ENGINEERING TOMORROW

Danfoss

Environmental **Product Declaration**

Pressure Switch, KP 1 – KP 7BS

EPD issued	2025-08-27
EPD expires	2030-08-27
EPD author	Danfoss Climate Solutions
EPD type	Cradle-to-gate with options
Declared unit	One product over its Reference Service Life
Products included	Reference product used Pressure switch KP7BS 060-120066 This EPD covers multiple products of KP Pressure switch. Full list of codes covered in Annex 1
Manufacturing Location	Grodzisk, Poland
Use Location	Sweden
Application	Refrigeration and Air conditioning system
Mass	0,487 kg without packaging 0,532 kg with packaging
Dimensions (H×W×D)	122x91x44 mm
Verification	[ ] External [X] Internal [ ] None
Produced to	Danfoss Product Category Rules (2022-09)
Internal independent verifier	Danfoss Power Electronics & Drives A/S

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 are 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 life cycle (Module 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 allows customers to calculate LCAs and produce EPDs for their 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 the use, maintenance, repair, replacement, refurbishment and operational energy and water use (B1-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

KP pressure switches are for use in refrigeration and air conditioning systems to give protection against excessively low suction pressure or excessively high discharge pressure. It is also used for starting and stopping refrigeration compressors and fans on air-cooled condensers. It can be connected directly to a single-phase AC motor of up to approx. 2 kW or installed in the control circuit of DC motors and large AC motors. KP pressure switches are fitted with a single pole double-throw (SPDT) switch. The position of the switch is determined by the pressure switch setting and the pressure at the connector. KP pressure switches are available in IP30, IP44 and IP55 enclosures.

Application for CAS Pressure switch,

- Refrigeration & Air Conditioning

See more information about FD (060-120066) on Danfoss Global Product Store

Figure 1: KP7BS Pressure Switch

The EPD covers all products in the KP Pressure switch product group referenced in Annex 1. Since the reference product 060-120066 is the biggest/heaviest in the referenced product group, it represents a conservative scenario. This assumption is based on the mass and material composition.

Reference Service Life

For the purpose of this EPD the reference service life (RSL) of the product is considered to be 5 years. However, with the correct maintenance, the lifetime of the product can reach over 5 years.

Intended market.

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

Product Description

Table 2: Product composition

Material	Mass (kg)	(%)
Metals	**0,421**	**86,5%**
Steel	0,374	76,8%
Copper and its alloys (Brass)	0,042	8,5%
Aluminium and its alloys	0,003	0,7%
Stainless steel	0,002	0,5%
Iron	0,0003	0,1%
Plastics	**0,058**	**11,8%**
Plastic with no GF	0,047	9,7%
Plastic with GF	0,009	1,8%
Rubbers	0,001	0,3%
Natural materials	**0,008**	**1,7%**
Paper and cardboard	0,008	1,7%
Other	**0,0001**	**0,02%**
Epoxy	0,0001	0,02%
Total product	**0,487**	**100,0%**
Paper and cardboard	0,045	100,0%
Packaging Total	**0,045**	**100,0%**
Total (Product + Packaging)	**0,532**	

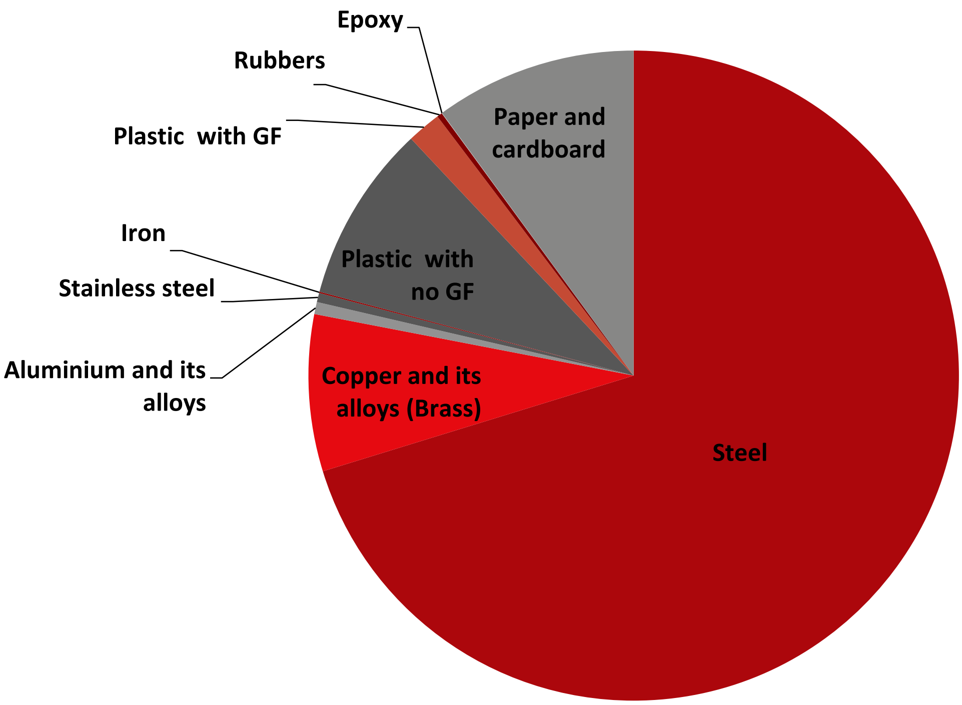

Figure 2: Material Composition Overview

Overview of LCA study

Data quality

The 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 software LCA for Experts (Sphera) database version 2025.1.

Allocation and cut-off criteria

The allocation is made following 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 fulfill the criteria for the exclusion of inputs and output criteria. No known material or energy flows were ignored, including those which fell below the limit of 1%. Accordingly, the total sum of input flows ignored is certainly less than 5% of the energy and mass applied.

Due to unavailable data sets for the process brass machining and stainless steel machining, it was assumed to be produced from a brass cast and stainless steel drawn of its material instead.

System boundaries

The results in this EPD are split into life cycle modules following EN 15804 (Figure 3): production (A1-A3), distribution (A4), (A5) installation, 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).

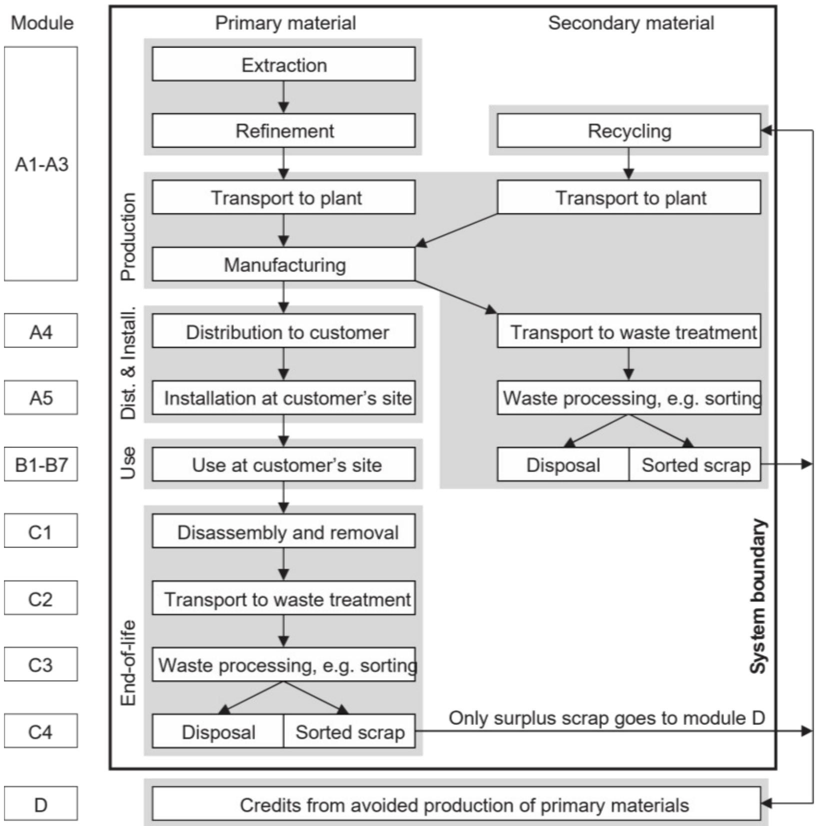

Figure 3: Modular structure used in this EPD (following EN 15804+A2)

Overview of LCA study

Product and packaging manufacture (A1-A3)

Final manufacturing occurs in the Grodzisk plant, Poland, data was collected for the year 2025. The facility is certified according to ISO 14001& ISO 9001. Where waste generated on-site is recyclable, it is separated and recycled. For further information, see here. All packaging materials can be safely recycled or incinerated if appropriate local facilities are available.

Table 3: Biogenic carbon content in the product and packaging

	Total (excluding recycling)
Biogenic carbon content in product [kg]	3,61E-03
Biogenic carbon content in accompanying packaging [kg]	2,08E-02

Note: 1 kg of biogenic carbon is equivalent to 44/12 kg of CO_2.

Shipping and installation (A4-A5)

Distribution is assumed to occur to the customer from the manufacturing location to the CDC (Central Distribution Center). The CDC is in Roedekro, Denmark. The assembly factory is in Grodzisk, Poland. Transportation at 1800 km distance by truck is assumed between the factory Poland Grodzisk to CDC 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 and there is no loss of product during installation. Energy use in handheld tools during installation is not included as it falls under the cut-off criteria.

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 and 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.

Overview of LCA study

This scenario illustrates best-case performance. It assumes a 100% collection rate and the 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, considering 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 unit of Pressure switch. Figure 4 presents the environmental impact of one Pressure switch 060-120066 across several environmental impact categories (following EN 15804+A2:2019) per life cycle stage, over its full 5-year life cycle, including Global Warming Potential.

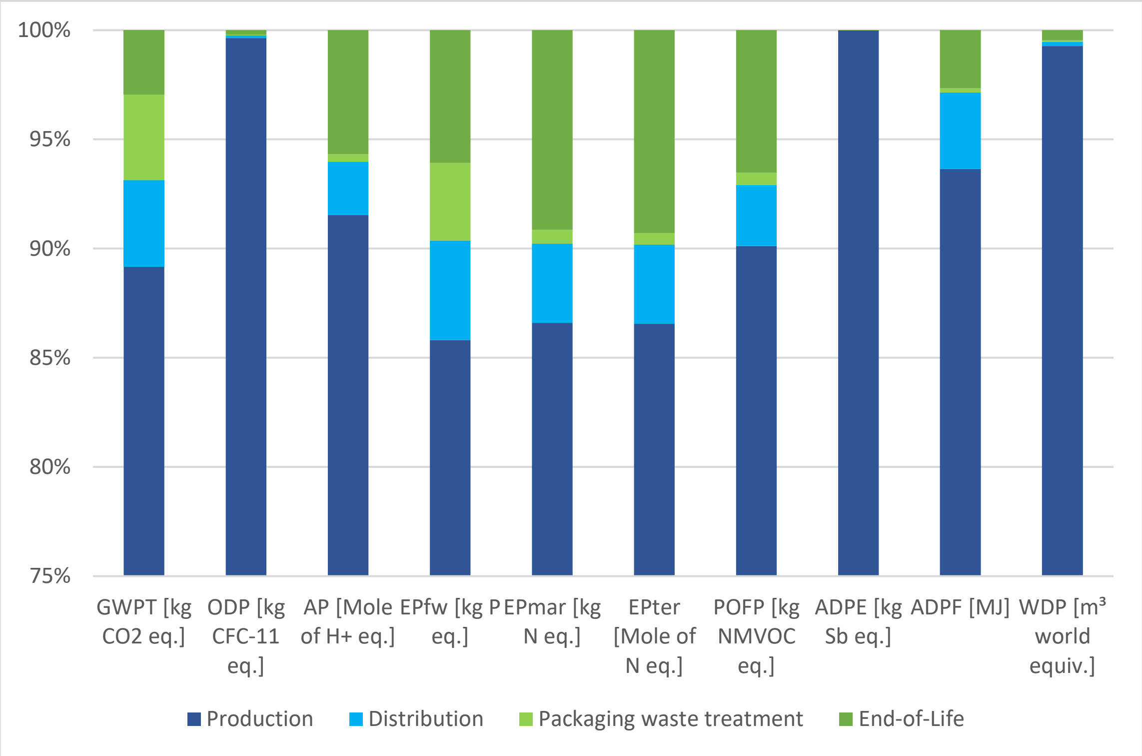

Figure 4: Breakdown of environmental impacts by life cycle stages (see Table 5 for descriptions of environmental impact indicators).

Table 4 Environmental Impact Indicators

	Production	Distribution	Packaging waste treatment	End-of-Life				(not included in Figure 4)
Life cycle stages based on EN 15804+A2	**A1-A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
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	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.]	2,13E+00	9,47E-02	9,39E-02	0,00E+00	5,59E-03	5,28E-02	1,20E-02	-3,04E-01
GWPF [kg CO2 eq.]	2,22E+00	9,37E-02	4,50E-03	0,00E+00	5,59E-03	5,23E-02	1,20E-02	-3,04E-01
GWPB [kg CO2 eq.]	-8,94E-02	0,00E+00	8,94E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWPLULUC [kg CO2 eq.]	2,61E-03	9,73E-04	3,65E-06	0,00E+00	1,37E-07	5,40E-04	2,90E-05	-2,40E-04
ODP [kg CFC-11 eq.]	1,36E-11	1,57E-14	4,04E-15	0,00E+00	6,61E-19	8,71E-15	2,02E-14	-4,30E-13
AP [Mole of H+ eq.]	6,77E-03	1,81E-04	2,49E-05	0,00E+00	7,92E-06	3,32E-04	8,09E-05	-7,99E-04
EPfw [kg P eq.]	4,79E-06	2,55E-07	1,98E-07	0,00E+00	1,23E-09	1,41E-07	1,97E-07	-1,28E-07
EPmar [kg N eq.]	1,86E-03	7,78E-05	1,34E-05	0,00E+00	3,08E-06	1,65E-04	2,84E-05	-1,74E-04
EPter [Mole of N eq.]	1,99E-02	8,33E-04	1,21E-04	0,00E+00	3,46E-05	1,79E-03	3,10E-04	-1,88E-03
POFP [kg NMVOC eq.]	5,31E-03	1,64E-04	3,36E-05	0,00E+00	7,32E-06	3,08E-04	6,86E-05	-6,06E-04
ADPE [kg Sb eq.]	7,89E-05	6,29E-09	5,25E-10	0,00E+00	2,01E-10	3,49E-09	6,21E-10	-1,36E-05
ADPF [MJ]	3,23E+01	1,21E+00	6,15E-02	0,00E+00	8,17E-02	6,72E-01	1,67E-01	-3,68E+00
WDP [m^3 world equiv.]	2,23E-01	4,32E-04	1,62E-04	0,00E+00	9,56E-06	2,40E-04	7,90E-04	-2,18E-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

Environmental performance

Table 5: 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 modules 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 (GWPT), cradle-to-grave, of the product is 2,39E+00 kg CO2-eq (A1-C4). The carbon footprint (GWPT) of production of this product, cradle-to-gate, is 2,13E+00 kg CO2-eq (A1-A3).

Environmental performance

Table 6: Resource use

	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
PERE [MJ]	1,04E+01	9,13E-02	4,20E-03	0,00E+00	0,00E+00	2,69E-04	5,07E-02	1,85E-02	4,05E-02
PERM [MJ]	1,26E-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
PERT [MJ]	1,05E+01	9,13E-02	4,20E-03	0,00E+00	0,00E+00	2,69E-04	5,07E-02	1,85E-02	4,05E-02
PENRE [MJ]	3,09E+01	1,21E+00	6,15E-02	0,00E+00	0,00E+00	8,17E-02	6,72E-01	1,67E-01	-3,68E+00
PENRM [MJ]	1,31E+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
PENRT [MJ]	3,23E+01	1,21E+00	6,15E-02	0,00E+00	0,00E+00	8,17E-02	6,72E-01	1,67E-01	-3,68E+00
SM [kg]	6,09E-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
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]	9,24E-03	4,51E-05	5,23E-06	0,00E+00	0,00E+00	4,32E-07	2,50E-05	2,33E-05	-6,96E-04

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^3	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]	1,20E-07	4,86E-11	1,02E-11	0,00E+00	0,00E+00	5,62E-13	2,70E-11	2,14E-11	-7,16E-07
NHWD [kg]	4,30E-02	1,69E-04	1,78E-02	0,00E+00	0,00E+00	8,18E-06	9,39E-05	4,57E-01	-8,69E-04
RWD [kg]	1,48E-03	2,29E-06	4,22E-07	0,00E+00	0,00E+00	8,75E-08	1,27E-06	1,11E-06	5,02E-06
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	4,55E-01	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]	1,21E-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]	8,44E-08	1,54E-09	1,82E-10	0,00E+00	0,00E+00	4,69E-11	2,18E-09	8,01E-10	-1,16E-08
IRP [kBq U235 eq.]	2,24E-01	3,28E-04	5,52E-05	0,00E+00	0,00E+00	1,24E-05	1,82E-04	1,28E-04	9,95E-04
ETPfw [CTUe]	1,24E01	1,58E00	4,59E-02	0,00E+00	0,00E+00	5,99E-02	8,74E-01	1,36E-01	-1,51E00
HTPc [CTUh]	4,81E-09	2,13E-11	8,07E-13	0,00E+00	0,00E+00	1,10E-12	1,18E-11	2,33E-12	-4,67E-10
HTPnc [CTUh]	1,14E-08	1,19E-09	5,70E-11	0,00E+00	0,00E+00	3,60E-11	6,60E-10	8,12E-11	-3,39E-10
SQP [Pt]	1,16E01	5,36E-01	7,67E-03	0,00E+00	0,00E+00	2,09E-04	2,97E-01	2,31E-02	1,63E-02
GWP-GHG [kg CO2 eq.]	2,22E+00	9,47E-02	0,00E+00	0,00E+00	0,00E+00	5,59E-03	0,00E+00	0,00E+00	0,00E+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 (freshwater)
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 experience with the indicator.

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

Environmental performance

Annex 1

How to read the table and determine the GWPT (Global Warming Potential Total)

1. Determine the code for identifying GWPT
2. Multiply the corresponding factor with the sum of values from A1-C4

<u>Example:</u>

Product Code : 060-519066

Conversion Factor : 0,662

GWPT A1-A3: **2,13E+00** KgCO2eq/ Pressure switch

Climate Change A1-A3 0,662 x 2,13E+00 KgCO2eq = **1,41E+00 KgCO2eq**

GWPT A1-C4: **2,39E+00** kg CO2-eq/ Pressure switch

Climate Change A1-C4 0,662 x 2,39E+00 KgCO2eq = **1,58E+00 KgCO2eq**

Codes	*Factors	GWPT (A1-A3)	GWPT (A1-C4)
060-120066	1,000	2,13E+00	2,39E+00
060-112066	0,729	1,55E+00	1,74E+00
060-440166	0,673	1,43E+00	1,61E+00
060-119066	0,665	1,42E+00	1,59E+00
060-519066	0,662	1,41E+00	1,58E+00

Codes	*Factors	GWPT (A1-A3)	GWPT (A1-C4)
060-119266	0,654	1,39E+00	1,56E+00
060-110166	0,647	1,38E+00	1,55E+00
060-119166	0,632	1,35E+00	1,51E+00
060-519166	0,620	1,32E+00	1,48E+00
060-110366	0,617	1,31E+00	1,47E+00

*Scaling factors were calculated by dividing the weight of each respective product by the weight of the heaviest item in the group.

References

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