

Environmental Product Declaration

Insulation material Classic 039 ECOSE® Technology



KNAUFINSULATION

Issuance date: 15.02.2010
 Validation date: 20.12.2010
 Validity date: 20.12.2013

Product characteristics made by:
 Building Research Institute, 00-611 Warsaw, ul. Filtrowa 1, www.itb.pl
 and verified by LCA expert group.

Manufacturer

Knauf

Certificate of conformity EC 0764 – CPD – 0122, EN 13162: 2001 and EN 13162:2001/AC: 2005

Basic information

Life cycle: Cradle to Gate (A1-A3 module prEN 15804)

The year of preparing the characteristic: 2010

Declared durability: 30 years

Functional unit (FU: 1 m²K/W for $\lambda=0,039$ W/mK, $\rho=12,5$ kg/m³, mass=0,49 kg)

Table 1. Product basic technical information

Product	Specification
Norm	EN 13162
Density of the wool, kg/m ³	12,5
Production volume, Mg	3477
λ accepted for calculations, W/mK	0,039
Reaction to fire class	A1
Application	Thermal and acoustic insulation

Product description



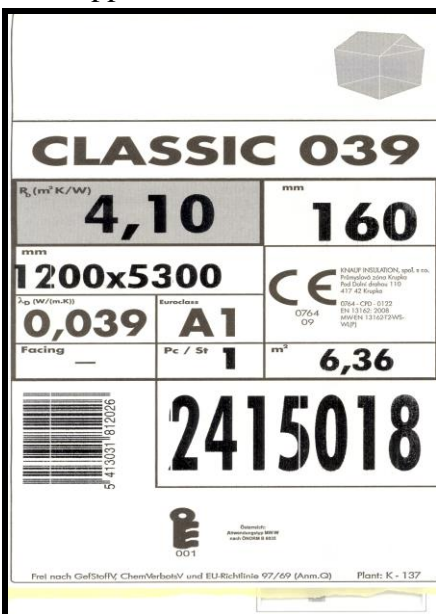
Insulating material Classic 039 ECOSE® Technology is made of mineral glass fiber. It is a hydrophobic multipurpose product. This product is produced in Czech Republic in Krupka u Teplic and represents 6,59% of overall production. The thermal and acoustic insulating properties make the material suitable for use in constructions of light claddings of buildings, primarily in wood or metal based constructions. It can also be applied as filling in joist ceilings. In case of application in the open diffusion systems no moisture barrier needs to be applied on the inside. In compositions it is very well applicable in the skeletal systems of wooden or metal frames. On the outside the product is coated with a fiber-building board on which final plaster stuff or metal cladding is applied.

Advantages

- high fire resistance
- ecological sugar-based filling and fiber bounding
- excellent thermal insulating and acoustic properties
- hydrophobic product
- very pleasant to work with
- simple and easy manipulation
- keeps shape well, ideally fills in the given space
- compressed package – easy to carry

Package

The product CLASSIC 039 is supplied in rolls that are packed in PE plastic film. The protective package is marked with the manufacturer's logo and a type plate indicating specification of the product and recommended mode of application.



Picture 2. Etiquette of analyzed product Classic 039 w ECOSE® Technology

Raw materials and energy.



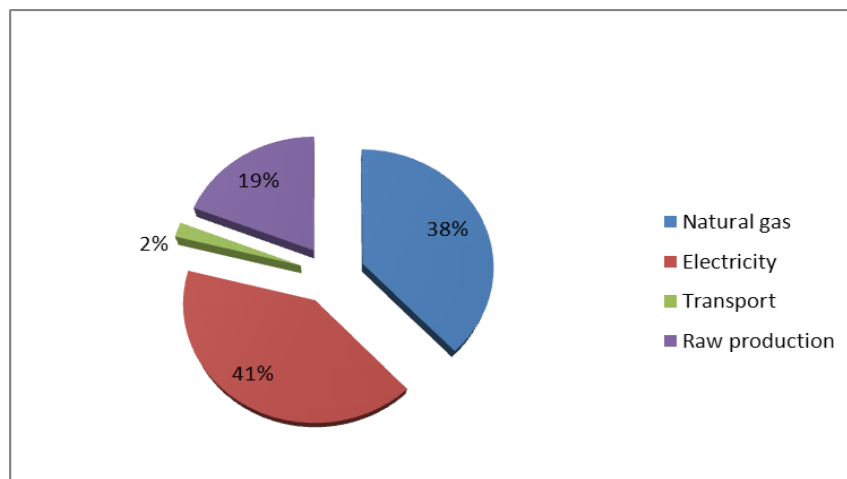
Table 2. Raw materials used to produce mineral glass wool

#	Name of semi-finished product or raw material	total amount used in production	Unit (Mg/yr; pieces/yr)	Semi-product used on FU (0,52 kg)	Semi-product amount/ tons product	New (N) or recycled (R)	From recycling %
1	Sand	3 690,53	Mg	3,45E-05	0,0705	N	0
2	Etibor/borax	4 394,01	Mg	4,11E-05	0,0840	N	0
3	Dolomite	1 418,61	Mg	1,33E-05	0,0271	N	0
4	Soda	1 057,92	Mg	9,91E-06	0,0202	N	0
5	Nepheline	1 057,92	Mg	9,91E-06	0,0202	N	0
6	Cullet	35 038,34	Mg	0,00033	0,6695	R	65
7	Cullet AMT	4 538,41	Mg	4,25E-05	0,0867	N	0
8	Ammonia water	97,528,4	Mg	8,75E-07	0,0018	N	0
9	Decstrose-amydex331	5 613,83	Mg	4,19E-05	0,0856	N	0
10	Oil BOMUL	504,09	Mg	2,93E-06	0,0060	N	0
11	Ammonia sulfate	734,70	Mg	7,79E-05	0,1590	N	0
12	Silicon	71,36	Mg	1,42E-06	0,0029	N	0
13	Foil	1 163,23	Mg	1,090E-05	0,0222	N	0
14	Frit (own glass)	2765,3	Mg	2,014E-05	0,0411	R	100

Overall sum of semi-finished products and raw materials for Mg of finished product is 1,297 Mg

Tablica 3. Primary energy consumption

Energy carriers	Amount of energy [MJ] per:	
	Mg	FU (0,49kg)
Production phase		
Natural gas (142 nm ³ /Mg wool, 35 MJ/nm ³)	5373	2,63
Electric energy (2619 MJ/MG)	5763	2,81
Transport	345	0,17
Raw materials and semi-finished products production		
Raw materials and semi-finished products production	2681	1,31
Total energy consumption	14185	6,95



Picture 3. Percentage share of particular energy carriers "cradle to gate"

Table 4. Emissions into air generated during production stage A3

Emission during production	Unit	Total amount	Emission per Mg	Emission per FU
Dust	kg	3012,15	0,0576	2,82E-05
CO	kg	21255,77	0,4063	0,000199
CO ₂	kg	15034000	287,3936	0,140822
NO ₂	kg	33646,41	0,6432	0,000315
SO ₂	kg	7957,6	0,1521	7,45E-05
Phenol	kg	106,81	0,0020	1,00E-06
Formaldehyd	kg	737,02	0,0141	6,903E-06
NH ₃	kg	67470,04	1,2898	0,000631
HCl	kg	138,86	0,0027	1,30E-06
HF	kg	437,94	0,0084	4,10E-06
Pb	kg	10,6	0,0002	9,92E-08
Aromatic hydrocarbons	kg	800	0,0153	7,49E-06

Table 5. Emissions into water generated during production stage A3

Water and sewage	Unit	Value	Additional information:
Water supplied	m ³	88516	1,69m ³ /Mg of wool produced
Domestic wastewater	m ³	500	to wastewater treatment plant
Composition of wastewater			
COD	mg/l	303	Accredited laboratory
BOD	mg/l	68,15	Accredited laboratory
General suspended matter	mg/l	198	Accredited laboratory
Ammonia nitrogen	mg/l	28	Accredited laboratory
Heavy metals	mg/l	0,001	Accredited laboratory

Note: The values shown in table 5 are for the purchase of water and emissions for the whole Plant.

Table 6. Waste generated in the phase of product manufacturing A3

Waste	Unit	Amount	Amount per Mg	Amount per FU	To go to:
Municipal waste	Mg	53,191	0,001	4,98E-07	Storage area
Other waste:					
Glass waste	Mg	76,8	0,0014	7,19E-07	recycling
Package waste	Mg	9,2	0,00016	8,62E-08	recycling
Plastic packages	Mg	8,88	0,00017	8,32E-08	recycling
Chemicals	Mg	28,4	0,0005	2,66E-07	Storage area
Metal waste	Mg	10,77	0,0002	1,01E-07	recycling
Package mix waste	Mg	5,06	9,67E-05	4,74E-08	składowisko
Soil and rocks	Mg	22,86	0,00043	2,14E-07	Re-use
Empty toners	Mg	6,535	0,00012	6,12E-08	Storage area
Oil mix	Mg	3	5,73E-05	2,81E-08	recycling
Waste residues	Mg	44,9	0,00086	4,21E-07	Storage area
Oil wastes	Mg	37,7	0,00072	3,53E-07	Re-use
Controlled dangerous substances	Mg	206	0,00393	1,93E-06	Energy recovery
Glass waste	Mg	1129,6	0,02159	1,06E-05	Storage area

Environmental and energetics characteristics (LCA)




Table 7. List of impact categories on the environment in the course of life cycle of glass wool
Declared Unit in accordance to 5.2 Pr EN15804 (mandatory A1, A2, A3 module)

EPD	Units	Life cycle of glass wool, impact on 1 Mg of the product		
		production of raw materials A1	External transport A2	production process + energy use A3
Environmental impact				
Greenhouse effect GWP	kg CO ₂	318,0	24,9	1181,5
Depletion of ozone layer ODP	kg CFC11	6,70E-05	0,00	0,000022
Acidification effect AP	kg SO ₂	2,955	0,202	5,548
Air contamination: potential for ozone creation POCP	kg ethylene (POCP)	0,22	0,012	0,141
Water contamination eutrophication EP	kg PO ₄	0,348	0,035	1,142
Depletion of mineral resources	kg Sb	0,106	0,00	0,0230
Depletion of fossil fuels	MJ	2196	311	9142
Environmental aspects				
Water consumption	m ³	3,35	0,01	1,69
Raw materials consumption	Mg	0,75	0,00	1,2971
Use of renewable energy	MJ	98	0,00	350
Use of primary energy	MJ	2681	345	11159

Table 8. List of impact categories on the environment in the course of life cycle of glass wool FU in accordance to 5.2 Pr EN15804 (mandatory A1, A2, A3 module)

EPD	Units	Life cycle of glass wool, impact on FU of the product (1 m ² K/W for $\lambda=0,039$ W/mK, $\rho=12,5$ kg/m ³ , mass=0,49 kg) of glass wool		
		production of raw materials A1	External transport A2	production process + energy use A3
Environmental impact				
Greenhouse effect GWP	kg CO ₂	0,156	0,012	0,579
Depletion of ozone layer ODP	kg CFC11	3,28E-08	3,19E-10	1,06E-08
Acidification effect AP	kg SO ₂	0,0014	9,91E-05	0,0027
Air contamination: potential for ozone creation POCP	Kg ethylene	0,0001	5,92E-06	6,91E-05
Water contamination eutrophication EP	kg PO ₄	0,00017	1,73E-05	0,00056
Depletion of mineral resources	kg Sb	5,19E-05	0	1,13E-05
Depletion of fossil fuels	MJ	1,076	0,152	4,479
Environmental aspects				
Water consumption	m ³	0,0016	4,9E-06	0,00083
Raw materials consumption	Mg	0,00037	0	0,00064
Use of renewable energy	MJ	0,048	0	0,172
Use of primary energy	MJ	1,314	0,169	5,468

Table 9. Environmental and energetics characteristics for product CLASSIC 039

Environmental Profile Declaration			
	Date of LCA start	November 2010	
	Date of finish	January 2011	
	Data source	Manufacturer's LCI data, ITB, EcoInvent, IEA, publications	
	Country	Czech Republic	
	Representativeness	1 fabryka w Krupce, dane za 2009	
	LCA methodology	UEAtc, pr EN 15804, ISO 14040, 14044	
	Allocation	99% impact; 6,59% production	
	Validation date	January 2011	
	Validity date	January 2014	
	Limits	Cradle to gate, A1-A3	
	Units	The values of criteria (a) per:	
		Mg	FU (0,49kg)
Environmental impact			
Greenhouse effect GWP	kg CO ₂	1524	0,75
Depletion of ozone layer ODP	kg CFC11	0,0001	4,37E-08
Acidification effect AP	kg SO ₂	8,7	0,0043
Air contamination: potential for ozone creation POCP	kg C ₂ H ₄	0,37	0,00018
Water contamination eutrophication EP	kg PO ₄	1,52	0,00075
Depletion of mineral resources	kg Sb	0,129	6,32E-05
Depletion of fossil fuels	MJ	11649	5,71
Environmental aspects			
Water consumption	m ³	5,05	0,0025
Raw materials consumption	Mg	2,05	0,001
Use of renewable energy	MJ	448	0,22
Use of primary energy	MJ	14185	6,95
Reference point	Per an inhabitant of Poland (b)	Standardized values (a/b*100%) [%]	
Greenhouse effect	9000 kg CO ₂	16,9%	-
Depletion of ozone layer	0,0069 kg CFC11	1,3%	-
Acidification effect	80,4 kg SO ₂	10,8%	-
Air contamination: potential for ozone creation	32,23 kg C ₂ H ₄	1,1%	-
Use of energy	78,3 GJ	18,7%	-
Water contamination: eutrophication	65,62 kg PO ₄	2,3%	-
Water usage	292 m ³	1,7%	-



Instytut Techniki Budowlanej

Zakład Fizyki Ciepłej, Instalacji Sanitarnych i Środowiska
02-656 Warszawa, ul. Ksawerów 21

**ŚWIADECTWO
DEKLARACJI ŚRODOWISKOWEJ III TYPU**

Wyrób:

wełna mineralna szklana CLASSIC 039 w ECOSE® Technology

Producent:

Knauf Insulation Sp. z o.o.

02-146 Warszawa, ul. 17 Sycznia 56

potwierdza się poprawność ustalenia danych uwzględnionych przy opracowaniu
Deklaracji Środowiskowej III typu oraz zgodność z wymaganiami norm:

PN-EN ISO 14040:2009

Zarządzanie środowiskowe. Ocena cyklu życia. Zasady i struktura

PN-EN ISO 14044:2009

Zarządzanie środowiskowe. Ocena cyklu życia. Wymagania i wytyczne

Niniejsze świadectwo, wydane po raz pierwszy 12 stycznia 2011 r. jest ważne 3 lata,
lub do czasu zmiany wymienionej Deklaracji Środowiskowej

Kierownik
Zakładu Fizyki Ciepłej,
Instalacji Sanitarnych i Środowiska

Krzysztof Kasperkiewicz



Dyrektor
Instytutu Techniki Budowlanej

Marek Kąkol

Warszawa, styczeń 2011 r.



The basis for LCA analysis was prEN 15804 - PCR norm.

Independent verification corresponding to ISO 14025 & 8.3.1.

internal

external

Verification of calculation method and PCR: UEAtc LCA Expert Group

Environmental audit and input data verification: dr inż. Michał Piasecki

Verification of procedures and declaration: dr inż. Halina Prejzner