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*Danfoss*

## Environmental **Product Declaration**

### Built-In Valves RA-N and RA-U



<b>EPD issued</b>	2025-07-15
<b>EPD expires</b>	2030-07-15
<b>EPD author</b>	Danfoss Climate Solutions A/S
<b>EPD type</b>	Cradle-to-gate with options
<b>Declared unit</b>	One product over its Reference Service Life
<b>Product included</b>	RA-U Built-in valve, V&N (013G0361)
<b>Products covered by EPD</b>	See Annex 1
<b>Manufacturing Location</b>	Silkeborg, Denmark
<b>Use Location</b>	European Union
<b>Application</b>	HVAC systems
<b>Mass</b>	0,0995 kg without packaging 0,1121 kg with packaging
<b>Dimensions (HxWxD)</b>	25 x 85,3 x 25 mm without packaging
<b>Verification</b>	<input type="checkbox"/> External <input checked="" type="checkbox"/> Internal <input type="checkbox"/> None
<b>Produced to</b>	<a href="#">Danfoss Product Category Rules (2022-09)</a>
<b>Internal independent verifier</b>	Danfoss Power Electronics & Drives A/S

#### **DISCLAIMER**

This EPD was prepared to the best of knowledge of Danfoss A/S. The life cycle assessment calculations were performed in accordance with ISO 14040 & 14044 and EN15804+A2.

All results were internally reviewed by independent experts. While this declaration has followed the guidance of ISO 14025, it has not been externally verified or registered by an EPD programme and therefore does not fully comply with the ISO 14025 standard.

This EPD has been published by Danfoss A/S on Danfoss Product Store and Danfoss Website. For questions, feedback or requests please contact your Danfoss sales representative.

## Introduction

This Environmental Product Declaration (EPD) follows the Danfoss Product Category Rules (PCR) (2022-09-20). These rules provide a consistent framework for calculating and reporting the environmental performance of Danfoss' products and is aligned with relevant international standards, particularly ISO 14025:2006 and EN 15804+A2:2019.

This document has been produced by Danfoss A/S following an internal verification process, but it is not a third-party verified document.

## What is an EPD?

An EPD is a document used to communicate transparently, the quantified environmental impacts of a product over its lifecycle stages. This quantification is done by performing a Life Cycle Assessment (LCA) in line with a consistent set of rules known as a PCR (Product Category Rules).

An EPD provides:

- A product's carbon footprint together with other relevant environmental indicators, including air pollution, water use, energy consumption and waste, over its own life cycle (Modules A-C), as well as the expected benefits of reuse and recycling in reducing the impact of future products (Module D). See Table 1 for module descriptions.
- Environmental data allowing customers to calculate LCAs and produce EPDs for their own products.

## Type of EPD

This EPD is of the type 'cradle-to-gate with options' and includes all relevant modules: production (A1-A3), shipping (A4) and installation (A5); deconstruction (C1), waste collection and transport (C2), treatment (C3) and disposal (C4). It also includes potential net benefits to future products from recycling or reusing post-consumer waste (D). The codes in brackets are the module labels from EN 15804+A2. Modules concerning use, maintenance, repair, replacement, refurbishment (B1-B5) and operational water use (B7) are excluded, following the cut-off rules from EN 15804.

**Table 1:** Modules of the product's life cycle included in the EPD

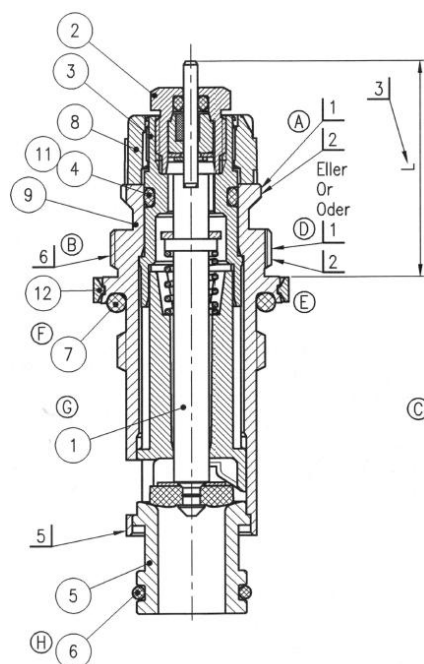
Product stage			Installation		Use stage							End-of-life stage				Benefits
Raw materials	Transport	Manufacture	Transport	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy Use	Operational water Use	De-install.	Transport	Waste processing	Disposal	Benefits and loads outside system boundaries
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MNR	MNR	MNR	MNR	MNR	MNR	MNR	X	X	X	X	X

(X = declared module; MNR = module not relevant)

## Product Description

The product covered by this EPD is representative of Built-in Valves RA-N and RA-U. The production location is the Danfoss plant in Silkeborg, Denmark. See more information on [Danfoss Product Store](#).

The RA-N and RA-U Integrated Preset Valve from Danfoss is an innovative solution designed for precise flow control and optimal system performance in heating and cooling applications. Combining the features of a thermostatic radiator valve with an integrated preset function, the RA-N and RA-U allows for easy adjustment of flow rates, ensuring energy efficiency and comfort. Its compact design ensures seamless integration into any system, while the preset option simplifies the balancing process, saving time and reducing installation costs. Integrated valves, type RA-N and RA-U, with built-in presetting are designed for incorporation into valve radiators from different radiator manufacturers.



**Figure 1:** The drawing of the Built-in Valve RA-N and RA-U with its main components

The EPD covers several products Built-in Valves RA-N and RA-U listed in Annex1, Table 13. These products differ in the size and weight of their components. The EPD has been prepared for the Built-in Valve RA-U, V&N (product code 013G0361). Since the reference product Built-in Valve RA-U, V&N (013G0361) is the largest in this product portfolio, therefore representing a conservative scenario.

For each Built-in Valves RA-N and RA-U product type a representative product code was selected (see Annex 1, Table 12). Products within each representative product code differ in the form of some component parts; the materials from which the components are made are either the same or of the same type, and the difference in their mass does not exceed 5% of the mass difference of the components of the representative product. However, the differences between products within each product group are minor and are considered to be negligible, meaning the same scalar factor can be used when determining the environmental parameters. The scalar factor for each product codes covered by EPD are presented in Annex 1, Table 13.

## Product Description

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For each representative product code listed in Annex 1, Table 12, an LCA (Life Cycle Assessment) has been conducted to assess the environmental impact. The scale factor is calculated as the ratio between the GWPT (A1-C4) value for the product code for which the scale factor is being calculated and the GWPT (A1-C4) value of the reference product code.

### Reference Service Life

For the purpose of this EPD the reference service life (RSL) of the product is considered to be 13 years.

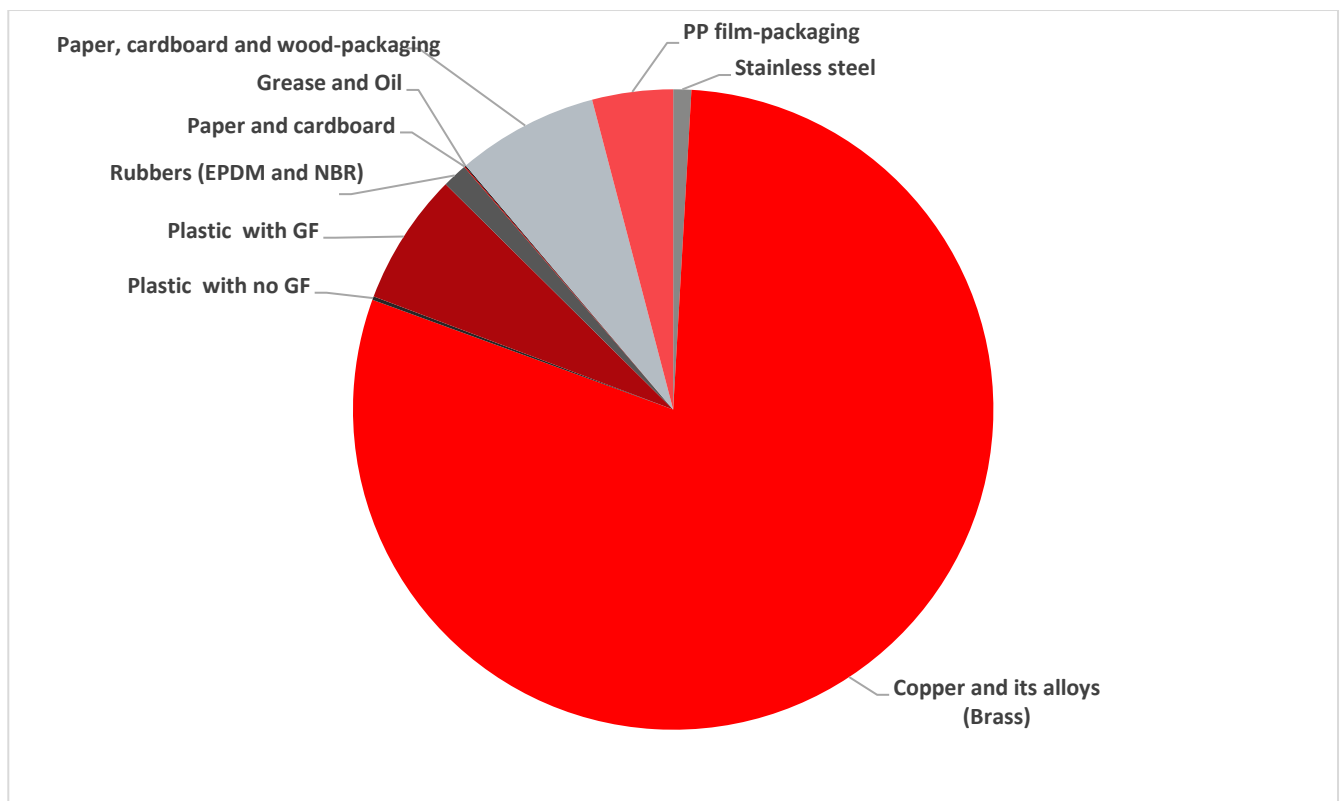
### Intended market

The intended market of this study is the European Union and the baseline scenario involves the distribution, installation, and end-of-life in the European Union. With regards to the use-stage and the end-of-life stage, this EPD is not representative of regions other than the European Union.

## Product Description

**Table 2:** Product composition

Material	Mass (kg)	%
<b>Metals</b>	<b>0,0903</b>	<b>90,7%</b>
Stainless steel	0,0010	1,0%
Copper and its alloys (Brass)	0,0893	89,7%
<b>Plastics &amp; Rubbers</b>	<b>0,0091</b>	<b>9,1%</b>
Plastic with no GF	0,0002	0,2%
Plastic with GF	0,0075	7,5%
Rubbers (EPDM and NBR)	0,0014	1,4%
<b>Natural materials</b>	<b>0,0001</b>	<b>0,1%</b>
Paper and cardboard	0,0001	0,1%
<b>Other materials</b>	<b>0,0001</b>	<b>0,1%</b>
Grease and Oil	0,0001	0,1%
<b>Product Total</b>	<b>0,0995</b>	<b>100,0%</b>
Paper, cardboard and wood-packaging	0,0080	63,7%
PP film-packaging	0,0046	36,3%
<b>Packaging Total</b>	<b>0,0126</b>	<b>100,0%</b>
<b>Total (Product and Packaging)</b>	<b>0,1121</b>	



**Figure 2:** Material Composition Overview

## Overview of LCA study

### Data quality

Data quality of the selected datasets is generally assessed as good and very good in terms of geographical, time and technology representativeness and applicability. Background data is from *LCA for Experts*© database version 2025.1.

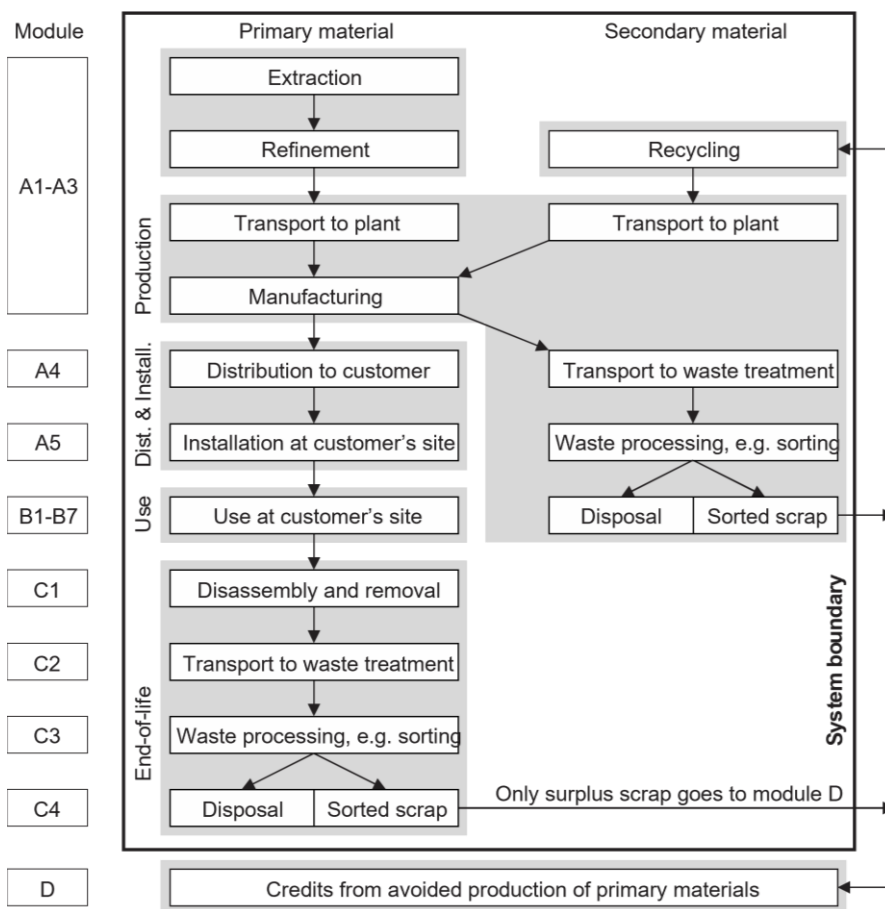
### Allocation and cut-off criteria

The allocation is made in accordance with the provisions of EN 15804+A2. All major raw materials and all the essential energy are included. All hazardous materials and substances are considered in the inventory. Data sets within the system boundary are complete and fulfil the criteria for the exclusion of inputs and output criteria.

- The grease has been substituted with the oil due to limitation with the Sphera database.

### System boundaries

The results in this EPD are split into life cycle modules following EN 15804 (Figure 1): production (A1-A3), distribution (A4), installation (A5), and the end of the product's life (C1-C4). Module D represents environmental benefits and loads that occur beyond the system boundary (i.e., in future products).



**Figure 3:** Modular structure used in this EPD (following EN 15804+A2)

## Overview of LCA study

### Product and packaging manufacture (A1-A3)

Final manufacturing occurs in the Silkeborg plant, Denmark. The facility is certified according to IATF 16949, ISO 14001, ISO 45001, and ISO 9001. Where waste generated on-site is recyclable, it is separated and recycled. For further information, [see here](#). The product is shipped in the packaging as described in Table 2. All packaging materials can be safely recycled or incinerated if appropriate local facilities are available. Production data was collected for the year 2024.

The production locations of component suppliers are categorized by product type into mechanical parts, documentation and packaging. The life cycle assessment (LCA) calculation assumes that, based on the total weight of the components, the majority of the mechanical parts and packaging are manufactured within the European Union. Transport of these components involves a combination of road (truck) and sea. Documentation is produced in Denmark, and road transport by truck is considered in the LCA for this component.

To allocate the electricity consumption per unit of product, a distribution method based on the total quantity of products produced in one year was used. Since all products included in the calculation consist of very similar components, differing only in a few details required for product functionality and made from the same materials, the energy consumption for the final assembly of one product was calculated by dividing the total energy consumption for the year by the total quantity of products produced in 2024. For all product versions, (see Annex 1, Table 13), the same energy consumption value per unit of product is considered. In the LCA calculation for the energy consumed in the product's final production, the carbon footprint of the electricity produced in Denmark is taken into account.

**Table 3:** Biogenic carbon content in product and packaging

	Total (excluding recycling)
Biogenic carbon content in product [kg]	2,78E-05
Biogenic carbon content in accompanying packaging [kg]	3,44E-03

Note: 1 kg biogenic carbon is equivalent to 44/12 kg of CO<sub>2</sub>.

### Shipping and installation (A4-A5)

Distribution is assumed to occur to customers within the European Union. Transportation at 2145 km distance by truck is assumed between the factory and the final customer. The EPD calculation takes into account the distance from the product's production location in Silkeborg, Denmark, to the Danfoss central warehouse for finished products in Rodekro, Denmark, as transportation to the final customer in European Union.

Module A5 includes disposal of packaging materials only, the benefits from e.g., energy recovered after plastic incineration are allocated to module D. The product is assumed to be installed by hand. Energy use in handheld tools during installation is not included as it falls under the cut-off criteria.

### Use phase (B1-B7)

The Built-in Valves RA-N and RA-U products are the mechanical products and do not require additional power supply to operate. There is no effect on the carbon footprint due to operation.

## Overview of LCA study

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### End-of-life (C1-C4)

The following end-of-life procedure has been applied:

- Manual dismantling is used to separate recyclable bulk materials, e.g. bulk metals and plastics.
- Shredding is used for the remaining parts, such as printed circuit board assemblies.
- Ferrous metals, non-ferrous metals and bulk plastics are recovered through recycling.
- The remaining materials go to either energy recovery or landfill.

In line with EN 15804+A2, only the 'net scrap' (i.e., the leftover recyclable materials remaining after inputs of recycled content required in the manufacturing phase are first satisfied) is used to calculate the benefits and loads beyond the system boundary (Module D).

For this EPD an average scenario with 50% of the product sent to recycling & 50% of the product sent to landfill (C3, C4, D) was used. This scenario is designed to represent an average end-of-life scenario.

For the EPD this average scenario was chosen as it is assumed that it represents the majority of cases on average.

1. Recycling scenario with 100% of the product sent to recycling at the end-of-life, excluding fractions that cannot be recycled or incinerated (e.g., glass reinforcing in glass-filled plastics) and are sent to landfill.

This scenario illustrates best case performance. It assumes a 100% collection rate and best available recycling technologies. Under this scenario electrical cables, and all metals, flat glass and unreinforced plastics found within the body and chassis of the product are recycled. Printed circuit board assemblies are incinerated, and the copper and precious metals (gold, silver, palladium, and platinum) are recycled.

2. Landfill scenario with 100% of the product sent to landfill.

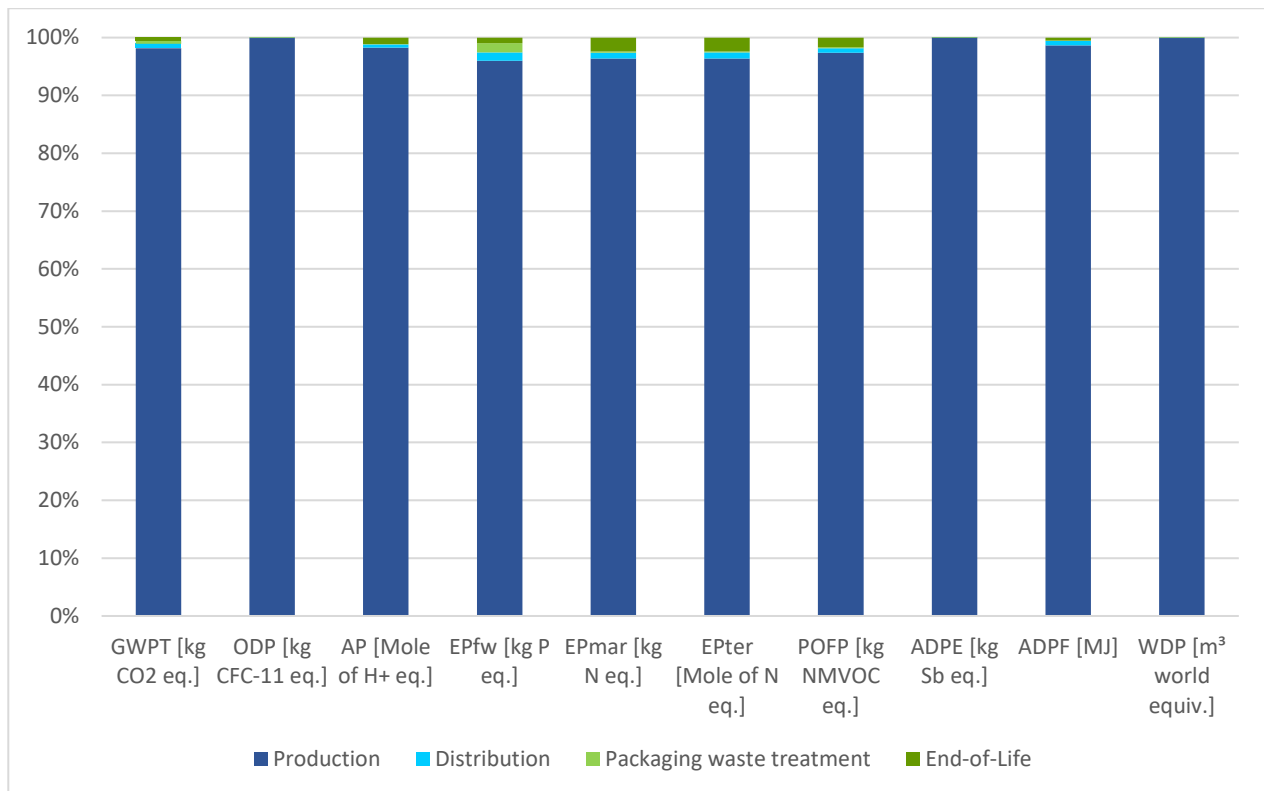
This scenario assumes that the whole product, including its packaging, is landfilled. It is designed to represent a poor end-of-life-route where valuable resources are lost.

### Benefits and loads beyond the system boundary (D)

Module D considers the net benefit of recycling (including energy recovery) of materials in the product and packaging, taking account of losses in the recycling process and the recycled material used in the production of the product. Module D covers the two end-of-life scenarios, as described above. It does not cover energy recovery from incineration since the process used in LCA for Experts has an efficiency below 60%. Therefore, the impacts of this process are reported in module C4, and no benefits are claimed in module D.

## Environmental performance

This section presents the environmental performance of one Built-in Valve RA-N and RA-U. Figure 4 presents the environmental impact of the Built-in Valve RA-N and RA-U across a number of environmental impact categories (following EN 15804+A2:2019) per life cycle stage, over its full 10-year life cycle, including Global Warming Potential.



**Figure 4:** Breakdown of environmental impacts by life cycle stages (Average of Landfill and Recycling End-of-Life scenario/only Landfill scenario) See Table 4 and Table 5 for descriptions of environmental impact indicators).



## Environmental performance

**Table 4:** Environmental impact indicators

	Production	Distribution	Packaging waste treatment	Use	End-of-Life				(not included in Figure 4)
Life cycle stages based on EN 15804+A2	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
Description	Manufacture of the product from 'cradle-to-gate'	Transport of the product to the customer	Installation of the product and disposal of used packaging	Use of the product over its lifetime e.g. 10 years	Deinstallation of the product from the site	Transport of the product to waste treatment	Processing waste for recycling	Disposal of waste that cannot be recycled (through landfill and incineration)	Potential benefits and loads beyond the system boundary due to reuse, recycling, and energy recovery
Environmental Impact Indicators									
GWPT [kg CO2 eq.]	2,62E+00	2,09E-02	1,38E-02	0,00E+00	0,00E+00	1,00E-03	1,10E-02	2,47E-03	-1,21E+00
GWPF [kg CO2 eq.]	2,63E+00	2,07E-02	1,09E-03	0,00E+00	0,00E+00	1,00E-03	1,09E-02	2,46E-03	-1,21E+00
GWPB [kg CO2 eq.]	-1,27E-02	0,00E+00	1,27E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWPLULUC [kg CO2 eq.]	6,67E-03	2,15E-04	9,01E-07	0,00E+00	0,00E+00	2,45E-08	1,13E-04	5,99E-06	-2,45E-03
ODP [kg CFC-11 eq.]	2,07E-11	3,47E-15	8,49E-16	0,00E+00	0,00E+00	1,18E-19	1,82E-15	4,06E-15	-5,99E-12
AP [Mole of H+ eq.]	7,68E-03	4,01E-05	6,26E-06	0,00E+00	0,00E+00	1,42E-06	6,92E-05	1,66E-05	-4,08E-03
EPfw [kg P eq.]	3,80E-06	5,64E-08	6,47E-08	0,00E+00	0,00E+00	2,19E-10	2,95E-08	7,16E-09	-1,21E-06
EPmar [kg N eq.]	1,62E-03	1,72E-05	3,15E-06	0,00E+00	0,00E+00	5,51E-07	3,44E-05	5,83E-06	-8,08E-04
EPter [Mole of N eq.]	1,77E-02	1,84E-04	3,12E-05	0,00E+00	0,00E+00	6,20E-06	3,74E-04	6,39E-05	-8,76E-03
POFP [kg NMVOC eq.]	4,61E-03	3,62E-05	7,07E-06	0,00E+00	0,00E+00	1,31E-06	6,43E-05	1,40E-05	-2,39E-03
ADPE [kg Sb eq.]	4,10E-04	1,39E-09	1,45E-10	0,00E+00	0,00E+00	3,61E-11	7,28E-10	1,26E-10	-2,79E-04
ADPF [MJ]	3,52E+01	2,68E-01	1,50E-02	0,00E+00	0,00E+00	1,46E-02	1,40E-01	3,39E-02	-1,34E+01
WDP [m <sup>3</sup> world equiv.]	6,29E-01	9,56E-05	3,55E-05	0,00E+00	0,00E+00	1,71E-06	5,01E-05	1,59E-04	-3,11E-01

How to read scientific numbers:

e.g. 2,05E02 = 2,05 x 10<sup>2</sup> = 205

2,04E-01 = 2,04 x 10<sup>-1</sup> = 0,204

## Environmental performance

**Table 5:** Environmental impact indicator descriptions

Acronym	Unit	Indicator
GWPT	kg CO <sub>2</sub> eq.	Carbon footprint (Global Warming Potential) – total
GWPF	kg CO <sub>2</sub> eq.	Carbon footprint (Global Warming Potential) – fossil
GWPB	kg CO <sub>2</sub> eq.	Carbon footprint (Global Warming Potential) – biogenic
GWPLULUC	kg CO <sub>2</sub> eq.	Carbon footprint (Global Warming Potential) – land use and land use change
ODP	kg CFC-11 eq.	Depletion potential of the stratospheric ozone layer
AP	Mole H+ eq.	Acidification potential
EPfw	kg P eq.	Eutrophication potential – aquatic freshwater
EPmar	kg N eq.	Eutrophication potential – aquatic marine
EPter	Mole of N eq.	Eutrophication potential – terrestrial
POFP	kg NMVOC eq.	Summer smog (photochemical ozone formation potential)
ADPE*	kg Sb eq.	Depletion of abiotic resources – minerals and metals
ADPF*	MJ	Depletion of abiotic resources – fossil fuels
WDP*	m <sup>3</sup> world eq.	Water deprivation potential (deprivation-weighted water consumption)

Results for module A1-A3 are specific to the product. All results from module A4 onwards should be considered as scenarios that represent one possible outcome. The true environmental performance of the product will depend on actual use.

The results in this section are relative expressions only and do not predict actual impacts, the exceeding of thresholds, safety margins, or risks. EPDs from others may not be comparable.

### Carbon footprint

The total carbon footprint, cradle-to-grave, of the product is **2,67E+00 kg CO<sub>2</sub>-eq** (A1-C4), based on the baseline use phase scenario. The carbon footprint of production of this product, cradle-to-gate, is **2,62E+00 kg CO<sub>2</sub>-eq** (A1-A3).

## Environmental performance

**Table 6:** Resource use

	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
PERE [MJ]	1,56E+01	2,02E-02	9,72E-04	0,00E+00	0,00E+00	4,82E-05	1,06E-02	3,74E-03	-3,85E+00
PERM [MJ]	9,69E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT [MJ]	1,56E+01	2,02E-02	9,72E-04	0,00E+00	0,00E+00	4,82E-05	1,06E-02	3,74E-03	-3,85E+00
PENRE [MJ]	3,50E+01	2,68E-01	1,50E-02	0,00E+00	0,00E+00	1,46E-02	1,40E-01	3,39E-02	-1,34E+01
PENRM [MJ]	2,07E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT [MJ]	3,52E+01	2,68E-01	1,50E-02	0,00E+00	0,00E+00	1,46E-02	1,40E-01	3,39E-02	-1,34E+01
SM [kg]	8,39E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF [MJ]	0,00E+00	0,00E+00	0,00E+00	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	0,00E+00	0,00E+00	0,00E+00
FW [m3]	1,73E-02	9,98E-06	1,18E-06	0,00E+00	0,00E+00	7,74E-08	5,23E-06	4,69E-06	-6,69E-03

**Table 7:** Resource use indicator descriptions

Acronym	Unit	Indicator
PERE	MJ	Use of renewable primary energy excluding renewable primary energy resources used as raw materials
PERM	MJ	Use of renewable primary energy resources used as raw materials
PERT	MJ	Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)
PENRE	MJ	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials
PENRM	MJ	Use of non-renewable primary energy resources used as raw materials
PENRT	MJ	Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)
SM	kg	Use of secondary material
RSF	MJ	Use of renewable secondary fuels
NRSF	MJ	Use of non-renewable secondary fuels
FW	m <sup>3</sup>	Net use of fresh water

## Environmental performance

**Table 8:** Waste categories and output flows

	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
HWD [kg]	3,14E-08	1,08E-11	2,57E-12	0,00E+00	0,00E+00	1,01E-13	5,63E-12	4,29E-12	-4,21E-07
NHWD [kg]	4,02E-02	3,74E-05	4,56E-03	0,00E+00	0,00E+00	1,46E-06	1,96E-05	9,51E-02	1,11E-02
RWD [kg]	2,24E-03	5,06E-07	8,88E-08	0,00E+00	0,00E+00	1,57E-08	2,65E-07	2,19E-07	-4,44E-04
CRU [kg]	0,00E+00	0,00E+00	0,00E+00	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,50E-02	0,00E+00
MER [kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE [MJ]	1,32E-03	0,00E+00	0,00E+00	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	0,00E+00	0,00E+00	0,00E+00

**Table 9:** Waste category and output flow descriptions

Acronym	Unit	Indicator
HWD	kg	Hazardous waste disposed
NHWD	kg	Non-hazardous waste disposed
RWD	kg	Radioactive waste disposed
CRU	kg	Components for reuse
MFR	kg	Materials for recycling
MER	kg	Materials for energy recovery
EEE	kg	Exported energy (electrical)
EET	kg	Exported energy (thermal)

## Environmental performance

**Table 10:** Additional indicators\*

	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
PM [Disease incidences]	8,70E-08	3,41E-10	4,38E-11	0,00E+00	0,00E+00	8,40E-12	4,55E-10	1,65E-10	-4,93E-08
IRP [kBq U235 eq.]	3,00E-01	7,26E-05	1,08E-05	0,00E+00	0,00E+00	2,22E-06	3,80E-05	2,48E-05	-3,07E-02
ETPfw [CTUe]	1,22E+01	3,48E-01	1,28E-02	0,00E+00	0,00E+00	1,07E-02	1,82E-01	2,60E-02	-3,12E+00
HTPc [CTUh]	3,00E-09	4,70E-12	2,07E-13	0,00E+00	0,00E+00	1,97E-13	2,47E-12	4,56E-13	-2,76E-10
HTPnc [CTUh]	1,56E-08	2,63E-10	1,01E-11	0,00E+00	0,00E+00	6,45E-12	1,38E-10	1,60E-11	-6,51E-09
SQP [Pt]	1,11E+01	1,18E-01	2,05E-03	0,00E+00	0,00E+00	3,74E-05	6,20E-02	4,75E-03	-2,26E+00

**Table 11:** Optional indicator descriptions

Acronym	Unit	Indicator
PM	Disease incidence	Potential incidence of disease due to particulate matter emissions
IRP**	kBq U235 eq.	Potential human exposure efficiency relative to U235
ETPfw*	CTUe	Potential Comparative Toxic Unit for ecosystems (fresh water)
HTPc*	CTUh	Potential Comparative Toxic Unit for humans (cancer)
HTPnc*	CTUh	Potential Comparative Toxic Unit for humans (non-cancer)
SQP*	Dimensionless	Potential soil quality index

\*Disclaimer for ADPE, ADPF, WDP, ETPfw, HTPc, HTPnc, SQP: The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

\*\*Disclaimer for ionizing radiation: This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

## Annex

### Annex 1: The product codes covered in this EPD

The EPD results are presented for the reference product code Built-in Valve RA-U V&N (013G0361).

For each product Built-in Valves RA-N and RA-U representative product sales codes have been selected and are listed in Table 12. An LCA calculation has been prepared for each representative product code listed in Table 12. The scale factor is calculated as the ratio between the GWPT (A1-C4) value of the representative product code for which the scale factor is being calculated and the GWPT (A1-C4) value of the reference product code.

**Table 12:** Built-In Valve RA-N and RA-U representative product codes

Product code	Product description
013G0361	RA-U Built-in valve, V&N
013G0270	RA-N Built-in valve
013G1383	RA-U Built-in valve
013G0391	RA-U Built-in valve, DHEI
013G3007	RA-FN Built-in valve, (Blue) 100°
013G1382	RA-N Built-in valve, series 3
013G0390	RA-N Built-in valve, series 3
013G0360	RA-N Built-in valve, series 3

To calculate the actual GWPT of purchased products covered by this EPD, multiply the GWPT from this EPD by the factor (see Table 13) corresponding to the purchased product's sales code. You can use this factor to calculate other indicators as well.

Example:

Product code: **013G0270**

Scale factor (see Table 13): **0,955**

Reference GWPT (A1-C4) (013G0361): **2,67E+00** kg CO<sub>2</sub>-eq

GWPT (A1-C4) (Product code) = Scale factor x GWPT (A1-C4)

GWPT (A1-C4) (013G0270): **0,955 x 2,67E+00** kg CO<sub>2</sub>-eq = **2,55E+00** kg CO<sub>2</sub>-eq

## Annex

**Table 13:** Built-in Valves RA-N and RA-U product codes, covered in this EPD

Product code	Product description	Scale factor	GWPT A1-A3 [KgCO <sub>2</sub> eq]
013G0361 <sup>(1,2)</sup>	RA-U Built-in valve, V&N	1,000	2,62E+00
013G0270 <sup>(1,3)</sup>	RA-N Built-in valve	0,955	2,50E+00
013G1383 <sup>(1,2)</sup>	RA-U Built-in valve	0,951	2,49E+00
013G0391 <sup>(1,2)</sup>	RA-U Built-in valve, DHEI	0,947	2,48E+00
013G3007 <sup>(1,4)</sup>	RA-FN Built-in valve, (Blue) 100°	0,929	2,43E+00
013G3008 <sup>(4)</sup>	RA-FN Built-in valve, (Green) 131°	0,929	2,43E+00
013G3009 <sup>(4)</sup>	RA-FN Built-in valve, (Yellow) 185°	0,929	2,43E+00
013G3010 <sup>(4)</sup>	RA-FN Built-in valve, (White) 233°	0,929	2,43E+00
013G1382 <sup>(1,3)</sup>	RA-N Built-in valve, series 3	0,835	2,19E+00
013G0390 <sup>(1,3)</sup>	RA-N Built-in valve, series 3	0,827	2,17E+00
013G0360 <sup>(1,3)</sup>	RA-N Built-in valve, series 3	0,820	2,15E+00
013G0363 <sup>(3)</sup>	RA-N Built-in valve, series 3	0,820	2,15E+00
013G0364 <sup>(3)</sup>	RA-N Built-in valve, series 3	0,820	2,15E+00
013G0365 <sup>(3)</sup>	RA-N Built-in valve, series 3	0,820	2,15E+00
013G0366 <sup>(3)</sup>	RA-N Built-in valve, series 3	0,820	2,15E+00
013G0367 <sup>(3)</sup>	RA-N Built-in valve, series 3	0,820	2,15E+00

Notes:

- 1.) Representative product code in group of the product
- 2.) RA-U: Integrated Presetting Valves - Small volume flows
- 3.) RA-N: Integrated Presetting Valves - Normal volume flows
- 4.) RA-FN: Fixed capacity Valve bodies

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