ENGINEERING TOMORROW

Environmental **Product Declaration**

RA-N presetting mechanical thermostatic radiator valve, building series DIN and NF

EPD issued	2022-12-16
EPD expires	2027-12-16
EPD author	Danfoss Climate Solutions
EPD type	Cradle-to-grave
Declared unit	One product 10 years
Products included	RA-N mechanical thermostatic radiator valve, building series DIN (code no. 013G0034) and NF (code no. 013G0014)
Geographical scope	Germany
Application	Manual thermostatic radiator valve for water-based heating system
Mass	0,26 kg without packaging (013G0034) 0,27 kg with packaging
Dimensions	cc. 82mm X Ø27-30mm
Verification	[ ] External [X] Internal [ ] None
Produced to	Danfoss Product Category Rules (2022-09-20)
Verifier	Danfoss Power Electronics 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 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 are based on relevant international standards, particularly ISO 14025:2006, EN 15804+A2:2019 and EN 50598-3:2015.

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-grave' and includes the following modules: production (A1-A3), shipping (A4) and installation (A5); operational energy use (B6); deconstruction (C1), waste collection (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	**X**	MNR	**X**	**X**	**X**	**X**	**X**

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

Overview of LCA study

The products studied in this report are presetting mechanical thermostatic radiator valves that are part of the thermostatic radiator valve for water-based heating system. Together with the thermostat they optimizes the energy use and maintains a high regulating capacity and reactivity to temperature changes. The radiator thermostat and valve help people to obtain comfort in their homes. By maintaining constant desired room temperatures, individually or room by room, and by helping to reduce energy consumption.

The production location is Viby, Denmark. See more information about the products on Danfoss Product Store and Danfoss Product Store.

Reference Service Life

For the purpose of this EPD the reference service life (RSL) of the products are considered to be 10 years. However, the actual lifetime of the products can reach over 20 years.

Intended market

The intended market of this study is Germany, and the baseline scenario involves the distribution, installation, and end-of-life in Germany.

Table 2: Product composition

	RA-N 'DIN'		RA-N 'NF'	
Material	**Mass (kg)**	**%**	**Mass (kg)**	**%**
Metals	**0,25**	96,2%	**0,239**	**96,0%**
Steel (excl. stainless steel)	0,00102	0,4%	0,00102	**0,4%**
Stainless steel	0,00032	0,1%	0,00032	**0,1%**
Copper and its alloys	0,245	94,2%	0,234	**94,0%**
Zinc and its alloys	0,00437	1,7%	0,00437	**1,8%**
Plastics	**0,00974**	3,7%	**0,00974**	**3,9%**
Other reinforced thermoplastics	0,007	2,7%	0,007	**2,8%**
Other unreinforced thermoplastics	0,00229	0,9%	0,00229	**0,9%**
Thermosetting plastics (unreinforced)	0,00045	0,2%	0,00045	**0,2%**
Total product	**0,26**		**0,249**	**96,0%**

Overview of LCA study

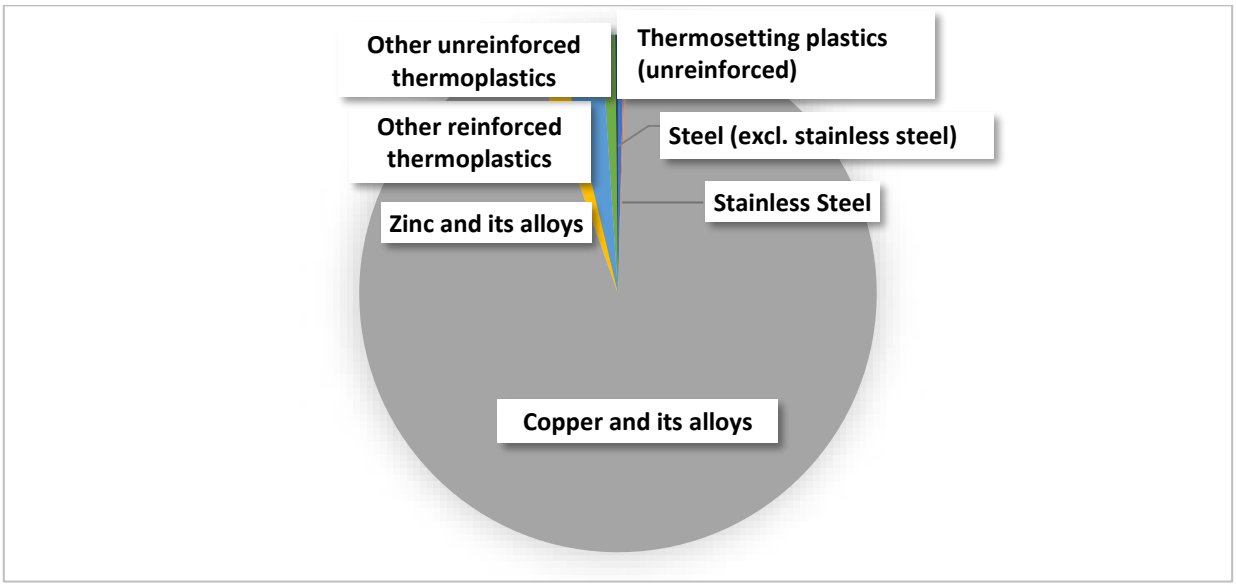
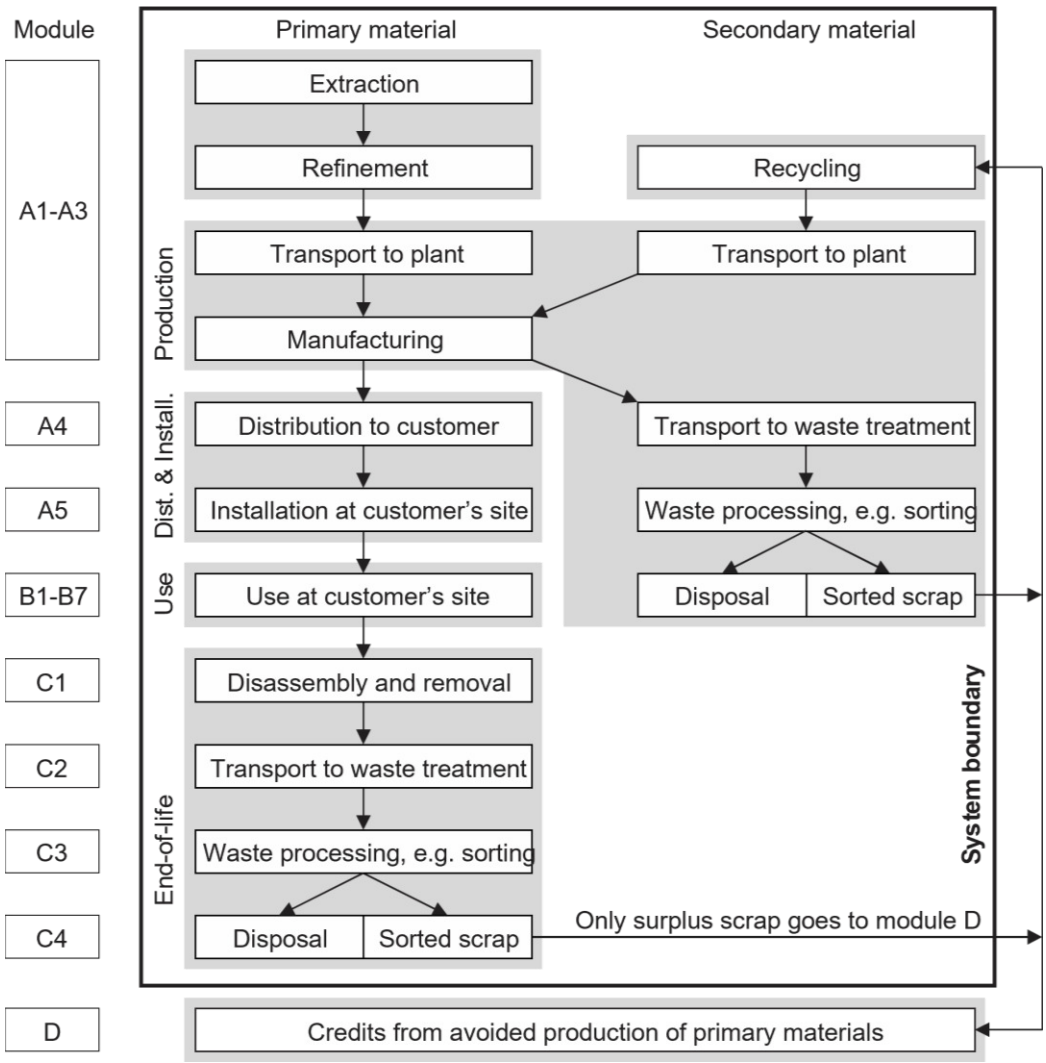


Figure 1: Material composition overview

The results in this EPD are split into life cycle modules following EN 15804 (Figure 1): production (A1-A3), distribution (A4), use (B6) 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).

Overview of LCA study

Figure 2: Modular structure used in this EPD (following EN 15804+A2)



Overview of LCA study

Product and packaging manufacture (A1-A3)

Final manufacturing occurs in Viby, Denmark. The facility is certified according to 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 products are shipped in the packaging described in Table 3 below. All packaging materials can be safely recycled or incinerated if appropriate local facilities are available.

Table 3: Packaging materials

	RA-N 'DIN'	RA-N 'NF'
Packaging material	**Mass (kg)**	**Mass (kg)**
Paper and cardboard	0,0111	0,0111
Total packaging	**0,0111**	**0,0111**

Table 4: Biogenic carbon content in product and packaging

	RA-N 'DIN'	RA-N 'NF'
	Total (excluding recycling)	**Total (excluding recycling)**
Biogenic carbon content in product [kg]	-	-
Biogenic carbon content in accompanying packaging [kg]	0,00498	0,00498

Shipping and installation (A4-A5)

Distribution is assumed to occur to customers in Germany as the chosen target market. An average distance of 650km by truck is considered based on sales data between the factory and the final customer.

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-B6)

The Reference Service Life (RSL) applied in this EPD is 10 years.

As the RA-N 'DIN' and 'NF' valves are a mechanical product, it does not require any electricity to operate the valves. The energy used for heating in the radiator system is out of the system boundaries and functional unit of the current product and LCA study.

Overview of LCA study

End of life (C1-C4)

The standard end-of-life procedure from EN 50598-3 has been applied:

- Manual dismantling is used to separable recyclable bulk materials, such as bulk metals and bulk 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).

Two scenarios are examined for the end-of-life.

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 (C3.1, C4.1, D.1)

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 (C3.2, C4.2, D.2).

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 and E)

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.

Environmental performance

This section presents the environmental performance of the RA-N 'DIN' and 'NF' thermostatic radiator valves. Figure 3/a,b present the environmental impact of the products 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.

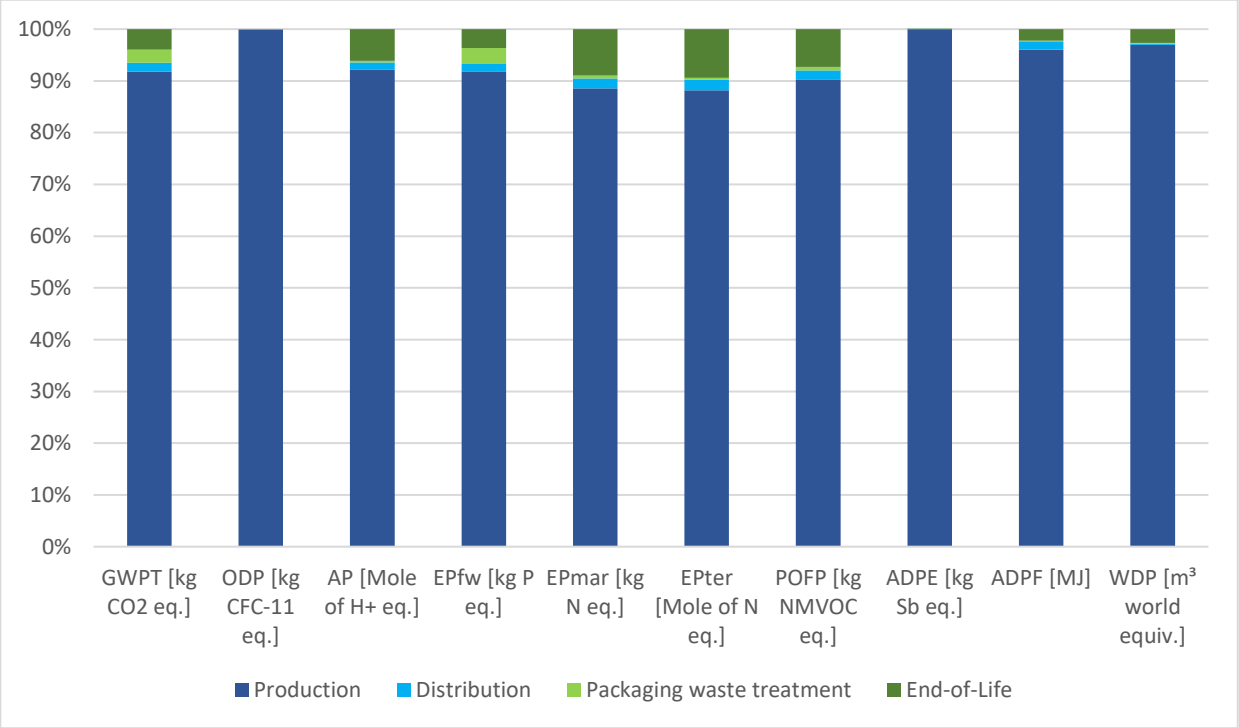


Figure 3/a: RA-N 'DIN' Breakdown of environmental impacts by life cycle stages (Average of Landfill and Recycling End-of-Life scenario). See Table 5 and 6 for descriptions of environmental impact indicators. Use phase is zero.

Environmental performance

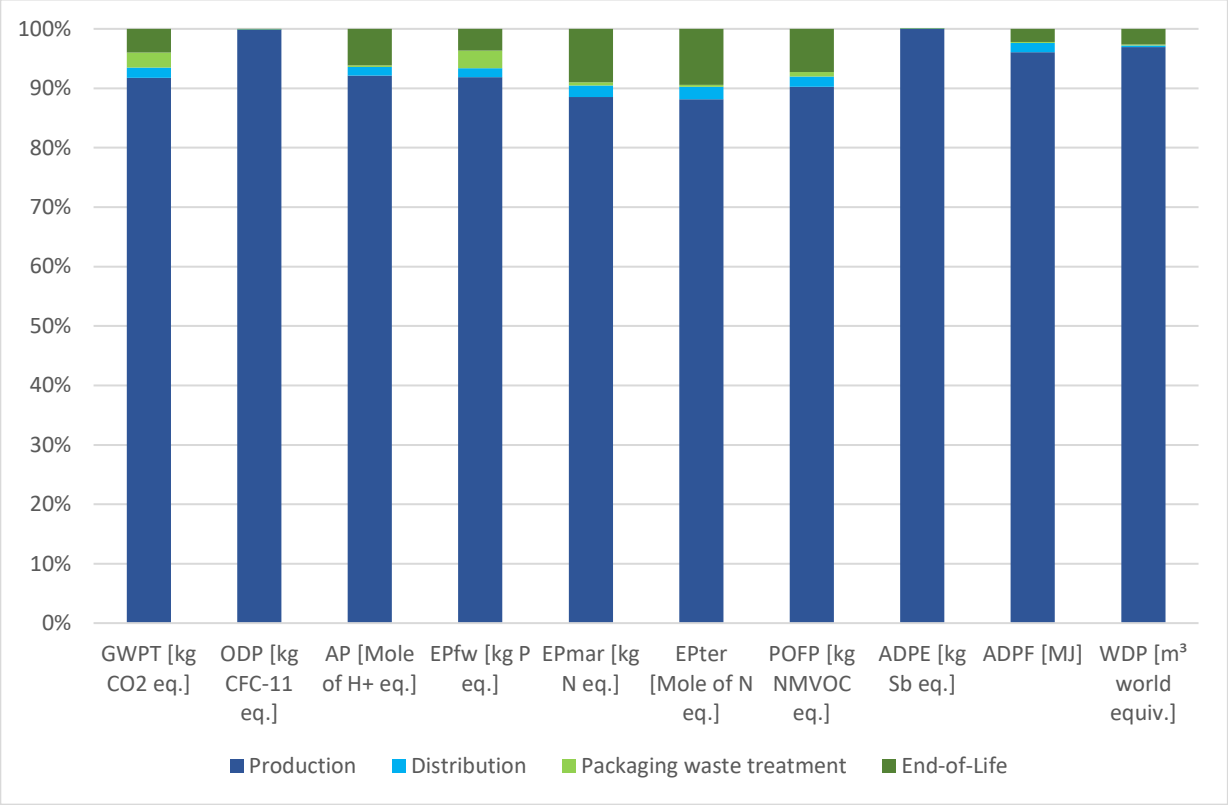


Figure 3/b: RA-N 'NF' Breakdown of environmental impacts by life cycle stages (Average of Landfill and Recycling End-of-Life scenario). See Table 5 and 6 for descriptions of environmental impact indicators. Use phase is zero.

Environmental performance

Table 5: Environmental impact indicators*

RA-N 'DIN' valve

	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**	**C3.3** Recycling*	**C3.2** Landfill	**C4.1** Recycling*	**C4.2** Landfill	**D** Recycling*	**D** Landfill
Description / **Environmental Impact Indicators**	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	
GWPT [kg CO2 eq.]	6,70E-01	1,28E-02	1,84E-02	0,00E+00	0,00E+00	2,36E-03	2,34E-02	0,00E+00	2,32E-02	6,80E-03	-4,44E-02	9,65E-02
GWPF [kg CO2 eq.]	6,88E-01	1,28E-02	9,15E-04	0,00E+00	0,00E+00	2,36E-03	2,34E-02	0,00E+00	2,32E-02	6,80E-03	-4,44E-02	9,65E-02
GWPB [kg CO2 eq.]	-1,75E-02	0,00E+00	1,75E-02	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
GWPLULUC [kg CO2 eq.]	3,88E-04	8,75E-05	4,48E-07	0,00E+00	0,00E+00	5,59E-08	1,59E-04	0,00E+00	2,91E-08	7,29E-06	-1,51E-05	1,97E-04
ODP [kg CFC-11 eq.]	8,63E-12	1,27E-15	1,06E-15	0,00E+00	0,00E+00	2,70E-19	2,31E-15	0,00E+00	1,01E-15	9,72E-15	-1,92E-13	9,93E-13
AP [Mole of H+ eq.]	1,46E-03	2,33E-05	4,49E-06	0,00E+00	0,00E+00	3,50E-06	1,42E-04	0,00E+00	2,69E-06	4,26E-05	-7,86E-05	1,76E-03
EPfw [kg P eq.]	2,77E-06	4,64E-08	8,88E-08	0,00E+00	0,00E+00	5,01E-10	8,40E-08	0,00E+00	2,63E-10	1,36E-07	-4,30E-08	4,93E-07
EPmar [kg N eq.]	4,29E-04	9,28E-06	2,61E-06	0,00E+00	0,00E+00	1,43E-06	6,95E-05	0,00E+00	6,82E-07	1,42E-05	-2,20E-05	1,09E-04
EPter [Mole of N eq.]	4,54E-03	1,07E-04	1,71E-05	0,00E+00	0,00E+00	1,57E-05	7,70E-04	0,00E+00	1,29E-05	1,56E-04	-2,34E-04	1,16E-03
POFP [kg NMVOC eq.]	1,09E-03	2,07E-05	8,89E-06	0,00E+00	0,00E+00	3,31E-06	1,32E-04	0,00E+00	1,81E-06	3,52E-05	-8,08E-05	3,47E-04
ADPE [kg Sb eq.]	4,54E-05	1,31E-09	8,57E-11	0,00E+00	0,00E+00	8,24E-11	2,37E-09	0,00E+00	2,68E-11	5,14E-10	-1,14E-05	1,80E-04
ADPF [MJ]	1,02E+01	1,70E-01	1,24E-02	0,00E+00	0,00E+00	3,34E-02	3,09E-01	0,00E+00	3,70E-03	9,24E-02	-1,25E+00	6,12E-01
WDP [m^3 world equiv.]	5,10E-02	1,45E-04	6,45E-05	0,00E+00	0,00E+00	3,91E-06	2,63E-04	0,00E+00	2,12E-03	4,07E-04	-7,91E-03	5,79E-02

Environmental performance

RA-N 'NF' valve

	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**	**C3.3** Recycling*	**C3.2** Landfill	**C4.1** Recycling*	**C4.2** Landfill	**D** Recycling*	**D** Landfill
Description / **Environmental Impact Indicators**	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	
GWPT [kg CO2 eq.]	6,10E-01	1,22E-02	1,67E-02	0,00E+00	0,00E+00	2,36E-03	2,23E-02	0,00E+00	2,32E-02	6,53E-03	-4,42E-02	9,20E-02
GWPF [kg CO2 eq.]	6,61E-01	1,21E-02	9,15E-04	0,00E+00	0,00E+00	2,26E-03	2,23E-02	0,00E+00	2,32E-02	6,53E-03	-4,39E-02	9,19E-02
GWPB [kg CO2 eq.]	-1,75E-02	0,00E+00	1,75E-02	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
GWPLULUC [kg CO2 eq.]	3,74E-04	8,26E-05	4,48E-07	0,00E+00	0,00E+00	5,35E-08	1,52E-04	0,00E+00	2,91E-08	6,99E-06	-1,53E-05	1,88E-04
ODP [kg CFC-11 eq.]	8,24E-12	1,20E-15	1,06E-15	0,00E+00	0,00E+00	2,59E-19	2,21E-15	0,00E+00	1,01E-15	9,34E-15	-1,94E-13	9,49E-13
AP [Mole of H+ eq.]	1,41E-03	2,20E-05	4,49E-06	0,00E+00	0,00E+00	3,35E-06	1,36E-04	0,00E+00	2,69E-06	4,08E-05	-8,03E-05	1,68E-03
EPfw [kg P eq.]	2,66E-06	4,38E-08	8,88E-08	0,00E+00	0,00E+00	4,80E-10	8,04E-08	0,00E+00	2,63E-10	1,35E-07	-4,49E-08	4,70E-07
EPmar [kg N eq.]	4,13E-04	8,77E-06	2,61E-06	0,00E+00	0,00E+00	1,37E-06	6,64E-05	0,00E+00	6,82E-07	1,36E-05	-2,19E-05	1,04E-04
EPter [Mole of N eq.]	4,38E-03	1,01E-04	1,71E-05	0,00E+00	0,00E+00	1,51E-05	7,37E-04	0,00E+00	1,29E-05	1,49E-04	-2,32E-04	1,10E-03
POFP [kg NMVOC eq.]	1,05E-03	1,95E-05	8,89E-06	0,00E+00	0,00E+00	3,17E-06	1,26E-04	0,00E+00	1,81E-06	3,38E-05	-7,98E-05	3,31E-04
ADPE [kg Sb eq.]	4,44E-05	1,24E-09	8,57E-11	0,00E+00	0,00E+00	7,89E-11	2,27E-09	0,00E+00	2,68E-11	4,94E-10	-1,17E-05	1,72E-04
ADPF [MJ]	9,83E+00	1,61E-01	1,24E-02	0,00E+00	0,00E+00	3,20E-02	2,95E-01	0,00E+00	3,70E-03	8,88E-02	-1,22E+00	5,78E-01
WDP [m^3 world equiv.]	4,99E-02	1,37E-04	6,45E-05	0,00E+00	0,00E+00	3,74E-06	2,52E-04	0,00E+00	2,12E-03	3,89E-04	-7,96E-03	5,52E-02

How to read scientific numbers:

e.g. 2,05E02 = 2,05 x 10^2 = 205

2,04E-01 = 2,04 x 10^{-1} = 0,204

*The End-of-Life modules present two scenarios, the impacts of Recycling and Landfill. The Tables onward only present the impacts from Landfill End-of-Life scenario.

Environmental performance

Table 6: Environmental impact indicator descriptions

Acronym	Unit	Indicator
GWPT	kg CO_2 eq.	Carbon footprint (Global Warming Potential) – total
GWPF	kg CO_2 eq.	Carbon footprint (Global Warming Potential) – fossil
GWPB	kg CO_2 eq.	Carbon footprint (Global Warming Potential) – biogenic
GWPLULUC	kg CO_2 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^3 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 carbon footprint (GWPF), cradle-to-grave, of the RA-N 'DIN' product is **7,31E-01kgCO2-eq (A1-C4)**, based on the average End-of-Life scenario. The carbon footprint (GWPF) of production of this product, cradle-to-gate, is **6,88E-01kgCO2-eq (A1-A3)**.

The carbon footprint (GWPF), cradle-to-grave, of the RA-N 'NF' product is **7,02E-01kgCO2-eq (A1-C4)**, based on the average End-of-Life scenario. The carbon footprint (GWPF) of production of this product, cradle-to-gate, is **6,61E-01kgCO2-eq (A1-A3)**.

Environmental performance

Table 7: Resource use

RA-N 'DIN'

	A1-A3	A4	A5	B6	C1	C2	C3	C4	D	E
PERE [MJ]	8,63E00	1,18E-02	9,71E-04			1,10E-04		8,27E-03	5,97E-01	
PERM [MJ]										
PERT [MJ]	8,63E00	1,18E-02	9,71E-04			1,10E-04		8,27E-03	5,97E-01	
PENRE [MJ]	9,82E00	1,71E-01	1,25E-02			3,34E-02		9,25E-02	6,12E-01	
PENRM [MJ]	4,12E-01									
PENRT [MJ]	1,02E01	1,71E-01	1,25E-02			3,34E-02		9,25E-02	6,12E-01	
SM [kg]	2,99E-01									
RSF [MJ]										
NRSF [MJ]										
FW [m3]	2,92E-03	1,36E-05	1,89E-06			1,77E-07		1,28E-05	5,66E-04	

RA-N 'NF'

	A1-A3	A4	A5	B6	C1	C2	C3	C4	D	E
PERE [MJ]	8,42E00	1,12E-02	5,58E-04			1,05E-04	2,05E-02	6,49E-04	-1,39E-01	
PERM [MJ]										
PERT [MJ]	8,42E00	1,12E-02	5,58E-04			1,05E-04	2,05E-02	6,49E-04	-1,39E-01	
PENRE [MJ]	9,43E00	1,62E-01	1,35E-02			3,20E-02	2,97E-01	3,70E-03	-1,22E00	
PENRM [MJ]	4,12E-01									
PENRT [MJ]	9,84E00	1,62E-01	1,35E-02			3,20E-02	2,97E-01	3,70E-03	-1,22E00	
SM [kg]	2,87E-01									
RSF [MJ]										
NRSF [MJ]										
FW [m3]	2,82E-03	1,29E-05	2,37E-06			1,69E-07	2,36E-05	4,97E-05	-2,55E-04	

Environmental performance

Table 8: 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^3	Net use of fresh water

Environmental performance

Table 9: Waste categories and output flows

RA-N 'DIN'

	A1-A3	A4	A5	B6	C1	C2	C3	C4	D	E
HWD [kg]	1,20E-08	9,05E-13	1,72E-12			2,30E-13		4,26E-12	-2,57E-07	
NHWD [kg]	2,31E-02	2,79E-05	8,16E-03			3,34E-06		2,60E-01	8,28E-03	
RWD [kg]	5,14E-04	3,18E-07	1,40E-07			3,58E-08		7,04E-07	7,36E-05	
CRU [kg]										
MFR [kg]										
MER [kg]										
EEE [MJ]	1,97E-03									
EET [MJ]										

RA-N 'NF'

	A1-A3	A4	A5	B6	C1	C2	C3	C4	D	E
HWD [kg]	1,17E-08	8,55E-13	5,58E-14			2,20E-13	1,57E-12	2,64E-13	-4,59E-07	
NHWD [kg]	2,26E-02	2,63E-05	1,26E-06			3,20E-06	4,83E-05	1,22E-04	1,35E-03	
RWD [kg]	4,93E-04	3,00E-07	3,20E-08			3,43E-08	5,50E-07	1,66E-07	-1,99E-05	
CRU [kg]										
MFR [kg]								2,42E-01		
MER [kg]										
EEE [MJ]	1,97E-03							4,86E-02		
EET [MJ]								8,64E-02		

Environmental performance

Table 10: 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 11: Additional indicators*

RA-N 'DIN'

	A1-A3	A4	A5	B6	C1	C2	C3	C4	D	E
PM [Disease incidences]	2,74E-08	1,48E-10	4,08E-11			1,86E-11		4,26E-10	1,32E-08	
IRP [kBq U235 eq.]	5,57E-02	4,80E-05	2,05E-05			5,07E-06		8,38E-05	2,70E-03	
ETPfw [CTUe]	3,78E00	1,21E-01	1,17E-02			2,42E-02		9,22E-01	1,43E00	
HTPc [CTUh]	1,84E-09	2,49E-12	4,91E-13			4,50E-13		5,07E-12	2,56E-11	
HTPnc [CTUh]	9,60E-09	1,39E-10	5,94E-11			1,95E-11		5,22E-10	8,55E-09	
SQP [Pt]	5,19E00	7,21E-02	1,09E-03			8,54E-05		1,10E-02	1,20E00	

RA-N 'NF'

	A1-A3	A4	A5	B6	C1	C2	C3	C4	D	E
PM [Disease incidences]	2,62E-08	1,40E-10	3,12E-11			1,79E-11	8,13E-10	1,61E-11	-1,14E-09	
IRP [kBq U235 eq.]	5,36E-02	4,53E-05	2,72E-06			4,85E-06	8,31E-05	2,72E-05	-1,76E-03	
ETPfw [CTUe]	3,64E00	1,14E-01	1,02E-02			2,32E-02	2,09E-01	1,98E-03	-5,56E-01	
HTPc [CTUh]	1,81E-09	2,35E-12	1,63E-13			4,31E-13	4,33E-12	1,60E-13	-8,01E-11	
HTPnc [CTUh]	9,29E-09	1,31E-10	6,77E-12			1,87E-11	2,66E-10	5,27E-12	-8,34E-10	
SQP [Pt]	5,00E00	6,82E-02	2,86E-03			8,18E-05	1,25E-01	8,31E-04	-9,08E-02	

Environmental performance

Table 12: 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 ionising 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.

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