



EPD

Environmental Product Declaration for Diabase Aggregates Latomio Pyrgon Limited

Program: The International EPD System
Program Operator: EPD International AB
EPD Registration Number: S-P-11386
Publication Date: 2023-12-01
Valid Until: 2028-11-30



MSC
LATOUIROS
INVESTMENTS LTD



In accordance with
ISO 14025 and
EN 15804:2012+A2:2019/AC:2021
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.



COMPANY INFORMATION

Latomio Pyrgon Limited (Pyrga Quarry), was founded in 1985, and it produces diabase aggregates in various fractions, from blasted rock to finely crushed material. Pyrga Quarry is part of a large group of quarries in Cyprus, **M.S.C. Latouros Investments Limited**.

All products are produced according to the Construction Products Regulation (CPR) within the EU regulation 305/2011 and European Standards.

M.S.C. Latouros Investments Limited

Building on 40 years of experience in the quarrying industry and being driven by its commitment to quality, responsible extraction and sustainable development, **M.S.C. Latouros Investments Limited (M.S.C.)** has become a leading aggregates supplier in Cyprus through a network of 3 aggregates quarries (2 calcareous limestone quarries: Latomia Latouros Limited and Elmeni (Latomia) Limited and one diabase quarry: Latomio Pyrgon Limited). M.S.C. also operates 1 gypsum quarry (Latouros Gypsum Limited), which exports high purity gypsum to Israel and Lebanon. In 2019, M.S.C. expanded its activities also to include the recycling of construction and demolition waste located at the pit of Latouros Quarries.

The group's mission is to create value by transforming raw materials into products that can be used to provide sufficient and reliable infrastructure that makes people's lives easier and more comfortable.

M.S.C. has a holistic sustainability framework, focused equally on all 3 pillars of sustainability: society, environment and economy. Special attention is given to aspects concerning quality, environmental protection and health & safety. Thus, all M.S.C. quarries have developed and maintained Quality Management System, Environmental Management System and Health & Safety Management System conforming to the requirements of ISO 9001, ISO 14001 and ISO 45001, respectively. The Management Systems are certified by Accredited Certification Bodies.

M.S.C. continuously works on reducing both its own and its customers' environmental impact by offering resource and energy-efficient products that help its customers reduce their environmental impact and operate more sustainably. Thus, being aware of the growing need for enhanced transparency of the environmental performance of building materials, M.S.C. has decided to create EPDs for its products to communicate to its customers the performance of Latouros Group's aggregates. These EPDs will drive environmental improvement throughout all M.S.C. activities and offer a competitive advantage to customers who want to be leaders in the sustainable infrastructure and building industry.

SCOPE

The scope of this product average EPD includes diabase aggregates produced at Pyrga Quarry plant. The analysis includes 2022 full year information regarding the consumption of raw materials, electricity, water and fuels.

This EPD covers multiple aggregate types based on the declared technical standards as described in the Declaration of Performance. The aggregates included in this EPD are shown in the table below and categorized by size and usage.



PRODUCT DESCRIPTION

Diabase aggregates in various fractions, from blasted rock to finely crushed material. All products are produced according to the Construction Products Regulation (CPR) within the EU regulation 305/2011 and European Standards.

The aggregates covered in this EPD are materials produced by Pyrga Quarry and, more specifically in Pyrga (Larnaca district) in Cyprus.

Table 1. Product types produced at the declared site

No.	Product Name	Characterization	EN 12620^a	EN 13139^b	EN 13043^c	EN 13242^d
1	Crushed Sand 0/4mm Cat.4	Fine aggregate		√		
2	Crushed Rock 0/32mm (For Subbase Applications)	All-in aggregate				√
3	Crushed Rock (3/4) 8/20mm	Coarse aggregate	√		√	
4	Crushed Rock (3/8) 4/10mm	Coarse aggregate	√		√	
5	Crushed Sand 0/4mm (Washed)	Fine aggregate	√			
6	Crushed Sand 0/4mm Cat.4 (passes 2 crushing steps)	Fine aggregate		√		
7	Crushed Rock 0/32mm (For Base Applications)	All-in aggregate				√
8	Crushed Rock 0/80mm (For Backfilling)	All-in aggregate				√
9	Crushed Rock 40/110mm (For Backfilling)	Coarse aggregate				√
10	Crushed Rock 0/32mm (For Subbase Applications – from mobile crusher)	All-in aggregate				√
11	Raw Rock Material	All-in aggregate				√
12	Overburden Material	All-in aggregate				√
13	Crushed Rock 0/12mm (For Backfilling – mixture of No. 1 and 4)	All-in aggregate				√
14	Crushed Rock 0/32mm (For Base Applications – mixture of No. 2 and 7)	All-in aggregate				√
15	Mixed Crushed Calcareous Limestone Sand with Crushed Diabase Sand 0/4mm	Fine aggregate		√		



- a- CYS EN 12620:2020+A1:2008 Aggregates for concrete
- b- CYS EN 13139:2002+AC:2004 Aggregates for mortar
- c- CYS EN 13043:2002+AC:2004 Aggregates for Bituminous Mixtures and Surface Treatments for Roads, Airfields and Other Trafficked Areas
- d- CYS EN13242:2002+A1:2007 Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction

The products do not contain any substances listed in the “Candidate List of Substances of Very High Concern (SVCH) for authorization” exceeding 0.1% of the weight of the product.



Figure 1. Aerial photo of Pyrga Quarry crushing plant



LCA INFORMATION

Declared unit

The declared unit is 1 tn of diabase aggregates.

Goal and Scope

This EPD evaluates the environmental impacts of the production of 1 tn of diabase aggregates manufactured at the Pyrga Quarry crushing plant.

Background data

The most recent version of the Ecoinvent database (v.3.9.1) was used as a source of background data.

Software

The software used for the production of the LCA results is OpenLCA 2.0.0.

Data quality

ISO 14044 was applied in terms of data collection and quality requirements. Data on raw materials, mineral oil waste generated, transportation of materials and products along with energy, fuels and water consumption in manufacturing stage was collected by Pyrga Quarry, while the impacts of the raw materials (e.g. explosives, oils, lubricants, filters and diesel) and disposal of mineral oil waste, were recovered from Ecoinvent database (v.3.9.1). Regarding electricity mix, the latest (2022) version of Association of Issuing Bodies (AIB) Report for "Residual Energy Mix 2022" for Cyprus was utilized. The climate impact (GWP-GHG) of used electricity in the A3 module is 607,40 g CO₂/kWh. The emission factor and Net Calorific Value (NCV) for diesel are provided from the National Inventory Report of 2022 for Cyprus.

Time representativeness

Data refers to the whole year 2022.

Geographical scope

Worldwide

System boundaries

The scope of the study is set to be Cradle-to-gate. The system's boundaries are shown in more detail in the table below. It should be noted that construction stage (modules A4-A5) and use stage (modules B1-B7) are optional and are not under the scope of this study. End of life stages (modules C1-C4) and the resource recovery stage (module D) are obligatory but can be excluded if the following three conditions are valid:

- the product or material is physically integrated with other products during installation so they cannot be physically separated from them at the end of life.
- the product or material is no longer identifiable at the end of life as a result of a physical or chemical transformation process, and
- the product or material does not contain biogenic carbon.

All these three criteria are met, thus, the scope of the study is cradle-to gate (modules A1-A3).

Assumptions

Module A2:

Transport is relevant for the delivery of raw materials from the supplier to the gate of the manufacturing plant. Due to the fact that the suppliers of explosives, lubricants, oils and filters are near the manufacturing plant, and quantities are minor compared to the mass of the limestone, their transportation is excluded from the study, although their environmental impacts concerning their production are taken into account.

Module A3:

Emission factors and net calorific values of diesel used and combusted in loading and crushing were obtained from the National Inventory Report (NIR) of 2022 for Cyprus. More specifically:

- Diesel Net Calorific Value (NCV): 43 TJ/kt
- Diesel Emission Factor: 74,1 t CO₂/TJ

Cut-off rules

Where there are insufficient data or data gaps for a unit process, the cut-off criteria are 1% of the total mass of input of that process. The total of neglected input flows per module is a maximum of 5% of energy usage and mass.

Allocations

Wherever possible, allocation was avoided by dividing the unit process to be allocated into two or more sub-processes and collecting the input and output data related to these sub-processes. Where allocation cannot be avoided, the inputs and outputs of the system are partitioned between its different products or functions in a way that reflects the underlying physical or economic relationships between them. In this case, no allocation was made since all activity data provided relate to all products manufactured in Pyrga Quarry plant as an average product.

Table 2. System boundaries

Modules	Product stage			Construction stage		Use stage							End of life stage				Resource recovery stage
	A1 Raw Materials Supply	A2 Transport	A3 Manufacturing	A4 Transport	A5 Construction installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 De-construction and demolition	C2 Transport	C3 Waste processing for reuse, recovery and/or recycling	C4 Disposal	D Reuse-Recovery-Recycling-potential
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Geography	CY	CY	CY	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation-products	<10%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation-sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

X= Included, ND= Module Not Declared



Figure 2. A summary of the excavation and production process

A1-A3: Product Stage

A1: Raw Material Supply

Production starts with raw materials supply. The main raw materials used for the production of diabase aggregates are energy carriers (diesel and electricity) and explosives used for the mining of diabase rock. Furthermore, small quantities of oils, lubricants and filters are utilized for equipment operation during the manufacturing process.

A2: Transportation of raw materials to manufacturer

Transport is relevant for delivery of raw materials from the supplier to the gate of the manufacturing plant. Due to the fact that the suppliers of explosives, lubricants, oils and filters are near the manufacturing plant, and quantities are minor compared to the mass of the diabase aggregates produced, their transportation is excluded from the study. However, their environmental impacts concerning their production are taken into account.



A3: Manufacturing

The initial step to virgin rock extraction is the removal of overburden material with an excavator to uncover the useful rock. The overburden material removed is stored at the site to be either sold to customers (when there is demand for it) or used as a backfilling material as part of the quarry's rehabilitation process.

The second step is to prepare for the blasting operation, which involves drilling holes with the use of the drilling machine. These holes are filled with explosives and then detonated.

The third step is to transfer the raw material to the crushing plant. At the Pyrga Quarry, one CAT988K wheel loader is used to load the raw material onto two CAT772G dumper trucks. The continued production process involves a combination of material feeders, conveyor belts, a washer, crushers and screens that transport, break, wash and sort the material into different products.

The washing of the sand results in liquid sludge, which is processed to remove the "clear water" from the sludge. The water is reused in the washing stage, and the liquid sludge is pumped to the old quarry pit for rehabilitation.

The total quantity of diesel fuel includes, among others transportation related to the manufacturing process and the consumption of fuel related to the transportation of the extracted material from the quarry to the manufacturing plant.

Waste disposal concerning sludge and gravel is excluded from the study since the total quantity of waste generated from the manufacturing process is used for quarry restoration treatment. Only waste disposal concerning mineral oils was taken into account.



Figure 3. Aerial photo of the quarry pit



ENVIRONMENTAL PERFORMANCE INDICATORS

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.

Table 3. Environmental Indicators - Total A1-A3

ENVIRONMENTAL IMPACTS	Unit	A1-A3 Diabase aggregates
GWP-total	kg CO ₂ eq	3,88E+00
GWP-fossil	kg CO ₂ eq	3,88E+00
GWP-biogenic	kg CO ₂ eq	4,88E-03
GWP-luluc	kg CO ₂ eq	2,41E-03
GWP-GHG	kg CO ₂ eq	3,86E+00
ODP	kg CFC ⁻¹¹ eq	6,42E-08
AP	mol H ⁺ eq	1,01E-01
EP-freshwater	kg P eq	6,71E-04
EP-marine	kg N eq	2,97E-02
EP-terrestrial	mol N eq	4,77E-01
POCP	kg NMVOC eq	9,11E-02
ADPe	kg Sb eq	9,66E-06
ADPf	MJ	5,10E+01
WDP	m ³ eq	3,12E+00

¹ This indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide emissions and uptake and biogenic carbon stored in the product with characterization factors (CFs) based on IPCC (2013).

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

Table 4. Resource Use - Total A1-A3

RESOURCE USE	Unit	A1-A3 Diabase aggregates
PERE	MJ	3,01E+00
PERM	MJ	0,00E+00
PERT	MJ	3,01E+00
PENRE	MJ	5,04E+01
PENRM	MJ	0,00E+00
PENRT	MJ	5,04E+01
SM	kg	0,00E+00
RSF	MJ	0,00E+00
NRSF	MJ	0,00E+00
FW	m ³	7,26E-02

PERE: Use of renewable primary energy excluding renewable primary energy resources used as raw materials, **PERM:** Use of renewable primary energy resources used as raw materials, **PERT:** Total use of renewable primary energy resources, **PENRE:** Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials, **PENRM:** Use of non-renewable primary energy resources used as raw materials, **PENRT:** Total use of non-renewable primary energy resources, **SM:** Use of secondary materials, **RSF:** Use of renewable secondary materials, **NRSF:** Use of non-renewable secondary fuels, **FW:** Use of net fresh water

Table 5. Output Flows and Waste Categories - Total A1-A3

OUTPUT FLOWS AND WASTE CATEGORIES	Unit	A1-A3 Diabase aggregates
HWD	kg	2,56E-04
NHWD	kg	1,72E-01
RWD	kg	8,73E-05
CRU	kg	0,00E+00
MFR	kg	0,00E+00
MER	kg	0,00E+00
EE	MJ	0,00E+00

HWD: Hazardous waste disposed, **NHWD:** Non-hazardous waste disposed, **RWD:** Radioactive waste disposed, **CRU:** Components for re-use, **MFR:** Materials for recycling, **MER:** Materials for energy recovery, **EE:** Exported energy



Figure 4. The loading of the extracted material



ADDITIONAL INFORMATION

- The EPD does not give information on the release of dangerous substances to soil, water and indoor air because the horizontal standards on measurement of the release of regulated dangerous substances from construction products using harmonized test methods, according to the provisions of the respective technical committees for European product standards, are not available.
- The EPD owner has the sole ownership, liability, and responsibility of the EPD.
- EPDs within the same product category but registered in different EPD programmes 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 characterization factors); have equivalent content declarations; and be valid at the time of comparison.

REFERENCES

- General Programme Instructions of the International EPD® System. Version 4.0, 2021-03-29
- **PCR 2019:14 v.1.3.1** Construction products. EPD System. Date 2023-07-08. Valid until 2024-12-20
- **EN 15804:2012+A2:2019/AC:2021**, Sustainability of construction works - Environmental Product Declarations — Core rules for the product category of construction products
- **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
- **UEPG** (European Aggregates Association) <https://uepg.eu/>
- **Ecoinvent / Ecoinvent Centre**, www.eco-invent.org
- **Residual Mixes and European Attribute Mix of 2022 from the Association of Issuing Bodies (AIB)**
- **United Nations Statistics Division (2015)**. Central Product Classification, version 2.1, <https://unstats.un.org/unsd/classifications/unsdclassifications/cpcv21.pdf>
- **a-CYS EN 12620:2002+A1:2008** Aggregates for concrete
- **b- CYS EN 13043:2002+AC:2004** Aggregates for bituminous mixtures and surface treatments for roads, airfields and other trafficked areas
- **c- CYS EN 13139:2002+AC:2004** Aggregates for Mortar
- **d- CYS EN 13242:2002+A1:2007** Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction



PROGRAM AND RELATED INFORMATION

Programme:	The International EPD System
Address:	Box 210 60 SE-100 31 Stockholm, Sweden
Website:	www.environdec.com
Email:	info@environdec.com

Accountabilities for PCR, LCA and third-party verification

Product Category Rules (PCR)

ISO standard ISO 21930:2017 and CEN standard EN 15804+A2:2019 serve as the core Product Category Rules (PCR)

PCR 2019:14 v.1.3.1 Construction products. EPD System. Date 2023-07-08. Valid until 2024-12-20

Product group classification: CPC 15320 'Pebbles, gravel, broken or crushed stone, macadam; granules, chippings and powder of stone'.

PCR review was conducted by: The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact

Life Cycle Assessment (LCA)

LCA Accountability: ENVIROMETRICS S.A.



3 Kodrou str., 152 32, Athens, Greece
email: info@envirometrics.gr
www.envirometrics.gr

Owner of the EPD



10, COSTA LATOUROU, 2540, P.O. BOX 11112, 2551 DALI, CYPRUS
email: latouros@latouros.com
<https://www.pyrgaquarry.com/>

Third party verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:



Prof. Vladimír Kočí, Šárecká 5, 16000, Prague 6 - Czech Republic
<http://www.lca.cz/>

Procedure for follow-up during EPD validity involves third party verifier

Yes No