ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

Flügger Filler Assortment

Flügger Sandplast 696 Fog, Flügger Sandplast LB

Flügger Sandplast LH Extra, Flügger Sandplast LGS Pro

Flügger Sandplast LSR Pro, Flügger Sandplast S

Flügger Sandplast S+, Flügger Sandplast LW

Flügger Sandplast LG, Flügger Filler Perform Airless

EPD Registration number: S-P-06457, Date of publication: 2022-07-20, Date of validity: 2027-07-17, Geographical scope: Northern & Central Europe

GENERAL INFORMATION

MANUFACTURER INFORMATION

Manufacturer	Flügger Group A/S
Address	Islevdalvej 151, 2610 Rødovre, Denmark
Contact details	anpap@flugger.com
Website	https://www.flugger.com/en/

PRODUCT IDENTIFICATION

Product name	Flügger Filler Assortment
Additional label(s)	Flügger Sandplast 696 Fog, Flügger Sandplast LB, Flügger Sandplast LG, Flügger Sandplast LH Extra, Flügger Sandplast LGS Pro (Airless & Roll), Flügger Sandplast LSR Pro, Flügger Sandplast S+, Flügger Sandplast S, Flügger Filler Perform Airless, Flügger Sandplast LW
Product number / reference	-
Place(s) of production	Bollebygd, Sweden
CPC code	3511-Paint and varnishes and related products

EPD INFORMATION

The EPD owner has the sole ownership, liability, and responsibility for the EPD. Construction products EPDs may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

EPD program operator EPD	The International EPD System
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
Product category rules	The CEN standard EN 15804 serves as the core PCR. In addition, the International EPD System PCR 2019:14 Construction products, version 1.11 (05.02.2021) is used.
EPD author	Flügger Group A/S
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
Verification date	2022-07-18
EPD verifier	Hetal Parekh Udas
EPD number	S-P-06457
Publishing date	2022-07-20
EPD valid until	2027-07-17

PRODUCT INFORMATION

PRODUCT DESCRIPTION

The following products are covered by this Environmental Product Declaration (EPD):

Flügger Sandplast 696 Fog, Flügger Sandplast LB, Flügger Sandplast LG, Flügger Sandplast LH Extra, Flügger Sandplast LGS Pro (Roll & Airless), Flügger Sandplast LSR Pro, Flügger Sandplast S+, Flügger Sandplast S, Flügger Filler Perform Airless, and Flügger Sandplast LW.

The above Flügger Filler Assortment contains ready-mixed, ready-to-use fillers with different properties and technical characteristics. The main characteristic of the above assortment is that the examined products are specially designed spray, roller, and bazooka fillers, which all of them provide premium filling capacity and high tensile strength.

In general, fillers come in different color shades. The assessed fillers range among light grey, grey, white, beige, and blue tone shades. In addition, the majority of the fillers are recommended for dry rooms and can be used for smoothing out ceilings and walls.

PRODUCT APPLICATION

All products contained in the Flügger Filler Assortment can be applied on top of new and already painted surfaces of most substrates, such as concrete, lightweight concrete, plaster, and gypsum boards.

In addition, all products included in the average Flügger Filler Assortment can be applied by different tools depending on the nature of each examined filler, as well as, on the size of the surface. Apply a sufficient amount and then work and smooth out the filler paste. Cold and heat can affect the viscosity of the material. Condensation during drying/ curing must not occur. Cold and increased humidity extends drying time, full curing, and recoating interval. Increased temperature and low atmospheric humidity reduce drying time and full curing. Risk of shrinkage where the filler paste is not completely cured before additional treatment. Always perform a test treatment for a check and acceptance of adhesion and result.

TECHNICAL SPECIFICATIONS

Product type: Plaster & Sealants
Nominal spreading rate: 1 m^2/ltr.
Humidity: Max. humidity 80% RH.
Min. working temp. during application and drying/curing:
Min +10 °C
Drying time at 20°C, 60% RH (Hours): 2
Re-coatable at 20°C, 60% RH (Hours): 20
Fully cured at 20°C, 60% RH (Hours): 28
Adhesion on concrete (MPa): 0,62
Layer thickness (max Mm): 2
Cleaning of tools etc.: Water

For more technical specifications information, please see the Technical Data Sheet on https://www.flugger.com/.

PRODUCT STANDARDS

All plasters covered by the Flügger Filler Assortment contribute to Green Building Standard credits by meeting the following specific requirements:

- Nordic Swan Ecolabel (3097 0008)

PHYSICAL PROPERTIES OF THE PRODUCT

Average physical properties for products covered by this EPD:

-Density: 1,12 (kg/liter)
-Solids weight: 57 %
-Solids by volume: 51 %
-Grain size (max. Mm): 0,23

ADDITIONAL TECHNICAL INFORMATION

For safety, health, and environmental conditions see the Safety Data Sheet for the declared product on https://www.flugger.com/

MARKET

Scandinavia and Europe

REFERENCE SERVICE LIFE, PRODUCT

The reference service life of the assessed products is highly dependent on the conditions of use.

ESTIMATED SERVICE LIFE, OBJECT

The coated object is not declared.

SUBSTANCES, REACH - VERY HIGH CONCERN

The products covered by this analysis do not contain any REACH SVHC substances in amounts greater than 0,1% (1000 ppm), nor substances of the Norwegian Priority list.

PRODUCT RAW MATERIAL COMPOSITION

Product and Packaging Material	Weight, kg	Post-consumer %	Renewable %	Country Region of origin
Water	0,30-0,35	-	-	Europe
Binder	0,01-0,05	-	-	Europe
Filler	0,50-0,55	-	-	Europe
Pigment	<0,0004	-	-	Europe
Solvent	<0,002	-	-	Europe
Additive	0,01-0,05	-	-	Europe
Biocide	<0,003	-	-	Europe
Premixing formulas	0,01-0,05	-	-	Europe
Transportation packaging	0,004	-	-	Europe
Product packaging	0,017	-	-	Europe

PRODUCT LIFE-CYCLE

MANUFACTURING AND PACKAGING (A1-A3)

The manufacturing stage (A1-A3) consists of four main stages: premixing, dispersion, adjusting, and filling. The first stage is premixing where pigments, extenders, binders, additives, and solvents are weighted and mixed. The next stage is the dispersion process where the pigments and extenders are grinded, embedded in binders, and stabilized. In the adjusting stage, the coating mixture is adjusted by adding more solvent/water or additives to adjust colour, viscosity, gloss, etc. to meet specifications.

The last two steps include the filling of the product into cans and loading it into pallets. The filler is filled in bags, and cans of various sizes in filling machines and then loaded into pallets. The full pallets are moved to a warehouse within the site. Eventually, the filler is moved out and transported to the construction site.

TRANSPORT AND INSTALLATION (A4-A5)

The transportation and installation stages (A4-A5) analyse the impacts that occurred during the transportation of the products to the construction site, as well as the impacts generated during the application of the product.

The transportation impacts were calculated for 1 kg of filler, with a final destination being a construction site in Oslo, and the transportation method is assumed to be a lorry.

The filler is applied to a surface (e.g., a wall or ceiling). Filler waste during application in this EPD assumes a commercial painting scenario and is based on values measured by Flügger's professional product support team. Packages and transportation packaging are handled as waste and are transported to the closest disposal facilities. Transportation distance to the closest incineration and recycling facilities is assumed to be equal to 50 km. The transportation method is assumed as a lorry.

PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not include the product use and maintenance stage (B1-B7). Therefore, environmental impacts related to this stage have not been studied.

Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

The end-of-life stage analyses the impacts related to the disposal of remnant filler on a surface when that surface reaches the end of its service life. The consumption of energy and natural resources is considered negligible for disassembling the end-of-life product. Therefore, the impacts of demolition are assumed zero (C1).

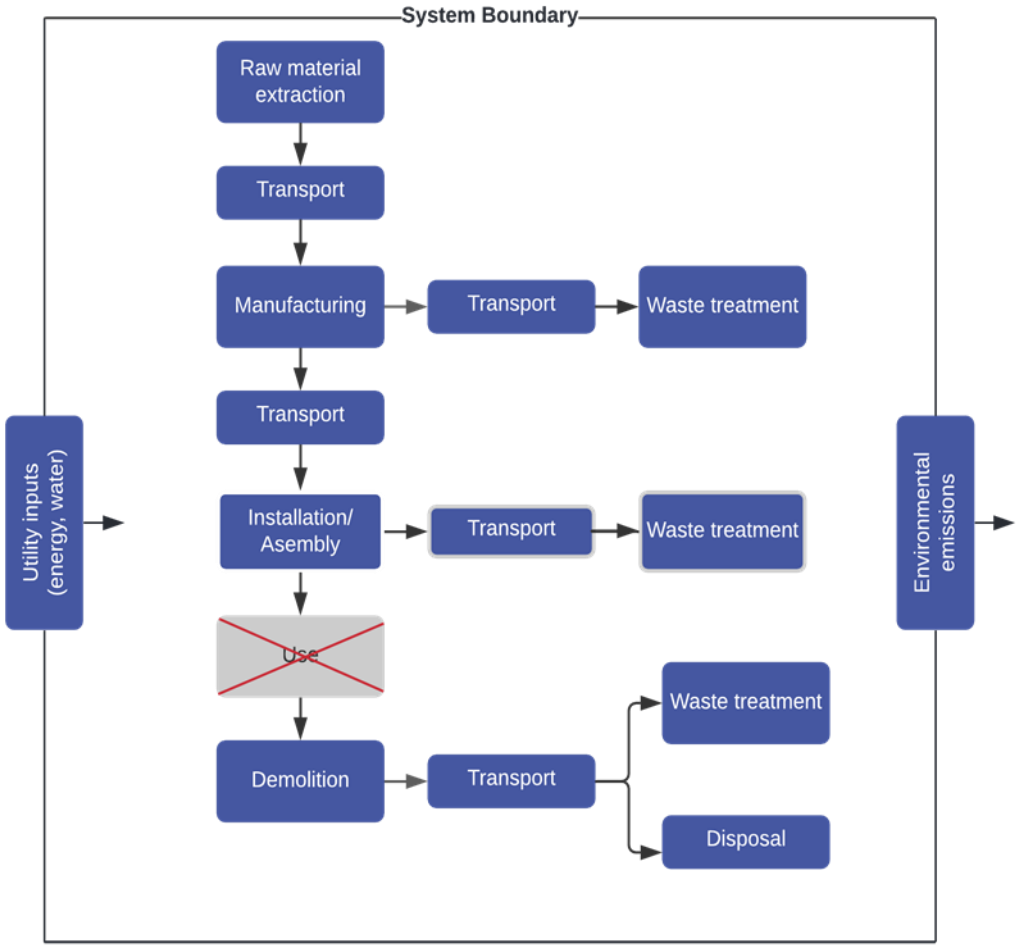
Module (C2) includes the transport of the waste filler to the closest disposal facilities. All end-of-life product is assumed to be sent to the closest disposal facilities, assuming a transportation distance equal to 50 km.

Module (C3) is assumed zero, as no further waste processing for reuse, recovery, or recycling takes place in this analysis for the mineral substrates.

Module (C4) is the disposal of end-of-life filler, which in this case landfill is considered as the final disposal method.

Module (D) includes the potential loads and benefits from recycling (i.e., wooden pallet) and incinerating packaging products (i.e., plastic wrapping, plastic top folie, and plastic buckets) at the end of life.

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	2021-2022

DECLARED AND FUNCTIONAL UNIT

Declared unit	1 kg
Mass per declared unit	1 kg

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0,0012

SYSTEM BOUNDARY

This EPD covers the cradle to gate with options scope with following modules; A1 (Raw material supply), A2 (Transport) and A3 (Manufacturing), A4 (Transport), A5 (Assembly) as well as C1 (Deconstruction), C2 (Transport at end-of-life), C3 (Waste processing) and C4 (Disposal). In addition, module D – (Benefits and loads beyond the system boundary) is included as well.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
x	x	x	x	x	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x	x	x
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr. / Demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 and the applied PCR. The study does not exclude any hazardous materials or substances.

The study includes all major raw materials and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.
All major raw materials and essential energy is included. Therefore,

100% of the total product content is included and extensively analysed. The life cycle analysis includes all industrial processes from raw material acquisition to production, distribution, and end-of-life stages.

However, the raw material acquisition, production, construction and end-of-life of the mineral substrate, the commuting of employees, administration services, and capital goods such as machinery, buildings, or office equipment, are excluded from the system boundary.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation.

In this study, as per EN 15804, allocation is conducted in the following order.

1. Allocation should be avoided.

2. Allocation should be based on physical properties (e.g., mass, volume) when the difference in revenue is small.

3. Allocation should be based on economic values.

As it is impossible to collect data separately for each product produced in the plant, data such as incoming energy, water, and waste production in-house is primarily allocated among all products through volume allocation. The recycling process and transportation of the material are allocated to this analysis. No co-product allocation is relevant for fillers.

This LCA study is conducted in accordance with all methodological considerations, such as performance, system boundaries, data quality, allocation procedures, and decision rules to evaluate inputs and outputs.

Allocation used in Ecoinvent 3.6 environmental data sources follows the methodology 'allocation, cut-off by classification'. This methodology is in line with the requirements of the EN 15804 - standard.

All estimations and assumptions taken into account are presented below:

Module A4

The transportation distance is defined according to PCR 2019:14 Construction Products. The transportation distance was calculated by estimating the distance that needs to be covered from Flügger's production plant in Bollebygd, Sweden to Oslo, Norway (330 km) and then to the final construction site assuming an average transportation distance equal to (30 km). The transportation method is assumed to be a lorry. Transportation does not cause losses as products are packaged accordingly. The volume capacity utilization factor is assumed to be 1 for the packaged products.

Module A5

The installation stage at the construction site includes unwrapping of the plastic buckets and application of the filler on top of the surface with airless spray, roller, filler knife, or bazooka. The consumption of energy and natural resources is negligible for the assembly stage. The application losses assume a commercial painting scenario and are equal to 3,6%. The value was measured

by Flügger's professional product support team. Packages and transportation packaging are handled as waste and assumed to be sorted and sent to the closest disposal facilities such as recycling, incineration, and landfill. Transportation distance to the closest incineration and recycling facilities is assumed to be equal to 50 km. The transportation method is assumed as lorry.

Module C1

Since the consumption of energy and natural resources is negligible for disassembling the end-of-life product, the impacts of demolition are assumed zero.

Module C2

It is estimated that the product loses some of its mass as the solvents of the filler evaporate during its use. In this study is assumed that all solvents in the filler have been released. All the end-of-life product is assumed to be sent to the closest disposal facilities. The transportation distance is assumed to be 50 km and the transportation method is assumed as lorry.

Module C3

No further waste treatment processes are considered to be taken place in the examined system.

Module C4

Filler waste is gathered as part of another product, in this case, a mineral substrate, and is generally not separated from it at the end of life. The typical disposal scenario for filler applied on a mineral substrate is the same as for the mineral construction waste, and 100% of the filler is assumed to be sent to landfill facilities. As part of the landfill process, 100% of the contained biocides are leached as emissions into freshwater, as a worst-case scenario since more accurate data is not available (CEPE, 2018).

AVERAGES AND VARIABILITY

GWP-GHG index varies depending on the filler raw materials present in the plaster's chemical composition. More specifically, fillers are substances consisting of particles that are practically insoluble in the application medium and are used to increase volume, improve technical properties, and influence optical properties. Based on the (Gysau, D., 2006) study, the statistical share of fillers in the overall composition of European paints and varnishes is estimated to be around 42%. This value is estimated to be higher in the plaster's chemical composition, where fillers' raw materials, make up more than 50% of the whole product.

There are different types of fillers that can be used in coating applications. Typical examples of filler raw materials are carbonates, silicates, silicas (silicon dioxides), sulphates, oxides, and organic fillers. In addition to the above type of categorisation, fillers can be also grouped according to their natural versus synthetic origin. In this study, the differences between the GWP-GHG index are spotted in products where "China clay", otherwise known as kaolin, is the dominant type of filler raw material.

More specifically, Flügger Sandplast LGS Pro (Airless & Roll) and Flügger Sandplast LG are some of the products, where "China clay", occupies more than 20% of the total fillers' composition of the whole product. On the contrary, products such as Flügger Sandplast S, and Flügger Sandplast S+ have the lowest environmental impact because they are composed almost entirely of dolomite. This observation is also supported by similar studies (Jingxiang et al., 2019) where kaolin is found to be one of the most significant contributors to the overall environmental impact of the assessed products, since it requires a lot of energy for its extraction (Almeida et al., 2016).

Data specificity and GWP-GHG variability for GWP-GHG for A1-A3, for the higher (Flügger Sandplast S) and lower side (Flügger Sandplast LGS Pro Roll) of the reported results.

The International EPD System additional data requirements.

Supply-chain specific data for GWP-GHG	> 90 %
Variation in GWP-GHG between products	-63.8%, +90.9%
Variation in GWP-GHG between sites	-

ENVIRONMENTAL IMPACT DATA

Note: additional environmental impact data may be presented in annexes.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total	kg CO_2e	3,25E-1	6,32E-2	1,22E-1	5,1E-1	3,33E-2	1,55E-1	MND	MND	MND	MND	MND	MND	MND	0E0	4,28E-3	0E0	3,53E-3	-1,75E-2
GWP – fossil	kg CO_2e	3,04E-1	6,31E-2	7,44E-2	4,41E-1	3,36E-2	1,47E-1	MND	MND	MND	MND	MND	MND	MND	0E0	4,27E-3	0E0	3,52E-3	2,92E-2
GWP – biogenic	kg CO_2e	2,11E-2	3,86E-5	4,79E-2	6,9E-2	2,55E-5	7,08E-3	MND	MND	MND	MND	MND	MND	MND	0E0	2,62E-6	0E0	6,98E-6	-4,66E-2
GWP – LULUC	kg CO_2e	2,31E-5	2,23E-5	6,41E-5	1,09E-4	1,06E-5	5,97E-6	MND	MND	MND	MND	MND	MND	MND	0E0	1,51E-6	0E0	1,05E-6	-5,95E-5
Ozone depletion pot.	kg CFC_{-11}e	8,67E-8	1,45E-8	3,96E-9	1,05E-7	8,25E-9	3,81E-9	MND	MND	MND	MND	MND	MND	MND	0E0	9,8E-10	0E0	1,45E-9	-1,68E-9
Acidification potential	mol H^+e	2,28E-3	2,61E-4	3,21E-4	2,86E-3	1,08E-4	1,17E-4	MND	MND	MND	MND	MND	MND	MND	0E0	1,76E-5	0E0	3,34E-5	-1,55E-4
EP-freshwater[3)]	kg Pe	5,83E-4	5,45E-7	3,33E-6	5,87E-4	2,85E-7	2,12E-5	MND	MND	MND	MND	MND	MND	MND	0E0	3,69E-8	0E0	4,25E-8	-2,83E-6
EP-marine	kg Ne	6,58E-4	7,72E-5	6,99E-5	8,05E-4	2,38E-5	3,43E-5	MND	MND	MND	MND	MND	MND	MND	0E0	5,21E-6	0E0	1,15E-5	-3,94E-5
EP-terrestrial	mol Ne	3,73E-3	8,53E-4	7,89E-4	5,37E-3	2,64E-4	2,53E-4	MND	MND	MND	MND	MND	MND	MND	0E0	5,76E-5	0E0	1,27E-4	-4,66E-4
POCP (“smog”)	kg NMVOCe	1,05E-3	2,68E-4	2,66E-4	1,59E-3	1,04E-4	7,13E-5	MND	MND	MND	MND	MND	MND	MND	0E0	1,81E-5	0E0	3,68E-5	-1,18E-4
ADP-minerals & metals	kg Sbe	1,91E-5	1,57E-6	6,28E-7	2,13E-5	5,98E-7	7,59E-7	MND	MND	MND	MND	MND	MND	MND	0E0	1,07E-7	0E0	3,22E-8	-1,96E-7
ADP-fossil resources	MJ	5,7E0	9,63E-1	2,59E0	9,25E0	5,46E-1	3,26E-1	MND	MND	MND	MND	MND	MND	MND	0E0	6,52E-2	0E0	9,84E-2	-3,52E-1
Water use[2)]	m^3e depr.	1,8E-2	3,42E-3	1,13E-1	1,35E-1	2,03E-3	2,28E-3	MND	MND	MND	MND	MND	MND	MND	0E0	2,32E-4	0E0	4,55E-3	-4,58E-3

1) GWP = Global Warming Potential; EP = Eutrophication potential; POCP = Photochemical ozone formation; ADP = Abiotic depletion potential. 2) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. 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. 3) Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO_4e.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	9,75E-10	4,87E-9	7,1E-9	1,29E-8	2,95E-9	5,5E-10	MND	MND	MND	MND	MND	MND	MND	0E0	3,3E-10	0E0	6,49E-10	-6,51E-9
Ionizing radiation[5)]	kBq U235e	1,52E-3	4,21E-3	4,15E-2	4,72E-2	2,39E-3	4,65E-4	MND	MND	MND	MND	MND	MND	MND	0E0	2,85E-4	0E0	4,04E-4	-3E-3
Ecotoxicity (freshwater)	CTUe	4,24E0	7,52E-1	1,28E0	6,27E0	4,17E-1	2,6E-1	MND	MND	MND	MND	MND	MND	MND	0E0	5,09E-2	0E0	6,21E-2	-9E-1
Human toxicity, cancer	CTUh	8,97E-9	2,13E-11	3,95E-11	9,03E-9	1,05E-11	4,38E-10	MND	MND	MND	MND	MND	MND	MND	0E0	1,44E-12	0E0	1,47E-12	-1,59E-11
Human tox. non-cancer	CTUh	1,08E-7	8,62E-10	9,43E-10	1,1E-7	4,76E-10	4,36E-9	MND	MND	MND	MND	MND	MND	MND	0E0	5,84E-11	0E0	4,54E-11	-6,19E-10
SQP	-	3,46E-2	1,07E0	5,73E-2	1,16E0	8,23E-1	4,31E-2	MND	MND	MND	MND	MND	MND	MND	0E0	7,26E-2	0E0	1,67E-1	-3,53E-2

4) SQP = Land use related impacts/soil quality. 5) EN 15804+A2 disclaimer for Ionizing radiation, human health. 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.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy	MJ	3,86E-2	1,37E-2	4,16E-1	4,68E-1	6,87E-3	1,98E-2	MND	MND	MND	MND	MND	MND	MND	0E0	9,26E-4	0E0	7,96E-4	-4,57E-1
Renew. PER as material	MJ	0E0	0E0	4,22E-2	4,22E-2	0E0	1,52E-3	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	-5,97E-2
Total use of renew. PER	MJ	3,86E-2	1,37E-2	4,58E-1	5,1E-1	6,87E-3	2,13E-2	MND	MND	MND	MND	MND	MND	MND	0E0	9,26E-4	0E0	7,96E-4	-5,17E-1
Non-re. PER as energy	MJ	2,5E-1	9,63E-1	1,7E0	2,91E0	5,46E-1	9,76E-2	MND	MND	MND	MND	MND	MND	MND	0E0	6,52E-2	0E0	9,84E-2	-3,52E-1
Non-re. PER as material	MJ	4,91E-2	0E0	8,84E-1	9,33E-1	0E0	3,36E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of non-re. PER	MJ	2,99E-1	9,63E-1	2,59E0	3,85E0	5,46E-1	1,31E-1	MND	MND	MND	MND	MND	MND	MND	0E0	6,52E-2	0E0	9,84E-2	-3,52E-1
Secondary materials	kg	5,21E-4	0E0	2,01E-4	7,22E-4	0E0	2,6E-5	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Renew. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m^3	5,5E-4	1,82E-4	1,17E-3	1,9E-3	1,14E-4	7,43E-5	MND	MND	MND	MND	MND	MND	MND	0E0	1,24E-5	0E0	1,08E-4	-1,04E-4

6) PER = Primary energy resources

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	3,55E-3	1E-3	2,96E-3	7,51E-3	5,3E-4	1,77E-3	MND	MND	MND	MND	MND	MND	MND	0E0	6,78E-5	0E0	9,18E-5	-9,13E-4
Non-hazardous waste	kg	4,75E-2	8,32E-2	1,14E-1	2,44E-1	5,86E-2	6,49E-2	MND	MND	MND	MND	MND	MND	MND	0E0	5,64E-3	0E0	6,68E-1	-5,76E-2
Radioactive waste	kg	1,22E-6	6,58E-6	1,74E-5	2,52E-5	3,75E-6	4,57E-7	MND	MND	MND	MND	MND	MND	MND	0E0	4,46E-7	0E0	6,51E-7	-2,25E-6

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	0E0	0E0	2,48E-3	2,48E-3	0E0	5,6E-3	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for energy rec	kg	0E0	0E0	6,51E-3	6,51E-3	0E0	2,8E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0

ENVIRONMENTAL IMPACTS – GWP-GHG - THE INTERNATIONAL EPD SYSTEM

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG	kg CO_2e	3,04E-1	6,31E-2	7,44E-2	4,41E-1	3,36E-2	1,47E-1	MND	MND	MND	MND	MND	MND	MND	0E0	4,27E-3	0E0	3,52E-3	2,92E-2

8) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013) This indicator Is almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	Electricity, Sweden, residual mix, Ecoinvent 3.6, Year: 2019
Electricity kg CO_2e / kWh	0,18
Heat production (wood pellet) data source and quality	Heat production, wood pellet, at furnace 300kw, state-of-the-art 2014 (Reference product: Heat, central or small-scale, other than natural gas), Ecoinvent 3.6, Year: 2019
District heating kg CO_2e / MJ	0,0126

Transport scenario documentation (A4)

Scenario parameter	Value
Type	Lorry
Type of vehicle	>32t, EURO 6
Capacity utilisation (%)	100
Fuel/ Energy consumption (Kg/tkm)	0,0192
Global warming potential (Kg CO_2 eq/tkm)	0,0863
Distance (km)	330 km (Bollebygd, Sweden – Oslo, Norway) 30 km Construction site in Norway

End of life documentation (C1-C4)

Scenario parameter	Value
Collection process - kg collected separately	-
Collection process - kg collected with mix construction waste	0,6707
Recovery system - kg for re-use	-
Recovery system - kg for recycling	-
Recovery system - kg for energy recovery	-
Disposal (total) – kg product or material for final deposition	0,6683 kg for final deposition 0,0024 kg released as emissions
Assumptions for scenario development, e.g., transportation	End-of-life product

BIBLIOGRAPHY

Almeida, M.I., Dias, A.C., Demertzi, M. and Arroja, L., (2016). Environmental profile of ceramic tiles and their potential for improvement. Journal of cleaner production, 131, pp.583-593.

Dahlgren, L., Stripple, H., Oliveira, F., Rydberg, T., and Zhang, Y. (2016). Raw materials LCI database for the European coatings and printing ink industries – Documentation of datasets v3.0, IVL U5659, May 2016.

EPD. General Programme Instructions of the international EPD® system. Version 4.0

Ecoinvent database v3.6 (2019) and One Click LCA database.

EN 15804:2012+A2:2019 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.

Gysau, D., 2006. Fillers for paints: fundamentals and applications. Vincentz Network GmbH & Co KG.

ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations. Principles and procedures.

ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.

ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.

Liv, J., Gu, F., Zhang, W. and Guo, J., (2019). Life cycle assessment and life cycle costing of sanitary ware manufacturing: A case study in China. Journal of Cleaner Production, 238, p.117938.

The International EPD System PCR 2019:14 Construction products, version 1.11 (05.02.2021)

Flügger Filler Assortment LCA background report 22.06.2022

ABOUT THE MANUFACTURER

Flügger is an international group based in the Nordic region that develops, produces, markets, and sells a wide range of building paints, wood stains, fillers, wallpapers, and accessories. The philosophy of Flügger is to make products and solutions that enable painters and consumers to deliver sustainable, beautiful, and high-quality painting results in an efficient way.

Flügger's passion for paint and good craftsmanship, as well as respect for the environment is deeply anchored in its history, which spans several centuries and roots back to 1783.

EPD AUTHOR AND CONTRIBUTORS

Manufacturer	Flügger Group A/S
EPD author	Flügger Group A/S
EPD verifier	Hetal Parekh Udas, One Click LCA
EPD program operator	The International EPD® System
Background data EPD-034	This EPD is based on Ecoinvent 3.6 (cut-off), CEPE, and One Click LCA databases.
LCA software	The LCA and EPD have been created using One Click LCA Pre-Verified EPD Generator for Paints, Coatings, Sealants and Adhesives

VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with EN 15804, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The background report (project report) for this EPD

VERIFICATION OVERVIEW

Following independent third party has verified this specific EPD:

EPD verification information	Answer
Independent EPD verifier	Hetal Parekh Udas, One Click LCA
EPD verification started on	2022-07-13
EPD verification completed on	2022-07-18
Supply-chain specific data %	> 90%
Approver of the EPD verifier	The International EPD® System

Author & tool verification	Answer
EPD author	Flügger Group A/S
EPD author training completion	2022-01-18
EPD Generator module	Paints, Coatings, Sealants and Adhesives
Independent software verifier	Ugo Pretato, Studio Fieschi & soci Srl.
Software verification date	2021-05-11

THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of

- the data collected and used in the LCA calculations,
- the way the LCA-based calculations have been carried out,
- the presentation of environmental data in the EPD, and
- other additional environmental information, as present

with respect to the procedural and methodological requirements in ISO 14025:2010 and EN 15804:2012+A2:2019.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

Signature

VERIFICATION AND REGISTRATION (ENVIRONDEC)

ISO standard ISO 21930 and CEN standard EN 15804 serves as the core Product Category Rules (PCR)	
PCR	PCR 2019:14 Construction products, version 1.11
PCR review was conducted by:	The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.
Independent third-party verification of the declaration and data, according to ISO 14025:2006:	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
Third party verifier	Hetal Parekh Udas, One Click LCA
	Approved by: The International EPD® System Technical Committee, supported by the Secretariat
Procedure for follow-up during EPD validity involves third party verifier	☐ yes ☑ no

EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden, E-mail: info@environdec.com

ANNEX 1 : ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO_2e	3,03E-1	6,25E-2	7,1E-2	4,37E-1	3,33E-2	1,47E-1	MND	MND	MND	MND	MND	MND	MND	0E0	4,24E-3	0E0	3,45E-3	2,95E-2
Ozone depletion Pot.	kg CFC_{-11}e	7,82E-8	1,15E-8	3,83E-9	9,36E-8	6,56E-9	3,43E-9	MND	MND	MND	MND	MND	MND	MND	0E0	7,79E-10	0E0	1,15E-9	-1,85E-9
Acidification	kg SO_2e	1,91E-3	1,29E-4	2,59E-4	2,3E-3	7,14E-5	9,55E-5	MND	MND	MND	MND	MND	MND	MND	0E0	8,71E-6	0E0	1,39E-5	-1,19E-4
Eutrophication	kg PO_4^3e	6,24E-4	2,68E-5	9,91E-5	7,5E-4	1,44E-5	4,11E-5	MND	MND	MND	MND	MND	MND	MND	0E0	1,81E-6	0E0	2,69E-6	-6,33E-5
POCP (“smog”)	kg C_2H_4e	1,82E-4	8,33E-6	1,63E-5	2,07E-4	4,11E-6	7,78E-6	MND	MND	MND	MND	MND	MND	MND	0E0	5,63E-7	0E0	1,02E-6	-5,03E-6
ADP-elements	kg Sbe	1,91E-5	1,57E-6	6,28E-7	2,13E-5	5,98E-7	7,59E-7	MND	MND	MND	MND	MND	MND	MND	0E0	1,07E-7	0E0	3,22E-8	-1,96E-7
ADP-fossil	MJ	5,7E0	9,63E-1	2,59E0	9,25E0	5,46E-1	3,26E-1	MND	MND	MND	MND	MND	MND	MND	0E0	6,52E-2	0E0	9,84E-2	-3,52E-1

ANNEX 2 : ENVIRONMENTAL IMPACT INDICATOR -GWP-GHG- THE INTERNATIONAL EPD SYSTEM FOR EACH PRODUCT UNDER THE AVERAGE FLÜGGER FILLER ASSORTMENT

ENVIRONMENTAL IMPACTS – GWP-GHG- THE INTERNATIONAL EPD SYSTEM FOR FLÜGGER SANDPLAST S+

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG	kg CO_2e	1,46E-1	3,93E-2	3,19E-2	2,17E-1	3,28E-2	1,07E-1	MND	MND	MND	MND	MND	MND	MND	0E0	5,16E-3	0E0	4,26E-3	9,14E-3

ENVIRONMENTAL IMPACTS – GWP-GHG- THE INTERNATIONAL EPD SYSTEM FOR FLÜGGER SANDPLAST S

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG	kg CO_2e	1,08E-1	3,23E-2	2,4E-2	1,64E-1	3,24E-2	1,02E-1	MND	MND	MND	MND	MND	MND	MND	0E0	5,06E-3	0E0	4,18E-3	6,88E-3

ENVIRONMENTAL IMPACTS – GWP-GHG- THE INTERNATIONAL EPD SYSTEM FOR FLÜGGER SANDPLAST LW

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG	kg CO_2e	2,73E-1	8,28E-2	1,41E-1	4,97E-1	3,5E-2	2,06E-1	MND	MND	MND	MND	MND	MND	MND	0E0	5,02E-3	0E0	4,14E-3	6,32E-2

ENVIRONMENTAL IMPACTS – GWP-GHG- THE INTERNATIONAL EPD SYSTEM FOR FLÜGGER SANDPLAST LSR PRO

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG	kg CO_2e	2,53E-1	7,42E-2	4,31E-2	3,7E-1	3,33E-2	1,2E-1	MND	MND	MND	MND	MND	MND	MND	0E0	4E-3	0E0	3,29E-3	1,23E-2

ENVIRONMENTAL IMPACTS – GWP-GHG- THE INTERNATIONAL EPD SYSTEM FOR FLÜGGER SANDPLAST LH EXTRA

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG	kg CO_2e	1,73E-1	5,73E-2	1,31E-1	3,61E-1	3,47E-2	1,97E-1	MND	MND	MND	MND	MND	MND	MND	0E0	4,87E-3	0E0	4,02E-3	5,84E-2

ENVIRONMENTAL IMPACTS – GWP-GHG- THE INTERNATIONAL EPD SYSTEM FOR FLÜGGER SANDPLAST LGS PRO AIRLESS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG	kg CO_2e	6,12E-1	6,58E-2	4,34E-2	7,21E-1	3,33E-2	1,29E-1	MND	MND	MND	MND	MND	MND	MND	0E0	3,65E-3	0E0	2,99E-3	1,24E-2

ENVIRONMENTAL IMPACTS – GWP-GHG- THE INTERNATIONAL EPD SYSTEM FOR FLÜGGER SANDPLAST LGS PRO ROLL

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG	kg CO_2e	6,12E-1	7,09E-2	1,58E-1	8,42E-1	3,47E-2	2,35E-1	MND	MND	MND	MND	MND	MND	MND	0E0	3,65E-3	0E0	2,99E-3	7,24E-2

ENVIRONMENTAL IMPACTS – GWP-GHG- THE INTERNATIONAL EPD SYSTEM FOR FLÜGGER SANDPLAST LG

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG	kg CO_2e	5,83E-1	5,85E-2	1,45E-1	7,87E-1	3,5E-2	2,24E-1	MND	MND	MND	MND	MND	MND	MND	0E0	4,62E-3	0E0	3,81E-3	6,47E-2

ENVIRONMENTAL IMPACTS – GWP-GHG- THE INTERNATIONAL EPD SYSTEM FOR FLÜGGER SANDPLAST LB

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG	kg CO_2e	1,83E-1	4,76E-2	9,4E-2	3,25E-1	3,37E-2	1,63E-1	MND	MND	MND	MND	MND	MND	MND	0E0	4,58E-3	0E0	3,79E-3	4,03E-2

ENVIRONMENTAL IMPACTS – GWP-GHG- THE INTERNATIONAL EPD SYSTEM FOR FLÜGGER SANDPLAST 696 FOG

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG	kg CO_2e	1,96E-1	4,93E-2	1,17E-1	3,62E-1	3,43E-2	1,84E-1	MND	MND	MND	MND	MND	MND	MND	0E0	4,72E-3	0E0	3,9E-3	5,24E-2

ENVIRONMENTAL IMPACTS – GWP-GHG- THE INTERNATIONAL EPD SYSTEM FOR FLÜGGER FILLER PERFORM AIRLESS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG	kg CO_2e	2,41E-1	6,65E-2	4,18E-2	3,5E-1	3,32E-2	1,14E-1	MND	MND	MND	MND	MND	MND	MND	0E0	3,83E-3	0E0	3,15E-3	1,2E-2