

Annex

HAS POM

For Hawle Service valve

to the

ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	E. Hawle Armaturenwerke GmbH
Declaration number	EPD-HAW-20260413-IBA1-EN
Issue date	See EPD
Valid to	See EPD



General Information

This Annex contains the life cycle impact assessment results for the declared unit of **1 piece of service valve products**:

Number	Product name	Product number
1.	ISO2 SERVICE VALVE PN16 IMBEMA: HAEV-ISO2 POM 15 AG1" PE25+AG5/4" W-IMB	5018360
2.	ISO2 COMB. SERVICE VALVE PN16 IMBEMA: HAEV-ISO2 POM 15 AG1" PE25+AG5/4"	5032253
3.	ISO2 COMBI SERVICE VALVE PN16 W/O ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" AG6/4"	5018384
4.	ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE25 mFIT	5032339
5.	ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE32 mFIT	5032340
6.	ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE40 mFIT	5032341
7.	ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE50 mFIT	5032342
8.	ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE63 mFIT	5032343
9.	HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 25 PE32	5033095
10.	HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 32 PE40	5033097
11.	HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 40 PE50	5033099
12.	HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 50 PE63	5033111
13.	ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 32 PE40	5018244
14.	ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 50 PE63	5018303
15.	ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 25 PE32	5018496
16.	ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 40 PE50	5029573
17.	ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 15 PE20	5029576
18.	ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 20 PE25	5029578
19.	COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE25 mFIT	5032334
20.	COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE32 mFIT	5032335
21.	COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE40 mFIT	5032336
22.	COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE50 mFIT	5032337
23.	COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE63 mFIT	5032338

This document declares the specific results according to EN 15804, EF 3.1 for the products mentioned above. It represents a complementary document to the IBU-EPD for **Hawle Service Valve [declaration number EPD-HAW-20260413-IBA1-EN]**.

General Information on the product

This Annex describes the product specific results for Hawle-Service Valve products, particularly those with Polyoxymethylene (POM) housing instead of a cast iron one. Further information on the LCA is provided in the complementing IBU-EPD for Hawle service valves.

LCA: Scenarios and additional technical information

The valve described in the IBU-EPD for Hawle Service Valve [declaration number EPD-HAW-20260413-IBA1-EN] is one of several different design variations of a service valve. These design variations can differ by nominal diameter, pipe connection type, geometry with/without change of flow direction, accessories and material of housing.

In this annex only products with housing made of POM are considered. The following design variations are presented:

- POM Service valves with ISO-sockets
- POM Service valves with external threads
- POM Service valves with Hawle-FIT push-fit connection
- POM Service valves with 90° angel
- POM Service valves with pre mounted fittings
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Each variation has various nominal diameters (DN20 up to DN50 or PE63). A combination of different variations is possible, for example one ISO-socket and one external thread.

All service valve variations are designed as a resilient seated wedge-type gate valve with a smooth and free bore.

All valves have a housing of POM. They contain a stainless-steel spindle and a rubber-coated brass wedge. Tightness is ensured by O-Rings, gaskets and seals made of elastomer (EPDM).

The main differences (beside the POM instead of cast iron) are the housing geometry and geometry of other parts such as wedge or spindle which lead to different component masses. Additionally, different kinds of sockets have different connection parts, such as:

- Products with ISO sockets have a POM clamp and an O-ring and a rubber dust cap at each socket
- Products with Hawle-FIT connections have a clamp and a clamping nut made of POM and an O-Ring made of EPDM in each socket.

The following life cycle phases of the service valve products are part of the analysis:

Module A1-A3: The production stage includes the upstream burdens of raw material supply, their transports and the production of the service valve products at E. Hawle Armaturenwerke GmbH in Vöcklabruck and Frankenmarkt.

- Module C2: Transport to recycling (50 km default-scenario)

- Module C3: Energy recovery of the polymer parts in a waste incineration plant.

- Module C4: Emissions from the disposal of the losses from waste processing (5 % of metals)

- Module D: Recycling of the recovered metals (95 % of metals) and substitution potentials from energy recovery from the incineration of the polymers.

Module C1 of service valve products does not contain any relevant environmental impacts and is to be declared as "0".

All data collected for the LCA of the service valve declared in the IBU-EPD represent the basis for the assessment. This basis was complemented with product specific information, mainly represented by the bill of materials of the declared products. All calculations follow the same principles.

The packaging of the valves is assumed to remain constant for all products and is represented based on a standard for shipping on the European market. Details can be found in chapter 2.9 and in chapter 4 of the main EPD.

The product specific net flow of steel scrap in Module D is declared in the results tables under "Use of secondary material (SM)" in Module D.

It should be noted that the data and methodological assumptions used for the preparation of the LCAs of the products listed comply with the requirements of EN 15804+A2 as well as IBU, PCR Part A and are thus suitable for use in an EPD.

2. LCA: Results

2.1 ISO2 SERVICE VALVE PN16 IMBEMA: HAEV-ISO2 POM 15 AG1" PE25+AG5/4" W-IMB

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED); MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	MNR	MNR	MNR	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece ISO2 SERVICE VALVE PN16 IMBEMA: HAEV-ISO2 POM 15 AG1" PE25+AG5/4" W-IMB (0.25 kg/piece)

Kemindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	1.04E+00	0.00E+00	9.73E-04	4.27E-01	8.51E-05	-1.61E-01
GWP-fossil	[kg CO ₂ -Eq.]	1.03E+00	0.00E+00	9.61E-04	4.27E-01	8.45E-05	-1.60E-01
GWP-biogenic	[kg CO ₂ -Eq.]	5.22E-03	0.00E+00	1.80E-06	1.39E-05	2.60E-07	-8.51E-04
GWP-luluc	[kg CO ₂ -Eq.]	1.35E-03	0.00E+00	1.01E-05	2.92E-05	2.66E-07	-2.15E-04
ODP	[kg CFC11-Eq.]	7.07E-12	0.00E+00	1.63E-16	8.69E-14	2.74E-16	-1.28E-12
AP	[mol H ⁺ -Eq.]	2.45E-03	0.00E+00	3.51E-06	5.41E-05	5.28E-07	-1.41E-04
EP-freshwater	[kg P-Eq.]	4.74E-05	0.00E+00	2.64E-09	1.26E-08	1.20E-10	-1.44E-07
EP-marine	[kg N-Eq.]	4.78E-04	0.00E+00	1.67E-06	1.49E-05	1.29E-07	-5.25E-05
EP-terrestrial	[mol N-Eq.]	5.13E-03	0.00E+00	1.80E-05	2.50E-04	1.40E-06	-5.86E-04
POCP	[kg NMVOC-Eq.]	2.21E-03	0.00E+00	3.21E-06	4.26E-05	3.99E-07	-1.40E-04
ADPE	[kg Sb-Eq.]	3.07E-05	0.00E+00	6.52E-11	9.54E-10	5.74E-12	2.25E-06
ADPF	[MJ]	1.99E+01	0.00E+00	1.26E-02	1.81E-01	1.38E-03	-2.85E+00
WDP	[m ³ world-Eq deprived]	4.71E+00	0.00E+00	4.48E-06	4.02E-02	9.88E-06	-1.54E-02

Caption: GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece ISO2 SERVICE VALVE PN16 IMBEMA: HAEV-ISO2 POM 15 AG1" PE25+AG5/4" W-IMB (0.25 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	3.96E+00	0.00E+00	9.47E-04	4.40E-02	2.25E-04	-9.26E-01
PERM	[MJ]	1.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	5.15E+00	0.00E+00	9.47E-04	4.40E-02	2.25E-04	-9.26E-01
PENRE	[MJ]	1.65E+01	0.00E+00	1.26E-02	2.99E+00	1.38E-03	-2.85E+00
PENRM	[MJ]	3.32E+00	0.00E+00	0.00E+00	-2.81E+00	0.00E+00	0.00E+00
PENRT	[MJ]	1.99E+01	0.00E+00	1.26E-02	1.81E-01	1.38E-03	-2.85E+00
SM	[kg]	8.61E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-6.61E-03
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	1.11E-01	0.00E+00	4.68E-07	9.56E-04	2.91E-07	-7.03E-04

Caption: PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece ISO2 SERVICE VALVE PN16 IMBEMA: HAEV-ISO2 POM 15 AG1" PE25+AG5/4" W-IMB (0.25 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	4.12E-09	0.00E+00	5.04E-13	8.94E-11	2.99E-13	-1.80E-09
NHWD	[kg]	2.22E-02	0.00E+00	1.75E-06	3.67E-02	3.98E-03	-4.92E-04
RWD	[kg]	1.48E-04	0.00E+00	2.37E-08	6.18E-06	1.92E-08	-2.16E-04
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	7.56E-02	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy
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RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece ISO2 SERVICE VALVE PN16 IMBEMA: HAEV-ISO2 POM 15 AG1" PE25+AG5/4" W-IMB (0.25 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND

Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index
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The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

Disclaimer – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP:

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

2.2 ISO2 COMB. SERVICE VALVE PN16 IMBEMA: HAEV-ISO2 POM 15 AG1" PE25+AG5/4"

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED); MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece ISO2 COMB. SERVICE VALVE PN16 IMBEMA: HAEV-ISO2 POM 15 AG1" PE25+AG5/4" (0.25 kg/piece)

Kemindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	1.05E+00	0.00E+00	9.88E-04	4.34E-01	8.64E-05	-1.64E-01
GWP-fossil	[kg CO ₂ -Eq.]	1.04E+00	0.00E+00	9.76E-04	4.34E-01	8.59E-05	-1.63E-01
GWP-biogenic	[kg CO ₂ -Eq.]	5.25E-03	0.00E+00	1.82E-06	1.41E-05	2.65E-07	-8.63E-04
GWP-luluc	[kg CO ₂ -Eq.]	1.36E-03	0.00E+00	1.03E-05	2.97E-05	2.70E-07	-2.19E-04
ODP	[kg CFC11-Eq.]	7.13E-12	0.00E+00	1.65E-16	8.83E-14	2.78E-16	-1.33E-12
AP	[mol H ⁺ -Eq.]	2.47E-03	0.00E+00	3.56E-06	5.50E-05	5.36E-07	-1.50E-04
EP-freshwater	[kg P-Eq.]	4.77E-05	0.00E+00	2.69E-09	1.28E-08	1.21E-10	-1.47E-07
EP-marine	[kg N-Eq.]	4.81E-04	0.00E+00	1.69E-06	1.52E-05	1.31E-07	-5.37E-05
EP-terrestrial	[mol N-Eq.]	5.16E-03	0.00E+00	1.83E-05	2.54E-04	1.42E-06	-6.00E-04
POCP	[kg NMVOC-Eq.]	2.22E-03	0.00E+00	3.26E-06	4.33E-05	4.05E-07	-1.44E-04
ADPE	[kg Sb-Eq.]	3.08E-05	0.00E+00	6.63E-11	9.69E-10	5.83E-12	1.99E-06
ADPF	[MJ]	2.00E+01	0.00E+00	1.28E-02	1.84E-01	1.41E-03	-2.90E+00
WDP	[m ³ world-Eq deprived]	4.74E+00	0.00E+00	4.56E-06	4.09E-02	1.00E-05	-1.59E-02

Caption GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece ISO2 COMB. SERVICE VALVE PN16 IMBEMA: HAEV-ISO2 POM 15 AG1" PE25+AG5/4" (0.25 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	4.00E+00	0.00E+00	9.62E-04	4.47E-02	2.29E-04	-9.42E-01
PERM	[MJ]	1.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	5.20E+00	0.00E+00	9.62E-04	4.47E-02	2.29E-04	-9.42E-01
PENRE	[MJ]	1.66E+01	0.00E+00	1.28E-02	6.76E+00	1.41E-03	-2.90E+00
PENRM	[MJ]	3.33E+00	0.00E+00	0.00E+00	-6.58E+00	0.00E+00	0.00E+00
PENRT	[MJ]	2.00E+01	0.00E+00	1.28E-02	1.84E-01	1.41E-03	-2.90E+00
SM	[kg]	8.66E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-5.85E-03
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	1.12E-01	0.00E+00	4.76E-07	9.72E-04	2.96E-07	-7.18E-04

Caption PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece ISO2 COMB. SERVICE VALVE PN16 IMBEMA: HAEV-ISO2 POM 15 AG1" PE25+AG5/4" (0.25 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	4.15E-09	0.00E+00	5.12E-13	9.08E-11	3.04E-13	-1.83E-09
NHWD	[kg]	2.23E-02	0.00E+00	1.78E-06	3.73E-02	4.05E-03	-6.23E-04
RWD	[kg]	1.49E-04	0.00E+00	2.41E-08	6.28E-06	1.95E-08	-2.19E-04
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	7.68E-02	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Caption HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece ISO2 COMB. SERVICE VALVE PN16 IMBEMA: HAEV-ISO2 POM 15 AG1" PE25+AG5/4" (0.25 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index						

The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

Disclaimer – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP:

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

2.3 ISO2 COMBI SERVICE VALVE PN16 W/O ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" AG6/4"

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED); MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece ISO2 COMBI SERVICE VALVE PN16 W/O ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" AG6/4" (0.84 kg/piece)

Kemindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	3.42E+00	0.00E+00	3.27E-03	1.05E+00	4.51E-04	-1.14E+00
GWP-fossil	[kg CO ₂ -Eq.]	3.40E+00	0.00E+00	3.23E-03	1.05E+00	4.48E-04	-1.14E+00
GWP-biogenic	[kg CO ₂ -Eq.]	1.32E-02	0.00E+00	6.03E-06	3.41E-05	1.38E-06	1.50E-03
GWP-luluc	[kg CO ₂ -Eq.]	5.39E-03	0.00E+00	3.39E-05	7.24E-05	1.41E-06	-2.56E-03
ODP	[kg CFC11-Eq.]	2.70E-11	0.00E+00	5.47E-16	2.15E-13	1.45E-15	-3.39E-12
AP	[mol H ⁺ -Eq.]	1.44E-02	0.00E+00	1.18E-05	1.33E-04	2.80E-06	-5.04E-03
EP-freshwater	[kg P-Eq.]	1.16E-04	0.00E+00	8.88E-09	3.10E-08	6.33E-10	-1.45E-06
EP-marine	[kg N-Eq.]	1.81E-03	0.00E+00	5.60E-06	3.68E-05	6.81E-07	-7.99E-04
EP-terrestrial	[mol N-Eq.]	1.95E-02	0.00E+00	6.06E-05	6.14E-04	7.43E-06	-8.71E-03
POCP	[kg NMVOC-Eq.]	7.76E-03	0.00E+00	1.08E-05	1.05E-04	2.11E-06	-2.39E-03
ADPE	[kg Sb-Eq.]	1.46E-04	0.00E+00	2.19E-10	2.36E-09	3.04E-11	-1.86E-05
ADPF	[MJ]	5.73E+01	0.00E+00	4.22E-02	4.48E-01	7.33E-03	-1.63E+01
WDP	[m ³ world-Eq deprived]	1.17E+01	0.00E+00	1.51E-05	9.88E-02	5.24E-05	-3.49E-01

Caption GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece ISO2 COMBI SERVICE VALVE PN16 W/O ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" AG6/4" (0.84 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	1.41E+01	0.00E+00	3.18E-03	1.09E-01	1.19E-03	-4.03E+00
PERM	[MJ]	1.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	1.53E+01	0.00E+00	3.18E-03	1.09E-01	1.19E-03	-4.03E+00
PENRE	[MJ]	5.02E+01	0.00E+00	4.22E-02	7.03E+00	7.33E-03	-1.63E+01
PENRM	[MJ]	7.09E+00	0.00E+00	0.00E+00	-6.58E+00	0.00E+00	0.00E+00
PENRT	[MJ]	5.73E+01	0.00E+00	4.22E-02	4.48E-01	7.33E-03	-1.63E+01
SM	[kg]	4.19E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.25E-01
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	2.77E-01	0.00E+00	1.57E-06	2.35E-03	1.54E-06	-1.44E-02

Caption PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece ISO2 COMBI SERVICE VALVE PN16 W/O ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" AG6/4" (0.84 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	1.45E-08	0.00E+00	1.69E-12	2.21E-10	1.58E-12	-8.50E-05
NHWD	[kg]	1.96E-01	0.00E+00	5.89E-06	9.09E-02	2.11E-02	6.18E-03
RWD	[kg]	5.97E-04	0.00E+00	7.97E-08	1.53E-05	1.02E-07	-5.92E-04
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	4.01E-01	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	1.88E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	3.37E+00	0.00E+00	0.00E+00

Caption HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece ISO2 COMBI SERVICE VALVE PN16 W/O ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" AG6/4" (0.84 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index						

The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

Disclaimer – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP:

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

2.4 ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE25 mFIT

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED); MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE25 mFIT (0.95 kg/piece)

Kernindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	3.91E+00	0.00E+00	3.70E-03	1.32E+00	4.51E-04	-1.26E+00
GWP-fossil	[kg CO ₂ -Eq.]	3.89E+00	0.00E+00	3.65E-03	1.32E+00	4.49E-04	-1.26E+00
GWP-biogenic	[kg CO ₂ -Eq.]	1.52E-02	0.00E+00	6.82E-06	4.31E-05	1.38E-06	1.00E-03
GWP-luluc	[kg CO ₂ -Eq.]	5.81E-03	0.00E+00	3.84E-05	9.06E-05	1.41E-06	-2.73E-03
ODP	[kg CFC11-Eq.]	2.83E-11	0.00E+00	6.18E-16	2.70E-13	1.45E-15	-4.41E-12
AP	[mol H ⁺ -Eq.]	1.53E-02	0.00E+00	1.33E-05	1.68E-04	2.80E-06	-5.23E-03
EP-freshwater	[kg P-Eq.]	1.43E-04	0.00E+00	1.00E-08	3.89E-08	6.34E-10	-1.56E-06
EP-marine	[kg N-Eq.]	1.99E-03	0.00E+00	6.33E-06	4.63E-05	6.82E-07	-8.43E-04
EP-terrestrial	[mol N-Eq.]	2.14E-02	0.00E+00	6.85E-05	7.73E-04	7.44E-06	-9.19E-03
POCP	[kg NMVOC-Eq.]	8.41E-03	0.00E+00	1.22E-05	1.32E-04	2.12E-06	-2.51E-03
ADPE	[kg Sb-Eq.]	1.46E-04	0.00E+00	2.48E-10	2.96E-09	3.05E-11	-1.92E-05
ADPF	[MJ]	6.72E+01	0.00E+00	4.77E-02	5.61E-01	7.34E-03	-1.83E+01
WDP	[m ³ world-Eq deprived]	1.44E+01	0.00E+00	1.70E-05	1.25E-01	5.24E-05	-3.63E-01

Caption: GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE25 mFIT (0.95 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	1.53E+01	0.00E+00	3.60E-03	1.36E-01	1.20E-03	-4.65E+00
PERM	[MJ]	1.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	1.65E+01	0.00E+00	3.60E-03	1.36E-01	1.20E-03	-4.65E+00
PENRE	[MJ]	5.83E+01	0.00E+00	4.77E-02	8.90E+00	7.34E-03	-1.83E+01
PENRM	[MJ]	8.86E+00	0.00E+00	0.00E+00	-8.34E+00	0.00E+00	0.00E+00
PENRT	[MJ]	6.72E+01	0.00E+00	4.77E-02	5.61E-01	7.34E-03	-1.83E+01
SM	[kg]	4.19E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.27E-01
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	3.42E-01	0.00E+00	1.78E-06	2.96E-03	1.55E-06	-1.51E-02

Caption: PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE25 mFIT (0.95 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	1.52E-08	0.00E+00	1.92E-12	2.77E-10	1.59E-12	-8.60E-05
NHWD	[kg]	2.02E-01	0.00E+00	6.67E-06	1.14E-01	2.11E-02	5.22E-03
RWD	[kg]	6.09E-04	0.00E+00	9.01E-08	1.92E-05	1.02E-07	-7.31E-04
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	4.01E-01	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	2.37E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	4.25E+00	0.00E+00	0.00E+00

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy
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RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE25 mFIT (0.95 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index						

The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

Disclaimer – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP:

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

2.5 ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE32 mFIT

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED); MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE32 mFIT (0.98 kg/piece)

Kernindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	4.04E+00	0.00E+00	3.81E-03	1.39E+00	4.53E-04	-1.29E+00
GWP-fossil	[kg CO ₂ -Eq.]	4.02E+00	0.00E+00	3.77E-03	1.39E+00	4.50E-04	-1.29E+00
GWP-biogenic	[kg CO ₂ -Eq.]	1.58E-02	0.00E+00	7.04E-06	4.54E-05	1.39E-06	8.83E-04
GWP-luluc	[kg CO ₂ -Eq.]	5.92E-03	0.00E+00	3.96E-05	9.58E-05	1.41E-06	-2.78E-03
ODP	[kg CFC11-Eq.]	2.86E-11	0.00E+00	6.38E-16	2.85E-13	1.46E-15	-4.70E-12
AP	[mol H ⁺ -Eq.]	1.55E-02	0.00E+00	1.38E-05	1.77E-04	2.81E-06	-5.30E-03
EP-freshwater	[kg P-Eq.]	1.51E-04	0.00E+00	1.04E-08	4.11E-08	6.36E-10	-1.59E-06
EP-marine	[kg N-Eq.]	2.04E-03	0.00E+00	6.53E-06	4.89E-05	6.84E-07	-8.58E-04
EP-terrestrial	[mol N-Eq.]	2.19E-02	0.00E+00	7.07E-05	8.16E-04	7.46E-06	-9.35E-03
POCP	[kg NMVOC-Eq.]	8.58E-03	0.00E+00	1.26E-05	1.39E-04	2.12E-06	-2.55E-03
ADPE	[kg Sb-Eq.]	1.46E-04	0.00E+00	2.56E-10	3.13E-09	3.05E-11	-1.96E-05
ADPF	[MJ]	6.98E+01	0.00E+00	4.93E-02	5.93E-01	7.36E-03	-1.88E+01
WDP	[m ³ world-Eq deprived]	1.52E+01	0.00E+00	1.76E-05	1.31E-01	5.26E-05	-3.68E-01

Caption GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE32 mFIT (0.98 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	1.56E+01	0.00E+00	3.71E-03	1.44E-01	1.20E-03	-4.83E+00
PERM	[MJ]	1.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	1.68E+01	0.00E+00	3.71E-03	1.44E-01	1.20E-03	-4.83E+00
PENRE	[MJ]	6.05E+01	0.00E+00	4.93E-02	9.34E+00	7.36E-03	-1.88E+01
PENRM	[MJ]	9.26E+00	0.00E+00	0.00E+00	-8.75E+00	0.00E+00	0.00E+00
PENRT	[MJ]	6.98E+01	0.00E+00	4.93E-02	5.93E-01	7.36E-03	-1.88E+01
SM	[kg]	4.19E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.29E-01
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	3.61E-01	0.00E+00	1.83E-06	3.12E-03	1.55E-06	-1.53E-02

Caption PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE32 mFIT (0.98 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	1.54E-08	0.00E+00	1.98E-12	2.93E-10	1.59E-12	-8.65E-05
NHWD	[kg]	2.03E-01	0.00E+00	6.88E-06	1.20E-01	2.12E-02	4.93E-03
RWD	[kg]	6.10E-04	0.00E+00	9.30E-08	2.02E-05	1.02E-07	-7.69E-04
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	4.02E-01	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	2.51E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	4.48E+00	0.00E+00	0.00E+00

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy
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RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE32 mFIT (0.98 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index						

The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

Disclaimer – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP:

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

2.6 ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE40 mFIT

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED); MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE40 mFIT (1.07 kg/piece)

Kernindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	4.45E+00	0.00E+00	4.16E-03	1.62E+00	4.52E-04	-1.38E+00
GWP-fossil	[kg CO ₂ -Eq.]	4.43E+00	0.00E+00	4.11E-03	1.62E+00	4.49E-04	-1.38E+00
GWP-biogenic	[kg CO ₂ -Eq.]	1.75E-02	0.00E+00	7.68E-06	5.29E-05	1.38E-06	4.62E-04
GWP-luluc	[kg CO ₂ -Eq.]	6.27E-03	0.00E+00	4.32E-05	1.11E-04	1.41E-06	-2.91E-03
ODP	[kg CFC11-Eq.]	2.97E-11	0.00E+00	6.96E-16	3.29E-13	1.46E-15	-5.52E-12
AP	[mol H ⁺ -Eq.]	1.63E-02	0.00E+00	1.50E-05	2.05E-04	2.80E-06	-5.43E-03
EP-freshwater	[kg P-Eq.]	1.74E-04	0.00E+00	1.13E-08	4.77E-08	6.35E-10	-1.68E-06
EP-marine	[kg N-Eq.]	2.20E-03	0.00E+00	7.13E-06	5.67E-05	6.83E-07	-8.91E-04
EP-terrestrial	[mol N-Eq.]	2.35E-02	0.00E+00	7.72E-05	9.47E-04	7.45E-06	-9.73E-03
POCP	[kg NMVOC-Eq.]	9.12E-03	0.00E+00	1.37E-05	1.62E-04	2.12E-06	-2.64E-03
ADPE	[kg Sb-Eq.]	1.46E-04	0.00E+00	2.79E-10	3.62E-09	3.05E-11	-1.98E-05
ADPF	[MJ]	7.80E+01	0.00E+00	5.38E-02	6.85E-01	7.35E-03	-2.04E+01
WDP	[m ³ world-Eq deprived]	1.74E+01	0.00E+00	1.92E-05	1.53E-01	5.25E-05	-3.79E-01

Caption: GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE40 mFIT (1.07 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	1.66E+01	0.00E+00	4.05E-03	1.67E-01	1.20E-03	-5.33E+00
PERM	[MJ]	1.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	1.78E+01	0.00E+00	4.05E-03	1.67E-01	1.20E-03	-5.33E+00
PENRE	[MJ]	6.73E+01	0.00E+00	5.38E-02	1.09E+01	7.35E-03	-2.04E+01
PENRM	[MJ]	1.08E+01	0.00E+00	0.00E+00	-1.03E+01	0.00E+00	0.00E+00
PENRT	[MJ]	7.80E+01	0.00E+00	5.38E-02	6.85E-01	7.35E-03	-2.04E+01
SM	[kg]	4.19E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.30E-01
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	4.14E-01	0.00E+00	2.00E-06	3.63E-03	1.55E-06	-1.57E-02

Caption: PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE40 mFIT (1.07 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	1.60E-08	0.00E+00	2.16E-12	3.39E-10	1.59E-12	-8.71E-05
NHWD	[kg]	2.09E-01	0.00E+00	7.51E-06	1.39E-01	2.12E-02	4.19E-03
RWD	[kg]	6.22E-04	0.00E+00	1.02E-07	2.34E-05	1.02E-07	-8.84E-04
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	4.02E-01	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	2.91E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	5.21E+00	0.00E+00	0.00E+00

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy
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RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE40 mFIT (1.07 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index						

The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

Disclaimer – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP:

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

2.7 ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE50 mFIT

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED); MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE50 mFIT (1.14 kg/piece)

Kemindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	4.75E+00	0.00E+00	4.44E-03	1.79E+00	4.54E-04	-1.46E+00
GWP-fossil	[kg CO ₂ -Eq.]	4.73E+00	0.00E+00	4.38E-03	1.79E+00	4.51E-04	-1.46E+00
GWP-biogenic	[kg CO ₂ -Eq.]	1.87E-02	0.00E+00	8.19E-06	5.85E-05	1.39E-06	1.62E-04
GWP-luluc	[kg CO ₂ -Eq.]	6.54E-03	0.00E+00	4.60E-05	1.22E-04	1.42E-06	-3.02E-03
ODP	[kg CFC11-Eq.]	3.05E-11	0.00E+00	7.42E-16	3.64E-13	1.46E-15	-6.18E-12
AP	[mol H ⁺ -Eq.]	1.68E-02	0.00E+00	1.60E-05	2.27E-04	2.81E-06	-5.57E-03
EP-freshwater	[kg P-Eq.]	1.91E-04	0.00E+00	1.21E-08	5.27E-08	6.37E-10	-1.75E-06
EP-marine	[kg N-Eq.]	2.31E-03	0.00E+00	7.60E-06	6.27E-05	6.85E-07	-9.21E-04
EP-terrestrial	[mol N-Eq.]	2.47E-02	0.00E+00	8.22E-05	1.05E-03	7.47E-06	-1.01E-02
POCP	[kg NMVOC-Eq.]	9.52E-03	0.00E+00	1.46E-05	1.79E-04	2.13E-06	-2.73E-03
ADPE	[kg Sb-Eq.]	1.46E-04	0.00E+00	2.97E-10	4.00E-09	3.06E-11	-2.04E-05
ADPF	[MJ]	8.41E+01	0.00E+00	5.73E-02	7.57E-01	7.37E-03	-2.17E+01
WDP	[m ³ world-Eq deprived]	1.92E+01	0.00E+00	2.04E-05	1.69E-01	5.27E-05	-3.90E-01

Caption: GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE50 mFIT (1.14 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	1.74E+01	0.00E+00	4.32E-03	1.84E-01	1.20E-03	-5.73E+00
PERM	[MJ]	1.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	1.85E+01	0.00E+00	4.32E-03	1.84E-01	1.20E-03	-5.73E+00
PENRE	[MJ]	7.23E+01	0.00E+00	5.73E-02	1.26E+01	7.37E-03	-2.17E+01
PENRM	[MJ]	1.18E+01	0.00E+00	0.00E+00	-1.18E+01	0.00E+00	0.00E+00
PENRT	[MJ]	8.41E+01	0.00E+00	5.73E-02	7.57E-01	7.37E-03	-2.17E+01
SM	[kg]	4.19E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E-01
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	4.55E-01	0.00E+00	2.13E-06	4.01E-03	1.55E-06	-1.62E-02

Caption: PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE50 mFIT (1.14 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	1.64E-08	0.00E+00	2.30E-12	3.75E-10	1.59E-12	-8.80E-05
NHWD	[kg]	2.13E-01	0.00E+00	8.00E-06	1.54E-01	2.12E-02	3.54E-03
RWD	[kg]	6.28E-04	0.00E+00	1.08E-07	2.59E-05	1.02E-07	-9.72E-04
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	4.03E-01	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	3.22E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	5.76E+00	0.00E+00	0.00E+00

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy
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RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE50 mFIT (1.14 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index						

The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

Disclaimer – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP:

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

2.8 ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE63 mFIT

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED); MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE63 mFIT (1.26 kg/piece)

Kernindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	5.26E+00	0.00E+00	4.90E-03	2.09E+00	4.56E-04	-1.59E+00
GWP-fossil	[kg CO ₂ -Eq.]	5.23E+00	0.00E+00	4.84E-03	2.09E+00	4.53E-04	-1.58E+00
GWP-biogenic	[kg CO ₂ -Eq.]	2.08E-02	0.00E+00	9.05E-06	6.83E-05	1.40E-06	-3.46E-04
GWP-luluc	[kg CO ₂ -Eq.]	7.00E-03	0.00E+00	5.09E-05	1.41E-04	1.42E-06	-3.22E-03
ODP	[kg CFC11-Eq.]	3.20E-11	0.00E+00	8.20E-16	4.21E-13	1.47E-15	-7.31E-12
AP	[mol H ⁺ -Eq.]	1.77E-02	0.00E+00	1.77E-05	2.64E-04	2.83E-06	-5.80E-03
EP-freshwater	[kg P-Eq.]	2.18E-04	0.00E+00	1.33E-08	6.12E-08	6.41E-10	-1.88E-06
EP-marine	[kg N-Eq.]	2.50E-03	0.00E+00	8.40E-06	7.28E-05	6.89E-07	-9.73E-04
EP-terrestrial	[mol N-Eq.]	2.67E-02	0.00E+00	9.09E-05	1.22E-03	7.51E-06	-1.06E-02
POCP	[kg NMVOC-Eq.]	1.02E-02	0.00E+00	1.62E-05	2.08E-04	2.14E-06	-2.87E-03
ADPE	[kg Sb-Eq.]	1.46E-04	0.00E+00	3.29E-10	4.62E-09	3.08E-11	-2.15E-05
ADPF	[MJ]	9.43E+01	0.00E+00	6.33E-02	8.75E-01	7.41E-03	-2.38E+01
WDP	[m ³ world-Eq deprived]	2.19E+01	0.00E+00	2.26E-05	1.96E-01	5.30E-05	-4.08E-01

Caption: GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE63 mFIT (1.26 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	1.87E+01	0.00E+00	4.77E-03	2.13E-01	1.21E-03	-6.41E+00
PERM	[MJ]	1.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	1.99E+01	0.00E+00	4.77E-03	2.13E-01	1.21E-03	-6.41E+00
PENRE	[MJ]	8.06E+01	0.00E+00	6.33E-02	2.13E+00	7.41E-03	-2.38E+01
PENRM	[MJ]	1.37E+01	0.00E+00	0.00E+00	-1.26E+00	0.00E+00	0.00E+00
PENRT	[MJ]	9.43E+01	0.00E+00	6.33E-02	8.75E-01	7.41E-03	-2.38E+01
SM	[kg]	4.19E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.37E-01
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	5.18E-01	0.00E+00	2.36E-06	4.67E-03	1.56E-06	-1.69E-02

Caption: PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE63 mFIT (1.26 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	1.72E-08	0.00E+00	2.54E-12	4.33E-10	1.60E-12	-8.95E-05
NHWD	[kg]	2.19E-01	0.00E+00	8.84E-06	1.78E-01	2.13E-02	2.44E-03
RWD	[kg]	6.45E-04	0.00E+00	1.20E-07	3.00E-05	1.03E-07	-1.12E-03
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	4.05E-01	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	3.74E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	6.70E+00	0.00E+00	0.00E+00

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy
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RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece ISO2 COMBI SERVICE VALVE PN16 WITH ISO FITTING: HAEV-KOMBI-ISO2 POM 25 AG2" PE63 mFIT (1.26 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index						

The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

Disclaimer – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP:

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

2.9 HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 25 PE32

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED); MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 25 PE32 (1.06 kg/piece)

Kemindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	4.59E+00	0.00E+00	4.14E-03	1.60E+00	4.53E-04	-1.33E+00
GWP-fossil	[kg CO ₂ -Eq.]	4.56E+00	0.00E+00	4.09E-03	1.60E+00	4.50E-04	-1.33E+00
GWP-biogenic	[kg CO ₂ -Eq.]	1.79E-02	0.00E+00	7.63E-06	5.20E-05	1.39E-06	2.97E-04
GWP-luluc	[kg CO ₂ -Eq.]	6.27E-03	0.00E+00	4.29E-05	1.11E-04	1.41E-06	-2.79E-03
ODP	[kg CFC11-Eq.]	3.03E-11	0.00E+00	6.92E-16	3.31E-13	1.46E-15	-5.10E-12
AP	[mol H ⁺ -Eq.]	1.66E-02	0.00E+00	1.49E-05	2.04E-04	2.81E-06	-5.11E-03
EP-freshwater	[kg P-Eq.]	1.83E-04	0.00E+00	1.12E-08	4.75E-08	6.36E-10	-1.61E-06
EP-marine	[kg N-Eq.]	2.25E-03	0.00E+00	7.09E-06	5.64E-05	6.84E-07	-8.51E-04
EP-terrestrial	[mol N-Eq.]	2.40E-02	0.00E+00	7.67E-05	9.41E-04	7.46E-06	-9.29E-03
POCP	[kg NMVOC-Eq.]	9.45E-03	0.00E+00	1.36E-05	1.61E-04	2.12E-06	-2.52E-03
ADPE	[kg Sb-Eq.]	1.52E-04	0.00E+00	2.77E-10	3.63E-09	3.06E-11	-1.54E-05
ADPF	[MJ]	8.02E+01	0.00E+00	5.34E-02	6.89E-01	7.36E-03	-1.98E+01
WDP	[m ³ world-Eq deprived]	1.84E+01	0.00E+00	1.91E-05	1.51E-01	5.26E-05	-3.61E-01

Caption GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 25 PE32 (1.06 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	1.66E+01	0.00E+00	4.03E-03	1.67E-01	1.20E-03	-5.19E+00
PERM	[MJ]	1.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	1.78E+01	0.00E+00	4.03E-03	1.67E-01	1.20E-03	-5.19E+00
PENRE	[MJ]	6.94E+01	0.00E+00	5.34E-02	1.10E+01	7.36E-03	-1.98E+01
PENRM	[MJ]	1.08E+01	0.00E+00	0.00E+00	-1.03E+01	0.00E+00	0.00E+00
PENRT	[MJ]	8.02E+01	0.00E+00	5.34E-02	6.89E-01	7.36E-03	-1.98E+01
SM	[kg]	4.36E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.14E-01
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	4.36E-01	0.00E+00	1.99E-06	3.59E-03	1.55E-06	-1.50E-02

Caption PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 25 PE32 (1.06 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	1.61E-08	0.00E+00	2.14E-12	3.41E-10	1.59E-12	-8.27E-05
NHWD	[kg]	2.12E-01	0.00E+00	7.46E-06	1.40E-01	2.12E-02	5.19E-03
RWD	[kg]	6.31E-04	0.00E+00	1.01E-07	2.34E-05	1.02E-07	-8.72E-04
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	4.02E-01	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	2.88E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	5.16E+00	0.00E+00	0.00E+00

Caption HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy

**RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece
HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 25 PE32 (1.06 kg/piece)**

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index						

The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

Disclaimer – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP:

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

2.10 HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 32 PE40

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED); MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 32 PE40 (1.54 kg/piece)

Kemindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	6.41E+00	0.00E+00	6.00E-03	2.39E+00	6.29E-04	-1.83E+00
GWP-fossil	[kg CO ₂ -Eq.]	6.37E+00	0.00E+00	5.93E-03	2.39E+00	6.25E-04	-1.83E+00
GWP-biogenic	[kg CO ₂ -Eq.]	2.52E-02	0.00E+00	1.11E-05	7.75E-05	1.92E-06	-3.45E-04
GWP-luluc	[kg CO ₂ -Eq.]	8.56E-03	0.00E+00	6.23E-05	1.67E-04	1.96E-06	-3.73E-03
ODP	[kg CFC11-Eq.]	4.25E-11	0.00E+00	1.00E-15	4.96E-13	2.02E-15	-8.01E-12
AP	[mol H ⁺ -Eq.]	2.18E-02	0.00E+00	2.16E-05	3.05E-04	3.90E-06	-6.68E-03
EP-freshwater	[kg P-Eq.]	2.66E-04	0.00E+00	1.63E-08	7.10E-08	8.84E-10	-2.17E-06
EP-marine	[kg N-Eq.]	3.05E-03	0.00E+00	1.03E-05	8.43E-05	9.50E-07	-1.13E-03
EP-terrestrial	[mol N-Eq.]	3.25E-02	0.00E+00	1.11E-04	1.41E-03	1.04E-05	-1.23E-02
POCP	[kg NMVOC-Eq.]	1.32E-02	0.00E+00	1.98E-05	2.40E-04	2.95E-06	-3.32E-03
ADPE	[kg Sb-Eq.]	2.07E-04	0.00E+00	4.02E-10	5.44E-09	4.24E-11	-2.16E-05
ADPF	[MJ]	1.13E+02	0.00E+00	7.75E-02	1.03E+00	1.02E-02	-2.75E+01
WDP	[m ³ world-Eq deprived]	2.67E+01	0.00E+00	2.77E-05	2.26E-01	7.30E-05	-4.72E-01

Caption GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 32 PE40 (1.54 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	2.33E+01	0.00E+00	5.85E-03	2.51E-01	1.67E-03	-7.39E+00
PERM	[MJ]	1.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	2.45E+01	0.00E+00	5.85E-03	2.51E-01	1.67E-03	-7.39E+00
PENRE	[MJ]	9.78E+01	0.00E+00	7.75E-02	2.57E+00	1.02E-02	-2.75E+01
PENRM	[MJ]	1.53E+01	0.00E+00	0.00E+00	-1.54E+00	0.00E+00	0.00E+00
PENRT	[MJ]	1.13E+02	0.00E+00	7.75E-02	1.03E+00	1.02E-02	-2.75E+01
SM	[kg]	5.89E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.50E-01
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	6.32E-01	0.00E+00	2.89E-06	5.37E-03	2.15E-06	-1.97E-02

Caption PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 32 PE40 (1.54 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	2.23E-08	0.00E+00	3.11E-12	5.10E-10	2.21E-12	-1.05E-04
NHWD	[kg]	2.73E-01	0.00E+00	1.08E-05	2.10E-01	2.94E-02	4.43E-03
RWD	[kg]	8.54E-04	0.00E+00	1.46E-07	3.50E-05	1.42E-07	-1.29E-03
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	5.59E-01	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	4.31E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	7.71E+00	0.00E+00	0.00E+00

Caption HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy

**RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece
HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 32 PE40 (1.54 kg/piece)**

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index						

The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

Disclaimer – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP:

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

2.11 HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 40 PE50

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED); MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 40 PE50 (1.81 kg/piece)

Kemindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	7.59E+00	0.00E+00	7.02E-03	3.03E+00	6.33E-04	-2.11E+00
GWP-fossil	[kg CO ₂ -Eq.]	7.55E+00	0.00E+00	6.94E-03	3.03E+00	6.29E-04	-2.11E+00
GWP-biogenic	[kg CO ₂ -Eq.]	2.98E-02	0.00E+00	1.30E-05	9.83E-05	1.94E-06	-1.50E-03
GWP-luluc	[kg CO ₂ -Eq.]	9.52E-03	0.00E+00	7.29E-05	2.13E-04	1.98E-06	-4.14E-03
ODP	[kg CFC11-Eq.]	4.51E-11	0.00E+00	1.17E-15	6.32E-13	2.04E-15	-1.05E-11
AP	[mol H ⁺ -Eq.]	2.39E-02	0.00E+00	2.53E-05	3.88E-04	3.93E-06	-7.16E-03
EP-freshwater	[kg P-Eq.]	3.37E-04	0.00E+00	1.91E-08	9.02E-08	8.90E-10	-2.44E-06
EP-marine	[kg N-Eq.]	3.48E-03	0.00E+00	1.20E-05	1.07E-04	9.57E-07	-1.24E-03
EP-terrestrial	[mol N-Eq.]	3.70E-02	0.00E+00	1.30E-04	1.79E-03	1.04E-05	-1.35E-02
POCP	[kg NMVOC-Eq.]	1.48E-02	0.00E+00	2.32E-05	3.06E-04	2.97E-06	-3.63E-03
ADPE	[kg Sb-Eq.]	2.08E-04	0.00E+00	4.71E-10	6.93E-09	4.27E-11	-2.38E-05
ADPF	[MJ]	1.36E+02	0.00E+00	9.07E-02	1.31E+00	1.03E-02	-3.23E+01
WDP	[m ³ world-Eq deprived]	3.37E+01	0.00E+00	3.24E-05	2.87E-01	7.35E-05	-5.10E-01

Caption GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 40 PE50 (1.81 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	2.59E+01	0.00E+00	6.84E-03	3.19E-01	1.68E-03	-8.89E+00
PERM	[MJ]	1.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	2.71E+01	0.00E+00	6.84E-03	3.19E-01	1.68E-03	-8.89E+00
PENRE	[MJ]	1.17E+02	0.00E+00	9.07E-02	1.99E+01	1.03E-02	-3.23E+01
PENRM	[MJ]	1.91E+01	0.00E+00	0.00E+00	-1.86E+01	0.00E+00	0.00E+00
PENRT	[MJ]	1.36E+02	0.00E+00	9.07E-02	1.31E+00	1.03E-02	-3.23E+01
SM	[kg]	5.89E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.59E-01
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	7.97E-01	0.00E+00	3.38E-06	6.82E-03	2.17E-06	-2.12E-02

Caption PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 40 PE50 (1.81 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	2.36E-08	0.00E+00	3.64E-12	6.50E-10	2.22E-12	-1.08E-04
NHWD	[kg]	2.88E-01	0.00E+00	1.27E-05	2.67E-01	2.96E-02	1.97E-03
RWD	[kg]	8.62E-04	0.00E+00	1.71E-07	4.46E-05	1.43E-07	-1.62E-03
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	5.62E-01	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	5.47E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	9.80E+00	0.00E+00	0.00E+00

Caption HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy

**RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece
HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 40 PE50 (1.81 kg/piece)**

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index						

The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

Disclaimer – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP:

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

2.12 HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 50 PE63

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED); MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 50 PE63 (2.47 kg/piece)

Kemindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	1.02E+01	0.00E+00	9.60E-03	4.30E+00	8.01E-04	-2.72E+00
GWP-fossil	[kg CO ₂ -Eq.]	1.02E+01	0.00E+00	9.49E-03	4.30E+00	7.96E-04	-2.71E+00
GWP-biogenic	[kg CO ₂ -Eq.]	4.10E-02	0.00E+00	1.77E-05	1.40E-04	2.45E-06	-3.42E-03
GWP-luluc	[kg CO ₂ -Eq.]	1.25E-02	0.00E+00	9.96E-05	2.99E-04	2.50E-06	-5.14E-03
ODP	[kg CFC11-Eq.]	6.02E-11	0.00E+00	1.61E-15	8.91E-13	2.58E-15	-1.50E-11
AP	[mol H ⁺ -Eq.]	3.02E-02	0.00E+00	3.46E-05	5.49E-04	4.97E-06	-8.47E-03
EP-freshwater	[kg P-Eq.]	4.70E-04	0.00E+00	2.61E-08	1.28E-07	1.13E-09	-3.06E-06
EP-marine	[kg N-Eq.]	4.58E-03	0.00E+00	1.65E-05	1.52E-04	1.21E-06	-1.51E-03
EP-terrestrial	[mol N-Eq.]	4.85E-02	0.00E+00	1.78E-04	2.53E-03	1.32E-05	-1.65E-02
POCP	[kg NMVOC-Eq.]	1.98E-02	0.00E+00	3.17E-05	4.32E-04	3.76E-06	-4.41E-03
ADPE	[kg Sb-Eq.]	2.65E-04	0.00E+00	6.44E-10	9.77E-09	5.41E-11	-2.64E-05
ADPF	[MJ]	1.87E+02	0.00E+00	1.24E-01	1.85E+00	1.30E-02	-4.24E+01
WDP	[m ³ world-Eq deprived]	4.70E+01	0.00E+00	4.43E-05	4.06E-01	9.31E-05	-6.10E-01

Caption GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 50 PE63 (2.47 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	3.48E+01	0.00E+00	9.35E-03	4.50E-01	2.12E-03	-1.20E+01
PERM	[MJ]	1.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	3.60E+01	0.00E+00	9.35E-03	4.50E-01	2.12E-03	-1.20E+01
PENRE	[MJ]	1.60E+02	0.00E+00	1.24E-01	2.83E+01	1.30E-02	-4.24E+01
PENRM	[MJ]	2.70E+01	0.00E+00	0.00E+00	-2.65E+01	0.00E+00	0.00E+00
PENRT	[MJ]	1.87E+02	0.00E+00	1.24E-01	1.85E+00	1.30E-02	-4.24E+01
SM	[kg]	7.45E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.78E-01
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	1.11E+00	0.00E+00	4.62E-06	9.66E-03	2.74E-06	-2.55E-02

Caption PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 50 PE63 (2.47 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	3.13E-08	0.00E+00	4.98E-12	9.15E-10	2.81E-12	-1.21E-04
NHWD	[kg]	3.50E-01	0.00E+00	1.73E-05	3.76E-01	3.75E-02	-5.40E-04
RWD	[kg]	1.11E-03	0.00E+00	2.34E-07	6.29E-05	1.81E-07	-2.28E-03
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	7.12E-01	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	7.75E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	1.39E+01	0.00E+00	0.00E+00

Caption HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy

**RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece
HAWLE-FIT SERVICE VALVE PN16 : HAS-FIT-ISO2 POM 50 PE63 (2.47 kg/piece)**

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index						

The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

Disclaimer – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP:

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

2.13 ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 32 PE40

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED); MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 32 PE40 (1.41 kg/piece)

Kemindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	5.66E+00	0.00E+00	5.49E-03	2.05E+00	6.34E-04	-1.70E+00
GWP-fossil	[kg CO ₂ -Eq.]	5.63E+00	0.00E+00	5.42E-03	2.05E+00	6.30E-04	-1.70E+00
GWP-biogenic	[kg CO ₂ -Eq.]	2.26E-02	0.00E+00	1.01E-05	6.68E-05	1.94E-06	3.57E-04
GWP-luluc	[kg CO ₂ -Eq.]	8.13E-03	0.00E+00	5.69E-05	1.40E-04	1.98E-06	-3.54E-03
ODP	[kg CFC11-Eq.]	4.17E-11	0.00E+00	9.18E-16	4.16E-13	2.04E-15	-6.82E-12
AP	[mol H ⁺ -Eq.]	2.05E-02	0.00E+00	1.98E-05	2.59E-04	3.93E-06	-6.54E-03
EP-freshwater	[kg P-Eq.]	2.20E-04	0.00E+00	1.49E-08	6.02E-08	8.91E-10	-2.05E-06
EP-marine	[kg N-Eq.]	2.79E-03	0.00E+00	9.40E-06	7.16E-05	9.58E-07	-1.08E-03
EP-terrestrial	[mol N-Eq.]	2.98E-02	0.00E+00	1.02E-04	1.20E-03	1.04E-05	-1.18E-02
POCP	[kg NMVOC-Eq.]	1.23E-02	0.00E+00	1.81E-05	2.04E-04	2.97E-06	-3.20E-03
ADPE	[kg Sb-Eq.]	2.07E-04	0.00E+00	3.68E-10	4.57E-09	4.28E-11	-2.23E-05
ADPF	[MJ]	9.91E+01	0.00E+00	7.09E-02	8.65E-01	1.03E-02	-2.52E+01
WDP	[m ³ world-Eq deprived]	2.20E+01	0.00E+00	2.53E-05	1.93E-01	7.36E-05	-4.59E-01

Caption GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 32 PE40 (1.41 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	2.23E+01	0.00E+00	5.34E-03	2.11E-01	1.68E-03	-6.62E+00
PERM	[MJ]	1.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	2.35E+01	0.00E+00	5.34E-03	2.11E-01	1.68E-03	-6.62E+00
PENRE	[MJ]	8.56E+01	0.00E+00	7.09E-02	1.38E+01	1.03E-02	-2.52E+01
PENRM	[MJ]	1.35E+01	0.00E+00	0.00E+00	-1.30E+01	0.00E+00	0.00E+00
PENRT	[MJ]	9.91E+01	0.00E+00	7.09E-02	8.65E-01	1.03E-02	-2.52E+01
SM	[kg]	5.89E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.52E-01
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	5.23E-01	0.00E+00	2.64E-06	4.58E-03	2.17E-06	-1.91E-02

Caption PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 32 PE40 (1.41 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	2.21E-08	0.00E+00	2.84E-12	4.28E-10	2.23E-12	-1.05E-04
NHWD	[kg]	2.63E-01	0.00E+00	9.89E-06	1.76E-01	2.97E-02	5.33E-03
RWD	[kg]	8.68E-04	0.00E+00	1.34E-07	2.96E-05	1.43E-07	-1.11E-03
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	5.63E-01	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	3.67E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	6.57E+00	0.00E+00	0.00E+00

Caption HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 32 PE40 (1.41 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index						

The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

Disclaimer – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP:

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

2.14 ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 50 PE63

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED); MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	MNR	MNR	MNR	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 50 PE63 (2.22 kg/piece)

Kernindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	9.08E+00	0.00E+00	8.64E-03	3.71E+00	7.92E-04	-2.45E+00
GWP-fossil	[kg CO ₂ -Eq.]	9.03E+00	0.00E+00	8.53E-03	3.71E+00	7.87E-04	-2.44E+00
GWP-biogenic	[kg CO ₂ -Eq.]	3.70E-02	0.00E+00	1.59E-05	1.22E-04	2.42E-06	-2.35E-03
GWP-luluc	[kg CO ₂ -Eq.]	1.17E-02	0.00E+00	8.96E-05	2.49E-04	2.48E-06	-4.71E-03
ODP	[kg CFC11-Eq.]	5.91E-11	0.00E+00	1.44E-15	7.41E-13	2.55E-15	-1.24E-11
AP	[mol H ⁺ -Eq.]	2.81E-02	0.00E+00	3.11E-05	4.67E-04	4.91E-06	-7.95E-03
EP-freshwater	[kg P-Eq.]	3.89E-04	0.00E+00	2.35E-08	1.08E-07	1.11E-09	-2.79E-06
EP-marine	[kg N-Eq.]	4.17E-03	0.00E+00	1.48E-05	1.29E-04	1.20E-06	-1.40E-03
EP-terrestrial	[mol N-Eq.]	4.44E-02	0.00E+00	1.60E-04	2.16E-03	1.31E-05	-1.53E-02
POCP	[kg NMVOC-Eq.]	1.84E-02	0.00E+00	2.85E-05	3.67E-04	3.71E-06	-4.09E-03
ADPE	[kg Sb-Eq.]	2.64E-04	0.00E+00	5.79E-10	8.14E-09	5.35E-11	-2.31E-05
ADPF	[MJ]	1.66E+02	0.00E+00	1.12E-01	1.54E+00	1.29E-02	-3.77E+01
WDP	[m ³ world-Eq deprived]	3.88E+01	0.00E+00	3.98E-05	3.48E-01	9.20E-05	-5.71E-01

Caption GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 50 PE63 (2.22 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	3.31E+01	0.00E+00	8.41E-03	3.76E-01	2.10E-03	-1.05E+01
PERM	[MJ]	1.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	3.43E+01	0.00E+00	8.41E-03	3.76E-01	2.10E-03	-1.05E+01
PENRE	[MJ]	1.41E+02	0.00E+00	1.12E-01	2.57E+01	1.29E-02	-3.77E+01
PENRM	[MJ]	2.47E+01	0.00E+00	0.00E+00	-2.42E+01	0.00E+00	0.00E+00
PENRT	[MJ]	1.66E+02	0.00E+00	1.12E-01	1.54E+00	1.29E-02	-3.77E+01
SM	[kg]	7.45E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.65E-01
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	9.20E-01	0.00E+00	4.16E-06	8.28E-03	2.71E-06	-2.38E-02

Caption PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 50 PE63 (2.22 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	3.12E-08	0.00E+00	4.48E-12	7.63E-10	2.78E-12	-1.18E-04
NHWD	[kg]	3.34E-01	0.00E+00	1.56E-05	3.13E-01	3.71E-02	2.19E-03
RWD	[kg]	1.17E-03	0.00E+00	2.11E-07	5.30E-05	1.79E-07	-1.96E-03
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	7.04E-01	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	6.63E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	1.19E+01	0.00E+00	0.00E+00

Caption HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 50 PE63 (2.22 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index						

The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

Disclaimer – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP:

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

2.15 ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 25 PE32

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED); MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 25 PE32 (0.95 kg/piece)

Kemindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	4.03E+00	0.00E+00	3.70E-03	1.34E+00	4.44E-04	-1.21E+00
GWP-fossil	[kg CO ₂ -Eq.]	4.01E+00	0.00E+00	3.65E-03	1.34E+00	4.41E-04	-1.21E+00
GWP-biogenic	[kg CO ₂ -Eq.]	1.58E-02	0.00E+00	6.82E-06	4.38E-05	1.36E-06	7.27E-04
GWP-luluc	[kg CO ₂ -Eq.]	5.85E-03	0.00E+00	3.84E-05	9.11E-05	1.39E-06	-2.59E-03
ODP	[kg CFC11-Eq.]	2.91E-11	0.00E+00	6.18E-16	2.71E-13	1.43E-15	-4.12E-12
AP	[mol H ⁺ -Eq.]	1.54E-02	0.00E+00	1.33E-05	1.70E-04	2.75E-06	-4.86E-03
EP-freshwater	[kg P-Eq.]	1.49E-04	0.00E+00	1.00E-08	3.93E-08	6.24E-10	-1.49E-06
EP-marine	[kg N-Eq.]	2.04E-03	0.00E+00	6.33E-06	4.68E-05	6.71E-07	-7.97E-04
EP-terrestrial	[mol N-Eq.]	2.18E-02	0.00E+00	6.85E-05	7.82E-04	7.32E-06	-8.69E-03
POCP	[kg NMVOC-Eq.]	8.68E-03	0.00E+00	1.22E-05	1.33E-04	2.08E-06	-2.36E-03
ADPE	[kg Sb-Eq.]	1.49E-04	0.00E+00	2.48E-10	2.97E-09	3.00E-11	-1.46E-05
ADPF	[MJ]	6.97E+01	0.00E+00	4.77E-02	5.63E-01	7.22E-03	-1.77E+01
WDP	[m³ world-Eq deprived]	1.49E+01	0.00E+00	1.70E-05	1.26E-01	5.16E-05	-3.41E-01

Caption GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 25 PE32 (0.95 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	1.55E+01	0.00E+00	3.60E-03	1.37E-01	1.18E-03	-4.55E+00
PERM	[MJ]	1.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	1.67E+01	0.00E+00	3.60E-03	1.37E-01	1.18E-03	-4.55E+00
PENRE	[MJ]	6.04E+01	0.00E+00	4.77E-02	9.44E+00	7.22E-03	-1.77E+01
PENRM	[MJ]	9.39E+00	0.00E+00	0.00E+00	-8.88E+00	0.00E+00	0.00E+00
PENRT	[MJ]	6.97E+01	0.00E+00	4.77E-02	5.63E-01	7.22E-03	-1.77E+01
SM	[kg]	4.28E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.10E-01
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m³]	3.54E-01	0.00E+00	1.78E-06	3.00E-03	1.52E-06	-1.42E-02

Caption PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 25 PE32 (0.95 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	1.56E-08	0.00E+00	1.92E-12	2.79E-10	1.56E-12	-8.04E-05
NHWD	[kg]	2.02E-01	0.00E+00	6.67E-06	1.14E-01	2.08E-02	5.93E-03
RWD	[kg]	6.30E-04	0.00E+00	9.01E-08	1.93E-05	1.00E-07	-7.34E-04
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	3.94E-01	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	2.40E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	4.30E+00	0.00E+00	0.00E+00

Caption HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 25 PE32 (0.95 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index						

The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

Disclaimer – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP:

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

2.16 ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 40 PE50

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED); MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 40 PE50 (1.59 kg/piece)

Kernindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	6.51E+00	0.00E+00	6.17E-03	2.50E+00	6.30E-04	-1.87E+00
GWP-fossil	[kg CO ₂ -Eq.]	6.48E+00	0.00E+00	6.10E-03	2.50E+00	6.26E-04	-1.87E+00
GWP-biogenic	[kg CO ₂ -Eq.]	2.61E-02	0.00E+00	1.14E-05	8.17E-05	1.93E-06	-5.07E-04
GWP-luluc	[kg CO ₂ -Eq.]	8.81E-03	0.00E+00	6.40E-05	1.69E-04	1.97E-06	-3.79E-03
ODP	[kg CFC11-Eq.]	4.38E-11	0.00E+00	1.03E-15	5.04E-13	2.03E-15	-8.39E-12
AP	[mol H ⁺ -Eq.]	2.20E-02	0.00E+00	2.23E-05	3.16E-04	3.91E-06	-6.76E-03
EP-freshwater	[kg P-Eq.]	2.66E-04	0.00E+00	1.68E-08	7.33E-08	8.85E-10	-2.21E-06
EP-marine	[kg N-Eq.]	3.10E-03	0.00E+00	1.06E-05	8.72E-05	9.52E-07	-1.14E-03
EP-terrestrial	[mol N-Eq.]	3.31E-02	0.00E+00	1.14E-04	1.46E-03	1.04E-05	-1.25E-02
POCP	[kg NMVOC-Eq.]	1.34E-02	0.00E+00	2.04E-05	2.48E-04	2.95E-06	-3.37E-03
ADPE	[kg Sb-Eq.]	2.07E-04	0.00E+00	4.14E-10	5.53E-09	4.25E-11	-2.21E-05
ADPF	[MJ]	1.16E+02	0.00E+00	7.97E-02	1.05E+00	1.02E-02	-2.82E+01
WDP	[m ³ world-Eq deprived]	2.66E+01	0.00E+00	2.84E-05	2.35E-01	7.31E-05	-4.78E-01

Caption GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 40 PE50 (1.59 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	2.42E+01	0.00E+00	6.01E-03	2.55E-01	1.67E-03	-7.61E+00
PERM	[MJ]	1.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	2.54E+01	0.00E+00	6.01E-03	2.55E-01	1.67E-03	-7.61E+00
PENRE	[MJ]	9.97E+01	0.00E+00	7.97E-02	1.71E+01	1.02E-02	-2.82E+01
PENRM	[MJ]	1.66E+01	0.00E+00	0.00E+00	-1.60E+01	0.00E+00	0.00E+00
PENRT	[MJ]	1.16E+02	0.00E+00	7.97E-02	1.05E+00	1.02E-02	-2.82E+01
SM	[kg]	5.89E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.52E-01
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	6.31E-01	0.00E+00	2.97E-06	5.59E-03	2.16E-06	-1.99E-02

Caption PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 40 PE50 (1.59 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	2.33E-08	0.00E+00	3.20E-12	5.19E-10	2.21E-12	-1.05E-04
NHWD	[kg]	2.74E-01	0.00E+00	1.11E-05	2.13E-01	2.95E-02	4.04E-03
RWD	[kg]	8.92E-04	0.00E+00	1.50E-07	3.59E-05	1.42E-07	-1.34E-03
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	5.59E-01	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	4.48E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	8.01E+00	0.00E+00	0.00E+00

Caption HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 40 PE50 (1.59 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index						

The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

Disclaimer – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP:

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

2.17 ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 15 PE20

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED); MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 15 PE20 (0.80 kg/piece)

Kernindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	3.31E+00	0.00E+00	3.12E-03	9.54E-01	4.51E-04	-1.06E+00
GWP-fossil	[kg CO ₂ -Eq.]	3.29E+00	0.00E+00	3.08E-03	9.54E-01	4.48E-04	-1.06E+00
GWP-biogenic	[kg CO ₂ -Eq.]	1.29E-02	0.00E+00	5.76E-06	3.12E-05	1.38E-06	1.49E-03
GWP-luluc	[kg CO ₂ -Eq.]	5.32E-03	0.00E+00	3.24E-05	6.45E-05	1.41E-06	-2.38E-03
ODP	[kg CFC11-Eq.]	2.77E-11	0.00E+00	5.22E-16	1.92E-13	1.45E-15	-2.68E-12
AP	[mol H ⁺ -Eq.]	1.43E-02	0.00E+00	1.13E-05	1.20E-04	2.79E-06	-4.67E-03
EP-freshwater	[kg P-Eq.]	1.06E-04	0.00E+00	8.48E-09	2.79E-08	6.33E-10	-1.35E-06
EP-marine	[kg N-Eq.]	1.78E-03	0.00E+00	5.35E-06	3.32E-05	6.81E-07	-7.45E-04
EP-terrestrial	[mol N-Eq.]	1.92E-02	0.00E+00	5.78E-05	5.56E-04	7.43E-06	-8.12E-03
POCP	[kg NMVOC-Eq.]	7.80E-03	0.00E+00	1.03E-05	9.47E-05	2.11E-06	-2.22E-03
ADPE	[kg Sb-Eq.]	1.51E-04	0.00E+00	2.09E-10	2.11E-09	3.04E-11	-1.42E-05
ADPF	[MJ]	5.53E+01	0.00E+00	4.03E-02	3.99E-01	7.33E-03	-1.51E+01
WDP	[m ³ world-Eq deprived]	1.07E+01	0.00E+00	1.44E-05	8.97E-02	5.23E-05	-3.26E-01

Caption GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 15 PE20 (0.80 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	1.40E+01	0.00E+00	3.04E-03	9.72E-02	1.19E-03	-3.70E+00
PERM	[MJ]	1.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	1.52E+01	0.00E+00	3.04E-03	9.72E-02	1.19E-03	-3.70E+00
PENRE	[MJ]	4.84E+01	0.00E+00	4.03E-02	6.79E+00	7.33E-03	-1.51E+01
PENRM	[MJ]	6.90E+00	0.00E+00	0.00E+00	-6.39E+00	0.00E+00	0.00E+00
PENRT	[MJ]	5.53E+01	0.00E+00	4.03E-02	3.99E-01	7.33E-03	-1.51E+01
SM	[kg]	4.34E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.08E-01
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	2.54E-01	0.00E+00	1.50E-06	2.13E-03	1.54E-06	-1.35E-02

Caption PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 15 PE20 (0.80 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	1.49E-08	0.00E+00	1.62E-12	1.97E-10	1.58E-12	-1.83E-09
NHWD	[kg]	1.95E-01	0.00E+00	5.63E-06	8.09E-02	2.11E-02	-6.23E-04
RWD	[kg]	6.26E-04	0.00E+00	7.61E-08	1.37E-05	1.02E-07	-2.19E-04
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	4.00E-01	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	1.71E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	3.06E+00	0.00E+00	0.00E+00

Caption HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 15 PE20 (0.80 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index						

The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

Disclaimer – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP:

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

2.18 ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 20 PE25

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED); MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 20 PE25 (0.88 kg/piece)

Kemindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	3.68E+00	0.00E+00	3.42E-03	1.14E+00	4.53E-04	-1.14E+00
GWP-fossil	[kg CO ₂ -Eq.]	3.66E+00	0.00E+00	3.38E-03	1.14E+00	4.50E-04	-1.14E+00
GWP-biogenic	[kg CO ₂ -Eq.]	1.44E-02	0.00E+00	6.32E-06	3.74E-05	1.39E-06	1.15E-03
GWP-luluc	[kg CO ₂ -Eq.]	5.62E-03	0.00E+00	3.55E-05	7.75E-05	1.41E-06	-2.50E-03
ODP	[kg CFC11-Eq.]	2.86E-11	0.00E+00	5.73E-16	2.31E-13	1.46E-15	-3.39E-12
AP	[mol H ⁺ -Eq.]	1.49E-02	0.00E+00	1.23E-05	1.45E-04	2.81E-06	-4.82E-03
EP-freshwater	[kg P-Eq.]	1.27E-04	0.00E+00	9.30E-09	3.35E-08	6.36E-10	-1.43E-06
EP-marine	[kg N-Eq.]	1.92E-03	0.00E+00	5.87E-06	3.99E-05	6.84E-07	-7.78E-04
EP-terrestrial	[mol N-Eq.]	2.06E-02	0.00E+00	6.35E-05	6.67E-04	7.46E-06	-8.48E-03
POCP	[kg NMVOC-Eq.]	8.29E-03	0.00E+00	1.13E-05	1.14E-04	2.12E-06	-2.32E-03
ADPE	[kg Sb-Eq.]	1.52E-04	0.00E+00	2.30E-10	2.53E-09	3.05E-11	-1.47E-05
ADPF	[MJ]	6.26E+01	0.00E+00	4.42E-02	4.79E-01	7.36E-03	-1.65E+01
WDP	[m ³ world-Eq deprived]	1.27E+01	0.00E+00	1.58E-05	1.08E-01	5.26E-05	-3.37E-01

Caption GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 20 PE25 (0.88 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	1.49E+01	0.00E+00	3.33E-03	1.17E-01	1.20E-03	-4.14E+00
PERM	[MJ]	1.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	1.61E+01	0.00E+00	3.33E-03	1.17E-01	1.20E-03	-4.14E+00
PENRE	[MJ]	5.45E+01	0.00E+00	4.42E-02	8.10E+00	7.36E-03	-1.65E+01
PENRM	[MJ]	8.13E+00	0.00E+00	0.00E+00	-7.62E+00	0.00E+00	0.00E+00
PENRT	[MJ]	6.26E+01	0.00E+00	4.42E-02	4.79E-01	7.36E-03	-1.65E+01
SM	[kg]	4.36E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.10E-01
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	3.03E-01	0.00E+00	1.65E-06	2.56E-03	1.55E-06	-1.40E-02

Caption PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 20 PE25 (0.88 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	1.54E-08	0.00E+00	1.77E-12	2.37E-10	1.59E-12	-8.13E-05
NHWD	[kg]	2.00E-01	0.00E+00	6.17E-06	9.73E-02	2.12E-02	6.76E-03
RWD	[kg]	6.35E-04	0.00E+00	8.35E-08	1.65E-05	1.02E-07	-6.34E-04
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	4.02E-01	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	2.05E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	3.67E+00	0.00E+00	0.00E+00

Caption HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece ISO2 SERVICE VALVE POM PN16 : HAS-ISO2 POM 20 PE25 (0.88 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index						

The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

Disclaimer – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP:

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

2.19 COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE25 mFIT

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED); MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE25 mFIT (0.97 kg/piece)

Kemindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	3.95E+00	0.00E+00	3.77E-03	1.33E+00	4.71E-04	-1.26E+00
GWP-fossil	[kg CO ₂ -Eq.]	3.93E+00	0.00E+00	3.73E-03	1.33E+00	4.68E-04	-1.26E+00
GWP-biogenic	[kg CO ₂ -Eq.]	1.55E-02	0.00E+00	6.97E-06	4.32E-05	1.44E-06	1.01E-03
GWP-luluc	[kg CO ₂ -Eq.]	5.92E-03	0.00E+00	3.92E-05	9.12E-05	1.47E-06	-2.74E-03
ODP	[kg CFC11-Eq.]	2.94E-11	0.00E+00	6.31E-16	2.71E-13	1.51E-15	-4.43E-12
AP	[mol H ⁺ -Eq.]	1.54E-02	0.00E+00	1.36E-05	1.68E-04	2.92E-06	-5.26E-03
EP-freshwater	[kg P-Eq.]	1.44E-04	0.00E+00	1.03E-08	3.91E-08	6.61E-10	-1.57E-06
EP-marine	[kg N-Eq.]	2.02E-03	0.00E+00	6.47E-06	4.65E-05	7.11E-07	-8.48E-04
EP-terrestrial	[mol N-Eq.]	2.16E-02	0.00E+00	6.99E-05	7.77E-04	7.76E-06	-9.24E-03
POCP	[kg NMVOC-Eq.]	8.63E-03	0.00E+00	1.25E-05	1.33E-04	2.21E-06	-2.52E-03
ADPE	[kg Sb-Eq.]	1.52E-04	0.00E+00	2.53E-10	2.98E-09	3.18E-11	-1.93E-05
ADPF	[MJ]	6.77E+01	0.00E+00	4.88E-02	5.64E-01	7.65E-03	-1.84E+01
WDP	[m ³ world-Eq deprived]	1.45E+01	0.00E+00	1.74E-05	1.25E-01	5.47E-05	-3.65E-01

Caption: GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE25 mFIT (0.97 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	1.57E+01	0.00E+00	3.67E-03	1.37E-01	1.25E-03	-4.67E+00
PERM	[MJ]	1.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	1.69E+01	0.00E+00	3.67E-03	1.37E-01	1.25E-03	-4.67E+00
PENRE	[MJ]	5.89E+01	0.00E+00	4.88E-02	8.90E+00	7.65E-03	-1.84E+01
PENRM	[MJ]	8.84E+00	0.00E+00	0.00E+00	-8.33E+00	0.00E+00	0.00E+00
PENRT	[MJ]	6.77E+01	0.00E+00	4.88E-02	5.64E-01	7.65E-03	-1.84E+01
SM	[kg]	4.36E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.28E-01
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	3.44E-01	0.00E+00	1.82E-06	2.97E-03	1.61E-06	-1.51E-02

Caption: PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE25 mFIT (0.97 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HW	[kg]	1.57E-08	0.00E+00	1.96E-12	2.79E-10	1.65E-12	-8.65E-05
NHW	[kg]	2.04E-01	0.00E+00	6.81E-06	1.15E-01	2.20E-02	5.28E-03
RWD	[kg]	6.30E-04	0.00E+00	9.20E-08	1.93E-05	1.06E-07	-7.34E-04
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	4.18E-01	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	2.38E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	4.27E+00	0.00E+00	0.00E+00

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy
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RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE25 mFIT (0.97 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index						

The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

Disclaimer – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP:

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

2.20 COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE32 mFIT

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED); MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE32 mFIT (1.00 kg/piece)

Kernindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	4.05E+00	0.00E+00	3.89E-03	1.39E+00	4.75E-04	-1.30E+00
GWP-fossil	[kg CO ₂ -Eq.]	4.03E+00	0.00E+00	3.84E-03	1.39E+00	4.72E-04	-1.30E+00
GWP-biogenic	[kg CO ₂ -Eq.]	1.59E-02	0.00E+00	7.18E-06	4.53E-05	1.45E-06	9.38E-04
GWP-luluc	[kg CO ₂ -Eq.]	6.02E-03	0.00E+00	4.04E-05	9.59E-05	1.48E-06	-2.81E-03
ODP	[kg CFC11-Eq.]	2.97E-11	0.00E+00	6.51E-16	2.85E-13	1.53E-15	-4.75E-12
AP	[mol H ⁺ -Eq.]	1.56E-02	0.00E+00	1.40E-05	1.77E-04	2.94E-06	-5.37E-03
EP-freshwater	[kg P-Eq.]	1.50E-04	0.00E+00	1.06E-08	4.11E-08	6.67E-10	-1.61E-06
EP-marine	[kg N-Eq.]	2.05E-03	0.00E+00	6.67E-06	4.89E-05	7.17E-07	-8.67E-04
EP-terrestrial	[mol N-Eq.]	2.20E-02	0.00E+00	7.21E-05	8.16E-04	7.82E-06	-9.46E-03
POCP	[kg NMVOC-Eq.]	8.77E-03	0.00E+00	1.28E-05	1.39E-04	2.23E-06	-2.58E-03
ADPE	[kg Sb-Eq.]	1.52E-04	0.00E+00	2.61E-10	3.13E-09	3.20E-11	-2.03E-05
ADPF	[MJ]	6.97E+01	0.00E+00	5.03E-02	5.93E-01	7.72E-03	-1.90E+01
WDP	[m ³ world-Eq deprived]	1.51E+01	0.00E+00	1.79E-05	1.31E-01	5.51E-05	-3.73E-01

Caption GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE32 mFIT (1.00 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	1.60E+01	0.00E+00	3.79E-03	1.44E-01	1.26E-03	-4.85E+00
PERM	[MJ]	1.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	1.72E+01	0.00E+00	3.79E-03	1.44E-01	1.26E-03	-4.85E+00
PENRE	[MJ]	6.05E+01	0.00E+00	5.03E-02	9.24E+00	7.72E-03	-1.90E+01
PENRM	[MJ]	9.16E+00	0.00E+00	0.00E+00	-8.65E+00	0.00E+00	0.00E+00
PENRT	[MJ]	6.97E+01	0.00E+00	5.03E-02	5.93E-01	7.72E-03	-1.90E+01
SM	[kg]	4.36E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.32E-01
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	3.58E-01	0.00E+00	1.87E-06	3.12E-03	1.63E-06	-1.54E-02

Caption PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE32 mFIT (1.00 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	1.59E-08	0.00E+00	2.02E-12	2.93E-10	1.67E-12	-8.77E-05
NHWD	[kg]	2.06E-01	0.00E+00	7.02E-06	1.20E-01	2.22E-02	4.87E-03
RWD	[kg]	6.31E-04	0.00E+00	9.49E-08	2.02E-05	1.07E-07	-7.69E-04
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	4.22E-01	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	2.50E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	4.48E+00	0.00E+00	0.00E+00

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy
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RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE32 mFIT (1.00 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index						

The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

Disclaimer – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP:

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

2.21 COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE40 mFIT

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED); MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE40 mFIT (1.09 kg/piece)

Kernindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	4.44E+00	0.00E+00	4.24E-03	1.60E+00	4.83E-04	-1.40E+00
GWP-fossil	[kg CO ₂ -Eq.]	4.41E+00	0.00E+00	4.19E-03	1.60E+00	4.80E-04	-1.40E+00
GWP-biogenic	[kg CO ₂ -Eq.]	1.75E-02	0.00E+00	7.83E-06	5.22E-05	1.48E-06	6.21E-04
GWP-luluc	[kg CO ₂ -Eq.]	6.41E-03	0.00E+00	4.40E-05	1.09E-04	1.51E-06	-2.96E-03
ODP	[kg CFC11-Eq.]	3.11E-11	0.00E+00	7.09E-16	3.25E-13	1.55E-15	-5.49E-12
AP	[mol H ⁺ -Eq.]	1.65E-02	0.00E+00	1.53E-05	2.03E-04	2.99E-06	-5.58E-03
EP-freshwater	[kg P-Eq.]	1.70E-04	0.00E+00	1.15E-08	4.70E-08	6.78E-10	-1.71E-06
EP-marine	[kg N-Eq.]	2.21E-03	0.00E+00	7.27E-06	5.59E-05	7.29E-07	-9.10E-04
EP-terrestrial	[mol N-Eq.]	2.37E-02	0.00E+00	7.86E-05	9.34E-04	7.96E-06	-9.93E-03
POCP	[kg NMVOC-Eq.]	9.34E-03	0.00E+00	1.40E-05	1.59E-04	2.26E-06	-2.70E-03
ADPE	[kg Sb-Eq.]	1.55E-04	0.00E+00	2.84E-10	3.56E-09	3.26E-11	-2.10E-05
ADPF	[MJ]	7.74E+01	0.00E+00	5.48E-02	6.75E-01	7.85E-03	-2.06E+01
WDP	[m ³ world-Eq deprived]	1.70E+01	0.00E+00	1.95E-05	1.51E-01	5.61E-05	-3.89E-01

Caption: GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE40 mFIT (1.09 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	1.71E+01	0.00E+00	4.13E-03	1.64E-01	1.28E-03	-5.34E+00
PERM	[MJ]	1.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	1.83E+01	0.00E+00	4.13E-03	1.64E-01	1.28E-03	-5.34E+00
PENRE	[MJ]	6.69E+01	0.00E+00	5.48E-02	1.07E+01	7.85E-03	-2.06E+01
PENRM	[MJ]	1.05E+01	0.00E+00	0.00E+00	-1.00E+01	0.00E+00	0.00E+00
PENRT	[MJ]	7.74E+01	0.00E+00	5.48E-02	6.75E-01	7.85E-03	-2.06E+01
SM	[kg]	4.43E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.36E-01
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	4.04E-01	0.00E+00	2.04E-06	3.58E-03	1.65E-06	-1.61E-02

Caption: PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE40 mFIT (1.09 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	1.67E-08	0.00E+00	2.20E-12	3.34E-10	1.70E-12	-8.97E-05
NHWD	[kg]	2.13E-01	0.00E+00	7.65E-06	1.37E-01	2.26E-02	4.34E-03
RWD	[kg]	6.53E-04	0.00E+00	1.03E-07	2.31E-05	1.09E-07	-8.75E-04
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	4.29E-01	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	2.87E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	5.14E+00	0.00E+00	0.00E+00

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy
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RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE40 mFIT (1.09 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index						

The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

Disclaimer – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP:

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

2.22 COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE50 mFIT

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED); MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE50 mFIT (1.16 kg/piece)

Kemindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	4.77E+00	0.00E+00	4.51E-03	1.80E+00	4.74E-04	-1.47E+00
GWP-fossil	[kg CO ₂ -Eq.]	4.75E+00	0.00E+00	4.46E-03	1.80E+00	4.71E-04	-1.46E+00
GWP-biogenic	[kg CO ₂ -Eq.]	1.89E-02	0.00E+00	8.33E-06	5.86E-05	1.45E-06	1.93E-04
GWP-luluc	[kg CO ₂ -Eq.]	6.64E-03	0.00E+00	4.68E-05	1.22E-04	1.48E-06	-3.04E-03
ODP	[kg CFC11-Eq.]	3.16E-11	0.00E+00	7.55E-16	3.64E-13	1.53E-15	-6.21E-12
AP	[mol H ⁺ -Eq.]	1.69E-02	0.00E+00	1.63E-05	2.27E-04	2.94E-06	-5.61E-03
EP-freshwater	[kg P-Eq.]	1.90E-04	0.00E+00	1.23E-08	5.28E-08	6.66E-10	-1.76E-06
EP-marine	[kg N-Eq.]	2.33E-03	0.00E+00	7.73E-06	6.28E-05	7.16E-07	-9.28E-04
EP-terrestrial	[mol N-Eq.]	2.49E-02	0.00E+00	8.37E-05	1.05E-03	7.81E-06	-1.01E-02
POCP	[kg NMVOC-Eq.]	9.72E-03	0.00E+00	1.49E-05	1.79E-04	2.22E-06	-2.75E-03
ADPE	[kg Sb-Eq.]	1.52E-04	0.00E+00	3.03E-10	4.00E-09	3.20E-11	-2.08E-05
ADPF	[MJ]	8.43E+01	0.00E+00	5.83E-02	7.57E-01	7.71E-03	-2.18E+01
WDP	[m ³ world-Eq deprived]	1.91E+01	0.00E+00	2.08E-05	1.69E-01	5.51E-05	-3.93E-01

Caption: GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE50 mFIT (1.16 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	1.78E+01	0.00E+00	4.39E-03	1.84E-01	1.26E-03	-5.75E+00
PERM	[MJ]	1.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	1.90E+01	0.00E+00	4.39E-03	1.84E-01	1.26E-03	-5.75E+00
PENRE	[MJ]	7.25E+01	0.00E+00	5.83E-02	1.20E+01	7.71E-03	-2.18E+01
PENRM	[MJ]	1.18E+01	0.00E+00	0.00E+00	-1.13E+01	0.00E+00	0.00E+00
PENRT	[MJ]	8.43E+01	0.00E+00	5.83E-02	7.57E-01	7.71E-03	-2.18E+01
SM	[kg]	4.36E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.34E-01
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	4.52E-01	0.00E+00	2.17E-06	4.02E-03	1.62E-06	-1.63E-02

Caption: PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE50 mFIT (1.16 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HW	[kg]	1.69E-08	0.00E+00	2.34E-12	3.75E-10	1.67E-12	-8.88E-05
NHW	[kg]	2.15E-01	0.00E+00	8.14E-06	1.54E-01	2.22E-02	3.55E-03
RWD	[kg]	6.51E-04	0.00E+00	1.10E-07	2.59E-05	1.07E-07	-9.73E-04
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	4.21E-01	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	3.22E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	5.76E+00	0.00E+00	0.00E+00

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy
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RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE50 mFIT (1.16 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index						

The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

Disclaimer – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP:

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

2.23 COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE63 mFIT

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED); MNR = MODULE NOT RELEVANT)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE63 mFIT (1.28 kg/piece)

Kemindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO ₂ -Eq.]	5.36E+00	0.00E+00	4.98E-03	2.11E+00	4.69E-04	-1.58E+00
GWP-fossil	[kg CO ₂ -Eq.]	5.33E+00	0.00E+00	4.92E-03	2.11E+00	4.66E-04	-1.58E+00
GWP-biogenic	[kg CO ₂ -Eq.]	2.13E-02	0.00E+00	9.19E-06	6.89E-05	1.44E-06	-4.30E-04
GWP-luluc	[kg CO ₂ -Eq.]	7.13E-03	0.00E+00	5.17E-05	1.43E-04	1.47E-06	-3.20E-03
ODP	[kg CFC11-Eq.]	3.31E-11	0.00E+00	8.33E-16	4.24E-13	1.51E-15	-7.25E-12
AP	[mol H ⁺ -Eq.]	1.80E-02	0.00E+00	1.80E-05	2.66E-04	2.91E-06	-5.72E-03
EP-freshwater	[kg P-Eq.]	2.22E-04	0.00E+00	1.35E-08	6.17E-08	6.59E-10	-1.87E-06
EP-marine	[kg N-Eq.]	2.55E-03	0.00E+00	8.53E-06	7.35E-05	7.09E-07	-9.65E-04
EP-terrestrial	[mol N-Eq.]	2.72E-02	0.00E+00	9.23E-05	1.23E-03	7.73E-06	-1.06E-02
POCP	[kg NMVOC-Eq.]	1.05E-02	0.00E+00	1.64E-05	2.09E-04	2.20E-06	-2.85E-03
ADPE	[kg Sb-Eq.]	1.53E-04	0.00E+00	3.34E-10	4.66E-09	3.17E-11	-2.02E-05
ADPF	[MJ]	9.62E+01	0.00E+00	6.43E-02	8.82E-01	7.63E-03	-2.38E+01
WDP	[m ³ world-Eq deprived]	2.22E+01	0.00E+00	2.30E-05	1.98E-01	5.45E-05	-4.04E-01

Caption GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE63 mFIT (1.28 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	1.92E+01	0.00E+00	4.85E-03	2.15E-01	1.24E-03	-6.42E+00
PERM	[MJ]	1.20E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	[MJ]	2.04E+01	0.00E+00	4.85E-03	2.15E-01	1.24E-03	-6.42E+00
PENRE	[MJ]	8.22E+01	0.00E+00	6.43E-02	1.44E+01	7.63E-03	-2.38E+01
PENRM	[MJ]	1.40E+01	0.00E+00	0.00E+00	-1.35E+01	0.00E+00	0.00E+00
PENRT	[MJ]	9.62E+01	0.00E+00	6.43E-02	8.82E-01	7.63E-03	-2.38E+01
SM	[kg]	4.36E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.32E-01
RSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	[MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	[m ³]	5.27E-01	0.00E+00	2.40E-06	4.71E-03	1.61E-06	-1.68E-02

Caption PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE63 mFIT (1.28 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HW	[kg]	1.78E-08	0.00E+00	2.58E-12	4.37E-10	1.65E-12	-8.85E-05
NHW	[kg]	2.22E-01	0.00E+00	8.98E-06	1.79E-01	2.20E-02	2.72E-03
RWD	[kg]	6.71E-04	0.00E+00	1.21E-07	3.03E-05	1.06E-07	-1.13E-03
CRU	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	[kg]	0.00E+00	0.00E+00	0.00E+00	4.17E-01	0.00E+00	0.00E+00
MER	[kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	[MJ]	0.00E+00	0.00E+00	0.00E+00	3.78E+00	0.00E+00	0.00E+00
EET	[MJ]	0.00E+00	0.00E+00	0.00E+00	6.76E+00	0.00E+00	0.00E+00

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy
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RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece COMBI ISO SERVICE VALVE PN16 WITH FITTING: HAS-KOMBI-ISO2 POM 25 AG2" PE63 mFIT (1.28 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PM	[Disease Incidence]	ND	ND	ND	ND	ND	ND
IRP	[kBq U235-Eq.]	ND	ND	ND	ND	ND	ND
ETP-fw	[CTUe]	ND	ND	ND	ND	ND	ND
HTP-c	[CTUh]	ND	ND	ND	ND	ND	ND
HTP-nc	[CTUh]	ND	ND	ND	ND	ND	ND
SQP	[-]	ND	ND	ND	ND	ND	ND
Caption	PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index						

The additional and optional impact categories according to *EN 15804+A2* are not declared, as the uncertainty of these indicators is to be classified as high.

Disclaimer – for the indicators ADPE, ADPF, WDP, ETP-fw, HTP-c, HTP-nc, SQP:

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2

Owner of the Declaration	E. Hawle Armaturenwerke GmbH
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-HAW-20260413-IBA1-EN
Issue date	21.07.2026
Valid to	20.07.2031

Service valve

E. Hawle Armaturenwerke GmbH

www.ibu-epd.com | <https://epd-online.com>



1. General Information

E. Hawle Armaturenwerke GmbH

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-HAW-20260413-IBA1-EN

This declaration is based on the product category rules:

Fittings and connections for water supply, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

21.07.2026

Valid to

20.07.2031



Dipl.-Ing. Hans Peters
(Chairman of Institut Bauen und Umwelt e.V.)



Dr. Martina Bender
(Managing Director Institut Bauen und Umwelt e.V.)

Service valve

Owner of the declaration

E. Hawle Armaturenwerke GmbH
Wagrainer Straße 13
4840 Vöcklabruck
Austria

Declared product / declared unit

1 piece service valve - type 'ISO service valve with sockets - HAS GJS 25 PE32'

Scope:

This Environmental Product Declaration refers to a declared unit of 1 piece service valve - type 'ISO service valve with sockets - HAS GJS 25 PE32' - produced at the production sites of E. Hawle Armaturenwerke GmbH in Vöcklabruck and Frankenmarkt (Austria).

In addition to the declared product, two annexes to this EPD declare the results of 61 further service valves mainly made of cast iron (Annex HAS GJS) and 23 further service valves mainly made of POM (Annex HAS POM).

The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as *EN 15804*.

Verification

The standard EN 15804 serves as the core PCR	
Independent verification of the declaration and data according to ISO 14025:2011	
☐	internally
☒	externally



Angela Schindler,
(Independent verifier)

2. Product

2.1 Product description/Product definition

The declared product is a resilient seated gate valve according to *EN 1171*, *EN 1074-1* and *EN 1074-2* with smooth, straight-through bore. The product is installed in the pipeline network via ISO-socket connections and is used to open or shut off the water flow.

The referred unit is traded as 'ISO service valve with sockets' and specified as 'HAS GJS 25 PE32'.

Catalogue number: 2600
Internal material number: 5003090
Goods no. / Imp. code no.: 84818061
EAN/UPC code: 9007878010002
Coating standard: *EN 14901*

The connection is a push-fit connection, which is called an ISO-socket. It contains a clamp and an O-ring. The ISO-socket is for PE pipes according to *EN 12201* and *DIN 8074* for operating conditions up to PN16 and up to 30 °C medium temperature, also for vacuum (with support liner). This push-fit socket is restrained acc. to *DIN 8076 T1/T3* with a special clamp for PVC pipes acc. to *EN 1452-2*.

The service valve is designed as a resilient seated wedge-type gate valve with a smooth and free bore. The body has a two-part design: the bottom part is connected to the pipeline via ISO-Socket. Optionally, internal threads, external threads, Hawle-FIT, ZAK, or other connection systems may also be used.

The top part (the bonnet) houses the spindle and the sealing wedge. The top and bottom part are connected with stainless steel screws and an elastomer gasket. The bonnet and the body are made from EN-GJS-400-15 ductile cast iron pursuant to *EN 1563*. They are epoxy powder coated on the inside and outside pursuant to *DIN 3476-1* and in compliance with the quality and testing provisions of *RAL-GZ 662* (GSK): Coating thickness: min. 250 µm, zero porosity: min. 3000 V spark test, adhesion: min. 16 N/mm².

The wedge is made of non ferrous metal brass CuZn21Si3P with max. 0.1 % lead content, rubberized outside with vulcanized EPDM rubber (*EN 681-1*) and has a drain hole.

The Duplex stainless steel spindle rounds out the load-optimized design and guarantees ultra-low wear, minimal closure torques, and optimum corrosion resistance (Duplex 1.4162 (PRE number ~26) and a pitting potential of min. 750 mV)

The spindle bearing (O-ring carrier from brass) incl. O-rings seals the spindle in the area of the spindle duct, acc. *DIN EN 13774* and ensure easy movement of the sealing wedge. A stainless steel retaining ring and a back seal secure the spindle.

O-rings, gaskets and seals are from elastomer (EPDM).

The Hawle service valve can be retrofitted with a variety of accessories: position indicators, hand wheels or extension spindles.

For the use and application of the product the respective national provisions at the place of use apply, in Germany, for example, the building codes of the federal states and the corresponding national specifications.

2.2 Application

The service gate valve is a shut-off valve designed primarily for fully opening or fully closing the flow of water (or similar non-aggressive media) in pressurized pipeline systems and is commonly used in potable water supply lines, especially for house connections. It is not intended for throttling or flow regulation.

2.3 Technical Data

The following data is decisive for the products of E. Hawle Armaturenwerke GmbH:

Constructional data

5003090 / HAS GJS 25 PE32

Name	Value	Unit
Medium	Water	
Nominal diameter (DN)	25	
Max. working pressure (PN)	16	bar
temperature (range)	0 - 30	°C
Connection 1	ISO push-fitting	
Connection 2	ISO push-fitting	
Weight	0.00222	t
Housing	Ductile iron (EN-GJS-400-115 EN 1563)	
Spindle material	Duplex stainless steel (1.4162 EN 10088-3)	

The performance values of the product with respect to its characteristics comply with the applicable technical regulation pursuant to *EN 1074* (no CE marking).

2.4 Delivery status

The Hawle Service valve is delivered fully assembled, tested, and packaged.

The HAS GJS 25 PE32 is 19 cm high, 17 cm long, and 8 cm wide; it has a weight of 2.22 kg.

2.5 Base materials/Ancillary materials

The main product components are listed in the table below.

Name	Value	Unit
Housing (cast iron epoxy powder coated)	48.1	%
Bonnet (cast iron epoxy powder coated)	25.8	%
Spindle (duplex stainless steel 1.4162)	6.9	%
Bushing (brass)	3.1	%
Back sealing (EPDM)	0.2	%
Wiper ring (EPDM)	0.4	%
O-rings (EPDM)	0.4	%
Retaining ring (stainless steel)	0.2	%
Wedge (brass)	9.9	%
Gasket (EPDM)	0.3	%
Screws (stainless steel)	3.4	%
ISO grip ring (POM)	0.8	%
Dust cap (EPDM)	0.5	%

The main constituents are made of metals: a cast iron housing +bonnet, a brass wedge, a stainless steel spindle, a brass bushing and stainless steel screws.

Other relevant components are elastomer parts from EPDM such as O-rings, gasket, dust cap and back sealing. The retaining ISO grip ring is made of POM.

A component of the product contains substances listed in the *candidate list* (date: 27.02.2026) exceeding 0.1 percentage by mass: **yes**

Substance: Lead

CAS number: 7439-92-1

Reason: Toxic for reproduction (Article 57c)

Hazards: H360FD, H362, H400 and H410 (according to *Regulation (EC) No 1272/2008 (CLP)*)

Component: Bushing (spindle collar)

Material: Brass CuZn40Pb2

Concentration:

- Approx. 2 % in the component

- Approx. 0.06 % in the product

The materials used in the product are exclusively metallic materials suitable for drinking water hygiene, which are classified by the Federal Environment Agency (UBA) as harmless for the protection of human health.

This product/article/at least one partial article contains other carcinogenic, mutagenic, reprotoxic (CMR) substances in categories 1A or 1B which are not on the *candidate list*, exceeding 0.1 percentage by mass: **no**

Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) *Ordinance on Biocide Products* No. 528/2012): **no**

2.6 Manufacture

The gate valve is manufactured in accordance with the quality management standard *ISO 9001*.

All products are checked for function and tightness prior to dispatch. Production takes place according to the specifications of the relevant standards. The products and the manufacturing methods also meet the requirements of the country-specific approvals.

Production takes place at the two production sites of E. Hawle Armaturenwerke GmbH in Vöcklabruck and Frankenmarkt.

The body components are processed mechanically; the surfaces are blasted and then epoxy powder coated. The spindles are produced from Duplex rod material that is swaged externally. The swaged part is processed mechanically at Hawle and the thread is rolled. Various plastic components are produced using injection moulding machines and later processed mechanically, such as drilling/milling or friction moulding. The sealing wedge is first blasted. The wedge and wedge nut are coated with adhesion promoter and are then vulcanized with rubber. Gaskets and sealings are made from raw rubber in elastomer production. Various O-rings are bought in. The individual components are assembled and are finished after passing functional and pressure testing.

2.7 Environment and health during manufacturing

The production process at Hawle complies with the health and safety management standard *ISO 45001*. The commitment to continuous improvement is reflected in the company's exceeding of legal requirements with regard to inspections, evaluations, prevention staff and prevention times, and additional measures in connection with the 'Hawle Vital Program' (free fruit, vaccine drives, reintegration measures,

various active events).

The certified environmental management system according to *ISO 14001* is proof of Hawle's commitment to steadily reducing its environmental impact. This includes various initiatives in the following areas:

- Resource efficiency: use of recycled plastics for parts that do not come into contact with drinking water; closing raw material loops with suppliers by way of cast iron swarf agglomeration; continuous scrap monitoring; integrated waste management concept; repair of used Euro-pallets, etc.
- Water management: preparation and re-use of test water;
- Energy management: thermal insulation; heat recovery plants; energy recovery plans; efficiency-boosting measures; lighting optimization, etc.

2.8 Product processing/Installation

Installation instructions are enclosed with the product. During laying, installation, and maintenance, the applicable standards, regulations, accident prevention regulations, and the regulations of the professional associations must be observed and complied with. Installation and maintenance shall only be carried out by trained professionals.

Tools needed for assembly are a saw or pipe cutter (to cut the PE-pipe to the right length), a ruler to measure the inlet distance, a moistening liquid (water or spray).

Hawle service valves are designed for maintenance-free operation. However, the valves must be operated at appropriate time intervals (recommended: 1x per year). After assembly, a pressure test is to be conducted in the open trench pursuant to *EN 805*; this is to be dictated by the working pressure.

2.9 Packaging

Appropriate packaging is selected to meet drinking water/hygiene requirements and to protect the products.

The following types of packaging are used:

Service valves and other housing products are protected with a shrink wrap foil.

Additional packaging serves merely to protect the product during transport and is dictated by the destination country in question (sea freight, air cargo, parcel express, truck). The provisions governing standard packaging types are set out in a dedicated handbook.

For continental Europe, the transport packaging consists of an exchangeable Euro-pallet with a reusable folding frame and a hardboard base.

Service valves are usually commissioned in cardboard boxes. The contact points from product and wood frame are protected with cardboard inserts (partly recycled secondary packaging) and the frame is braced with PET straps.

The packaging materials can either be re-used or sent to the country-specific waste collection systems (waste wood, waste paper, plastic packaging).

2.10 Condition of use

The material composition during the usage phase is the same as that at the time of manufacture. The highly corrosion-resistant design ensures a long product life.

The Service Valve is designed for maintenance-free operation. However, the valves must be operated at appropriate time intervals (recommended: 1x per year).

2.11 Environment and health during use

From an environmental and health perspective, there are no hazards or restrictions on use.

2.12 Reference service life

Hawle products are produced to extremely high standards. In order to achieve the greatest possible service life, the products are made from or coated with particularly corrosion-resistant materials.

The reference service life of the service valve is 50 years according to *EN 1074*.

Influences on ageing may include non-standard conditions, such as corrosive media or soils, and excessive operation of the valve.

2.13 Extraordinary effects

Fire

Service valves are not subject to the Construction Products Regulation. A building material class/flammability cannot be specified.

Water

In the event of flooding or other exposure to water, no negative effects on the product and therefore no resulting consequences for the environment are to be expected.

Mechanical destruction

No negative consequences for the environment are to be expected in the event of mechanical destruction. As part of a drinking water supply pipeline, potential impacts in the event of a functional failure must be considered in the overall risk assessment of the supply pipeline.

2.14 Re-use phase

Repair: The top part of the body including the wedge/spindle can be exchanged and replaced with new components. Special tools are available for dismantling the ISO connection during reconstruction or repair work, so-called pull-off trays. Spare parts, such as clamps and O-rings, are available from Hawle and can be easily replaced.

Reuse: The cast iron body components could be returned to the production cycle by way of lye treatment/recoating.

Recycling: The product can be dismantled into its components. The materials that are relevant in terms of weight (cast iron, stainless steel, brass) can be recycled directly, elastomer parts can only be used for energy recovery.

2.15 Disposal

The product is disposed of according to national regulations. Not considering the possibilities mentioned in 2.14, the gate valve is disposed of by being fed into the scrap iron processing cycle.

The waste code according to the *European Waste Catalogue* is: 17 04 07 Mixed Metal Waste.

2.16 Further information

You can find further information at: www.hawle.com

3. LCA: Calculation rules

3.1 Declared Unit

This environmental product declaration refers to a declared unit of 1 piece service valve - type 'ISO service valve with sockets - HAS GJS 25 PE32' - with a weight of 2.22 kg/piece.

Declared unit and mass reference

Name	Value	Unit
Declared unit	1	pce.
Mass reference	2.22	kg/pce

The results for additional versions of service valves can be found in two annexes to this EPD:

- Annex HAS GJS declaring 61 further service valves mainly made of cast iron
- Annex HAS POM declaring 23 further service valves mainly made of POM

3.2 System boundary

The life cycle assessment of service valves refers to a cradle-to-gate analysis with modules C1–C4 and module D (A1–A3 + C + D). The following life cycle phases are part of the analysis:

Module A1–A3 | Production stage

The production stage includes the upstream burdens of raw material supply, their transport and the production at E. Hawle Armaturenwerke GmbH in Vöcklabruck and Frankenmarkt. The production sites are supplied with 100 % green electricity (GWP-total = 0,01 kg CO₂-equivalents/kWh). The provision of thermal energy at the site in Vöcklabruck is based on district heating using natural gas and biomass. Thermal energy supply in Frankenmarkt is based on local heating using biomass. The production of the product packaging is also included in module A1–A3.

Module C1 | Deconstruction and demolition

The product is used underground and is either dismantled from the accompanying structures or the valves may remain in the ground after their service life. Burdens associated with the dismantling of the products are assumed as low. The real energy consumption of dismantling strongly depends on the site-specific conditions.

Module C2 | Transport to disposal

The transport to the disposal of the material is estimated declaring a 50 km radius to the waste processing.

Module C3 | Waste processing

Module C3 refers to the emissions from the disposal of the polymer parts of the products. The scenario includes the energy recovery of the polymers in a waste incineration plant. Product flows that reach Module D for recycling reach the end-of-waste state in C3 and thus leave the product system. Environmental impacts resulting from the sorting of metal scrap are not included, as referring energy demand is considered to be negligible.

Module C4 | Landfilling

Module C4 refers to the emissions from the disposal of the losses from waste processing (5 % of metals).

Module D | Benefits and loads beyond the system boundary

Module D declares the recycling of the recovered metals (95 % of metals) including the environmental potential for substituting primary material. In addition, substitution potentials from energy recovery of the incineration of the polymers are accounted for in this module.

3.3 Estimates and assumptions

Assumptions and approximations are applied in case of a lack of representative data. All assumptions and approximations are documented precisely and represent a best-guess representation of reality. The regional applicability of the used background data refers to average data for Europe or Austria. If no European or Austrian data was available, German data was used to represent the Austrian market.

3.4 Cut-off criteria

The LCA model covers all available input and output flows, which can be represented based on robust data and from which a significant contribution can be expected. Data gaps are filled with conservative assumptions of average data or generic data if available and are documented accordingly. Only data with a contribution of less than 1 % were cut off. Thus, no data were neglected, of which a substantial impact is to be expected. All relevant data were collected comprehensively. Cut-off material and energy flows were chosen carefully based on their expected quantitative contribution as well as potential environmental impacts. Thus, it can be assumed that the sum of all neglected input flows does not account for more than 5 % of the total material, water and energy flows.

3.5 Background data

Primary and secondary data are used for the evaluation of upstream environmental impacts in the LCA model. Primary data from one supplier of cast iron is available for modelling the upstream supply chain. Secondary data are taken from the *MLC 2025.2* background database.

3.6 Data quality

Data collection is based on industry-specific questionnaires. It follows an iterative process clarifying questions via email, telephone calls or in personal/web meetings. Intensive discussions between E. Hawle Armaturenwerke GmbH and Daxner & Merl result in an accurate mapping of product-related material and energy flows. This leads to a high quality of foreground data collected. Data collection relies on a consistent process according to *ISO 14044*.

The technological, geographical and time-related representativeness of the database was kept in mind when selecting background data. Whenever specific data were missing, either generic datasets or representative average data were used instead. The implemented *MLC*-background datasets refer to the latest versions available and are carefully chosen. Except for the dataset for POM, they are not more than ten years old. Due to a lack of more actual data for POM, the industry publication of *Plastics Europe* from 2010 is part of this analysis. In the absence of more recent data, this data set serves as a conservative approximation.

3.7 Period under review

Foreground data were collected in the 2024 production year, and the data are based on the volumes produced on an annual basis.

3.8 Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product's lifespan: Europe

3.9 Allocation

For energy demand, auxiliary materials and land occupation, no product-specific data are available. Therefore, annual quantities were allocated to the product using representative allocation keys (product mass, pieces produced).

All inputs of secondary material are regarded as burden-free. To calculate the net flow, the total external scrap input is subtracted from the total mass of the metal in the product.

3.10 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account. The *MLC 2025.2* database was used to calculate the LCA (*LCA FE-Software* Version 10.9).

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

The declared product does not contain any biogenic carbon.

Information on describing the biogenic carbon content at factory gate

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging	0.03	kg C

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO₂.

The carbon stored in the packaging was taken into account as 'CO₂-neutral'. This means that the storage effect of the carbon bound in the packaging is not included in the calculation and is considered to be emitted immediately.

Installation into the building (A5)

The end-of-life of the packaging materials is not declared in module A5.

Name	Value	Unit
Packaging (wooden)	0.056	kg
Packaging (particle board)	0.016	kg
Packaging (PE-foil)	0.011	kg
Packaging (cardboard)	0.003	kg
Packaging (PET-strip)	0.0005	kg

End of life (C1-C4)

Name	Value	Unit
Collected separately waste type (steel)	1.64	kg
Recycling (95 %)	1.56	kg
Landfilling (5 %)	0.08	kg
Collected separately waste type (stainless steel)	0.23	kg
Recycling (95 %)	0.22	kg
Landfilling (5 %)	0.01	kg
Collected separately waste type (brass)	0.27	kg
Recycling (95 %)	0.26	kg
Landfilling (5 %)	0.01	kg
Collected separately waste type (polymers)	0.07	kg
Energy recovery (100 %)	0.07	kg

Reuse, recovery and/or recycling potentials (D), relevant scenario information

Name	Value	Unit
Nef flow (steel)	0.33	kg
Net flow (stainless steel)	0.15	kg
Net flow (brass)	-0.01	kg

This scenario contains a recycling rate of 95 %. As scrap is purchased in the upstream supply chain for the production of the metal parts, this is offset against the metal scrap for recycling (net flow).

5. LCA: Results

The following table contains the LCA results (Environmental impact assessment according to *EN 15804, EF 3.1*) for a declared unit of 1 piece service valve - type 'ISO service valve with sockets - HAS GJS 25 PE32' with a weight of 2.22 kg/piece.

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

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

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 piece service valve - type 'ISO service valve with sockets - HAS GJS 25 PE32'

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Global Warming Potential total (GWP-total)	kg CO ₂ eq	6.48E+00	0	8.64E-03	1.88E-01	2.29E-03	-1.47E+00
Global Warming Potential fossil fuels (GWP-fossil)	kg CO ₂ eq	6.39E+00	0	8.53E-03	1.88E-01	2.28E-03	-1.47E+00
Global Warming Potential biogenic (GWP-biogenic)	kg CO ₂ eq	7.8E-02	0	1.59E-05	6.81E-06	-3.24E-06	7.07E-03
Global Warming Potential luluc (GWP-luluc)	kg CO ₂ eq	1.84E-02	0	8.96E-05	7.03E-06	7.17E-06	-2.43E-03
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC11 eq	9.82E-11	0	1.44E-15	2.09E-14	7.39E-15	7.03E-13
Acidification potential of land and water (AP)	mol H ⁺ eq	2.64E-02	0	3.11E-05	2.01E-05	1.42E-05	-6.62E-03
Eutrophication potential aquatic freshwater (EP-freshwater)	kg P eq	3.34E-05	0	2.35E-08	4.43E-09	3.23E-09	-1.42E-06
Eutrophication potential aquatic marine (EP-marine)	kg N eq	5.25E-03	0	1.48E-05	5.41E-06	3.47E-06	-9.95E-04
Eutrophication potential terrestrial (EP-terrestrial)	mol N eq	5.78E-02	0	1.6E-04	9.44E-05	3.78E-05	-1.04E-02
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg NMVOC eq	1.61E-02	0	2.85E-05	1.54E-05	1.08E-05	-3.25E-03
Abiotic depletion potential for non fossil resources (ADPE)	kg Sb eq	1.7E-04	0	5.79E-10	2.39E-10	1.55E-10	-2.32E-05
Abiotic depletion potential for fossil resources (ADPF)	MJ	7.92E+01	0	1.12E-01	4.35E-02	3.73E-02	-1.72E+01
Water use (WDP)	m ³ world eq deprived	1.67E+00	0	3.98E-05	1.66E-02	2.67E-04	-3.92E-01

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 piece service valve - type 'ISO service valve with sockets - HAS GJS 25 PE32'

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Renewable primary energy as energy carrier (PERE)	MJ	7.48E+01	0	8.41E-03	1.13E-02	6.08E-03	-2.08E+00
Renewable primary energy resources as material utilization (PERM)	MJ	1.2E+00	0	0	0	0	0
Total use of renewable primary energy resources (PERT)	MJ	7.59E+01	0	8.41E-03	1.13E-02	6.08E-03	-2.08E+00
Non renewable primary energy as energy carrier (PENRE)	MJ	7.57E+01	0	1.12E-01	3.04E+00	3.73E-02	-1.72E+01
Non renewable primary energy as material utilization (PENRM)	MJ	3.51E+00	0	0	-2.99E+00	0	0
Total use of non renewable primary energy resources (PENRT)	MJ	7.92E+01	0	1.12E-01	4.35E-02	3.73E-02	-1.72E+01
Use of secondary material (SM)	kg	1.85E+00	0	0	0	0	4.67E-01
Use of renewable secondary fuels (RSF)	MJ	0	0	0	0	0	0
Use of non renewable secondary fuels (NRSF)	MJ	0	0	0	0	0	0
Use of net fresh water (FW)	m ³	6.27E-02	0	4.16E-06	3.91E-04	7.86E-06	-7.24E-02

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 piece service valve - type 'ISO service valve with sockets - HAS GJS 25 PE32'

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed (HWD)	kg	8.46E-08	0	4.48E-12	2.25E-11	8.06E-12	-9.62E-05
Non hazardous waste disposed (NHWD)	kg	1.11E+00	0	1.56E-05	8.55E-03	1.07E-01	7.96E-02
Radioactive waste disposed (RWD)	kg	2.46E-03	0	2.11E-07	1.91E-06	5.18E-07	-1.51E-04
Components for re-use (CRU)	kg	0	0	0	0	0	0
Materials for recycling (MFR)	kg	1.58E+00	0	0	2.04E+00	0	0
Materials for energy recovery (MER)	kg	0	0	0	0	0	0
Exported electrical energy (EEE)	MJ	0	0	0	3.04E-01	0	0
Exported thermal energy (EET)	MJ	0	0	0	5.45E-01	0	0

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 piece service valve - type 'ISO service valve with sockets - HAS GJS 25 PE32'

Parameter	Unit	A1-A3	C1	C2	C3	C4	D
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Incidence of disease due to PM emissions (PM)	Disease incidence	ND	ND	ND	ND	ND	ND
Human exposure efficiency relative to U235 (IR)	kBq U235 eq	ND	ND	ND	ND	ND	ND
Comparative toxic unit for ecosystems (ETP-fw)	CTUe	ND	ND	ND	ND	ND	ND
Comparative toxic unit for humans (carcinogenic) (HTP-c)	CTUh	ND	ND	ND	ND	ND	ND
Comparative toxic unit for humans (noncarcinogenic) (HTP-nc)	CTUh	ND	ND	ND	ND	ND	ND
Soil quality index (SQP)	SQP	ND	ND	ND	ND	ND	ND

Disclaimer – for the indicators 'abiotic depletion potential for non-fossil resources', 'abiotic depletion potential for fossil resources', 'water (user) deprivation potential, deprivation-weighted water consumption', 'potential comparative toxic unit for ecosystems', 'potential comparative toxic unit for humans – cancerogenic', 'Potential comparative toxic unit for humans - not cancerogenic', 'potential soil quality index'.

The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high, as there is limited experience with the indicator.

6. LCA: Interpretation

The following interpretation contains a summary of the LCA results referenced to a declared unit of 1 piece service valve -

type 'ISO service valve with sockets - HAS GJS 25 PE32'.

Hot-spot analysis of service valve HAS GJS 25 PE32



The comparison of the products' life cycle phases shows a clear dominance of the production phase (modules A1-A3).

Environmental impacts in module C3 mainly refer to emissions from the energetic treatment of the polymers in a waste incineration plant. Module C4 declares impacts from landfilling of metal losses making up a minor fraction of the total environmental impact of the valve.

Environmental potentials in module D refer to the recycling potential of primary steel, stainless steel and brass as well as the benefits for the recovered energy from the incineration of the polymer components.

When it comes to the environmental impacts in the production phase, the production of the cast iron represents the major hot-spot in most impact categories considered. Due to the upstream supply chain of the cast iron being partially represented by primary data, this leads to a high representativeness of the results.

Other metal parts also show a certain contribution, especially stainless steel when it comes to the abiotic depletion potential minerals and metals. The overall contribution of POM in the impact of the declared products is low.

7. Requisite evidence

Not relevant for this EPD.

8. References

Standards

EN 1171

EN 1171:2015: Industrial valves. Cast iron gate valves: This European Standard specifies the requirements for cast iron gate valves with flanged ends, socket ends, or spigot ends.

EN 12201

EN 12201:2024 - Plastics piping systems for water supply, and for drains and sewers under pressure.

DIN 8074

DIN 8074:2023 10 - Polyethylene (PE) pipes - PE 80, PE 100 - Dimensions.

DIN 8076

DIN 8076:2013 09 - Pressure pipelines made from thermoplastics materials - Metal and plastics compression fittings for polyethylene (PE) pipes.

EN 1452-2

EN 1452-2:2020 03: Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure - Unplasticized poly(vinyl chloride) (PVC-U) - Part 2: Pipes.

DIN EN 13774

DIN EN 13774:20213 05: Valves for gas distribution systems with maximum operating pressure less than or equal to 16 bar - Performance requirements.

EN 15804

EN 15804:2012+A2:2019+AC:2021, Sustainability of construction works - Environmental Product Declarations — Core rules for the product category of construction products.

ISO 14025

EN ISO 14025:2011, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.

DIN 3476-1

DIN 3476-1:2018-08, Valves - Requirements and tests - Part 1: Protection against corrosion by epoxy coating of coating powders (P) or liquid varnishes (F).

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EN 805

DIN EN 805:2000-03, Water supply - Requirements for systems and components outside buildings.

EN 1563

DIN EN 1563:2019-04, Founding - Spheroidal graphite cast irons.

EN 1074-1

DIN EN 1074-1:2000-07, Valves for water supply - Fitness for purpose requirements and appropriate verification tests - Part 1: General requirements.

EN 1074-2

DIN EN 1074-2:2004-07, Valves for water supply - Fitness for purpose requirements and appropriate verification tests - Part 2: Isolating valves.

EN 1092-1

DIN EN 1092-1:2018-12, Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated - Part 1: Steel flanges.

EN 1092-2

DIN EN 1092-2:1997-06, Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated - Part 2: Cast iron flanges.

EN 10088-3

DIN EN 10088-3:2014-12, Stainless steels - Part 3: Technical delivery conditions for semi-finished products, bars, rods, wire, sections and bright products of corrosion resisting steels for general purposes.

EN 12351

DIN EN 12351:2010-08, Industrial valves – Protective caps for valves with flanged connections.

EN 14901

DIN EN 14901:2014-12, Ductile iron pipes, fittings and accessories - Requirements and test methods for organic coatings of ductile iron fittings and accessories - Part 1: Epoxy coating (heavy duty).

ISO 9001

ISO 9001:2015-09, Quality management systems - Requirements.

ISO 14001

DIN EN ISO 14001:2015-11, Environmental management systems - requirements with guidance for use.

ISO 14044

DIN EN ISO 14044:2006-10, Environmental management - Life cycle assessment – Requirements and guidance.

ISO 45001

ISO 45001:2018-03, Occupational health and safety management systems - Requirements with guidance for use.

ÖVGW PW 100

PW 100, products in water supply; general requirements and tests for awarding of ÖVGW qualitymark, German version, 2011-11-02.

ÖVGW PW 501

PW 501, Fittings in water supply, part 1-3, German version, 2014-12-15.

RAL-GZ 662

RAL Deutsches Institut für Gütesicherung und Kennzeichnung E. V., RAL-GZ 662, Heavy Duty Corrosion Protection of Valves and Fittings with Powder Coating, 2021-04-21.

Further references

ECHA-Candidate List

Candidate List of Substances of Very High Concern (SVHC) of 05.02.2026, published in accordance with Article 59 (10) of the REACH Regulation Helsinki: European Chemicals Agency.

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European Waste Catalogue

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Sphera, 1992-2026. Available at:
<https://lcadatabase.sphera.com/>.

Ordinance on Biocide Products

Regulation (EU) No 528/2012 of the European Parliament and of the Council of 22 May 2012 concerning the making available on the market and use of biocidal products.

PCR Part A

Product category rules for building-related products and services. Part A: Calculation rules for life cycle assessment and project report requirements according to EN 15804+A2:2019. version 1.4. Berlin: Institut Bauen und Umwelt e.V.. (ed.), 2024.

PCR: Fittings and connections for water supply

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