aalberts integrated piping systems

Apollo SmartPress HNBR

Environmental Product Declaration

in accordance with
ISO 14044, ISO 14040 and EN 15804

EN

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 piping 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 Apollo SmartPress Gas stainless fittings listed in the appendix -chapter 5- of this document. Valves and articles with bronze, brass or gunmetal components are not covered in this declaration. An Apollo SmartPress bend 90° FF 1", article number: 123456957, 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.

Version:	1.0
Date of issue:	01/12/2023
Author of LCA:	Fabian Bruns
Calculated in:	Ecochain, v4.2.0
Production data:	2022

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

Roland Voermans
COO

2 product

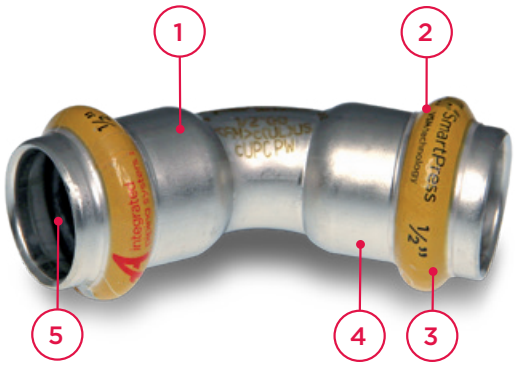
2.1 description and application purpose

Apollo® SmartPress is an innovative press connection system designed for joining ½-2" IPS ASTM A312 schedule 5S and 10S stainless steel pipe (approved for use with both AISI type 304/304L or 316/316L stainless). The Apollo SmartPress product range consists of V-profile IPS press fittings and valves produced from AISI 316L stainless steel alloy that are fitted with patented sealing elements for a guaranteed safe, leak-tight and lasting connection. The Apollo SmartPress system offers end-users a complete solution with maximum coverage of commercial and industrial applications requiring HNBR, EPDM or FKM sealing elements.

For each sealing element variation, available Apollo SmartPress fitting configurations include: couplings, caps, elbows, thread adapters, tees, threaded tees, fitting reducers, flange adapters, van stone flange adapters, and unions; Apollo SmartPress valve configurations include: optimized single-piece FullFlow ball valves and 3-piece ball valves (stem extensions and press x thread end-connections available).

2.2 Apollo SmartPress

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



1. fitting body
2. fitting bead
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 Apollo SmartPress bend 90° FF 1". This article was chosen as a reference because it is the most common product in the Apollo Smartpress 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, Apollo SmartPress 90° bend FF 1", consists of the following raw materials:

stainless steel:	308 gram
elastomers:	5.5 gram
plastic:	0.4 gram
total circa:	314 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, transport distances from materials suppliers were used. Class Euro5 trucks are used as the main means of transport and were used for calculation.
A3: Apollo SmartPress 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 Apollo SmartPress products. Therefore the green electricity Netherlands mix was used for calculating the electricity consumption.
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.
Transportation to customers within the USA is done by logistical partners. The main means of transport is by sea cargo and truck. The average transportation distance is calculated at 6600 km over sea and 802km by truck.
A5: The installation is done by use of a press tool which uses a considered negligible amount of energy.
B1-B7: An Apollo SmartPress fitting is designed for a lifetime of 50+ years of service. An Apollo SmartPress 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 estimated at 30km and modelled by use of 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 processer and is therefore calculated in phase D.
D: Transport to the recycler is estimated at 50km and done by use of trucks. Recycling rates for building materials in the USA were used to calculate the amount of material that went for recycling, landfill and incineration. 85% of stainless steel will be recycled, 7% of elastomers incinerated and 100% of PVC film incinerated. The rest of the product was modelled to go into 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 v4.3.0

Ecochain

Product:	03 SmartPress bend 90° 1" HNBR	LCA standard:	EN15804+A2 (2019)
Unit:	1 units	Standard database:	Dutch - Nationale Milieudatabase v3.3 (obv Ecoinvent 3.6)
Manufacturer:	Aalberts IPS - NL	Externally verified:	No
		Export date:	04-12-2023

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The LCA background information and project dossier have been registered in the online Ecochain application in the account Aalberts IPS - NL (2022). (☑ = 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	☑

Product stage

A1 Raw material supply A2 Transport A3 Manufacturing

Construction process stage

A4 Transport gate to site
A5 Assembly / Construction installation process

Use stage

B1 Use B2 Maintenance B3 Repair B4 Replacement B5 Refurbishment
B6 Operational energy use B7 Operational water use

End-of-Life stage

C1 De-construction demolition C2 Transport C3 Waste processing
C4 Disposal

Benefits and loads beyond the system boundaries

D Reuse- Recovery- Recycling- potential

environmental impacts and parameters

GWP-total = EF Climate Change [kg CO_2 eq]; GWP-f = EF Climate change - Fossil [kg CO_2 eq]; GWP-b = EF Climate Change - Biogenic [kg CO_2 eq]; GWP-luluc = EF Climate Change - Land use and LU change [kg CO_2 eq]; ODP = EF Ozone depletion [kg CFC11 eq]; AP = EF Acidification [mol H+ 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 [m3 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 [m3]; 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

results

Environmental impact	Unit	A1	A2	A3	A1-A3	A4	C2	D	Total
GWP-total	kg CO2 eq	1.421E+0	4.905E-2	9.776E-3	1.480E+0	5.365E-2	1.553E-3	-3.642E-1	1.171E+0
GWP-f	kg CO2 eq	1.410E+0	4.901E-2	8.335E-3	1.467E+0	5.361E-2	1.552E-3	-3.684E-1	1.154E+0
GWP-b	kg CO2 eq	1.061E-2	2.262E-5	1.404E-3	1.204E-2	9.445E-6	8.281E-7	3.879E-3	1.593E-2
GWP-luluc	kg CO2 eq	9.316E-4	1.796E-5	3.731E-5	9.868E-4	2.615E-5	5.425E-7	2.763E-4	1.290E-3
ODP	kg CFC11 eq	7.093E-8	1.082E-8	1.162E-9	8.291E-8	1.143E-8	3.526E-10	-8.370E-9	8.632E-8
AP	mol H+ eq	9.076E-3	2.845E-4	1.472E-4	9.507E-3	8.461E-4	6.342E-6	-1.421E-3	8.939E-3
EP-fw	kg P eq	5.412E-5	4.943E-7	3.048E-7	5.492E-5	4.209E-7	1.219E-8	-1.311E-5	4.225E-5
EP-m	kg N eq	1.527E-3	1.002E-4	3.056E-5	1.657E-3	2.286E-4	1.882E-6	-2.610E-4	1.627E-3
EP-T	mol N eq	1.741E-2	1.105E-3	5.057E-4	1.902E-2	2.536E-3	2.081E-5	-3.050E-3	1.852E-2
POCP	kg NMVOC eq	5.540E-3	3.154E-4	9.470E-5	5.950E-3	6.769E-4	6.371E-6	-2.100E-3	4.534E-3
ADP-mm	kg Sb eq	5.099E-5	1.242E-6	8.475E-7	5.308E-5	1.000E-6	4.200E-8	-1.901E-7	5.393E-5
ADP-f	MJ	1.532E+1	7.391E-1	9.146E-2	1.615E+1	7.625E-1	2.340E-2	-2.559E+0	1.437E+1
WDP	m3 depriv.	1.790E-1	2.644E-3	3.885E-3	1.856E-1	2.186E-3	6.514E-5	-7.029E-2	1.175E-1
PM	disease inc.	1.239E-7	4.400E-9	1.494E-9	1.298E-7	3.632E-9	1.080E-10	-2.128E-8	1.123E-7
IR	kBq U-235 eq	3.474E-2	3.097E-3	6.935E-5	3.791E-2	3.221E-3	1.023E-4	6.544E-3	4.778E-2
ETP-fw	CTUe	4.980E+1	6.590E-1	4.672E-1	5.093E+1	6.165E-1	1.874E-2	-1.239E+1	3.917E+1
HTP-c	CTUh	2.313E-8	2.138E-11	2.403E-11	2.317E-8	2.600E-11	5.266E-13	-4.676E-11	2.315E-8
HTP-nc	CTUh	6.603E-8	7.209E-10	7.270E-10	6.748E-8	6.258E-10	2.043E-11	7.223E-8	1.404E-7
SQP	Pt	7.772E+0	6.411E-1	3.219E+0	1.163E+1	4.741E-1	1.614E-2	-5.309E-1	1.159E+1
Resource use	Unit	A1	A2	A3	A1-A3	A4	C2	D	Total
PERE	MJ	2.391E-3	0	1.233E+0	1.236E+0	0	3.303E-4	1.540E-5	1.236E+0
PERM	MJ	3.895E+0	9.252E-3	0	3.905E+0	8.067E-3	0	7.639E-2	3.989E+0
PERT	MJ	3.898E+0	9.252E-3	1.233E+0	5.140E+0	8.067E-3	3.303E-4	7.641E-2	5.225E+0
PENRE	MJ	5.448E-1	0	9.739E-2	6.422E-1	0	2.485E-2	1.077E-3	6.681E-1
PENRM	MJ	1.577E+1	7.847E-1	0	1.655E+1	8.096E-1	0	-2.655E+0	1.471E+1
PENRT	MJ	1.631E+1	7.847E-1	9.739E-2	1.720E+1	8.096E-1	2.485E-2	-2.654E+0	1.538E+1
PET	MJ	2.021E+1	7.940E-1	1.331E+0	2.234E+1	8.177E-1	2.518E-2	-2.578E+0	2.060E+1
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	6.125E-3	9.001E-5	1.232E-4	6.338E-3	7.503E-5	2.465E-6	-1.327E-3	5.089E-3

Output flows and waste categories	Unit	A1	A2	A3	A1-A3	A4	C2	D	Total
HWD	kg	3.025E-5	1.873E-6	5.602E-11	3.213E-5	1.518E-6	6.134E-8	-4.457E-5	-1.086E-5
NHWD	kg	1.653E+0	4.688E-2	3.897E-5	1.700E+0	3.273E-2	1.119E-3	1.719E-2	1.751E+0
RWD	kg	3.260E-5	4.853E-6	2.526E-11	3.745E-5	5.107E-6	1.596E-7	2.473E-6	4.519E-5
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

Ecochain

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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.

500H	Apollo SmartPress HNBR straight coupling (2 x press)	
article no.	**dimension**	**conversion factor**
123456811	½"	0,29
123456812	¾"	0,36
123456813	1"	0,65
123456814	1½"	0,94
123456815	2"	1,34

501H	Apollo SmartPress HNBR slip coupling (2 x press)	
article no.	**dimension**	**conversion factor**
123456816	½"	0,37
123456817	¾"	0,44
123456818	1"	0,88
123456819	1½"	1,38
123456820	2"	2,25

503H	Apollo SmartPress HNBR straight connector (press x female thread)	
article no.	**dimension**	**conversion factor**
123456830	½" x FPT½"	0,33
123456831	¾" x FPT½"	0,36
123456832	¾" x FPT¾"	0,38
123456833	1" x FPT½"	0,66
123456834	1" x FPT¾"	0,59
123456835	1" x FPT1"	0,72
123456836	1½" x FPT1"	1,23
123456837	1½" x FPT1¼"	0,99
123456838	1½" x FPT1½"	1,37
123456839	2" x FPT1¼"	2,07
123456840	2" x FPT1½"	1,86
123456841	2" x FPT2"	1,86

504H	Apollo SmartPress HNBR straight connector (press x male thread)	
article no.	**dimension**	**conversion factor**
123456821	½" x MPT½"	0,26
123456822	¾" x MPT½"	0,32
123456823	¾" x MPT¾"	0,39
123456824	¾" x MPT1	0,52
123456825	1" x MPT¾"	0,56
123456826	1" x MPT1"	0,62
123456827	1½" x MPT¾"	0,95
123456828	1½" x MPT1½"	1,32
123456829	2" x MPT2"	1,67

506-2H	Apollo SmartPress HNBR bend 45° (press x male)	
article no.	**dimension**	**conversion factor**
123456857	½"	0,32
123456858	¾"	0,43
123456859	1"	0,80
123456860	1½"	1,33
123456861	2"	2,06

506H	Apollo SmartPress HNBR bend 45° (2 x press)	
article no.	**dimension**	**conversion factor**
123456852	½"	0,32
123456853	¾"	0,42
123456854	1"	0,73
123456855	1½"	1,27
123456856	2"	2,08

507-2H	Apollo SmartPress HNBR bend 90° (press x male)	
article no.	**dimension**	**conversion factor**
123456847	½"	0,36
123456848	¾"	0,51
123456849	1"	0,94
123456850	1½"	1,73
123456851	2"	2,78

507H	Apollo SmartPress HNBR bend 90° (2 x press)	
article no.	**dimension**	**conversion factor**
123456842	½"	0,37
123456843	¾"	0,50
123456844	1"	1,00
123456845	1½"	1,66
123456846	2"	2,49

511H	Apollo SmartPress HNBR tee (3 x press)	
article no.	**dimension**	**conversion factor**
123456862	½"	0,49
123456863	¾"	0,66
123456864	1"	1,07
123456865	1½"	1,78
123456866	2"	2,61

511RH	Apollo SmartPress HNBR tee reduced (3 x press)	
article no.	**dimension**	**conversion factor**
123456867	¾" x ¾" x ½"	0,55
123456868	1" x 1" x ½"	0,92
123456869	1" x 1" x ¾"	0,94
123456870	1½" x 1½" x ½"	1,50
123456871	1½" x 1½" x ¾"	1,52
123456872	1½" x 1½" x 1"	1,64
123456873	2" x 2" x ½"	2,16
123456874	2" x 2" x ¾"	2,18
123456875	2" x 2" x 1"	2,56
123456876	2" x 2" x 1½"	2,44

517H	Apollo SmartPress HNBR stop end (1 x press)	
article no.	**dimension**	**conversion factor**
123456919	½"	0,25
123456920	¾"	0,30
123456921	1"	0,57
123456922	1½"	0,97
123456923	2"	1,36

518H	Apollo SmartPress HNBR reducer (male x press)	
article no.	**dimension**	**conversion factor**
123456897	Ø¾" x ½"	0,32
123456898	Ø1" x ½"	0,46
123456889	Ø1" x ¾"	0,46
123456890	Ø1½" x ½"	0,69
123456891	Ø1½" x ¾"	0,71
123456892	Ø1½" x 1"	0,82
123456893	Ø2" x ½"	0,96
123456894	Ø2" x ¾"	0,98
123456895	Ø2" x 1"	1,10
123456896	Ø2" x 1½"	1,18

5712H	Apollo SmartPress HNBR tee female thread (press x female thread x press)	
article no.	**dimension**	**conversion factor**
123456877	½" x ½" x FPT½"	0,53
123456878	¾" x ¾" x FPT½"	0,67
123456879	¾" x ¾" x FPT¾"	0,68
123456880	1" x 1" x FPT½"	1,08
123456881	1" x 1" x FPT¾"	1,00
123456882	1" x 1" x FPT1"	1,22
123456883	1½" x 1½" x FPT½"	1,68
123456884	1½" x 1½" x FPT¾"	1,57
123456885	1½" x 1½" x FPT1	1,79
123456886	2" x 2" x FPT½"	2,45
123456887	2" x 2" x FPT¾"	2,23
123456888	2" x 2" x FPT1"	2,56

5733H	Apollo SmartPress HNBR flanged connector PN6 (1 x press)	
article no.	**dimension**	**conversion factor**
123456909	½"	4,23
123456910	¾"	5,14
123456911	1"	6,04
123456912	1½"	4,77
123456913	2"	7,08

5772H	Apollo SmartPress HNBR van stone class 150 (1 x press)	
article no.	**dimension**	**conversion factor**
123456904	½"	1,88
123456905	¾"	2,39
123456906	1"	3,60
123456907	1½"	5,77
123456908	2"	8,29

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our sustainable spirit

reduce rethink recycle

more information?

For a complete and up-to-date product range and our additional services, visit: www.aalberts-ips.eu

Would you like to make an appointment to meet an account manager in your region or receive advice and support from one of our experts?
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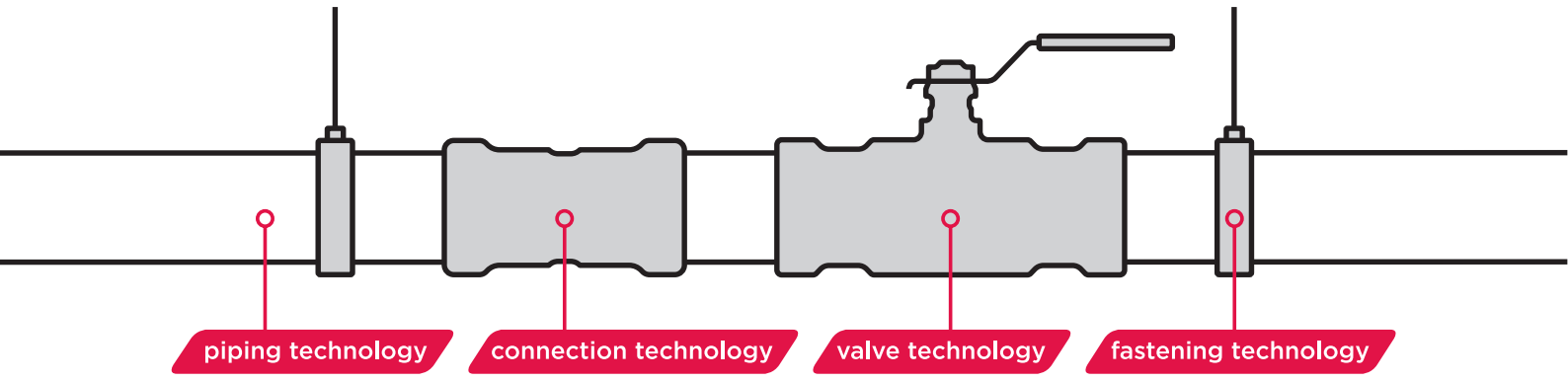

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