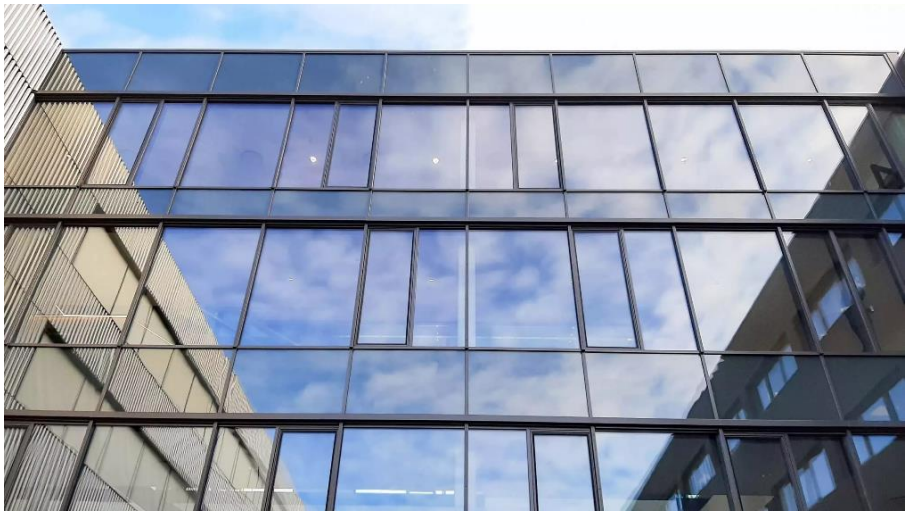
Type III Environmental Product Declaration No. 838/2025

Issuance date: 30.09.2025
Validity date: 30.09.2030

Hansen Fasad systems



Owner of the EPD:

HSHansen
Address: Randersvej 2b
DK-8600 Silkeborg
Denmark
Tel.: +45 96751100
Website: www.hshansen.dk
Contact: info@hsh.dk

EPD Program Operator:

Building Research Institute (ITB)
Address: Filtrowa 1
00-611 Warsaw, Poland
Website: www.itb.pl
Contact: energia@itb.pl

ITB is the verified member of The European Platform for EPD program operators and LCA practitioner www.eco-platform.org

Basic information

This declaration is the Type III Environmental Product Declaration (EPD) based on EN 15804+A2 and verified according to ISO 14025 by an external auditor. It contains the information on the impacts of the declared construction materials on the environment and their aspects verified by the independent third-party authority according to ISO 14025. Basically, comparison or evaluation of EPD data is possible only if all the compared data were created according to EN 15804+A2.

Life cycle analysis (LCA): A1-A3, B4-B6, C1-C4 and D modules in accordance with EN 15804 (Cradle-to-Gate with options)

The year of preparing the EPD: 2025

Product standard: EN 13830:2015+A1:2020

Service Life: 50 years

PCR: ITB-PCR A, v 1.6

Functional unit: 1 m^2

Reasons for performing LCA: B2B

Representativeness: European

MANUFACTURER

HSHansen design, manufacture, and install unitised facades, curtain walling, bolted structural glazing, roofing, entrances, commercial window, and door systems, and other advanced building products. Prefab moves hours from the building site to a controlled environment and results in significantly shorter on-site construction time. HSHansen a/s produces windows, doors, slidings or facades which can be built together in many different ways for the costumers individual specifications. The facade sytems are primarily sold to customers in Denmark, Sweden, United Kingdom and other parts of Europe. Hansen Polska is the manufacturing plant within HansenGroup from 2006. The company is located in Głogów Małopolski, Poland (Fig. 1). The production facilities including warehouse covers an area of 7 800 m².

Fig. 1. Hansen Polska manufacturing plant located in Głogów Małopolski, Poland.

PRODUCTS DESCRIPTION AND APPLICATION

Hansen Fasad is a stick system curtain wall, offering a wide range of applications. It is possible to incorporate openable windows, infills, shadow boxes, sliding doors etc. The system can be used both as a vertical façade and as inclined roof glazing.

The main product components are shown in the table below. Values are given as intervals covering the three declared Hansen Fasad product variations– triple glass, emalit glass and wind panel.

Material	Weight % of declared product
Aluminium	12 - 14
Steel	1 - 16
Glass	0 - 57
Mineral wool	0 - 9
Plastic elements	27 - 32
Packaging material	**kg per declared unit**
Foil	0,1
Wood	2,1

The technical specifications of Hansen Fasad produced by HSHansen a/s are presented in Table 1.

Table 1. The specification of facades systems produced by HSHansen a/s.

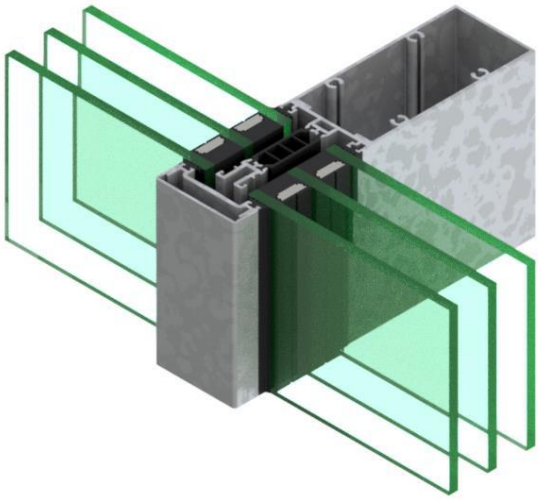
Category	Description
Construction	The static properties of the profiles are optimized, as the compaction of the aluminium profiles and the thermal break contributes to the strength of the system.
Design	Elevation width of the profile system is 50 mm. Profile depth between 50 and 260 mm. The system supplier HansenConcepts is ISO 9001 certified.
Profiles	The system is available in a number of profile designs, which can create different visual appearances of the façade. Standard profiles for Hansen Fasad originate from fabricated profiles produced using Hydro REDUXA billet.
Glazing range	23–71 mm
Thermal insulation	from 0,87 W/m²K
Insulating zone	The profiles are insulated with a specially designed thermal break between the aluminium profiles. This breaks the cold bridge throughout the entire length of the profiles. Extra insulation of the rebate is optional.
Variety	Hansen Fasad® is also found in a Structural Glazing (SG) system, where the glass is held by hidden fittings. For the visual appearance of the façade, the space between the two glass panes is jointed with silicone.
Air permeability	AE 1200
Water tightness	RE 1200
Wind load classification	Serviceability: 2000 Pa Safety: 3000 Pa

More information can be found on the HSHansen a/s website: www.hshansen.com

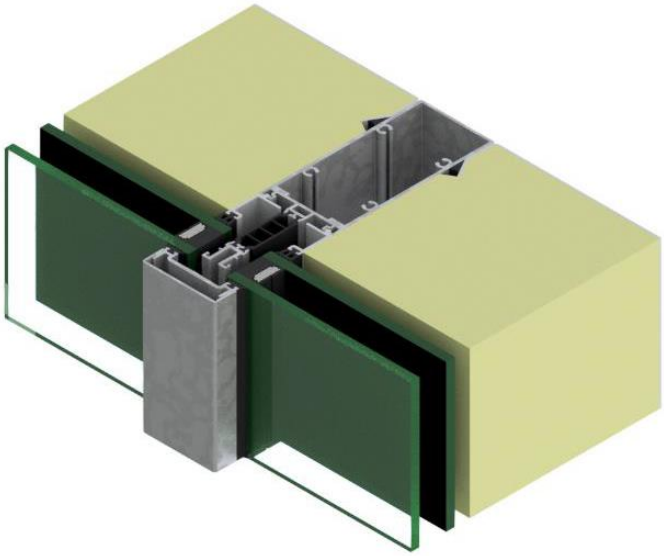
LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Declared Unit

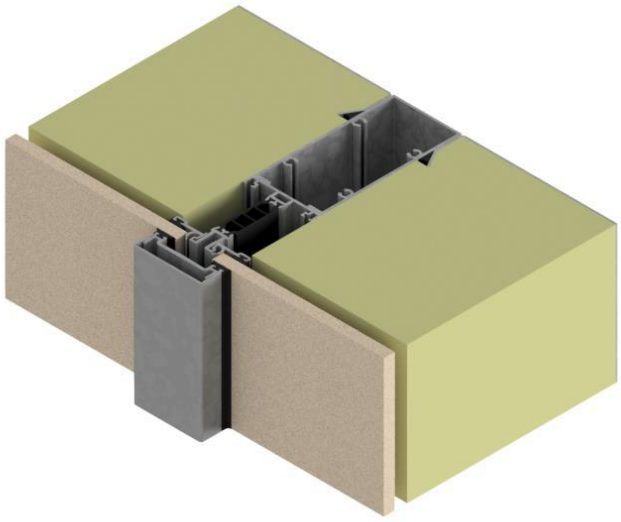
The declaration refers to declared unit (DU) – 1 m^2 of Hansen Fasad – triple glass, emalit glass and wind panel



Hansen Fasad with triple layer glass



Hansen Fasad with emalit glass



Hansen Fasad with wind panel

Allocation

The allocation rules used for this EPD are based on EN 15804 + A2 and ITB-PCR A v 1.6. Production of the facades systems is a line process conducted in the manufacturing plan located in Głogów Małopolski (Poland). All impacts from raw materials extraction and processing are allocated in A1 module of EPD. Input and output data from the production is inventoried and allocated to the production on the mass basis. Water and energy consumption, associated emissions and generated wastes are allocated to module A3. Energy supply was inventoried for whole production process. Packaging materials were taken into consideration.

System boundary

The life cycle analysis (LCA) of the declared products covers: product stage – modules A1-A3, use stage – modules B4-B6, end of life – modules C1-C4 and benefits and loads beyond the system boundary – module D (cradle-to-gate with options). Energy and water consumption, emissions as well as information on generated wastes were inventoried and were included in the calculations. It can be assumed that the total sum of omitted processes does not exceed 5% of all impact categories. In accordance with EN 15804 + A2, machines and facilities (capital goods) required for the production as well as transportation of employees were not included in LCA.

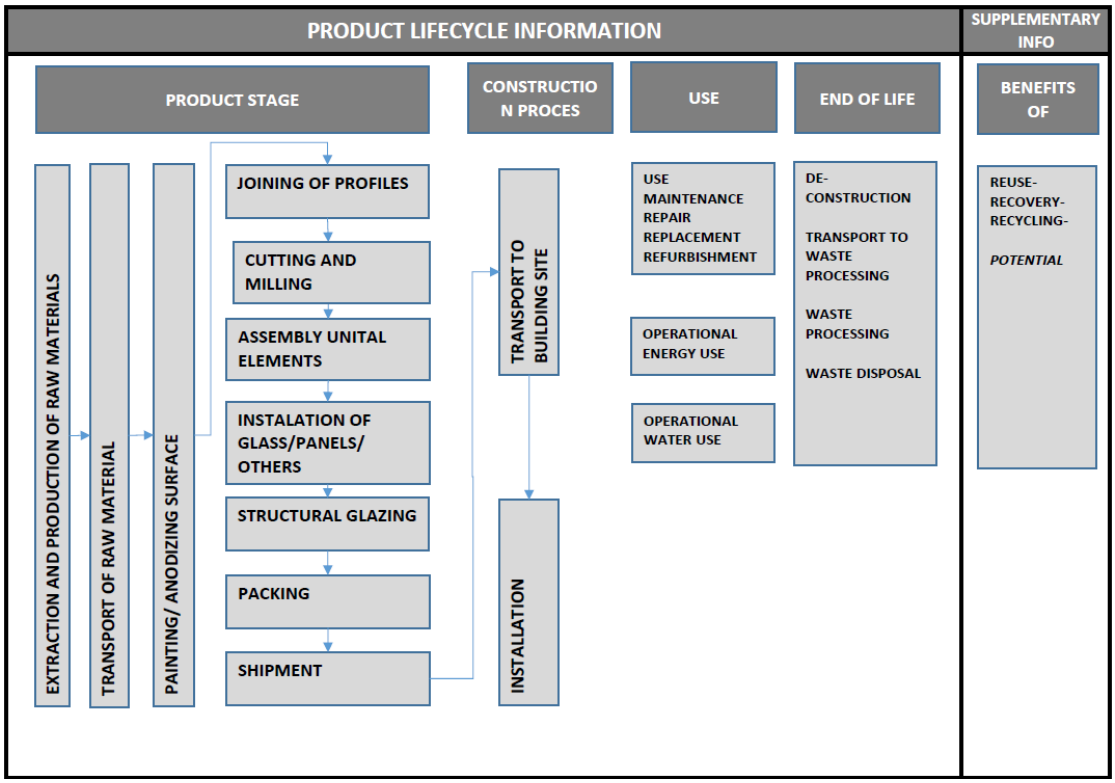


Fig. 2. A scheme of Hansen Fasad which is manufacturing by HSHansen a/s.

System limits

Minimum 99.0% input materials and energy consumption (electricity, gas or LPG) were inventoried in a processing plant and were included in the calculation. In the assessment, all significant parameters from gathered production data are considered, i.e. all material used for each of the representative facade. Substances with a percentage share of less than 0.1% of total mass were excluded from the calculations. The packaging products (wooden pallets) are included. It can be assumed that the total sum of omitted processes does not exceed 5% of all impact categories. In accordance with EN 15804 + A2, machines and facilities (capital goods) required for the production as well as transportation of employees were not included in LCA.

Modules A1 and A2 : *Raw materials supply and transport*

Raw materials such as aluminium or gaskets are produced in Denmark whereas glass and most of ancillary items come mainly from local Polish suppliers. Data on transport of the different products to the manufacturing plants is collected and modelled for factory by assessor. Means of transport include small (>10 t), average (10 – 16 t) and big (>16 t) trucks. Based on data provided by the manufacturer, all input of transport resources was inventoried in details. For A2 module (transport) European averages for fuel data are applied.

Module A3 : *Production*

A scheme of Hansen Fasad production process is presented in Fig. 2. After anodizing or powder coating aluminium surface treatment which is done by external supplier in Denmark or Poland, the profiles are transported (ca. 1400 km) to the production facility in Głogów Małopolski. There, these profiles are CNC machined into correct lengths, holes are drilled and the frames are put together and mounted with glass and fittings for facade systems.

Module B4-B6 : ***Use stage***

In the use stage all impacts related to the use of the Hansen facade system over the entire life cycle. If the product contains at least one insulating glass unit, changing it at least once every 31 years shall be included in Module B4. This does not apply to Windpanel that does not contain insulating glass, therefore the B4 module for them has zero impact.

There are no consumables, maintenance, repair, replacements or refurbishments related to the use of the facades for the period of the reference service life. Facades do not use energy or water during their service life. There are no emissions released from the product during the use. There are no energy use to operate building integrated technical systems like energy use for electrical components e.g. electrical motors. Replacement of the product due to aesthetic reasons (change of design) and not related to the loss of performance is not taken into account. Therefore, modules B5-B6 have zero impacts.

Modules C1-C4 and D ***: End-of-life (EoL)***

It is assumed that at the end-of-life, 100 % of facades are demounted using electric tools. Materials recovered from dismantled products are recycled, incinerated (module C3) and landfilled (module C4) according to the realistic treatment practice (mass allocation) of industrial waste what is presented in Table 2. 95 % of the resulting aluminium undergo recycling after sorting and cutting while the remaining 5 % is forwarded to landfill as mixed construction and demolition wastes. In turn, 60 % plastic elements (e.g. gaskets, PVC) and 30 % glass undergo waste processing while the remaining are forwarded to landfill in the form of mixed construction and demolition wastes. A potential credit resulting from the recycling of aluminium, plastic and glass are presented in module D. Utilization of packaging material which constitute less than 1 % of the total system flows was not taken into consideration.

Table 2. End-of-life scenario for Hansen Fasad components.

Material	Waste processing		Landfilling
	Material recovery (reuse, recycling)	Energy recovery (incineration)	
aluminium / steel	95 %	0 %	5 %
glass	30 %	0 %	70 %
plastic elements (e.g. PVC)	30 %	30 %	40 %

Data quality

The data selected for LCA analysis originates from ITB-LCI questionnaires completed by HSHansen a/s using the inventory data, ITB and Ecoinvent database v. 3.10. No specific data collected is older than five years and no generic datasets used are older than ten years. The representativeness, completeness, reliability, and consistency are judged as good. Data for Polish electricity was supported by Ecoinvent database v. 3.10 and KOBiZE. KOBiZE data is supplemented with Ecoinvent v. 3.10 data on the national electricity mix impact where no specific indicator data is provided. Specific EPDs for aluminium, steel and glass were used for calculations. Environmental characteristics that were not included in these EPDs were taken from the Ecoinvent.

Data collection period

The data for manufacture of the declared products refers to period between 01.07.2022 – 30.06.2023 (1 year). The life cycle assessments were prepared for Europe as reference area.

Assumptions and estimates

Impacts were inventoried and calculated for Hansen facade system at the production site located in Głogów Małopolski (Poland) which are a standard and representative for the HSHansen group system. The results provided in the EPD are presented for an average value (from the formulation and average plant loads, as declared by the HSHansen in the LCI).
As glass type and thickness may vary, the following conversion factors can be used.in order to obtain results for eg. a 4 -18 - 4 - 18 – 4 glass, where values form the Tables 4-7 should be multiplied by a conversion factor of 0.729, and for eg. a 6 - 16 - 6 - 16 - 6 glass, the conversion facor will be 1.094.

Additional information

Polish electricity (Ecoinvent v. 3.10 supplemented by actual national KOBiZE data) emission factor used is 0.597 kg CO_2/kWh. As a general rule, no particular environmental or health protection measures other than those specified by law are necessary.

Calculation rules

LCA was performed using ITB-LCA tool developed in accordance with EN 15804 + A2.

Databases

The data for the processes comes from Ecoinvent v. 3.10 and ITB-Database. Specific data quality analysis was a part of external audit.

LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit

The declaration refers to declared unit (DU) – 1 m^2 of Hansen Fasad : triple glass, emalit glass and wind panel.

Table 3. System boundaries for the environmental characteristic of Hansen Fasade system.

Environmental assessment information (MD – Module Declared, MND – Module Not Declared, INA – Indicator Not Assessed)																
Product stage			Construction process		Use stage							End of life				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport to construction site	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction 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
MD	MD	MD	MND	MND	MND	MND	MND	MD	MD	MD	MND	MD	MD	MD	MD	MD

Table 4. LCA results of Hansen Fasade – 1 m^2 of triple glass – environmental impacts

Indicator	Unit	A1	A2	A3	A1-A3	B4	B5	B6	C1	C2	C3	C4	D
Global Warming Potential - total	eq. kg CO_2	1.09E+02	4.27E+00	4.87E+00	1.18E+02	3.89E+01	0.00E+00	0.00E+00	1.37E-01	5.71E-01	7.46E+00	7.74E-01	-2.15E+01
Greenhouse gas potential - fossil	eq. kg CO_2	1.10E+02	4.25E+00	4.84E+00	1.19E+02	3.85E+01	0.00E+00	0.00E+00	1.36E-01	5.69E-01	3.68E+00	7.70E-01	-2.27E+01
Greenhouse gas potential - biogenic	eq. kg CO_2	-8.08E-01	1.45E-02	3.04E-02	-7.63E-01	1.37E-01	0.00E+00	0.00E+00	8.73E-04	1.94E-03	3.44E+00	3.31E-03	1.31E+00
Global warming potential - land use and land use change	eq. kg CO_2	3.46E-01	1.67E-03	1.64E-03	3.49E-01	2.58E-01	0.00E+00	0.00E+00	4.80E-05	2.23E-04	4.21E-04	2.81E-04	-1.22E-02
Stratospheric ozone depletion potential	eq. kg CFC 11	2.42E-05	9.83E-07	1.24E-07	2.54E-05	3.97E-06	0.00E+00	0.00E+00	8.24E-10	1.32E-07	2.91E-08	9.23E-08	-1.04E-05
Soil and water acidification potential	eq. mol H^+	5.69E-01	1.72E-02	5.03E-02	6.36E-01	2.18E-01	0.00E+00	0.00E+00	1.61E-03	2.31E-03	2.90E-03	2.73E-03	-1.10E-01
Eutrophication potential - freshwater	eq. kg P	1.87E-02	2.86E-04	7.91E-03	2.69E-02	5.69E-03	0.00E+00	0.00E+00	2.59E-04	3.82E-05	2.96E-04	3.29E-05	-5.92E-03
Eutrophication potential - seawater	eq. kg N	1.04E-01	5.21E-03	7.61E-03	1.16E-01	4.43E-02	0.00E+00	0.00E+00	2.29E-04	6.97E-04	1.27E-03	3.27E-03	-1.71E-02
Eutrophication potential - terrestrial	eq. mol N	1.19E+00	5.68E-02	6.45E-02	1.31E+00	5.80E-01	0.00E+00	0.00E+00	2.00E-03	7.60E-03	1.17E-02	1.07E-02	-2.51E-01
Potential for photochemical ozone synthesis	eq. kg NMVOC	3.64E-01	1.74E-02	2.18E-02	4.03E-01	1.35E-01	0.00E+00	0.00E+00	5.72E-04	2.33E-03	3.19E-03	3.21E-03	-6.21E-02
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	1.77E-03	1.51E-05	2.40E-06	1.79E-03	1.05E-03	0.00E+00	0.00E+00	6.12E-08	2.02E-06	5.37E-06	9.59E-07	-5.69E-04
Abiotic depletion potential - fossil fuels	MJ	1.74E+03	6.31E+01	1.14E+02	1.91E+03	5.08E+02	0.00E+00	0.00E+00	2.42E+00	8.44E+00	4.77E+00	7.14E+00	-4.66E+02
Water deprivation potential	eq. m^3	5.49E+01	2.92E-01	1.51E+00	5.67E+01	2.80E+01	0.00E+00	0.00E+00	4.55E-02	3.90E-02	5.35E-01	3.41E-02	-1.71E+01

Table 5. LCA results of Hansen Fasade – 1 m^2 of triple glass – additional impacts indicators

Indicator	Unit	A1	A2	A3	A1-A3	B4	B5	B6	C1	C2	C3	C4	D
Particulate matter	disease incidence	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

Table 6. LCA results of Hansen Fasade – 1 m^2 of triple glass – the resource use

Indicator	Unit	A1	A2	A3	A1-A3	B4	B5	B6	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	5.62E+02	9.05E-01	7.00E+00	5.70E+02	3.78E+01	0.00E+00	0.00E+00	2.27E-01	1.21E-01	-4.24E+01	3.40E-03	-2.18E+00
Consumption of renewable primary energy resources used as raw materials	MJ	6.10E+01	0.00E+00	0.00E+00	6.10E+01	4.33E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.33E+01	0.00E+00	0.00E+00
Total consumption of renewable primary energy resources	MJ	6.06E+02	9.05E-01	7.00E+00	6.14E+02	6.38E+01	0.00E+00	0.00E+00	2.27E-01	1.21E-01	9.22E-01	9.20E-02	-1.61E+01
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.40E+03	6.31E+01	7.95E+01	1.54E+03	5.08E+02	0.00E+00	0.00E+00	2.42E+00	8.44E+00	-2.24E+02	4.30E-01	-2.10E+01
Consumption of non-renewable primary energy resources used as raw materials	MJ	3.39E+02	0.00E+00	3.47E+01	3.73E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.28E+02	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	1.74E+03	6.31E+01	1.14E+02	1.91E+03	5.08E+02	0.00E+00	0.00E+00	2.42E+00	8.44E+00	4.77E+00	7.14E+00	-4.66E+02
Consumption of secondary materials	kg	1.71E+00	2.12E-02	1.24E-02	1.74E+00	6.25E-01	0.00E+00	0.00E+00	2.18E-04	2.83E-03	1.39E-02	2.52E-03	1.36E+01
Consumption of renewable secondary fuels	MJ	6.64E-01	2.33E-04	3.89E-05	6.64E-01	2.38E-01	0.00E+00	0.00E+00	1.09E-06	3.12E-05	1.92E-04	5.46E-05	-2.27E-03
Consumption of non-renewable secondary fuels	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	0.00E+00
Net consumption of freshwater resources	m^3	4.45E+00	7.94E-03	1.94E-01	4.65E+00	5.33E-01	0.00E+00	0.00E+00	6.82E-03	1.06E-03	9.88E-03	7.48E-03	-4.12E-01

Table 7. LCA results of Hansen Fasade – 1 m^2 of triple glass – waste categories

Indicator	Unit	A1	A2	A3	A1-A3	B4	B5	B6	C1	C2	C3	C4	D
Hazardous waste neutralized	kg	6.42E+01	7.08E-02	8.49E-01	6.51E+01	6.05E+01	0.00E+00	0.00E+00	2.74E-02	9.47E-03	3.26E-01	1.20E-02	-1.70E+00
Non-hazardous waste neutralised	kg	8.73E+01	1.26E+00	3.85E+01	1.27E+02	9.01E+00	0.00E+00	0.00E+00	1.26E+00	1.68E-01	9.53E+00	6.43E+00	-2.91E+01
Radioactive waste	kg	3.10E-02	4.34E-04	1.23E-05	3.15E-02	2.78E-02	0.00E+00	0.00E+00	3.54E-07	5.82E-05	2.19E-05	4.19E-05	-4.56E-04
Components for re-use	kg	0.00E+00	0.00E+00	1.92E-04	1.92E-04	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	kg	4.00E+00	1.95E-04	6.05E-04	4.00E+00	1.15E+00	0.00E+00	0.00E+00	1.89E-05	2.61E-05	4.31E+00	1.13E-03	-4.75E+00
Materials for energy recovery	kg	1.25E-01	1.58E-06	1.45E-06	1.25E-01	1.09E-01	0.00E+00	0.00E+00	2.68E-08	2.11E-07	1.30E-06	4.21E-07	1.22E-04
Energy exported	MJ	1.16E+00	7.00E-02	6.06E-02	1.29E+00	4.20E-02	0.00E+00	0.00E+00	1.84E-03	9.37E-03	5.19E+00	1.69E-02	-1.08E+00

Table 8. LCA results of Hansen Fasade – 1 m^2 of emalit glass – environmental impacts

Indicator	Unit	A1	A2	A3	A1-A3	B4	B5	B6	C1	C2	C3	C4	D
Global Warming Potential - total	eq. kg CO_2	1.23E+02	4.27E+00	4.87E+00	1.32E+02	3.49E+01	0.00E+00	0.00E+00	1.37E-01	6.11E-01	9.96E+00	8.37E-01	-2.64E+01
Greenhouse gas potential - fossil	eq. kg CO_2	1.23E+02	4.25E+00	4.84E+00	1.32E+02	3.45E+01	0.00E+00	0.00E+00	1.36E-01	6.09E-01	0.00E+00	8.34E-01	-2.82E+01
Greenhouse gas potential - biogenic	eq. kg CO_2	-5.96E-01	1.45E-02	3.04E-02	-5.51E-01	1.23E-01	0.00E+00	0.00E+00	8.73E-04	2.08E-03	0.00E+00	2.27E-03	1.78E+00
Global warming potential - land use and land use change	eq. kg CO_2	3.34E-01	1.67E-03	1.64E-03	3.37E-01	2.31E-01	0.00E+00	0.00E+00	4.80E-05	2.39E-04	0.00E+00	1.95E-04	-1.51E-02
Stratospheric ozone depletion potential	eq. kg CFC 11	2.53E-05	9.83E-07	1.24E-07	2.64E-05	3.56E-06	0.00E+00	0.00E+00	8.24E-10	1.41E-07	4.13E-10	5.95E-08	-1.39E-05
Soil and water acidification potential	eq. mol H^+	6.63E-01	1.72E-02	5.03E-02	7.30E-01	1.96E-01	0.00E+00	0.00E+00	1.61E-03	2.47E-03	0.00E+00	1.87E-03	-1.28E-01
Eutrophication potential - freshwater	eq. kg P	2.40E-02	2.86E-04	7.91E-03	3.22E-02	5.18E-03	0.00E+00	0.00E+00	2.59E-04	4.09E-05	0.00E+00	2.42E-05	-7.19E-03
Eutrophication potential - seawater	eq. kg N	1.16E-01	5.21E-03	7.61E-03	1.29E-01	3.98E-02	0.00E+00	0.00E+00	2.29E-04	7.46E-04	0.00E+00	3.75E-03	-2.06E-02
Eutrophication potential - terrestrial	eq. mol N	1.34E+00	5.68E-02	6.45E-02	1.47E+00	5.20E-01	0.00E+00	0.00E+00	2.00E-03	8.14E-03	1.20E-13	7.35E-03	-2.86E-01
Potential for photochemical ozone synthesis	eq. kg NMVOC	4.21E-01	1.74E-02	2.18E-02	4.61E-01	1.21E-01	0.00E+00	0.00E+00	5.72E-04	2.49E-03	0.00E+00	2.28E-03	-7.72E-02
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	2.00E-03	1.51E-05	2.40E-06	2.02E-03	9.38E-04	0.00E+00	0.00E+00	6.12E-08	2.16E-06	0.00E+00	6.45E-07	-6.72E-04
Abiotic depletion potential - fossil fuels	MJ	1.92E+03	6.31E+01	1.14E+02	2.09E+03	4.56E+02	0.00E+00	0.00E+00	2.42E+00	9.04E+00	0.00E+00	4.80E+00	-6.07E+02
Water deprivation potential	eq. m^3	5.84E+01	2.92E-01	1.51E+00	6.02E+01	2.51E+01	0.00E+00	0.00E+00	4.55E-02	4.18E-02	4.25E-16	2.41E-02	-2.06E+01

Table 9. LCA results of Hansen Fasade – 1 m^2 of emalit glass – additional impacts indicators

Indicator	Unit	A1	A2	A3	A1-A3	B4	B5	B6	C1	C2	C3	C4	D
Particulate matter	disease incidence	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

Table 10. LCA results of Hansen Fasade – 1 m^2 of emalit glass – the resource use

Indicator	Unit	A1	A2	A3	A1-A3	B4	B5	B6	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	5.93E+02	9.05E-01	7.00E+00	6.01E+02	3.39E+01	0.00E+00	0.00E+00	2.27E-01	1.30E-01	0.00E+00	3.40E-03	-2.10E+00
Consumption of renewable primary energy resources used as raw materials	MJ	5.65E+01	0.00E+00	0.00E+00	5.65E+01	3.88E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of renewable primary energy resources	MJ	6.34E+02	9.05E-01	7.00E+00	6.42E+02	5.72E+01	0.00E+00	0.00E+00	2.27E-01	1.30E-01	9.23E-18	6.80E-02	-1.85E+01
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.56E+03	6.31E+01	7.95E+01	1.70E+03	4.56E+02	0.00E+00	0.00E+00	2.42E+00	9.04E+00	0.00E+00	4.30E-01	-2.02E+01
Consumption of non-renewable primary energy resources used as raw materials	MJ	3.60E+02	0.00E+00	3.47E+01	3.94E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	1.92E+03	6.31E+01	1.14E+02	2.09E+03	4.56E+02	0.00E+00	0.00E+00	2.42E+00	9.04E+00	0.00E+00	4.80E+00	-6.07E+02
Consumption of secondary materials	kg	2.84E+00	2.12E-02	1.24E-02	2.87E+00	5.60E-01	0.00E+00	0.00E+00	2.18E-04	3.03E-03	2.66E-21	1.71E-03	1.83E+01
Consumption of renewable secondary fuels	MJ	6.43E-01	2.33E-04	3.89E-05	6.43E-01	2.13E-01	0.00E+00	0.00E+00	1.09E-06	3.34E-05	0.00E+00	4.39E-05	-1.42E-03
Consumption of non-renewable secondary fuels	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	0.00E+00
Net consumption of freshwater resources	m^3	4.51E+00	7.94E-03	1.94E-01	4.72E+00	4.79E-01	0.00E+00	0.00E+00	6.82E-03	1.14E-03	0.00E+00	4.86E-03	-4.88E-01

Table 11. LCA results of Hansen Fasade – 1 m^2 of emalit glass – waste categories

Indicator	Unit	A1	A2	A3	A1-A3	B4	B5	B6	C1	C2	C3	C4	D
Hazardous waste neutralized	kg	6.15E+01	7.08E-02	8.49E-01	6.24E+01	5.42E+01	0.00E+00	0.00E+00	2.74E-02	1.01E-02	0.00E+00	8.43E-03	-2.11E+00
Non-hazardous waste neutralised	kg	1.13E+02	1.26E+00	3.85E+01	1.53E+02	8.47E+00	0.00E+00	0.00E+00	1.26E+00	1.80E-01	0.00E+00	8.54E+00	-3.42E+01
Radioactive waste	kg	2.85E-02	4.34E-04	1.23E-05	2.89E-02	2.49E-02	0.00E+00	0.00E+00	3.54E-07	6.23E-05	0.00E+00	2.70E-05	-5.46E-04
Components for re-use	kg	0.00E+00	0.00E+00	1.92E-04	1.92E-04	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	kg	3.88E+00	1.95E-04	6.05E-04	3.89E+00	1.03E+00	0.00E+00	0.00E+00	1.89E-05	2.80E-05	0.00E+00	1.12E-03	-4.28E+00
Materials for energy recovery	kg	1.13E-01	1.58E-06	1.45E-06	1.13E-01	9.81E-02	0.00E+00	0.00E+00	2.68E-08	2.26E-07	0.00E+00	2.37E-07	1.68E-04
Energy exported	MJ	1.86E+00	7.00E-02	6.06E-02	1.99E+00	3.82E-02	0.00E+00	0.00E+00	1.84E-03	1.00E-02	0.00E+00	1.15E-02	-1.28E+00

Table 12. LCA results of Hansen Fasade – 1 m^2 of wind panel – environmental impacts

Indicator	Unit	A1	A2	A3	A1-A3	B4	B5	B6	C1	C2	C3	C4	D
Global Warming Potential - total	eq. kg CO_2	1.13E+02	4.27E+00	4.87E+00	1.23E+02	0.00E+00	0.00E+00	0.00E+00	1.37E-01	5.10E-01	1.51E+01	1.14E+00	-1.94E+01
Greenhouse gas potential - fossil	eq. kg CO_2	1.20E+02	4.25E+00	4.84E+00	1.29E+02	0.00E+00	0.00E+00	0.00E+00	1.36E-01	5.08E-01	2.98E-01	1.14E+00	-2.08E+01
Greenhouse gas potential - biogenic	eq. kg CO_2	-6.94E+00	1.45E-02	3.04E-02	-6.90E+00	0.00E+00	0.00E+00	0.00E+00	8.73E-04	1.74E-03	4.37E-01	1.82E-03	1.36E+00
Global warming potential - land use and land use change	eq. kg CO_2	1.14E-01	1.67E-03	1.64E-03	1.17E-01	0.00E+00	0.00E+00	0.00E+00	4.80E-05	1.99E-04	3.95E-04	1.71E-04	-1.20E-02
Stratospheric ozone depletion potential	eq. kg CFC 11	2.22E-05	9.83E-07	1.24E-07	2.34E-05	0.00E+00	0.00E+00	0.00E+00	8.24E-10	1.17E-07	1.55E-08	4.21E-08	-1.02E-05
Soil and water acidification potential	eq. mol H^+	5.50E-01	1.72E-02	5.03E-02	6.18E-01	0.00E+00	0.00E+00	0.00E+00	1.61E-03	2.06E-03	2.10E-03	1.69E-03	-8.04E-02
Eutrophication potential - freshwater	eq. kg P	2.01E-02	2.86E-04	7.91E-03	2.83E-02	0.00E+00	0.00E+00	0.00E+00	2.59E-04	3.41E-05	1.39E-04	2.27E-05	-5.00E-03
Eutrophication potential - seawater	eq. kg N	9.81E-02	5.21E-03	7.61E-03	1.11E-01	0.00E+00	0.00E+00	0.00E+00	2.29E-04	6.22E-04	7.35E-04	5.29E-03	-1.45E-02
Eutrophication potential - terrestrial	eq. mol N	1.06E+00	5.68E-02	6.45E-02	1.18E+00	0.00E+00	0.00E+00	0.00E+00	2.00E-03	6.79E-03	5.52E-03	6.83E-03	-1.65E-01
Potential for photochemical ozone synthesis	eq. kg NMVOC	3.72E-01	1.74E-02	2.18E-02	4.11E-01	0.00E+00	0.00E+00	0.00E+00	5.72E-04	2.08E-03	1.63E-03	2.24E-03	-5.75E-02
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	1.36E-03	1.51E-05	2.40E-06	1.38E-03	0.00E+00	0.00E+00	0.00E+00	6.12E-08	1.80E-06	1.23E-05	5.16E-07	-4.34E-04
Abiotic depletion potential - fossil fuels	MJ	1.78E+03	6.31E+01	1.14E+02	1.95E+03	0.00E+00	0.00E+00	0.00E+00	2.42E+00	7.54E+00	2.84E+00	4.02E+00	-4.47E+02
Water deprivation potential	eq. m^3	3.55E+01	2.92E-01	1.51E+00	3.73E+01	0.00E+00	0.00E+00	0.00E+00	4.55E-02	3.48E-02	6.43E-02	2.12E-02	-1.21E+01

Table 13. LCA results of Hansen Fasade – 1 m^2 of wind panel – additional impacts indicators

Indicator	Unit	A1	A2	A3	A1-A3	B4	B5	B6	C1	C2	C3	C4	D
Particulate matter	disease incidence	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

Table 14. LCA results of Hansen Fasade – 1 m^2 of wind panel – the resource use

Indicator	Unit	A1	A2	A3	A1-A3	B4	B5	B6	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	5.98E+02	9.05E-01	7.00E+00	6.06E+02	0.00E+00	0.00E+00	0.00E+00	2.27E-01	1.08E-01	0.00E+00	6.94E-03	-2.87E+00
Consumption of renewable primary energy resources used as raw materials	MJ	7.88E+01	0.00E+00	0.00E+00	7.88E+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
Total consumption of renewable primary energy resources	MJ	6.77E+02	9.05E-01	7.00E+00	6.85E+02	0.00E+00	0.00E+00	0.00E+00	2.27E-01	1.08E-01	3.89E-01	6.40E-02	-1.16E+01
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.41E+03	6.31E+01	7.95E+01	1.55E+03	0.00E+00	0.00E+00	0.00E+00	2.42E+00	7.54E+00	0.00E+00	8.79E-01	-2.64E+01
Consumption of non-renewable primary energy resources used as raw materials	MJ	3.67E+02	0.00E+00	3.47E+01	4.02E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	1.78E+03	6.31E+01	1.14E+02	1.95E+03	0.00E+00	0.00E+00	0.00E+00	2.42E+00	7.54E+00	2.84E+00	4.02E+00	-4.47E+02
Consumption of secondary materials	kg	2.80E+00	2.12E-02	1.24E-02	2.83E+00	0.00E+00	0.00E+00	0.00E+00	2.18E-04	2.53E-03	5.13E-03	1.49E-03	1.36E+01
Consumption of renewable secondary fuels	MJ	4.30E-01	2.33E-04	3.89E-05	4.30E-01	0.00E+00	0.00E+00	0.00E+00	1.09E-06	2.78E-05	4.27E-04	4.53E-05	8.99E-04
Consumption of non-renewable secondary fuels	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	0.00E+00
Net consumption of freshwater resources	m^3	4.13E+00	7.94E-03	1.94E-01	4.33E+00	0.00E+00	0.00E+00	0.00E+00	6.82E-03	9.48E-04	1.62E-03	3.55E-03	-2.78E-01

Table 15. LCA results of Hansen Fasade – 1 m^2 of wind panel – waste categories

Indicator	Unit	A1	A2	A3	A1-A3	B4	B5	B6	C1	C2	C3	C4	D
Hazardous waste neutralized	kg	7.36E+00	7.08E-02	8.49E-01	8.28E+00	0.00E+00	0.00E+00	0.00E+00	2.74E-02	8.46E-03	2.83E-02	7.40E-03	-1.57E+00
Non-hazardous waste neutralised	kg	1.11E+02	1.26E+00	3.85E+01	1.51E+02	0.00E+00	0.00E+00	0.00E+00	1.26E+00	1.50E-01	5.27E-01	1.29E+01	-2.51E+01
Radioactive waste	kg	1.09E-02	4.34E-04	1.23E-05	1.14E-02	0.00E+00	0.00E+00	0.00E+00	3.54E-07	5.19E-05	9.06E-06	1.91E-05	-3.34E-04
Components for re-use	kg	0.00E+00	0.00E+00	1.92E-04	1.92E-04	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	kg	2.86E+00	1.95E-04	6.05E-04	2.86E+00	0.00E+00	0.00E+00	0.00E+00	1.89E-05	2.33E-05	1.74E+01	2.27E-03	-1.11E+01
Materials for energy recovery	kg	1.53E-02	1.58E-06	1.45E-06	1.53E-02	0.00E+00	0.00E+00	0.00E+00	2.68E-08	1.89E-07	4.74E-07	1.20E-07	1.25E-04
Energy exported	MJ	1.94E+00	7.00E-02	6.06E-02	2.07E+00	0.00E+00	0.00E+00	0.00E+00	1.84E-03	8.36E-03	1.15E-01	9.91E-03	-1.21E+00

A1-A3 modules tables overview

ENVIRONMENTAL IMPACTS PER SQUARE METER				
Indicator	**Unit**	Hansen Fasad with triple layer glass	Hansen Fasad with emalit glass	Hansen Fasad with wind panel
		A1-A3	**A1-A3**	**A1-A3**
Global Warming Potential - total	eq. kg CO_2	1.18E+02	1.32E+02	1.23E+02
Greenhouse gas potential - fossil	eq. kg CO_2	1.19E+02	1.32E+02	1.29E+02
Greenhouse gas potential - biogenic	eq. kg CO_2	-7.63E-01	-5.51E-01	-6.90E+00
Global warming potential - land use and land use change	eq. kg CO_2	3.49E-01	3.37E-01	1.17E-01
Stratospheric ozone depletion potential	eq. kg CFC 11	2.54E-05	2.64E-05	2.34E-05
Soil and water acidification potential	eq. mol H^+	6.36E-01	7.30E-01	6.18E-01
Eutrophication potential - freshwater	eq. kg P	2.69E-02	3.22E-02	2.83E-02
Eutrophication potential - seawater	eq. kg N	1.16E-01	1.29E-01	1.11E-01
Eutrophication potential - terrestrial	eq. mol N	1.31E+00	1.47E+00	1.18E+00
Potential for photochemical ozone synthesis	eq. kg NMVOC	4.03E-01	4.61E-01	4.11E-01
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	1.79E-03	2.02E-03	1.38E-03
Abiotic depletion potential - fossil fuels	MJ	1.91E+03	2.09E+03	1.95E+03
Water deprivation potential	eq. m^3	5.67E+01	6.02E+01	3.73E+01

RESOURCE USE PER SQUARE METER				
Indicator	**Unit**	Hansen Fasad with triple layer glass	Hansen Fasad with emalit glass	Hansen Fasad with wind panel
		A1-A3	**A1-A3**	**A1-A3**
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	5.70E+02	6.01E+02	6.06E+02
Consumption of renewable primary energy resources used as raw materials	MJ	6.10E+01	5.65E+01	7.88E+01
Total consumption of renewable primary energy resources	MJ	6.14E+02	6.42E+02	6.85E+02
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.54E+03	1.70E+03	1.55E+03
Consumption of non-renewable primary energy resources used as raw materials	MJ	3.73E+02	3.94E+02	4.02E+02
Total consumption of non-renewable primary energy resources	MJ	1.91E+03	2.09E+03	1.95E+03
Consumption of secondary materials	kg	1.74E+00	2.87E+00	2.83E+00
Consumption of renewable secondary fuels	MJ	6.64E-01	6.43E-01	4.30E-01
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater resources	m^3	4.65E+00	4.72E+00	4.33E+00

WASTE CATEGORIES PER SQUARE METER				
Indicator	**Unit**	Hansen Fasad with triple layer glass	Hansen Fasad with emalit glass	Hansen Fasad with wind panel
		A1-A3	**A1-A3**	**A1-A3**
Hazardous waste neutralized	kg	6.51E+01	6.24E+01	8.28E+00
Non-hazardous waste neutralised	kg	1.27E+02	1.53E+02	1.51E+02
Radioactive waste	kg	3.15E-02	2.89E-02	1.14E-02
Components for re-use	kg	1.92E-04	1.92E-04	1.92E-04
Materials for recycling	kg	4.00E+00	3.89E+00	2.86E+00
Materials for energy recovery	kg	1.25E-01	1.13E-01	1.53E-02
Energy exported	MJ	1.29E+00	1.99E+00	2.07E+00

Verification

The process of verification of this EPD is in accordance with ISO 14025 and ISO 21930. After verification, this EPD is valid for a 5-year-period. EPD does not have to be recalculated after 5 years, if the underlying data have not changed significantly.

The basis for LCA analysis was EN 15804 + A2 and ITB PCR A
Independent verification corresponding to ISO 14025 (subclause 8.1.3) ☒ external ☐ internal
External verification of EPD: Halina Prejzner, PhD Eng. LCA, LCI audit and input data verification: Mateusz Kozicki, PhD Verification of LCA: Michał Piasecki, PhD D.Sc. Eng.

Note 1: The declaration owner has the sole ownership. liability and responsibility for the for the information provided and contained in EPD. Declarations within the same product category but from different programs may not be comparable. Declarations of construction products may not be comparable if they do not comply with EN 15804 + A2. For further information about comparability. see EN 15804 + A2 and ISO 14025. Depending on the application. a corresponding conversion factor such as the specific weight per surface area must be taken into consideration.

Note 2: ITB is a public Research Organization and Notified Body (EC Reg. no 1488) to the European Commission and to other Member States of the European Union designated for the tasks concerning the assessment of building products' performance. ITB acts as the independent. third-party verification organization (17065/17025 certified). ITB-EPD program is recognized and registered member of The European Platform – Association of EPD program operators and ITB-EPD declarations are registered and stored in the international ECO-PORTAL.

Normative references

- ITB-PCR A. v. 1.6 General Product Category Rules for Construction Products
- EN 13830:2015+A1:2020 Curtain walling - Product standard
- ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and procedures
- ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services
- ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guidelines
- ISO 15686-1:2011 Buildings and constructed assets – Service life planning – Part 1: General principles and framework
- ISO 15686-8:2008 Buildings and constructed assets – Service life planning – Part 8: Reference service life and service-life estimation
- EN 15804:2012+A2:2019 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
- ISO 14067:2018 Greenhouse gases - Carbon footprint of products - Requirements and guidelines for quantification
- EN 15942:2012 Sustainability of construction works – Environmental product declarations – Communication format business-to-business
- EN 14351-1+A2 Windows and doors - Product standard. performance characteristics - Part 1: Windows and external pedestrian doorsets
- EN 17213: 2020 Windows and doors - Environmental Product Declarations - Product category rules for windows and pedestrian doorsets
- KOBiZE Emissions (CO_2, SO_2, NO_x, CO and total dust) from electricity, December 2023

LCA, LCI audit and input data verification
Mateusz Kozicki, PhD

qualified electronic signature

Head of the Thermal Physic, Acoustics and Environment Department
Agnieszka Winkler-Skalna, PhD

qualified electronic signature

Instytut Techniki Budowlanej

Instytut Techniki Budowlanej
00-611 Warsaw, Filtrowa 1

Thermal Physics, Acoustics and Environment Department
02-656 Warsaw, Ksawerów 21

CERTIFICATE № 838/2025
of TYPE III ENVIRONMENTAL DECLARATION

Products:

Hansen Fasad systems

Manufacturer:

HSHansen

Randersvej 2b, DK-8600 Silkeborg, Denmark

confirms the correctness of the data included in the development of
Type III Environmental Declaration and accordance with the requirements of the standard

EN 15804+A2

Sustainability of construction works.
Environmental product declarations.
Core rules for the product category of construction products.

This certificate, issued on 30th September 2025 is valid for 5 years
or until amendment of mentioned Environmental Declaration

Head of the Thermal Physic, Acoustics and Environment Department
Agnieszka Winkler-Skalna, PhD

INSTYTUT TECHNIKI BUDOWLANEJ

Deputy Director for Research and Innovation
Krzysztof Kuczyński, PhD

Warsaw, September 2025