Environmental Product Declaration

Concrete and reinforced concrete prefabricates

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Basic information

This declaration is the type III environmental product declaration based on EN 15804 rules and verified according to ISO 14025. It contains the environmental information on the impacts and aspects of declared construction materials verified by the independent Advisory Board according to ISO 14025.

Life cycle: Cradle to Gate (EN 15804, A1-A3 modules)
The year of preparing the characteristic: 2013
Declared durability: 50 years
Declared Unit : 1 m^3 of concrete with a given compressive strength class, environmental exposure class based on EN (PCR UN CPC 375)
Functional Unit: 1 Mg and 1 m^2 of Precast Concrete Products (walls, balconies, balustrades, columns, filigree, stairs) with a specified reference service life (NPCR 20)

Product information

The concrete used in the production of prefabricates (declared in this document) is the concrete of classes C30/37, C35/45, C40/50, C50/60.

Strength class	C30/37	C35/45	C40/50	C50/60
Environmental exposure class	XC4, XS1, XD2, XF1	XD3	XC4, XD3, XF1	XF1, XC4
Bulk density	2363 kg/m^3	2359,2 kg/m^3	2376,3 kg/m^3	2348,9 kg/m^3
W/C	0,48	0,45	0,43	0,42
Cement strength class	52,5 R	52,5 R	52,5 R	52,5 R

SCANBET Ltd. specializes in production of concrete and reinforced concrete prefabricates ranging from walls, ceilings, stairs to balconies (weight up to 20 Mg, dimensions up to 10m). The present production capabilities include reinforced concrete prefabricates (not pre-stressed) in the approx. amount of 90 m^3/day. EPS used for insulation is AQUA EPS P80, P120 and P150 produced by Yetico.

Prefabricated reinforced concrete balconies

- simply supported balconies
- bracket balconies with the application of the technology partially or fully eliminating thermal bridge.
- due to adequate concrete technology, our balconies after installation do not require any lagging, insulation, planking nor concrete topping. This technology is successfully and exclusively used in Scandinavia and Germany.

Prefabricated flights of stairs

- external stairs (made of frost resistant concrete)
- internal stairs: simple, landing flights of stairs and landings

Prefabricated elevator shafts

- waterproof bottom (tub)
- side walls ceiling
- (cover)

Prefabricated reinforced concrete walls

- external bearing walls
- "SANDWICH" external walls
- "SANDWICH" pedestals
- single and "SANDWICH" ground sills

Prefabncated elements of reinforced concrete building structures, halls, stadiums etc.

- prefabricated beams
- prefabricated posts
- prefabricated footings (e.g. "glasses")
- prefabricated retaining walls
- prefabricated cornices of viaducts etc.

Prefabricated reinforced concentrate ceilings

- elements of massive ceilings (fuli plates)
- "filigran" plates
- hollow - core plates

For the production of elements exposed to the influence of weather conditions (f. ex. balcony plates) SCANBET uses concrete of increased frost resistance. Thin - walled elements or elements of complex form are manufactured from SCC self-compacting concrete. For the production of elevation elements architectonic concrete is applied.

In SCANBET quality control is carried out on the basis of the Institutional Quality Control System. It consists in controlling operations on every stage of production. System of Quality Control was approved by Norwegian certifying body - Kontrollradet. The certifying body granted SCANBET the certificate of Institutional Quality Control System in the scope of compatibility assessment for the following standards:

- NS-EN 13225:2004 Concrete prefabricates. Bar construction elements;
- NS-EN 13747:2005+A1:2008 Concrete prefabricates. Floor slabs for combined floor systems ;
- NS-EN 14843:2007 Concrete prefabricates. Stairs;
- NS-EN 1992:2007 Concrete prefabricates. Elements of walls.

CE Certificate confirming the Production Quality Control in the scope of prefabricated construction elements according to NS-EN 13369 standard - common reauirements for concrete prefabricates. SCANBET Institutional Quality Control System complies with DIN EN 206-1, 1045-2 and DIN 1045-4. We have Certificate of Compatibility issued by Brandenburgische Technische Universitat Cottbus. SCANBET is also accredited by Swedish Certification System Society NORDCERT. The above mentioned Society granted us a Certificate confirming compliance with EN 13369, BKR, BBK and with the BBC certification rules.

Raw materials and energy.

Table 2. Raw materials used to produce SCANBET concrete

No	Name of semi-finished product or raw material	Total amount used in production	Unit (Mg/yr; pieces/yr)	Semi-product used on 1m^3	Semi-product amount/ tons product
1	Rebars		Mg	98,4%	0,0778
2	Reinforcing mesh		Mg	98,4%	0,0383
3	Water		Mg	98,4%	0,0817
4	Sand 0		Mg	98,4%	0,8008
5	Gravel 2/8		Mg	98,4%	0,2585
6	Gravel 8/16		Mg	98,4%	0,2596
7	Grits 2/16		Mg	98,4%	0,5947
8	CEM I 42,5		Mg	98,4%	0,0018
9	CEM I 52,5		Mg	98,4%	0,2810
10	CEM I 42,5 R-NA		Mg	98,4%	0,1027
11	Admixture I		Mg	98,4%	0,0000
12	Admixture II LP		Mg	98,4%	0,0002
13	Admixture III FM		Mg	98,4%	0,0019
14	Plywood		Mg	98,4%	0,0077
15	Wood		Mg	98,4%	0,0193

Overall sum of semi-finished products and raw materials for 1 m^3 of concrete mix is 2,52 Mg.
All inputs of raw materials and energy have been included in LCA calculations.

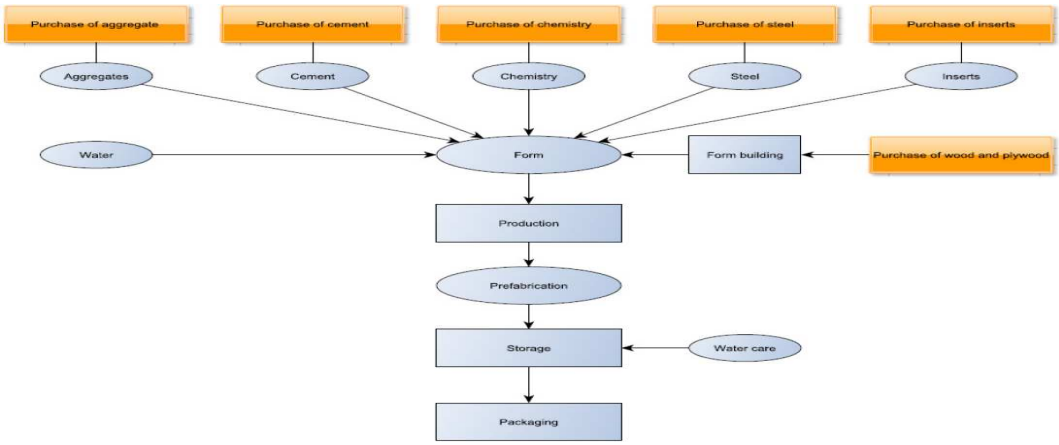

Fig.1. SCANBET concrete production scheme (A3 module)

Table 3.Primary energy consumption for A3module

Energy carriers	Amount of energy [MJ] per m3
Production stage A3	
Heat (biomass)	313,7
Electricity	171,4
ON (only inside fabric)	98,5
Oil	31,4

Table 4. Emissions into air generated during production stage A3

Emission during production	Unit	Total amount	Emission per m^3 of product
CO	kg	65,36	0,0031
CO_2	kg	633992	30,42
NO_2	kg	784,32	0,038
SO_2	kg	1307,2	0,062
CH_4	kg	6,536	0,0003
NMVOC	kg	163,4	0,0078
N2O	kg	13,072	0,0006
Note 1: Emission of CO_2 was estimated (for heat production from wood fuel) is based on the wood combustion factor. In accordance to national regulations emission from bio-based fuels is carbon zero.			
Note 2: The values shown in table 4 were estimated basing on fuel consumption and combustion factors. Manufacturer doesn't provide measurement service.			
Note 3. The values shown in table 4 are for the whole concrete production.			

Table 5. Emissions into water generated during production stage A3

Water and sewage	Unit	Total amount	Emission per m^3 of product
Water supplied	m^3	1702	0,081
Domestic wastewater	m^3	2699	0,129
Composition of wastewater			
COD	mg/l	125	16191,7
BOD	mg/l	15	1943,0
General suspeneded matter	mg/l	35	4533,7
Ammonia nitrogen	mg/l	10	1295,3
Phosphorans	mg/l	1	129,5
Note 4: The values shown in table 5 were estimated basing on the waste contaminates values for Szczecin region. Manufacturer doesn't provide measurement service.			
Note 5: The values shown in table 5 are for the whole concrete production.			

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

Waste	Unit	Amount	Amount per m^3	To go to:
Municipal waste	Mg	35,91	0,0017	landfill
Other waste:				
Saw dust, cuttings, wood, particle board and veneer	Mg	244,72	0,012	recycling
Styrofoam, insulation	Mg	22,82	0,0011	recycling

Environmental characteristics (LCA)- concrete

Table 7. Environmental characteristic for 1 m3 concrete class C30/37

Environmental assessment information (MND – Module not declared, MD – Module Declared)																
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	MND	MND	MND	MND	MND	MND	MND	MND	MND

Environmental impacts: 1 m^3 C30/37					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO_2 eq.]	287,4	31,0	13,9	332,3
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	9,6E-6	0,00	0	9,6E-06
Acidification potential of soil and water	[kg SO_2 eq.]	0,5	0,363	0,089	0,952
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	0,097	0,013	0,003	0,113
Formation potential of tropospheric ozone	[kg Ethene eq.]	0,028	0,060	0,134	0,222
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	6E-4	3,2E-6	2,29E-6	6E-4
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	1176	413	294	1883
Environmental aspects on resource use: 1 m^3 C30/37					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	47	0	13,2	60,2
Use of renewable primary energy resources used as raw materials	[MJ]	0	0	314	314
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	47	0	327,2	374,2
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	1696	413,0	135,7	2244,7
Use of non-renewable primary energy resources used as raw materials	[MJ]	0	0	158,2	158,2
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	1696	413	294	2403
Use of secondary material	[kg]	15,5	0	0	15,5
Use of renewable secondary fuels	[MJ]	53,4	0	0	53,4
Use of non-renewable secondary fuels	[MJ]	214,2	0	0	214,2
Net use of fresh water	[dm^3]	571,9	3,9	163	738,8
Other environmental information describing waste categories: 1 m^3					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	0,4	0	0	0,4
Non-hazardous waste disposed	[kg]	240,9	2,05	1,7	244,65
Radioactive waste disposed	[kg]	0	0	0	0
Components for re-use	[kg]	0	0	0	0
Materials for recycling	[kg]	0	0	12,8	12,8
Materials for energy recovery	[kg]	0	0	0	0
Exported energy	[MJ]	0	0	0	0

Table 8. Environmental characteristic for 1 m^3 concrete class C35/45

Environmental assessment information (MND – Module not declared, MD – Module Declared)																
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**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**

Environmental impacts: 1 m^3 C35/45					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO_2 eq.]	299,9	31,0	13,9	344,8
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	1,2E-5	0,00	0	1,2E-5
Acidification potential of soil and water	[kg SO_2 eq.]	0,52	0,363	0,089	0,972
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	0,1	0,013	0,003	0,116
Formation potential of tropospheric ozone	[kg Ethene eq.]	0,026	0,060	0,134	0,22
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	6,2E-4	3,2E-6	2,29E-6	6,2E-4
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	1325	413	294	2032
Environmental aspects on resource use: 1 m^3 C35/45					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	48	0	13,2	61,2
Use of renewable primary energy resources used as raw materials	[MJ]	0	0	314	314
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	48	0	327,2	375,2
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	1861	413,0	135,7	2409,7
Use of non-renewable primary energy resources used as raw materials	[MJ]	0	0	158,2	158,2
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	1861	413	294	2568
Use of secondary material	[kg]	159	0	0	159
Use of renewable secondary fuels	[MJ]	54,9	0	0	54,9
Use of non-renewable secondary fuels	[MJ]	220,5	0	0	220,5
Net use of fresh water	[dm^3]	607,8	3,9	158	769,7
Other environmental information describing waste categories: 1 m^3 C35/45					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	0,42	0	0	0,42
Non hazardous waste disposed	[kg]	247,3	2,05	1,7	251,05
Radioactive waste disposed	[kg]	0	0	0	0
Components for re-use	[kg]	0	0	0	0
Materials for recycling	[kg]	0	0	12,8	12,8
Materials for energy recovery	[kg]	0	0	0	0
Exported energy	[MJ]	0	0	0	0

Table 9. Environmental characteristic for 1 m^3 concrete class C40/50

Environmental assessment information (MND – Module not declared, MD – Module Declared)																
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**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**

Environmental impacts: 1 m^3 C40/50					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO_2 eq.]	347	31,0	13,9	391,9
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	1,35E-5	0,00	0,00	1,35E-05
Acidification potential of soil and water	[kg SO_2 eq.]	0,59	0,363	0,089	1,042
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	0,1	0,013	0,003	0,116
Formation potential of tropospheric ozone	[kg Ethene eq.]	0,029	0,060	0,134	0,223
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	6,9-4	3,2E-6	2,29E-6	6,9E-4
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	1508	413	294	2215
Environmental aspects on resource use: 1 m^3 C40/50					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	54	0	13,2	67,2
Use of renewable primary energy resources used as raw materials	[MJ]	0	0	314	314
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	54	0	327,2	381,2
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	2120	413,0	135,7	2668,7
Use of non-renewable primary energy resources used as raw materials	[MJ]	0	0	158,2	158,2
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	2120	413	294	2827
Use of secondary material	[kg]	18,1	0	0	18,1
Use of renewable secondary fuels	[MJ]	62,8	0	0	62,8
Use of non-renewable secondary fuels	[MJ]	252	0	0	252
Net use of fresh water	[dm^3]	673	3,9	172	848,9
Other environmental information describing waste categories: 1 m^3 C40/50					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	0,5	0	0	0,5
Non hazardous waste disposed	[kg]	279	2,05	1,7	282,75
Radioactive waste disposed	[kg]	0	0	0	0
Components for re-use	[kg]	0	0	0	0
Materials for recycling	[kg]	0	0	12,8	12,8
Materials for energy recovery	[kg]	0	0	0	0
Exported energy	[MJ]	0	0	0	0

Table 10. Environmental characteristic for 1 m^3 concrete class C50/60

Environmental assessment information (MND – Module not declared, MD – Module Declared)																
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**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**

Environmental impacts: 1 m^3 C50/60					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Global warming potential	[kg CO_2 eq.]	359	31,0	13,9	403,9
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	1,5E-5	0,00	0	0,000015
Acidification potential of soil and water	[kg SO_2 eq.]	0,6	0,363	0,089	1,052
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	0,12	0,013	0,003	0,136
Formation potential of tropospheric ozone	[kg Ethene eq.]	0,029	0,060	0,134	0,223
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	7,1E-4	3,2E-6	2,29E-6	7,1E-4
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	1580	413	294	2287
Environmental aspects on resource use: 1 m^3 C50/60					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	56,7	0	13,2	69,9
Use of renewable primary energy resources used as raw materials	[MJ]	0	0	314	314
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	56,7	0	327,2	383,9
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	2222,9	413,0	135,7	2771,6
Use of non-renewable primary energy resources used as raw materials	[MJ]	0	0	158,2	158,2
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	2222,9	413	294	2929,9
Use of secondary material	[kg]	19,02	0	0	19,02
Use of renewable secondary fuels	[MJ]	65,9	0	0	65,9
Use of non-renewable secondary fuels	[MJ]	264,6	0	0	264,6
Net use of fresh water	[dm^3]	726	3,9	176	905,9
Other environmental information describing waste categories: 1 m^3 C50/60					
Indicator	**Unit**	**A1**	**A2**	**A3**	**A1-A3**
Hazardous waste disposed	[kg]	0,5	0	0	0,5
Non hazardous waste disposed	[kg]	291,8	2,05	1,7	295,55
Radioactive waste disposed	[kg]	0	0	0	0
Components for re-use	[kg]	0	0	0	0
Materials for recycling	[kg]	0	0	12,8	12,8
Materials for energy recovery	[kg]	0	0	0	0
Exported energy	[MJ]	0	0	0	0

Table 11. Environmental characteristic for 1 m^3 concrete classes C30-37, C35-45, C40/50, C50/60

Environmental assessment information (MND – Module not declared, MD – Module Declared)																
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**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**

Environmental impacts: 1 m^3					
Indicator	**Unit**	**C30/37**	**C35/45**	**C40/50**	**C50/60**
Global warming potential	[kg CO_2 eq.]	332,3	344,8	391,9	403,9
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	9,6E-06	1,2E-5	1,35E-05	0,000015
Acidification potential of soil and water	[kg SO_2 eq.]	0,952	0,972	1,042	1,052
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	0,113	0,116	0,116	0,136
Formation potential of tropospheric ozone	[kg Ethene eq.]	0,222	0,22	0,223	0,223
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	6E-4	6,2E-4	6,9E-4	7,1E-4
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	1883	2032	2215	2287
Environmental aspects on resource use: 1 m^3					
Indicator	**Unit**	**C30/37**	**C35/45**	**C40/50**	**C50/60**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	60,2	61,2	67,2	69,9
Use of renewable primary energy resources used as raw materials	[MJ]	314	314	314	314
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	374,2	375,2	381,2	383,9
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	2244,7	2409,7	2668,7	2771,6
Use of non-renewable primary energy resources used as raw materials	[MJ]	158,2	158,2	158,2	158,2
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	2403	2568	2827	2929,9
Use of secondary material	[kg]	15,5	159	18,1	19,02
Use of renewable secondary fuels	[MJ]	53,4	54,9	62,8	65,9
Use of non-renewable secondary fuels	[MJ]	214,2	220,5	252	264,6
Net use of fresh water	[dm^3]	738,8	769,7	848,9	905,9
Other environmental information describing waste categories: 1 m^3					
Indicator	**Unit**	**C30/37**	**C35/45**	**C40/50**	**C50/60**
Hazardous waste disposed	[kg]	0,4	0,42	0,5	0,51
Non-hazardous waste disposed	[kg]	244,65	251,05	282,75	295,55
Radioactive waste disposed	[kg]	0	0	0	0
Components for re-use	[kg]	0	0	0	0
Materials for recycling	[kg]	12,8	12,8	12,8	12,8
Materials for energy recovery	[kg]	0	0	0	0
Exported energy	[MJ]	0	0	0	0

Table 12. Environmental characteristic for 1 ton of reinforced concrete as prefabricated element made of C30-37, C35-45, C40/50, C50/60 concrete(A1-A3)

Environmental impacts: 1 Mg					
Indicator	**Unit**	**C30/37**	**C35/45**	**C40/50**	**C50/60**
Global warming potential	[kg CO_2 eq.]	213,3	219,0	237,2	245,2
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	6,8E-06	7,8E-06	8,4E-06	9,2E-06
Acidification potential of soil and water	[kg SO_2 eq.]	0,66	0,67	0,69	0,70
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	0,094	0,096	0,095	0,10
Formation potential of tropospheric ozone	[kg Ethene eq.]	0,13	0,13	0,13	0,13
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	0,00034	0,00035	0,00038	0,0004
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	1328,8	1394,2	1461,3	1509,37
Environmental aspects on resource use: 1 Mg					
Indicator	**Unit**	**C30/37**	**C35/45**	**C40/50**	**C50/60**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	76,7	77,2	79,2	81,3
Use of renewable primary energy resources used as raw materials	[MJ]	132,9	133,1	132,1	133,7
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	209,6	210,3	211,4	215,0
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	1542,0	1614,5	1712,0	1776,2
Use of non-renewable primary energy resources used as raw materials	[MJ]	67,0	67,1	66,6	67,4
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	1609,0	1681,6	1778,6	1843,6
Use of secondary material	[kg]	65,4	126,3	66,1	67,3
Use of renewable secondary fuels	[MJ]	61,5	62,2	65,2	67,2
Use of non-renewable secondary fuels	[MJ]	90,6	93,5	106,1	112,7
Net use of fresh water	[dm^3]	518,7	532,7	562,3	593,2
Other environmental information describing waste categories: 1 Mg					
Indicator	**Unit**	**C30/37**	**C35/45**	**C40/50**	**C50/60**
Hazardous waste disposed	[kg]	0,18	0,19	0,22	0,23
Non-hazardous waste disposed	[kg]	116,8	119,7	132,2	139,2
Radioactive waste disposed	[kg]	0	0	0	0
Components for re-use	[kg]	0	0	0	0
Materials for recycling	[kg]	24,4	24,5	24,3	24,6
Materials for energy recovery	[kg]	0	0	0	0
Exported energy	[MJ]	0	0	0	0

Table 13. Environmental characteristic for 1 m^2 of reinforced concrete prefabricated element made of C30/37, concrete + 12 cm EPS insulation (A1-A3)

Environmental impacts: 1 m^2					
Indicator	**Unit**	**10cm+12cm**	**15cm+12cm**	**20cm+12cm**	**25cm+12cm**
Global warming potential	[kg CO_2 eq.]	58,57	83,78	109,0	134,19
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	1,64E-06	2,44E-06	3,25E-06	4,05E-06
Acidification potential of soil and water	[kg SO_2 eq.]	0,16	0,24	0,32	0,40
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	0,023	0,034	0,046	0,057
Formation potential of tropospheric ozone	[kg Ethene eq.]	0,0648	0,0804	0,096	0,1116
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	0,0048	0,0049	0,0049	0,005
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	408,5	565,5	722,5	879,5
Environmental aspects on resource use: 1 m^2					
Indicator	**Unit**	**10cm+12cm**	**15cm+12cm**	**20cm+12cm**	**25cm+12cm**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	18,48	27,54	36,6	45,66
Use of renewable primary energy resources used as raw materials	[MJ]	31,4	47,1	62,8	78,5
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	49,88	74,64	99,4	124,16
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	469,4	651,5	833,7	1015,9
Use of non-renewable primary energy resources used as raw materials	[MJ]	15,82	23,73	31,64	39,55
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	485,2	675,3	865,4	1055,5
Use of secondary material	[kg]	15,75	23,475	31,2	38,925
Use of renewable secondary fuels	[MJ]	14,54	21,81	29,08	36,35
Use of non-renewable secondary fuels	[MJ]	21,42	32,13	42,84	53,55
Net use of fresh water	[dm^3]	122,60	183,90	245,2	306,474
Other environmental information describing waste categories: 1 m^2					
Indicator	**Unit**	**10cm+12cm**	**15cm+12cm**	**20cm+12cm**	**25cm+12cm**
Hazardous waste disposed	[kg]	0,044	0,066	0,087	0,11
Non-hazardous waste disposed	[kg]	32,4	46,2	56,0	73,8
Radioactive waste disposed	[kg]	0	0	0	0
Components for re-use	[kg]	0	0	0	0
Materials for recycling	[kg]	5,9	8,79	11,68	14,57
Materials for energy recovery	[kg]	0	0	0	0
Exported energy	[MJ]	0	0	0	0

Table 14. Environmental characteristic for 1 m^2 of reinforced concrete prefabricated element made of C35/45, concrete + 12 cm EPS insulation (A1-A3)

Environmental impacts: 1 m^2					
Indicator	**Unit**	**10cm+12cm**	**15cm+12cm**	**20cm+12cm**	**25cm+12cm**
Global warming potential	[kg CO_2 eq.]	59,82	85,65	111,48	137,31
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	1,88E-06	2,80E-06	3,73E-06	4,65E-06
Acidification potential of soil and water	[kg SO_2 eq.]	0,16584	0,24444	0,32304	0,40
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	0,023512	0,034812	0,046112	0,057
Formation potential of tropospheric ozone	[kg Ethene eq.]	0,0646	0,0801	0,0956	0,11
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	0,004883	0,0049245	0,004966	0,005
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	423,4	587,85	752,3	916,8
Environmental aspects on resource use: 1 m^2					
Indicator	**Unit**	**10cm+12cm**	**15cm+12cm**	**20cm+12cm**	**25cm+12cm**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	18,58	27,69	36,8	45,9
Use of renewable primary energy resources used as raw materials	[MJ]	31,4	47,1	62,8	78,5
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	49,98	74,79	99,6	124,41
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	485,87	676,305	866,74	1057,2
Use of non-renewable primary energy resources used as raw materials	[MJ]	15,82	23,73	31,64	39,55
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	501,7	700,05	898,4	1096,75
Use of secondary material	[kg]	30,1	45	59,9	74,8
Use of renewable secondary fuels	[MJ]	14,69	22,035	29,38	36,7
Use of non-renewable secondary fuels	[MJ]	22,05	33,075	44,1	55,1
Net use of fresh water	[dm^3]	125,7	188,5	251,4	314,2
Other environmental information describing waste categories: 1 m^2					
Indicator	**Unit**	**10cm+12cm**	**15cm+12cm**	**20cm+12cm**	**25cm+12cm**
Hazardous waste disposed	[kg]	0,046	0,069	0,091	0,11
Non-hazardous waste disposed	[kg]	33,04	47,16	61,3	75,4
Radioactive waste disposed	[kg]	0	0	0	0
Components for re-use	[kg]	0	0	0	0
Materials for recycling	[kg]	5,9	8,8	11,7	14,6
Materials for energy recovery	[kg]	0	0	0	0
Exported energy	[MJ]	0	0	0	0

Table 15. Environmental characteristic for 1 m^2 of reinforced concrete prefabricated element made of C40/50, concrete + 12 cm EPS insulation (A1-A3)

Environmental impacts: 1 m^2					
Indicator	**Unit**	**10cm+12cm**	**15cm+12cm**	**20cm+12cm**	**25cm+12cm**
Global warming potential	[kg CO_2 eq.]	64,53	92,72	120,9	149,09
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	2,03E-06	3,03E-06	4,03E-06	5,03E-06
Acidification potential of soil and water	[kg SO_2 eq.]	0,173	0,253	0,34	0,42
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	0,024	0,035	0,046	0,057
Formation potential of tropospheric ozone	[kg Ethene eq.]	0,065	0,080	0,096	0,11
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	0,00489	0,004935	0,00498	0,005025
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	441,7	615,3	788,9	962,5
Environmental aspects on resource use: 1 m^2					
Indicator	**Unit**	**10cm+12cm**	**15cm+12cm**	**20cm+12cm**	**25cm+12cm**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	19,18	28,59	38	47,41
Use of renewable primary energy resources used as raw materials	[MJ]	31,4	47,1	62,8	78,5
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	50,58	75,69	100,8	125,91
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	511,77	715,16	918,54	1121,93
Use of non-renewable primary energy resources used as raw materials	[MJ]	15,82	23,73	31,64	39,55
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	527,6	738,9	950,2	1161,5
Use of secondary material	[kg]	16,01	23,865	31,72	39,575
Use of renewable secondary fuels	[MJ]	15,48	23,22	30,96	38,7
Use of non-renewable secondary fuels	[MJ]	25,2	37,8	50,4	63
Net use of fresh water	[dm^3]	133,6	200,4	267,2	334,0
Other environmental information describing waste categories: 1 m^2					
Indicator	**Unit**	**10cm+12cm**	**15cm+12cm**	**20cm+12cm**	**25cm+12cm**
Hazardous waste disposed	[kg]	0,05	0,08	0,10	0,13
Non-hazardous waste disposed	[kg]	36,21	51,91	67,62	83,32
Radioactive waste disposed	[kg]	0	0	0	0
Components for re-use	[kg]	0	0	0	0
Materials for recycling	[kg]	5,9	8,8	11,7	14,6
Materials for energy recovery	[kg]	0	0	0	0
Exported energy	[MJ]	0	0	0	0

Table 16. Environmental characteristic for 1 m^2 of reinforced concrete prefabricated element made of C50/60 concrete + 12 cm EPS insulation (A1-A3)

Environmental impacts: 1 m^2					
Indicator	**Unit**	**10cm+12cm**	**15cm+12cm**	**20cm+12cm**	**25cm+12cm**
Global warming potential	[kg CO_2 eq.]	65,7	94,5	123,3	152,1
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	2,18E-06	3,25E-06	4,33E-06	5,40E-06
Acidification potential of soil and water	[kg SO_2 eq.]	0,17	0,26	0,34	0,42
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	0,025512	0,037812	0,050112	0,062412
Formation potential of tropospheric ozone	[kg Ethene eq.]	0,065	0,080	0,09	0,11
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	0,0049	0,0049	0,0049	0,005
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	448,9	626,1	803,3	980,5
Environmental aspects on resource use: 1 m^2					
Indicator	**Unit**	**10cm+12cm**	**15cm+12cm**	**20cm+12cm**	**25cm+12cm**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	19,45	28,99	38,54	48,09
Use of renewable primary energy resources used as raw materials	[MJ]	31,4	47,1	62,8	78,5
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	50,85	76,09	101,34	126,6
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	522,06	730,59	939,12	1147,65
Use of non-renewable primary energy resources used as raw materials	[MJ]	15,82	23,73	31,64	39,55
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	537,89	754,34	970,78	1187,23
Use of secondary material	[kg]	16,10	24,00	31,9	39,8
Use of renewable secondary fuels	[MJ]	15,79	23,68	31,58	39,4
Use of non-renewable secondary fuels	[MJ]	26,46	39,69	52,92	66,15
Net use of fresh water	[dm^3]	139,31	208,96	278,60	348,25
Other environmental information describing waste categories: 1 m^2					
Indicator	**Unit**	**10cm+12cm**	**15cm+12cm**	**20cm+12cm**	**25cm+12cm**
Hazardous waste disposed	[kg]	0,055	0,082	0,11	0,14
Non-hazardous waste disposed	[kg]	37,49	53,83	70,18	86,5
Radioactive waste disposed	[kg]	0	0	0	0
Components for re-use	[kg]	0	0	0	0
Materials for recycling	[kg]	5,9	8,79	11,68	14,57
Materials for energy recovery	[kg]	0	0	0	0
Exported energy	[MJ]	0	0	0	0

Table 17. Environmental characteristic for 1 m^2 of reinforced concrete prefabricated element made of C30/37, concrete + 15 cm EPS insulation (A1-A3)

Environmental impacts: 1 m^2					
Indicator	**Unit**	**10cm+15cm**	**15cm+15cm**	**20cm+15cm**	**25cm+15cm**
Global warming potential	[kg CO_2 eq.]	60,61	85,81	111,02	136,23
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	1,64E-06	2,45E-06	3,25E-06	4,06E-06
Acidification potential of soil and water	[kg SO_2 eq.]	0,17	0,24	0,32	0,40
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	0,023	0,034	0,046	0,057
Formation potential of tropospheric ozone	[kg Ethene eq.]	0,073	0,089	0,10	0,12
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	0,0060	0,0061	0,0061	0,0062
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	432,12	589,12	746,12	903,12
Environmental aspects on resource use: 1 m^2					
Indicator	**Unit**	**10cm+15cm**	**15cm+15cm**	**20cm+15cm**	**25cm+15cm**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	18,57	27,63	36,69	45,75
Use of renewable primary energy resources used as raw materials	[MJ]	31,4	47,1	62,8	78,5
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	49,97	74,73	99,49	124,25
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	495,62	677,805	859,99	1042,175
Use of non-renewable primary energy resources used as raw materials	[MJ]	15,82	23,73	31,64	39,55
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	511,45	701,55	891,65	1081,75
Use of secondary material	[kg]	15,83	23,55	31,3	39,0
Use of renewable secondary fuels	[MJ]	14,54	21,81	29,08	36,35
Use of non-renewable secondary fuels	[MJ]	21,42	32,13	42,84	53,55
Net use of fresh water	[dm^3]	122,61	183,9	245,19	306,48
Other environmental information describing waste categories: 1 m^2					
Indicator	**Unit**	**10cm+15cm**	**15cm+15cm**	**20cm+15cm**	**25cm+15cm**
Hazardous waste disposed	[kg]	0,044	0,066	0,087	0,11
Non-hazardous waste disposed	[kg]	33,599	47,3985	61,198	74,9975
Radioactive waste disposed	[kg]	0	0	0	0
Components for re-use	[kg]	0	0	0	0
Materials for recycling	[kg]	5,93	8,82	11,71	14,6
Materials for energy recovery	[kg]	0	0	0	0
Exported energy	[MJ]	0	0	0	0

Table 18. Environmental characteristic for 1 m^2 of reinforced concrete prefabricated element made of C35/45, concrete + 15 cm EPS insulation (A1-A3)

Environmental impacts: 1 m^2					
Indicator	**Unit**	**10cm+15cm**	**15cm+15cm**	**20cm+15cm**	**25cm+15cm**
Global warming potential	[kg CO_2 eq.]	61,86	87,69	113,52	139,35
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	1,89E-06	2,81E-06	3,73E-06	4,66E-06
Acidification potential of soil and water	[kg SO_2 eq.]	0,17	0,25	0,32	0,40
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	0,024	0,035	0,046	0,058
Formation potential of tropospheric ozone	[kg Ethene eq.]	0,07	0,089	0,10	0,12
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	0,0060	0,0061	0,0061	0,0062
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	447,02	611,48	775,9	940,38
Environmental aspects on resource use: 1 m^2					
Indicator	**Unit**	**10cm+15cm**	**15cm+15cm**	**20cm+15cm**	**25cm+15cm**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	18,67	27,78	36,89	46
Use of renewable primary energy resources used as raw materials	[MJ]	31,4	47,1	62,8	78,5
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	50,07	74,88	99,69	124,5
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	512,12	702,5	892,9	1083,4
Use of non-renewable primary energy resources used as raw materials	[MJ]	15,82	23,73	31,64	39,55
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	527,95	726,3	924,65	1123
Use of secondary material	[kg]	30,18	45,08	59,98	74,87
Use of renewable secondary fuels	[MJ]	14,69	22,035	29,38	36,72
Use of non-renewable secondary fuels	[MJ]	22,05	33,08	44,1	55,12
Net use of fresh water	[dm^3]	125,7	188,53	251,37	314,2
Other environmental information describing waste categories: 1 m^2					
Indicator	**Unit**	**10cm+15cm**	**15cm+15cm**	**20cm+15cm**	**25cm+15cm**
Hazardous waste disposed	[kg]	0,047	0,069	0,092	0,114
Non-hazardous waste disposed	[kg]	34,24	48,36	62,48	76,6
Radioactive waste disposed	[kg]	0	0	0	0
Components for re-use	[kg]	0	0	0	0
Materials for recycling	[kg]	5,93	8,82	11,71	14,6
Materials for energy recovery	[kg]	0	0	0	0
Exported energy	[MJ]	0	0	0	0

Table 19. Environmental characteristic for 1 m^2 of reinforced concrete prefabricated element made of C40/50, concrete + 15 cm EPS insulation (A1-A3)

Environmental impacts: 1 m^2					
Indicator	**Unit**	**10cm+15cm**	**15cm+15cm**	**20cm+15cm**	**25cm+15cm**
Global warming potential	[kg CO_2 eq.]	66,6	94,8	122,9	151,13
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	2,04E-06	3,04E-06	4,04E-06	5,04E-06
Acidification potential of soil and water	[kg SO_2 eq.]	0,18	0,25	0,34	0,42
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	0,024	0,035	0,046	0,058
Formation potential of tropospheric ozone	[kg Ethene eq.]	0,07	0,089	0,10	0,12
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	0,006	0,0061	0,0062	0,0062
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	465,32	638,92	812,52	986,13
Environmental aspects on resource use: 1 m^2					
Indicator	**Unit**	**10cm+15cm**	**15cm+15cm**	**20cm+15cm**	**25cm+15cm**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	19,27	28,68	38,09	47,5
Use of renewable primary energy resources used as raw materials	[MJ]	31,4	47,1	62,8	78,5
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	50,67	75,78	100,89	126
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	538,02	741,405	944,79	1148,175
Use of non-renewable primary energy resources used as raw materials	[MJ]	15,82	23,73	31,64	39,55
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	553,85	765,15	976,45	1187,75
Use of secondary material	[kg]	16,085	23,94	31,795	39,65
Use of renewable secondary fuels	[MJ]	15,48	23,22	30,96	38,7
Use of non-renewable secondary fuels	[MJ]	25,2	37,8	50,4	63
Net use of fresh water	[dm^3]	133,62	200,42	267,21	334,00
Other environmental information describing waste categories: 1 m^2					
Indicator	**Unit**	**10cm+15cm**	**15cm+15cm**	**20cm+15cm**	**25cm+15cm**
Hazardous waste disposed	[kg]	0,055	0,081	0,108	0,13
Non-hazardous waste disposed	[kg]	37,409	53,1135	68,818	84,5225
Radioactive waste disposed	[kg]	0	0	0	0
Components for re-use	[kg]	0	0	0	0
Materials for recycling	[kg]	5,93	8,82	11,71	14,6
Materials for energy recovery	[kg]	0	0	0	0
Exported energy	[MJ]	0	0	0	0

Table 20. Environmental characteristic for 1 m^2 of reinforced concrete prefabricated element made of C50/60 concrete + 15 cm EPS insulation (A1-A3)

Environmental impacts: 1 m^2					
Indicator	**Unit**	**10cm+15cm**	**15cm+15cm**	**20cm+15cm**	**25cm+15cm**
Global warming potential	[kg CO_2 eq.]	67,8	96,56	125,3	154,12
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	2,19E-06	3,26E-06	4,34E-06	5,41E-06
Acidification potential of soil and water	[kg SO_2 eq.]	0,176	0,2586	0,3412	0,4238
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	0,026	0,038	0,050	0,062
Formation potential of tropospheric ozone	[kg Ethene eq.]	0,073	0,089	0,10	0,120
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	0,0060	0,0061	0,0061	0,0062
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	472,52	649,72	826,92	1004,12
Environmental aspects on resource use: 1 m^2					
Indicator	**Unit**	**10cm+15cm**	**15cm+15cm**	**20cm+15cm**	**25cm+15cm**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	19,54	29,085	38,63	48,175
Use of renewable primary energy resources used as raw materials	[MJ]	31,4	47,1	62,8	78,5
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	50,94	76,185	101,43	126,675
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	548,31	756,84	965,37	1173,9
Use of non-renewable primary energy resources used as raw materials	[MJ]	15,82	23,73	31,64	39,55
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	564,14	780,585	997,03	1213,475
Use of secondary material	[kg]	16,18	24,08	31,98	39,88
Use of renewable secondary fuels	[MJ]	15,79	23,685	31,58	39,475
Use of non-renewable secondary fuels	[MJ]	26,46	39,69	52,92	66,15
Net use of fresh water	[dm^3]	139,32	208,97	278,61	348,258
Other environmental information describing waste categories: 1 m^2					
Indicator	**Unit**	**10cm+15cm**	**15cm+15cm**	**20cm+15cm**	**25cm+15cm**
Hazardous waste disposed	[kg]	0,056	0,083	0,11	0,137
Non-hazardous waste disposed	[kg]	38,69	55,03	71,38	87,722
Radioactive waste disposed	[kg]	0	0	0	0
Components for re-use	[kg]	0	0	0	0
Materials for recycling	[kg]	5,93	8,82	11,71	14,6
Materials for energy recovery	[kg]	0	0	0	0
Exported energy	[MJ]	0	0	0	0

Table 21. Environmental characteristic for 1 m^2 of reinforced concrete prefabricated element made of C30/37, concrete + 8cm EPS insulation (A1-A3)

Environmental impacts: 1 m^2					
Indicator	**Unit**	**10cm+8cm**	**15cm+8cm**	**20cm+8cm**	**25cm+8cm**
Global warming potential	[kg CO_2 eq.]	55,9	81,1	106,3	131,47
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	1,6E-06	2,43E-06	3,23E-06	4,04E-06
Acidification potential of soil and water	[kg SO_2 eq.]	0,16	0,24	0,32	0,39
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	0,022908	0,034	0,045	0,056
Formation potential of tropospheric ozone	[kg Ethene eq.]	0,054	0,069	0,085	0,10
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	0,0033	0,0033	0,0033	0,0034
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	377	534	691	848
Environmental aspects on resource use: 1 m^2					
Indicator	**Unit**	**10cm+8cm**	**15cm+8cm**	**20cm+8cm**	**25cm+8cm**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	18,36	27,42	36,48	45,54
Use of renewable primary energy resources used as raw materials	[MJ]	31,4	47,1	62,8	78,5
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	49,76	74,52	99,28	124,04
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	434,37	616,56	798,74	980,93
Use of non-renewable primary energy resources used as raw materials	[MJ]	15,82	23,73	31,64	39,55
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	450,2	640,3	830,4	1020,5
Use of secondary material	[kg]	15,65	23,37	31,1	38,8
Use of renewable secondary fuels	[MJ]	14,54	21,81	29,08	36,35
Use of non-renewable secondary fuels	[MJ]	21,42	32,13	42,84	53,55
Net use of fresh water	[dm^3]	122,6	183,89	245,17	306,47
Other environmental information describing waste categories: 1 m^2					
Indicator	**Unit**	**10cm+8cm**	**15cm+8cm**	**20cm+8cm**	**25cm+8cm**
Hazardous waste disposed	[kg]	0,04	0,07	0,087	0,11
Non-hazardous waste disposed	[kg]	30,80	44,6	58,4	72,2
Radioactive waste disposed	[kg]	0	0	0	0
Components for re-use	[kg]	0	0	0	0
Materials for recycling	[kg]	5,86	8,75	11,64	14,53
Materials for energy recovery	[kg]	0	0	0	0
Exported energy	[MJ]	0	0	0	0

Table 22. Environmental characteristic for 1 m^2 of reinforced concrete prefabricated element made of C35/45, concrete + 8 cm EPS insulation (A1-A3)

Environmental impacts: 1 m^2					
Indicator	**Unit**	**10cm+8cm**	**15cm+8cm**	**20cm+8cm**	**25cm+8cm**
Global warming potential	[kg CO_2 eq.]	57,1	82,93	108,76	134,59
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	1,9E-06	2,8E-06	3,72E-06	4,64E-06
Acidification potential of soil and water	[kg SO_2 eq.]	0,16	0,24	0,32	0,39
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	0,023	0,035	0,046	0,057
Formation potential of tropospheric ozone	[kg Ethene eq.]	0,0534	0,0689	0,0844	0,0999
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	0,0032	0,0033	0,0034	0,0034
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	391,9	556,35	720,8	885,25
Environmental aspects on resource use: 1 m^2					
Indicator	**Unit**	**10cm+8cm**	**15cm+8cm**	**20cm+8cm**	**25cm+8cm**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	18,46	27,57	36,68	45,79
Use of renewable primary energy resources used as raw materials	[MJ]	31,40	47,10	62,80	78,50
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	49,86	74,67	99,48	124,29
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	450,87	641,31	831,74	1022,18
Use of non-renewable primary energy resources used as raw materials	[MJ]	15,82	23,73	31,64	39,55
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	466,70	665,05	863,40	1061,75
Use of secondary material	[kg]	30,00	44,90	59,80	74,70
Use of renewable secondary fuels	[MJ]	14,69	22,04	29,38	36,73
Use of non-renewable secondary fuels	[MJ]	22,05	33,08	44,10	55,13
Net use of fresh water	[dm^3]	125,69	188,52	251,36	314,19
Other environmental information describing waste categories: 1 m^2					
Indicator	**Unit**	**10cm+8cm**	**15cm+8cm**	**20cm+8cm**	**25cm+8cm**
Hazardous waste disposed	[kg]	0,05	0,07	0,09	0,11
Non-hazardous waste disposed	[kg]	31,44	45,56	59,68	73,80
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	0,00	0,00
Materials for recycling	[kg]	5,86	8,75	11,64	14,53
Materials for energy recovery	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ]	0,00	0,00	0,00	0,00

Table 23. Environmental characteristic for 1 m^2 of reinforced concrete prefabricated element made of C40/50, concrete + 8 cm EPS insulation (A1-A3)

Environmental impacts: 1 m^2					
Indicator	**Unit**	**10cm+8cm**	**15cm+8cm**	**20cm+8cm**	**25cm+8cm**
Global warming potential	[kg CO_2 eq.]	61,8	89,99	118,18	146,4
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	2,02E-06	3,02E-06	4,02E-06	5,02E-06
Acidification potential of soil and water	[kg SO_2 eq.]	0,17	0,25	0,33	0,41
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	0,023	0,034	0,046	0,057
Formation potential of tropospheric ozone	[kg Ethene eq.]	0,05	0,07	0,085	0,10
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	0,0033	0,003	0,0034	0,0034
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	410,2	583,8	757,4	931
Environmental aspects on resource use: 1 m^2					
Indicator	**Unit**	**10cm+8cm**	**15cm+8cm**	**20cm+8cm**	**25cm+8cm**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	19,06	28,47	37,88	47,29
Use of renewable primary energy resources used as raw materials	[MJ]	31,40	47,10	62,80	78,50
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	50,46	75,57	100,68	125,79
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	476,77	680,16	883,54	1086,93
Use of non-renewable primary energy resources used as raw materials	[MJ]	15,82	23,73	31,64	39,55
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	492,60	703,90	915,20	1126,50
Use of secondary material	[kg]	15,91	23,77	31,62	39,48
Use of renewable secondary fuels	[MJ]	15,48	23,22	30,96	38,70
Use of non-renewable secondary fuels	[MJ]	25,20	37,80	50,40	63,00
Net use of fresh water	[dm^3]	133,61	200,40	267,20	333,99
Other environmental information describing waste categories: 1 m^2					
Indicator	**Unit**	**10cm+8cm**	**15cm+8cm**	**20cm+8cm**	**25cm+8cm**
Hazardous waste disposed	[kg]	0,05	0,08	0,11	0,13
Non-hazardous waste disposed	[kg]	34,61	50,31	66,02	81,72
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	0,00	0,00
Materials for recycling	[kg]	5,86	8,75	11,64	14,53
Materials for energy recovery	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ]	0,00	0,00	0,00	0,00

Table 24. Environmental characteristic for 1 m^2 of reinforced concrete prefabricated element made of C50/60 concrete + 8 cm EPS insulation (A1-A3)

Environmental impacts: 1 m^2					
Indicator	**Unit**	**10cm+8cm**	**15cm+8cm**	**20cm+8cm**	**25cm+8cm**
Global warming potential	[kg CO_2 eq.]	63,00	91,8	120,6	149,4
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	2,17E-06	3,2E-06	4,3E-06	5,4E-06
Acidification potential of soil and water	[kg SO_2 eq.]	0,17	0,25	0,34	0,42
Eutrophication potential	[kg $(PO_4)^{3-}$ eq.]	0,025	0,038	0,05	0,062
Formation potential of tropospheric ozone	[kg Ethene eq.]	0,054	0,069	0,09	0,10
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	0,0032	0,0033	0,0033	0,003
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	417,4	594,6	771,8	949
Environmental aspects on resource use: 1 m^2					
Indicator	**Unit**	**10cm+8cm**	**15cm+8cm**	**20cm+8cm**	**25cm+8cm**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	19,33	28,88	38,42	47,97
Use of renewable primary energy resources used as raw materials	[MJ]	31,40	47,10	62,80	78,50
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	50,73	75,98	101,22	126,47
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	487,06	695,59	904,12	1112,65
Use of non-renewable primary energy resources used as raw materials	[MJ]	15,82	23,73	31,64	39,55
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	502,89	719,34	935,78	1152,23
Use of secondary material	[kg]	16,00	23,90	31,80	39,71
Use of renewable secondary fuels	[MJ]	15,79	23,69	31,58	39,48
Use of non-renewable secondary fuels	[MJ]	26,46	39,69	52,92	66,15
Net use of fresh water	[dm^3]	139,31	208,95	278,60	348,24
Other environmental information describing waste categories: 1 m^2					
Indicator	**Unit**	**10cm+8cm**	**15cm+8cm**	**20cm+8cm**	**25cm+8cm**
Hazardous waste disposed	[kg]	0,05	0,08	0,11	0,14
Non-hazardous waste disposed	[kg]	35,89	52,23	68,58	84,92
Radioactive waste disposed	[kg]	0,00	0,00	0,00	0,00
Components for re-use	[kg]	0,00	0,00	0,00	0,00
Materials for recycling	[kg]	5,86	8,75	11,64	14,53
Materials for energy recovery	[kg]	0,00	0,00	0,00	0,00
Exported energy	[MJ]	0,00	0,00	0,00	0,00

Verification

The process of verification of an EPD is in accordance with EN ISO14025, clause 8 and ISO21930, clause 9. After verification this EPD is valid for a 5 years period. EPD does not have to be recalculated after 5 years, if the underlying data has not changed significantly.

The basis for LCA analysis was EN 15804
Independent verification corresponding to ISO 14025 & 8.3.1. [x] external [ ] internal
Verification of EPD: dr eng. Aleksander Panek LCI audit and input data verification: msc eng. Dominik Bekierski LCA: dr inż. Michał Piasecki Verification of procedures and declaration: dr eng. Halina Prejzner

Normative references

- ISO14025: 2006, Environmental management – Type III environmental declarations – Principles and procedure.
- ISO 21930: 2007, Sustainability in building and construction – Environmental declaration of building products.
- ISO14044: 2006, Environmental management – Life cycle assessment – Requirements and guidelines.
- ISO15686-1: 2000, Buildings and constructed assets — Service life planning — Part 1: General principles
- ISO15686-8: 2008, Buildings and constructed assets – Service life planning – Part 8: Reference service life
- EN15804: 2012, Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.
- EN15942: 2011, Sustainability of construction