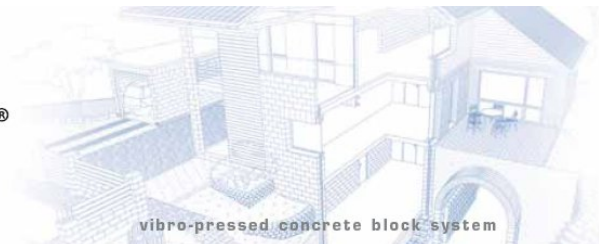


ENVIRONMENTAL PRODUCT DECLARATION

In agreement with ISO 14025:2006,
PCR 2006:2 Building products, version 1.0



KB BLOK[®]
PERFECT CONSTRUCTION SYSTEM



CONCRETE BLOCKS
KB Blocks, KLASIK Blocks, KB ATLAS Blocks,
KLASIK XC Blocks, KB STROP XC Roof

REV. 0 Date 27th May 2009

Registration number (NPEZ): 3013EPD-09-0333-01

Identification number:

Distributed to:

No. 1 KB-BLOK systém, s.r.o.

No. 2 Certification Body

No. 3 Mgr. Tereza Votočková, head of Certification Body

No. 4 CENIA


Organization:	KB-BLOK system, s.r.o.	VAT Id. Number: 14866021
Address	Masarykova 635, 439 42 Postoloprty – Industrial Zone	
Statutory body	Josef Brabec, executive head	
EPD representative	Ing. Miroslav Rác, production manager	
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Product:	Walling Concrete Blocks of KB-BLOK system, ltd
Product type:	KB Concrete Blocks, KLASIK Concrete Blocks, KB ATLAS Concrete Blocks, KLASIK XC Concrete Blocks, KB STROP XC Ceiling Blocks
Use:	Building from accurate vibro-pressed concrete blocks.
Weight /kg/:	The products weight ranging from 2,3 kg (KB ATLAS 30-90 concrete block) – to 33 kg (KB KLASIK XC 240 concrete block)
Product lifetime /days/:	The products are under warranty for 10 680 days - 30 years. Products lifetime (to concrete degradation starting) is estimated by experts for 17 800 days – 50 years
Hazardous substance contents:	Yes/No
UN CPC:	37550 (subclass) ; 6810.91 (HS 2007); 2395 (ISIC Rev.4) (Prefabricated structural components for building or civil engineering works, made of cement, concrete or artificial stone)

The main product ranges and their characteristics

The including product ranges (KB Concrete Blocks, KLASIK Concrete Blocks, KB ATLAS Concrete Blocks, KLASIK XC Concrete Blocks, KB STROP XC Ceiling Blocks) are considered as one product, due to the same function and also the same feedstocks. Only three materials – gravel aggregate, cements and water – constitute 97.6 % of total weight of feedstocks.

Tab.1: Product ranges and their characteristics

KB Concrete Blocks	<p>The walling concrete blocks are the heart of KB-BLOK building system. This product range includes main blocks, annular blocks, subsidiary blocks, supplementary blocks and tiling blocks.</p> <p>The product range is completed by sacrificial formwork blocks and folded lineal walling.</p>		<p>The main blocks width 200 mm, thickness 90 mm, annular blocks width 200 mm, subsidiary blocks width 150 mm, 300 mm, blocks width 100 mm, tiling blocks, sacrificial formwork blocks and folded lineal walling.</p>
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<p>KLASIK Blocks</p>	<p>KLASIK blocks are alternative of classic facework. It is produced in size of classic Czech brick, in two variations – hollow brick and solid brick. Product range also includes subsidiary blocks.</p>		<p>KB-KLASIK blocks – KLASIK smooth hollow and smooth solid brick, KLASIK ANTIK. KLASIK Subsidiary blocks – A-C, A-F, A-P, A-U, A-H, A-Y.</p>
<p>KB ATLAS Blocks</p>	<p>KB ATLAS Blocks provide disordered structure of walling that highlights building effect and function. Structure general appearance combining higher and lower pieces is closer to nature appearance.</p>		<p>Basic blocks – KB ATLAS 30, 40, 60, 90. KB ATLAS Blocks 150, 30-150, 40-150, 60-150, 90-150.</p>
<p>KLASIK XC Blocks</p>	<p>This product range is subset of KLASIK blocks. Its side joint is formed by non-mortar contact chase.</p>		<p>XC 80, 160, 240.</p>
<p>KB STROP XC</p>	<p>KB STROP XC ceiling blocks are also subset of KLASIK blocks. This product range includes concrete blocks composed on ceiling stanchions (KB Supporting Frame XC)</p>		
<p>The types of surface finishing: the smooth, the cleaved, the scraped, the grounded, the smooth GRIND, the cleaved RUSTIK.</p>			
<p>Color types: colors, multicolor, colors 08, multicolors 08, colors 09, multicolors 09.</p>			

The characteristics of KB-BLOK system, ltd:

The KB-BLOK system, ltd was founded in 1991. Since 1992 the company KB – BLOK system, ltd has been developing the system of the concrete walling using the KB-BLOK system that utilizes excellent properties of concrete, especially its high compression strength and surface lasting quality. For development of this building system wide foreign experiences are used, especially from USA where this type of building has almost a centenary tradition and decennial own experiences.

KB – BLOK system, ltd is a dynamically developing company with an annual substantial volume of production increase. Through the continuous innovation of product assortment originated building system with more than 130 basic elements. KB-BLOK building system includes approximately 500 products. The main product ranges of KB-BLOK system are:

- Concrete blocks
- Scandinavian roofs cover
- Gravity retaining wall system – Gravity Stone
- Landscape gardening pieces
- Concrete pavage and segments

Today the company is in a position of a leader and an innovator on the concrete walling materials. Nowadays, the company operates 5 production lines. A tradition has been established that annually the company launches several new articles on the market presented at the building fairs. Exhibition stands become discussion centers where friendly meetings with trading partners and professional community take place.

KB-BLOK system is distinguished especially on the following characteristics:

- unique sandwich structure
- simply building system
- variable face works
- attractive interior surface walls
- economical operation and maintenance
- long service life of buildings
- usability for all types of buildings

For development of the market, research, development and promotion of the concrete walling system our company closely cooperates with schools and students. For all schools we arrange workshops in the company premises in Postoloprty and at schools. Our KB-BLOK building system has been introduced into the school curriculum.

Supplies of all building materials are offered to our customers via the network of shops of our independent building materials sale division. In these shops building firms and small traders can buy everything for their buildings.

KB-BLOK system, ltd applies the quality system according to ISO 9001 and environmental protection system according to ISO 14001 (EMS).

Content declaration of used materials and chemical substances

The main feedstocks of product are gravel aggregate (81,8 weight %), cements (13,9 weight %), processing recyclate (2 weight %), water (1,9 weight %) and chemical components and pigments (0,4 weight %). More detailed chemical components and pigments characteristics are in the following table:

Tab.2: Content declaration of materials and chemical substances

Material / substance	Function	Components	CAS number	Health class	Environmental class	% of total weight
Gravel aggregate	Mass creating	-	-	-	-	81,91
Cements	Binding	Cement sintred clay	65997-15-1	R36/37/38, R 43	-	13,92
Processing recyclate	Mass creating/ binding	-	-	-	-	2,00
Water	Homogenisati on stabilisator	-	-	-	-	1,99
<i>Pigments:</i>						<i>0,12</i>
Bayferrox 110 G, 330 G, 503 G, 615 G, 920 G, 965 G	Chromatic agens	Fe ₂ O ₃	1309-37-1	-	-	0,05
	Chromatic agens	Fe ₃ O ₄	1317-61-9	-	-	0,02
	Chromatic agens	FeO(OH)	20344-49-4	-	-	0,05
TRONOX CR	Chromatic agens	TiO ₂	13463-67-7	-	-	0,00001
<i>Chemical substances:</i>						<i>0,06</i>
CHRYSLAV MIX, CHRYSO AD,	Plasticizer	Sodium thiocyanate	540-72-7	R20/21/22, R32	-	0,00000083
	Plasticizer	Sulfonic acids	68439-57-6	R38, R41	-	0,0000012
	Plasticizer	Diethanolamin	8051-30-7	-	-	0,0000012
	Concrete addition	Formaldehyde	50-00-0	R23/24/25, R34, R40, R43	-	0,000012
	Concrete addition	Sodium nitrate	7631-99-4	R8	-	0,00000049

The others non-hazardous	-	-	-	-	-	0,059
<i>Used materials and chemical substances that are not parts of the product</i>						
Diesel oil	Fuel	Gas oil nonspec.	68334-30-5	R40	-	-
		Methyl esters of fatty acids (FAME)	85586-25-0	R65/66	-	-
DPD oil	Formwork dismantling	Petrol	64742-48-9	R65/66	-	-
Hydraulic oil	Engine pursuit	Ester salt	80939-62-4	R36/38	R 51/53	-
Gear oil	Engine pursuit	-	-	-	-	-

Reference Unit:

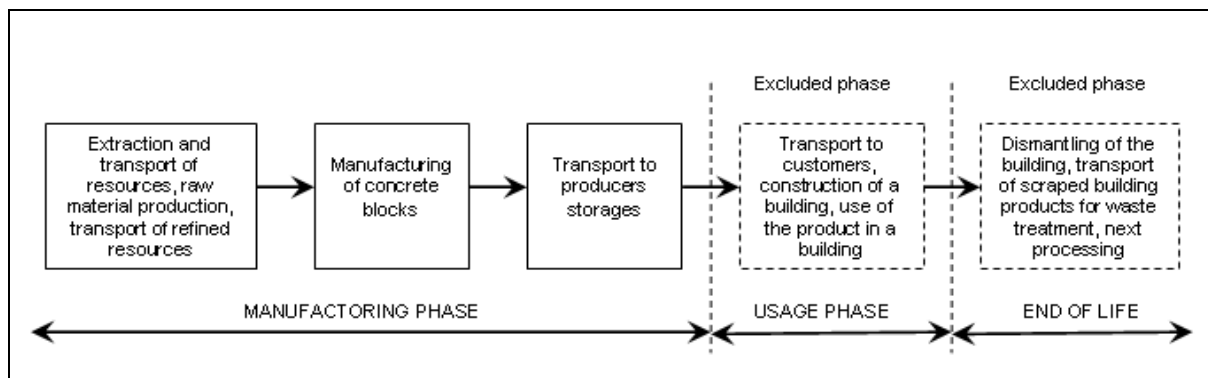
The reference unit is the 1 000 kg of KB-BLOK concrete walling blocks in agreement with PCR 2006:02 – Building Products. The units are according to The International System of Units and normalized units of used SW.

System boundaries:

The basic cycle phases of this product are shown in Fig. 1. Declared life cycle includes only three basic generic process steps in one cycle phase – the manufacturing phase. In accordance with PCR 2006:2, the usage phase and the end of life are excluded.

The manufacturing phase includes the extraction and transport of resources, raw material production, and transport of the refined resources in the first generic process step; manufacturing of the product in the second step and transport to producer’s storages in the third step.

Fig.1: System boundaries



The greatest resource, energy, waste and good inflows, outflows and activities are in the products life cycle manufacturing phase. The extraction of resources and raw material production are the most environmentally consuming from generic process steps.

The usage phase and the end of life were not included to the quantified part of concrete blocks life cycle assessment.

Use phase information:

The usage phase includes unit processes such as transfer to customers, building site operations and duration of construction. KB-BLOK system has been designed in order not to use heavy lifting equipment (cranes) during its construction. Transfer to customers and realization of construction can not be relevantly expressed due to the changeability of unit processes.

Duration of building site unit process represents operations which are necessary for its preservation in the course of not decreasing qualities of basic parameters (stability, heat and water transmission) and material durability. The durability depends on material quality and production techniques, the techniques layed to installation and climatic effects. The components are under warranty for 30 years. According to expert estimations the material durability is 50 years since the beginning of concrete

degradation. The total durability (until the necessary dismantling of building site) can not be relevantly expressed. KB-BLOK system s.r.o. provides and recommends to follow established principles of walling with KB-BLOK components and constructional techniques for the individual component of the system. The achievement of long components durability is one of the main purposes. The principles are part of product catalogues of the company.

The utilization (duration) of building site unit process do not represent any inputs and outputs. KB-BLOK constructive components are service-free (maintenance – free) in the usage phase and also do not require any processes on mechanical and chemical base. The producer do not recommend any abrasion, impregnation, coloration and any other similar procedures.

End of life information (dismantling / recycling)

The end of life was quantified in the KB-BLOK concrete blocks LCA study based on presumed processes because there are still no KB-BLOK concrete blocks in the end of the life phase (production was started in 1992 and blocks are 30 years under warranty). The end of the life phase represents approximately 1 % of total product life cycle impacts as was approved in the sensitivity analysis made in LCA study. In agreement with PCR 2006:02 – Building Products the end of life is not included in EPD.

The KB-BLOK concrete blocks are 100 % recyclable building material. The recycate (broken concrete) could substitute artificial or natural stone aggregate because its similar characteristics. The recycate treatment and usage next to the dismantling construction site are suitable because volume of traffic decreasing. It is necessary to avoid a bonding of recycate with foreign materials (dangerous above all). The recycate contaminated by dangerous materials should be properly treated.

Data quality

- 1) Other data representative for the process are used (class 2 in agreement with PCR 3.2.1) – industrial and operational data of KB-BLOK system ltd It is overall input data (s. tab. 1).
- 2) Other data, which are assumed to be a conservative estimation of the actual data, are used (class 3 in agreement with PCR 3.2.1) – Boustead Consulting Ltd. Database. They are data generated by SW Boustead Model from class 2 data.

Data quality requirements were introduced in this characteristics:

- time-related coverage of data - 2007
- geographical coverage – the actual Boustead model and database has been used for the class 3 data. There were used Czech Republic data for production of the fuels and energies.
- technology coverage - the actual Boustead model and database has been used for the class 3 data. The data are technology average of particular products and process steps.

Environmental performance profile

Tab.3 Life cycle inventory analysis results

Resource use	Generic process step (manufacturing phase)			
	Extraction	Manufacturing	Transport	TOTAL
Material consumption /kg/ref. unit				
Non-renewable	1045,02	0,50	0,19	1045,71
Renewable	2,70	0,12	0,03	2,85
Water (refined)	3670,00	9,94	5,60	3685,54
Energy consumption /MJ/ref. unit				
Nuclear	161,78	27,54	1,23	190,55
Fuel consumption /MJ/ref. unit				
Coal	819,59	91,26	3,63	914,49
Crude oil	577,68	35,2	105,69	718,57
Natural gas	262,88	19,25	5,13	287,26
Renewable	5,91	92,58	0,06	98,55
Others	0,80	0,32	-0,01	1,11
TOTAL	1822,73	173,57	115,67	2111,98
Waste production /kg/ref. unit				
Recyclable	-	-	-	-
Others	0,18	0,03	0,033	0,18
Hazardous	1045,02	0,50	0,19	1045,72

There was not contained recyclable waste in the table because its relevant quantification is not possible.

Tab.4: Potential environmental impact of the reference unit LCA

Impact category	Unit	Generic process step (manufacturing phase)			
		Extraction	Manufacturing	Transport	TOTAL
ref. unit					
Global warming	kg CO ₂ eq	2,34E+02	5,83E+00	9,15E+00	2,49E+02
Ozone layer depletion	kg CFC-11 eq	0,00E+00	2,00E-08	1,00E-08	3,00E-08
Acidification	mol H ⁺ eq	6,25E-02	3,61E-03	1,48E-03	6,76E-02
Eutrophication	kg PO ₄ ³⁻ eq	6,40E-02	4,35E-03	1,17E-02	8,01E-02
Eutrophication	kg O ₂	2,95E+00	2,01E-01	5,42E-01	3,70E+00
Photochemical oxidation	kg C ₂ H ₄ eq	8,51E-02	5,65E-03	6,17E-03	9,68E-002

Rem: Eutrophication impact category was formulated in two versions. The $g PO_4^{3-} eq$ is the impact category indicator according to *PCR 2006:02 – Building Products* and the $g O_2 /g, max_{eq}$ is the impact category indicator according to *International EPD Consortium (IEC), Supporting Annexes for EPD*.

Additional environmental information

KB-BLOK system, ltd applies the quality control system according to ISO 9001 that is used as an instrument for fulfillment of the corporate quality strategy. The quality system has been extended by the EMS environmental protection system according to ISO 14001. By means of these two instruments of management there has been created the managerial structure, that enables us to communicate better with our customers and meet their requirements.

Management systems and products of our company are certified and supervised by Building Research Institute – Certification Company, Ltd.

The process goal of KB-BLOK system, ltd is the economical and environmental improvement of the company. The own recycling line for products utilization and periodically engine oils filtration (since 2008) are steps for this improvement. These technologies provide waste amount decreasing (also hazardous waste) and raw materials inflows decreasing.

Mean of obtaining explanatory materials

Explanatory materials are available at KB-BLOK system, ltd, Masarykova 635, 439 42 Postoloprty – industrial zone, Czech Republic, info@kb-blok.cz.

References

- [1] LCA Study of KB Concrete Blocks, KLASIK Concrete Blocks, KB ATLAS Concrete Blocks, KLASIK XC Concrete Blocks, KB STROP XC Ceiling Blocks; Tichá M., Nobilis L., Děčín, Czech Republic, 2009
- [2] PCR 2006:2 Building products, version 1.0; Erlandsson and col., 2006
- [3] General Programme Instructions for EPD + Supporting Annexes; The International EPD Consortium (IEC), 2008, Vasagatan 15-17, SE-111 20 Stockholm, info@environdec.com
- [4] ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – principle and procedures, 2006
- [5] ISO 14040:2006 Environmental management – Life cycle assessment – Principles and framework, 2006
- [6] ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guidelines, 2006
- [7] ISO 14020:2000 Environmental labels and declarations – general principles, 2002
- [8] ISO 14021:1999 Environmental labels and declarations -- Self-declared environmental claims (Type II environmental labelling), 1999
- [9] Announcement of Rules of the National Eco-Labeling Programme publication, Official Journal of the Ministry of the Environment of the Czech Republic, annual vol. XVII, vol. 8, 2007

Mandatory statements

The same products environmental declarations from different programmes need not to be comparable.

There was the usage phase excluded from concrete block life cycle for these reasons:

- It is according to EPD – PCR 2006:2 Building products,
- the generic process steps transport to customers and construction of a building are not relevantly quantified because specificity of orders and buildings,
- the usage of the concrete blocks in the building has no inflows and outflows – concrete blocks are not conserved or renovated.

There was the end of life excluded from concrete block life cycle for these reasons:

- It is according to EPD – PCR 2006:2 Building products,
- the exact quantification of end-of-life product is not possible because there are still no KB-BLOK concrete blocks in the end of life phase (production was started in 1992 and blocks are 30 years under warranty).
- the end of life phase represents approximately 1 % of total product life cycle impacts as was approved in the sensitivity analysis made in LCA study,
- the process step dismantling of a building are not relevantly quantified because of specificity of buildings and dismantling processes.

This declaration was generated by Ing. Rác (KB-BLOK system, s.r.o.), Ing. Nobilis (ECO trend ltd) and Ing. Tichá – MT Konzult.

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 1.0 Rules of the National Eco-Labeling Programme
Product category rules (PCR):	2006:2 Building products, version 1.0, 22. 2. 2006, Swedish Environmental Management Council, Vasagatan 15-17, SE-111 20 Stockholm

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 30th May 2009 in agreement with ISO 14025:2006. The certificate results from the Final report no. P-3013EPD-09-0333 from 1st July 2009 that includes certification body ascertaining and validity conditions of the certificate.

The verified EPD has reg. no. 3013EPD-09-0333-01.

Registration number	3013EPD - 09 - 0333 from 1 st July 2009
Certified validity	to 1st July 2012 Výzkumný ústav pozemních staveb - Certifikační společnost, s.r.o., Pražská 16, 102 21 Praha 10 – Hostivař, Czech Republic tel.: 271751148 fax: 20281017241 e-mail: votockova@vups.cz
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1st July 2009

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Tereza Votočková
Head of Certification Body

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