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Valid to: 05-04-2023

3rd PARTY VERIFIED

EPD

VERIFIED ENVIRONMENTAL PRODUCT DECLARATION | ISO 14025 & EN 15804



Owner of declaration

HSHansen
Bredgade 4
DK-6950 Lem



Issued:
03-04-2020

Valid to:
05-04-2023

Basis of calculation

This EPD is developed in accordance with the European standard EN 15804+A1.

Comparability

EPDs of construction products may not be comparable if they do not comply with the requirements in EN 15804. EPD data may not be comparable if the datasets used are not developed in accordance with EN 15804 and if the background systems are not based on the same database.

Validity

This EPD has been verified in accordance with ISO 14025 and is valid for 5 years from the date of issue.

Use

The intended use of an EPD is to communicate scientifically based environmental information for construction products, for the purpose of assessing the environmental performance of buildings.

EPD type

- Cradle-to-gate
- Cradle-to-gate with options
- Cradle-to-grave

Programme operator

Danish Technological Institute
www.dti.dk



Programme

EPD Danmark
www.epddanmark.dk



Declared products


Hansen UnitAl with triple layer glass-REDUXA (160 mm)
Hansen UnitAl with emalite glass-REDUXA (160 mm)
Hansen UnitAl with panel-REDUXA (160 mm)

Production site

Bredgade 4
DK-6950 Lem
Denmark

Products use

Hansen UnitAl is a prefabricated system for facades and roof. Prefab reduces the time on the building site and moves the processes to controlled conditions. This ensures a shorter lead time on the building site. UnitAl is usually manufactured in widths of 3.000 mm and one full floor height. The width is chosen due to transportation. Good planning and performance at the site can close up to 400 m² facade on one day.

| |
|---|
| CEN standard EN 15804 serves as the core PCR |
| Independent verification of the declaration and data, according to EN ISO 14025 <input type="checkbox"/> internal <input checked="" type="checkbox"/> external |
| Third party verifier:  Kim Christiansen |

Declared unit

1 square meter



Henrik Fred Larsen
EPD Danmark

Life cycle stages and modules (X = module declared MND = module not declared)

| Product | | | Construction process | | Use | | | | | | | | End of life | | | | Beyond the system boundary |
|---------------------|-----------|---------------|----------------------|----------------------|-----|-------------|--------|-------------|---------------|------------------------|-----------------------|----------------------------|-------------|------------------|----------|--|----------------------------|
| Raw material supply | Transport | Manufacturing | Transport | Installation process | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Re-use, recovery and recycling potential | |
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D | |
| X | X | X | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | MND | |

Product information

Product description

Facade elements with 160 mm Al-profiles based on "Hydro 4.0 Aluminium Extrusion Ingot" (REDUXA) covered by the EPD: NEPD-1840-468-EN, and triple glass of the type 6-18-4-18-4 (regarding UnitAl-glass). The main product components are shown in the table below. Values are given as intervals covering the three declared product variations. Specific recipes and some input materials (0-2 mass-%) are not shown in this table due to reasons of confidentiality.

| Material | Weight-% of declared product |
|---------------------|------------------------------|
| Glass | 0-69 |
| Aluminium | 27-49 |
| Plastic | 4-6 |
| Mineral wool | 0-20 |
| Calcium silicate | 0-25 |
| Packaging material* | kg per declared unit |
| PE film | 0,61 |
| Pallets | 2,8 |

Representativity

This declaration, including data collection and the modeled foreground system including results, represents the production of 1 square meter of Hansen UnitAl-REDUXA curtain wall system at the production site located in Denmark. Product specific data are based on average values collected in the period from 01.01.2016 to 31.12.2016. Background data are based mainly on GaBi and are less than 10 years old. Only in one case, GaBi data was supplemented with data from ecoinvent and the consistency of the data used is therefore considered as high. Generally, the used background datasets are of high quality, and the majority of the datasets are only a couple of years old and therefore the requirements in EN15804 are met.

Dangerous substances

Hansen UnitAl curtain walls does not contain substances listed in the "Candidate List of Substances of Very High Concern for authorisation"

(<http://echa.europa.eu/candidate-list-table>)

Essential characteristics (CE)

Hansen UnitAl curtain walls are covered by harmonised technical specification EN 13830:2015. Declaration of performance according to EU regulation 305/2011 is available for all declared product variations.

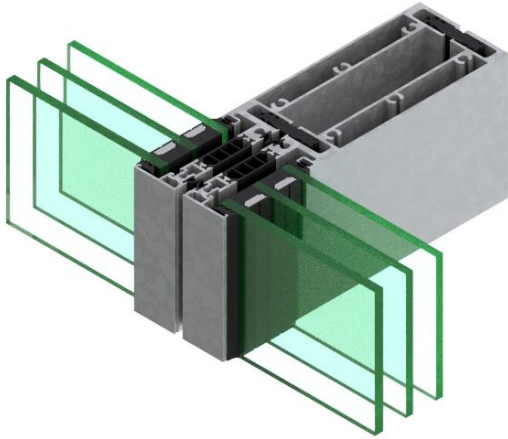
Further technical information can be obtained by contacting the manufacturer or on the manufacturers website:

www.hsh.dk

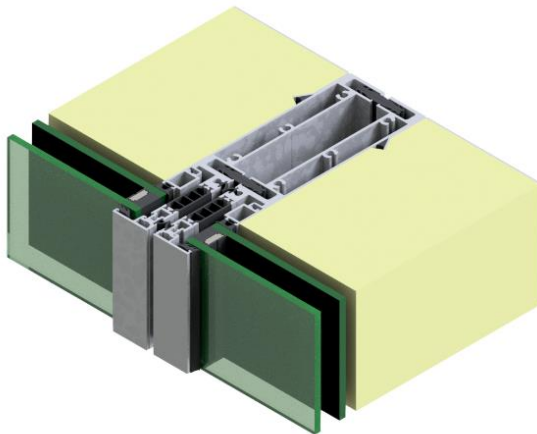
Reference Service Life (RSL)

No RSL is declared. This EPD is based on a cradle-to-gate assessment.

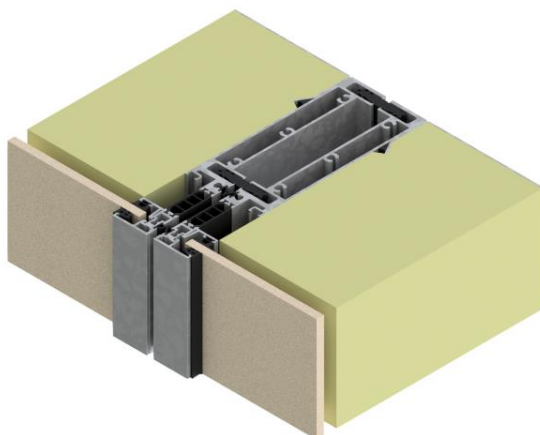
Product illustrations



Hansen UnitAl with triple layer glass



Hansen UnitAl with emalite glass



Hansen UnitAl with panel

LCA background

Declared unit

The LCI and LCIA results in this EPD relates to 1 square meter of Hansen UnitAl curtain wall of the types: Hansen UnitAl with triple layer glass-REDUXA, Hansen UnitAl with emalite glass-REDUXA and Hansen UnitAl with panel-REDUXA.

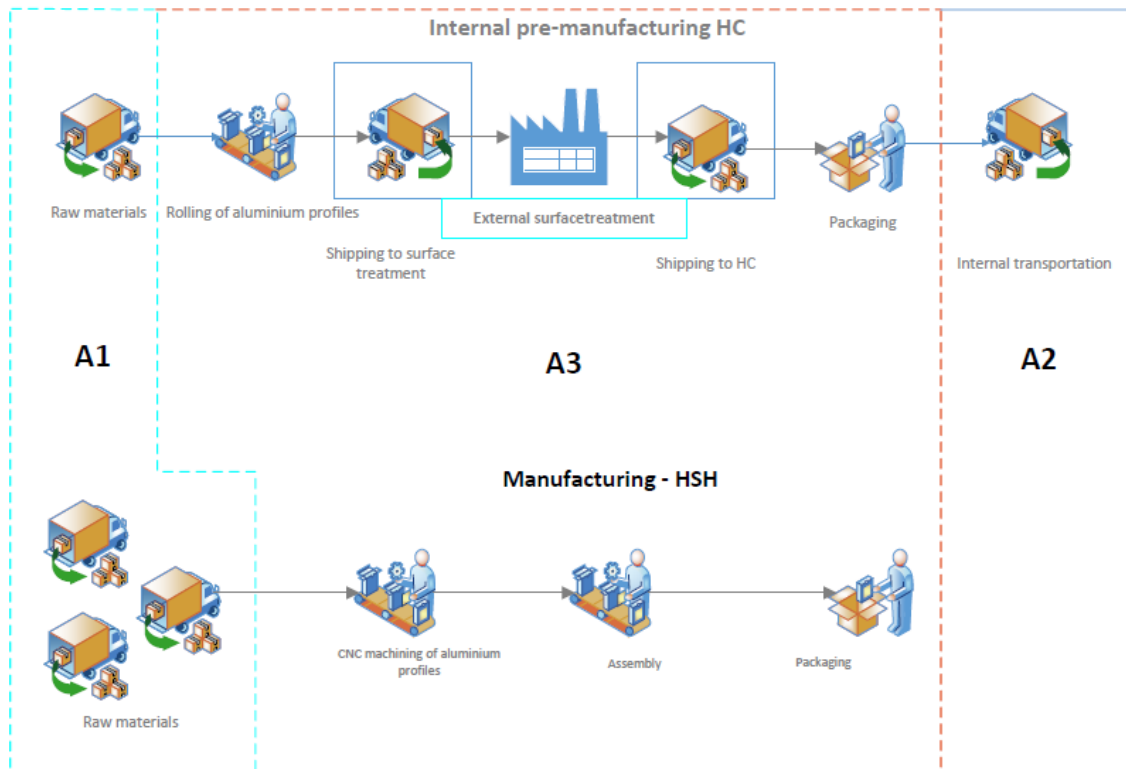
The declared unit (1 m²) is calculated based on a 3x3 m² facade element

| Name | Value | Unit |
|---|-------|-------------------|
| Declared unit | 1 | m ² |
| Conversion factor to 1 kg: UnitAl with triple glass | 47,0 | kg/m ² |
| Conversion factor to 1 kg: UnitAl with emalite | 48,6 | kg/m ² |
| Conversion factor to 1 kg: UnitAl with panel | 33,8 | kg/m ² |

PCR

This EPD is developed according to the core rules for the product category of construction products in EN 15804.

Flow diagram



System boundary

This EPD is based on a cradle-to-gate LCA, in which >99 weight-% has been accounted for.

The general rules for the exclusion of inputs and outputs follows the requirements in EN 15804, 6.3.5, where the total of neglected input flows per module shall be a maximum of 5 % of energy usage and mass and 1 % of energy usage and mass for unit processes.

Product stage (A1-A3) includes:

- A1 – Extraction and processing of raw materials
- A2 – Transport to the production site
- A3 – Manufacturing processes

The product stage comprises the acquisition of all raw materials, products and energy, transport to the production site, packaging and

waste processing up to the “end-of-waste” state or final disposal. The LCA results are declared in aggregated form for the product stage, which means, that the sub-modules A1, A2 and A3 are declared as one module A1-A3.

The production process of the Hansen UnitAl curtain walls starts with rolling together the aluminium profiles with the thermal break. This happens at a production facility in Lem, Denmark (HC) either before or after surface treatment (anodizing or powder coating) of the aluminum profile. The profiles are then transported (1 km) to the other production facility in Lem (HSH).

After this short internal transport, the profiles are CNC machined into correct lengths, holes are drilled etc. and the frames are put together and mounted with triple glass, emalite glas, mineral wool, wind panel etc. depending on the type of UnitAl.

The facade elements are now ready for quality control and packaging before leaving the production facility

LCA results

| ENVIRONMENTAL IMPACTS PER SQUARE METER | | | | |
|--|---|---------------------------------|----------------------------------|--------------------------|
| Parameter | Unit | UnitAI with triple glass-REDUXA | UnitAI with emalite glass-REDUXA | UnitAI with panel-REDUXA |
| | | A1-A3 | A1-A3 | A1-A3 |
| GWP | [kg CO ₂ -eq.] | 1,51E+02 | 1,91E+02 | 1,66E+02 |
| ODP | [kg CFC11-eq.] | 4,96E-06 | 5,89E-06 | 5,00E-06 |
| AP | [kg SO ₂ -eq.] | 5,74E-01 | 7,83E-01 | 6,76E-01 |
| EP | [kg PO ₄ ³⁻ -eq.] | 7,44E-02 | 1,07E-01 | 6,22E-02 |
| POCP | [kg ethene-eq.] | 3,57E-02 | 4,75E-02 | 4,13E-02 |
| ADPE | [kg Sb-eq.] | 4,78E-04 | 8,12E-04 | 2,11E-04 |
| ADPF | [MJ] | 1,81E+03 | 2,25E+03 | 1,93E+03 |
| Caption | GWP = Global warming potential; ODP = Ozone depletion potential; AP = Acidification potential of soil and water; EP = Eutrophication potential; POCP = Photochemical ozone creation potential; ADPE = Abiotic depletion potential for non fossil resources; ADPF = Abiotic depletion potential for fossil resources | | | |

| RESOURCE USE PER SQUARE METER | | | | |
|-------------------------------|---|---------------------------------|----------------------------------|--------------------------|
| Parameter | Unit | UnitAI with triple glass-REDUXA | UnitAI with emalite glass-REDUXA | UnitAI with panel-REDUXA |
| | | A1-A3 | A1-A3 | A1-A3 |
| PERE | [MJ] | 1,04E+03 | 1,30E+03 | 1,29E+03 |
| PERM* | [MJ] | 5,00E+01 | 9,23E+01 | 1,13E+02 |
| PERT | [MJ] | 1,09E+03 | 1,40E+03 | 1,40E+03 |
| PENRE | [MJ] | 1,93E+03 | 2,52E+03 | 2,13E+03 |
| PENRM** | [MJ] | 8,91E+01 | 8,91E+01 | 8,02E+01 |
| PENRT | [MJ] | 2,02E+03 | 2,61E+03 | 2,21E+03 |
| SM | [kg] | - | - | - |
| RSF | [MJ] | 2,71E-15 | 2,71E-15 | 2,71E-15 |
| NRSF | [MJ] | 3,18E-14 | 3,18E-14 | 3,18E-14 |
| FW | [m ³] | 3,42E+00 | 4,05E+00 | 3,90E+00 |
| Caption | PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non renewable primary energy excluding non renewable primary energy resources used as raw materials; PENRM = Use of non renewable primary energy resources used as raw materials; PENRT = Total use of non renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non renewable secondary fuels; FW = Use of net fresh water | | | |

* Contribution from packaging material per product type: All

** Contribution from packaging material per product type: 3,48E+01 MJ

| OUTPUT FLOWS AND WASTE CATEGORIES PER SQUARE METER | | | | |
|--|---|---------------------------------|----------------------------------|--------------------------|
| Parameter | Unit | UnitAI with triple glass-REDUXA | UnitAI with emalite glass-REDUXA | UnitAI with panel-REDUXA |
| | | A1-A3 | A1-A3 | A1-A3 |
| HWD | [kg] | 4,14E-01 | 4,14E-01 | 4,14E-01 |
| NHWD | [kg] | 1,96E+01 | 1,96E+01 | 1,96E+01 |
| RWD | [kg] | 2,25E-03 | 2,25E-03 | 2,25E-03 |
| CRU | [kg] | - | - | - |
| MFR | [kg] | - | - | - |
| MER | [kg] | - | - | - |
| EEE | [MJ] | - | - | - |
| EET | [MJ] | - | - | - |
| Caption | HWD = Hazardous waste disposed; NHWD = Non hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy | | | |

Additional information

Indoor air

The EPD does not give information on release of dangerous substances to indoor air because the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonised test methods according to the provisions of the respective technical committees for European product standards are not available.

Soil and water

The EPD does not give information on release of dangerous substances to soil and water because the horizontal standards on measurement of release of regulated dangerous substances from construction products using harmonised test methods according to the provisions of the respective technical committees for European product standards are not available.

References

| | |
|---------------------------------------|---|
| Publisher |  http://www.epddanmark.dk |
| Programme operator | Danish Technological Institute Buildings & Environment Gregersensvej DK-2630 Taastrup http://www.teknologisk.dk |
| LCA-practitioner | Danish Technological Institute Buildings & Environment Gregersensvej DK-2630 Taastrup http://www.teknologisk.dk |
| LCA software / background data | Thinkstep GaBi 9.2 2019 incl. databases (8.7) + Ecoinvent 3 2017 http://www.gabi-software.com http://www.ecoinvent.org |
| 3rd party verifier | Kim Christiansen – kimconsult.dk |

General programme instructions

Version 1.9

www.epddanmark.dk

EN 15804

DS/EN 15804 + A1:2013 - "Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products"

EN 15942

DS/EN 15942:2011 – " Sustainability of construction works – Environmental product declarations – Communication format business-to-business"

ISO 14025

DS/EN ISO 14025:2010 – " Environmental labels and declarations – Type III environmental declarations – Principles and procedures"

ISO 14040

DS/EN ISO 14040:2008 – " Environmental management – Life cycle assessment – Principles and framework"

ISO 14044

DS/EN ISO 14044:2008 – " Environmental management – Life cycle assessment – Requirements and guidelines"