Annex

E3 valves VRS sockets

For Hawle E3 valves

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-20230068-IBA1-DE
Issue date	03.03.2023
Valid to	02.03.2028

Institut Bauen und Umwelt e.V.

General Information

This Annex contains the life cycle impact assessment results for the declared unit of **1 piece of E3 VRS valves**:

- E3 VRS 80/98 PN16 with a weight of 18,6 kg/piece
- E3 VRS 100/118 PN16 with a weight of 24,5 kg/piece
- E3 VRS 125/144 PN16 with a weight of 37,5 kg/piece
- E3 VRS 150/170 PN16 with a weight of 44,5 kg/piece
- E3 VRS 200/222 PN16 with a weight of 72,0 kg/piece
- E3 VRS 250/274 PN16 with a weight of 109,6 kg/piece
- E3 VRS 300/326 PN16 with a weight of 160,0 kg/piece

This document declares the specific results for the products mentioned above.
It represents a complementary document to the IBU-EPD for **Hawle E3 valve DN100 [declaration number EPD-HAW-20230068-IBA1-EN].**

General Information on the product

This Annex describes the product specific results for Hawle E3 VRS valves. Further information on the LCA are provided in the complementing IBU-EPD for Halwe E3 DN 100.

LCA: Scenarios and additional technical information

The main difference between the VRS valves and the valve described in the IBU-EPD for Hawle E3 valve DN100 [declaration number EPD-HAW-20230068-IBA1-EN] is the addition of a VRS socket on one side and VRS spigot end on the other side of the valve instead of the flange connections. All other frame conditions remain constant.

The following life cycle phases of the VRS valves 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 E3 VRS valves at E. Hawle Armaturenwerke GmbH in Vöcklabruck and Frankenmarkt.

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

- Module D: Recycling of 100% of the valves.

Module C1, C3 and C4 of the VRS valves do not contain any relevant environmental impacts and are to be declared as "0".

All data collected for the LCA of the E3 valves 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. Further details can be found 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 E3 VRS 80/98 PN16 valve

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 E3 VRS 80/98 PN16 valve (18.6 kg/piece)

Kernindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO_2-Eq.]	4,08E+1	0,00E+0	5,64E-2	0,00E+0	0,00E+0	-7,49E+0
GWP-fossil	[kg CO_2-Eq.]	4,00E+1	0,00E+0	5,60E-2	0,00E+0	0,00E+0	-7,49E+0
GWP-biogenic	[kg CO_2-Eq.]	8,08E-1	0,00E+0	0,00E+0	0,00E+0	0,00E+0	3,82E-3
GWP-luluc	[kg CO_2-Eq.]	2,02E-2	0,00E+0	3,76E-4	0,00E+0	0,00E+0	-1,55E-4
ODP	[kg CFC11-Eq.]	3,06E-10	0,00E+0	5,48E-15	0,00E+0	0,00E+0	-1,64E-14
AP	[mol H^+-Eq.]	1,22E-1	0,00E+0	1,87E-4	0,00E+0	0,00E+0	-1,61E-2
EP-freshwater	[kg P-Eq.]	1,68E-4	0,00E+0	1,99E-7	0,00E+0	0,00E+0	-1,36E-6
EP-marine	[kg N-Eq.]	2,61E-2	0,00E+0	8,53E-5	0,00E+0	0,00E+0	-2,83E-3
EP-terrestrial	[mol N-Eq.]	2,75E-1	0,00E+0	9,55E-4	0,00E+0	0,00E+0	-2,48E-2
POCP	[kg NMVOC-Eq.]	7,82E-2	0,00E+0	1,67E-4	0,00E+0	0,00E+0	-1,15E-2
ADPE	[kg Sb-Eq.]	5,16E-4	0,00E+0	5,63E-9	0,00E+0	0,00E+0	-1,87E-5
ADPF	[MJ]	5,11E+2	0,00E+0	7,33E-1	0,00E+0	0,00E+0	-6,88E+1
WDP	[m^3 world-Eq deprived]	9,45E+0	0,00E+0	6,25E-4	0,00E+0	0,00E+0	-1,39E+0

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 E3 VRS 80/98 PN16 valve (18.6 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	4,61E+2	0,00E+0	5,08E-2	0,00E+0	0,00E+0	4,33E+0
PERM	[MJ]	5,70E+1	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
PERT	[MJ]	5,18E+2	0,00E+0	5,08E-2	0,00E+0	0,00E+0	4,33E+0
PENRE	[MJ]	4,90E+2	0,00E+0	7,36E-1	2,21E+1	0,00E+0	-6,88E+1
PENRM	[MJ]	2,21E+1	0,00E+0	0,00E+0	-2,21E+1	0,00E+0	0,00E+0
PENRT	[MJ]	5,12E+2	0,00E+0	7,36E-1	0,00E+0	0,00E+0	-6,88E+1
SM	[kg]	1,58E+1	0,00E+0	0,00E+0	0,00E+0	0,00E+0	4,32E+0
RSF	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
NRSF	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
FW	[m^3]	4,09E-1	0,00E+0	5,87E-5	0,00E+0	0,00E+0	-3,14E-2

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 E3 VRS 80/98 PN16 valve (18.6 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	6,63E-8	0,00E+0	3,89E-12	0,00E+0	0,00E+0	-5,31E-10
NHWD	[kg]	8,79E+0	0,00E+0	1,20E-4	0,00E+0	0,00E+0	1,04E+0
RWD	[kg]	2,11E-2	0,00E+0	1,37E-6	0,00E+0	0,00E+0	8,55E-6
CRU	[kg]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
MFR	[kg]	1,52E+1	0,00E+0	0,00E+0	1,79E+1	0,00E+0	0,00E+0
MER	[kg]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
EEE	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
EET	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0

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 E3 VRS 80/98 PN16 valve (18.6 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.

2.2 E3 VRS 100/118 PN16 valve

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 E3 VRS 100/118 PN16 valve (24.5 kg/piece)

Kernindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO_2-Eq.]	5,32E+1	0,00E+0	7,42E-2	0,00E+0	0,00E+0	-9,50E+0
GWP-fossil	[kg CO_2-Eq.]	5,21E+1	0,00E+0	7,37E-2	0,00E+0	0,00E+0	-9,51E+0
GWP-biogenic	[kg CO_2-Eq.]	1,09E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	4,85E-3
GWP-luluc	[kg CO_2-Eq.]	2,54E-2	0,00E+0	4,96E-04	0,00E+0	0,00E+0	-1,96E-4
ODP	[kg CFC11-Eq.]	4,04E-10	0,00E+0	7,22E-15	0,00E+0	0,00E+0	-2,08E-14
AP	[mol H^+-Eq.]	1,50E-1	0,00E+0	2,46E-04	0,00E+0	0,00E+0	-2,04E-2
EP-freshwater	[kg P-Eq.]	2,17E-4	0,00E+0	2,63E-07	0,00E+0	0,00E+0	-1,72E-6
EP-marine	[kg N-Eq.]	3,32E-2	0,00E+0	1,12E-04	0,00E+0	0,00E+0	-3,59E-3
EP-terrestrial	[mol N-Eq.]	3,49E-1	0,00E+0	1,26E-03	0,00E+0	0,00E+0	-3,15E-2
POCP	[kg NMVOC-Eq.]	9,86E-2	0,00E+0	2,21E-04	0,00E+0	0,00E+0	-1,46E-2
ADPE	[kg Sb-Eq.]	5,41E-4	0,00E+0	7,41E-09	0,00E+0	0,00E+0	-2,37E-5
ADPF	[MJ]	6,72E+2	0,00E+0	9,65E-01	0,00E+0	0,00E+0	-8,73E+1
WDP	[m^3 world-Eq deprived]	1,20E+1	0,00E+0	8,23E-04	0,00E+0	0,00E+0	-1,77E+0

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 E3 VRS 100/118 PN16 valve (24.5 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	6,09E+2	0,00E+0	6,69E-2	0,00E+0	0,00E+0	5,50E+0
PERM	[MJ]	5,70E+1	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
PERT	[MJ]	6,66E+2	0,00E+0	6,69E-2	0,00E+0	0,00E+0	5,50E+0
PENRE	[MJ]	6,43E+2	0,00E+0	9,69E-1	3,06E+1	0,00E+0	-8,73E+1
PENRM	[MJ]	3,06E+1	0,00E+0	0,00E+0	-3,06E+1	0,00E+0	0,00E+0
PENRT	[MJ]	6,73E+2	0,00E+0	9,69E-1	0,00E+0	0,00E+0	-8,73E+1
SM	[kg]	2,08E+1	0,00E+0	0,00E+0	0,00E+0	0,00E+0	5,49E+0
RSF	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
NRSF	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
FW	[m^3]	5,28E-1	0,00E+0	7,73E-5	0,00E+0	0,00E+0	-3,99E-2

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 E3 VRS 100/118 PN16 valve (24.5 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	8,51E-8	0,00E+0	5,13E-12	0,00E+0	0,00E+0	-6,74E-10
NHWD	[kg]	1,16E+1	0,00E+0	1,58E-4	0,00E+0	0,00E+0	1,32E+0
RWD	[kg]	2,77E-2	0,00E+0	1,80E-6	0,00E+0	0,00E+0	1,09E-5
CRU	[kg]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
MFR	[kg]	2,04E+1	0,00E+0	0,00E+0	2,35E+1	0,00E+0	0,00E+0
MER	[kg]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
EEE	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
EET	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0

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 E3 VRS 100/118 PN16 valve (24.5 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 E3 VRS 125/144 PN16 valve

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 E3 VRS 125/144 PN16 valve (37.5 kg/piece)

Kernindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO_2-Eq.]	8,11E+1	0,00E+0	1,14E-1	0,00E+0	0,00E+0	-1,38E+1
GWP-fossil	[kg CO_2-Eq.]	7,94E+1	0,00E+0	1,13E-1	0,00E+0	0,00E+0	-1,38E+1
GWP-biogenic	[kg CO_2-Eq.]	1,67E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	7,05E-3
GWP-luluc	[kg CO_2-Eq.]	3,75E-2	0,00E+0	7,59E-04	0,00E+0	0,00E+0	-2,85E-4
ODP	[kg CFC11-Eq.]	6,20E-10	0,00E+0	1,11E-14	0,00E+0	0,00E+0	-3,02E-14
AP	[mol H^+-Eq.]	2,24E-1	0,00E+0	3,76E-04	0,00E+0	0,00E+0	-2,96E-2
EP-freshwater	[kg P-Eq.]	3,25E-4	0,00E+0	4,02E-07	0,00E+0	0,00E+0	-2,50E-6
EP-marine	[kg N-Eq.]	4,96E-2	0,00E+0	1,72E-04	0,00E+0	0,00E+0	-5,21E-3
EP-terrestrial	[mol N-Eq.]	5,20E-1	0,00E+0	1,93E-03	0,00E+0	0,00E+0	-4,58E-2
POCP	[kg NMVOC-Eq.]	1,46E-1	0,00E+0	3,38E-04	0,00E+0	0,00E+0	-2,12E-2
ADPE	[kg Sb-Eq.]	7,55E-4	0,00E+0	1,13E-08	0,00E+0	0,00E+0	-3,44E-5
ADPF	[MJ]	1,02E+3	0,00E+0	1,48E+00	0,00E+0	0,00E+0	-1,27E+2
WDP	[m^3 world-Eq deprived]	1,82E+1	0,00E+0	1,26E-03	0,00E+0	0,00E+0	-2,56E+0

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 E3 VRS 125/144 PN16 valve (37.5 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	9,37E+2	0,00E+0	1,02E-1	0,00E+0	0,00E+0	7,99E+0
PERM	[MJ]	5,70E+1	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
PERT	[MJ]	9,94E+2	0,00E+0	1,02E-1	0,00E+0	0,00E+0	7,99E+0
PENRE	[MJ]	9,80E+2	0,00E+0	1,48E+0	4,50E+1	0,00E+0	-1,27E+2
PENRM	[MJ]	4,50E+1	0,00E+0	0,00E+0	-4,50E+1	0,00E+0	0,00E+0
PENRT	[MJ]	1,03E+3	0,00E+0	1,48E+0	0,00E+0	0,00E+0	-1,27E+2
SM	[kg]	3,22E+1	0,00E+0	0,00E+0	0,00E+0	0,00E+0	7,97E+0
RSF	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
NRSF	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
FW	[m^3]	8,05E-1	0,00E+0	1,18E-4	0,00E+0	0,00E+0	-5,79E-2

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 E3 VRS 125/144 PN16 valve (37.5 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	1,25E-7	0,00E+0	7,85E-12	0,00E+0	0,00E+0	-9,79E-10
NHWD	[kg]	1,80E+1	0,00E+0	2,42E-4	0,00E+0	0,00E+0	1,92E+0
RWD	[kg]	4,23E-2	0,00E+0	2,75E-6	0,00E+0	0,00E+0	1,58E-5
CRU	[kg]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
MFR	[kg]	3,19E+1	0,00E+0	0,00E+0	3,60E+1	0,00E+0	0,00E+0
MER	[kg]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
EEE	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
EET	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0

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 E3 VRS 100/118 PN16 valve (24.5 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 E3 VRS 150/170 PN16 valve

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 E3 VRS 150/170 PN16 valve (44.5 kg/piece)

Kernindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO_2-Eq.]	9,46E+1	0,00E+0	1,35E-1	0,00E+0	0,00E+0	-1,67E+1
GWP-fossil	[kg CO_2-Eq.]	9,26E+1	0,00E+0	1,34E-1	0,00E+0	0,00E+0	-1,67E+1
GWP-biogenic	[kg CO_2-Eq.]	1,99E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	8,53E-3
GWP-luluc	[kg CO_2-Eq.]	4,32E-2	0,00E+0	9,00E-04	0,00E+0	0,00E+0	-3,45E-4
ODP	[kg CFC11-Eq.]	7,31E-10	0,00E+0	1,31E-14	0,00E+0	0,00E+0	-3,65E-14
AP	[mol H^+-Eq.]	2,53E-1	0,00E+0	4,46E-04	0,00E+0	0,00E+0	-3,59E-2
EP-freshwater	[kg P-Eq.]	3,83E-4	0,00E+0	4,77E-07	0,00E+0	0,00E+0	-3,03E-6
EP-marine	[kg N-Eq.]	5,73E-2	0,00E+0	2,04E-04	0,00E+0	0,00E+0	-6,31E-3
EP-terrestrial	[mol N-Eq.]	6,01E-1	0,00E+0	2,29E-03	0,00E+0	0,00E+0	-5,54E-2
POCP	[kg NMVOC-Eq.]	1,68E-1	0,00E+0	4,01E-04	0,00E+0	0,00E+0	-2,56E-2
ADPE	[kg Sb-Eq.]	7,63E-4	0,00E+0	1,35E-08	0,00E+0	0,00E+0	-4,16E-5
ADPF	[MJ]	1,19E+3	0,00E+0	1,75E+00	0,00E+0	0,00E+0	-1,53E+2
WDP	[m^3 world-Eq deprived]	2,10E+1	0,00E+0	1,49E-03	0,00E+0	0,00E+0	-3,10E+0

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 E3 VRS 150/170 PN16 valve (44.5 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	1,11E+3	0,00E+0	1,22E-1	0,00E+0	0,00E+0	9,67E+0
PERM	[MJ]	5,70E+1	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
PERT	[MJ]	1,16E+3	0,00E+0	1,22E-1	0,00E+0	0,00E+0	9,67E+0
PENRE	[MJ]	1,14E+3	0,00E+0	1,76E+0	5,28E+1	0,00E+0	-1,53E+2
PENRM	[MJ]	5,28E+1	0,00E+0	0,00E+0	-5,28E+1	0,00E+0	0,00E+0
PENRT	[MJ]	1,19E+3	0,00E+0	1,76E+0	0,00E+0	0,00E+0	-1,53E+2
SM	[kg]	3,78E+1	0,00E+0	0,00E+0	0,00E+0	0,00E+0	9,65E+0
RSF	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
NRSF	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
FW	[m^3]	9,41E-1	0,00E+0	1,40E-4	0,00E+0	0,00E+0	-7,01E-2

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 E3 VRS 150/170 PN16 valve (44.5 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	1,46E-7	0,00E+0	9,31E-12	0,00E+0	0,00E+0	-1,19E-9
NHWD	[kg]	2,11E+1	0,00E+0	2,87E-4	0,00E+0	0,00E+0	2,33E+0
RWD	[kg]	4,96E-2	0,00E+0	3,27E-6	0,00E+0	0,00E+0	1,91E-5
CRU	[kg]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
MFR	[kg]	3,79E+1	0,00E+0	0,00E+0	4,27E+1	0,00E+0	0,00E+0
MER	[kg]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
EEE	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
EET	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0

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 E3 VRS 150/170 PN16 valve (44.5 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 E3 VRS 200/220 PN16 valve

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 E3 VRS 200/220 PN16 valve (72.0 kg/piece)

Kernindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO_2-Eq.]	1,53E+2	0,00E+0	2,18E-1	0,00E+0	0,00E+0	-2,68E+1
GWP-fossil	[kg CO_2-Eq.]	1,50E+2	0,00E+0	2,17E-1	0,00E+0	0,00E+0	-2,68E+1
GWP-biogenic	[kg CO_2-Eq.]	3,28E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	1,37E-2
GWP-luluc	[kg CO_2-Eq.]	6,85E-2	0,00E+0	1,46E-03	0,00E+0	0,00E+0	-5,53E-4
ODP	[kg CFC11-Eq.]	1,19E-9	0,00E+0	2,12E-14	0,00E+0	0,00E+0	-5,86E-14
AP	[mol H^+-Eq.]	4,03E-1	0,00E+0	7,22E-04	0,00E+0	0,00E+0	-5,76E-2
EP-freshwater	[kg P-Eq.]	6,29E-4	0,00E+0	7,72E-07	0,00E+0	0,00E+0	-4,86E-6
EP-marine	[kg N-Eq.]	9,15E-2	0,00E+0	3,30E-04	0,00E+0	0,00E+0	-1,01E-2
EP-terrestrial	[mol N-Eq.]	9,59E-1	0,00E+0	3,70E-03	0,00E+0	0,00E+0	-8,89E-2
POCP	[kg NMVOC-Eq.]	2,67E-1	0,00E+0	6,48E-04	0,00E+0	0,00E+0	-4,11E-2
ADPE	[kg Sb-Eq.]	1,15E-3	0,00E+0	2,18E-08	0,00E+0	0,00E+0	-6,68E-5
ADPF	[MJ]	1,94E+3	0,00E+0	2,84E+00	0,00E+0	0,00E+0	-2,46E+2
WDP	[m^3 world-Eq deprived]	3,38E+1	0,00E+0	2,42E-03	0,00E+0	0,00E+0	-4,98E+0

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 E3 VRS 200/220 PN16 valve (72.0 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	1,79E+3	0,00E+0	1,97E-1	0,00E+0	0,00E+0	1,55E+1
PERM	[MJ]	5,70E+1	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
PERT	[MJ]	1,85E+3	0,00E+0	1,97E-1	0,00E+0	0,00E+0	1,55E+1
PENRE	[MJ]	1,85E+3	0,00E+0	2,85E+0	9,16E+1	0,00E+0	-2,46E+2
PENRM	[MJ]	9,16E+1	0,00E+0	0,00E+0	-9,16E+1	0,00E+0	0,00E+0
PENRT	[MJ]	1,95E+3	0,00E+0	2,85E+0	0,00E+0	0,00E+0	-2,46E+2
SM	[kg]	6,09E+1	0,00E+0	0,00E+0	0,00E+0	0,00E+0	1,55E+1
RSF	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
NRSF	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
FW	[m^3]	1,52E+0	0,00E+0	2,27E-4	0,00E+0	0,00E+0	-1,12E-1

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 E3 VRS 200/220 PN16 valve (72.0 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	2,32E-7	0,00E+0	1,51E-11	0,00E+0	0,00E+0	-1,90E-9
NHWD	[kg]	3,42E+1	0,00E+0	4,64E-4	0,00E+0	0,00E+0	3,73E+0
RWD	[kg]	7,97E-2	0,00E+0	5,29E-6	0,00E+0	0,00E+0	3,06E-5
CRU	[kg]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
MFR	[kg]	6,13E+1	0,00E+0	0,00E+0	6,90E+1	0,00E+0	0,00E+0
MER	[kg]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
EEE	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
EET	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0

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 E3 VRS 200/220 PN16 valve (72.0 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 E3 VRS 250/274 PN16 valve

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 E3 VRS 250/274 PN16 valve (109.6 kg/piece)

Kernindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO_2-Eq.]	2,35E+2	0,00E+0	3,32E-1	0,00E+0	0,00E+0	-4,06E+1
GWP-fossil	[kg CO_2-Eq.]	2,30E+2	0,00E+0	3,30E-1	0,00E+0	0,00E+0	-4,06E+1
GWP-biogenic	[kg CO_2-Eq.]	4,95E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	2,07E-2
GWP-luluc	[kg CO_2-Eq.]	1,03E-1	0,00E+0	2,22E-03	0,00E+0	0,00E+0	-8,38E-4
ODP	[kg CFC11-Eq.]	1,80E-9	0,00E+0	3,23E-14	0,00E+0	0,00E+0	-8,88E-14
AP	[mol H^+-Eq.]	6,24E-1	0,00E+0	1,10E-03	0,00E+0	0,00E+0	-8,72E-2
EP-freshwater	[kg P-Eq.]	9,41E-4	0,00E+0	1,18E-06	0,00E+0	0,00E+0	-7,37E-6
EP-marine	[kg N-Eq.]	1,40E-1	0,00E+0	5,03E-04	0,00E+0	0,00E+0	-1,53E-2
EP-terrestrial	[mol N-Eq.]	1,46E+0	0,00E+0	5,63E-03	0,00E+0	0,00E+0	-1,35E-1
POCP	[kg NMVOC-Eq.]	4,07E-1	0,00E+0	9,87E-04	0,00E+0	0,00E+0	-6,22E-2
ADPE	[kg Sb-Eq.]	1,72E-3	0,00E+0	3,32E-08	0,00E+0	0,00E+0	-1,01E-4
ADPF	[MJ]	3,00E+3	0,00E+0	4,32E+00	0,00E+0	0,00E+0	-3,73E+2
WDP	[m^3 world-Eq deprived]	5,15E+1	0,00E+0	3,68E-03	0,00E+0	0,00E+0	-7,54E+0

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 E3 VRS 250/274 PN16 valve (109.6 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	2,72E+3	0,00E+0	2,99E-1	0,00E+0	0,00E+0	2,35E+1
PERM	[MJ]	5,70E+1	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
PERT	[MJ]	2,77E+3	0,00E+0	2,99E-1	0,00E+0	0,00E+0	2,35E+1
PENRE	[MJ]	2,86E+3	0,00E+0	4,34E+0	1,43E+2	0,00E+0	-3,73E+2
PENRM	[MJ]	1,43E+2	0,00E+0	0,00E+0	-1,43E+2	0,00E+0	0,00E+0
PENRT	[MJ]	3,00E+3	0,00E+0	4,34E+0	0,00E+0	0,00E+0	-3,73E+2
SM	[kg]	9,25E+1	0,00E+0	0,00E+0	0,00E+0	0,00E+0	2,34E+1
RSF	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
NRSF	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
FW	[m^3]	2,31E+0	0,00E+0	3,46E-4	0,00E+0	0,00E+0	-1,70E-1

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 E3 VRS 250/274 PN16 valve (109.6 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	3,50E-7	0,00E+0	2,29E-11	0,00E+0	0,00E+0	-2,88E-9
NHWD	[kg]	5,20E+1	0,00E+0	7,06E-4	0,00E+0	0,00E+0	5,65E+0
RWD	[kg]	1,21E-1	0,00E+0	8,05E-6	0,00E+0	0,00E+0	4,64E-5
CRU	[kg]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
MFR	[kg]	9,29E+1	0,00E+0	0,00E+0	1,05E+2	0,00E+0	0,00E+0
MER	[kg]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
EEE	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
EET	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0

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 E3 VRS 250/274 PN16 valve (109.6 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 E3 VRS 300/326 PN16 valve

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 E3 VRS 300/326 PN16 valve (160.0 kg/piece)

Kernindikator	Einheit	A1-A3	C1	C2	C3	C4	D
GWP-total	[kg CO_2-Eq.]	3,43E+2	0,00E+0	4,85E-1	0,00E+0	0,00E+0	-5,44E+1
GWP-fossil	[kg CO_2-Eq.]	3,36E+2	0,00E+0	4,82E-1	0,00E+0	0,00E+0	-5,44E+1
GWP-biogenic	[kg CO_2-Eq.]	7,32E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	2,78E-2
GWP-luluc	[kg CO_2-Eq.]	1,49E-1	0,00E+0	3,24E-03	0,00E+0	0,00E+0	-1,12E-3
ODP	[kg CFC11-Eq.]	2,68E-9	0,00E+0	4,72E-14	0,00E+0	0,00E+0	-1,19E-13
AP	[mol H^+-Eq.]	8,78E-1	0,00E+0	1,60E-03	0,00E+0	0,00E+0	-1,17E-1
EP-freshwater	[kg P-Eq.]	1,38E-3	0,00E+0	1,72E-06	0,00E+0	0,00E+0	-9,87E-6
EP-marine	[kg N-Eq.]	2,02E-1	0,00E+0	7,34E-04	0,00E+0	0,00E+0	-2,05E-2
EP-terrestrial	[mol N-Eq.]	2,11E+0	0,00E+0	8,22E-03	0,00E+0	0,00E+0	-1,80E-1
POCP	[kg NMVOC-Eq.]	5,86E-1	0,00E+0	1,44E-03	0,00E+0	0,00E+0	-8,34E-2
ADPE	[kg Sb-Eq.]	1,96E-3	0,00E+0	4,84E-08	0,00E+0	0,00E+0	-1,36E-4
ADPF	[MJ]	4,36E+3	0,00E+0	6,30E+00	0,00E+0	0,00E+0	-5,00E+2
WDP	[m^3 world-Eq deprived]	7,48E+1	0,00E+0	5,37E-03	0,00E+0	0,00E+0	-1,01E+1

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 E3 VRS 300/326 PN16 valve (160.0 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
PERE	[MJ]	4,03E+3	0,00E+0	4,37E-1	0,00E+0	0,00E+0	3,15E+1
PERM	[MJ]	5,70E+1	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
PERT	[MJ]	4,09E+3	0,00E+0	4,37E-1	0,00E+0	0,00E+0	3,15E+1
PENRE	[MJ]	4,16E+3	0,00E+0	6,33E+0	2,07E+2	0,00E+0	-5,00E+2
PENRM	[MJ]	2,07E+2	0,00E+0	0,00E+0	-2,07E+2	0,00E+0	0,00E+0
PENRT	[MJ]	4,37E+3	0,00E+0	6,33E+0	0,00E+0	0,00E+0	-5,00E+2
SM	[kg]	1,38E+2	0,00E+0	0,00E+0	0,00E+0	0,00E+0	3,14E+1
RSF	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
NRSF	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
FW	[m^3]	3,38E+0	0,00E+0	5,05E-4	0,00E+0	0,00E+0	-2,28E-1

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 E3 VRS 300/326 PN16 valve (160.0 kg/piece)

Indikator	Einheit	A1-A3	C1	C2	C3	C4	D
HWD	[kg]	5,10E-7	0,00E+0	3,35E-11	0,00E+0	0,00E+0	-3,86E-9
NHWD	[kg]	7,74E+1	0,00E+0	1,03E-3	0,00E+0	0,00E+0	7,57E+0
RWD	[kg]	1,80E-1	0,00E+0	1,17E-5	0,00E+0	0,00E+0	6,21E-5
CRU	[kg]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
MFR	[kg]	1,40E+2	0,00E+0	0,00E+0	1,53E+2	0,00E+0	0,00E+0
MER	[kg]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
EEE	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0
EET	[MJ]	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0	0,00E+0

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 E3 VRS 300/326 PN16 valve (160.0 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.