ENGINEERING TOMORROW

Danfoss

Environmental **Product Declaration**

Actuator NovoCon L and NovoCon XL

EPD issued	2025-08-08
EPD expires	2030-08-08
EPD author	Danfoss Climate Solutions A/S
EPD type	Cradle-to-gate with options
Declared unit	One product over its Reference Service Life
Product included	NovoCon L DN 125-150, SD (003Z8562)
Products covered by EPD	See Annex 1
Manufacturing Location	Ljubljana, Slovenia
Use Location	European Union
Application	HVAC systems
Mass	9,047 kg without packaging 9,810 kg with packaging
Dimensions (H×W×D)	191 x 186 x 353 mm without packaging
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 is aligned with 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-gate with options' and includes all relevant modules: production (A1-A3), shipping (A4) and installation (A5); operational energy use (B6); 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	**X**	MNR	**X**	**X**	**X**	**X**	**X**

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

Product Description

The product covered by this EPD is representative of NovoCon L and NovoCon XL actuator. The production location is the Danfoss plant in Ljubljana, Slovenia. See more information on Danfoss Product Store.

The NovoCon L and NovoCon XL are digital, programmable actuators designed for use with Danfoss pressure independent control valves (PICVs) in HVAC systems. It provides high-precision control of flow and temperature in large commercial buildings. The actuator integrates seamlessly with BACnet or Modbus building automation systems, offering advanced diagnostics, remote commissioning, and real-time performance data. Ideal for systems with chillers, larger heat exchangers and extensive hydraulic circuits.

The NovoCon XL is a high force digital actuator developed for larger valves and more demanding HVAC applications.

Figure 1: NovoCon L-SU/SD and NovoCon XL actuator

The NovoCon L actuator can be equipped with a built-in safety function for closing or opening valves. This feature enables the actuator to automatically move to the upper or lower end of its stroke without an external power supply, using an integrated mechanical power spring under specific operating conditions.

Product Description

The NovoCon XL actuator differs from the NovoCon L primarily in the length of the yoke used to attach the actuator to the valve and in the stroke length. The actuator's operating mechanism, housing, gears, spindle, and APCB are identical in all versions covered in this document with minor differences in component mass and shape in the variant with the built-in power spring.

An LCA (Life Cycle Assessment) calculation has been prepared for three product codes. (See Annex 1, Table 12) The document states that this version of the actuator, which includes a built-in safety function, consists of components made from the same materials, differing only in shape. The mass of the components does not vary by more than 5%. The LCA was calculated based on the heavier of the two versions. Therefore, the document uses the same calculated values for both the NovoCon L-SD (003Z8562) and NovoCon L-SU (003Z8561) actuator versions.

For the purposes of this calculation, the NovoCon L-SD (003Z8562) actuator with the integrated safety function (power spring; Spring Down)) is used, as it represents the heaviest product configuration by mass and GWPT value. For other product variants covered by this document, a scalar factor is applied accordingly. For each 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 10 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)	%
Metals	**8,331**	**92,08%**
Steel (excl, stainless steel)	5,391	59,58%
Stainless steel	1,041	11,51%
Aluminium and its alloys	1,427	15,77%
Iron	0,404	4,47%
Copper and its alloys (Brass)	0,068	0,75%
Plastics & Rubbers	**0,478**	**5,28%**
Plastic with no GF	0,431	4,76%
Plastic with GF	0,045	0,49%
Rubbers	0,00198	0,02%
Natural materials	**0,0138**	**0,15%**
Paper and cardboard	0,01380	0,15%
Electrical/electronic	**0,213**	**2,35%**
PCBA	0,0999	1,10%
Motor	0,1131	1,25%
Other materials	**0,012**	**0,13%**
Grease and Oil	0,012	0,13%
Product Total	**9,047**	**100,00%**
Packaging - Paper and cardboard	0,763	100,00%
Packaging Total	**0,763**	**100,00%**
Total (Product + Packaging)	**9,810**	

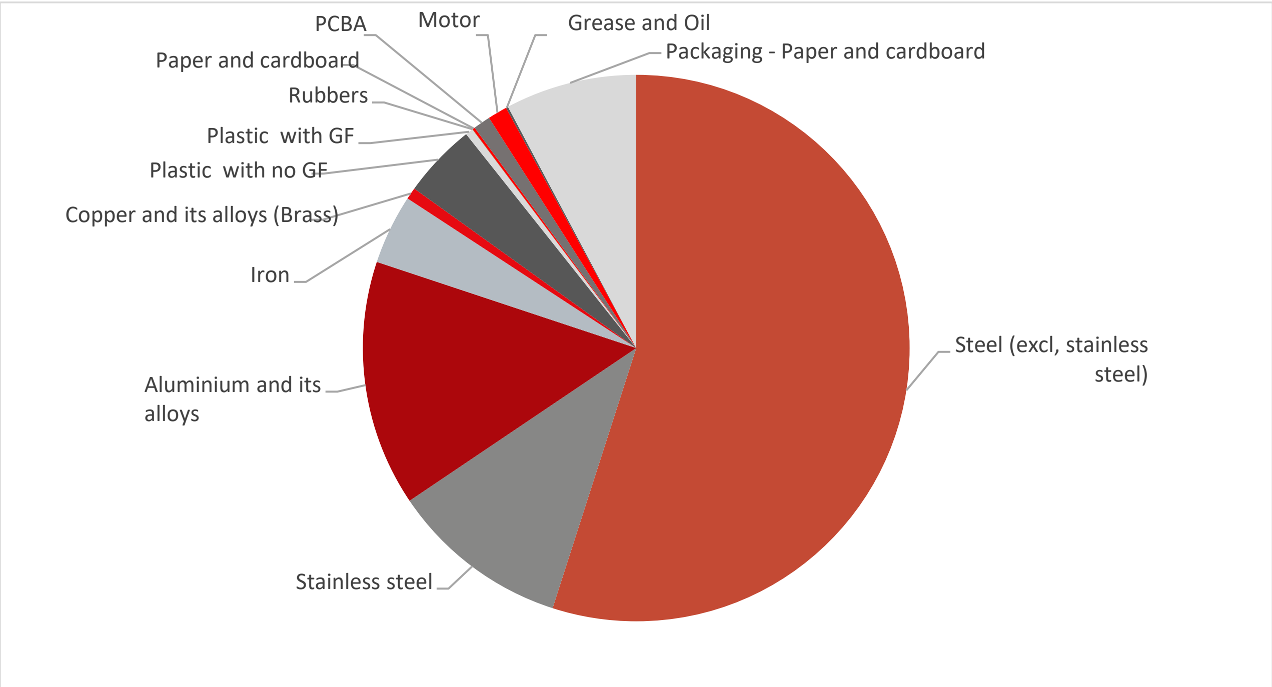

Figure 2: Material Composition Overview

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.

Assumptions:

- The electronic components database used for the LCA calculation does not include all possible options for selection. For components where it was not possible to select the exact housing or component type, the most similar available alternative was chosen. The component was entered into the calculation using the weight specified in the technical documentation. When adding a component to the calculation, either its size or weight was adjusted, depending on the component type and the calculation requirements. Further details are provided in the calculation data file.

Cut off:

- Fuses, as electronic components on the PCB, are excluded from the LCA calculation due to limitations in the Sphera database. Their mass is negligible compared to the total mass of the product.

Substitutions:

- Grease has been substituted with oil due to limitations in the Sphera database.
- TPE material has been substituted with TPU material due to limitations in the Shera database.
- Due to unavailability of datasets for the PA6T/XT-GF35 material, it has been replaced with PA66GF material with an appropriate glass fibre content.

Overview of LCA study

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), 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).

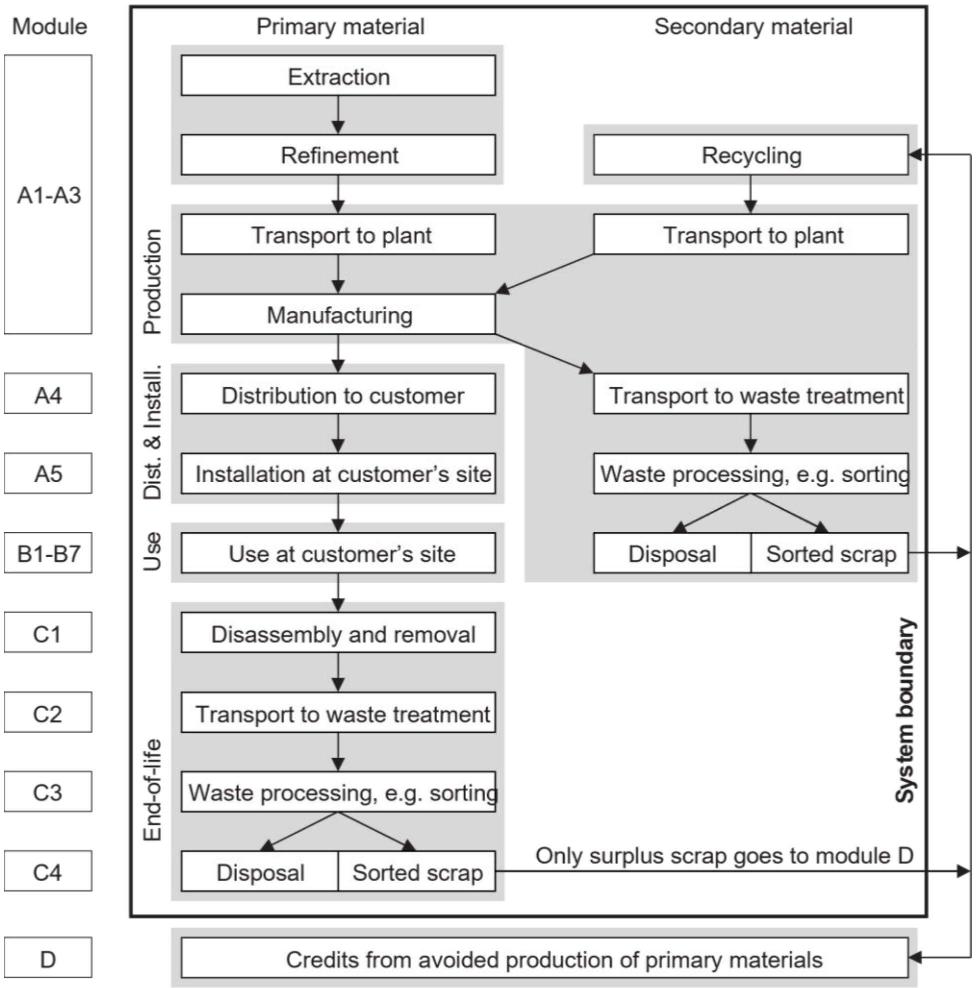

Figure 3: Modular structure used in this EPD (following EN 15804+A2)

Overview of LCA study

Product and packaging manufacture (A1-A3)

Final manufacturing occurs in the Ljubljana plant, Slovenia. 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 1. All packaging materials can be safely recycled or incinerated if appropriate local facilities are available. Production data was collected for the year 2024.

The component suppliers' production locations are divided based on the type of product into suppliers of mechanical parts, documentation, packaging and electronics components. The calculation takes into account that, based on the total weight of the components, the majority of the mechanical components are manufactured in the European Union. The transport of the mechanical components includes truck transport and sea transport. The production of the product documentation is in Denmark, while the production of packaging is in Slovenia. The location of the supplier of the assembled printed circuit board (APCB) and electronic components is in Poland. For all other types of the parts, road transport by truck is considered in the LCA calculation.

A mass allocation method was used to estimate the electrical energy used to produce one unit of the NovoCon L actuator. The total amount of electricity consumed is divided by the actual number of products produced. In the final assembly, 1,06 kWh of electricity is consumed to produce one product.

In the LCA calculation for the energy consumed in the product's final production, the value for the carbon footprint of the produces electricity in Slovenia is taken into account.

Table 3: Biogenic carbon content in product and packaging

	Total (excluding recycling)
Biogenic carbon content in product [kg]	5,93E-03
Biogenic carbon content in accompanying packaging [kg]	3,28E-01

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

Shipping and installation (A4-A5)

Distribution is assumed to occur to customers within the European Union. Transportation at 3371 km distance by truck is assumed between the factory and the final customer. The calculation accounts for transport by truck from the final production site in Ljubljana, Slovenia to the central warehouse for finished product in Rodekro, Denmark, a distance of 1371km. Additionally, the calculation includes the standard transport distance to markets within the European Union, which is 2000 km.

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 scope of this study is targeted for the European Union market; therefore, the product under study is sold and used in the European Union.

The calculation of electricity consumption for actuator operation over its lifetime includes two scenarios demonstrating the use of the actuator to control two different types of valves. The first example involves the use of the NovoCon L actuator to control a control valve (CV). The second example shows the NovoCon L actuator used to control a pressure-independent control valve (PICV).

In determining the electricity consumed during the actuator's lifetime, the measured actuator travel values for controlling both valve types over one winter season are taken into account. The calendar year is divided into the heating season and the cooling season. The LCA calculation assumes that the total operating time and total standby time of the actuator are the same in both seasons. It is also assumed that the actuator operates 365 days per year. Measurements for both valve types were conducted at the same time under identical operating conditions.

Based on the actuator's travel measured over one calendar year and considering the minimum actuator speed, the total operating time and total standby time over the actuator's expected lifetime are calculated.

For a control valve (CV), the actuator's movement changes the flow rate, but the actual flow also depends on system pressure. As a result, regulation is less stable unless the pressure remains constant. When controlling CVs, the actuator performs more frequent travel due to system pressure fluctuations, which cause variations in the medium flow rate as it adjusts to the preset control parameters.

For a pressure independent control valve (PICV), the actuator directly controls the flow, while the valve's internal mechanism compensates for pressure changes. This results in more stable regulation. Using an actuator to control a PICV requires less travel, which leads to shorter total travel over the actuator's lifetime and consequently lower energy consumption.

The electrical energy consumption of the actuator during its lifetime depends on the power required during active operation and the duration of that operation, as well as the power consumed in standby mode and the total standby time.

All values in this EPD document are calculated and presented based on the worst-case scenario for regulating the control valve (CV), for which a longer actuator operating time is expected.

The major limitation of the impact calculations for the use phase is that the electricity grid mix in use is assumed to remain at the same carbon intensity over time. Following the plans for the decarbonization of the grid across EU, the environmental impacts are expected to decrease over time within the course of the next 10 years. However, as decarbonization will occur in the future and as the pace of decarbonization is uncertain, the use of the emission intensity of today's grid should prove to be a "worst-case", conservative assumption.

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).

Overview of LCA study

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 NovoCon L actuator. Figure 4 presents the environmental impact of the NovoCon L actuator 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.

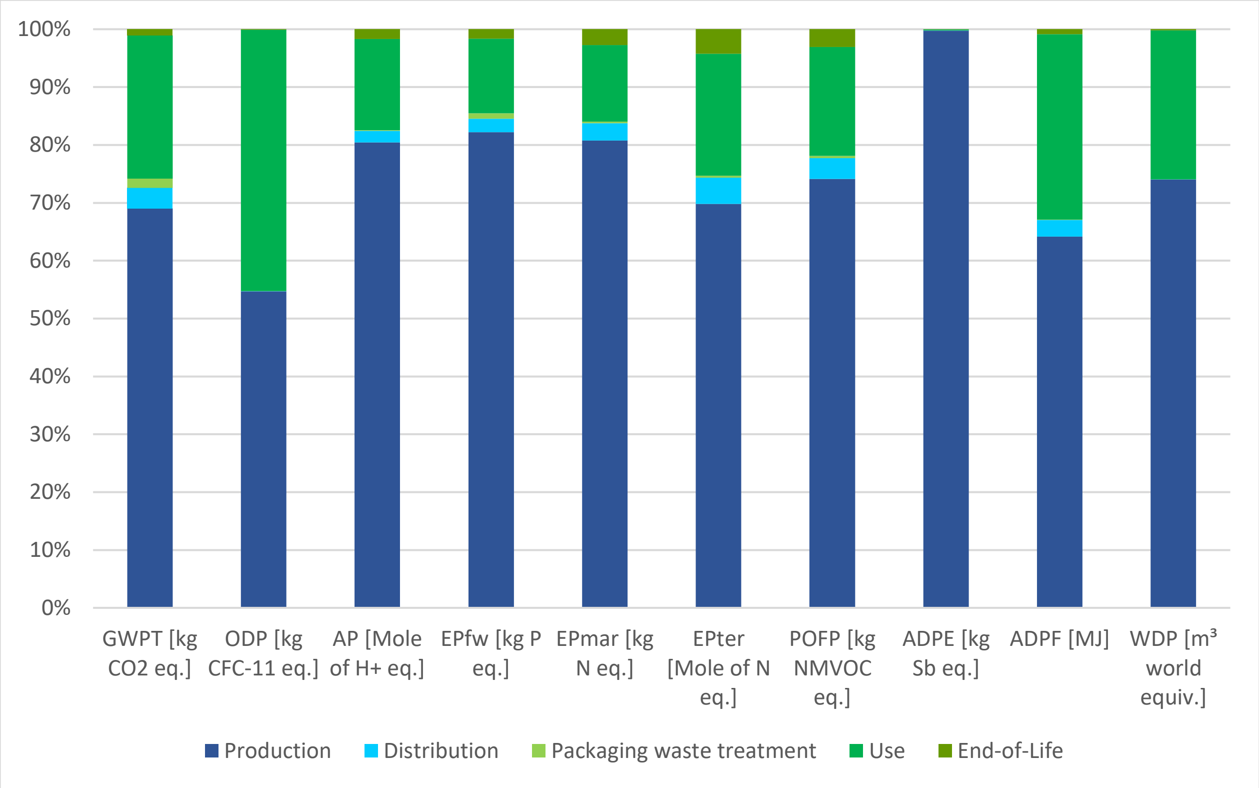

Figure 4: Breakdown of environmental impacts by life cycle stages (Average of Landfill and Recycling End-of-Life scenario/only Landfill scenario) See Table 4 and Table 5 for descriptions of environmental impact indicators).

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 / **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.]	5,61E+01	2,89E+00	1,30E+00	2,01E+01	0,00E+00	9,13E-02	5,91E-01	2,11E-01	-1,82E+01
GWPF [kg CO2 eq.]	5,72E+01	2,86E+00	7,11E-02	2,00E+01	0,00E+00	9,13E-02	5,85E-01	2,11E-01	-1,82E+01
GWPB [kg CO2 eq.]	-1,22E+00	0,00E+00	1,22E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
GWPLULUC [kg CO2 eq.]	1,02E-01	2,97E-02	5,77E-05	6,61E-02	0,00E+00	2,23E-06	5,88E-03	3,36E-04	-1,46E-02
ODP [kg CFC-11 eq.]	5,52E-10	4,78E-13	6,39E-14	4,56E-10	0,00E+00	1,08E-17	5,91E-13	2,35E-13	-6,18E-11
AP [Mole of H+ eq.]	2,24E-01	5,52E-03	3,94E-04	4,39E-02	0,00E+00	1,29E-04	3,62E-03	9,55E-04	-8,25E-02
EPfw [kg P eq.]	2,75E-04	7,77E-06	3,12E-06	4,30E-05	0,00E+00	2,00E-08	1,57E-06	3,96E-06	-1,20E-05
EPmar [kg N eq.]	6,42E-02	2,37E-03	2,12E-04	1,05E-02	0,00E+00	5,02E-05	1,79E-03	3,41E-04	-1,16E-02
EPter [Mole of N eq.]	3,91E-01	2,54E-02	1,92E-03	1,18E-01	0,00E+00	5,65E-04	1,94E-02	3,73E-03	-1,25E-01
POFP [kg NMVOC eq.]	1,03E-01	4,99E-03	5,31E-04	2,61E-02	0,00E+00	1,19E-04	3,35E-03	8,25E-04	-3,84E-02
ADPE [kg Sb eq.]	1,95E-03	1,92E-07	8,29E-09	4,16E-06	0,00E+00	3,29E-09	4,21E-08	7,11E-09	-6,44E-04
ADPF [MJ]	8,17E+02	3,69E+01	9,71E-01	4,08E+02	0,00E+00	1,33E+00	7,68E+00	1,93E+00	-2,27E+02
WDP [m^3 world equiv.]	1,42E+01	1,32E-02	2,56E-03	4,94E+00	0,00E+00	1,56E-04	7,96E-03	2,61E-02	-1,90E+00

How to read scientific numbers:

e.g. 2,05E02 = $2{,}05 \times 10^{2}$ = 205

2,04E-01 = $2{,}04 \times 10^{-1}$ = 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 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 **8,12E+01 kg CO2-eq** (A1-C4), based on the baseline use phase scenario. The carbon footprint of production of this product, cradle-to-gate, is **5,61E+01 kg CO2-eq** (A1-A3).

Environmental performance

Table 6: Resource use

	A1-A3	A4	A5	B6	C1	C2	C3	C4	D
PERE [MJ]	3,43E+02	2,78E+00	6,64E-02	2,79E+02	0,00E+00	4,39E-03	8,49E-01	2,25E-01	-4,14E+01
PERM [MJ]	2,06E-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]	3,43E+02	2,78E+00	6,64E-02	2,79E+02	0,00E+00	4,39E-03	8,49E-01	2,25E-01	-4,14E+01
PENRE [MJ]	8,02E+02	3,69E+01	9,71E-01	4,08E+02	0,00E+00	1,33E+00	7,68E+00	1,93E+00	-2,27E+02
PENRM [MJ]	1,48E+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]	8,17E+02	3,69E+01	9,71E-01	4,08E+02	0,00E+00	1,33E+00	7,68E+00	1,93E+00	-2,27E+02
SM [kg]	8,58E-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
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]	4,62E-01	1,38E-03	8,27E-05	2,16E-01	0,00E+00	7,06E-06	5,04E-04	6,66E-04	-1,29E-01

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]	9,49E-07	1,48E-09	1,61E-10	5,32E-07	0,00E+00	9,17E-12	8,70E-10	2,78E-10	-3,13E-04
NHWD [kg]	5,48E+00	5,16E-03	2,81E-01	3,16E-01	0,00E+00	1,33E-04	1,36E-03	5,03E+00	-1,53E+00
RWD [kg]	6,12E-02	6,97E-05	6,67E-06	6,42E-02	0,00E+00	1,43E-06	8,36E-05	1,57E-05	-8,58E-03
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	4,90E+00	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]	7,99E-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]	2,65E-06	4,70E-08	2,88E-09	3,63E-07	0,00E+00	7,66E-10	2,39E-08	9,54E-09	-1,20E-06
IRP [kBq U235 eq.]	9,42E+00	1,00E-02	8,72E-04	1,06E+01	0,00E+00	2,02E-04	1,35E-02	1,91E-03	-1,71E+00
ETPfw [CTUe]	4,28E+02	4,80E+01	7,25E-01	6,91E+01	0,00E+00	9,77E-01	9,48E+00	1,71E+00	-9,56E+01
HTPc [CTUh]	1,44E-07	6,48E-10	1,27E-11	6,49E-09	0,00E+00	1,80E-11	1,34E-10	3,16E-11	-5,50E-08
HTPnc [CTUh]	3,92E-07	3,62E-08	9,01E-10	1,37E-07	0,00E+00	5,87E-10	7,25E-09	1,17E-09	-5,74E-08
SQP [Pt]	2,75E+02	1,63E+01	1,21E-01	1,64E+02	0,00E+00	3,41E-03	3,38E+00	2,76E-01	-6,69E+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 1: The product codes of all products covered in this EPD

The EPD results are presented for the reference product code NovoCon L, DN 125-150, Spring Down (003Z8562). When calculating the energy consumption (Module B6) over the lifetime of the actuator, control valve (CV) control is taken into account. This scenario represents the worst-case scenario for valve control when comparing control valve (CV) control with the pressure independent control valve control.

For the purposes of the LCA calculation, the NovoCon L, SD (003Z8562) actuator with the integrated safety function (power spring) is used, as it represents the heaviest product configuration by mass and GWPT value. Since the reference product NovoCon L-SD (003Z8562) is the largest in this product portfolio, therefore representing a conservative scenario. For other product variants covered by this document, a scalar factor is applied accordingly. For product code listed in the Table 12 the 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.

Table 12: NovoCon L and NovoCon XL product codes, covered by this EPD

Product code	Product Description	Use Phase Scenario No. / Valve type	Scale Factor	GWPT A1-A3 [KgCO$_2$eq]	GWPT A1-C4 [KgCO$_2$eq]
003Z8560	NovoCon L, DN 125–DN 150	Scenario 1 / CV	0,846	4,75E+01	6,87E+01
		Scenario 2 / PICV	0,840	4,71E+01	6,82E+01
003Z8561	NovoCon L, DN 125–DN 150, SU	Scenario 1 / CV	1,000	5,61E+01	8,12E+01
		Scenario 2 / PICV	0,989	5,55E+01	8,03E+01
003Z8562	NovoCon L, DN 125–DN 150, SD	Scenario 1 / CV	1,000	5,61E+01	8,12E+01
		Scenario 2 / PICV	0,989	5,55E+01	8,03E+01
003Z8563	NovoCon XL, DN 200–DN 250	Scenario 1 / CV	0,891	5,00E+01	7,24E+01
		Scenario 2 / PICV	0,881	4,94E+01	7,15E+01

Note:

CV - Control Valve
PICV – Pressure Independent Control Valve
SU – spring up
SD- spring down

To calculate the actual GWPT of purchased products covered by this EPD, multiply the GWPT from this EPD by the factor (see Table 12) corresponding to the purchased product's sales code. You can use this factor to calculate other indicators as well.

Annex

Example:
Product code: **003Z8560**
Scale factor for Scenario 2 / PICV (Table 12): **0,840**
Reference GWPT (A1-C4) (003Z8562): **8,12E+01** kg CO2-eq

GWPT (A1-C4) (Product code) = Scale factor x GWPT (A1-C4)
GWPT (A1-C4) (003Z8560): **0,840** x **8,12E+01** kg CO2-eq = **6,82E+01** kg CO2-eq
kg CO2-eq

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