Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2012+A2:2019 for:
Swegon Ceiling Diffuser 600
from
Swegon Group AB

Programme:	The International EPD® System, www.environdec.com
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Swegon

Programme information

Programme:	The International EPD® System EPD International AB Box 210 60 SE-100 31 Stockholm Sweden www.environdec.com info@environdec.com
Product category rules (PCR): PCR 2019:14 Construction products. Version 1.11, date 2021-05-02.	
PCR review was conducted by: The Technical Committee of the International EPD® System. Chair: Claudia A. Peña. Contact via info@environdec.com	
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☐ EPD process certification ☒ EPD verification	
Third party verifier: Bureau Veritas Certification Sverige AB (Camilla Landén and Anders Nordelöf) The certification body is accredited by: SWEDAC, accreditation nr 1236	
Procedure for follow-up of data during EPD validity involves third party verifier: ☒ Yes ☐ No	
The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804.	

Company information

Owner of the EPD
Swegon Group AB

Description of the organisation
People spend most of their time indoors, which is why we need a sound indoor climate for our health, well-being, and happiness. Swegon´s ambition is to achieve the world's best indoor environment with the least possible impact on the external environment. Our business models, services, products, and systems are all designed to provide the right solution for each individual project.

Swegon Group AB is a market leading supplier in the field of indoor environment, offering solutions for ventilation, heating, cooling, and climate optimisation, as well as connected services and expert technical support. Swegon has subsidiaries in and distributors all over the world and 16 production plants in Europe, North America and India. The company employs more than 2 600 people.

Name and location of production site
Swegon Operations AB, Industrigatan 5, 273 35 Tomelilla

Product information

Product name
Swegon Ceiling Diffuser 600

Product identification
The table below provides information on the product presented in this EPD.

Product	Representative product included in the EPD	Technical standard	Weight (kg)	Dimensions (mm)	Material composition
Ceiling diffuser	Swegon Ceiling Diffuser 600 (Average)	Corrosion Class C2 according to SS-EN ISO 12944-2	3.53	595x595	Steel, Plastic, Powder coating, Rubber

Product description
The ceiling diffuser is a component of the ventilation system that is mounted on the ceiling of the room to facilitate the supply of air to the indoor environment. Ceiling diffusers are visible to the users of the room and have an average lifetime of 30 years. This EPD concerns an average square ceiling diffuser with plastic nozzles for supply and distribution of air to indoor environments.

Products included in the EPD
Ceiling diffusers are available in different shapes (circular, quadratic etc.) and sizes depending on the application needs. This EPD concerns the Swegon Ceiling Diffuser 600 representing an average environmental performance for several products as listed in the table below. The average product was defined based on the weighted average of the products sold in year 2020. To investigate potential variations in results, two extreme product cases provided by Swegon were modelled and analysed first: one without plastic components and one with a high number of plastic components. The results indicated that the difference among the two extreme products was lower than 10%.

This EPD covers the products listed in the Table below:

Product name	Total weight (kg)
LOCKZONE C 125-600	3.74
LOCKZONE C 160-600	3.71
LOCKZONE C 200-600	3.70
LOCKZONE C 250-600	3.67
LOCKZONEC 315-600	3.66
LOCKZONE C 400-600	3.49
HAWK C 125-600	3.74
HAWK C 160-600	3.71
HAWK C 200-600	3.70
HAWK C 250-600	3.67
HAWK C 315-600	3.66
HAWK C 400-600	3.49
SWIFT C 200-600	3.61
SWIFT C 250-600	3.58
SWIFT C 315-600	3.57
PELICAN CE-HF 125-600	3.17
PELICAN CE-HF 160-600	3.14
PELICAN CE-HF 200-600	3.13
PELICAN CE-HF 250-600	3.10
PELICAN CE-HF 315-600	3.09
PELICAN CE-HF 400-600	2.92

Products included in the EPD

Product name	Total weight (kg)
EAGLE Cc 125-600	3.69
EAGLE Cc 160-600	3.65
EAGLE Cc 200-600	3.61
EAGLE Cc 250-600	3.56
EAGLE Cc 315-600	3.51
EAGLE Cc 400-600	3.34
EAGLE Cr 125-600	3.70
EAGLE Cr 160-600	3.65
EAGLE Cr 200-600	3.62
EAGLE Cr 250-600	3.56
EAGLE Cr 315-600	3.52
EAGLE Cr 400-600	3.32
COLIBRI Cc 125-600	3.61
COLIBRI Cc 160-600	3.58
COLIBRI Cc 200-600	3.48
COLIBRI Cc 250-600	3.37
COLIBRI Cc 315-600	3.36
COLIBRI Cc 400-600	3.19
COLIBRI Cr 125-600	3.59
COLIBRI Cr 160-600	3.56
COLIBRI Cr 200-600	3.45
COLIBRI Cr 250-600	3.28
COLIBRI Cr 315-600	3.27
COLIBRI Cr 400-600	3.10
VIREO C 125-600	3.59
VIREO C 160-600	3.56
VIREO C 200-600	3.48
VIREO C 250-600	3.45
VIREO C 315-600	3.35
VIREO C 400-600	3.18
KITE CR 125-600	3.35
KITE CR 160-600	3.33
KITE CR 200-600	3.29
KITE CR 250-600	3.26
KITE CR 315-600	3.26

UN CPC code

The CPC code applied is CPC 54632 Ventilation and air-conditioning equipment installation services.

Geographical scope

Global.

LCA information

Declared unit

The declared unit is set to 1 kg of finished ceiling diffuser

The diffusers are normally sold in pieces. To be able to apply the results in other products within this product family however, results are presented as 1 kg of finished product.

Reference service life

This EPD does not indicate Reference Service Life (RSL).

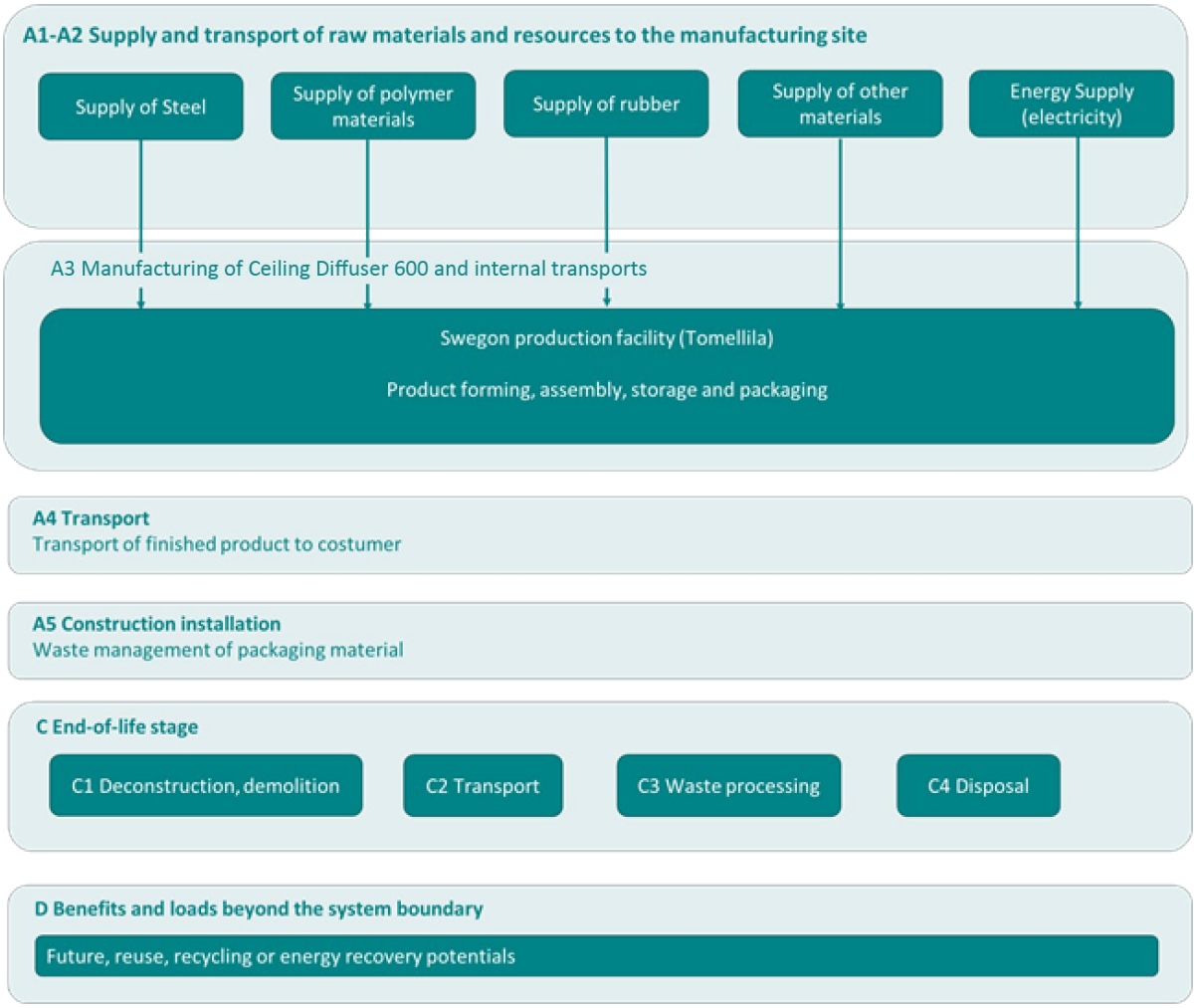
Time representativeness

The data used to model product manufacturing corresponds to 2020. The data from generic databases are from 2014 – 2021. No data used is older than 10 years.

Database(s) and LCA software used

The LCA was modelled using the LCA software GaBi 10 Professional and the respective generic life cycle inventory data-sets provided by Sphera (2021).

System diagram



Description of system

Cradle to gate with module C1-C4, module D and with optional modules. The life cycle stages included are described in the table below:

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction, demolition	Transport	Waste processing	Disposal	Reuse, recycling or energy recovery potentials
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	X	X*	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	UK, NL, SE, CN	UK, NL, SE, CN	SE	SE, GLO		GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO
Specific data used	2,7%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - products	<10%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation -sites	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-

X: Module declared
ND: Module not declared
*This stage (A5) is partly declared i.e. only handling of packaging material is included.

Allocation

Allocation has been avoided whenever possible by increasing the level of detail of the production process and by collecting product specific environmental data. Electricity consumption at the production facility was based on specific measurements and product specific data were collected. In cases where allocation could not be avoided the electricity demand was allocated to the product based on its mass or time in the respective machine.

All direct and indirect energy (heat and electricity) consumption were included in the analysis. For the indirect energy use (such as for lighting and heating) a mass-based allocation approach was applied.

Scenarios

The analysis is carried out using factory-specific data for use of energy and utilities and waste generation, as well as product-specific data for use of raw materials. Therefore, the results represent the product system and no other scenarios were applied in production.

Data quality

Site-specific production data has been retrieved for 2020 from the production site. The upstream and downstream processes have been modelled based on data from generic databases, mostly Sphera database. The collected data was reviewed in terms of consistency, and it is estimated as good quality.

Cut-off criteria

The study applies a cut-off criterion of maximum 1%.

Modelling of transportation modules

Three types of transportation processes are included in this LCA study; the transport of raw materials and its packaging to the production sites (A2), the transport of the final products to the customers (A4) and the transport of waste materials from the production sites to the disposal (C2). The following table presents the transport scenarios applied and the modelling assumptions:

Transport module	Transport mode	Average distance (km)	Capacity utilization (%)
Suppliers to manufacturing (A2)	28-32-ton Euro 5 diesel truck	314	85%
	Boat	9 538	
Manufacturing to customer (A4)	28-32-ton Euro 5 diesel truck	632	85%
	Boat	148	
Customer to waste management (C2)	28-32-ton Euro 5 diesel truck	150	85%

Modelling of product manufacturing (A3)

Ceiling diffusers consists primarily of steel, with smaller amounts of plastic and rubber components, as well as paint. The steel sheets produced in upstream modules is supplied in the form of cold rolled sheets that are formed and painted in Swegon's production facility. Additional components such as the plastic nozzles and inlets are also coated and mounted to the product.

The inventory performed for the production process accounts for all the energy and heat flows needed during the production process (including electricity) as well as the energy demands for auxiliary process such as internal transports. Electricity demand in the facilities is modelled using the site-specific renewable electricity mix that is supplied to Swegon, consisting 100% of hydro power. The heat is supplied by district heating, so generic data for the Swedish district heating was used.

A small amount of water use was reported and accounted for. The waste streams from the manufacturing site include steel scrap and the phosphating bath fluid that are sent to recycling and landfill respectively.

Modelling of End-Of-Life (C1-C4)

The impacts from deconstruction were modelled based on literature data for energy use in demolition, accounting for 0.004 MJ of diesel-powered machinery work per kg finished product. The entire product was assumed to be demolished at the End of Life.

Below is an example on how the amounts for C3 and C4 was calculated.

*C3 = Reference flow * 0.85 * share of steel in the product*

C4 = Reference flow - C3

The following end-of-life scenario has been applied:

Scenario	Kg per declared unit	Source for scenario
Recycling, waste processing at treatment plant. (C3)	0.74	Assumption
Disposal, at inert construction waste landfill (C4)	0.26	Assumption

In this scenario, it was assumed that only steel (that represents the main material flow of the product) will be recycled.

Modelling of benefits beyond End-Of-Life (D)

For module D, the benefits from the recycling waste are presented. The steel recycled is credited with the avoided production of the raw material that would be displaced if recycled. A loss factor of 15 % for steel was applied to the benefits from the recycling waste streams since losses exits in the recycling process.

Furthermore, the steel was assumed to consist of 12.7 % scrap which therefore was subtracted before crediting. The steel was credited with the dataset "GLO: Values of scrap (Worldsteel 2018)."

Key estimates and assumptions

The scenarios and assumptions applied in this study for all the life cycle stages included are based on data provided by Swegon and correspond to the most likely scenario.

Content declaration

The content declaration includes the declared unit of product (1 kg) and the associated packaging material; therefore, the gross material weight is larger than 1 kg.

Product components	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Steel	0.865	12.7	0
Polymers	0.070	0	0
Powder coating	0.060	0	0
Rubber	0.005	0	0
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	
Corrugated board box	0.19	19	1.43E-08

No substances that appear in the REACH candidate list of SVHC (Candidate List of Substances of Very High Concern) are present or used in the product concerning this EPD.

Environmental performance for the Ceiling Diffuser 600

Potential environmental impact per kg finished product

Parameter describing environmental impacts	Unit	A1-A3	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
Indicator for climate impact, GWP-GHG	kg CO2 eq.	4,49E+00	4,30E+00	7,21E-02	1,14E-01	4,60E-02	6.49E-03	3.29E-04	8.70E-03	1.95E-03	3.87E-03	-1.05E+00
Climate Change - total	kg CO2 eq.	4,67E+00	4,45E+00	7,34E-02	1,47E-01	4,69E-02	2.68E-01	3.35E-04	8.88E-03	2.00E-03	3.83E-03	-1.10E+00
Climate Change - fossil	kg CO2 eq.	4,62E+00	4,43E+00	7,31E-02	1,16E-01	4,66E-02	6.66E-03	3.33E-04	8.81E-03	1.99E-03	3.93E-03	-1.10E+00
Climate Change - biogenic	kg CO2 eq.	4,38E-02	1,25E-02	2,83E-05	3,13E-02	-5,34E-05	2.61E-01	-4.29E-07	-1.13E-05	6.48E-07	-1.14E-04	-7.10E-04
Climate Change - land use and land use change	kg CO2 eq.	1,37E-03	1,05E-03	2,35E-04	7,67E-05	3,63E-04	4.58E-06	2.76E-06	7.25E-05	1.37E-05	1.16E-05	1.59E-04
Ozone depletion	kg CFC-11 eq.	1,55E-08	1,55E-08	8,57E-18	1,68E-12	5,92E-18	5.16E-17	4.30E-20	1.13E-18	5.15E-18	1.53E-17	-1.83E-15
Acidification	Mol H+ eq.	1,39E-02	1,28E-02	9,29E-04	1,96E-04	2,28E-04	7.44E-05	1.94E-06	2.69E-05	1.92E-05	2.80E-05	-1.97E-03
Eutrophication aquatic freshwater	kg (PO4)3- eq.	6,13E-05	5,93E-05	9,39E-08	1,86E-06	1,32E-07	9.34E-09	1.00E-09	2.63E-08	5.66E-09	6.60E-09	-2.24E-07
Eutrophication aquatic marine	kg N eq.	2,99E-03	2,44E-03	4,67E-04	8,49E-05	8,54E-05	2.71E-05	9.50E-07	1.23E-05	9.42E-06	7.27E-06	-2.93E-04
Eutrophication terrestrial	mol N eq.	3,15E-02	2,56E-02	5,12E-03	7,67E-04	9,49E-04	3.37E-04	1.05E-05	1.38E-04	1.04E-04	7.99E-05	-2.86E-03
Photochemical ozone formation	kg NMVOC eq.	1,02E-02	8,77E-03	1,23E-03	1,84E-04	1,88E-04	7.17E-05	1.83E-06	2.42E-05	2.75E-05	2.20E-05	-1.50E-03
Depletion of abiotic resources - minerals and metals	kg Sb eq.	5,27E-06	5,26E-06	3,67E-09	1,02E-08	3,45E-09	7.89E-10	2.56E-11	6.74E-10	2.18E-09	3.71E-10	-2.38E-06
Depletion of abiotic resources - fossil fuels	MJ	5,19E+01	4,91E+01	9,87E-01	1,81E+00	6,20E-01	8.55E-02	4.48E-03	1.18E-01	3.88E-02	5.22E-02	-9.53E+00
Water use	m^3	5,40E-01	4,33E-01	3,19E-04	1,07E-01	3,89E-04	3.31E-02	2.92E-06	7.69E-05	3.72E-04	4.22E-04	-2.15E-01

Use of resources per kg finished product

Parameter describing environmental impacts	Unit	A1-A3	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE)	MJ	1,22E+01	1,20E+01	2,32E-02	1,75E-01	3,30E-02	1.62E-02	2.50E-04	6.58E-03	2.86E-03	7.03E-03	8.77E-01
Use of renewable primary energy resources used as raw materials (PERM)	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	0.00E+00	0.00E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PERT)	MJ	1,22E+01	1,20E+01	2,32E-02	1,75E-01	3,30E-02	1.62E-02	2.50E-04	6.58E-03	2.86E-03	7.03E-03	8.77E-01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (PENRE)	MJ	5,19E+01	4,91E+01	9,88E-01	1,81E+00	6,21E-01	8.55E-02	4.49E-03	1.18E-01	3.88E-02	5.22E-02	-9.54E+00
Use of non-renewable primary energy resources used as raw materials (PENRM)	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	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (PENRT)	MJ	5,19E+01	4,91E+01	9,88E-01	1,81E+00	6,21E-01	8.55E-02	4.49E-03	1.18E-01	3.88E-02	5.22E-02	-9.54E+00
Use of secondary material (SM)	kg	1.54E-01	1.54E-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	0.00E+00
Use of renewable secondary fuels (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	0.00E+00	0.00E+00
Use of non renewable secondary fuels (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	0.00E+00	0.00E+00
Net use of fresh water (FW)	m^3	3,73E-02	3,47E-02	2,75E-05	2,60E-03	3,79E-05	7.80E-04	2.86E-07	7.53E-06	1.07E-05	1.29E-05	-4.83E-03

Waste production per kg finished product

Parameter describing environmental impacts	Unit	A1-A3	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed (HWD)	kg	3,02E-02	2,90E-08	2,34E-11	3,02E-02	3,00E-11	1.58E-11	2.26E-13	5.95E-12	2.17E-12	5.54E-12	2.66E-09
Non-hazardous waste disposed (NHWD)	kg	2,19E-01	2,19E-01	1,17E-04	5,30E-04	9,08E-05	8.40E-03	6.67E-07	1.75E-05	1.04E-05	2.60E-01	1.15E-01
Radioactive waste disposed (RWD)	kg	4,16E-04	3,60E-04	1,11E-06	5,40E-05	7,48E-07	4.33E-06	5.43E-09	1.43E-07	5.01E-07	5.48E-07	3.45E-07

Output flows per kg finished product

Parameter describing environmental impacts	Unit	A1-A3	A1	A2	A3	A4	A5	C1	C2	C3	C4	D
Components for re-use (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	0.00E+00	0.00E+00
Materials for recycling (MFR)	kg	6,19E-01	0.00E+00	0.00E+00	6,19E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for energy recovery (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	0.00E+00	0.00E+00
Exported electrical energy (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	0.00E+00	0.00E+00	0.00E+00
Exported thermal energy (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	0.00E+00	0.00E+00

Additional information

Certifications and labels

All production plants in Sweden are certified under ISO 14001 and ISO 9001.

Technical documentation

LOCKZONE Ceiling

https://www.swegon.com/siteassets/_product-documents/air-diffusers/ceiling-diffusers/flush-design/_en/lockzoneca.pdf

HAWK Ceiling

https://www.swegon.com/siteassets/_product-documents/air-diffusers/ceiling-diffusers/flush-design/_en/hawkca.pdf

SWIFT Ceiling

https://www.swegon.com/siteassets/_product-documents/air-diffusers/ceiling-diffusers/flush-design/_en/swiftca.pdf

PELICAN CE HF

https://www.swegon.com/siteassets/_product-documents/air-diffusers/extract-air-diffusers/_en/pelicancehfa.pdf

EAGLE Ceiling

https://www.swegon.com/siteassets/_product-documents/air-diffusers/ceiling-diffusers/flush-design/_en/eaglecca_cra.pdf

COLIBRI Ceiling

https://www.swegon.com/siteassets/_product-documents/air-diffusers/ceiling-diffusers/flush-design/_en/colibricb.pdf

VIREO Ceiling

https://www.swegon.com/siteassets/_product-documents/air-diffusers/ceiling-diffusers/flush-design/_en/vireoca_alx.pdf

KITE Ceiling

https://www.swegon.com/siteassets/_product-documents/air-diffusers/ceiling-diffusers/flush-design/_en/kitecra.pdf

Differences from previous version

Version 1.1:

The scope of the EPD has been updated to Global in order for customers all around the world to use it. This implied differences in transport to customer (A4) and the scenarios for end of life was still deemed as representative for the global scope.

Furthermore a previous error was corrected, the upstream impact of the generated production scrap was not accounted for. This is now corrected.

A new product was also added in the product family, KITE.

References

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