   | 3.772E-4  |
| ADP-f                             | MJ           | 2.609E+0  | 4.751E-2  | 6.131E-2  | 2.718E+0  | 2.485E-1  | 4.072E-3  | -6.638E-1  | 2.307E+0  |
| WDP                               | m3 depriv.   | 2.388E-2  | 1.322E-4  | 2.604E-3  | 2.662E-2  | 8.887E-4  | 1.133E-5  | -1.409E-2  | 1.343E-2  |
| PM                                | disease inc. | 2.819E-8  | 2.192E-10 | 1.002E-9  | 2.941E-8  | 1.479E-9  | 1.879E-11 | -8.002E-10 | 3.011E-8  |
| IR                                | kBq U-235 eq | 3.215E-3  | 2.077E-4  | 4.649E-5  | 3.469E-3  | 1.041E-3  | 1.780E-5  | 7.289E-4   | 5.257E-3  |
| ETP-fw                            | CTUe         | 4.025E+0  | 3.804E-2  | 3.131E-1  | 4.376E+0  | 2.215E-1  | 3.260E-3  | -2.983E+0  | 1.617E+0  |
| HTP-c                             | CTUh         | 1.149E-10 | 1.069E-12 | 1.611E-11 | 1.320E-10 | 7.186E-12 | 9.162E-14 | 6.039E-11  | 1.997E-10 |
| HTP-nc                            | CTUh         | 5.975E-9  | 4.148E-11 | 4.873E-10 | 6.504E-9  | 2.423E-10 | 3.555E-12 | 2.001E-8   | 2.676E-8  |
| SQP                               | Pt           | 2.291E-1  | 3.277E-2  | 2.158E+0  | 2.419E+0  | 2.155E-1  | 2.808E-3  | -1.388E-1  | 2.499E+0  |
| Resource use                      | Unit         | A1        | A2        | A3        | A1-A3     | A4        | C2        | D          | Total     |
| PERE                              | MJ           | 6.201E-2  | 6.705E-4  | 8.266E-1  | 8.892E-1  | 3.110E-3  | 5.746E-5  | 8.868E-3   | 9.013E-1  |
| PERM                              | MJ           | 0         | 0         | 0         | 0         | 0         | 0         | 0          | 0         |
| PERT                              | MJ           | 6.201E-2  | 6.705E-4  | 8.266E-1  | 8.892E-1  | 3.110E-3  | 5.746E-5  | 8.868E-3   | 9.013E-1  |
| PENRE                             | MJ           | 2.648E+0  | 5.044E-2  | 6.528E-2  | 2.764E+0  | 2.638E-1  | 4.323E-3  | -6.884E-1  | 2.343E+0  |
| PENRM                             | MJ           | 0         | 0         | 0         | 0         | 0         | 0         | 0          | 0         |
| PENRT                             | MJ           | 2.648E+0  | 5.044E-2  | 6.528E-2  | 2.764E+0  | 2.638E-1  | 4.323E-3  | -6.884E-1  | 2.343E+0  |
| PET                               | MJ           | 2.710E+0  | 5.111E-2  | 8.918E-1  | 3.653E+0  | 2.669E-1  | 4.380E-3  | -6.795E-1  | 3.245E+0  |
| SM                                | kg           | 0         | 0         | 0         | 0         | 0         | 0         | 0          | 0         |
| RSF                               | MJ           | 0         | 0         | 0         | 0         | 0         | 0         | 0          | 0         |
| NRSF                              | MJ           | 0         | 0         | 0         | 0         | 0         | 0         | 0          | 0         |
| FW                                | m3           | 8.526E-4  | 5.003E-6  | 8.256E-5  | 9.402E-4  | 3.026E-5  | 4.288E-7  | -3.208E-4  | 6.500E-4  |
| Output flows and waste categories | Unit         | A1        | A2        | A3        | A1-A3     | A4        | C2        | D          | Total     |
| HWD                               | kg           | 4.784E-5  | 1.245E-7  | 3.755E-11 | 4.796E-5  | 6.296E-7  | 1.067E-8  | -1.201E-5  | 3.660E-5  |
| NHWD                              | kg           | 3.595E-3  | 2.271E-3  | 2.612E-5  | 5.892E-3  | 1.576E-2  | 1.946E-4  | 3.145E-3   | 2.499E-2  |
| RWD                               | kg           | 2.184E-6  | 3.240E-7  | 1.693E-11 | 2.508E-6  | 1.631E-6  | 2.776E-8  | -1.097E-8  | 4.156E-6  |
| CRU                               | kg           | 0         | 0         | 0         | 0         | 0         | 0         | 0          | 0         |
| MFR                               | kg           | 0         | 0         | 0         | 0         | 0         | 0         | 0          | 0         |
| MER                               | kg           | 0         | 0         | 0         | 0         | 0         | 0         | 0          | 0         |
| EE                                | MJ           | 0         | 0         | 0         | 0         | 0         | 0         | 0          | 0         |
| EET                               | MJ           | 0         | 0         | 0         | 0         | 0         | 0         | 0          | 0         |
| EEE                               | MJ           | 0         | 0         | 0         | 0         | 0         | 0         | 0          | 0         |

## 5 appendix

The life cycle assessment results listed in chapter 4 can be converted to the other sales articles listed using the conversion factor in accordance with the following tables.

| C1401 straight coupling (2 x press) |           |                   |
|-------------------------------------|-----------|-------------------|
| Article no.                         | dimension | conversion factor |
| 6201351                             | 12        | 0.33              |
| 6201360                             | 15        | 0.46              |
| 6201371                             | 18        | 0.54              |
| 6201382                             | 22        | 0.70              |
| 6201393                             | 28        | 0.91              |
| 6201404                             | 35        | 1.26              |
| 6201415                             | 42        | 1.75              |
| 6201426                             | 54        | 2.37              |
| 6340411                             | 66,7      | 4.93              |
| 6206200                             | 76.1      | 6.67              |
| 6206211                             | 88.9      | 9.01              |
| 6206222                             | 108       | 13.44             |

| C1403 slip coupling (2 x press) |           |                   |
|---------------------------------|-----------|-------------------|
| Article no.                     | dimension | conversion factor |
| 6201437                         | 12        | 0.49              |
| 6201448                         | 15        | 0.68              |
| 6201459                         | 18        | 0.80              |
| 6201461                         | 22        | 1.04              |
| 6201470                         | 28        | 1.38              |
| 6201481                         | 35        | 1.95              |
| 6201492                         | 42        | 2.73              |
| 6201503                         | 54        | 4.09              |
| 6341357                         | 66,7      | 8.43              |
| 6206233                         | 76.1      | 11.60             |
| 6206244                         | 88.9      | 15.85             |
| 6206255                         | 108       | 27.41             |

| C1432 combination tube (not galvanised, welding end x male) |             |                   |
|-------------------------------------------------------------|-------------|-------------------|
| Article no.                                                 | dimension   | conversion factor |
| 6207817                                                     | 15 x 17     | 1.19              |
| 6207828                                                     | 18 x 20     | 1.43              |
| 6207168                                                     | 22 x 24     | 1.73              |
| 6207179                                                     | 28 x 31     | 2.78              |
| 6201514                                                     | 35 x 38     | 3.35              |
| 6201525                                                     | 42 x 44,5   | 3.93              |
| 6201536                                                     | 54 x 57     | 5.59              |
| 6206530                                                     | 76.1 x 80,5 | 16.67             |
| 6206541                                                     | 88.9 x 94,9 | 21.73             |
| 6206552                                                     | 108 x 110   | 27.36             |

| C1408 bend 90° (2 x press) |           |                   |
|----------------------------|-----------|-------------------|
| Article no.                | dimension | conversion factor |
| 6201547                    | 12        | 0.40              |
| 6201558                    | 15        | 0.57              |
| 6201569                    | 18        | 0.72              |
| 6201571                    | 22        | 1.00              |
| 6201580                    | 28        | 1.48              |
| 6201591                    | 35        | 2.15              |

|         |      |       |
|---------|------|-------|
| 6201602 | 42   | 3.25  |
| 6201613 | 54   | 4.81  |
| 6340281 | 66,7 | 9.72  |
| 6208004 | 76.1 | 13.36 |
| 6208048 | 88.9 | 17.93 |
| 6208059 | 108  | 24.69 |

| C1411 bend 90° (press x male) |              |                   |
|-------------------------------|--------------|-------------------|
| Article no.                   | dimension    | conversion factor |
| 6201624                       | 12 x Ø12     | 0.37              |
| 6201635                       | 15 x Ø15     | 0.56              |
| 6201646                       | 18 x Ø18     | 0.72              |
| 6201657                       | 22 x Ø22     | 0.99              |
| 6201668                       | 28 x Ø28     | 1.52              |
| 6201679                       | 35 x Ø35     | 2.14              |
| 6201681                       | 42 x Ø42     | 3.23              |
| 6201690                       | 54 x Ø54     | 4.51              |
| 6340290                       | 66,7 x Ø66,7 | 9.80              |
| 6208061                       | 76.1 x Ø76.1 | 13.19             |
| 6208070                       | 88.9 x Ø88.9 | 16.05             |
| 6208081                       | 108 x Ø108   | 24.69             |

| C1413 bend 45° (2 x press) |           |                   |
|----------------------------|-----------|-------------------|
| Article no.                | dimension | conversion factor |
| 6201701                    | 15        | 0.48              |
| 6201712                    | 18        | 0.59              |
| 6201723                    | 22        | 0.80              |
| 6201734                    | 28        | 1.16              |
| 6201745                    | 35        | 1.64              |
| 6201756                    | 42        | 2.43              |
| 6201767                    | 54        | 3.48              |
| 6340312                    | 66,7      | 7.49              |
| 6208125                    | 76.1      | 9.88              |
| 6208136                    | 88.9      | 14.05             |
| 6208147                    | 108       | 18.77             |

| C1412 bend 45° (press x male) |              |                   |
|-------------------------------|--------------|-------------------|
| Article no.                   | dimension    | conversion factor |
| 6201778                       | 15 x Ø15     | 0.49              |
| 6201789                       | 18 x Ø18     | 0.59              |
| 6201791                       | 22 x Ø22     | 0.80              |
| 6201800                       | 28 x Ø28     | 1.15              |
| 6201811                       | 35 x Ø35     | 1.64              |
| 6201822                       | 42 x Ø42     | 2.40              |
| 6201833                       | 54 x Ø54     | 3.51              |
| 6340301                       | 66,7 x Ø66,7 | 8.05              |
| 6208092                       | 76.1 x Ø76.1 | 10.15             |
| 6208103                       | 88.9 x Ø88.9 | 22.84             |
| 6208114                       | 108 x Ø108   | 33.95             |

| C1425 bend pipe 90° (2 x male) |           |                   |
|--------------------------------|-----------|-------------------|
| Article no.                    | dimension | conversion factor |
| 6201844                        | Ø12       | 0.90              |
| 6201855                        | Ø15       | 1.21              |
| 6201866                        | Ø18       | 1.37              |
| 6201877                        | Ø22       | 1.63              |
| 6201888                        | Ø28       | 2.30              |
| 6201899                        | Ø35       | 4.73              |
| 6201901                        | Ø42       | 7.54              |
| 6201910                        | Ø54       | 11.47             |

| C1417 crossover (2 x male) |           |                   |
|----------------------------|-----------|-------------------|
| Article no.                | dimension | conversion factor |
| 6201921                    | Ø12       | 0.73              |
| 6201932                    | Ø15       | 0.99              |
| 6201943                    | Ø18       | 1.21              |
| 6201954                    | Ø22       | 1.79              |
| 6201965                    | Ø28       | 2.54              |

| C1414 tee (3 x press) |           |                   |
|-----------------------|-----------|-------------------|
| Article no.           | dimension | conversion factor |
| 6202482               | 12        | 0.59              |
| 6202493               | 15        | 0.88              |
| 6202504               | 18        | 1.05              |
| 6202515               | 22        | 1.33              |
| 6202526               | 28        | 1.93              |
| 6202537               | 35        | 2.65              |
| 6202548               | 42        | 3.63              |
| 6202559               | 54        | 5.32              |
| 6340334               | 66,7      | 10.04             |
| 6206442               | 76.1      | 15.59             |
| 6206453               | 88.9      | 19.75             |
| 6206464               | 108       | 30.47             |

| C1415 tee reduced (3 x press) |                  |                   |
|-------------------------------|------------------|-------------------|
| Article no.                   | dimension        | conversion factor |
| 6202768                       | 12 x 15 x 12     | 0.65              |
| 6202561                       | 15 x 12 x 15     | 0.77              |
| 6202779                       | 15 x 18 x 15     | 0.90              |
| 6202781                       | 15 x 22 x 15     | 1.02              |
| 6202570                       | 18 x 12 x 18     | 0.90              |
| 6202581                       | 18 x 15 x 18     | 1.00              |
| 6202790                       | 18 x 22 x 18     | 1.12              |
| 6202592                       | 22 x 12 x 22     | 1.12              |
| 6202603                       | 22 x 15 x 22     | 1.22              |
| 6202614                       | 22 x 18 x 22     | 1.25              |
| 6202801                       | 22 x 28 x 22     | 1.51              |
| 6202625                       | 28 x 15 x 28     | 1.60              |
| 6202636                       | 28 x 18 x 28     | 1.63              |
| 6202647                       | 28 x 22 x 28     | 1.72              |
| 6202658                       | 35 x 15 x 35     | 2.15              |
| 6202669                       | 35 x 18 x 35     | 2.17              |
| 6202671                       | 35 x 22 x 35     | 2.26              |
| 6202680                       | 35 x 28 x 35     | 2.46              |
| 6202691                       | 42 x 22 x 42     | 3.02              |
| 6202702                       | 42 x 28 x 42     | 3.22              |
| 6202713                       | 42 x 35 x 42     | 3.38              |
| 6202724                       | 54 x 22 x 54     | 4.33              |
| 6202735                       | 54 x 28 x 54     | 4.53              |
| 6202746                       | 54 x 35 x 54     | 4.69              |
| 6202757                       | 54 x 42 x 54     | 4.85              |
| 6340345                       | 66,7 x 28 x 66,7 | 8.10              |

|         |                    |       |
|---------|--------------------|-------|
| 6340356 | 66,7 x 35 x 66,7   | 8.30  |
| 6340367 | 66,7 x 42 x 66,7   | 8.54  |
| 6340378 | 66,7 x 54 x 66,7   | 8.88  |
| 6207047 | 76.1 x 22 x 76.1   | 11.79 |
| 6207058 | 76.1 x 28 x 76.1   | 11.95 |
| 6207069 | 76.1 x 35 x 76.1   | 12.10 |
| 6207071 | 76.1 x 42 x 76.1   | 12.26 |
| 6206475 | 76.1 x 54 x 76.1   | 13.15 |
| 6340389 | 76.1 x 66,7 x 76.1 | 14.26 |
| 6209654 | 88.9 x 22 x 88.9   | 15.67 |
| 6209665 | 88.9 x 28 x 88.9   | 15.51 |
| 6209676 | 88.9 x 35 x 88.9   | 15.79 |
| 6209687 | 88.9 x 42 x 88.9   | 15.84 |
| 6209698 | 88.9 x 54 x 88.9   | 16.20 |
| 6340391 | 88.9 x 66,7 x 88.9 | 16.26 |
| 6206486 | 88.9 x 76.1 x 88.9 | 18.52 |
| 6209711 | 108 x 22 x 108     | 23.85 |
| 6209720 | 108 x 28 x 108     | 24.09 |
| 6209731 | 108 x 35 x 108     | 24.28 |
| 6209742 | 108 x 42 x 108     | 23.43 |
| 6209753 | 108 x 54 x 108     | 24.32 |
| 6209764 | 108 x 76.1 x 108   | 26.51 |
| 6206497 | 108 x 88.9 x 108   | 26.98 |

| C1416 tee reduced (3 x press) |              |                   |
|-------------------------------|--------------|-------------------|
| Article no.                   | dimension    | conversion factor |
| 6206739                       | 22 x 15 x 15 | 1.17              |
| 6206741                       | 22 x 22 x 15 | 1.65              |

| C1418 tee female branch (press x female thread x press) |                    |                   |
|---------------------------------------------------------|--------------------|-------------------|
| Article no.                                             | dimension          | conversion factor |
| 6202812                                                 | 15 x Rp½" x 15     | 1.04              |
| 6202823                                                 | 18 x Rp½" x 18     | 1.20              |
| 6209841                                                 | 18 x Rp¾" x 18     | 1.46              |
| 6202834                                                 | 22 x Rp½" x 22     | 1.41              |
| 6206706                                                 | 22 x Rp¾" x 22     | 1.67              |
| 6341995                                                 | 22 x Rp1" x 22     | 2.70              |
| 6202845                                                 | 28 x Rp½" x 28     | 1.79              |
| 6207181                                                 | 28 x Rp¾" x 28     | 2.04              |
| 6209601                                                 | 28 x Rp1" x 28     | 3.09              |
| 6202856                                                 | 35 x Rp½" x 35     | 2.33              |
| 6207102                                                 | 35 x Rp¾" x 35     | 2.58              |
| 6209610                                                 | 35 x Rp1" x 35     | 3.64              |
| 6202867                                                 | 42 x Rp½" x 42     | 3.06              |
| 6207113                                                 | 42 x Rp¾" x 42     | 3.35              |
| 6209621                                                 | 42 x Rp1" x 42     | 4.41              |
| 6202878                                                 | 54 x Rp½" x 54     | 4.41              |
| 6207124                                                 | 54 x Rp¾" x 54     | 4.65              |
| 6207795                                                 | 54 x Rp1" x 54     | 5.70              |
| 6340400                                                 | 66,7 x Rp¾" x 66,7 | 8.26              |
| 6206508                                                 | 76.1 x Rp¾" x 76.1 | 11.88             |
| 6206519                                                 | 88.9 x Rp¾" x 88.9 | 16.59             |
| 6206521                                                 | 108 x Rp¾" x 108   | 23.93             |

| C1407 reducer (press x male) |              |                   |
|------------------------------|--------------|-------------------|
| Article no.                  | dimension    | conversion factor |
| 6202119                      | Ø15 x 12     | 0.37              |
| 6202121                      | Ø18 x 12     | 0.40              |
| 6202130                      | Ø18 x 15     | 0.49              |
| 6202141                      | Ø22 x 12     | 0.48              |
| 6202152                      | Ø22 x 15     | 0.54              |
| 6202163                      | Ø22 x 18     | 0.59              |
| 6202174                      | Ø28 x 15     | 0.69              |
| 6202185                      | Ø28 x 18     | 0.73              |
| 6202196                      | Ø28 x 22     | 0.80              |
| 6202207                      | Ø35 x 22     | 0.96              |
| 6202218                      | Ø35 x 28     | 1.14              |
| 6206651                      | Ø42 x 22     | 1.35              |
| 6206662                      | Ø42 x 28     | 1.42              |
| 6202229                      | Ø42 x 35     | 1.48              |
| 6206673                      | Ø54 x 18     | 2.11              |
| 6202231                      | Ø54 x 22     | 2.22              |
| 6202240                      | Ø54 x 28     | 1.85              |
| 6206684                      | Ø54 x 35     | 2.09              |
| 6202251                      | Ø54 x 42     | 2.21              |
| 6340213                      | Ø66,7 x 28   | 4.27              |
| 6340224                      | Ø66,7 x 35   | 3.21              |
| 6340235                      | Ø66,7 x 42   | 3.26              |
| 6340246                      | Ø66,7 x 54   | 3.58              |
| 6206387                      | Ø76.1 x 42   | 5.63              |
| 6206398                      | Ø76.1 x 54   | 5.67              |
| 6340257                      | Ø76.1 x 66,7 | 5.78              |
| 6206409                      | Ø88.9 x 54   | 7.28              |
| 6340268                      | Ø88.9 x 66,7 | 6.86              |
| 6206411                      | Ø88.9 x 76.1 | 8.72              |
| 6340279                      | Ø108 x 66,7  | 10.47             |
| 6206420                      | Ø108 x 76.1  | 11.00             |
| 6206431                      | Ø108 x 88.9  | 12.35             |

| C1405 straight connector (press x male thread) |                           |                   |
|------------------------------------------------|---------------------------|-------------------|
| Article no.                                    | dimension                 | conversion factor |
| 6202262                                        | 12 x R $\frac{3}{8}$ "    | 0.37              |
| 6202284                                        | 15 x R $\frac{1}{2}$ "    | 0.58              |
| 6202273                                        | 15 x R $\frac{3}{8}$ "    | 0.46              |
| 6202295                                        | 18 x R $\frac{1}{2}$ "    | 0.65              |
| 6202306                                        | 18 x R $\frac{3}{4}$ "    | 0.85              |
| 6206717                                        | 22 x R $\frac{1}{2}$ "    | 0.91              |
| 6202317                                        | 22 x R $\frac{3}{4}$ "    | 1.00              |
| 6206728                                        | 22 x R1"                  | 1.17              |
| 6209852                                        | 28 x R $\frac{3}{4}$ "    | 1.33              |
| 6202328                                        | 28 x R1"                  | 1.44              |
| 6341247                                        | 35 x R1"                  | 1.93              |
| 6202339                                        | 35 x R1 $\frac{1}{4}$ "   | 2.35              |
| 6202341                                        | 42 x R1 $\frac{1}{2}$ "   | 2.99              |
| 6202350                                        | 54 x R2"                  | 4.07              |
| 6340422                                        | 66,7 x R2 $\frac{1}{2}$ " | 8.06              |
| 6204781                                        | 76.1 x R2 $\frac{1}{2}$ " | 8.46              |
| 6204792                                        | 88.9 x R3"                | 14.47             |

| C1402 straight connector (press x female thread) |                          |                   |
|--------------------------------------------------|--------------------------|-------------------|
| Article no.                                      | dimension                | conversion factor |
| 6202361                                          | 12 x Rp $\frac{1}{2}$ "  | 0.54              |
| 6202372                                          | 15 x Rp $\frac{1}{2}$ "  | 0.58              |
| 6202383                                          | 18 x Rp $\frac{1}{2}$ "  | 0.80              |
| 6202394                                          | 18 x Rp $\frac{3}{4}$ "  | 0.86              |
| 6340202                                          | 22 x Rp $\frac{1}{2}$ "  | 1.12              |
| 6202405                                          | 22 x Rp $\frac{3}{4}$ "  | 1.06              |
| 6341984                                          | 22 x Rp1"                | 1.26              |
| 6207806                                          | 28 x Rp $\frac{1}{2}$ "  | 1.94              |
| 6209830                                          | 28 x Rp $\frac{3}{4}$ "  | 1.32              |
| 6202416                                          | 28 x Rp1"                | 1.94              |
| 6340917                                          | 35 x Rp $\frac{1}{2}$ "  | 2.64              |
| 6340928                                          | 35 x Rp $\frac{3}{4}$ "  | 2.48              |
| 6340939                                          | 35 x Rp1"                | 2.54              |
| 6206695                                          | 35 x Rp1 $\frac{1}{4}$ " | 1.73              |
| 6341192                                          | 42 x Rp1 $\frac{1}{2}$ " | 2.65              |
| 6341203                                          | 54 x Rp2"                | 4.44              |

| C1433 straight connector (male x female thread) |                         |                   |
|-------------------------------------------------|-------------------------|-------------------|
| Article no.                                     | dimension               | conversion factor |
| 6202427                                         | 12 x Rp $\frac{1}{2}$ " | 0.62              |
| 6209874                                         | 12 x Rp $\frac{3}{8}$ " | 1.22              |
| 6202438                                         | 15 x Rp $\frac{1}{2}$ " | 0.64              |
| 6202449                                         | 18 x Rp $\frac{1}{2}$ " | 0.70              |
| 6202451                                         | 18 x Rp $\frac{3}{4}$ " | 0.98              |
| 6202460                                         | 22 x Rp $\frac{1}{2}$ " | 0.74              |
| 6202471                                         | 22 x Rp $\frac{3}{4}$ " | 1.02              |

| C1404 straight connector euroconus (press x eurocone) |                         |                   |
|-------------------------------------------------------|-------------------------|-------------------|
| Article no.                                           | dimension               | conversion factor |
| 6208169                                               | 15 x $\frac{3}{4}$ " EK | 1.38              |
| 6208171                                               | 18 x $\frac{3}{4}$ " EK | 1.00              |

| C1428 angle adapter 90° (press x male thread) |                        |                   |
|-----------------------------------------------|------------------------|-------------------|
| Article no.                                   | dimension              | conversion factor |
| 6202064                                       | 12 x R $\frac{3}{8}$ " | 0.81              |
| 6202075                                       | 15 x R $\frac{3}{8}$ " | 0.75              |
| 6202086                                       | 15 x R $\frac{1}{2}$ " | 1.26              |
| 6202097                                       | 18 x R $\frac{1}{2}$ " | 1.17              |
| 6202108                                       | 22 x R $\frac{3}{4}$ " | 2.10              |

| C1409 angle adapter 90° (press x female thread) |                         |                   |
|-------------------------------------------------|-------------------------|-------------------|
| Article no.                                     | dimension               | conversion factor |
| 6341038                                         | 22 x Rp $\frac{1}{2}$ " | 2.20              |
| 6341049                                         | 28 x Rp $\frac{1}{2}$ " | 4.16              |
| 6341051                                         | 35 x Rp $\frac{1}{2}$ " | 6.27              |

| C1430 elbow 90° (press x male thread) |                         |                   |
|---------------------------------------|-------------------------|-------------------|
| Article no.                           | dimension               | conversion factor |
| 6201976                               | 12 x R $\frac{3}{8}$ "  | 0.54              |
| 6201987                               | 15 x R $\frac{3}{8}$ "  | 0.69              |
| 6201998                               | 15 x R $\frac{1}{2}$ "  | 0.85              |
| 6202009                               | 18 x R $\frac{1}{2}$ "  | 0.96              |
| 6202011                               | 22 x R $\frac{3}{4}$ "  | 2.00              |
| 6202020                               | 28 x R1"                | 2.16              |
| 6202031                               | 35 x R1 $\frac{1}{4}$ " | 3.54              |
| 6202042                               | 42 x R1 $\frac{1}{2}$ " | 4.51              |
| 6202053                               | 54 x R2"                | 6.47              |

| C1438 bend 90° (press x female thread) |                         |                   |
|----------------------------------------|-------------------------|-------------------|
| Article no.                            | dimension               | conversion factor |
| 6200931                                | 15 x Rp $\frac{3}{8}$ " | 0.63              |
| 6200942                                | 15 x Rp $\frac{1}{2}$ " | 0.86              |
| 6200953                                | 18 x Rp $\frac{1}{2}$ " | 1.04              |
| 6209577                                | 22 x Rp $\frac{1}{2}$ " | 3.09              |
| 6200964                                | 22 x Rp $\frac{3}{4}$ " | 1.44              |
| 6207025                                | 28 x Rp $\frac{1}{2}$ " | 2.44              |
| 6200986                                | 28 x Rp $\frac{3}{4}$ " | 2.02              |
| 6209588                                | 28 x Rp1"               | 2.90              |
| 6201063                                | 35 x Rp $\frac{1}{2}$ " | 4.35              |
| 6201074                                | 35 x Rp $\frac{3}{4}$ " | 3.73              |
| 6209599                                | 35 x Rp1"               | 3.19              |

| C1444 straight union (press x female thread) |                          |                   |
|----------------------------------------------|--------------------------|-------------------|
| Article no.                                  | dimension                | conversion factor |
| 6208906                                      | 15 x Rp $\frac{1}{2}$ "  | 1.72              |
| 6208917                                      | 18 x Rp $\frac{1}{2}$ "  | 1.77              |
| 6208928                                      | 22 x Rp $\frac{3}{4}$ "  | 2.62              |
| 6208939                                      | 28 x Rp1"                | 4.12              |
| 6208941                                      | 35 x Rp1 $\frac{1}{4}$ " | 5.47              |
| 6208950                                      | 42 x Rp1 $\frac{1}{2}$ " | 6.28              |
| 6208961                                      | 54 x Rp2"                | 10.99             |

| C1431 venturi insert |           |                   |
|----------------------|-----------|-------------------|
| Article no.          | dimension | conversion factor |
| 6202922              | Ø18       | 0.11              |
| 6202933              | Ø22       | 0.14              |
| 6202944              | Ø28       | 0.26              |

| C1439 reducer (2 x press) |           |                   |
|---------------------------|-----------|-------------------|
| Article no.               | dimension | conversion factor |
| 6201129                   | 22 x 15   | 0.56              |
| 6201131                   | 28 x 22   | 0.74              |

| C1426 flanged connector (press x flange) |             |                   |
|------------------------------------------|-------------|-------------------|
| Article no.                              | dimension   | conversion factor |
| 6341500                                  | 35 x DN32   | 23.27             |
| 6341511                                  | 42 x DN40   | 26.47             |
| 6341522                                  | 54 x DN50   | 32.01             |
| 6340323                                  | 66,7 x DN65 | 40.68             |
| 6206596                                  | 76.1 x DN65 | 39.69             |
| 6206607                                  | 88.9 x DN80 | 48.91             |
| 6206618                                  | 108 x DN100 | 57.12             |

| C1427 flanged connector PN6 (press x flange) |                 |                   |
|----------------------------------------------|-----------------|-------------------|
| Article no.                                  | dimension       | conversion factor |
| 6207080                                      | 66,7 DN65 PN6   | 23.16             |
| 6206629                                      | 76.1 x DN65 PN6 | 23.77             |
| 6206631                                      | 88.9 x DN80 PN6 | 36.84             |
| 6206640                                      | 108 x DN100 PN6 | 43.57             |

| C1434 crossing 90° (4 x press) |           |                   |
|--------------------------------|-----------|-------------------|
| Article no.                    | dimension | conversion factor |
| 6202889                        | 15        | 1.19              |
| 6202891                        | 18 x 15   | 1.31              |
| 6202900                        | 22 x 15   | 1.53              |
| 6202911                        | 22 x 18   | 1.65              |
| 6207135                        | 28 x 15   | 1.96              |
| 6207146                        | 28 x 18   | 2.09              |
| 6207157                        | 28 x 22   | 2.26              |

| C1429 stop end (1 x press) |           |                   |
|----------------------------|-----------|-------------------|
| Article no.                | dimension | conversion factor |
| 6202955                    | 15        | 0.25              |
| 6202966                    | 18        | 0.30              |
| 6202977                    | 22        | 0.44              |
| 6202988                    | 28        | 0.57              |
| 6202999                    | 35        | 0.74              |
| 6203001                    | 42        | 1.19              |
| 6203010                    | 54        | 1.79              |
| 6340171                    | 66,7      | 3.74              |
| 6206915                    | 76.1      | 5.33              |
| 6206926                    | 88.9      | 6.81              |
| 6206937                    | 108       | 9.10              |

| C1436 crossing pair double (press x male) |           |                   |
|-------------------------------------------|-----------|-------------------|
| Article no.                               | dimension | conversion factor |
| 6206750                                   | 12 x Ø12  | 2.73              |
| 6206761                                   | 15 x Ø12  | 3.36              |
| 6206772                                   | 15 x Ø15  | 3.95              |
| 6206783                                   | 18 x Ø12  | 3.67              |
| 6206794                                   | 18 x Ø15  | 4.02              |
| 6206948                                   | 22 x Ø12  | 4.25              |
| 6206805                                   | 22 x Ø15  | 4.56              |
| 6206816                                   | 28 x Ø12  | 4.96              |
| 6206827                                   | 28 x Ø15  | 6.35              |
| 6206838                                   | 35 x Ø15  | 6.60              |

| C1437 crossing pair single (press x male) |           |                   |
|-------------------------------------------|-----------|-------------------|
| Article no.                               | dimension | conversion factor |
| 6206959                                   | 12 x Ø12  | 2.06              |
| 6206961                                   | 15 x Ø12  | 2.68              |
| 6206849                                   | 15 x Ø15  | 2.99              |
| 6206851                                   | 18 x Ø12  | 3.00              |
| 6206860                                   | 18 x Ø15  | 3.19              |
| 6206871                                   | 22 x Ø12  | 3.93              |
| 6206882                                   | 22 x Ø15  | 3.67              |
| 6206893                                   | 28 x Ø12  | 4.27              |
| 6206904                                   | 28 x Ø15  | 4.42              |

| C1443 slip coupling (press x female thread) |                         |                   |
|---------------------------------------------|-------------------------|-------------------|
| Article no.                                 | dimension               | conversion factor |
| 6241312                                     | 22 x Rp $\frac{1}{2}$ " | 1.27              |
| 6241323                                     | 22 x Rp $\frac{3}{4}$ " | 1.67              |
| 6241268                                     | 28 x Rp $\frac{1}{2}$ " | 1.84              |
| 6241279                                     | 28 x Rp $\frac{3}{4}$ " | 1.65              |

| C1447 crossing (4 x press) |                   |                   |
|----------------------------|-------------------|-------------------|
| Article no.                | dimension         | conversion factor |
| 6341005                    | 35 x 28 x 35 x 28 | 2.90              |
| 6340972                    | 35 x 35 x 35 x 35 | 3.41              |
| 6341016                    | 42 x 28 x 42 x 28 | 3.81              |
| 6340983                    | 42 x 42 x 42 x 42 | 4.47              |
| 6341027                    | 54 x 28 x 54 x 28 | 5.12              |
| 6340994                    | 54 x 54 x 54 x 54 | 6.53              |

| C1446 union coupling (press x female thread) |           |                   |
|----------------------------------------------|-----------|-------------------|
| Article no.                                  | dimension | conversion factor |
| 6340521                                      | 15 x G¾"  | 0.83              |
| 6340532                                      | 18 x G¾"  | 0.84              |
| 6342479                                      | 22 x G¾"  | 1.23              |
| 6340554                                      | 22 x G1»  | 1.17              |
| 6340565                                      | 28 x G1¼" | 1.83              |
| 6340576                                      | 35 x G1½" | 2.17              |
| 6340587                                      | 42 x G1¾" | 2.89              |
| 6340598                                      | 54 x G¾"  | 4.85              |

| C1442 transition for grooved couplings (press x groove) |             |                   |
|---------------------------------------------------------|-------------|-------------------|
| Article no.                                             | dimension   | conversion factor |
| 6241301                                                 | 28 x 33,7   | 1.42              |
| 6241345                                                 | 35 x 42,4   | 1.93              |
| 6241356                                                 | 42 x 48,3   | 2.46              |
| 6241367                                                 | 54 x 60,3   | 3.49              |
| 6341181                                                 | 76.1 x 73,0 | 6.75              |
| 6340774                                                 | 76.1 x 76.1 | 6.79              |
| 6340785                                                 | 88.9 x 88.9 | 8.58              |
| 6340796                                                 | 108 x 114   | 12.42             |

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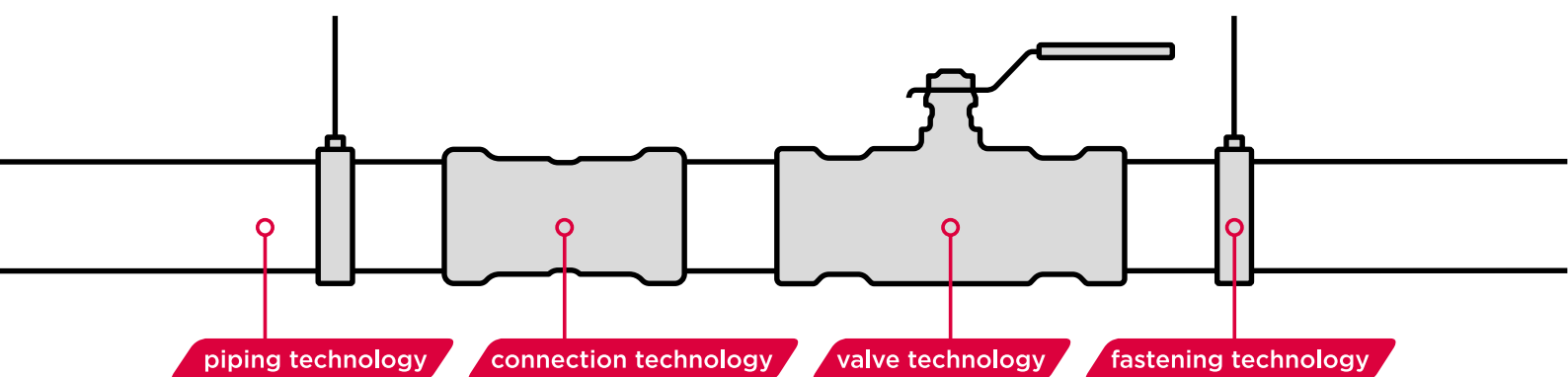
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