ENVIRONMENTAL PRODUCT DECLARATION

In accordance with EN 15804+A2 & ISO 14025

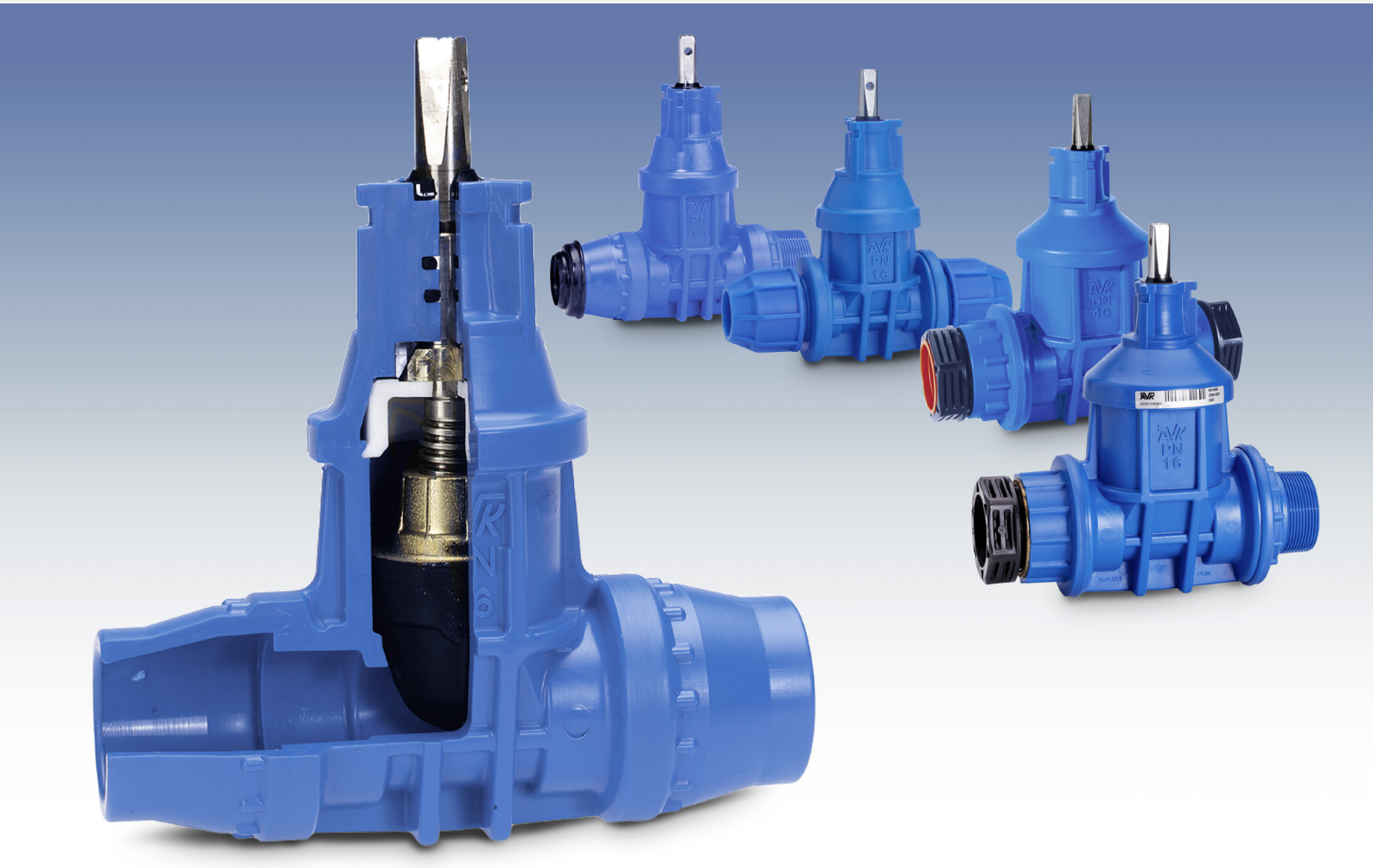
Service connection valves, POM

AVK International A/S

EPD HUB, HUB-3997
Published on 25.09.2025, last updated on 25.09.2025, valid until 24.09.2030

Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804, EPD Hub PCR version 1.1 (5 December 2023) and JRC characterization factors EF 3.1.

Created with One Click LCA



GENERAL **INFORMATION**

This EPD is intended for business-to-business and/or business-to-consumer communication. The manufacturer has the sole ownership, liability, and responsibility for the 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 EN 15804 and if they are not compared in a building context.

ABOUT THE MANUFACTURER

AVK International A/S is part of the AVK Group, a privately owned Danish company employing +5,300 people worldwide. At AVK International A/S, we manufacture valves and accessories, and thanks to additional product types from other AVK factories, we are able to offer a wide selection of high-quality products to the markets in our geographical region covering Continental Europe, Central Asian and Caucasian countries and North Africa.

MANUFACTURER	
Manufacturer	AVK International A/S
Address	Smedeskovvej 40, 8464 Galten, Denmark
Contact details	julvib@avk.dk
Website	www.avkvalves.eu

EPD STANDARDS, SCOPE AND VERIFICATION	
Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804:2012+A2:2019/AC:2021 and ISO 14025
PCR	EPD Hub Core PCR Version 1.1, 5 Dec 2023
Sector	Construction product
Category of EPD	Third party verified EPD
Parent EPD number	-
Scope of the EPD	Cradle to gate with options, A4-A5, and modules C1-C4, D
EPD author	Julie Vibe
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
EPD verifier	Magaly Gonzalez Vazquez, as an authorized verifier acting for EPD Hub Limited

PRODUCT	
Product name	Service connection valve, POM
Additional labels	
Product reference	see annex
Place(s) of raw material origin	Europe and Asia
Place of production	Galten, Denmark
Place(s) of installation and use	Europe, ROW
Period for data	01/10/2023-30/09/2024
Averaging in EPD	Multiple products
Variation in GWP-fossil for A1-A3 (%)	+0%/–15%
GTIN (Global Trade Item Number)	-
NOBB (Norwegian Building Product Database)	-
A1-A3 Specific data (%)	33.7

ENVIRONMENTAL DATA SUMMARY	
Declared unit	1 kg of POM Service Connection Valve
Declared unit mass	1 kg
GWP-fossil, A1-A3 ($kgCO_2e$)	6.09E+00
GWP-total, A1-A3 ($kgCO_2e$)	6.01E+00
Secondary material, inputs (%)	23.1
Secondary material, outputs (%)	39
Total energy use, A1-A3 (kWh)	17.4
Net freshwater use, A1-A3 (m^3)	0.34

PRODUCT **AND MANUFACTURER**

PRODUCT DESCRIPTION

AVK International's POM service connection valves are designed for underground installation in water distribution networks. AVK resilient seated service connection valves are designed with built-in safety in every detail.

The wedge is vulcanized with AVK's own drinking water approved EPDM rubber compound. It features an outstanding durability due to the ability of the rubber to regain its original shape, the double bonding vulcanization process and the sturdy wedge design. The corrosion free materials and the high strength stem safeguard the unmatched reliability. The valves within this study do not embody any motorized or electric components. AVK International's valves require no maintenance or inspection once installed and are only assumed to need repair/replacement if exterior damage is inflicted upon them.

The EPD is an average EPD covering the POM valves in series 16. The EPD was generated using a representative product as the averaging method. The results of the EPD are calculated based on data for the variant 16/50-010 DN32, as this was determined to be the most representative variant.

PRODUCT RAW MATERIAL MAIN COMPOSITION		
Raw material category	Amount, mass %	Material origin
Metals	44.6	Asia
Minerals	-	-
Fossil materials	55.4	Europe
Bio-based materials	-	-

BIOGENIC CARBON CONTENT Product's biogenic carbon content at the factory gate	
Biogenic carbon content in product, kg C	-
Biogenic carbon content in packaging, kg C	0.0295

FUNCTIONAL UNIT AND SERVICE LIFE	
Declared unit	1 kg of POM Service Connection Valve
Mass per declared unit	1 kg
Functional unit	-
Reference service life	-

SUBSTANCES, REACH - VERY HIGH CONCERN		
Substances of very high concern	EC	CAS
Brass: lead (Pb)	231-100-4	7439-92-1

Further information can be found at:
www.avkvalves.eu

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY
This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
x	x	x	x	x	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

MANUFACTURING AND PACKAGING (A1-A3)
The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

A market-based approach is used in modelling the electricity mix utilized in the factory.

The service connection valve is composed of primarily POM along with components of steel, rubber and plastic. The body and bonnet are made of the plastic material POM and sourced from European suppliers. The wedge made of brass is casted and sourced from European suppliers. The steel is received as rods and processed into the stem component. Smaller brass components are manufactured and processed on site from brass rods. Steel and brass raw materials are sourced from Asia and Europe. Smaller rubber and plastic components are sourced and received as finished components and assembled into the valve. Rubber and plastic parts are moulded and sourced primarily from local suppliers. The A2 transport of the A1 materials is based on actual distances between the supplier and AVK International A/S.

The assembled valve consists of the following components:

- POM body and bonnet
- Stainless steel stem
- Brass and rubber wedge
- Brass thrust collar
- Rubber seals and rings
- POM or brass coupling

Following the assembly of the valve, the valve is pressure tested and packaged. The manufacturing process requires electricity and fuels for the different equipment as well as natural gas for heating. Ancillary materials used for manufacturing includes mineral oils and tap water. Production losses have been estimated from production waste accounts. All production waste is sent directly to recycling facilities. The wastewater treatment is also considered. A wooden pallet, fiberboard and cardboard are used as a packaging material for transporting the product from the factory gate.

The use of green energy in manufacturing is demonstrated through contractual instruments (GOs, RECs, etc.), and its use is ensured throughout the validity period of this EPD.

TRANSPORT AND INSTALLATION (A4-A5)
Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

An average sale weighted distance for the transportation has been calculated based on sales data with location, transport mode and mass. Vehicle capacity utilization volume factor is assumed to be 1 which means full load. In reality, it may vary but as role of transportation emissions in total results is small, the variety in load is assumed to be negligible. To be conservative, empty returns are included in this study as implemented through an average load factor in the Ecoinvent transport datapoints. Transportation does not cause losses as product is packaged properly.

Environmental impacts from installation into the building include generation of waste packaging materials (A5) and release of biogenic carbon dioxide from wood pallets. The impacts of material production, its processing and disposal as installation waste are also included. The A5 waste handling is assumed to follow a European scenario as this is the primary market. For wood packaging a treatment method of 32% recycling, 30% incineration and 38% landfill is assumed (source: EUROSTAT). For cardboard packaging 83% recycling, 8% incineration and 9% landfill is assumed (source: EUROSTAT). For plastic packaging the waste handling is assumed to be 40% recycling, 37% incineration and 23% landfill (source: EUROSTAT).

Installation is carried out underground at an installation depth of 1.2 m and requires excavation. The excavation activity has been calculated based on estimated volume of the valve and the required installation depth. Besides the excavation activity, no energy demanding activities are required for the installation, only manual handheld tools are expected to be used. The installation waste is assumed to be sent to the closest waste handling site by lorry 50 km away and is assumed to follow a European waste scenario.

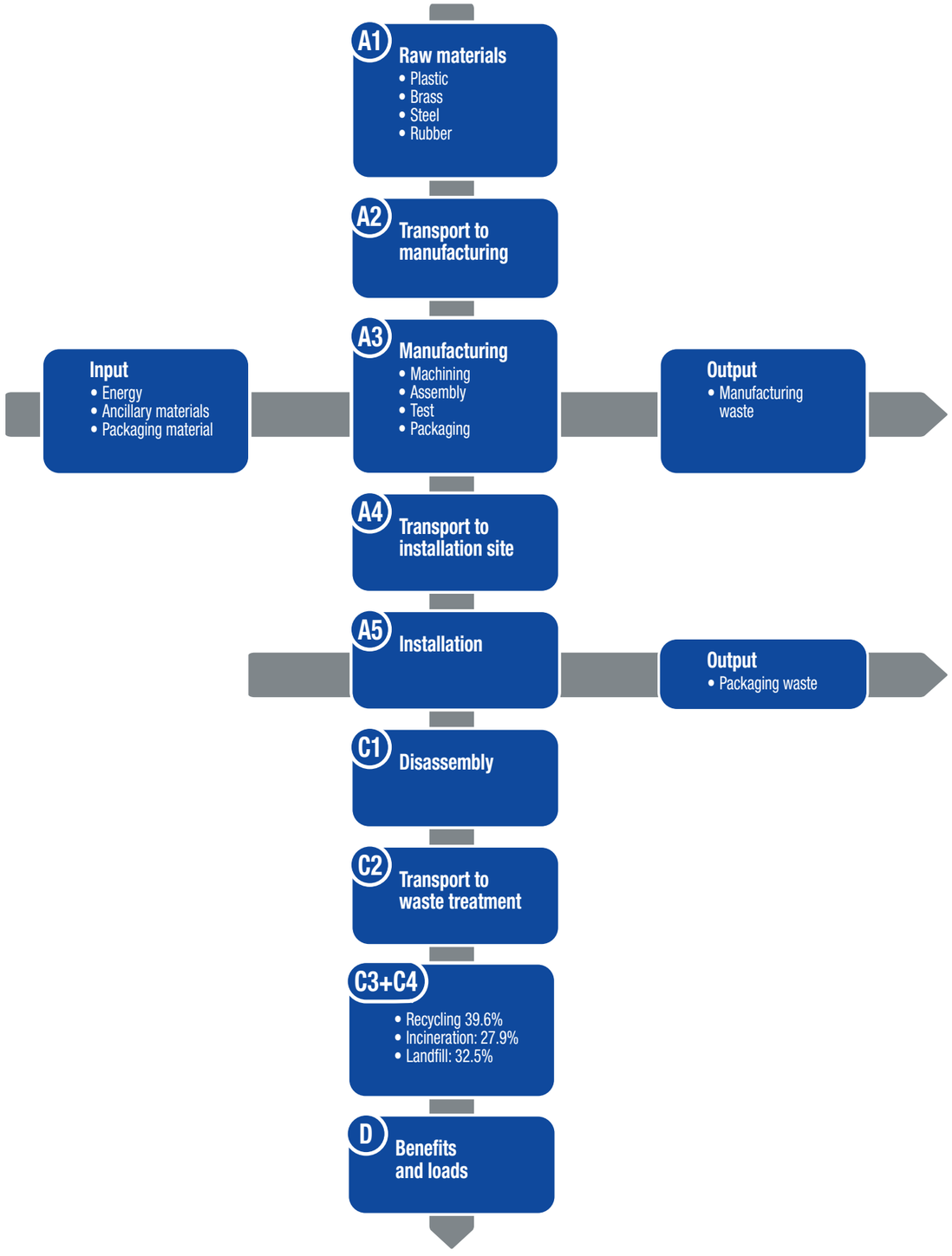
PRODUCT USE AND MAINTENANCE (B1-B7)
This EPD does not cover the use phase.
Air, soil, and water impacts during the use phase have not been studied.

The deconstruction of the valve is expected to mirror the installation (A5). The deconstruction is assumed to be carried out by professionals and the valve is sent to a waste handling site intact, where the disassembly and sorting of materials is carried out. The end-of-life product is assumed to be sent to the closest facilities by lorry and is assumed to be 50 km away (C2). Of the end-of-life product, 39.6% is sent to recycling and 27.9% to incineration facilities (C3). 32.51% of the end-of-life product goes to landfill (C4). Brass is assumed to be 40% recycled and 60% goes to landfill. For plastic, a scenario of 26% recycling, 26.5% landfill and 47.5% incineration is assumed
(source: Plastics Europe).

20% of the rubber is assumed to be recycled and 80% goes to landfill (source: EPA). For steel, a waste treatment of 85% recycling and 15% landfill is assumed (source: World Steel). As it is assumed in the LCA model that only virgin materials are used, the benefits and loads from recycling and incineration of the end-of-life product can be credited in module D. The reference year corresponds to the data collection period. Due to the recycling and incineration potential of metals and plastics, the end-of-life product is converted into recycled materials, while energy and heat is produced from material incineration (D). The benefits and loads of waste packaging materials in A5 are also considered in module D.

MANUFACTURING **PROCESS**

Life cycle stages



LIFE-CYCLE **ASSESSMENT**

CUT-OFF CRITERIA
The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

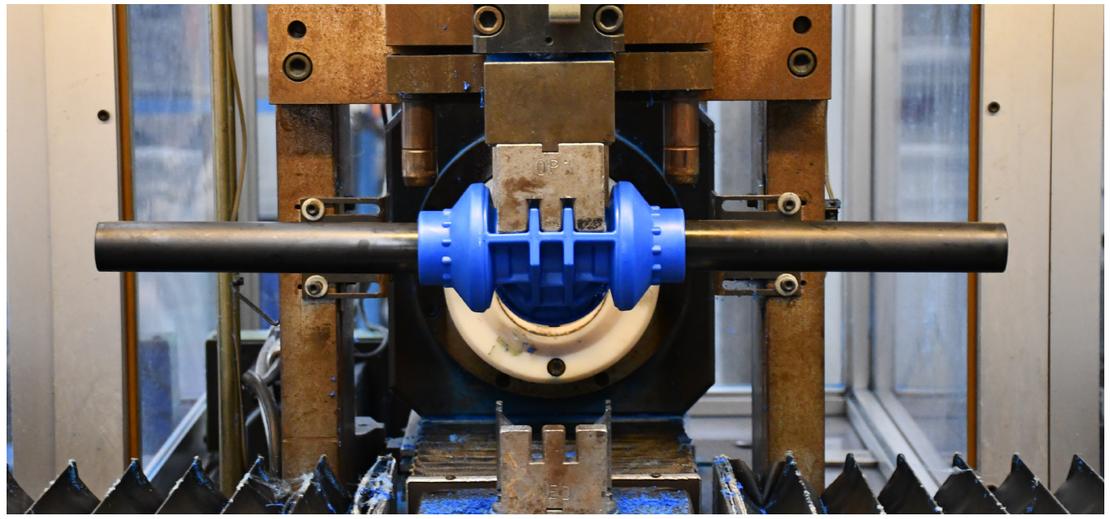
The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

This LCA study includes the provision of all materials, transportation, energy and emission flows, and end of life processing of product. The use phase is not covered, assuming there are no use emissions or replacements. All industrial processes from raw material acquisition and pre-processing, production, product distribution and installation, and end-of-life management are included. For easier modelling and because of lack of accuracy in available modelling resources, some constituents under 1% of product mass are excluded. These include some ancillary materials which are used in the product manufacturing only in very small amounts and have a negligible impact on the emissions of the product.

Apart from excavation, the installation is assumed to be handled manually or with handheld electric tools. It is assumed that the overall use of these electric tools will be very limited and is therefore excluded. This is also the case for any lubricant used in the installation. As we assume C1 to mirror A5, the use of tools is also excluded from the deconstruction stage.

Transport from production site to warehouse and logistics site is a one way trip of <3km. Due to lack of data and the 1% threshold, this process is excluded.

VALIDATION OF DATA
Data collection for production, transport, and packaging was conducted using time and site-specific information, as defined in the general information section on page 1 and 2. Upstream process calculations rely on generic data as defined in the Bibliography section. Manufacturer-provided specific and generic data were used for the product's manufacturing stage. The analysis was performed in One Click LCA EPD Generator, with the 'Cut-Off, EN 15804+A2' allocation method, and characterization factors according to EN 15804:2012+A2:2019/AC:2021 and JRC EF 3.1.



ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

DATA TYPE	ALLOCATION
Raw materials	No allocation
Packaging material	Allocated by mass or volume
Ancillary materials	Allocated by mass or volume
Manufacturing energy and waste	Allocated by mass or volume

All estimations and assumptions regarding the cut off criteria and the allocation are declared in the part “Cut-off Criteria except the estimations/ assumptions below:

Proxy data is used for certain materials due to their unavailability in the database.

Module A2, A4 & C2: Vehicle capacity utilization volume factor is assumed to be 1 which means full load. It may vary but as the role of transportation emission in total results is small, the variety in load is assumed to be negligible. To be conservative, empty returns are included in this study as implemented through an average load factor in the Ecoinvent transport datapoints. Transport of ancillary and packaging materials is assumed to be 50 km by default.

Module A4: Transportation does not cause losses as products are packaged properly. Also, volume capacity utilization factor is assumed to be 1 for the nested packaged products. Additionally, transportation distances are assumed based on distance between AVK International A/S in Galten, Denmark and the capital of each country of the sales statistics.

Module A5: Packaging waste is declared as installation waste.

Module C2: Transportation distance to waste handling facility is estimated as 50 km and the transportation method is assumed as lorry.

Module C3, C4, D: The product undergoes separate collection and a certain percentage of each material is assumed to be recycled, incinerated and landfilled. Ash from incineration processes is assumed negligible. The recycled end-of-life materials are assumed to serve as secondary raw materials in manufacturing while the materials incinerated displace electricity and heat production.

PRODUCT & MANUFACTURING SITES GROUPING	
Type of grouping	Multiple products
Grouping method	Based on a representative product
Variation in GWP-fossil for A1-A3, %	+0%/–15%

Among the products declared in this EPD, the service connection valve variant 16/50-010 DN32 has been used as the representative product. From calculation it was concluded that this valve has a close to average weighted distribution of materials while also being the most sold variants and was consequently chosen as the most representative product.

Primary data represents the manufacturing of this valve. The data was used to calculate representative impacts for the range of products declared. The included valves vary in size and type of end coupling, but the manufacturing process and the overall material distribution is similar for all included product variants. The variability of the primary data or the emissions between the products did not amount to more than -15%/+0% of the relevant data.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.10.1 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1 environmental data sources follow the methodology ‘allocation, Cut-off, EN 15804+A2‘.

ENVIRONMENTAL **IMPACT DATA**

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1																			
Impact category	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP – total[1)]	kg CO_2e	5.72E+00	8.48E-02	2.06E-01	6.01E+00	7.93E-02	1.43E-01	MND	MND	MND	MND	MND	MND	MND	1.85E-02	5.35E-03	7.04E-01	1.33E-02	-1.99E+00
GWP – fossil	kg CO_2e	5.69E+00	8.47E-02	3.14E-01	6.09E+00	7.93E-02	3.47E-02	MND	MND	MND	MND	MND	MND	MND	1.85E-02	5.35E-03	7.07E-01	1.33E-02	-2.00E+00
GWP – biogenic	kg CO_2e	2.27E-02	1.80E-05	-1.08E-01	-8.54E-02	1.76E-05	1.08E-01	MND	MND	MND	MND	MND	MND	MND	2.35E-06	1.21E-06	-2.61E-03	-8.62E-06	1.26E-02
GWP – LULUC	kg CO_2e	6.75E-03	3.93E-05	3.93E-04	7.18E-03	3.60E-05	6.52E-06	MND	MND	MND	MND	MND	MND	MND	2.46E-06	2.39E-06	2.96E-05	1.70E-06	-2.81E-03
Ozone depletion pot.	kg $CFC\text{-}_{11}$e	5.83E-07	1.24E-09	9.10E-09	5.93E-07	1.17E-09	3.11E-10	MND	MND	MND	MND	MND	MND	MND	2.66E-10	7.89E-11	3.68E-10	7.33E-11	-2.39E-08
Acidification potential	mol H^+e	1.61E-01	6.88E-04	1.07E-03	1.63E-01	4.03E-04	1.81E-04	MND	MND	MND	MND	MND	MND	MND	1.64E-04	1.82E-05	2.62E-04	1.97E-05	-5.19E-02
EP-freshwater[2)]	kg Pe	1.35E-02	5.88E-06	1.63E-04	1.36E-02	5.94E-06	1.51E-06	MND	MND	MND	MND	MND	MND	MND	7.82E-07	4.16E-07	8.36E-06	2.63E-07	-3.91E-03
EP-marine	kg Ne	1.02E-02	1.90E-04	2.04E-04	1.06E-02	1.21E-04	9.18E-05	MND	MND	MND	MND	MND	MND	MND	7.55E-05	5.99E-06	1.30E-04	2.77E-04	-3.51E-03
EP-terrestrial	mol Ne	1.31E-01	2.09E-03	1.83E-03	1.35E-01	1.32E-03	8.93E-04	MND	MND	MND	MND	MND	MND	MND	8.26E-04	6.52E-05	1.01E-03	8.02E-05	-4.51E-02
POCP ("smog")[3)]	kg NMVOCe	3.88E-02	6.87E-04	9.10E-04	4.04E-02	4.85E-04	2.67E-04	MND	MND	MND	MND	MND	MND	MND	2.46E-04	2.69E-05	2.71E-04	3.05E-05	-1.39E-02
ADP-minerals & metals[4)]	kg Sbe	2.06E-03	2.08E-07	2.13E-06	2.06E-03	2.12E-07	1.83E-08	MND	MND	MND	MND	MND	MND	MND	8.53E-09	1.49E-08	5.31E-07	5.27E-09	-6.33E-04
ADP-fossil resources	MJ	5.31E+01	1.19E+00	6.28E+00	6.06E+01	1.14E+00	2.81E-01	MND	MND	MND	MND	MND	MND	MND	2.42E-01	7.76E-02	2.77E-01	6.27E-02	-2.96E+01
Water use[5)]	m^3e depr.	1.36E+01	5.49E-03	8.75E-02	1.36E+01	5.49E-03	2.16E-03	MND	MND	MND	MND	MND	MND	MND	8.43E-04	3.83E-04	4.72E-02	2.54E-04	-7.80E-01

1) GWP = Global Warming Potential;
2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3.07 to get PO4e;
3) POCP = Photochemical ozone formation;
4) ADP = Abiotic depletion potential;
5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	5.08E-07	7.40E-09	5.49E-09	5.21E-07	7.58E-09	4.90E-09	MND	MND	MND	MND	MND	MND	MND	4.63E-09	5.35E-10	3.50E-09	4.35E-10	-1.94E-07
Ionizing radiation[6)]	kBq U235e	6.95E-01	9.61E-04	8.29E-02	7.79E-01	9.66E-04	2.47E-04	MND	MND	MND	MND	MND	MND	MND	1.37E-04	6.76E-05	7.61E-04	5.39E-05	-1.63E-01
Ecotoxicity (freshwater)	CTUe	2.90E+02	1.56E-01	7.13E-01	2.91E+02	1.57E-01	3.33E-02	MND	MND	MND	MND	MND	MND	MND	1.57E-02	1.10E-02	1.46E+00	4.53E-01	-6.59E+01
Human toxicity, cancer	CTUh	5.31E-07	1.47E-11	1.34E-10	5.31E-07	1.33E-11	4.42E-12	MND	MND	MND	MND	MND	MND	MND	2.52E-12	8.83E-13	7.81E-11	1.67E-12	-5.27E-09
Human tox. non-cancer	CTUh	1.71E-06	6.97E-10	2.98E-09	1.72E-06	7.12E-10	1.28E-10	MND	MND	MND	MND	MND	MND	MND	3.62E-11	5.02E-11	2.30E-09	2.97E-10	-4.66E-07
SQP[7)]	-	6.04E+01	1.03E+00	6.48E+00	6.79E+01	1.09E+00	5.64E-02	MND	MND	MND	MND	MND	MND	MND	1.84E-02	7.81E-02	3.25E-01	1.35E-01	-2.07E+01

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator;
7) SQP = Land use related impacts/soil quality.

USE OF NATURAL RESOURCES																			
Impact category	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Renew. PER as energy[8)]	MJ	1.34E+01	1.52E-02	1.10E+00	1.45E+01	1.52E-02	-1.02E+00	MND	MND	MND	MND	MND	MND	MND	2.09E-03	1.06E-03	2.52E-02	8.32E-04	-4.65E+00
Renew. PER as material	MJ	9.24E-02	0.00E+00	7.19E-01	8.11E-01	0.00E+00	-7.19E-01	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	-6.79E-02	-2.45E-02	6.03E-02
Total use of renew. PER	MJ	1.35E+01	1.52E-02	1.82E+00	1.54E+01	1.52E-02	-1.74E+00	MND	MND	MND	MND	MND	MND	MND	2.09E-03	1.06E-03	-4.27E-02	-2.37E-02	-4.59E+00
Non-re. PER as energy	MJ	4.12E+01	1.19E+00	5.63E+00	4.81E+01	1.14E+00	-1.64E-01	MND	MND	MND	MND	MND	MND	MND	2.42E-01	7.76E-02	-1.54E+01	-4.66E+00	-2.97E+01
Non-re. PER as material	MJ	1.43E+01	0.00E+00	5.08E-01	1.48E+01	0.00E+00	-5.08E-01	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	-1.08E+01	-3.46E+00	2.09E-01
Total use of non-re. PER	MJ	5.55E+01	1.19E+00	6.14E+00	6.29E+01	1.14E+00	-6.72E-01	MND	MND	MND	MND	MND	MND	MND	2.42E-01	7.76E-02	-2.63E+01	-8.12E+00	-2.95E+01
Secondary materials	kg	2.31E-01	5.18E-04	3.74E-03	2.35E-01	4.88E-04	2.13E-04	MND	MND	MND	MND	MND	MND	MND	1.73E-04	3.30E-05	6.41E-04	1.93E-05	2.52E-01
Renew. secondary fuels	MJ	3.66E-03	5.64E-06	2.10E-02	2.46E-02	5.88E-06	6.54E-07	MND	MND	MND	MND	MND	MND	MND	2.88E-07	4.20E-07	1.18E-05	3.76E-07	-6.51E-04
Non-ren. secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water	m^3	3.35E-01	1.62E-04	2.92E-03	3.38E-01	1.63E-04	-7.16E-05	MND	MND	MND	MND	MND	MND	MND	2.07E-05	1.15E-05	8.35E-04	-4.50E-04	-3.48E-02

8) PER = Primary energy resources.

ENVIRONMENTAL IMPACT DATA

END OF LIFE – WASTE																			
Impact category	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste	kg	1.86E+00	1.95E-03	1.05E-02	1.87E+00	1.91E-03	8.00E-04	MND	MND	MND	MND	MND	MND	MND	4.31E-04	1.31E-04	1.43E-02	9.18E-05	-8.85E-01
Non-hazardous waste	kg	5.33E+01	3.49E-02	1.53E+00	5.49E+01	3.49E-02	1.77E-01	MND	MND	MND	MND	MND	MND	MND	5.56E-03	2.43E-03	3.54E-01	6.47E-01	-1.28E+01
Radioactive waste	kg	1.17E-04	2.35E-07	2.24E-05	1.39E-04	2.36E-07	6.13E-08	MND	MND	MND	MND	MND	MND	MND	3.36E-08	1.65E-08	1.90E-07	1.32E-08	-4.15E-05

END OF LIFE – OUTPUT FLOWS																			
Impact category	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	5.80E-02	0.00E+00	1.86E-02	7.66E-02	0.00E+00	2.67E-02	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	3.90E-01	0.00E+00	0.00E+00
Materials for energy rec	kg	1.98E-07	0.00E+00	0.00E+00	1.98E-07	0.00E+00	2.50E-02	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	2.32E-02	0.00E+00	0.00E+00	2.32E-02	0.00E+00	1.47E-01	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	4.27E+00	0.00E+00	0.00E+00
Exported energy – Electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.23E-02	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	1.80E+00	0.00E+00	0.00E+00
Exported energy – Heat	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.51E-02	MND	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	2.47E+00	0.00E+00	0.00E+00

ENVIRONMENTAL IMPACTS – EN 15804+A1. CML																			
Impact category	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Global Warming Pot.	kg CO_2e	5.66E+00	8.43E-02	3.13E-01	6.05E+00	7.89E-02	3.62E-02	MND	MND	MND	MND	MND	MND	MND	1.84E-02	5.32E-03	7.09E-01	1.28E-02	-1.98E+00
Ozone depletion Pot.	kg CFC-$_{11}$e	4.65E-07	9.92E-10	7.47E-09	4.73E-07	9.32E-10	2.47E-10	MND	MND	MND	MND	MND	MND	MND	2.11E-10	6.30E-11	3.22E-10	5.84E-11	-1.99E-08
Acidification	kg SO_2e	1.38E-01	5.41E-04	8.99E-04	1.39E-01	3.13E-04	1.28E-04	MND	MND	MND	MND	MND	MND	MND	1.16E-04	1.39E-05	1.96E-04	1.46E-05	-4.53E-02
Eutrophication	kg PO_4^3e	9.14E-03	8.36E-05	7.12E-04	9.94E-03	6.03E-05	3.12E-05	MND	MND	MND	MND	MND	MND	MND	2.69E-05	3.39E-06	5.53E-05	1.58E-05	-8.83E-03
POCP ("smog")	kg C_2H4e	5.96E-03	3.40E-05	8.11E-05	6.07E-03	2.32E-05	1.01E-05	MND	MND	MND	MND	MND	MND	MND	8.76E-06	1.24E-06	1.57E-05	2.95E-06	-2.04E-03
ADP-elements	kg Sbe	2.05E-03	2.03E-07	2.11E-06	2.06E-03	2.07E-07	1.77E-08	MND	MND	MND	MND	MND	MND	MND	8.31E-09	1.45E-08	5.13E-07	5.14E-09	-6.32E-04
ADP-fossil	MJ	4.61E+01	1.18E+00	4.74E+00	5.20E+01	1.12E+00	2.77E-01	MND	MND	MND	MND	MND	MND	MND	2.40E-01	7.65E-02	2.65E-01	6.18E-02	-2.70E+01

ADDITIONAL INDICATOR – GWP-GHG																			
Impact category	**Unit**	**A1**	**A2**	**A3**	**A1-A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[9]	kg CO_2e	5.69E+00	8.47E-02	3.14E-01	6.09E+00	7.93E-02	3.48E-02	MND	MND	MND	MND	MND	MND	MND	1.85E-02	5.35E-03	7.07E-01	1.33E-02	-2.00E+00

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013). In addition, the characterisation factors for the flows - CH_4 fossil, CH_4 biogenic and Dinitrogen monoxide - were updated in line with the guidance of IES PCR 1.2.5 Annex 1. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterization factor for biogenic CO_2 is set to zero.

SCENARIO DOCUMENTATION

MANUFACTURING ENERGY SCENARIO DOCUMENTATION	
Scenario parameter	**Value**
Electricity data source and quality	Market group for electricity, low voltage (Reference product: electricity, low voltage)
Electricity CO_2e / kWh	0.31
District heating data source and quality	-
District heating CO_2e / kWh	-

TRANSPORT SCENARIO DOCUMENTATION A4	
Scenario parameter	**Value**
Fuel and vehicle type. Eg, electric truck, diesel powered truck	Market for transport, freight, lorry >32 metric ton, EURO6. Market for transport, freight, sea, container ship.
Average transport distance, km	645.34 km (road) + 468.05 km (sea)
Capacity utilization (including empty return) %	50
Bulk density of transported products	-
Volume capacity utilization factor	1

INSTALLATION SCENARIO DOCUMENTATION A5	
Scenario parameter	**Value**
Ancillary materials for installation (specified by material) / kg or other units as appropriate	-
Water use / m^3	-
Other resource use / kg	Hydraulic digger for excavation activity. Total excavation activity (digging + filling) is 0.0319 m^3.
Quantitative description of energy type (regional mix) and consumption during the installation process / kWh or MJ	-
Waste materials on the building site before waste processing, generated by the product's installation (specified by type) / kg	Wood pallet: 0.0325 kg Wood pallet frame: 0.01625 kg Cardboard: 0.00043 kg Fibreboard: 0.0208 kg Plastic packaging: 0.010976 kg
Output materials (specified by type) as result of waste processing at the building site e.g. collection for recycling, for energy recovery, disposal (specified by route) / kg	(recycling %, incineration %, landfill % respectively) Wood pallet: 32%, 30%, 38% Wood pallet frame: 32%, 30%, 38% Cardboard: 83%, 8%, 9% Fibreboard: 32%, 30%, 38% PE cover: 40%, 37%, 23%
Direct emissions to ambient air, soil and water / kg	-

END OF LIFE SCENARIO DOCUMENTATION	
Scenario parameter	**Value**
Collection process – kg collected separately	-
Collection process – kg collected with mixed waste	1
Recovery process – kg for re-use	-
Recovery process – kg for recycling	0.396
Recovery process – kg for energy recovery	0.279
Disposal (total) – kg for final deposition	0.325
Scenario assumptions e.g. transportation	Transported 50 km by lorry

VERIFICATION STATEMENT

THIRD-PARTY VERIFICATION STATEMENT
EPD Hub declares that this EPD is verified in accordance with ISO 14025 by an independent, third-party verifier. The project report on the Life Cycle Assessment and the report(s) on features of environmental relevance are filed at EPD Hub. EPD Hub PCR and ECO Platform verification checklist are used.

EPD Hub is not able to identify any unjustified deviations from the PCR and EN 15802+A2 in the Environmental Product Declaration and its project report.

EPD Hub maintains its independence as a third-party body; it was not involved in the execution of the LCA or in the development of the declaration and has no conflicts of interest regarding this verification.

The company-specific data and upstream and downstream data have been examined as regards plausibility and consistency. The publisher is responsible for ensuring the factual integrity and legal compliance of this declaration.

The software used in creation of this LCA and EPD is verified by EPD Hub to conform to the procedural and methodological requirements outlined in ISO 14025:2010, ISO 14040/14044, EN 15804+A2, and EPD Hub Core Product Category Rules and General Program Instructions.

Verified tools

Tool verifier:
Magaly Gonzalez Vazquez
Tool verification validity:
27 March 2025 - 26 March 2028

Magaly Gonzalez Vazquez, as an authorized verifier acting for EPD Hub Limited
25.09.2025

EPD Hub
VERIFIED ISO 14025

ANNEX

INCLUDED VALVE VARIANTS

16/01-010	16/55-010	16/69-001
16/29-010	16/57-010	16/90-010
16/50-010	16/58-010	16/91-001
16/50-011	16/59-010	16/93-010
16/53-010	16/64-010	
16/54-010	16/66-010	