EPD®
THE INTERNATIONAL EPD® SYSTEM

ECO PLATFORM EPD VERIFIED

ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH ISO14025:2006 and EN 15804:2012+A2:2019/AC:2021

CEMENT-BASED FLOOR SCREEDS by NORDIA S.A.

EPD of multiple products based on the average results of the product group

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

EPD REGISTRATION NUMBER	PUBLICATION DATE	DATE OF VALIDITY
S-P-11336	2023-12-18	2028-12-17

PROGRAM	PROGRAM OPERATOR	UN CPC
The International EPD® System www.environdec.com	EPD International AB	3751: Non-refractory mortars and concretes

MARMOLINE
ADVANCED BUILDING MATERIALS

PROGRAM INFORMATION

PROGRAM OPERATOR: EPD International AB

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- The EPD owner has the sole ownership, liability, and responsibility for the EPD.

PRODUCT CATEGORY RULES (PCR)	▪ CEN Standard EN 15804 serves as the Core Product Category Rules (PCR) ▪ PCR 2019:14 Construction products version 1.3.1 (EN 15804:A2)
PCR REVIEW WAS CONDUCTED BY	The technical Committee of the International EPD ® System. See www.environdec.com/TC for a list of members. Chair: No Chair Appointed Contact via: info@environdec.com
LCA ACCOUNTABILITY	SustChem Technical Consulting S.A. www.sustchem.gr
INDEPENDENT THIRD-PARTY VERIFICATION OF THE DECLARATION AND DATA, ACCORDING TO ISO 14025:2006, VIA	✓ EPD verification by accredited certification body
THIRD PARTY VERIFICATION	Business Quality Verification P.C. is an approved certification body accountable for the third-party verification www.bqv.gr – info@bqv.gr
THE CERTIFICATION BODY IS ACCREDITED BY	Hellenic Accreditation System ESYD with accreditation number 1218
PROCEDURE FOR FOLLOW-UP OF DATA DURING EPD VALIDITY INVOLVES THIRD PARTY VERIFIER	YES ✓ NO

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

COMPANY INFORMATION

VISION

NORDIA S.A. is a prominent company with extensive expertise in the building materials industry, actively engaged in the following sectors:

- Production and construction of construction chemicals and mortars under the MARMOLINE brand.
- Production of concrete admixtures as an authorized licensee of the French multinational CHRYSO.
- Quarrying, processing, and sales of marble under the NORDIA MARBLE brand.

The company's objective is to cater to the construction sector's diverse needs, ranging from home renovations to large-scale new developments. Its foundation lays back in 1998 by establishing a manufacturing plant for construction mortars in Dionyssos, Attica. Dionyssos marble dust, a unique raw material featured in most of their products even today, played a significant role in the development of a product line focused on ready-to-use mortars, with particular emphasis on ready-to-use renders and tile adhesives.

Environmental Commitment

Each product is designed and produced according to the following principles:

- Raw material saving and recycling.
- Energy saving.
- Zero environmental pollution.
- Clean and tidy building site.

EMBLEMATIC CONSTRUCTIONS

- *Stavros Niarchos Foundation Cultural Center*
- *The New Acropolis Museum*
- *Athens Conservatoire*
- *Basil & Elise Goulandris Foundation*
- *Ayia Sofia Arena Stadium - AEK*
- *Tae Kwo Do Arena*
- *Olympic Velodrom*
- *Megaron the Athens Concert Hall*
- *Grand Resort Lagonissi*

VALUES

The company's dedication is to create top-notch, user-friendly materials while maintaining a strong commitment to environmental responsibility. It adheres to the ISO 14001 standard for Environmental Management Systems, implement innovative and secure production processes, and employ state-of-the-art production facilities with ISO 9001-certified Quality Management. These measures ensure the production of high-quality products that conform to European Commission standards and meet the specific requirements of the countries where the products are distributed.

Its primary focus is on delivering safe, user-friendly, and environmentally responsible products for both residential and commercial developments. The company's team stands out for their exceptional scientific knowledge and professional expertise. Its main objective is to continually seek new knowledge to stay at the forefront of technological advancements. Concurrently, it prioritizes the development of its workforce's skills and foster a culture of teamwork and respect.

PRODUCT INFORMATION

This Environmental Product Declaration (EPD) primarily aims to convey the environmental impacts linked to the manufacturing of **Floor Screed Products** offered by Nordia S.A.

A CONCISE OVERVIEW AND DESCRIPTION OF NORDIA'S FOOR SCREED PRODUCTS

The examined products comprise of cement-based floor screed products, which are essential materials used in construction and flooring projects to create a smooth, level, and durable surface. They play a crucial role in providing a foundation for various flooring finishes, such as tiles, hardwood, vinyl, or carpet. Nordia's floor screeds are used in various settings, including residential, commercial, and industrial construction, and are applied over the structural slab or subfloor to address imperfections, level uneven surfaces, and improve the overall quality and integrity of the floor.
All products (except GB250) are classified in terms of their Reaction to Fire (RtF) and are CE certified according to EN 13813:2002 standards.

NORDIA S.A.	
FLOOR SCREEDS	
GB30 → CE, RtF: A1	FLOW SL 500 → CE, RtF: A1
GB250	FLOW 200 → CE, RtF: A1
GTL30 → CE, RtF: F	FLOW SL 1000 → CE, RtF: A1

PRODUCT INFORMATION

MARMOLINE

TECHNICAL SPECIFICATIONS							
DESCRIPTION	**CONTROL NORM**	**GB 30**	**GB250**	**GTL 30**	**FLOW 200**	**FLOW SL 500**	**FLOW SL 1000**
Form	-	Powder	Powder	Powder	Powder	Powder	Powder
Grading	-	0-4mm	4mm (maximum value)	3mm	0-4mm	0-4mm	0-4mm
Packaging	-	Bags of 40kg or Bulk in silo	Bags of 25kg or 40kg	Bags of 30kg or Bulk in silo	Bags of 40kg	Bags of 30kg	Bags of 30kg
Wet Mortar Density	-	2000kg/m^3	-	1600kg/m^3	1950kg/m^3	2100kg/m^3	2100kg/m^3
Mixing Ratio	-	5 - 5.5 lt of water / bag of 40 kg	5 - 5.3 lt of water / bag of 40 kg	5 - 6 lt of water / bag of 30 kg	5 - 5.5 lt of water / bag of 40 kg	6 - 7 lt of water / bag of 30 kg	6 - 7 lt of water / bag of 30 kg
Flexural Strength	EN 13813:2002 § 5.2, table 1, & §5.2.1, table2 EN 13892-2	≥12 Mpa	~ 4 MPa (7 days) / ~ 5 MPa (28 days) [EN 1015-11]	≥5 Mpa	≥6 Mpa	40 Mpa	40 Mpa
Compressive Strength	EN 13813:2002 § 5.2, table 1 & § 5.2.2, table3 EN 13892-2	≥4 Mpa	~ 20 MPa (7 days) / ~ 25 MPa (28 days) [EN 1015-11]	≥1.5 Mpa	≥2 Mpa	7 Mpa	7 Mpa
Reaction to Fire	EN 13813:2002 § 5.3.4	Class A1	-	Class A1	Class A1	Class A1	Class A1

NORDIA

PRODUCT INFORMATION

GB30 is a ready industrial mortar based on Portland grey cement, white marble aggregates and special additives to improve adhesion to difficult surfaces and improve its flow properties.
It does not contain lime. Simply mix with water. It minimizes material preparation time and increases the speed of application.
It can be used for filling, leveling and sloping of floors, to create a final surface suitable for fixing ceramic tiles, marbles or granites.

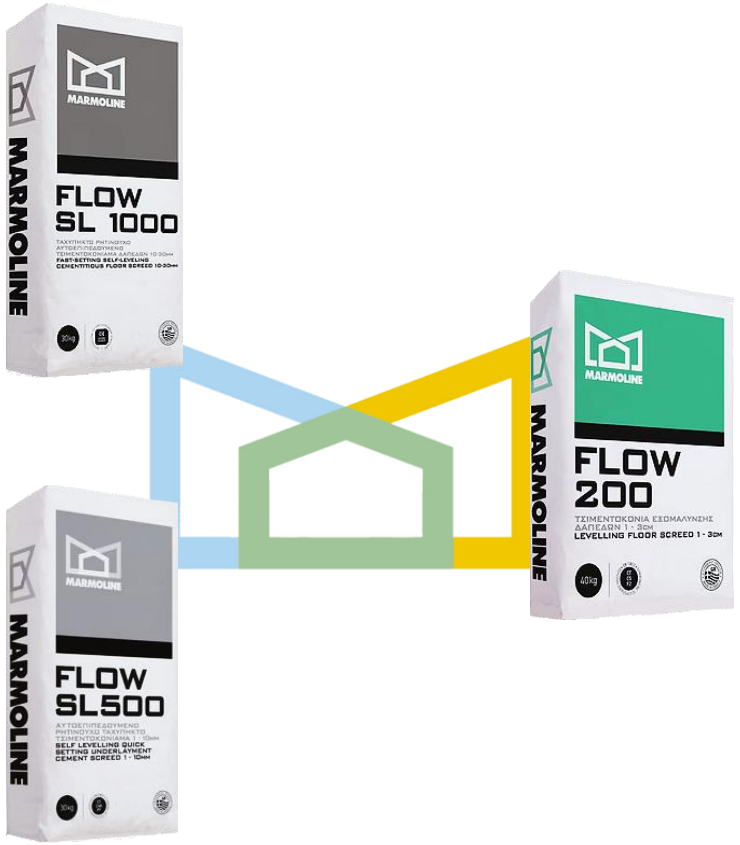
GB250 is a 1-component, ready to use, pre-weighed, cementitious based mortar, containing aggregates of selected granulometry, special additives and polymer components, used for void filling.
Thanks to its special composition, it offers high final strengths and performance stability.
It is used to fill the reinforced concrete zoning of horizontal tie systems and lintels. It is also used in various construction operations, and wherever a high-strength gravel concrete is needed.

GTL30 is a ready mortar based on Portland grey cement, white marble aggregates, special additives to improve adhesion to difficult surfaces and improve its flow properties, and polystyrene grains which provide thermal insulation and reduce the burden.
It does not contain lime. Simply mix with water. It minimizes material preparation time and increases the speed of application.
It may be used for filling, leveling and sloping of floors, to create a final surface ready for fixing ceramic tiles, marbles or granites. Suitable to use both indoors and outdoors (balconies, roofs, flat-roofs, etc.). It does not crack nor affects pipes. Additionally, it provides considerable thermal insulation and due to its lighter weight, it can be used in cases where thicker filling is required.

PRODUCT INFORMATION

FLOW SL 1000 is a fast-setting, polymer-modied, self-leveling cementitious floor screed.
Suitable for smoothing, levelling and creating a flat durable surface on concrete floors, screeds, mosaic etc. It is characterized by high compressive, flexural and abrasion resistances, very good adhesion to the substrate, full self-levelling, rapid curing/drying and low shrinkage.
It may be used to create a smooth, flat and durable final surface to which any type of tile (and plastic) or wooden floor or carpet can be fixed.

FLOW SL 500 is a ready to use, one component, cementitious-based, industrial product, based on high-strength grey cement of special granulometry, aggregates and special enhancing additives for fast and easy self-levelling coating of floors.
It provides excellent levelling of the substrate. Self-leveling polymer modified cement screed, used to create flat and durable surfaces on concrete, cement screed, mosaic floors etc.
It may be used to fill cavities of floors and repair defects on existing substrates. Ideal in cases of floors where plastic tiles, wooden floors or carpet are to be fixed.



FLOW 200 is a ready industrial mortar based on grey Portland cement, graded aggregates from the famous Greek Dionyssos marble, and special additives to improve adhesion to difficult surfaces and improve its flow properties.
It does not contain lime. It minimizes material preparation time and increases the speed of application.
It may be used to fill and level floors, to create a final surface for fixing ceramic tiles, marbles or granites. Suitable for indoors or outdoors use (balconies, roofs, flat-roofs, etc.). It does not crack and produces a perfect and particularly hard final surface.

CONTENT INFORMATION

This is an EPD of multiple products, based on an average product. **Floor Screed** has been selected as the average product. The composition of the product is expressed in mass per declared unit (kg/kg). The table below displays the content declaration for this average product.

CONTENT DECLARATION OF AN AVERAGE CEMENT-BASED FLOOR SCREED EXPRESSED IN KG PER D.U. (KG/KG)				
PRODUCT COMPONENTS	**WEIGHT KG/KG**	**RANGE**	**POST-CONSUMER RECYCLED MATERIAL (%)**	**BIOGENIC MATERIAL, WEIGHT- % AND KG C/KG**
Portland Cement II 32.5N	1.96E-01	1.80E-01 – 2.50E-01	0%	0
Calcium Carbonate	7.79E-01	6.00E-02 – 8.16E-01	0%	0
Calcium Aluminate	2.41E-03	0.00E+00 – 9.00E-02	0%	0
Polymer Dispersions	6.69E-04	0.00E+00 – 2.50E-02	0%	0
Silica Sand	1.38E-02	0.00E+00 – 5.17E-01	0%	0
Anhydrite	1.34E-03	0.00E+00 – 5.00E-02	0%	2.53E-05
Additives	6.39E-03	1.50E-04 - 1.50E-02	0%	0
TOTAL	**1.00E+00**	**-**	**0%**	**2.53E-05**
PACKAGING MATERIALS	**WEIGHT KG/KG**	**RANGE**	**WEIGHT (%) VERSUS THE PRODUCT**	**WEIGHT, BIOGENIC CARBON, KG C/KG**
Polyethylene LDPE (film)	1.51E-04	1.50E-04 – 5.07E-04	0.02%	0
Paper (Sacks)	1.36E-03	8.7E-04 – 3.81E-03	0.14%	5.72E-04
Wood (pallets)	7.00E-03	1.73E-04 – 2.10E-02	0.70%	1.32E-04
TOTAL	**8.51E-03**	**-**	**0.85%**	**7.05E-04**

CARBON ELECTRICITY INTENSITY	
ENVIRONMENTAL EFFECTS	**CO_2 EMISSIONS (KG CO_2/KWH)***
	0.642

** Residual Greek Mix: DAPEEP Report 2022 In accordance with section 1.4 of PCR 2019: 14 "Construction Products" version 1.3.1, it is required to disclose the climate impact (measured in kilograms of CO2 eq. per kilowatt-hour (kWh) using the GWP-GHG indicator) associated with the electricity acquisition during the manufacturing process in A3*

- No substances included in the Candidate List of Substances of Very High Concern for authorization under the REACH Regulations that exceed 0.1% of the total weight are present in the examined systems.

LCA INFORMATION

SYSTEM BOUNDARIES

This LCA study follows a "cradle-to-gate" approach with modules C1-C4 & module D.

DECLARED UNIT

The declared unit used in this EPD is **one (1) kilogram (kg) of an average cement-based Floor Screed.**

TIME REPRESENTATIVENESS

The data used for the analysis are based on one-year average production data, from August 2022 to July 2023.

GEOGRAPHICAL SCOPE

Global

DATABASES USED

Ecoinvent 3.8.1 & Professional 2021

SOFTWARE USED

LCA for experts (GaBi)

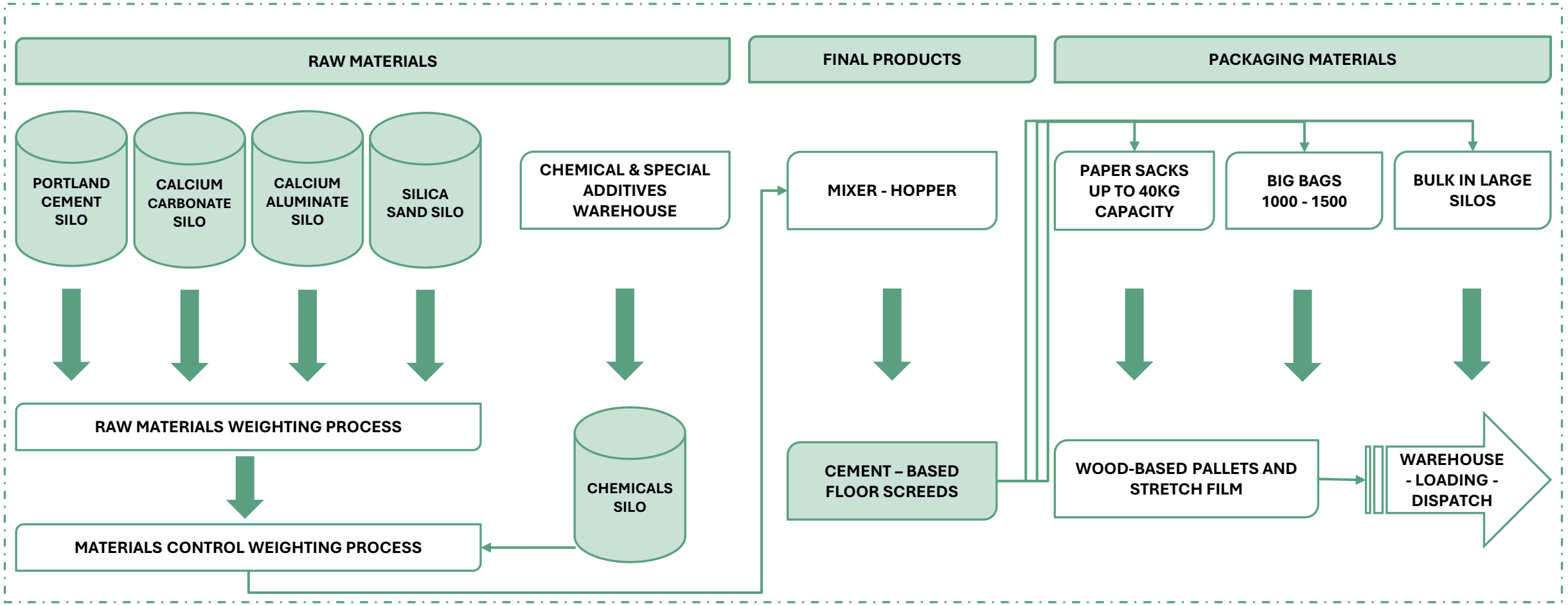
	PRODUCT STAGE				CONSTRUCTION PROCESS STAGE	USE STAGE							END OF LIFE STAGE				RESOURCE RECOVERY STAGE
	Raw Material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse – Recovery- Recycling potential
MODULE	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
MODULES DECLARED	**X**	**X**	**X**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**X**	**X**	**X**	**X**	**X**
GEOGRAPHY	GLO	GLO	GR	-	-	-	-	-	-	-	-	-	EU-27	EU-27	EU-27	EU-27	EU-27
SHARE OF SPECIFIC DATA		>90%															
VARIATION – PRODUCTS		Variation – products **From -67.10% to 9.50%**															
VARIATION -SITES		0%															

*The variations above correspond to the differences in GWP-GHG indicator results in A1-A3 between an average Floor Screed product and the GB250 and FLOW SL 1000, that correspond to the minimum and maximum results of the specific indicator, among the products under study.

DESCRIPTION OF EXAMINED MODULES

MARMOLINE

THE PRIMARY PROCESSES INVOLVED IN THE PRODUCTION PROCESS ARE REPRESENTED IN THE BELOW FLOW-CHART:



NORDIA

DESCRIPTION OF EXAMINED MODULES

As depicted in the preceding diagram, the study encompasses specific Life Cycle stages: **Production, End-of-life,** and **Resource - Recovery**. Information modules that have been excluded (construction and use stages) are scenario-driven. The main aim of this Environmental Product Declaration (EPD) is to communicate the environmental factors associated with the real data that the company can manage during the production of floor screed products.

PRODUCT STAGE

MODULES A1-A3

These aggregated modules (Modules A1-A3), comprehensively assess the entire lifecycle of raw materials and packaging components, encompassing their creation, transportation to Nordia's facilities, and the utilization of associated utilities such as electricity. To be more specific, Module A1 focuses on the manufacture of raw and packaging materials utilized in the production of floor screed products, including items like Calcium Carbonate, Portland Cement II 32.5 N, Calcium Aluminate, Silica Sand, Anhydrite, and Polymer Dispersions, as well as the manufacturing of packaging materials, specifically paper sacks, wooden-based pallets, and PE film for wrapping. Module A2 pertains to the transportation of these raw and packaging materials to Nordia's manufacturing plant. Lastly, Module A3 deals with the generation of imported electricity from the Greek grid and installed PV system and the volume of waste generated from production processes.

END-OF-LIFE STAGE

The end-of-life phase for the construction product initiates when it's either replaced, dismantled, or removed from the building or construction site, no longer serving any purpose. Alternatively, it can commence when the building itself reaches its end-of-life, depending on the chosen scenario for how the product's life ends. In this study, we take the perspective that the end-of-life stage for floor screed products begins when the building is deconstructed or demolished, as these floor screeds cannot be separated from the building's structure once installed.

In terms of the different end-of-life scenarios, we examine the emissions associated with disposing of 100% of cement-based floor screed waste during this phase. We opt for the most probable approach, which, in this case, is landfilling. Due to uncertainties regarding the specific disposal methods used, we've taken a practical approach and considered landfilling as the sole disposal option.

PROCESSES	KG/KG
Collection process specified by type	0kg collected separately 1kg collected with mixed construction waste
Recovery system specified by type	0kg for re-use
Disposal specified by type	0kg for recycling
Assumptions for scenario development (transportation)	0kg for energy recovery

DESCRIPTION OF EXAMINED MODULES

END-OF-LIFE STAGE

MODULE C1

Module C1 focuses on calculating emissions associated with removing the product from the building during the deconstruction process. In this study, we have established a realistic scenario derived from literature research. The deconstruction of floor screed products is assumed to be carried out using mechanical means, specifically employing a 100kW diesel excavator.

MODULE C2

Within this module, we examine the transport of disassembled floor screed products to waste treatment facilities. We make certain assumptions regarding the average distance between construction sites and waste management facilities, as well as the modes of transportation involved.

MODULE C3

In this module, it is assumed the 100% of the cement floor screed waste will be landfilled and hence the environmental impact is considered equal to zero.

MODULE C4

This module takes into account the emissions linked to the disposal of all waste generated from cement-based floor screed. The most realist and plausible method, was adopted which in this instance, is landfilling.

Disclaimer: Considering that Module C is included in this EPD, is discouraged to use the results of modules A1-A3 without considering the results of module C.

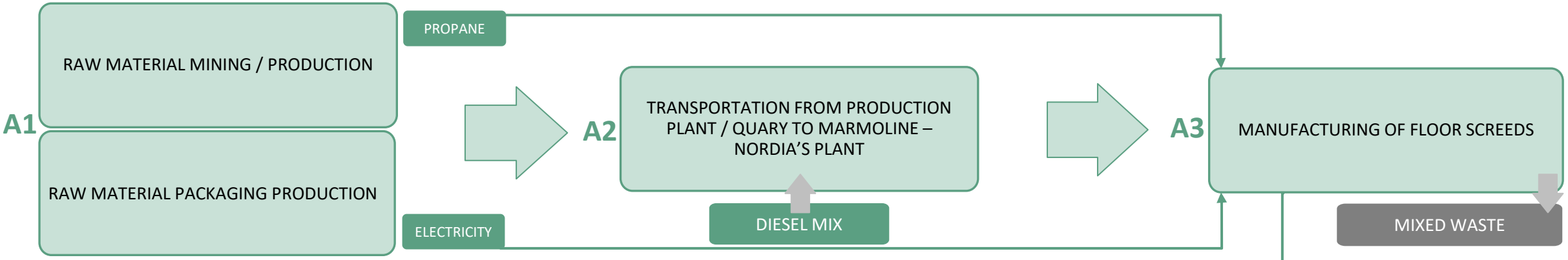
RESOURCE/ RECOVERY STAGE

MODULE D

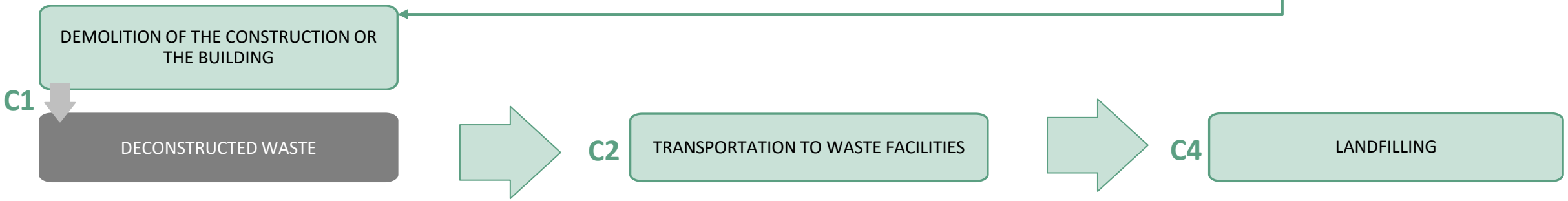
As outlined in the PCR for "Construction products," this module evaluates the environmental consequences of net flows involving reclaimed materials (those that are reused or recycled) or the energy output exiting modules A-C. Given that all deconstructed waste will be sent to a landfill without any recovery, reuse, or recycling processes, this module is considered to have zero impact.

SYSTEM DIAGRAM

PRODUCT STAGE
MODULES A1 – A3



END-OF-LIFE STAGE
MODULES C1, C2, C4



ADDITIONAL LCA INFORMATION

ASSUMPTIONS:

- Assumptions were employed when selecting the modes of transportation for road routes, taking into account factors such as technology, fuel type, and payload capacity. An average mode of transportation was chosen for each route to offer a reasonable approximation for all transported goods. It is assumed that a diesel-powered truck with Euro 6 emissions standards, a gross weight of 12-14 tons, and a payload capacity of 9.3 tons is used.
- An assumption was made regarding the timing and method used for disassembling floor screed products. The end-of-life phase for these floor screeds is set to align with the building's demolition. To achieve this, a deconstruction was carried out, using mechanical methods, specifically using a diesel-powered excavator with a 100kW power rating.
- Assumptions regarding the end-of-life of deconstructed cement-based floor screed waste is used. More specifically, the most likely outcome is that all the broken-down waste will be sent to a landfill for disposal. This choice is supported by the fact that over 40% of waste made from cement in Greece is disposed of in this manner. Moreover, floor screed products do not break down naturally or decompose, making them inappropriate for composting or other organic waste management methods. They are chemically stable, which reduces the risk of harmful substances seeping into the environment when they are securely stored in a landfill.
- Regarding the disposal of floor screed products in landfills, a process referred to as "Treatment of limestone residue, inert material landfill" has been utilized. This approach is chosen due to the substantial presence of calcium carbonate in a significant portion of this waste category. Consequently, this specific database is deemed a fitting and precise portrayal of the waste material.
- An assumption regarding the proximity of waste treatment facilities to construction sites was made. Namely, it was assumed that the treatment facilities would be located within a distance of 100 kilometers from the construction sites.
- Although drying and grain cracking processes do not take place on a regular basis in the production process, the LCA study takes them into account so as to assess the worst-case scenario.

ALLOCATIONS:

- Regarding electricity consumption, 80% of the total volumes used, is attributed to the production of mortars.
- All propane consumption, constituting 100%, is exclusively allocated to mortar production, encompassing adhesives, floor screeds, plasters, grouts, and concrete repair products.
- The mass allocation method was utilized to assess manufacturing process waste, chosen for its reference to total facility waste volumes in the specified year.

CUT-OFFS:

The combined disregarded input flows for each module, such as A1-A3, C1-C4, and module D, should not exceed 5% of the total energy usage and mass. These guidelines were adhered to in order to assess the influence of including or excluding inventory flows. All key raw materials, components, and necessary energy inputs are accounted for within the system boundaries. The study incorporates data for basic flows to and from the product system, accounting for at least 99% of the stated environmental impacts. The only processes not considered in this study are:

- Production of certain primary flows, i.e., special chemical additives, which were determined to be considerably less than 1% of the declared environmental impacts.
- The handling of mixed municipal waste because the quantities generated are so minimal when compared to the declared unit volume, as to be considered inconsequential.
- Wooden-based pallets management is not included in this study since these pallets are intended for multiple uses.
- The manufacturing of silos designed for transportation purposes, as they fall under the classification of capital goods.

ENVIRONMENTAL PERFORMANCE INDICATORS

NORDIA S.A. – FLOOR SCREED PRODUCTS

MARMOLINE

POTENTIAL ENVIRONMENTAL IMPACTS/ 1 KG OF AN AVERAGE CEMENT-BASED FLOOR SCREED								
CORE ENVIRONMENTAL IMPACT INDICATORS		UNIT	A1-A3	C1	C2	C3	C4	D
Global Warming Potential – total	GWP-total	kg CO_2 eq.	1.830E-01	6.460E-04	1.218E-02	0.000E+00	1.245E-02	0.000E+00
Global Warming Potential – fossil	GWP-fossil	kg CO_2 eq.	1.795E-01	6.410E-04	1.208E-02	0.000E+00	1.243E-02	0.000E+00
Global Warming Potential – biogenic[3]	GWP-biogenic	kg CO_2 eq.	-4.980E-03	0.000E+00	0.000E+00	0.000E+00	4.980E-03	0.000E+00
Global Warming Potential – land use and land use change	GWP-luluc	kg CO_2 eq.	3.336E-03	5.057E-06	9.908E-05	0.000E+00	2.625E-05	0.000E+00
Global Warming Potential – GHG[1]	GWP-GHG	kg CO_2 eq.	1.830E-01	6.460E-04	1.218E-02	0.000E+00	1.245E-02	0.000E+00
Ozone Depletion Potential	ODP	kg CFC 11 eq.	3.246E-08	7.889E-20	1.546E-18	0.000E+00	3.597E-09	0.000E+00
Acidification Potential	AP	Mole of H+ eq.	4.704E-04	3.044E-06	1.174E-05	0.000E+00	1.108E-04	0.000E+00
Eutrophication Potential – freshwater	EP-freshwater	kg P eq.	7.718E-06	1.833E-09	3.592E-08	0.000E+00	9.337E-07	0.000E+00
Eutrophication Potential – marine	EP-marine	kg N eq.	5.256E-05	1.431E-06	3.691E-06	0.000E+00	4.286E-05	0.000E+00
Eutrophication Potential – terrestrial	EP-terrestrial	mol N eq.	1.811E-03	1.585E-05	4.454E-05	0.000E+00	4.679E-04	0.000E+00
Photochemical Oxidant Formation Potential	POCP	kg NMVOC eq.	4.636E-04	4.026E-06	1.014E-05	0.000E+00	1.324E-04	0.000E+00
Abiotic Depletion Potential – elements[2]	ADPe	kg Sb eq.	1.143E-07	4.701E-11	9.211E-10	0.000E+00	2.533E-08	0.000E+00
Abiotic Depletion Potential. fossil resources[2]	ADPf	MJ net calorific value	1.588E+00	8.220E-03	1.611E-01	0.000E+00	2.498E-01	0.000E+00
Water Deprivation Potential[2]	WDP	m^3 world eq. deprived	2.147E-02	5.362E-06	1.051E-04	0.000E+00	7.222E-03	0.000E+00

[1] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero

[2] The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

[3] Actually, this indicator is negative due to an uptake of biogenic carbon in packaging materials. Considering that module A5 is not declared, the correlated emissions due to end-of-life of packaging, are balanced-out already in Module A1-A3, hence resulting in a total value of zero. In terms of the biogenic carbon content of the product, the amount of carbon uptake and degradation throughout the life cycle of the product can be found in the table above. This value was calculated and added manually in A1-A3 (uptake) and C4 where degradation of product occurs.

NORDIA

ENVIRONMENTAL PERFORMANCE INDICATORS

NORDIA S.A. – FLOOR SCREED PRODUCTS

POTENTIAL ENVIRONMENTAL IMPACTS/ 1 KG OF AN AVERAGE CEMENT-BASED FLOOR SCREED								
RESOURCE USE INDICATORS		UNIT	A1-A3	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ. net calorific value	7.873E-01	4.587E-04	8.988E-03	0.000E+00	2.724E-03	0.000E+00
Use of renewable primary energy resources used as raw materials	PERM	MJ. net calorific value	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total use of renewable primary energy resources	PERT	MJ. net calorific value	7.775E+01	4.587E-04	8.988E-03	0.000E+00	2.724E-03	0.000E+00
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ. net calorific value	5.053E+02	8.231E-03	1.613E-01	0.000E+00	2.499E-01	0.000E+00
Use of non-renewable primary energy resources used as raw materials	PENRM	MJ. net calorific value	0.000E+00	5.806E-05	5.806E-05	0.000E+00	0.000E+00	0.000E+00
Total use of non-renewable primary energy resources	PENRT	MJ. net calorific value	8.413E+02	8.231E-03	1.613E-01	0.000E+00	2.499E-01	0.000E+00
Use of secondary material	SM	kg	0.000E+00	5.597E-04	5.597E-04	1.119E-03	2.239E-03	0.000E+00
Use of renewable secondary fuels	RSF	MJ. net calorific value	0.000E+00	8.275E-04	8.275E-04	1.655E-03	3.310E-03	0.000E+00
Use of non-renewable secondary fuels	NRSF	MJ. net calorific value	0.000E+00	2.124E-03	2.124E-03	4.249E-03	8.497E-03	0.000E+00
Use of net fresh water	FW	m^3	5.251E-04	5.251E-07	1.029E-05	0.000E+00	1.682E-04	0.000E+00

ENVIRONMENTAL PERFORMANCE INDICATORS

NORDIA S.A. – FLOOR SCREED PRODUCTS

MARMOLINE

POTENTIAL ENVIRONMENTAL IMPACTS/ 1 KG OF AN AVERAGE CEMENT-BASED FLOOR SCREED								
WASTE INDICATORS		**UNIT**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	HWD	kg	2.189E-10	4.148E-13	8.126E-12	0.000E+00	0.000E+00	0.000E+00
Non-hazardous waste disposed	NHWD	kg	8.686E-04	1.223E-06	2.396E-05	0.000E+00	0.000E+00	0.000E+00
Radioactive waste disposed	RWD	kg	1.006E-05	9.956E-09	1.951E-07	0.000E+00	0.000E+00	0.000E+00
OUTPUT FLOWS		**UNIT**						
Components for re-use	CRU	kg	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Material for recycling	MFR	kg	1.556E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Materials for energy recovery	MER	kg	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Exported energy	EE	MJ	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS		**UNIT**						
Particulate matter emissions	PM	Disease incidence	1.035E-08	3.446E-11	7.031E-11	0.000E+00	6.333E-09	0.000E+00
Ionizing radiation human[4]	IRP	kBq U235 eq.	1.153E+00	1.425E-06	2.793E-05	0.000E+00	1.127E-03	0.000E+00
Eco-toxicity. Freshwater[2]	ETP-fw	CTUe	6.861E-01	5.941E-03	1.164E-01	0.000E+00	1.705E-01	0.000E+00
Human toxicity. cancer effects[2]	HTP-c	CTUh	2.837E-10	1.198E-13	2.349E-12	0.000E+00	5.390E-12	0.000E+00
Human toxicity. non-cancer effects[2]	HTP-nc	CTUh	8.135E-09	7.209E-12	1.215E-10	0.000E+00	1.239E-10	0.000E+00
Land use related impacts / Soil quality[2]	SQP	dimensionless	1.558E+00	2.823E-03	5.531E-02	0.000E+00	3.557E-01	0.000E+00

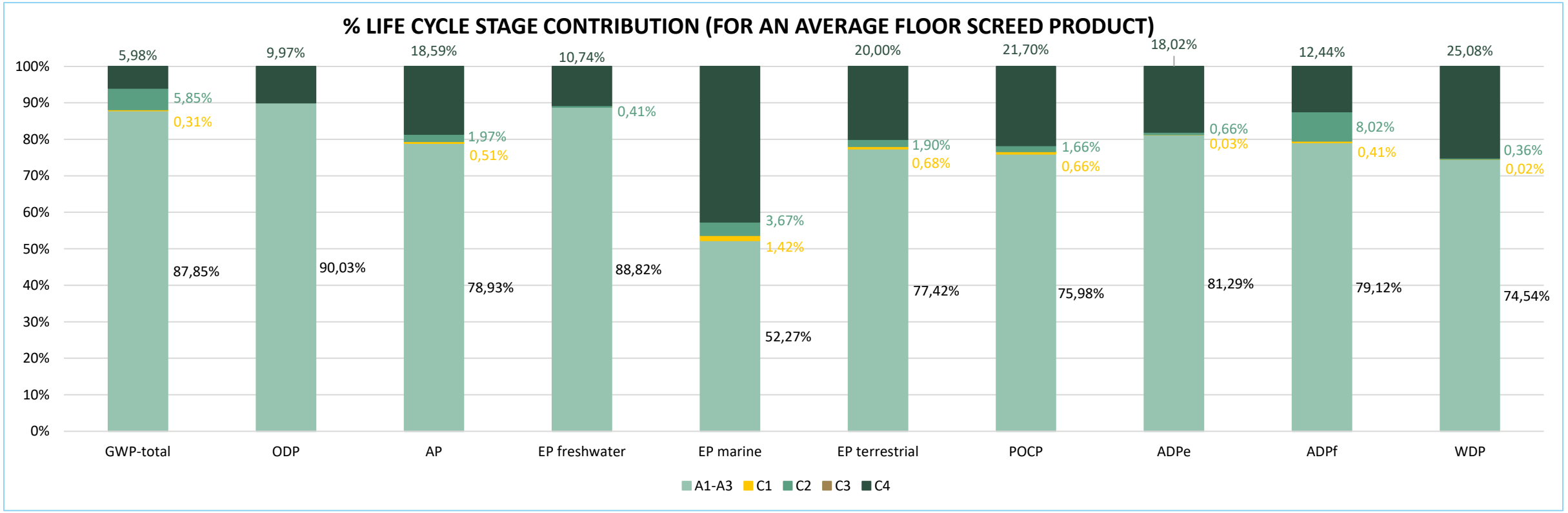
A complete list of the potential environmental impacts is available for the all Floor Screed Products and can be directly acquired from Nordia's personnel.

[2] The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.
[4] This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

NORDIA

INTERPRETATION

- The following diagram illustrates the respective contributions of the assessed modules (A1-A3 & C1-C4) to the fundamental environmental impact indicators. The evaluation of the outcomes took the form of a dominance analysis focused on these key environmental impacts. Evidently, the modules A1-A3 exert a predominant influence on the majority of the scrutinized impact categories
- Concerning the assessment of Global Warming Potential (GWP), it is observed that the most influential phases in the life cycle are modules A1-A3, which collectively contribute to ca. 88% of the total impact. These modules encapsulate a significant portion of environmental considerations. Following these, Modules C1, C2, and C4 also play roles in GWP, albeit to a lesser extent, accounting for 0.31%, 5.85%, and 5.98%, respectively. This breakdown illustrates the hierarchy of contributions to GWP throughout the various phases of the product's life cycle.



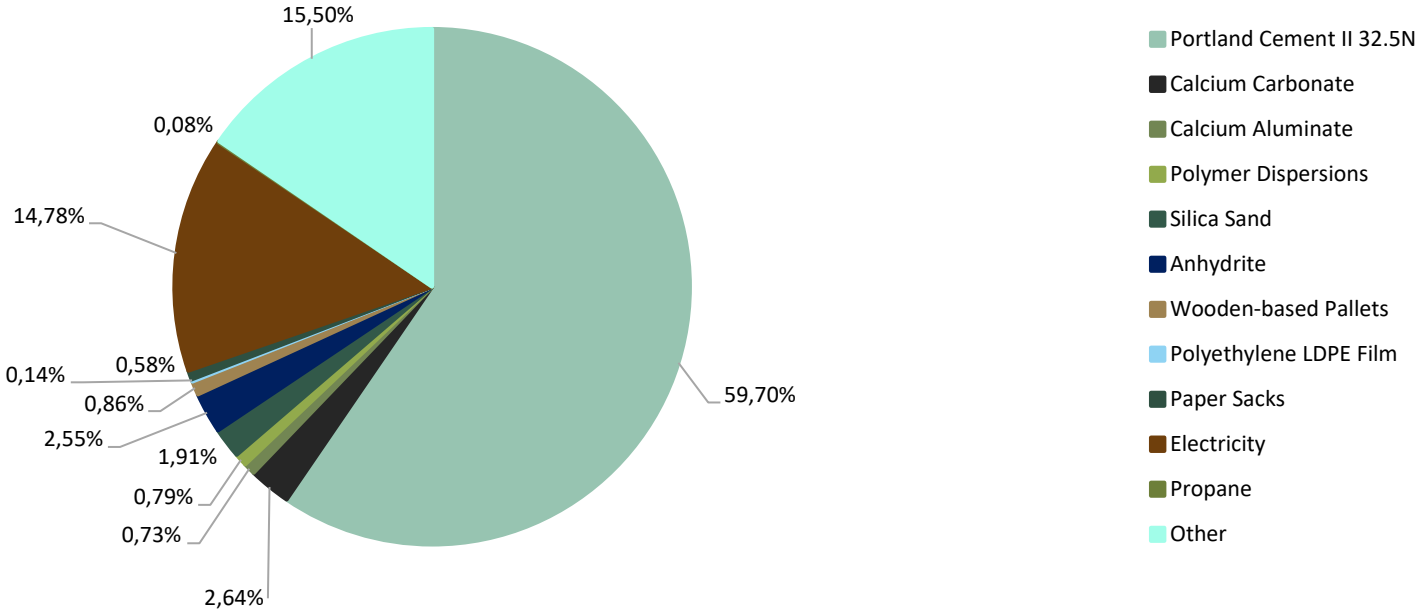
Disclaimer: The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

INTERPRETATION

- The majority of the total Global Warming Potential (GWP) is associated with the extraction and production of raw materials, with a notable focus on the manufacturing of Portland Cement II 32.5N. This significant influence is vividly depicted in the left-side chart of the presentation, where Portland Cement II 32.5N production alone accounts for ca. 60% of the entire GWP-total. This emphasizes that the environmental impact, especially in terms of global warming potential, is greatly driven by the processes involved in obtaining and producing raw materials, and the production of Portland Cement II 32.5N plays a central role in this impact. The chart visually underscores the pivotal role of this particular aspect in the overall carbon footprint.

Process Contribution to GWP- total for Modules A1-A3

For an Average Floor Screed Product



Disclaimer: The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

ADDITIONAL ENVIRONMENTAL INDICATORS

% VARIATIONS OF INCLUDED PRODUCTS

ENVIRONMENTAL IMPACT INDICATORS

As per the PCR 2019:14 Construction Products version 1.3.1, when the products included exhibit a difference of over 10% concerning their declared environmental impact indicators, the specific variance for each impact indicator should be reported. The subsequent tables showcase total variances observed for all examined products, encompassing all the environmental impacts considered, compared to the potential environmental impacts of an average product.

% VARIATIONS FROM THE AVERAGE FLOOR SCREED						
INDICATOR	**GB30**	**GB250**	**GTL30**	**FLOW 200**	**FLOW SL 500**	**FLOW SL 1000**
Climate Change - Total	-14.83%	9.50%	2.41%	0.50%	-66.96%	-67.10%
Climate Change - Fossil	-14.91%	9.22%	2.60%	0.32%	-67.18%	-67.32%
Climate Change - Biogenic	NA	NA	NA	NA	0%	0%
Climate Change - Land Use and Land Use Change	-10.12%	26.02%	-8.65%	11.23%	-45.07%	-45.30%
Global Warming Potential- GWP-GHG	-14.83%	9.50%	2.60%	0.50%	-66.96%	-67.10%
Ozone Depletion	-84.26%	-78.62%	270.97%	-80.29%	81.95%	79.55%
Acidification	-16.32%	10.76%	-5.60%	1.45%	-74.29%	-74.43%
Eutrophication. Fresh water	-50.62%	54.06%	-23.06%	23.57%	-88.36%	-88.58%
Eutrophication, marine	-18.30%	0.92%	0.95%	-3.11%	-77.17%	-77.39%
Eutrophication, terrestrial	-12.55%	14.18%	-4.27%	4.53%	-63.97%	-64.20%
Photochemical Ozone Formation, human health	-13.71%	14.32%	-2.63%	4.84%	-64.63%	-64.91%
Resource use, mineral and metals	-35.18%	23.69%	-16.09%	9.41%	-86.27%	-86.47%
Resource use, fossils	-26.10%	-6.47%	31.85%	-11.70%	-74.30%	-74.47%
Water Use	-22.83%	16.41%	-6.97%	7.57%	-78.56%	-78.87%

ADDITIONAL ENVIRONMENTAL INDICATORS

% VARIATIONS OF INCLUDED PRODUCTS

USE OF RESOURCES

% VARIATIONS FROM THE AVERAGE FLOOR SCREED						
INDICATOR	**GB30**	**GB250**	**GTL30**	**FLOW 200**	**FLOW SL 500**	**FLOW SL 1000**
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	-29.64%	48.69%	-1.46%	33.19%	172.48%	189.62%
Use of renewable primary energy resources used as raw materials	0.00%	0.00%	0.00%	0.00%	71.46%	71.46%
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	74.04%	-71.28%	-71.87%	-71.44%	-97.19%	-97.01%
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	31.95%	-27.66%	-27.79%	-27.68%	-98.45%	-98.44%
Use of non-renewable primary energy resources used as raw materials	0.00%	0.00%	0.00%	0.00%	26.95%	26.95%
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	32.05%	-27.70%	-27.89%	-27.71%	-99.07%	-99.07%
Use of secondary materials	0.00%	0.00%	0.00%	0.00%	-28.64%	-28.64%
Use of renewable secondary fuels	0.00%	0.00%	0.00%	0.00%	-28.64%	-28.64%
Use of non-renewable secondary fuels	0.00%	0.00%	0.00%	0.00%	-28.64%	-28.64%
Use of net fresh water	-27.27%	11.29%	5.08%	2.42%	-79.68%	-79.94%

ADDITIONAL ENVIRONMENTAL INDICATORS

% VARIATIONS OF INCLUDED PRODUCTS

WASTE CATEGORIES

% VARIATIONS FROM THE AVERAGE FLOOR SCREED						
INDICATOR	**GB30**	**GB250**	**GTL30**	**FLOW 200**	**FLOW SL 500**	**FLOW SL 1000**
Hazardous waste disposed	-17.93%	-17.99%	30.24%	-17.81%	-70.28%	-70.29%
Non-hazardous waste disposed	-72.05%	-72.04%	-42.51%	-71.93%	-95.94%	-95.94%
Radioactive waste disposed	-32.37%	-35.30%	0.82%	-34.06%	-90.13%	-90.13%

Regarding Output flows and considering that a mass balance approach was followed for waste produced from production processes, as well as the fact that all waste is considered to be landfilled, the variation for all output flows indicators for all of the examined products less than 10% and hence, no reported

ADDITIONAL ENVIRONMENTAL INDICATORS

% VARIATIONS OF INCLUDED PRODUCTS

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS

% VARIATIONS FROM THE AVERAGE FLOOR SCREED						
INDICATOR	**GB30**	**GB250**	**GTL30**	**FLOW 200**	**FLOW SL 500**	**FLOW SL 1000**
Particulate Matter emissions	-4.70%	1.41%	-2.12%	-0.29%	-49.76%	-50.00%
Ionizing radiation human	-10.15%	26.39%	-8.74%	13.07%	-42.51%	-42.82%
Eco-toxicity, freshwater	-42.81%	-18.33%	28.66%	-23.16%	-88.00%	-88.08%
Human toxicity, cancer	-15.50%	30.53%	-4.88%	16.60%	-50.88%	-51.86%
Human toxicity, non-cancer effects	-11.58%	21.84%	-3.58%	8.09%	-49.94%	-50.08%
Land use related impacts / Soil quality	-61.84%	120.23%	-1.66%	84.18%	-65.57%	-69.73%

REFERENCES

- International EPD® System, PCR 2019:14 Construction Products, version 1.3.1
- EN 15804:2012+A2:2019/AC 2021 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
- International EPD® System, General Program Instructions for the International EPD System, version 4.01
- ISO 14020:2000 - Environmental Labels and Declarations - General Principles
- 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
- The International EPD® System - The International EPD System is a program for type III environmental declarations, maintaining a system to verify and register EPDs as well as keeping a library of EPDs and PCRs in accordance with ISO 14025. www.environdec.com
- Sphera - GaBi Product Sustainability software - www.sphera.com
- Ecoinvent / Ecoinvent Centre - www.Eco-invent.org
- Mavridou, Sofia. (2018). Construction and Demolition (C&D) Waste: Potential uses and current situation in Greece and Cyprus.