



Environmental Product Declaration of 1m³ of Average Ready Mix Concrete

ACC Limited

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ISO 14025:2006, EN 15804:2012

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Geographical scope:	India

1. Introduction

ACC Limited Ready Mix is the largest supplier of Ready Mix Concrete in India and most of the plants have RMX certification from Quality Council of India. ACC Limited has also been awarded with 'India's Most Sustainable 2015', Sustainable Plus Platinum label of CII-ITC and CII-ITC Sustainability Award 2013, 2015 and 2016 for 'Outstanding Accomplishment'.

The declaration is established for the average product of ACC concrete manufacturing plants in India. The average is based on the weighted average production volume of each plant. As the applications of Ready Mix Concrete as an intermediate material are numerous, a unique functional unit cannot be defined and therefore this EPD is based on a declared unit of 1 m³ of average Ready Mix Concrete.

Over the last few years, ACC Limited has developed and is well recognized throughout the country as one of the leading manufacturers and supplier of Ready Mix Concrete. It has won a number of challenging and prestigious projects. ACC's Ready Mix Concrete (RMX) business serves the infrastructure, commercial and realty segments. The Company has shaped its RMX business as a solution provider serving diverse customer segments from skyscrapers, townships, roads and highways, flyovers, metro rail projects to irrigation schemes and power plants, each with its own requirement of concrete applications.

The reference period for the data used within this EPD is the year 2017 (January to December). The geographical scope of this EPD is India.

The current document is based on Life Cycle Assessment report of 1 m³ of average Ready Mix Concrete and is developed for providing a measurable and verifiable input for the environmental assessment of Ready Mix Concrete manufactured at various locations and operated by ACC Limited Ready Mix in India.

2. EPD, PCR, LCA Information

Table 1 EPD Information

EPD Information	
Declaration holder	ACC Limited Contact: Mr. Pralhad Mujumdar, CEO, Concrete Business E-mail: pralhad.mujumdar@acclimited.com Contact: Mr. K. N. Rao, Director, Environment & Energy Email: narayanarao.kapilavai@acclimited.com ACC Thane Complex, LBS Marg. Thane, India, 400604
Product	Ready Mix Concrete
UN CPC Code	375
Reference standards	ISO 14025; EN 15804
Reference PCR	Construction Products and Construction Services, 2012:01, version 2.2 and Sub-PCR-G Concrete and Concrete Elements
Demonstration of verification	External, independent verification
Third party verifier	Dr Hudai Kara, Metsims Sustainability Consulting, 4 Clear Water Place, Oxford OX2 7NL, UK E-mail: hudai.kara@metsims.com

Table 2 LCA Information

Title	Life Cycle Assessment Report- 2017 Ready Mix Concrete, ACC Limited
System Boundary	Cradle to gate
Functional Unit	1 m ³ of Ready Mix Concrete
LCA consultant	Dr. Rajesh Kumar Singh Thinkstep Sustainability Solutions Pvt. Ltd. 421, MIDAS, Sahar Plaza, Andheri Kurla Road, Andheri East, Mumbai, India – 400059 E-mail: Rajesh.Singh@thinkstep.com
Reference standards	ISO 14040/44 standard

Additional information about EPD

This EPD provides information concerning the average production of Ready Mix Concrete manufactured at all manufacturing plants throughout the country. Most of the plants have RMX certification from Quality Council of India.

Product Category Rules (PCR) for the assessment of the environmental performance of Ready Mix Concrete is 'Construction products and construction services, 2012:01, version 2.2' and 'Sub-PCR-G Concrete and concrete elements' complying with the standard EN 15804. Product classification is UN CPC 375 Concrete 2013:02 Version 1.02. This PCR is applicable to the product "Ready Mix Concrete". EPD of construction products may not be comparable if they do not comply with EN15804. The environmental impacts were calculated on the basis of the functional unit wherein each flow related to material consumption, energy consumption, emissions, effluent and waste is scaled to the reference flow.

3. Product Description and System Boundaries

3.1 Product Identification and Usage

Concrete is a composite material obtained through the homogenization of cement, aggregates, water and additives. Concretes covered by this EPD are constituted from cement, coarse and fine aggregates, secondary materials, recycled or fresh water and admixtures, proportioned to exceed the target strength for the respective strength classes for this EPD.

All the RMX 'Value Added Solutions' (VAS) like ACC Adhar, ACC Bucketcrete, ACC Colourcrete, ACC Column 4, ACC Coolcrete, ACC Ecocrete, ACC Feathercrete, ACC Fibercrete, ACC Flowcrete, ACC Imprintcrete, ACC Jetsetcrete, ACC Neev, ACC Supercoat, ACC Supercrete, ACC Suraksha, ACC UTWT, ACC Sustaincrete are included in the overall grade production volume considered in the study. The description of these VASs are given in the link <http://www.acclimited.com/products/concrete-value-added-products>.

The commercial applications of Ready Mix Concrete cover a wide range: from foundation, flooring, car parking, access roads, terracing, frames, stairs, lift shafts, to major infrastructure works, hydro-technical constructions, etc.

The average Ready Mix Concrete is based on the weighted average production volume of each of the grade as presented in Table 3, produced across each of the Ready Mix Concrete plants. This EPD also covers grades from M5 to M80 of Ready Mix Concrete produced by ACC Limited in India.

Table 3 Grade wise Production Volume

Grade Name	Percentage contribution
M5	0.46%
M7.5	0.74%
M10	3.80%
M12.5	0.02%
M15	3.53%
M20	10.43%
M25	28.78%
M30	21.62%
M35	9.56%
M40	12.63%
M45	1.61%
M50	3.90%
M55	0.06%
M60	1.86%
M70	0.84%
M80	0.14%
M95	0.01%
Total	100.00%

Products do not contain any substances that can be included in "Candidate List of Substances of Very High Concern for Authorization" and raw materials used are not part of the EU REACH regulation

3.2 Product Manufacturing

The main steps in Ready Mix Concrete production process are:

- Raw material preparation
- Raw material supply and storage
- Mixing

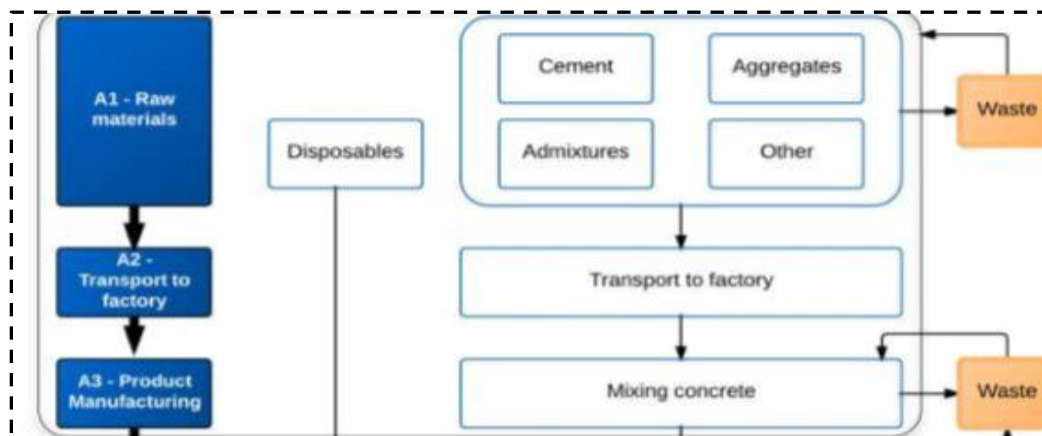


Figure 1 System boundary for the LCA study (A1, A2, A3)

The process flow of production of cement and aggregates is considered upstream to Ready Mix Concrete production and directly considered as materials ready for consumption in this EPD. The ingredients are blended in a mechanical mixer. Energy for the concrete production is supplied by electricity.

3.3 System boundaries

The selected system boundaries comprise the production of Ready Mix Concrete including raw material extraction up to the finished product at the factory gate.

Table 4 System boundary and product stages

Module	Product stages
A1	Materials
A2	Upstream Transport (Inbound)
A3	Manufacturing

This declaration qualifies as an attributional LCA, as it describes the environmentally relevant physical flows to and from the processes associated with the life cycle of Ready Mix Concrete.

The system boundary does not include:

- Capital equipment and maintenance of production facility
- Maintenance and operation of equipment
- Human labor
- Distribution of the product
- Use phase of the product

4. LCA

4.1 Information Sources and Data Quality

It is important that data quality is in accordance with the requirements of the declaration's goal and scope. This is essential to the reliability of the declaration and achievement of the intended application. The quality of the LCI data for modelling the life cycle stages at ACC Limited Ready Mix's units have been assessed according to ISO 14044 (ISO, 2006b). Data quality is judged by its quality (measured, calculated or estimated), completeness (e.g. are there unreported emissions), consistency (degree of uniformity of the methodology applied on a study serving as a data source) and representativeness (geographical, time period, technology). To cover these requirements and to ensure reliable results, first-hand industry data in combination with consistent, upstream LCA information is used. The datasets have been used in LCA-models worldwide for several years in industrial and scientific applications for internal as well as critically reviewed studies. In the process of providing these datasets, they have been cross-checked with other databases and values from industry and science.

ACC Limited Ready Mix provided the most accurate and representative data for Ready Mix Concrete production. For all data requirements, primary data were used where possible, and finally upstream LCA data from GaBi 8 professional database was used.

4.2 Estimation and Methodology

4.2.1 Allocation Procedure

No allocation has been done, as no co-products are produced. The flow of materials, energy and also the associated release of substances and energy into the environment is related exclusively to the concrete produced.

4.2.2 Average Ready Mix Concrete

The inventory data of the Ready Mix Concrete produced at all manufacturing unit is used to calculate the declared average concrete. Other plants showcase similar mix of data thus the data collected is considered representative of all plants. The average is determined based on the produced amounts by weight in 2017.

4.2.3 Declared Unit

The declared unit for the EPD is 1m³ of Ready Mix Concrete leaving the factory gate.

4.2.4 Impact Assessment

A list of relevant impact categories and category indicators is defined and associated with the inventory data. Various environmental impacts and emissions are associated with production of Ready Mix Concrete, from raw material production, transport of materials to manufacturing site to Ready Mix Concrete production. PCR identifies the following LCI and LCIA as per standard EN 15804. Characterization factors were taken from Annexure C of the standard EN 15804.

1. Potential Environmental Impact (according with EN15804)

- Global warming potential, GWP (100 years) (kg CO₂ equivalent)
- Depletion potential of the stratospheric ozone layer, ODP (kg CFC-11 equivalent)
- Acidification potential of soil and water, AP (kg SO₂ equivalent)
- Eutrophication potential, EP (kg PO₄³⁻ equivalent)
- Formation potential of tropospheric ozone, POCP (kg Ethene (C₂H₂) equivalent)
- Abiotic depletion potential (ADP-elements) for non-fossil resources (kg Sb equivalent)
- Abiotic depletion potential (ADP-fossil fuels) for fossil resources (MJ, net calorific value)

2. Use of Natural Resources (according with EN15804)

- Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) (MJ, net calorific value)
- Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) (MJ, net calorific value)
- Use of secondary material (kg)
- Use of renewable secondary fuels (MJ, net calorific value)
- Use of non- renewable secondary fuels (MJ, net calorific value)
- Use of net fresh water (m³)

3. Other Environmental Indicators

- Hazardous waste disposed (kg)
- Non-hazardous waste disposed (kg)
- Radioactive waste disposed/stored (kg)
- Components for re-use (kg)
- Materials for recycling (kg)
- Materials for energy recovery (kg)
- Exported energy (MJ)

4.3 Cut Off Rules

For the foreground process of Ready Mix Concrete production, no cut-off is necessary. However, a significant contribution to the overall environmental impacts comes from the production of cement. Therefore, the cut-off used in the calculation for the cement, is continued in its effects in the production of concrete. In practice, this means that, at least, all material flows going into the cement production processes (inputs) higher than 1% of the total mass flow (t) or higher than 1% of the total primary energy input (MJ) are part of the system and modelled in order to calculate elementary flows. All material flows leaving the product system (outputs) accounting for more than 1% of the total mass flow is part of the system. All available inputs and outputs, even below the 1% threshold, have been considered for the LCI calculation. For hazardous and toxic materials and substances the cut-off rules do not apply.

4.4 Background Data

Background data is included based on generic datasets from the GaBi 8 Database of Thinkstep in the version of 2018. The background data is based on reviewed data from life cycle inventories, representing time span of 5 years. As all datasets were validated, the data quality for the entire study can be judged as very good.

4.5 System Boundaries

4.5.1 Technical system boundaries

The technical system boundaries were defined according to the provisions of the PCR. The LCA model of Ready Mix Concrete represents a cradle-to-gate system. Primary raw material is accounted from the quarry, including all processes including transportation to the production facilities. The scope covers the ecological information to be divided into raw material production, transportation, Ready Mix Concrete production and disposal and transport of wastes. The material production includes the raw material extraction, production of the raw materials and auxiliary material production. The production contains the in-house manufacturing processes. Material flows and emissions not associated with the production process, such as energy used for personal transportation, were not included in this study.

Table 5 Description of the system boundary (X = Included in LCA, MNA Module Not Assessed)

Product Stage			Installation Stage		Use stage							End-of-Life Stage				Benefits beyond system boundary
Raw material supply	Transport	Manufacturing	Transport to building site	Installation into building	Use / application	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction / demolition	Transport to End-of-Life	Waste processing for reuse, recovery or recycling	Disposal	Reuse, recovery or recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA

4.5.2 Geographical system boundaries

The geographical coverage of this declaration covers the production of Ready Mix Concrete in India. Wherever possible, the country specific boundaries have been adapted and other datasets were chosen from EU if no Indian datasets were available.

4.5.3 Temporal system boundaries

All material flows of the processes are based on company and site-specific data gathered for the year 2017, i.e., the data collection is related to one year of operation for the period January 2017 to December 2017. All background data originates from the GaBi database version of 2017 with validity until 2022. The LCIA of PSC data used in the LCA study has been taken from the LCA report of ACC Cement, published in 2018.

4.6 Comparability

The EPD is established on the basis of the product category rules (PCR) for Construction Products and Sub-PCR Concrete. According to these standards, EPDs do not compare the environmental performance of products in the construction sector. Any comparison of the declared environmental performance of products lies outside the scope of these standards and is suggested to be feasible only if all compared declarations follow equal standard provisions.

5. Results

Based on 2017 data, the following results have been obtained for the average concrete produced in the ACC Limited Ready Mix plants. The declared unit is 1 m³ of average Ready Mix Concrete.

Table 6 LCIA results for 1 m³ average Ready Mix Concrete

Parameter	Unit	Module A1-A3
Global warming potential	kg CO ₂ -eq	2.79E+02
Depletion potential of the stratospheric ozone layer	kg CFC 11-eq	8.56E-10
Acidification potential of land and water	kg SO ₂ -eq	9.23E-01
Eutrophication potential	kg PO ₄ ³⁻ -eq	1.20E-01
Formation potential of tropospheric ozone photochemical oxidants	kg ethene-eq	1.92E-02
Abiotic depletion potential for non-fossil resources	kg Sb-eq	4.50E-06
Abiotic depletion potential for fossil resources	MJ	2.00E+03

Table 7 Use of Natural Resources analysis for 1 m³ of average Ready Mix Concrete

Parameter	Unit	Module A1-A3
Renewable primary energy as energy carrier	MJ	6.18E+01
Renewable primary energy resources as material utilization [MJ]	MJ	0.00E+00
Total use of renewable primary energy resources	MJ	6.18E+01
Non-renewable primary energy as energy carrier	MJ	2.11E+03
Non-renewable primary energy as material utilization	MJ	0.00E+00
Total use of non-renewable primary energy resources	MJ	2.11E+03
Use of secondary material [kg]	kg	7.40E+00
Use of renewable secondary fuels [MJ]	MJ	0.00E+00
Use of non-renewable secondary fuels [MJ]	MJ	0.00E+00
Use of net fresh water	m ³	4.71E-01

Table 8 Supplementary Indicators of waste categories for 1 m³ of average Ready Mix Concrete

Parameter	Unit	Module A1-A3
Non-hazardous waste	kg	4.05E+01
Hazardous waste	kg	8.62E-03
Radioactive waste	kg	9.02E-03

Table 9 Other indicators for 1 m³ of average Ready Mix Concrete

Parameter	Unit	Module A1-A3
Components for re-use	kg	0.00E+00
Materials for recycling	kg	0.00E+00
Materials for energy recovery	kg	0.00E+00
Exported energy	MJ	0.00E+00

6. Interpretation

Table 10 Interpretation of LCIA for 1m³ RMX

Parameter	Most significant contributor
ADP elements	Abiotic depletion potential (ADP element) is 4.50E-06 kg Sb-Equiv. of which 50.1% contribution is from OPC production and 31.8% is from coarse aggregates.
ADP Fossil	Abiotic depletion potential (ADP element from Fossil) is 2000 MJ of which 81.9% is from OPC production and 10.2% from production of diesel used in inbound transportation.
Acidification potential	Acidification Potential is 0.92 kg SO ₂ -Equiv. The contribution of OPC production is 76.6% and 3.85% from slag cement production.
Eutrophication potential	Eutrophication Potential is 0.12 kg Phosphate-Equiv. The contribution of OPC production is 73.1%, 3.96% from cement transportation and 3.12% from slag cement production.
Global warming potential	Global Warming Potential is 279 kg CO ₂ -Equiv. The contribution of OPC production is 86.2% and 2.82% contribution from slag cement production. Admixture contributes 2.12%.
Ozone depletion potential	Ozone Layer Depletion Potential is 8.56E-10 kg CFC 11-Equiv. The contribution of admixture production is 98.0 % and OPC and slag cement together contributes 1.56%.
Primary energy demand	Primary Energy Demand is 2171.80 MJ. The OPC production contributes to 77.6%. Production of diesel used in inbound transport contributes 9.40%.
Photochemical ozone creation potential	Photochemical Ozone Creation Potential is 0.02 kg Ethene-Equiv. Major contributions of 248% is seen from OPC production.
Waste generation	Hazardous waste is 0.01 kg, majorly associated with admixture production which is 100%. The amount of non-hazardous waste is 40.5 kg, majorly coming from production of crushed coarse aggregates i.e. 48.9% and natural fine aggregates which is contributing 26.9%. Radioactive waste is 9.02E-3 kg, contributed by OPC production (41.5%), admixture (25.7%) and coarse aggregate (27.4%).
Water demand	The water demand is 0.47 m ³ , dominated by water used in OPC production which is 51.6%. RMX production process onsite contributes 34.7%.

7. Results of ACC RMX Grades

The following tables present the grade wise result for the 1m³ Ready Mix Concrete for the LCI/LCIA indicators.

LCIA for M5 Grade of Ready Mix Concrete

LCIA	A1-A3
Global Warming Potential (GWP 100 years) [kg CO ₂ -Equiv.]	1.40E+02
Ozone Layer Depletion Potential (ODP, steady state) [kg CFC11-Equiv.]	7.55E-10
Acidification Potential (AP) [kg SO ₂ -Equiv.]	5.63E-01
Eutrophication Potential (EP) [kg Phosphate-Equiv.]	7.20E-02
Photochemical Ozone Creation Potential (POCP) [kg Ethene-Equiv.]	-4.90E-04
Abiotic Depletion Potential (ADP elements) [kg Sb-Equiv.]	2.72E-06
Abiotic Depletion Potential (ADP-fossil fuels) (net cal. value) [MJ]	1.02E+03
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE) (net cal. value) [MJ]	3.71E+01
Use of renewable primary energy resources used as raw materials (PERM) (net cal. value) [MJ]	0.00E+00
Total use of renewable primary energy resources (PERT) (net cal. value) [MJ]	3.71E+01
Use of non- renewable primary energy excluding non- renewable primary energy resources used as raw materials (PENRE) (net cal. value) [MJ]	1.16E+03
Use of non- renewable primary energy resources used as raw Materials (PENRM) (net cal. value) [MJ]	0.00E+00
Total use of non- renewable primary energy resources (PENRT) (net cal. value) [MJ]	1.16E+03
Use of secondary material [kg]	1.01E+01
Use of renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of non- renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of net fresh water [m ³]	3.81E-01
Hazardous waste disposed [kg]	7.60E-03
Non-hazardous waste disposed [kg]	5.64E+01
Radioactive waste disposed/stored [kg]	5.83E-03
Components for re-use [kg]	0.00E+00
Materials for recycling [kg]	0.00E+00
Materials for energy recovery [kg]	0.00E+00
Exported energy [MJ]	0.00E+00

LCIA for M7.5 Grade of Ready Mix Concrete

LCIA	A1-A3
Global Warming Potential (GWP 100 years) [kg CO ₂ -Equiv.]	1.47E+02
Ozone Layer Depletion Potential (ODP, steady state) [kg CFC11-Equiv.]	4.41E-10
Acidification Potential (AP) [kg SO ₂ -Equiv.]	6.23E-01
Eutrophication Potential (EP) [kg Phosphate-Equiv.]	7.69E-02
Photochemical Ozone Creation Potential (POCP) [kg Ethene-Equiv.]	5.17E-03
Abiotic Depletion Potential (ADP elements) [kg Sb-Equiv.]	2.59E-06
Abiotic Depletion Potential (ADP-fossil fuels) (net cal. value) [MJ]	7.21E+02
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE) (net cal. value) [MJ]	3.60E+01
Use of renewable primary energy resources used as raw materials (PERM) (net cal. value) [MJ]	0.00E+00
Total use of renewable primary energy resources (PERT) (net cal. value) [MJ]	3.60E+01
Use of non- renewable primary energy excluding non- renewable primary energy resources used as raw materials (PENRE) (net cal. value) [MJ]	1.16E+03
Use of non- renewable primary energy resources used as raw Materials (PENRM) (net cal. value) [MJ]	0.00E+00
Total use of non- renewable primary energy resources (PENRT) (net cal. value) [MJ]	1.16E+03
Use of secondary material [kg]	3.47E+01
Use of renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of non- renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of net fresh water [m ³]	3.60E-01
Hazardous waste disposed [kg]	4.11E-03
Non-hazardous waste disposed [kg]	5.71E+01
Radioactive waste disposed/stored [kg]	4.96E-03
Components for re-use [kg]	0.00E+00
Materials for recycling [kg]	0.00E+00
Materials for energy recovery [kg]	0.00E+00
Exported energy [MJ]	0.00E+00

LCIA for M10 Grade of Ready Mix Concrete

LCIA	A1-A3
Global Warming Potential (GWP 100 years) [kg CO ₂ -Equiv.]	1.87E+02
Ozone Layer Depletion Potential (ODP, steady state) [kg CFC11-Equiv.]	6.57E-10
Acidification Potential (AP) [kg SO ₂ -Equiv.]	7.34E-01
Eutrophication Potential (EP) [kg Phosphate-Equiv.]	9.25E-02
Photochemical Ozone Creation Potential (POCP) [kg Ethene-Equiv.]	8.08E-03
Abiotic Depletion Potential (ADP elements) [kg Sb-Equiv.]	3.17E-06
Abiotic Depletion Potential (ADP-fossil fuels) (net cal. value) [MJ]	1.12E+03
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE) (net cal. value) [MJ]	4.43E+01
Use of renewable primary energy resources used as raw materials (PERM) (net cal. value) [MJ]	0.00E+00
Total use of renewable primary energy resources (PERT) (net cal. value) [MJ]	4.43E+01
Use of non- renewable primary energy excluding non- renewable primary energy resources used as raw materials (PENRE) (net cal. value) [MJ]	1.47E+03
Use of non- renewable primary energy resources used as raw Materials (PENRM) (net cal. value) [MJ]	0.00E+00
Total use of non- renewable primary energy resources (PENRT) (net cal. value) [MJ]	1.47E+03
Use of secondary material [kg]	2.72E+01
Use of renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of non- renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of net fresh water [m ³]	4.03E-01
Hazardous waste disposed [kg]	6.39E-03
Non-hazardous waste disposed [kg]	5.99E+01
Radioactive waste disposed/stored [kg]	6.34E-03
Components for re-use [kg]	0.00E+00
Materials for recycling [kg]	0.00E+00
Materials for energy recovery [kg]	0.00E+00
Exported energy [MJ]	0.00E+00

LCIA for M15 Grade of Ready Mix Concrete

LCIA	A1-A3
Global Warming Potential (GWP 100 years) [kg CO ₂ -Equiv.]	2.11E+02
Ozone Layer Depletion Potential (ODP, steady state) [kg CFC11-Equiv.]	7.42E-10
Acidification Potential (AP) [kg SO ₂ -Equiv.]	7.70E-01
Eutrophication Potential (EP) [kg Phosphate-Equiv.]	9.88E-02
Photochemical Ozone Creation Potential (POCP) [kg Ethene-Equiv.]	8.71E-03
Abiotic Depletion Potential (ADP elements) [kg Sb-Equiv.]	3.59E-06
Abiotic Depletion Potential (ADP-fossil fuels) (net cal. value) [MJ]	1.55E+03
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE) (net cal. value) [MJ]	5.01E+01
Use of renewable primary energy resources used as raw materials (PERM) (net cal. value) [MJ]	0.00E+00
Total use of renewable primary energy resources (PERT) (net cal. value) [MJ]	5.01E+01
Use of non- renewable primary energy excluding non- renewable primary energy resources used as raw materials (PENRE) (net cal. value) [MJ]	1.66E+03
Use of non- renewable primary energy resources used as raw Materials (PENRM) (net cal. value) [MJ]	0.00E+00
Total use of non- renewable primary energy resources (PENRT) (net cal. value) [MJ]	1.66E+03
Use of secondary material [kg]	8.01E+00
Use of renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of non- renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of net fresh water [m ³]	4.35E-01
Hazardous waste disposed [kg]	7.47E-03
Non-hazardous waste disposed [kg]	5.92E+01
Radioactive waste disposed/stored [kg]	7.25E-03
Components for re-use [kg]	0.00E+00
Materials for recycling [kg]	0.00E+00
Materials for energy recovery [kg]	0.00E+00
Exported energy [MJ]	0.00E+00

LCIA for M20 Grade of Ready Mix Concrete

LCIA	A1-A3
Global Warming Potential (GWP 100 years) [kg CO ₂ -Equiv.]	2.49E+02
Ozone Layer Depletion Potential (ODP, steady state) [kg CFC11-Equiv.]	6.90E-10
Acidification Potential (AP) [kg SO ₂ -Equiv.]	8.86E-01
Eutrophication Potential (EP) [kg Phosphate-Equiv.]	1.13E-01
Photochemical Ozone Creation Potential (POCP) [kg Ethene-Equiv.]	1.57E-02
Abiotic Depletion Potential (ADP elements) [kg Sb-Equiv.]	3.93E-06
Abiotic Depletion Potential (ADP-fossil fuels) (net cal. value) [MJ]	1.74E+03
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE) (net cal. value) [MJ]	5.57E+01
Use of renewable primary energy resources used as raw materials (PERM) (net cal. value) [MJ]	0.00E+00
Total use of renewable primary energy resources (PERT) (net cal. value) [MJ]	5.57E+01
Use of non- renewable primary energy excluding non- renewable primary energy resources used as raw materials (PENRE) (net cal. value) [MJ]	1.91E+03
Use of non- renewable primary energy resources used as raw Materials (PENRM) (net cal. value) [MJ]	0.00E+00
Total use of non- renewable primary energy resources (PENRT) (net cal. value) [MJ]	1.91E+03
Use of secondary material [kg]	1.28E+01
Use of renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of non- renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of net fresh water [m ³]	4.62E-01
Hazardous waste disposed [kg]	6.88E-03
Non-hazardous waste disposed [kg]	5.74E+01
Radioactive waste disposed/stored [kg]	7.68E-03
Components for re-use [kg]	0.00E+00
Materials for recycling [kg]	0.00E+00
Materials for energy recovery [kg]	0.00E+00
Exported energy [MJ]	0.00E+00

LCIA for M25 Grade of Ready Mix Concrete

LCIA	A1-A3
Global Warming Potential (GWP 100 years) [kg CO ₂ -Equiv.]	2.90E+02
Ozone Layer Depletion Potential (ODP, steady state) [kg CFC11-Equiv.]	6.90E-10
Acidification Potential (AP) [kg SO ₂ -Equiv.]	1.00E+00
Eutrophication Potential (EP) [kg Phosphate-Equiv.]	1.28E-01
Photochemical Ozone Creation Potential (POCP) [kg Ethene-Equiv.]	2.20E-02
Abiotic Depletion Potential (ADP elements) [kg Sb-Equiv.]	4.33E-06
Abiotic Depletion Potential (ADP-fossil fuels) (net cal. value) [MJ]	2.03E+03
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE) (net cal. value) [MJ]	6.24E+01
Use of renewable primary energy resources used as raw materials (PERM) (net cal. value) [MJ]	0.00E+00
Total use of renewable primary energy resources (PERT) (net cal. value) [MJ]	6.24E+01
Use of non- renewable primary energy excluding non- renewable primary energy resources used as raw materials (PENRE) (net cal. value) [MJ]	2.20E+03
Use of non- renewable primary energy resources used as raw Materials (PENRM) (net cal. value) [MJ]	0.00E+00
Total use of non- renewable primary energy resources (PENRT) (net cal. value) [MJ]	2.20E+03
Use of secondary material [kg]	1.17E+01
Use of renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of non- renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of net fresh water [m ³]	4.86E-01
Hazardous waste disposed [kg]	6.88E-03
Non-hazardous waste disposed [kg]	5.65E+01
Radioactive waste disposed/stored [kg]	8.35E-03
Components for re-use [kg]	0.00E+00
Materials for recycling [kg]	0.00E+00
Materials for energy recovery [kg]	0.00E+00
Exported energy [MJ]	0.00E+00

LCIA for M30 Grade of Ready Mix Concrete

LCIA	A1-A3
Global Warming Potential (GWP 100 years) [kg CO ₂ -Equiv.]	3.31E+02
Ozone Layer Depletion Potential (ODP, steady state) [kg CFC11-Equiv.]	8.47E-10
Acidification Potential (AP) [kg SO ₂ -Equiv.]	1.12E+00
Eutrophication Potential (EP) [kg Phosphate-Equiv.]	1.43E-01
Photochemical Ozone Creation Potential (POCP) [kg Ethene-Equiv.]	2.80E-02
Abiotic Depletion Potential (ADP elements) [kg Sb-Equiv.]	4.80E-06
Abiotic Depletion Potential (ADP-fossil fuels) (net cal. value) [MJ]	2.36E+03
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE) (net cal. value) [MJ]	6.96E+01
Use of renewable primary energy resources used as raw materials (PERM) (net cal. value) [MJ]	0.00E+00
Total use of renewable primary energy resources (PERT) (net cal. value) [MJ]	6.96E+01
Use of non- renewable primary energy excluding non- renewable primary energy resources used as raw materials (PENRE) (net cal. value) [MJ]	2.49E+03
Use of non- renewable primary energy resources used as raw Materials (PENRM) (net cal. value) [MJ]	0.00E+00
Total use of non- renewable primary energy resources (PENRT) (net cal. value) [MJ]	2.49E+03
Use of secondary material [kg]	8.55E+00
Use of renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of non- renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of net fresh water [m ³]	5.29E-01
Hazardous waste disposed [kg]	8.52E-03
Non-hazardous waste disposed [kg]	5.51E+01
Radioactive waste disposed/stored [kg]	9.43E-03
Components for re-use [kg]	0.00E+00
Materials for recycling [kg]	0.00E+00
Materials for energy recovery [kg]	0.00E+00
Exported energy [MJ]	0.00E+00

LCIA for M35 Grades of Ready Mix Concrete

LCIA	A1-A3
Global Warming Potential (GWP 100 years) [kg CO ₂ -Equiv.]	3.96E+02
Ozone Layer Depletion Potential (ODP, steady state) [kg CFC11-Equiv.]	1.02E-09
Acidification Potential (AP) [kg SO ₂ -Equiv.]	1.33E+00
Eutrophication Potential (EP) [kg Phosphate-Equiv.]	1.69E-01
Photochemical Ozone Creation Potential (POCP) [kg Ethene-Equiv.]	4.21E-02
Abiotic Depletion Potential (ADP elements) [kg Sb-Equiv.]	5.35E-06
Abiotic Depletion Potential (ADP-fossil fuels) (net cal. value) [MJ]	2.68E+03
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE) (net cal. value) [MJ]	7.95E+01
Use of renewable primary energy resources used as raw materials (PERM) (net cal. value) [MJ]	0.00E+00
Total use of renewable primary energy resources (PERT) (net cal. value) [MJ]	7.95E+01
Use of non- renewable primary energy excluding non- renewable primary energy resources used as raw materials (PENRE) (net cal. value) [MJ]	2.94E+03
Use of non- renewable primary energy resources used as raw Materials (PENRM) (net cal. value) [MJ]	0.00E+00
Total use of non- renewable primary energy resources (PENRT) (net cal. value) [MJ]	2.94E+03
Use of secondary material [kg]	1.92E+01
Use of renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of non- renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of net fresh water [m ³]	6.03E-01
Hazardous waste disposed [kg]	1.02E-02
Non-hazardous waste disposed [kg]	5.54E+01
Radioactive waste disposed/stored [kg]	1.07E-02
Components for re-use [kg]	0.00E+00
Materials for recycling [kg]	0.00E+00
Materials for energy recovery [kg]	0.00E+00
Exported energy [MJ]	0.00E+00

LCIA for M40 Grades of Ready Mix Concrete

LCIA	A1-A3
Global Warming Potential (GWP 100 years) [kg CO ₂ -Equiv.]	4.01E+02
Ozone Layer Depletion Potential (ODP, steady state) [kg CFC11-Equiv.]	1.39E-09
Acidification Potential (AP) [kg SO ₂ -Equiv.]	1.39E+00
Eutrophication Potential (EP) [kg Phosphate-Equiv.]	1.75E-01
Photochemical Ozone Creation Potential (POCP) [kg Ethene-Equiv.]	4.97E-02
Abiotic Depletion Potential (ADP elements) [kg Sb-Equiv.]	5.15E-06
Abiotic Depletion Potential (ADP-fossil fuels) (net cal. value) [MJ]	2.31E+03
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE) (net cal. value) [MJ]	7.79E+01
Use of renewable primary energy resources used as raw materials (PERM) (net cal. value) [MJ]	0.00E+00
Total use of renewable primary energy resources (PERT) (net cal. value) [MJ]	7.79E+01
Use of non- renewable primary energy excluding non- renewable primary energy resources used as raw materials (PENRE) (net cal. value) [MJ]	2.97E+03
Use of non- renewable primary energy resources used as raw Materials (PENRM) (net cal. value) [MJ]	0.00E+00
Total use of non- renewable primary energy resources (PENRT) (net cal. value) [MJ]	2.97E+03
Use of secondary material [kg]	5.07E+01
Use of renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of non- renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of net fresh water [m ³]	6.32E-01
Hazardous waste disposed [kg]	1.37E-02
Non-hazardous waste disposed [kg]	5.43E+01
Radioactive waste disposed/stored [kg]	1.10E-02
Components for re-use [kg]	0.00E+00
Materials for recycling [kg]	0.00E+00
Materials for energy recovery [kg]	0.00E+00
Exported energy [MJ]	0.00E+00

LCIA for M45 Grade of Ready Mix Concrete

LCIA	A1-A3
Global Warming Potential (GWP 100 years) [kg CO ₂ -Equiv.]	4.33E+02
Ozone Layer Depletion Potential (ODP, steady state) [kg CFC11-Equiv.]	6.27E-09
Acidification Potential (AP) [kg SO ₂ -Equiv.]	1.42E+00
Eutrophication Potential (EP) [kg Phosphate-Equiv.]	1.82E-01
Photochemical Ozone Creation Potential (POCP) [kg Ethene-Equiv.]	4.72E-02
Abiotic Depletion Potential (ADP elements) [kg Sb-Equiv.]	6.25E-06
Abiotic Depletion Potential (ADP-fossil fuels) (net cal. value) [MJ]	3.07E+03
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE) (net cal. value) [MJ]	9.04E+01
Use of renewable primary energy resources used as raw materials (PERM) (net cal. value) [MJ]	0.00E+00
Total use of renewable primary energy resources (PERT) (net cal. value) [MJ]	9.04E+01
Use of non- renewable primary energy excluding non- renewable primary energy resources used as raw materials (PENRE) (net cal. value) [MJ]	3.24E+03
Use of non- renewable primary energy resources used as raw Materials (PENRM) (net cal. value) [MJ]	0.00E+00
Total use of non- renewable primary energy resources (PENRT) (net cal. value) [MJ]	3.24E+03
Use of secondary material [kg]	1.12E+01
Use of renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of non- renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of net fresh water [m ³]	6.65E-01
Hazardous waste disposed [kg]	1.31E-02
Non-hazardous waste disposed [kg]	5.34E+01
Radioactive waste disposed/stored [kg]	1.32E-02
Components for re-use [kg]	0.00E+00
Materials for recycling [kg]	0.00E+00
Materials for energy recovery [kg]	0.00E+00
Exported energy [MJ]	0.00E+00

LCIA for M50 Grade of Ready Mix Concrete

LCIA	A1-A3
Global Warming Potential (GWP 100 years) [kg CO ₂ -Equiv.]	4.37E+02
Ozone Layer Depletion Potential (ODP, steady state) [kg CFC11-Equiv.]	1.50E-09
Acidification Potential (AP) [kg SO ₂ -Equiv.]	1.50E+00
Eutrophication Potential (EP) [kg Phosphate-Equiv.]	1.89E-01
Photochemical Ozone Creation Potential (POCP) [kg Ethene-Equiv.]	5.66E-02
Abiotic Depletion Potential (ADP elements) [kg Sb-Equiv.]	5.49E-06
Abiotic Depletion Potential (ADP-fossil fuels) (net cal. value) [MJ]	2.53E+03
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE) (net cal. value) [MJ]	8.36E+01
Use of renewable primary energy resources used as raw materials (PERM) (net cal. value) [MJ]	0.00E+00
Total use of renewable primary energy resources (PERT) (net cal. value) [MJ]	8.36E+01
Use of non- renewable primary energy excluding non- renewable primary energy resources used as raw materials (PENRE) (net cal. value) [MJ]	3.22E+03
Use of non- renewable primary energy resources used as raw Materials (PENRM) (net cal. value) [MJ]	0.00E+00
Total use of non- renewable primary energy resources (PENRT) (net cal. value) [MJ]	3.22E+03
Use of secondary material [kg]	5.29E+01
Use of renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of non- renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of net fresh water [m ³]	6.62E-01
Hazardous waste disposed [kg]	1.47E-02
Non-hazardous waste disposed [kg]	5.42E+01
Radioactive waste disposed/stored [kg]	1.18E-02
Components for re-use [kg]	0.00E+00
Materials for recycling [kg]	0.00E+00
Materials for energy recovery [kg]	0.00E+00
Exported energy [MJ]	0.00E+00

LCIA for M55 Grade of Ready Mix Concrete

LCIA	A1-A3
Global Warming Potential (GWP 100 years) [kg CO ₂ -Equiv.]	4.52E+02
Ozone Layer Depletion Potential (ODP, steady state) [kg CFC11-Equiv.]	1.24E-08
Acidification Potential (AP) [kg SO ₂ -Equiv.]	1.47E+00
Eutrophication Potential (EP) [kg Phosphate-Equiv.]	1.88E-01
Photochemical Ozone Creation Potential (POCP) [kg Ethene-Equiv.]	4.92E-02
Abiotic Depletion Potential (ADP elements) [kg Sb-Equiv.]	7.08E-06
Abiotic Depletion Potential (ADP-fossil fuels) (net cal. value) [MJ]	3.40E+03
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE) (net cal. value) [MJ]	9.97E+01
Use of renewable primary energy resources used as raw materials (PERM) (net cal. value) [MJ]	0.00E+00
Total use of renewable primary energy resources (PERT) (net cal. value) [MJ]	9.97E+01
Use of non- renewable primary energy excluding non- renewable primary energy resources used as raw materials (PENRE) (net cal. value) [MJ]	3.44E+03
Use of non- renewable primary energy resources used as raw Materials (PENRM) (net cal. value) [MJ]	0.00E+00
Total use of non- renewable primary energy resources (PENRT) (net cal. value) [MJ]	3.44E+03
Use of secondary material [kg]	0.00E+00
Use of renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of non- renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of net fresh water [m ³]	6.90E-01
Hazardous waste disposed [kg]	1.75E-02
Non-hazardous waste disposed [kg]	5.47E+01
Radioactive waste disposed/stored [kg]	1.60E-02
Components for re-use [kg]	0.00E+00
Materials for recycling [kg]	0.00E+00
Materials for energy recovery [kg]	0.00E+00
Exported energy [MJ]	0.00E+00

LCIA for M60 Grade of Ready Mix Concrete

LCIA	A1-A3
Global Warming Potential (GWP 100 years) [kg CO ₂ -Equiv.]	4.47E+02
Ozone Layer Depletion Potential (ODP, steady state) [kg CFC11-Equiv.]	1.58E-08
Acidification Potential (AP) [kg SO ₂ -Equiv.]	1.52E+00
Eutrophication Potential (EP) [kg Phosphate-Equiv.]	1.91E-01
Photochemical Ozone Creation Potential (POCP) [kg Ethene-Equiv.]	5.80E-02
Abiotic Depletion Potential (ADP elements) [kg Sb-Equiv.]	6.90E-06
Abiotic Depletion Potential (ADP-fossil fuels) (net cal. value) [MJ]	2.75E+03
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE) (net cal. value) [MJ]	9.72E+01
Use of renewable primary energy resources used as raw materials (PERM) (net cal. value) [MJ]	0.00E+00
Total use of renewable primary energy resources (PERT) (net cal. value) [MJ]	9.72E+01
Use of non- renewable primary energy excluding non- renewable primary energy resources used as raw materials (PENRE) (net cal. value) [MJ]	3.36E+03
Use of non- renewable primary energy resources used as raw Materials (PENRM) (net cal. value) [MJ]	0.00E+00
Total use of non- renewable primary energy resources (PENRT) (net cal. value) [MJ]	3.36E+03
Use of secondary material [kg]	4.54E+01
Use of renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of non- renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of net fresh water [m ³]	6.85E-01
Hazardous waste disposed [kg]	1.61E-02
Non-hazardous waste disposed [kg]	5.41E+01
Radioactive waste disposed/stored [kg]	1.58E-02
Components for re-use [kg]	0.00E+00
Materials for recycling [kg]	0.00E+00
Materials for energy recovery [kg]	0.00E+00
Exported energy [MJ]	0.00E+00

LCIA for M70 Grade of Ready Mix Concrete

LCIA	A1-A3
Global Warming Potential (GWP 100 years) [kg CO ₂ -Equiv.]	4.67E+02
Ozone Layer Depletion Potential (ODP, steady state) [kg CFC11-Equiv.]	3.43E-08
Acidification Potential (AP) [kg SO ₂ -Equiv.]	1.58E+00
Eutrophication Potential (EP) [kg Phosphate-Equiv.]	1.97E-01
Photochemical Ozone Creation Potential (POCP) [kg Ethene-Equiv.]	6.06E-02
Abiotic Depletion Potential (ADP elements) [kg Sb-Equiv.]	8.78E-06
Abiotic Depletion Potential (ADP-fossil fuels) (net cal. value) [MJ]	3.09E+03
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE) (net cal. value) [MJ]	1.16E+02
Use of renewable primary energy resources used as raw materials (PERM) (net cal. value) [MJ]	0.00E+00
Total use of renewable primary energy resources (PERT) (net cal. value) [MJ]	1.16E+02
Use of non- renewable primary energy excluding non- renewable primary energy resources used as raw materials (PENRE) (net cal. value) [MJ]	3.58E+03
Use of non- renewable primary energy resources used as raw Materials (PENRM) (net cal. value) [MJ]	0.00E+00
Total use of non- renewable primary energy resources (PENRT) (net cal. value) [MJ]	3.58E+03
Use of secondary material [kg]	3.52E+01
Use of renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of non- renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of net fresh water [m ³]	7.45E-01
Hazardous waste disposed [kg]	1.58E-02
Non-hazardous waste disposed [kg]	5.17E+01
Radioactive waste disposed/stored [kg]	2.07E-02
Components for re-use [kg]	0.00E+00
Materials for recycling [kg]	0.00E+00
Materials for energy recovery [kg]	0.00E+00
Exported energy [MJ]	0.00E+00

LCIA for M80 Grade of Ready Mix Concrete

LCIA	A1-A3
Global Warming Potential (GWP 100 years) [kg CO ₂ -Equiv.]	4.76E+02
Ozone Layer Depletion Potential (ODP, steady state) [kg CFC11-Equiv.]	4.43E-08
Acidification Potential (AP) [kg SO ₂ -Equiv.]	1.58E+00
Eutrophication Potential (EP) [kg Phosphate-Equiv.]	1.98E-01
Photochemical Ozone Creation Potential (POCP) [kg Ethene-Equiv.]	5.93E-02
Abiotic Depletion Potential (ADP elements) [kg Sb-Equiv.]	9.90E-06
Abiotic Depletion Potential (ADP-fossil fuels) (net cal. value) [MJ]	3.44E+03
Use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE) (net cal. value) [MJ]	1.27E+02
Use of renewable primary energy resources used as raw materials (PERM) (net cal. value) [MJ]	0.00E+00
Total use of renewable primary energy resources (PERT) (net cal. value) [MJ]	1.27E+02
Use of non- renewable primary energy excluding non- renewable primary energy resources used as raw materials (PENRE) (net cal. value) [MJ]	3.71E+03
Use of non- renewable primary energy resources used as raw Materials (PENRM) (net cal. value) [MJ]	0.00E+00
Total use of non- renewable primary energy resources (PENRT) (net cal. value) [MJ]	3.71E+03
Use of secondary material [kg]	1.66E+01
Use of renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of non- renewable secondary fuels (net cal. value) [MJ]	0.00E+00
Use of net fresh water [m ³]	7.39E-01
Hazardous waste disposed [kg]	1.65E-02
Non-hazardous waste disposed [kg]	5.28E+01
Radioactive waste disposed/stored [kg]	2.37E-02
Components for re-use [kg]	0.00E+00
Materials for recycling [kg]	0.00E+00
Materials for energy recovery [kg]	0.00E+00
Exported energy [MJ]	0.00E+00

8. Other environmental information

The constituent materials used within our products are responsibly sourced and we apply the principles of Sustainable Development and of Environmental Stewardship as a standard business practice in our operations. Protecting the environment by preserving non-renewable natural resources, increasing energy efficiency, reducing the environmental emissions, limiting the impact of materials transportation to and from our operations is part of our way in doing business.

9. References

- EN 15804: 2012 + A1 2013, Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
- GaBi 8: 2017. thinkstep AG; GaBi 8: Software - System and Database for Life Cycle Engineering. Copyright. Leinfelden, Echterdingen, 1992-2017.
- ISO 14025:2006 Environmental labels and declarations - Type III environmental declarations - Principles and procedures
- ISO 14040:2006 Environmental management - Life cycle assessment – Principles and framework
- ISO 14044:2006 Environmental management - Life cycle assessment - Requirements and guidelines
- Product Category Rules (PCR) 2012:01 version 2.2 and Sub-PCR-G refers to the standard EN 16757:2017 Sustainability of construction works - Environmental product declarations - Product Category Rules for concrete and concrete elements, 2015-01-21, The International EPD System.