aalberts integrated piping systems

VSH XPress Copper Gas

35 - 54 mm

Environmental Product Declaration

in accordance with
ISO 14044, ISO 14040 and EN 15804

EN EPD

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.

1.3 declared Product

This document applies to the VSH XPress Copper Gas fittings listed in the appendix -chapter 6- of this document. Articles with brass or components are not covered in this declaration. A bend 90° FF 42, article number 4803887, has been used as a reference article.

1.4 LCA standards

This EPD is generated according to the following standards and requirements of: NEN-EN ISO 14040 [1], NEN-EN ISO 14044 [2], NEN-EN ISO 14025 [3] and EN15804+A2:2019 [4]

1.5 calculation method

LCA standard:	EN15804+A2 (2019)
Database:	Worldwide - Ecoinvent v 3.8 Cut-Off
PCR:	CEN standard 15804 serves as the Core PCR

1.6 statement comparability EPD

EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with the requirements in EN15804. EPD data may not be comparable if the datasets used are not developed in accordance with EN15804 and if the background systems are not based on the same database.

1.7 verification statement

This EPD is a preliminary self-declared version and is in the process of getting externally verified.

1.8 EPD details

Version:	1.0
Date of issue:	01/02/2025
Author of LCA:	Fabian Bruns
Production data:	2023
EPD created with:	LCA software Ecochain Helix | version 4.3.1

Hilversum, february 2025
Aalberts integrated piping systems B.V.

Roland Voermans
COO

2 product

2.1 description and application purpose

is a complete piping system suitable for a wide variety of applications, from drinking water, heating and solar installations to cooling water and compressed air systems. The range consists of press fittings and pressing tools. The fittings are pressed with jaws and slings with M-profile and are available from 35 up to and including 54 mm.

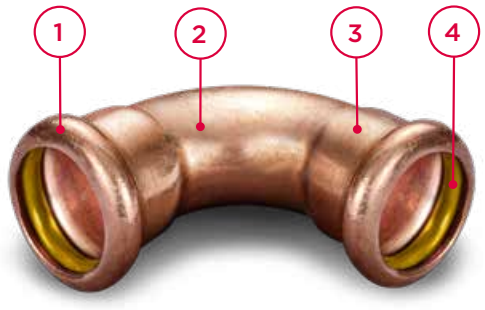
- fittings are made of CU-DHP copper, bronze CC499K (Rg5) or brass (CW024A).
- VSH XPress Copper can be used with copper pipes in accordance with EN 1057 R220/R250/R290.

The o-ring has decisive influence on the performance:

- HNBR (Hydrogenated Nitrile Butadiene Rubber), yellow coloured

2.2 VSH XPress Copper Gas fittings

fittings are produced in our modern, automated factories in France and Hungary. The product range includes fittings and tools. VSH XPress 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. insertion socket
4. o-ring

2.3 product composition

The reference article, 90° bend FF 42, article number 4803887, consists of the following raw materials:

copper:	245 gram
elastomers:	4.1 gram
total circa:	249 gram

2.4 range and conversion factors

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 6-.

3 life cycle assessment scope

3.1 system boundaries

This EPD can be regarded as a Cradle-to-Gate with options, A4-A5, C1-C4 and D. The following phases are considered not relevant for this product range: B.

3.2 process flowchart

A simplified overview of the VSH XPress Copper Gas production process flow:

3.3 data quality

For module A1, specific data for product compositions as provided by the manufacturer are used. For module A2, transportation data of the raw materials used to the production site was collected. For module A3, energy consumption and waste production data was collected for production year 2023. The used background processes are derived from Worldwide - Ecoinvent v 3.8 Cut-Off.

3.4 allocation

Allocation was carried out in accordance with the provisions of the EN15804. All manufacturing inputs (energy and auxiliary materials) were measured and assessed.

3.5 cut-off criteria

All relevant inputs and outputs - like emissions, energy and materials - have been taken into account in this LCA. In accordance with EN15804, the total neglected input flows per module does not exceed 5% of energy usage and mass.

3.6 assumptions and background information

A1-A3: For the raw material supply 100% of the materials on the bill of materials were modelled using data from suppliers when available or otherwise from the Ecoinvent database. Also included were copper waste and ancillary materials like water, lubrication oil, bags and cardboard boxes.
VSH XPress Copper Gas 35 - 54 mm products are manufactured in the factory of Aalberts integrated piping systems located in Budapest, Hungary. Specific transport distances of materials to Aalberts integrated piping systems from material suppliers were used. Class Euro5 trucks are used as the main means of transport and were used for calculation.
This factory makes use of the national electricity mix for manufacturing the VSH XPress copper Gas products. Therefore the national electricity mix Hungary was used for calculating the electricity consumption.
A4-A5: Transport from the factory in Budapest to the warehouse in Zeewolde is done by Aalberts integrated piping systems and logistical partners. The main means of transport is by Class Euro5 trucks or better performing engine. The transportation distance is calculated at 1375 km. Transportation to customers within Europe is done by logistical partners. The main means of transport in Europe is by Class Euro5 trucks or better performing engine. The average transportation distance is calculated at 662 km. The installation is done by use of a press tool which uses a considered negligible amount of energy.
B1-B7: A VSH XPress Copper Gas fitting is designed for a lifetime of 50+ years of service. It does not need any maintenance, repair, replacement or refurbishment and has no operational water or energy use during its lifetime. This module was therefore not assessed (ND).
C1-C4: The piping system is assumed to be stripped as a whole from a building in the demolition process by means of diesel powered machines. The diesel modelled for the demolition process is 0.001 L/Kg of a fitting.
The following transport distances were used; 50 km for waste separation, 100 km for recycling and 150 km for incineration or landfill by means of unspecified lorry truck.
For building materials the values from the Nationale Milieu Database were used [5] and for the cardboard packaging the confederation of European paper industries [6] value was used to calculate the amount of material that went for recycling, landfill and incineration.

material	recycling rate	incineration	landfill
copper	95%	-	5%
copper production waste	100%	-	-
EPDM o-ring	-	80%	20%
packaging foil	-	80%	20%
packaging box	70,5%	29,5%	-

D: Recycling rates described in Module C were used to calculate the benefits and loads beyond the system in module D.

4 life cycle assessment results

The table below shows the results of Elbow 90 (2 x press), diameter 22 mm according to EN15804+A2 (2019)

impact category	unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D	total
climate change (EN15804+A2)	kg CO_2 eq	0.671	0.013	0.337	1.021	0.098	8.169E-4	1.682E-3	0.014	0.024	-0.429	**0.731**
climate change - fossil	kg CO_2 eq	0.68	0.013	0.334	1.026	0.098	8.166E-4	1.681E-3	0.014	0.013	-0.439	**0.714**
climate change - biogenic (EN15804+A2)	kg CO_2 eq	-9.629E-3	5.374E-5	3.307E-3	-6.269E-3	9.595E-5	2.271E-7	7.760E-7	6.613E-4	0.011	0.011	**0.016**
climate change - land use and LU change (EN15804+A2)	kg CO_2 eq	1.033E-3	7.762E-6	2.777E-4	1.318E-3	4.676E-5	6.436E-8	6.159E-7	3.175E-5	1.423E-6	-3.064E-4	**1.092E-3**
ozone depletion	kg CFC11 eq	7.589E-8	2.525E-9	2.962E-8	1.080E-7	2.078E-9	1.764E-10	3.710E-10	5.590E-10	7.974E-10	-3.482E-8	**7.719E-8**
acidification	mol H+ eq	0.021	5.663E-5	1.852E-3	0.023	3.115E-4	8.541E-6	9.748E-6	8.724E-5	2.483E-5	-0.02	**4.168E-3**
eutrophication, freshwater	kg P eq	1.810E-4	2.767E-7	4.454E-5	2.258E-4	7.643E-7	2.973E-9	1.696E-8	1.525E-7	4.097E-8	-1.541E-4	**7.272E-5**
eutrophication, marine	kg N eq	2.092E-3	1.292E-5	2.386E-4	2.344E-3	1.059E-4	3.770E-6	3.435E-6	3.097E-5	9.377E-6	-1.657E-3	**8.401E-4**
eutrophication, terrestrial	mol N eq	0.031	1.432E-4	2.722E-3	0.034	1.131E-3	4.137E-5	3.787E-5	3.342E-4	1.006E-4	-0.028	**7.897E-3**
photochemical ozone formation	kg NMVOC eq	7.065E-3	6.116E-5	8.759E-4	8.002E-3	4.654E-4	1.137E-5	1.081E-5	1.058E-4	2.809E-5	-6.151E-3	**2.473E-3**
resource use, minerals and metals	kg Sb eq	3.417E-4	4.588E-7	2.501E-6	3.447E-4	3.067E-7	1.252E-9	4.259E-8	7.757E-8	8.702E-8	-3.268E-4	**1.843E-5**
resource use, fossils	MJ	10.605	0.369	8.614	19.588	1.354	0.011	0.025	0.181	0.057	-5.619	**15.599**
water use	m^3 depriv.	0.45	7.732E-3	0.189	0.646	5.531E-3	1.505E-5	9.068E-5	9.148E-4	6.389E-4	-0.389	**0.264**
particulate matter	disease inc.	7.911E-8	1.789E-9	4.511E-9	8.541E-8	7.575E-9	2.260E-10	1.509E-10	1.295E-9	3.516E-10	-6.910E-8	**2.590E-8**
Ionising radiation	kBq U-235 eq	0.044	5.821E-4	0.079	0.124	6.789E-4	4.816E-5	1.062E-4	1.968E-4	2.296E-4	-0.027	**0.098**
ecotoxicity, freshwater	CTUe	370.195	0.179	3.959	374.333	1.313	6.775E-3	0.023	0.236	0.089	-349.564	**26.437**
human toxicity, cancer	CTUh	8.078E-9	6.637E-12	1.352E-10	8.220E-9	4.354E-11	2.368E-13	7.332E-13	7.744E-12	3.284E-12	-7.655E-9	**6.209E-10**
human toxicity, non-cancer	CTUh	5.827E-7	3.155E-10	4.151E-9	5.872E-7	1.255E-9	5.816E-12	2.473E-11	1.859E-10	1.254E-10	-5.568E-7	**3.201E-8**
land use	Pt	9.367	0.348	1.522	11.236	0.811	1.438E-3	0.022	0.13	0.053	-5.933	**6.321**
use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	0.22	7.879E-3	0.746	0.973	0.021	0	0	3.154E-3	7.601E-4	0.013	**1.012**
use of renewable primary energy resources used as raw materials	MJ	0.105	0	0	0.105	0	6.079E-5	3.174E-4	3.174E-4	1.659E-4	-1.874	**-1.769**
total use of renewable primary energy resources	MJ	2.6	7.879E-3	0.746	3.353	0.021	6.079E-5	3.174E-4	3.472E-3	9.260E-4	-1.861	**1.518**
use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	0.836	0.397	9.017	10.25	1.44	0	0	0.166	0.058	0.129	**12.042**
use of non-renewable primary energy resources used as raw materials	MJ	0.052	0	0	0.052	0	0.012	0.027	0.027	3.123E-3	-6.108	**-5.987**
total use of non-renewable primary energy resources	MJ	11.308	0.397	9.017	20.722	1.44	0.012	0.027	0.193	0.061	-5.979	**16.475**
total energy	MJ	1.056	0.405	9.762	11.223	1.461	0.012	0.027	0.196	0.062	-7.84	**5.141**
use of secondary material	kg	0.147	0	0	0.147	0	0	0	0	0	0	**0.147**
use of renewable secondary fuels	MJ	0	0	0	0	0	0	0	0	0	0	**0**
use of non-renewable secondary fuels	MJ	0	0	0	0	0	0	0	0	0	0	**0**
use of net fresh water	m^3	0.012	2.012E-4	6.300E-3	0.018	1.800E-4	5.784E-7	3.088E-6	3.687E-5	2.450E-5	-9.822E-3	**8.916E-3**

impact category	unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D	total
hazardous waste disposed	kg.	1.183E-5	2.350E-7	4.694E-6	1.676E-5	8.624E-6	3.061E-8	6.424E-8	1.026E-6	1.529E-7	-6.547E-6	**2.011E-5**
non-hazardous waste disposed	kg	0.382	0.028	0.027	0.437	0.066	1.331E-5	1.608E-3	9.561E-3	0.017	-0.339	**0.192**
radioactive waste disposed	kg	4.715E-5	7.020E-7	6.502E-5	1.129E-4	4.401E-7	7.804E-8	1.665E-7	2.248E-7	3.540E-7	-2.498E-5	**8.915E-5**
components for re-use	kg	0	0	0	0	0	0	0	0	0	0	**0**
materials for recycling	kg	0	0	0	0	0	0	0	0	0	0	**0**
materials for energy recovery	kg	0	0	0	0	0	0	0	0	0	0	**0**
exported energy	MJ	0	0	0	0	0	0	0	0	0	0	**0**
exported energy thermic	MJ	0.013	0	0	0.013	0	0	0	0	0	0	**0.013**
exported energy electric	MJ	7.560E-3	0	0	7.560E-3	0	0	0	0	0	0	**7.560E-3**

5 References

1. ISO 14040: Environmental management - Life cycle assessment – Principles and Framework', International Organization for Standardization, ISO14040:2006
2. ISO 14044: Environmental management - Life cycle assessment - Requirements and guidelines', International Organization for Standardization, ISO14044:2006
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4. NEN-EN 15804:2012+A2:2019: Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products',
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5. Forfaitaire waarden (mei 2024): forfaitaire waarden voor verwerking-scenario's einde leven behorende bij: Bepalingsmethode milieuprestatie bouwwerken, https://milieudatabase.nl/nl/milieuprestatie/bepalingsmethode
6. the paper value chain reached a 70.5% recycling rate in 2022': CEPI press release 31 july 2023, https://www.cepi.org/wp-content/uploads/2023/07/EPRC-press-release_moniroting-report-2022_FINAL_31072023.pdf

6 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.

G7270	straight coupling (2 x press)	
article no.	**dimensions**	**conversion factor**
4804470	35	0.39
4804481	42	0.56
4804492	54	0.80

G7270S	slip coupling (2 x press)	
article no.	**dimensions**	**conversion factor**
4804547	35	0.61
4804558	42	0.89
4804569	54	1.25

G7002A	bend 90° (2 x press)	
article no.	**dimensions**	**conversion factor**
4803876	35	0.72
4803887	42	1.00
4803898	54	1.47

G7001A	bend 90° (press x male)	
article no.	**dimensions**	**conversion factor**
4803801	35	0.76
4803810	42	1.09
4803821	54	1.61

G7041	bend 45° (2 x press)	
article no.	**dimensions**	**conversion factor**
4804019	35	0.57
4804021	42	0.82
4804030	54	1.14

G7040	bend 45° (press x male)	
article no.	**dimensions**	**conversion factor**
4803942	35	0.59
4803953	42	0.87
4803964	54	1.27

G7130	tee (3 x press)	
article no.	**dimensions**	**conversion factor**
4804140	35	1.09
4804151	42	1.45
4804162	54	2.10

G7125	tee reduced (3 x press)	
article no.	**dimensions**	**conversion factor**
4804250	35 x 22 x 35	0.98
4804261	35 x 28 x 35	1.07
4804272	42 x 28 x 42	1.33
4804283	42 x 35 x 42	1.33
4807638	42 x 22 x 42	1.04
4807649	54 x 22 x 54	1.61
4804294	54 x 42 x 54	2.32

G6130G	tee female branch (press x female thread x press)	
article no.	**dimensions**	**conversion factor**
4804899	35 x Rp½" x 35	1.09
4804901	35 x Rp1" x 35	1.11
4804910	42 x Rp½" x 42	1.36
4804932	54 x Rp½" x 54	2.15

G7243	reducer (male x press)	
article no.	**dimensions**	**conversion factor**
4804360	Ø35 x 22	0.35
4804371	Ø35 x 28	0.36
4804382	Ø42 x 22	0.46
4804393	Ø42 x 28	0.53
4804404	Ø42 x 35	0.53
4804415	Ø54 x 35	0.63
4804426	Ø54 x 42	0.77
4807286	Ø54 x 28	0.61

G6243G	straight connector (press x male thread)	
article no.	**dimensions**	**conversion factor**
4803513	35 x R1"	0.56
4803524	35 x R1¼"	0.54
4803535	42 x R1¼"	0.95
4803546	42 x R1¼"	0.94
4803557	54 x R2"	1.11

G6270G	straight connector (press x female thread)	
article no.	**dimensions**	**conversion factor**
4803634	35 x Rp1¼"	0.59
4803645	42 x Rp1½"	0.77
4803656	54 x Rp2"	1.23

G6092G	adapter bend 90° (press x male thread)	
article no.	**dimensions**	**conversion factor**
4804800	35 x R1¼"	1.29
4804811	42 x R1½"	1.86
4804822	54 x R2"	2.68

G6090G	adapter bend 90° (press x female thread)	
article no.	**dimensions**	**conversion factor**
4804723	35 x Rp1¼"	1.24
4804734	42 x Rp1½"	1.76
4804745	54 x Rp2"	2.73

G6340	straight union (2 x press)	
article no.	**dimensions**	**conversion factor**
4803700	35	2.07
4803711	42	2.74
4803722	54	4.44

G7301	stop end (1 x press)	
article no.	**dimensions**	**conversion factor**
4804613	35	0.30
4804624	42	0.41
4804635	54	0.54

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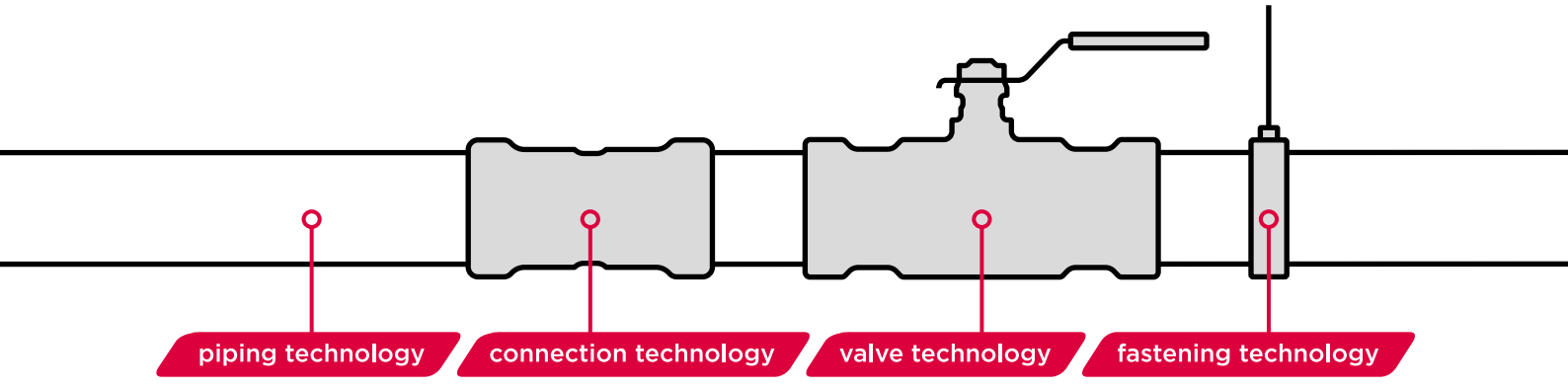

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