EPD®

Cendec®

ENVIRONMENTAL PRODUCT DECLARATION

In agreement with ISO 14025:2006; EN 15804:2012, PCR 2012:01
Construction products and construction services
(combined PCR & PCR Basic Module),
Version: no. 1.1 Date: 21. 2. 2013

Environmental product declaration
of Klokočka administrative building
reconstruction

SKANSKA

REV. 0 Date 18th July 2014
Number: 3013EPD-14-0339

Organization:	Skanska, a.s. **Production Division** Light Cladding branch	Registration No. / VAT 26271303
Address	Líbalova 1/2348 Praha 4 / 14900	
Statutory body	Ing. Dan Ťok Statutory Director	
EPD representative	Bc. Karel Fronk Sustainable Development Manager	
Contact	Phone: +420 737 256 708 E-mail: karel.fronk@skanska.cz	www.skanska.cz

Product:	Glass building envelope, particulary modular aluminium facade
Use:	Construction industry
Product lifetime / years:	The products are under warranty for 10 years.
Hazardous substance contents:	Yes / No
UN CPC:	Construction products and CPC 54 construction services

1 Programme related information

1.1 Name of the programme and programme operator

Programme operator for this EPD is Cendec® with affiliation to International EPD®system. Cendec® is Czech Type III environmental declaration operator which is affiliated to the International EPD®system by Memorandum of Understanding signed January 10th 2013.

International EPD ®system	Cendec®
International EPD Consortium (IEC)	Center for Environmental Declarations
Postal address: Vasagatan 15-17, SE-111 20 Stockholm, Sweden	Postal address: Šárecká 5, 160 00 Prague 6, Czech Republic
E-mail: info@environdec.com	E-mail: info@cendec.cz
www.environdec.com	www.cendec.cz

1.2 The reference pcr document

The reference documents for this EPD are General Programme Instructions (v. 2.01, 2013) and Product Category Rules for CPC Division (not available): Construction Products and CPC Division 54: Construction Services (IEC 2012). Product Category Rules (PCR) are specified for certain information modules "cradle-to-gate", so called core modules. The structure and aggregation level of the core modules is defined by the United Nation Statistics Division - Classification Registry CPC codes (http://unstats.un.org). EPD of construction products may not be comparable if they do not comply with EN 15804.

1.3 Registration number

The registration number of this EPD is: 3013EPD-14-0339

1.4 Date of publication and validity

The publication date of this EPD is: 18.7.2014
This EPD is valid until: 18.7.2019

1.5 Geographical scope of application of epd

The geographical scope of this EPD is fully international.

1.6 Information about the year or reference period of the underlying data to the epd

The reference period to this EPD is year 2013. Data shown below refers to 2013 and have been collected directly from the Skanska LOP, a.s. (Czech Republic). Other general data used were taken from the ILCD, Ecoinvent database and other commercially available LCA databases.

1.7 Reference to the website

More information related to The International EPD® System programme is available at www.environdec.com. More information related to Czech type III environmental declaration programme is available at www.cendec.cz

2 Product related information

Trade name of product: glass building envelope with aluminum façade of Autosalon Klokočka, Prague, Czech Republic

Unequivocal identification of the product according to the CPC classification system: Construction products and CPC 54 construction services.

2.1 Specification of the company

Address of company: Praha 4 – Chodov, Líbalova 1/2348, ZIP 149 00

Skanska Group in the Czech Republic and Slovakia forms apart of the global Skanska Group, which is one of the world's leading construction and development companies-with extensive experience in the area of building commercial, residential and PPP projects. The Group's origins can be traced back to 1887 and the Swedish company Skanska AB Cementgjuteriet, which, at the time, specialized in the manufacture of ornamental concrete building products. Over the coming years, the company gradually transformed itself into a major international company specializing in the supply of a full range of construction related services. The company has been operating under the 'Skanska' name since 1984. Skanska Group currently has roughly 57,100 employees and conducts its business in Europe (e.g. Sweden, Norway, Finland, Great Britain, Romania, Poland, Czech Republic and Slovakia), the United States and Latin America.

We provide consultancy in the area of the construction principles of light cladding, thermal technology, acoustics and statics of the facades, windows, doors and glassed roofs for architects and general contractors. Our design department addresses not only the design of an optimum building solution of the light cladding but also the optimization of the respective constructions based on architectural, material, static and thermal-technical requirements. We process the projects in 3D systems Inventor , Revit and BIM. The complete production of light cladding is provided using our own capacities in our manufacturing hall.

2.2 Technical description of the product

Key products of Skanska LOP are stick and unit facades, nevertheless manufacturing program includes windows, doors, sills, acustics glass partitions, etc. We are able to integrate photovoltaic and energy systems into our products. We work only with certified profiles (Schüco, Wicona, Hueck, Reynears) and top quality glass products (AGC Glass, Guardian, Pilkington, Saint-Gobain Glass). The quality of the products is guaranteed by EN ISO 9001, OHSAS 18001 BOZP and ISO 14001 – Environmental management.

2.3 Declared unit

According to the EN 15804 and PCR 2012:1.2 the declared unit is one whole building envelope.

2.4 Description of underlying lca-based information

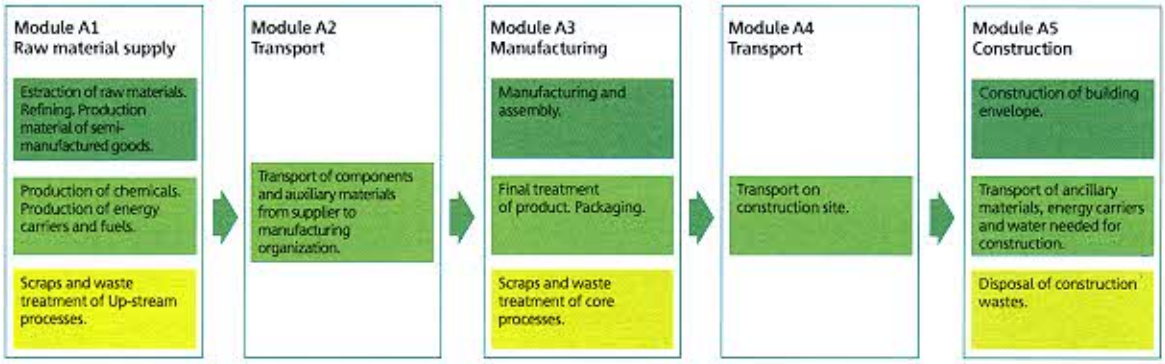
2.4.1 System boundaries

System boundaries of this EPD are cradle to gate with options. Based on EN 15804 The International EPD® System has adopted an LCA calculations procedure which is separated into different life cycle stages, so called modules A1, A2, A3, A4 and A5:

- Module A1: Upstream processes including energy production
- Module A2: Transport of inputs to producer
- Module A3: Core processes including infrastructure and waste processing
- Module A4: Transport of manufactured envelope to the construction location
- Module A5: On site construction of building envelope

Schematic description of system boundaries consisting of up-steam module processes, core processes and down-stream processes is shown on following figure.

Figure 1 System boundaries



2.4.2 Data quality

all core module data are of specific quality. Data used for calculation were originated from the year 2013. Data set needed for calculation is complete.

2.4.3 Lca study

the LCA calculations rules used for this declaration follow the overall requirements for The International EPD® System. These rules follow the international standards ISO 14040 and ISO 14044 with respect to EN 15804. The product system for this LCA has been described by using specific data when available; generic data have been used in accordance with PCR (IEC 2012) and GPI (v. 2.01, 2013) requirements. Underlying LCA study used for this EPD was complete and covering all relevant inputs. For LCA study site specific data from producer were used. The LCA was conducted in year 2014. Underlying LCA study was elaborated by LCA studio, www.lcastudio.cz (Kočí 2014).

2.5 Content of materials and chemical substances

The Autosalon Klokočka glass building envelope with aluminium facade consists of following materials:

Table 1 Main material composition of Autosalon Klokočka building envelope

Material	Mass, kg
Aluminium profiles	27 295
Aluminium parts	1 691
EPDM sealing	3 382
Steel fasteners	267
Steel construction	5 440
Table glass	105 565
Stone wool	3116
OSB boards	4241
Polystyrene	319

Product do not contain specific chemical compounds.

3 Environmental performance-related information

All environmental performance is reported per declared unit 1 piece of Autosalon Klokočka building envelope.

3.1 Use of natural resources

Following tables report the main consumption of resources. Use of resources in kg/D.U and in MJ/D.U. is expressed. All energy data are expressed as net caloric value.

Table 2 Resource consumption (kg) associated with construction of Autosalon Klokočka building envelope. Data are referred to D.U.

Kg/DU	Total	Module A1	Module A2	Module A3	Module A4	Module A5
Crude oil (resource)	31129,41	29637,31	1090,081	32,13471	277,3914	92,49613
Hard coal (resource)	50927,62	50907,05	4,794343	12,8334	1,226891	1,7152
Lignite (resource)	58920,58	58891,17	7,081701	17,98677	1,815302	2,522497
Natural gas (resource)	40783,09	40572,44	87,89143	88,72376	22,42439	11,6102
Peat (resource)	118,7672	118,375	0,129692	0,213052	0,032928	0,01654
Uranium (resource)	2,475407	2,474024	0,000366	0,00085	9,33E-05	7,45E-05
Bauxite	135615	135615	0,009226	0,008131	0,002387	0,001938
Iron ore (56,86%)	361,3583	361,3583	0	0	0	0
Water	2,43E+09	2,43E+09	186091,7	260628,8	47877,97	34049,95

Table 3 Resource (MJ) and electricity consumption associated with construction of Autosalon Klokočka building envelope. Data are referred to D.U.

MJ/DU	Total	Module A1	Module A2	Module A3	Module A4	Module A5
Non renewable energy resources	6259185	6185322	50320,1	6205,297	12807,91	4529,639
Renewable energy resources	1399290	1396420	1910,242	268,0642	503,0708	188,4939
Electricity, MJ				262752		

Table 4 Other parameters describing resource consumption. Data are referred to D.U.

Consumption refered to D.U.	
Use of renewable primary energy excluding renewable primary energy resources used as raw materials, MJ	1399289,73
Use of renewable primary energy resources used as raw materials, MJ	8,56
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials), MJ	1399298,29
Use of non- renewable primary energy excluding nonrenewable primary energy resources used as raw materials, MJ	6259185,39
Use of non- renewable primary energy resources used as raw materials, MJ	0,04
Total use of non- renewable primary energy resources (primary energy and primary energy resources used as raw materials), MJ	6259185,43
Use of secondary material, kg	581,78
Use of renewable secondary fuels, MJ	128,58
Use of net fresh water, m^3	540

3.2 Potential environmental impacts

Characterization factors are those prescribed in the CML 2001 methodology for calculating environmental impact as required by EPD® programme in GPI (v. 2.01, 2013). This methodology is fully developed and used at an European level due to the reliability of its data and its scientific bases which are supported in the methodology and procedures established by Guinée et al. (Guinee 2001). The environmental impacts per declared unit are presented in following tables:

Table 5 Impact category results of environmental results of construction of Autosalon Klokočka building envelope. Data are referred to D.U.

Autosalon Klokočka building envelope	Total	Module A1	Module A2	Module A3	Module A4	Module A5
Abiotic Depletion (ADP elements)						
[kg Sb-Equiv.]	0,61792	0,617377	0,000136	0,000353	3,49E-05	1,96E-05
Abiotic Depletion (ADP fossil)						
[MJ]	5137913	5064674	50155,2	5821,965	12765,86	4496,028
Acidification Potential (AP)						
[kg SO2-Equiv.]	2421,723	2392,586	20,53061	1,362399	4,971113	2,272508
Eutrophication Potential (EP)						
[kg Phosphate-Equiv.]	170,1024	162,7654	4,140636	1,140692	1,164038	0,891676
Global Warming Potential (GWP 100 years)						
[kg CO2-Equiv.]	467687,9	459027,8	3655,237	3063,29	928,3954	1013,205
Ozone Layer Depletion Potential (ODP, steady state)						
[kg R11-Equiv.]	0,015157	0,015154	1,73E-08	3,11E-06	4,43E-09	2,30E-09
Photochem. Ozone Creation Potential (POCP)						
[kg Ethene-Equiv.]	152,3962	158,5578	-4,99061	0,370567	-1,85244	0,310952

3.3 Other environmental indicators

During use phase of glass building envelope with aluminium facade no toxic substances are released. The following indicators are also reported in the EPD per declared unit:

Table 6 Other environmental indicators of Autosalon Klokočka building envelope. Data are referred to D.U.

Landfilling of paper waste	11 714	kg/D.U.
Landfill of plastic packaging	4 530	kg/D.U.
Mixed commercial waste for incineration	1 980	kg/D.U.
Glass waste for landfilling	1 344	kg/D.U.
Hazardous waste (N) for landfilling	1 672	kg/D.U.
Mixed construction and demolition waste for landfilling	32 420	kg/D.U.
Mixed municipal waste (O) for landfilling	13 680	kg/D.U.
Bulk innert waste for landfilling	67 700	kg/D.U.
Aluminium recycling	11 590	kg/D.U.

4 Additional environmental information

We strive to improve our projects, products and services from the perspective of protection of the environment by actively seeking out new ways with which can minimize any negative impact on the environment throughout the entire lifecycle of a given project, product or service. Protection of the environment and the reduction of any possible negative impact on the environment as a result of our construction activities form an integral part of Skanska's global corporate strategy mission and make up one of our five core corporate values. We emphasize energy efficiency and the efficient use of resources, reducing waste and the protection of the environment.

Skanska makes use of an Environmental Management System (EMS) in accordance with the requirements set out in the ISO 14001 standard. In all of our projects, we use the "green building" concept to consider the environment impact of the project throughout its lifecycle. Our goal is to become a leading builder and developer known for its environmental consciousness and environmental awareness. Apart from the certifications, we concentrate the best experience from our projects focused on the sustainability aspects (social, economic and environmental) and on unique technologies and innovations used in Skanska Group in the form of the so-called Sustainability Case Studies available on web pages.

5 Mandatory statement

5.1 Comparisions of epds within this product category

This EPD® refers to the International System EPD® developed by the International EPD® Consortium (IEC) and is available, on the website, www.environdec.com.

This EPD has been developed according to the PCR Construction products and CPC division 54 construction services; and EN 15804:2012.

EPDs within the same product category but from different programmes may not be comparable.

5.2 Verification and registration

PCR was prepared by: IVL Swedish Environmental Research Institute, Swedish Environmental Protection Agency, SP Trätek, Swedish Wood Preservation Institute, Swedisol, SCDA, Svenskt Limträ AB, SSAB
PCR moderator: Martin Erlandsson, IVL Swedish Environmental Research Institute, Sweden, martin.erlandsson@ivl.se
PCR review was conducted by: The International EPD® System Technical Committee

Independent verification of the declaration data, according to ISO 14025:

☐ Internal × External ☐ EPD proces certification

Third party verifier:
VÚPS, s.r.o.
Accreditation number and body: ČIA

6 Validity of the EPD

This EPD is valid for 5 years, i.e. until 18.7.2019. If any change in production causing increase of any environmental impact larger than +/- 5% the EPD shall be adjusted.

7 References

Guinee, J. (2001). „Handbook on life cycle assessment - Operational guide to the ISO standards." International Journal of Life Cycle Assessment 6(5): 255-255.
IEC (2008). „General Programme Instructions for environmental product declarations, EPD." 44.
IEC (2012). „Product Category Rules: CPC Division (not available): Construction Products and CPC Division 54: Construction Services." Product Category Rules: 35.
Kočí, V. (2014). Life Cycle Assessment of glass building envelope, particulary modular aluminium facade produced by Skanska LOP Czech Republic. Praha, LCA studio.

This Environmental Declaration was made by: Vladimír Kočí, PhD

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

☐ internal ☒ external

Programme:	EPD® system (www.environdec.com)
Verification procedure:	ISO 14025: 2006 Environmental labels and declarations – Type III environmental declarations – principle and procedures General Programme Instructions for Environmental Product Declarations, EPD, version 2.01.
Product category rules (PCR):	PCR CONSTRUCTION PRODUCTS AND CPC 54 CONSTRUCTION SERVICES, version 1.1, 2013-02-21

Výzkumný ústav pozemních staveb - Certifikační společnost, s.r.o., (Building Research Institute – Certification Company, Ltd.) – Certification Body for EPD verification no. 3013 accredited by Czech Accreditation Institute made independent verification of EPD in 3rd April 2013 in agreement with ISO 14025:2006. The certificate results from the Final report no. P-3013EPD-14-0339 from 18th July 2014 that includes certification body ascertaining and validity conditions of the certificate.

The verified EPD has reg. no. 3013EPD-14-0339.

Registration number	3013EPD-14-0339 from 18th July 2014
Certified validity	to 18th July 2019
Contact	Výzkumný ústav pozemních staveb - Certifikační společnost, s.r.o., Pražská 16, 102 21 Praha 10 – Hostivař Czech Republic tel.: +420 271751148 fax: ++420 241017241 e-mail: vlasata@vups.cz

18th July 2014
Barbora Vlasatá

CERTIFIKAČNÍ ORGÁN PRO EPD VÚPS Certifikační společnost Výzkumný ústav pozemních staveb

Head of Certification Body
Distributed to:
No. 1 Skanska LOP
No. 2 VÚPS, Mgr. Barbora Vlasatá, Head of Certification Body
No. 3 CENIA
No. 4 CENDEC, ENVIRONDEC