



# ENVIRONMENTAL PRODUCT DECLARATION

*In accordance with ISO 14025 for*

## **Ultracolor Plus FA**



Programme:  
**The International  
EPD<sup>®</sup> System;**  
[www environdec.com](http://www.environdec.com)

Programme  
operator:  
**EPD International AB**

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scope:  
**International**

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## 1. COMPANY DESCRIPTION / GOAL & SCOPE

Founded in 1937 in Milan, Italy, Mapei produces adhesives and complementary products for laying all types of floor, wall and coating materials, and also specializes in other chemical products used in the building industry, such as waterproofing products, specialty mortars, admixtures for concrete, cement additives, products for underground constructions and for the restoration of concrete and historical buildings. There are currently 89 subsidiaries in the Mapei Group, with a total of 83 production facilities located around the world in 36 different countries and in 5 different continents. Mapei also has 31 central laboratories. Most locations are ISO 9001 and ISO 14001 or EMAS-certified.

Mapei's strategy of internationalization is based on two main objectives: being closer to local needs and lowering transportation costs. With the declared objective of being close to buyers and clients, Mapei's presence in the five continents enables the company to comply with the requirements of each location, and to use only locally-based managers and qualified personnel, without changing the approach of Mapei.

Mapei invests 12% in its company's total work-force and 5% of its turnover in Research & Development; in particular, 70% of its R&D efforts are directed to develop eco-sustainable and environmentally friendly products, which give important contribution to all major green rating systems for eco-sustainable buildings such as LEED and BREEAM.

Furthermore, Mapei has developed a sales and technical service network with offices all over the world and offers an efficient Technical Assistance Service that is valued by architects, engineers, contractors and owners.

The goal of the study is to provide necessary data and documentation to produce an EPD according to the requirements of PCR Environdec (version 2.31, 2019-12-20) under EN 15804:2014 and to have more comprehension about the environmental impacts related to **Ultracolor Plus FA** manufactured in Mapei Corp. (US) and Mapei Inc. (CAN) located in 3 different plants (Garland (TX), West Chicago (IL) and Brampton (Walker, CA), in 2019, including packaging of the finished products. The primary data used to produce this EPD came from US and global datasets available in the Ecoinvent and Thinkstep database. Table 12 in the Data Quality section lists the dataset sources and specific geographical references.

Target audiences of the study are customers and other parties with an interest in the environmental impacts of **Ultracolor Plus FA**.

This analysis shall not support comparative assertions intended to be disclosed to the public.

## 2. PRODUCT DESCRIPTION

**Ultracolor Plus FA** with DropEffect™ technology is an ultra-premium, fine-aggregate, fast-setting, polymer-modified, color-consistent, nonshrinking, efflorescence-free grout for joint widths from 1/16" to 3/4" (1,5 to 19 mm).

**Ultracolor Plus FA is formulated with 10% recycled content** and meets the ANSI A138.1 specification for Green Squared certification.



## 3. CONTENT DECLARATION

The main components and ancillary materials of **Ultracolor Plus FA** are the following:

Table 1: Composition

Materials	Percentage (%)
Binders	20 – 40
Fillers	20 – 60
Recycled materials (pre-consumer)	10
Pigments	< 5
Additives and Packaging	0 – 10

The products contain neither carcinogenic substances nor substances of very high concern (SVHC) on the REACH Candidate List published by the European Chemicals Agency, in a concentration higher than 0,1 % (by unit weight).

Ultracolor Plus FA



## 4. DECLARED UNIT AND REFERENCE SERVICE LIFE

The declared unit is 1 kg of powder, packaging included.

The product considered in this EPD meets or exceeds the following technical specifications:

:

- ISO 13007: Terms, Definitions and Specifications for Ceramic Tile Grouts and Adhesives
- ANSI A118.6: Specifications For Ceramic Tile Grouts
- ANSI A118.7: High Performance Cement Grouts For Tile Installation
- SCS Green Squared: Certified per ANSI A138.1

The product considered is classified as ISO 13007 CG2WAF.

Additionally the product has been certified to meet the following sustainability specification:

- ANSI A138.1 – Green Squared® American National Standard Specifications for Sustainable Ceramic Tiles, Glass Tiles, and Tile Installation Materials

The finished products studied are delivered as follows:

- 11,3 kg plastic bags (25 lbs)
- LDPE (wrapping material)
- Wooden pallet

The service life of grout depends on its care, but is expected to be equivalent to the service life of ceramic tile as the majority of tile installations keep the original grout throughout their lifespan. Ceramic tile service life is, in turn, assumed to be equivalent to the service life of the building in which the products are installed (TCNA, 2014). The level of maintenance depends on the use and desired appearance of the surface. A building's reference service life (RSL) is typically assumed to be 60 years. Grouts (and ceramic tiles) are thus assumed to have an RSL of 60 years.

## 5. SYSTEM BOUNDARIES AND ADDITIONAL TECHNICAL INFORMATION

The approach is “cradle to gate”.

The following modules have been considered:

- A1 – A3 (Product Stage): Extraction and transport of raw materials and packaging, manufacturing process

Table 2: System boundaries

System Boundaries														
A1 – A3			A4 – A5		B1 – B7					C1 – C4				D
PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE					END OF LIFE STAGE				
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	
Raw Material Supply	Transport	Manufacturing	Transport	Installation Process	Use	Maintenance	Repair	Replacement	Refurbishment	Deconstruction/ Demolition	Transport	Waste Processing	Disposal	
					B6	Operational Energy Use								
					B7	Operational Water Use								

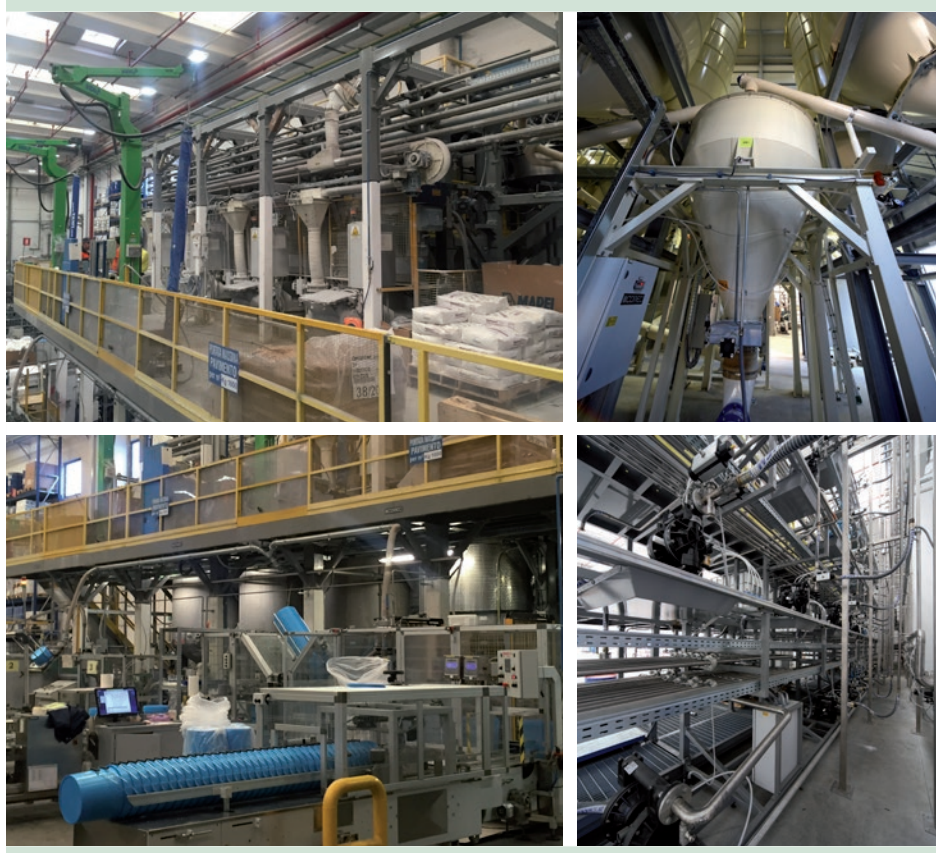
included
  excluded

A brief description of the manufacturing process is the following:

The production process starts from raw materials, which are purchased from external and intercompany suppliers and stored in the plant. Bulk raw materials are stored in specific silos and added automatically in the production mixer, according to the formula of the product. Other raw materials, supplied in bags, big bags or tanks, are stored in the warehouse and added automatically or manually in the mixer. The production is a discontinuous process, in which all the components are mechanically mixed in batches. The semi-finished product is then packaged in plastic bags, put on wooden pallets, covered by stretched hoods and stored in the finished products warehouse. The quality of final products is controlled before the sale.



Figure 1: Production process detail



## 6. CUT-OFF RULES AND ALLOCATION

Criteria for the exclusion of inputs and outputs (cut-off rules) in the LCA, information modules and any additional information are intended to support an efficient calculation procedure. They are not applied in order to hide data.

The following procedure is followed for the exclusion of inputs and outputs:

- All inputs and outputs to a unit process, for which data are available, are included in the calculation.

Input flows are covered for more than 99,99% of the formula.

Table 3: Cut-off criteria

Process excluded from study	Cut-off criteria	Quantified contribution from process
A1: raw materials	Less than 0.1% (by mass) included in the formulas	Sensitivity study demonstrates a relative contribution lower than 0.3%
A3: particle emission	Less than 10 <sup>-5</sup> kg/kg of finished product	Sensitivity study demonstrate a contribution lower than 0.5%

For the allocation procedure and principles consider the following table (Table 4):

Table 4: Allocation procedure and principles

Module	Allocation Principle
A1	All data refer to 1 kg of powder • A1: electricity is allocated to the whole plant or specific line
A3	All data refer to 1 kg of packaged product • A3-wastes: all data are allocated to the whole plant

## 7. ENVIRONMENTAL PERFORMANCE AND INTERPRETATION



### **GWP<sub>100</sub>**

Global Warming Potential refers to the emission/presence of GHGs (greenhouse gases) in the atmosphere (mainly CO<sub>2</sub>, N<sub>2</sub>O, CH<sub>4</sub>) which contribute to the increase in the temperature of the planet.



### **AP**

Acidification Potential refers to the emission of specific acidifying substances (i.e. NO<sub>x</sub>, SO<sub>x</sub>) in the air. These substances decrease the pH of the rainfall with predictable damages to the ecosystem.



### **EP**

Eutrophication Potential refers to the nutrient enrichment of flowing water, which determines unbalance in aquatic ecosystems and causes the death of the aquatic fauna.



### **ODP**

Ozone Depletion Potential refers to the degradation of the stratospheric layer of the ozone involved in blocking the UV component of sunrays. Depletion is due to particularly reactive components that originate from chlorofluorocarbon (CFC) or chlorofluoromethanes (CFM).



### **POCP**

The Photochemical Ozone Creation Potential is the ozone formation in low atmosphere. This is quite common in the cities where a great amount of pollutants (like VOC and NO<sub>x</sub>) are emitted every day (industrial emissions and vehicles). It is mainly diffused during the summertime.



### **ADP<sub>e</sub> (elements)**

Abiotic Depletion Potential elements refers to the depletion of the mineral resources.



### **ADP<sub>f</sub> (fossil fuel)**








Abiotic Depletion Potential fossil fuel refers to the depletion of the fossil fuel resources.



The following tables show environmental impacts for the product considered according to **CML2001** (Jan. 2016) methodology. For impacts calculated with **TRACI 2.1** methodology see § 9.1. All the results are referred to the declared unit (see § 4).

## Ultracolor Plus FA

Table 5: **Ultracolor Plus FA** – Environmental categories. Impacts referred to the declared unit and calculated according to CML2001 methodology

Environmental Category	Unit	A1 – A3
 <b>GWP<sub>100</sub></b>	(kg CO <sub>2</sub> eq.)	9.87E-01
 <b>ADPe (element)</b>	(kg Sb eq.)	3.31E-06
 <b>ADPf (fossil)</b>	(MJ)	7.90E+00
 <b>AP</b>	(kg SO <sub>2</sub> eq.)	7.56E-03
 <b>EP</b>	(kg (PO <sub>4</sub> ) <sup>3-</sup> eq.)	1.34E-03
 <b>ODP</b>	(kg R-11 eq.)	2.25E-07
 <b>POCP</b>	(kg ethylene eq.)	7.31E-04

**GWP<sub>100</sub>**: Global Warming Potential; **ADPe**: Abiotic Depletion Potential (elements); **EP**: Eutrophication Potential; **AP**: Acidification Potential; **POCP**: Photochemical Ozone Creation Potential; **ODP**: Ozone Depletion Potential; **ADPf**: Abiotic Depletion Potential (fossil)



Table 6: **Ultracolor Plus FA** – Other environmental indicators, impacts referred to the declared unit

Environmental Indicator	Unit	A1-A3
RPEE	MJ	5.98E+00
RPEM	MJ	-
TPE	MJ	5.98E+00
NRPE	MJ	8.66E+00
NRPM	MJ	-
TRPE	MJ	8.66E+00
SM	kg	9.80E-02
RSF	MJ	-
NRSF	MJ	-
W	m <sup>3</sup>	8.09E-03

**RPEE** Renewable primary energy as energy carrier; **RPEM** Renewable primary energy as material utilisation; **TPE** Total use of renewable primary energy sources; **NRPE** Non-renewable primary energy as energy carrier; **NRPM** Non-renewable primary energy as material utilization; **TRPE** Total use of non-renewable primary energy sources; **SM** Use of secondary materials; **RSF** Renewable secondary fuels; **NRSF** Non-renewable secondary fuels; **W** Net use of fresh water

Table 7: **Ultracolor Plus FA** – Waste production and other output flows, impacts referred to the declared unit

Output flow	Unit	A1-A3
NHW	kg	3.67E-03
HW	kg	1.05E-03
RW	kg	-
Components for re-use	kg	-
Materials for recycling	kg	1.33E-03
Materials for energy recovery	kg	-
Exported energy	MJ	-

**HW** Hazardous waste disposed; **NHW** Non Hazardous waste disposed; **RW** Radioactive waste disposed

From Table 5 to Table 7 are shown the environmental impacts related to **Ultracolor Plus FA**.

The production of raw materials gives the highest contribution in all impact categories considered CML2001.

Raw materials extraction and processing show the most relevant environmental load considering the system boundaries. Binders (both organic and inorganic) and pigments represent the most relevant contribution for the GWP100 environmental category (up to 90% - see the detail in Table 9).

The contribution of the module A3 is relevant also because the packaging components (plastic bag and wooden pallet) have quite high emission factors.

Part of fillers used is made of recycled materials (pre-consumer); thanks to that the environmental loads for all the categories studied are lower, if compared to the results obtained using not recycled filler. The value of **recycled material** used in the formulation is shown in Table 6 as SM (Secondary Material) indicator. Ultracolor Plus FA contains **10% of recycled material**.

The details about the relative contribution of the different modules considered in the system boundaries are shown in Table 8. A focus on the GWP100 of module A1 is shown in Table 9.



Table 8: Environmental impact as percentage according to CML2001 (Jan. 2016) methodology.

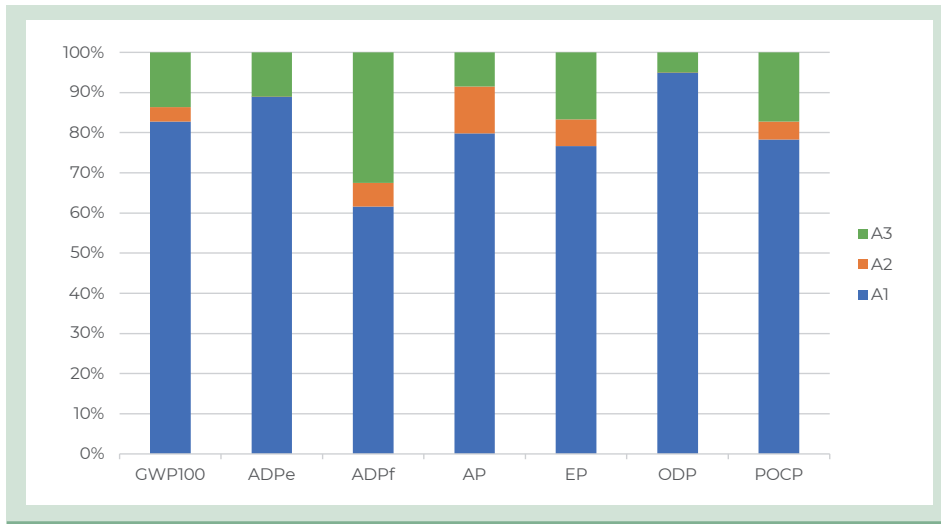
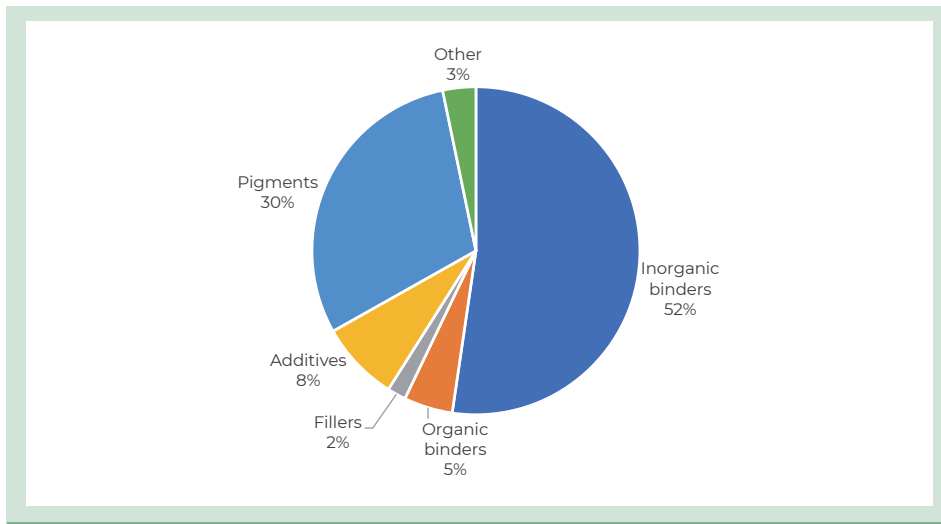


Table 9: Detail on GWP100 for the module A1



More details about the electrical mix used in this EPD are reported in next table:

	Data source	Amount	Unit
Electricity grid mix (US) – 2013	thinkstep database	0.614	kg CO <sub>2</sub> -eqv/kWh

## 8. DATA QUALITY

Table 18: Data quality

Dataset & Geographical reference	Database (source)	Temporary reference
<b>A1-A3</b>		
Binders (US, specific from supplier)	ecoinvent v 3.3	2010 - 2015
Fillers (GLO)	ecoinvent v 3.3	2010 - 2016
Electricity grid mix (US)	thinkstep database	2013
Additives & others (Packaging components)	ecoinvent v 3.3	2007 - 2016
<b>A2</b>		
Truck transport (GLO)	thinkstep database	2016
Oceanic ship (27500 DWT - GLO)	thinkstep database	2016
Light Train (Gross Ton Weight 500 Tons - GLO)	thinkstep database	2016
Electricity mix (US)	thinkstep database	2013
Diesel for transport (US)	thinkstep database	2013
Heavy Fuel Oil (US)	thinkstep database	2013

All data included in table above refer to a period between 2007 and 2016; all datasets come from global or US databases and they are all less than 10 years old (according to EN 15804 § 6.3.7 “Data quality requirements”).

Primary data concern the year 2019 and represent the whole annual production.

## 9. VERIFICATION AND REGISTRATION

### 9.1 TRACI 2.1

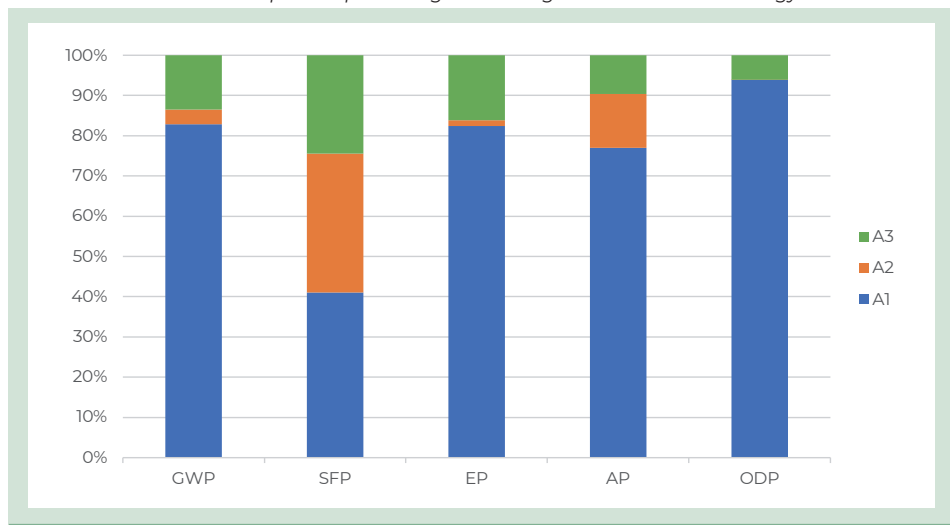
This study has been carried out also with TRACI methodology; the results are available in the tables below.

Table 11: **Ultracolor Plus FA** – Environmental categories. Impacts referred to the declared unit and calculated according to TRACI 2.1 methodology

Environmental Category	Unit	A1 – A3
<b>GWP</b>	(kg CO <sub>2</sub> eq.)	9.83E-01
<b>SFP</b>	(kg Sb eq.)	4.94E-02
<b>EP</b>	(kg SO <sub>2</sub> eq.)	2.18E-03
<b>AP</b>	(kg (PO <sub>4</sub> ) <sup>3-</sup> eq.)	6.98E-03
<b>ODP</b>	(kg R-11 eq.)	2.30E-07

**GWP:** Global Warming Potential; **SFP:** Smog Formation Potential; **EP:** Eutrophication Potential; **AP:** Acidification Potential; **ODP:** Ozone Depletion Potential

Table 12: Environmental Impact as percentage according to TRACI 2.1 methodology



### 9.2 VOC Emissions

Volatile Organic Compounds (VOC) emissions have been evaluated on Ultracolor Plus FA, according to California DPH Section 01350.

The grout has been analyzed in emission chambers, in order to detect its VOC emissions in the ventilated chambers.

**Ultracolor Plus FA** meets the requirements of the Carpet and Rug Institute's Green Label plus program with a range of total VOCs lower than 0.5 mg/m<sup>3</sup>.

### 9.3 Recycled content

The product contains 10% of recycled material (pre-consumer).

## 10. SIGNIFICANT CHANGES FROM THE PREVIOUS VERSION

In this revision, new primary data have been considered. Due to these updates, the impact indicators ADPf and primary energies have changed more than 10%.

## 11. VERIFICATION AND REGISTRATION

EPD of construction products may not be comparable if they do not comply with EN 15804.

Environmental product declarations within the same product category from different programs may not be comparable.

CEN standard EN15804 served as the core PCR	
PCR:	PCR 2012:01 Construction products and Construction services, Version 2.31, 2019-12-20
PCR review was conducted by:	The Technical Committee of the International EPD® System. Chair:Filippo Sessa Contact via <a href="mailto:info@environdec.com">info@environdec.com</a>
Independent verification of the declaration and data, according to ISO 14025	<input checked="" type="checkbox"/> EPD Process Certification (Internal) <input type="checkbox"/> EPD Verification (external)
Third party verifier:	Certiquality S.r.l. Number of accreditation: 003H rev15
Accredited or approved by:	Accredia
Procedure for follow-up of data during EPD validity involves third-party verifier	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

## 12. REFERENCES

- EN 15804: SUSTAINABILITY OF CONSTRUCTION WORKS  
- ENVIRONMENTAL PRODUCT DECLARATIONS - CORE  
RULES FOR THE PRODUCT CATEGORY OF CONSTRUCTION  
PRODUCTS
- GENERAL PROGRAMME INSTRUCTIONS OF THE  
INTERNATIONAL EPD® SYSTEM. VERSION 3.01
- HBEFA - HANDBOOK EMISSION FACTORS FOR ROAD  
TRANSPORT
- ISO 14025 ENVIRONMENTAL LABELS AND DECLARATIONS  
- TYPE III ENVIRONMENTAL DECLARATIONS - PRINCIPLES  
AND PROCEDURES
- ISO 14040: ENVIRONMENTAL MANAGEMENT - LIFE CYCLE  
ASSESSMENT - PRINCIPLES AND FRAMEWORKS
- ISO 14044 ENVIRONMENTAL MANAGEMENT – LIFE CYCLE  
ASSESSMENT – REQUIREMENTS AND GUIDELINES
- PCR 2012:01; “PRODUCT GROUP CLASSIFICATION: MULTIPLE  
UN CPC CODES CONSTRUCTION PRODUCTS AND  
CONSTRUCTION SERVICES”; VERSION 2.31
- TCNA EPD FOR CEMENT GROUT FOR TILE INSTALLATION



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