Environmental Product Declaration

as per ISO 14025 and EN 15804

Owner of the declaration:	Furhoffs Rostfria
Publisher:	Kiwa-Ecobility Experts
Programme operator:	Kiwa-Ecobility Experts
Registration number:	EPD-Kiwa-EE-000344-EN
Issue date:	02.11.2023
Valid to:	02.11.2028

Furhoffs Rostfria AB

Stainless steel floor drains

Furo 165 (includes Furo 152, Furo 140)

1. General information

AB Furhoffs Rostfria

Programme operator:
Kiwa-Ecobility Experts
Voltastr. 5
13355 Berlin
Germany

Registration number:
EPD-Kiwa-EE-000344-EN

This declaration is based on the Product Category Rules:
PCR B for construction steel products (construction steel products; draft; 2020-03-13)

Issue date:
02.11.2023

Valid to:
02.11.2028

Frank Huppertz
(Head of Kiwa-Ecobility Experts)

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(Chairman of the independent expert committee – Kiwa-Ecobility Experts)

Stainless steel floor drains

Owner of the declaration:
AB FURHOFFS ROSTFRIA
Haganders väg 2
541 34 Skövde
Sweden

Declared product / declared unit:
1 piece of floor drain

Scope:
The EPD type: Cradle to gate with modules C1–C4 and module D
The floor drains are made of stainless steel. Furhoffs productionsite is in Skövde.
This specific EPD refers to the worst case product Furo 165 and includes Furo 152 and Furo 140.
Kiwa-Ecobility Experts assumes no liability for manufacturer's information, LCA data and evidence.

Verification:
The European standard EN 15804+A2:2019 serves as the core PCR.

Independent verification of the declaration and data according to ISO 14025:2006.

☐internal ☒external

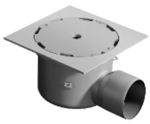
Elisabet Amat Guasch
(External verifier)

2. Product

2.1 Product description

All of the declared floor drains are produced of stainless steel. They are adjusted for being set in cement floors or wooden beam floors. The floor drains can be installed flexible in all different kinds of flooring. They are applied at wet rooms in public baths and swimmingpools, kitchen and restaurants, but also industrial buildings with varying exposure.
This EPD refers to a worst case product, which is Furo 165. It's the worst case of a product group consisting of Furo 152, Furo 140 and Furo 165.
These products were grouped together since they are similar in material- and application.

Table 1: Declared floor drains product group

Product group according to Furo 165	Weight (kg)	Application
Furo 152 	Ca. 22.5	Stainless floor sandtrap for industry and workshops
 Furo 140	Ca. 17.4	Stainless floor drain for areas with higher loads like industry, workshops, garage and parking garage
 Furo 165 (worst case)	Ca. 30.7	Stainless floor drain for high hygienic demands of the food industry

2.2 Application

This product group Furo 165 is available in three different types to cover several application possibilities.

2.3 Technical data

Furhoffs floor drains are available in different designs (models) and sizes. Weight and application areas of the individual models can be found in table 1. The declared products have similarities since they are made of the same materials. The main difference is weight/size and accessories, for example grating. These differences are based on the fact, that there are floor drains for specific floor types, applications, flow rates and loading classes.

Table 2: Characteristics of Furo 165

Characteristic (Furo165)	Unit	Value
EN 1.4301 Stainless Steel alt. EN 1.4404 Stainless Steel	-	-
SS-EN 1253-1, Flow rate, outlet side size 75	l/s	5,0
SS-EN 1253-1, Flow rate, outlet side size 110	l/s	5,6
SS-EN 1253-1, Flow rate, outlet bottom size 75	l/s	5,5
SS-EN 1253-1, Flow rate, outlet bottom size 110	l/s	7,7
SS-EN 1253-1, Loading class	-	L15, M125

*The loading class L15 refers to light traffic without forklifts, according to SS-EN 1253-1 with 10 kN load. The loading class M125 refers to heavy traffic with lorrys and trucks, according to SS-EN 1253-1 with 85 kN load.

2.4 Placing on the market/ Application rules

The main markets are Sweden, Norway and to a less extent Finland.

The stainless steel floor drains are manufactured according to the requirements of the harmonized standard SS-EN 1253-1:2015 Gullies for buildings - Part 1: Trapped floor gullies with a depth water seal of at least 50 mm.

Furo 140 and 152 are fitted by parts from Furo 008 which also has a type approval.

2.5 Base materials / Ancillary materials

Table 3: Raw material for Furo 165

Raw material Furo 165	Unit	Value
Base material		
Stainless steel	%	99,70%
EPDM rubber	%	0,15%
Plastic, polyethylene	%	0,15%
Total base material	kg	30,54
Ancillary material		
Water	%	64,43%
Cutting gas	%	32,54%
Welding gas	%	1,60%
Pickling liquid	%	1,42%
Total ancillary material	kg	12,01

2.6 Manufacturing

The manufacturing of the stainless steel floor drains contains the following processes:

- Delivery of raw materials
- Cutting
- Shaping
- Welding
- Pickling
- Blasting
- Assembling
- Packaging

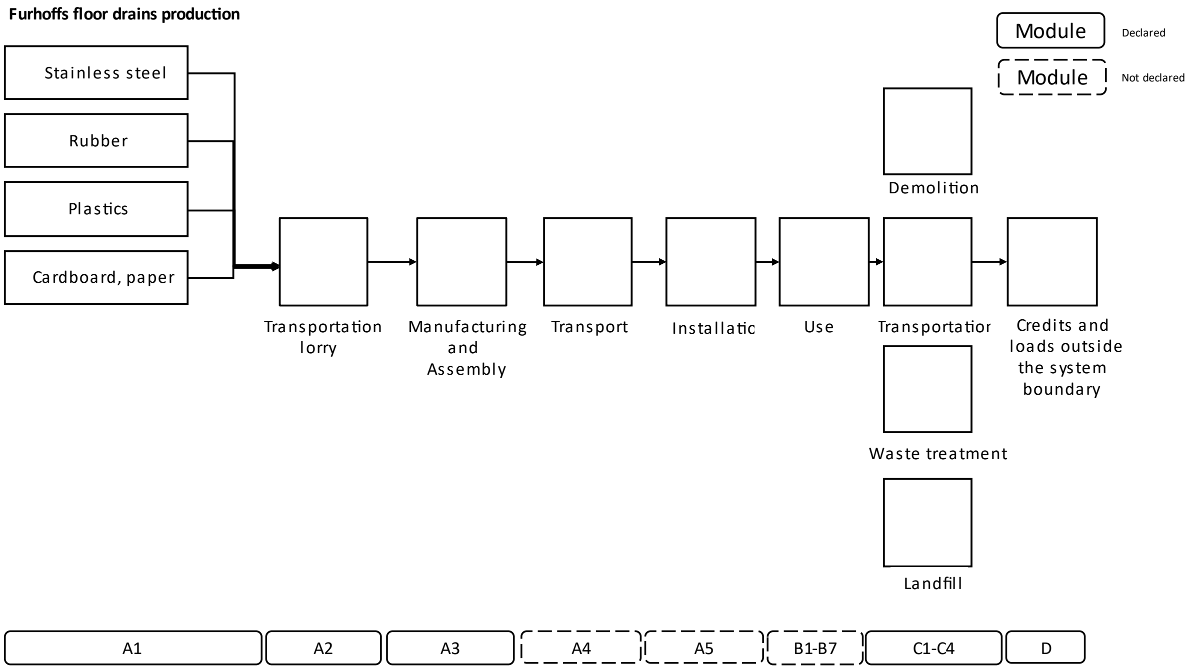


Figure 1: Graphic schematic process flow diagram for the Furhoffs production and module declared

2.7 Packaging

For delivery, the drains are wrapped into plastics, packed in cardboard boxes and transported on europallets.

2.8 Reference Service Life (RSL)

The lifetime of stainless floor drains will be limited by the service life of the construction. The stainless steel products are specified for an intended service life of at least 50 years under the respective loading classes / environmental conditions.

2.9 Other Information

For further information on this product please visit the webpage under the following link: www.furhoffs.com

3. LCA: Calculation rules

3.1 Declared unit

One piece of floor drain is chosen as the declared unit.

Table 4: Declared unit and conversion factor for Furo 165

Product Furo 165	Unit	Value
Declared Unit	piece	1
Unit weight	kg	30,54
Conversion factor to 1 piece	kg	0,032646

3.2 System boundary

This EPD was created in accordance with EN 15804 requirements and includes the production stage and the End-of-life stage. According to EN 15804 this corresponds to product phases A1-A3, C1-C4 and D (EPD type "Cradle to gate, modules C1-C4 and module D" (A1-A3, C, D).

In a typical steel products manufacturing process, the individual components such as stainless steel plates, welding consumables, pickling materials, and other ancillary materials are delivered to the production facility. All the raw materials are mainly delivered by inland transport by truck. Until the materials are actually used in production, they are stored in the warehouse.

All inputs, including raw materials, primary products, energy, and ancillary materials as well as the accumulated waste are considered in the assessment. The use of the final product is not within the manufacturer's sphere of influence. Therefore, modules B1-7 have not been considered.

Production stage

A1: This stage considers the extraction and processing of raw materials as well as energy consumption. All installed raw materials of the products were analyzed, and the masses were determined. Steel material is given as a sum of different stainless steel raw materials.

A2: The raw materials are transported to the manufacturing plant. In this case, the model includes relevant transportation of each raw material. Supplier information regarding the transport distances and vehicle type were provided by Furhoffs Rostfria or chosen from relevant market profiles.

A3: This stage includes manufacturing of the products and packing. It also considers the energy consumption and waste generated at the manufacturing site. Energy and ancillary materials per declared unit refer to an average share. Energy comes from non-fossile hydropower.

Module A4: not declared

Module A5: not declared

Modules B1 to B7: not declared. In normal use scenario, it is assumed that no maintenance (B2), repair (B3), replacement (B4) and refurbishment (B5) is needed.

Module C1-C4: The modules C1 to C4 contain the end of life stage of the products: demolition/de-construction, trans-port, waste prosessing and disposal.

Module D: Module D considers the reuse, recovery or recycling potential.

3.3 Estimates and assumptions

Energy and ancillary materials per declared unit refer to an average share of the Furhoffs yearly revenue considering the declared floor drains.

3.4 Cut-off Criteria

All material flows that contribute to more than 1% of the total mass, energy or environmental impact of the system have been considered in the LCA. It can be assumed that the neglected processes in total contributed less than 5% to the considered impact categories.
The production of the machines, plants and other infrastructure required to produce the stainless steel products were not taken into account in the LCA.

3.5 Period under review and Geographical reference area

All process-specific data was collected for the operating year 2022. The quantities of raw and auxiliary materials as well as energy consumption have been recorded over the entire operating year 2022. The geographical reference area is Sweden.

3.6 Data quality

Overall, the quality of the data can be considered as good. In the operating data survey all relevant process-specific data could be collected. The data relating to the manufacturing phase of the stainless drains are determined by Furhoffs Rostfria and refers to the production site in Skövde.

Background data was taken from the Ecoinvent 3.6 database. The database is regularly checked and thus complies with the requirements of ISO 14040/44 (background data not older than 10 years). The background data meets the requirements of EN 15804. The quantities of raw materials, consumables and supplies used as well as the energy consumption have been recorded and averaged over the entire year of operation.

The general rule has been that specific data from specific production processes or average data derived from specific processes must be given priority when calculating an EPD or Life Cycle Assessment. Data for processes that the manufacturer cannot influence or choose, were backed up with generic data.

3.7 Allocation

There are no co-products in the raw material supply phase, so no allocation methods were used at this stage. There are no allocations during the manufacturing phase in the production facility.

3.8 Comparability

In principle, a comparison or assessment of the environmental impacts of different products is only possible if they have been prepared in accordance with EN 15804. For the evaluation of the comparability, the following aspects have to be considered in particular: PCR used , functional or declared unit, geographical reference, definition of the system boundary, declared modules, data selection (primary or secondary data, background database, data quality), scenarios used for use and disposal phases, and the life cycle inventory (data collection, calculation methods, allocations, validity period). PCRs and general program instructions of different EPDs programs may differ. A comparability needs to be evaluated. For further guidance see EN 15804+A2 (5.3 Comparability of EPD for construction products) and ISO 14025 (6.7.2 Requirements for comparability).

4. LCA: Scenarios and additional technical information

Module A3:
Use of water is declared only for technological process (pickling); no waste scenario is assumed as no wastewater occurs. For the pickling liquid there's been a waste scenario assumed. The generated production waste concerning the ancillary material is stated per declared unit. For raw material only certain inputs cause production waste. These inputs are declared in kg.

Module C1-C4:
The floor drains are assumed to be disposed of in Northern Europe. The floor drains are assumed to be dismantled using hand tools (C1) and transported 50 km to a local recycling (C2).
The product is disposed according to the selected waste scenario: recovery of materials, recycling 94%, reuse 5 % (C3). The fluff sorted from the shredded metal is landfill by 1% (C4).

Module D:
The recycled metals are credited an avoided production of primary steel.

5. LCA: Results

The following tables show the results of the impact assessment indicators, resource use, waste and other output streams. The results presented here refer to the declared average product.

Disclaimer on ADP-e, ADP-f, WDP, ETP-fw, HTP-c, HTP-nc, SQP: The results of these environmental impact indicators must be used with caution, as the uncertainties in these results are high or as there is limited experience with the indicator.

Disclaimer on IR: This impact category mainly addresses the potential effect of low dose ionizing radiation on human health in the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents and occupational exposures, nor does it consider radioactive waste disposal in underground facilities. Potential ionizing radiation from soil, radon, and some building materials is also not measured by this indicator.

Description of the system boundary

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manu-facturing	Transport from manu-facturer to place of use	Construction -installation process	Use	Main-tenance	Repair	Replacement	Refur-bishmen	Operational energy use	Operational water use	De-construction / demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

X=Module declared | MND=Module not declared

LCA results - Indicators describing environmental impacts based on the impact assessment (LCIA): 1 piece Furo165 (EN 15804+A2)									
Parameter	**Unit**	**A1**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
Core environmental impact indicators (EN 15804+A2)									
GWP-total	kg CO2 eqv.	1,55E+02	1,89E+00	2,71E+01	0,00E+00	1,99E-01	2,57E-01	1,38E-02	-3,75E+01
GWP-f	kg CO2 eqv.	1,54E+02	1,88E+00	3,05E+01	0,00E+00	1,99E-01	2,57E-01	1,38E-02	-3,79E+01
GWP-b	kg CO2 eqv.	1,39E+00	1,01E-03	-3,37E+00	0,00E+00	9,17E-05	1,01E-05	1,33E-05	3,84E-01
GWP-luluc	kg CO2 eqv.	1,22E-01	6,59E-04	4,18E-02	0,00E+00	7,28E-05	3,20E-06	9,53E-07	2,58E-02
ODP	kg CFC 11 eqv.	8,26E-06	4,28E-07	1,96E-06	0,00E+00	4,39E-08	9,44E-10	9,70E-10	-9,75E-07
AP	mol H+ eqv.	9,86E-01	7,70E-03	2,13E-01	0,00E+00	1,15E-03	4,70E-05	2,40E-05	-1,48E-01
EP-fw	kg P eqv.	6,45E-03	1,48E-05	1,24E-03	0,00E+00	2,00E-06	1,17E-07	3,62E-08	-1,36E-03
EP-m	kg N eqv.	1,66E-01	2,28E-03	3,64E-02	0,00E+00	4,06E-04	1,66E-05	1,22E-05	-2,74E-02
EP-T	mol N eqv.	1,90E+00	2,53E-02	4,11E-01	0,00E+00	4,48E-03	1,84E-04	9,00E-05	-3,20E-01
POCP	kg NMVOC eqv.	5,99E-01	7,74E-03	1,01E-01	0,00E+00	1,28E-03	4,71E-05	2,87E-05	-2,14E-01
ADP-mm	kg Sb-eqv.	5,53E-03	5,10E-05	1,35E-03	0,00E+00	5,04E-06	7,88E-08	2,54E-08	-2,47E-05
ADP-f	MJ	1,71E+03	2,84E+01	3,72E+02	0,00E+00	3,00E+00	6,59E-02	6,86E-02	-2,72E+02
WDP	m3 world eqv.	2,88E+01	7,91E-02	5,71E+00	0,00E+00	1,07E-02	3,77E-03	3,02E-03	-6,96E+00
Additional environmental impact indicators (EN 15804+A2)									
PM	disease incidence	1,30E-05	1,31E-07	2,83E-06	0,00E+00	1,79E-08	3,33E-10	4,61E-10	-2,26E-06
IR	kBq U235 eqv.	4,81E+00	1,24E-01	1,29E+00	0,00E+00	1,26E-02	1,94E-04	2,77E-04	5,84E-01
ETP-fw	CTUe	5,36E+03	2,27E+01	1,04E+03	0,00E+00	2,67E+00	5,24E-01	1,12E-01	-1,26E+03
HTP-c	CTUh	2,42E-06	6,39E-10	5,90E-07	0,00E+00	8,67E-11	6,72E-12	1,35E-12	-1,71E-08
HTP-nc	CTUh	6,98E-06	2,48E-08	3,50E-06	0,00E+00	2,92E-09	2,37E-10	4,71E-11	6,80E-06
SQP	Pt	8,61E+02	1,96E+01	6,15E+02	0,00E+00	2,60E+00	3,63E-02	1,50E-01	-5,97E+01

ADP-mm= Abiotic depletion potential for non-fossil resources | **ADP-f**=Abiotic depletion for fossil resources potential | **AP**= Acidification potential, Accumulated Exceedance | **EP-fw** = Eutrophication potential, fraction of nutrients reaching freshwater end compartment | **EP-m**= Eutrophication potential, fraction of nutrients reaching marine end compartment| **EP-T**= Eutrophication potential, Accumulated Exceedance | **GWP-b**=Global Warming Potential biogenic | **GWP-f**=Global Warming Potential fossil fuels | **GWP-luluc**=Global Warming Potential land use and land use change |**GWP-total**=Global Warming Potential total| **ODP**=Depletion potential of the stratospheric ozone layer |**POCP**=Formation potential of tropospheric ozone | **WDP**=Water (user) deprivation potential, deprivation- weighted water consumption | **ETP-fw**=Potential Comparative Toxic Unit for ecosystems | **HTP-c**=Potential Toxic Unit for Humans toxicity, cancer | **HTP-nc**= Potential Toxic Unit for humans, non-cancer | **IRP**=Potential Human exposure efficiency relative to U235, human health | **PM**=Potential incidence of disease due to Particulate Matter emissions | **SQP**=Potential soil quality index

LCA results - Indicators describing resource use and environmental information derived from life cycle inventory (LCI): 1 piece Furo165 (EN 15804+A2)

Parameter	Unit	A1	A2	A3	C1	C2	C3	C4	D
PERE	MJ	4,29E+02	4,01E-01	1,99E+02	0,00E+00	3,75E-02	3,55E-03	7,90E-04	6,76E+00
PERM	MJ	0,00E+00	0,00E+00	3,19E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	4,29E+02	4,01E-01	2,31E+02	0,00E+00	3,75E-02	3,55E-03	7,90E-04	6,76E+00
PENRE	MJ	1,82E+03	3,02E+01	3,97E+02	0,00E+00	3,18E+00	7,08E-02	7,29E-02	-2,82E+02
PENRM	MJ	0,00E+00	0,00E+00	1,48E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-2,46E-01
PENRT	MJ	1,82E+03	3,02E+01	3,98E+02	0,00E+00	3,18E+00	7,08E-02	7,29E-02	-2,83E+02
SM	Kg	3,97E+00	0,00E+00	1,02E+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
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
FW	M3	9,49E-01	2,99E-03	2,01E-01	0,00E+00	3,65E-04	3,43E-04	7,26E-05	-1,33E-01
HWD	Kg	3,29E-03	7,45E-05	-3,02E-04	0,00E+00	7,60E-06	2,55E-07	1,03E-07	-4,50E-03
NHWD	Kg	1,74E+02	1,36E+00	4,25E+01	0,00E+00	1,90E-01	7,17E-03	3,99E-01	-3,57E+00
RWD	Kg	4,42E-03	1,94E-04	1,12E-03	0,00E+00	1,97E-05	2,32E-07	4,35E-07	1,81E-04
CRU	Kg	0,00E+00	0,00E+00	3,93E-01	0,00E+00	0,00E+00	1,53E+00	0,00E+00	0,00E+00
MFR	Kg	0,00E+00	0,00E+00	7,39E+00	0,00E+00	0,00E+00	2,87E+01	0,00E+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
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
EEE	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

PERE=Use of renewable primary energy excluding renewable primary energy resources used as raw materials | **PERM**= Use of renewable primary energy resources used as raw materials | **PERT**=Total use of renewable primary energy resources | **PENRE**= Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials | **PENRM**= Use of non-renewable primary energy resources used as raw materials | **PENRT**= Total use of non-renewable primary energy resources | **SM**=Use of secondary material | **RSF**=Use of renewable secondary fuels | **NRSF**=Use of non-renewable secondary fuels | **FW**=Use of fresh water | **HWD**=Hazardous waste disposed | **NHWD**=Non-hazardous waste disposed | **RWD**=Radioactive waste disposed | **CRU**=Components for re-use | **MFR**=Materials for recycling | **MER**=Materials for energy recovery | **EET**=Exported energy, thermical | **EE**=Exported energy, electrical

LCA results - information on biogenic carbon content at the factory gate: 1 piece Furo165 (EN 15804+A2)

Parameter	Unit	Value
biogenic carbon content in product	kg C	0
biogenic carbon content in accompanying packaging	kg C	1,021

NOTE 1 piece biogenic carbon is equivalent to 44/12 kg CO2

6. LCA: Interpretation

6.1 Dominance analysis

The results show that the production of stainless steel (A1) is the dominating process in most of the environmental impact categories. Additionally, the steel has the largest contribution in the corresponding avoided production of materials beyond the system boundary (D). This stems especially from the steel content that is costly to produce, but which can be recycled at the end-of-life. The packaging materials (pallets and cardboard) contribute to a biogenic CO2 uptake. The electrical energy for the production comes from non-fossil hydropower and causes low impact.

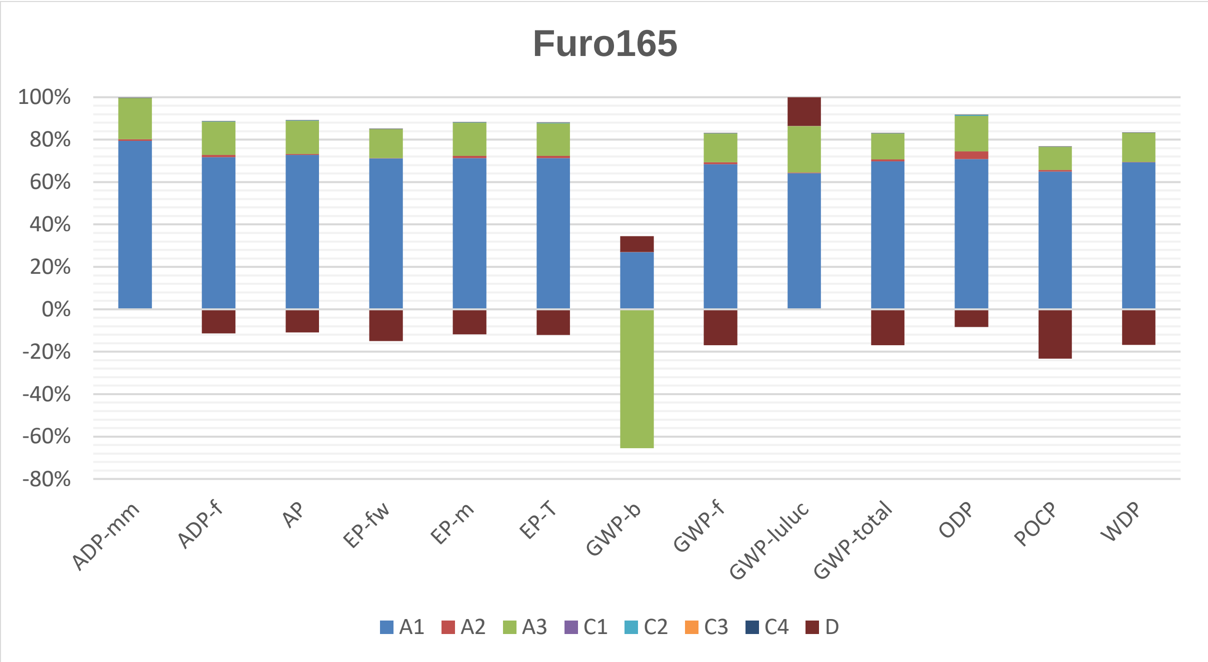


Figure 2: Influence of the modules A1 – A3, C1 - C4 and D on the environmental core indicators for Furo 165. The majority of the CO2 emissions within the impact category GWP-biogenic originate from the packaging. Since the module A5 which includes the waste processing of packaging is not declared there seem to be a disbalance of biogenic CO2 emissions. Therefore, the alleged disbalance can be explained by the fact that the module A5 is not included in the EPD declaration.

6.3 Data quality

The background data is taken from Ecoinvent database version 3.6 (2019). The life cycle assessment was modeled with the NIBE tool. Geographical reference space of the background data is global or Europe. Almost all consistent datasets contained in the Ecoinvent database are documented and can be viewed in the online Ecoinvent documentation.

Overall, the quality of the data can be considered as good. In the operating data survey all relevant process-specific data could be collected. The data relating to the manufacturing phase of the stainless steel floor drains are determined by Furhoffs Rostfria and refers to the production site in Skövde, Sweden.

The general rule has been that specific data from specific production processes or average data derived from specific processes must be given priority when calculating an EPD or Life Cycle Assessment. Data for processes that the manufacturer cannot influence or choose, were backed up with generic data.

7. References

Ecoinvent 2019	Ecoinvent Datenbank Version 3.6 (2019)
EN 15804	EN 15804:2012+A2:2019: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products
ISO 14025	ISO 14025:2006 Environmental labels and declarations — Type III environmental declarations — Principles and procedures EN 13249
ISO 14040	ISO 14040:2006 Environmental management - Life cycle assessment - Principles and framework
ISO 14044	ISO 14044:2006 Environmental management - Life cycle assessment - Requirements and guidelines
NMD 2019	NMD STICHTING NATIONAL ENVIRONMENTAL DATABASE: Environmental Performance Assessment Method for Construction; 1.1 (March 2022); Rijswijk
PCR A	Kiwa-Ecobility Experts, Berlin, 2022: PCR A – General Program Category Rules for Construction Products from the EPD programme of Kiwa-Ecobility Experts; Version 2.1
PCR B	Kiwa-Ecobility Experts, Berlin, 2020: PCR B – Product Category Rules for steel construction products, Requirements on the Environmental Product Declarations for steel construction products; Version 2020-03-13
R<THiNK 2023	R<THiNK; Online-EPD-Tool by NIBE B.V.
SimaPro Software	Industry data LCA library; website: https://simapro.com/databases/industry-data-lca-library/

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