Environmental Product Declaration (EPD)

of secondary raw materials or aggregates of industrial origin

SAND MATRIX

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EPD

1 DESCRIPTION OF THE COMPANY AND THE PRODUCT

1.1 The company

Officina dell'Ambiente S.p.A, located in the municipality of Lomello in Pavia province, performs the treatment and recovery process of special hazardous and non-hazardous wastes, mainly bottom ashes derived from municipal incineration plants to be re-used as secondary raw material for the production of cement and other building materials.

Thousands of tonnes of bottom ashes from incineration, instead of being disposed in landfill, are treated in a controlled manner through a treatment/recovery cycle which generates a secondary raw material, named Matrix®, as substitute of primary raw material for cement production and other building products.

Today, Matrix® has become a family of products with different characteristics, particle size and application ranging over almost all building sectors. At the moment, representatives of the Matrix® Family are:

- Matrix® Standard, with a particle size between 0 and 10 mm;
- AGMatrix®, with a particle size between 2 and 10 mm; this product has been EC-labelled as aggregate for concrete in 2008;
- Sand Matrix®, a group of sands that can be produced in particle size of 0-2 mm, 0-4 mm and 2-4 mm.

The recovery of incineration bottom ashes, otherwise disposed in landfill, allows to conserve resources mitigating the demand for raw materials and the depletion of natural resources.

Officina dell'Ambiente S.p.A. complies with European Union Directives that provide a management policy aimed at minimizing waste production, focusing on their recovery rather than their disposal.

Officina dell'Ambiente S.p.A. supplies several cement plants and producers of concrete with a wide range of products as substitutes of primary raw materials with the dual purpose of removing a considerable flow of waste from landfill and to preserve the reserves of natural materials.

Officina dell'Ambiente S.p.A. holds the Environmental Management System certificate according to the scheme of UNI EN ISO 14001:2004, which has the following scope: *treatment and recovery of specific hazardous and non-hazardous waste through the phases of weighing, unloading, storage and physical-mechanical separation.*

The headquarters of Officina dell'Ambiente S.p.A, which corresponds to the production site, is the following:

Strada Provinciale 193bis – Tenuta Grua, Lomello (PV)

This site is registered under EC Regulation 1221/09 EMAS from 30/8/2006 with the number 555 (Environmental verifier DNV Italy).

1.2 Sand Matrix®

The main process of Officina dell'Ambiente S.p.A. is aimed to obtain the product named Matrix® Standard, starting from bottom ashes derived from municipal incineration plants. The process involves a set of physical-mechanical treatments, without the addition of chemical reagents, consisting of a screening, crushing and separation of ferrous and non-ferrous metals.

More in detail, the main production process of Officina dell'Ambiente S.p.A. consists of the following phases:

- acceptance of the waste;
- unloading of the waste in specific areas of the production site;
- waste maturation process;
- loading of the waste through loading hoppers and transferring to the treatment plant;
- screening and separation of the waste;
- crushing and separation of ferrous metals from unscreened waste;

- storage of Matrix® Standard in specific areas of the production site;
- picking and selling of the finished product.

Following the production of Matrix® Standard, Officina dell'Ambiente has built in the external area of the plant a system of vibrating sieves working without the use of water, which separates Matrix® Standard into the fractions with particle size 0-4 mm, 2-10 mm and >10 mm (which is sent back to the crushing system). The fraction with particle size 0-4 mm (Sand Matrix® 0-4 mm) is further separated into the fractions with particle size 0-2 mm (Sand Matrix® 0-2 mm) and 2-4 mm (Sand Matrix® 2-4 mm) using the vibrating sieves.
All Sand Matrix® products (0-2, 0-4, 2-4 mm) own characteristics and specific EC marking for various sectors, such as the production of concrete, pre-measured mortars, bituminous conglomerate, brick and cement mixtures.
As required by PCR document 2012:01, in Matrix® products there are no substances with a high degree of concern (SVHC) provided in the ECHA Candidate List with a concentration greater than 0,1%.

Product	U.M.	Quantity			
		2012	2013	2014	Average
Sand Matrix® 0-2 mm	ton	29.719	23.729	20.230	**24.559**
Sand Matrix® 2-4 mm	ton	7.104	4.838	8.634	**6.859**
Sand Matrix® 0-4 mm	ton	15.578	21.366	30.145	**22.363**

Table 1: Quantity of Sand Matrix® produced from 2012 to 2014

Declared Unit
1000 kg of Matrix product
The phases of distribution, use and disposal of the product are not included in the study

1.3 Composition of the product

Parameter	U.M.	2012	2013	2014	average	SD*
Humidity	%	14,13	11,17	11,36	12,22	2,33
SiO_2	% s.s.	31,23	33,78	34,55	33,19	2,06
Al_2O_3	% s.s.	11,12	10,72	10,14	10,66	0,50
Fe_2O_3	% s.s.	10,20	10,12	9,89	10,07	0,69
CaO	% s.s.	21,83	20,54	19,67	20,68	1,32
MgO	% s.s.	2,62	2,70	2,75	2,69	0,11
Na_2O	% s.s.	2,58	3,00	3,39	2,99	0,32
K_2O	% s.s.	1,04	1,09	1,12	1,08	0,07
TiO_2	% s.s.	1,02	1,03	0,96	1,00	0,05
Mn_2O_3	% s.s.	0,17	0,20	0,19	0,19	0,01
Cr_2O_3	% s.s.	0,11	0,11	0,11	0,11	0,01
S (total)	% s.s.	0,62	0,57	0,61	0,60	0,04
SO_3	% s.s.	1,55	1,43	1,51	1,50	0,10
P_2O_5	% s.s.	1,74	1,59	1,32	1,55	0,15
Cl	% s.s.	0,61	0,56	0,54	0,57	0,07
$CaCO_3$	% s.s.	10,41	10,67	10,48	10,52	0,83
Loss on ignition	% s.s.	8,14	6,01	6,10	6,75	0,87

Parameter	U.M.	2012	2013	2014	average	SD*
As	mg/kg	14	14	15	14	2
Cd	mg/kg	12	11	16	13	5
Cr total	mg/kg	763	769	721	751	45
Cr (VI)	mg/kg	< 1	< 1	< 1	< 1	
Cu	mg/kg	5834	4526	4360	4907	473
Hg	mg/kg	< 5	< 5	< 5	< 5	
Mn	mg/kg	1195	1410	1315	1306	100
Ni	mg/kg	250	234	226	237	20
Pb	mg/kg	2688	2167	2017	2291	258
Sb	mg/kg	145	135	124	135	8
Se	mg/kg	< 5	< 5	< 5	< 5	
V	mg/kg	40	43	43	42	3
Zn	mg/kg	5561	4510	4127	4733	358

* average of standard deviation

Table 2: Average chemical composition of Sand Matrix® produced from 2012 to 2014

1.4 System boundaries

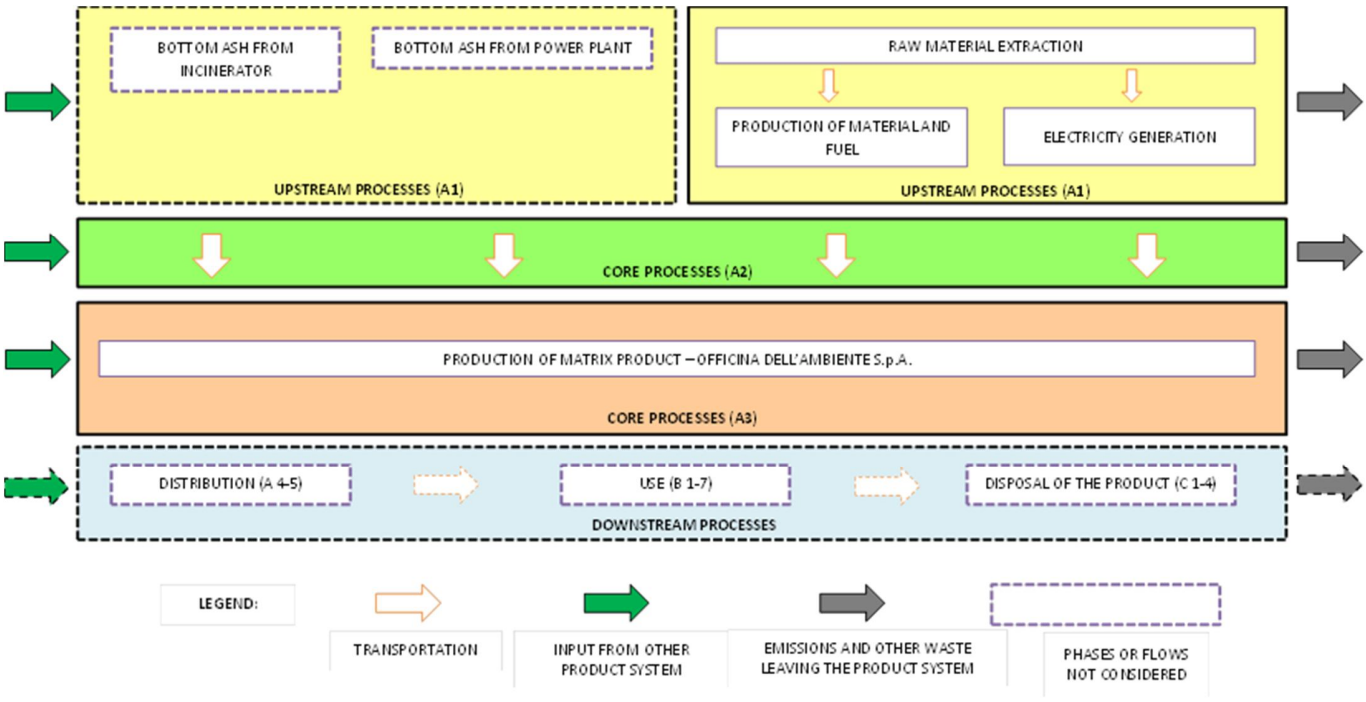
System boundaries determine the unit processes to be included in LCA study and which data as "input" and/or "output" to/from the system can be omitted. According to the PCR 2012:01 and to the EN 15804:2012, the life cycle of Matrix® products is divided into upstream and core phases, as specified below.
The upstream phase (A1) comprises the supply of raw materials and specifically:

- the extraction and processing of raw materials and recycling processes of the secondary raw materials from the previous product system (with the exception of the processes which are part of the waste treatment of the previous product system);
- the electricity generation from primary energy sources, including their extraction, refining and distribution;
- energy recovery from secondary fuels (with the exception of processes which are part of the waste treatment in the system of the previous product).

The core phase, divided in two parts, includes the following processes:

- external and internal transport between processes belonging to the core phase (A2);
- production of Matrix® products and treatment of waste derived from the production of Matrix® products (A3).

The downstream phase is not included in the system boundaries. In the figure below it is shown the schematic diagram of the life cycle of the product and the table regarding life cycle stages according to the PCR and to the EN 15804.



GPI module	Comparability basis: Asset life cycle stages	Within the product group Information module	Performance in a construction application EPD type Declared unit: Cradle-Gate
UPSTREAM	A1) RAW MATERIAL SUPPLY	A1-3) PRODUCTION PHASE	MANDATORY
CORE	A2) Transport		
	A3) Manufacturing		
DOWNSTREAM	A4) TRANSPORT	A3-4) MANUFACTURING PHASE	Optional
	A5) Construction, installation process		
	B1) Material emission from usage*	B) Usage stage	Optional
	B2) Maintenance		
	B3) Repair		
	B4) Replacement		
	B5) Refurbishment		
	C1) Deconstruction, demolition	C) End of life	Optional
	C2) Transport		
	C3) Waste processing		
	C4) Disposal		
Other environmental information	D) Reuse, recycle or recovery	D) Recyclability potentials	Optional
Inclusion of reference service life (RSL)	B)1-5	B) Usage stage	Mandatory if all life stages included

* Named 'Use' in ISO 21930

1.5 Data quality and cut-off

The inventory analysis was conducted using specific data provided by Officina dell'Ambiente SpA concerning the consumption of raw materials and electricity, the production of Matrix® products and related waste. All data refer to the last three years (2012, 2013 and 2014) while in the model the average values were used. The electricity consumed by Officina dell'Ambiente is produced from hydroelectric and photovoltaic sources.
Selected generic data was used from international databases (in particular Ecoinvent 3.01) regarding the production processes of the auxiliary materials used for the production of Matrix® products, the processes of generation and distribution of electricity, the means of transportation and waste treatment processes related to the production of Matrix® products. Furthermore, the distances of transportation were calculated using Google Maps online calculator. Generic data was not used.
According to the PCR 2012:01 and to the cut-off rules, flows lower than 1% of the total inventory were excluded; in particular the following processes were excluded: the packaging of auxiliaries; the maturation process of the bottom ash, the accumulation and the process of natural weathering of the Matrix® Standard; the consumption of natural gas for heating offices, the travels of workers to and from work and the construction of machinery and plants, as not directly related to the product.

1.6 Distribution, use phase and disposal of the product

The distribution of the product, use phase and disposal of Matrix® products were not considered ("cradle-to-gate" LCA study, i.e. from cradle to the gate of the company).

1.7 Comparison of EPD within the same product category

This EPD meets the requirements of ISO 14025 and EN 15804. The EPD within the same product category but which refer to different programs cannot be compared. EPD of construction products may not be comparable if they do not comply with the requirements of comparability set in EN 15804.
AGMatrix® product described in this document is based on specific PCR 2012:01 version 1.2 dated 15-03-2013.

1.8 Validity of EPD

This EPD refers to the geographical area of Italy and remains valid until the 25th of March 2016.

2 ENVIRONMENTAL PERFORMANCE

The environmental performance of Sand Matrix® products, as described below, is based on the methodology of Life Cycle Assessment (LCA) and it was calculated in accordance with ISO 14040 and 14044, the International EPD system, PCR 2012:01 and EN 15804:2012. The management and update of environmental data concerning EPD products are regulated by a specific procedure in the manual for the management systems of safety and the environment (EMAS). The radioactivity of bottom ash from incineration of municipal waste is monitored before sending to Officina dell'Ambiente in order to exclude the delivery of radioactive bottom ash.

2.1 Assessment methodology

The calculation method adopted for the LCA study of the present EPD is described in the document "GPI for an International EPD® System" and the characterization factors used to convert the data deriving from the inventory analysis of the life cycle into impact categories are listed in the web-site www.environdec.com and described in the PCR. In addition to the impact categories required by PCR, the impact categories related to aquatic and terrestrial ecotoxicity, human toxicity and land use were also considered; these impact categories taken from the CML 2001 method developed by the Center of Environmental Science (CML) of Leiden University in the Netherlands (http://cml.leiden.edu/software/data-cmlia.html).

2.2 Environmental profile of Sand Matrix®

The impact categories, which characterize upstream and core phases and the life cycle of Sand Matrix® 0-2 mm, refer to one (1) tonne of product. The results of the impact categories of Sand Matrix® 0-4 mm and Sand Matrix® 2-4 mm are not shown because, according to the GPI document, the difference from the Matrix® Sand 0-2 mm is less than 5% for all impact categories (the maximum percentage difference is 0,1%). Resources whose contribution is greater than 5% of the total impact of one (1) ton of Sand Matrix® 0-2 mm, are also shown.

Impact categories	Unit	Upstream (A1)	Core (A2)	Core (A3)	Life cycle
Global warming 100 years	kg CO_2 eq	0,814	40,243	12,237	53,295
Ozone layer depletion	mg CFC-11 eq	0,114	2,320	0,637	3,071
Photochemical oxidation	g C_2H_4	0,147	4,500	1,461	6,108
Acidification	g SO_2 eq	2,830	240,060	75,090	317,980
Eutrophication	g PO_4--- eq	0,565	42,043	16,134	58,742
Depletion of abiotic resource (element)	kg Sb eq	0,000	0,000	0,000	0,000
Depletion of abiotic resource (fossil)	MJ	12,091	565,241	140,120	717,542
Human toxicity 100 years	*kg 1,4-DB eq*	*0,121*	*1,907*	*3,088*	*5,116*
Freshwater aquatic ecotoxicity 100 years	*kg 1,4-DB eq*	*0,079*	*0,326*	*15,481*	*15,887*
Marine aquatic ecotoxicity 100 years	*kg 1,4-DB eq*	*0,293*	*3,151*	*49,988*	*53,432*
Terrestrial ecotoxicity 100 years	*kg 1,4-DB eq*	*0,001*	*0,002*	*0,001*	*0,004*
Land use	*m^2a*	*0,006*	*0,018*	*0,388*	*0,411*
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	35,656	0,729	0,448	36,833
Use of renewable primary energy resources used as raw materials	MJ	0,002	0,006	0,007	0,014
Total use of renewable primary energy resources	MJ	35,657	0,735	0,455	36,847
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	13,473	586,306	146,299	746,077
Use of non- renewable primary energy resources used as raw materials	MJ	0,045	0,020	0,011	0,075
Total use of non-renewable primary energy resources	MJ	13,518	586,325	146,310	746,153
Use of secondary material	kg	0,000	0,000	1,143	1,143
Use of renewable secondary fuels	MJ	0,000	0,000	0,000	0,000
Use of net fresh water	m^3	0,004	0,026	0,552	0,582
Non-hazardous waste	kg	0,646	5,548	5,610	11,804
Hazardous waste	kg	0,001	0,009	0,002	0,012
Radioactive waste	kg	0,000	0,000	0,000	0,000

Table 3: The environmental impacts of 1 tonne of Sand Matrix® 0-2mm

Use of renewable primary energy excluding renewable primary energy resources used as raw materials	Unit	Life cycle
Energy potential converted	MJ	26,890
Solar energy	MJ	0,193
Other resources	MJ	0,200
Total resources	MJ	36,847

Use of renewable primary energy resources used as raw materials	Unit	Life cycle
Soft wood in forest	MJ	0,008
Hard wood in forest	MJ	0,006
Other resources	MJ	0,000
Total resources	MJ	0,014

Table 4: Renewable resources whose contribution is greater than 5% of the total impact of 1 ton of Sand Matrix® 0-2mm

Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw ma-terials	Unit	Life cycle
Oil	MJ	492,245
Natural gas	MJ	235,148
Other resources	MJ	11,006
Total resources	MJ	746,153

Use of non- renewable primary energy resources used as raw materials	Unit	Life cycle
Oil	MJ	0,072
Total resources	MJ	0,072

Table 5: Renewable resources whose contribution is greater than 5% of the total impact of 1 ton of Sand Matrix® 0-2mm

2.1 Additional environmental information

Comparison between Sand Matrix® and sand production

Sand Matrix® 0-2 mm was compared with sand, whose life cycle includes the extraction of the raw material, the handling inside the cave and the treatment of the extracted material; the life cycle of the sand was obtained from the Ecoinvent database (process Sand {IT}| gravel and quarry operation | Alloc Def, U" modified with the Italian energy mix), ETH database (process "Sand ETH U") and ELCD database (process "Sand 0/2, wet and dry quarry, production mix, at plant, undried RER S"). The following table presents the results of the comparison relative to 1 ton of product.

Impact category	Unit	Sand Matrix® 0-2 mm	Sand Matrix® 0-2 mm with avoided impacts of slag disposal	Sand Matrix® 0-2 mm with avoided impacts of slag disposal and primary production of iron and aluminium	Sand (Ecoinvent)	Sand (ETH)	Sand (ELCD)
Non renewable resources without energy content	kg	53,295	-624,766	-695,444	3,205	9,786	2,457
Non renewable resources with energy content	MJ eq	3,071	2,570	-2,830	0,354	10,355	0,181
Renewable resources without energy content	kg	6,108	-153,942	-262,887	0,570	1,769	1,077
Renewable resources without energy content	MJ eq	317,980	61,244	-612,162	19,113	31,030	20,376
Water consumption	litre	58,742	-3033,858	-3134,866	3,438	5,838	2,075
Global warming potential 100 years	kg CO_2 eq	5,116	-12,072	-75,229	1,066	1,019	0,182
Ozone depletion	mg CFC-11 eq	15,887	-2332,486	-2396,693	0,232	0,510	0,009
Photochemical smog formation	g C_2H_4	53,432	-7404,680	-7638,381	0,877	2,648	0,087
Acidification	g SO_2 eq	0,004	-0,026	-0,074	0,002	0,001	0,000
Eutrophication	g PO_4--- eq	0,411	0,282	0,100	0,367	4,625	0,000
Human toxicity	kg 1,4-DB eq	0,582	0,521	0,396	0,022	0,093	0,004
Water ecotoxicity	kg 1,4-DB eq	36,833	17,112	9,126	1040,023	2,918	2,358
Marine water ecotoxicity	kg 1,4-DB eq	0,014	-0,028	-0,062	0,025	0,037	0,000
Soil ecotoxicity	kg 1,4-DB eq	746,077	657,313	-173,008	51,734	150,554	28,831
Land use	m^2a	0,075	0,0007	0,0003	3,002	2,918	2,358

Table 6: Results of the comparison between Sand Matrix® 0-2 mm (without and with avoided impacts) and sand

From the above results, it can be noted that, as regards the indicators of global warming, formation of photochemical smog, acidified cation and eutrophication, all the impact categories are higher in the life cycle of the Sand Matrix® (compared to the process database Ecoinvent): that is due to the higher consumption of fossil fuels. Only the indicator depletion of the ozone layer for the process of extracting the sand of the database ETH is greater than Sand Matrix®.
Concerning the indicators of toxicity, all impact categories are higher in the life cycle of Sand Matrix® due to increased consumption of fossil fuels and processes for waste disposal.
The consumption of non-renewable resources as raw material in the Sand Matrix® results to be higher than other extraction processes of the sand, as well as the consumption of non-renewable resources of Sand Matrix®, mainly due to the transport of waste incinerators to Officina dell'Ambiente; consumption of renewable resources as raw material is not particularly significant as it is related to the biomass used for the production of electricity in the energy mix of European countries. Instead, the consumption of renewable energy resources indicates that the extraction of sand used traditional resources (fossil fuels). It should be emphasized that for the production of Sand Matrix is used only electricity from renewable sources. The water consumption is higher than in the production of the Sand Matrix® because it refers the water used to wet the heaps.
With regards to the comparison between the scenarios of Sand Matrix® with and without avoided impacts of bottom ash, the greatest benefit is evident in the indicator of ecotoxicity in water and the indicator of eutrophication as a result of avoided emissions into water of toxic substance, phosphate and COD released by bottom ash.
With regards to the comparison between the scenarios of Sand Matrix® with and without avoided impacts of bottom ash disposal in landfill (calculated modifying process "Municipal solid waste (waste treatment) {CH} | treatment of municipal solid waste, sanitary landfill | Alloc Def, U" of Ecoinvent database) and the primary production of iron and aluminium (calculated with processes "Sinter, iron {GLO} | production | Alloc Def, U" and "Aluminium hydroxide {PA} | aluminum hydro-xide production | Alloc Def, U" of Ecoinvent database), the greatest benefits are evident in the indicators of non renewable resources, with and without energy content, due to the avoided supply of raw materials and fossil fuels (the latter contributes to the reduction of global warming potential); water consumption remains almost constant because it is related to the production of Sand Matrix®; also in the indicator of formation of photochemical smog, due to the avoided emission of carbon monoxide derived from primary production of iron; also in the indicator of acidification, due to the avoided emission of sulphur dioxide derived from the primary production of iron; and also in the indicator of eutrophication, toxicity and ecotoxicity, due to the avoided emissions derived from landfill.

Quality of Matrix® products

Officina dell'Ambiente S.p.A. applies a production cycle that includes a series of self-limitations with the aim to further increase the level of assurance of the already high technical standards of the Matrix ®. In particular, bottom ashes produced by incinerators that treat special industrial waste are never delivered to Officina dell'Ambiente, even if that bottom ash could be theoretically compatible for its chemical and physical properties; other types of waste are never delivered and treated, even if Officina dell'Ambiente is authorized to receive different EWC code waste, therefore mixing of wastes does not occur; waste from storage centres is never delivered to Officina dell'Ambiente but only ash produced by individual furnaces is accepted, so as to maintain a clear traceability and specificity of the incoming material. Environmental controls on Matrix ® Family are performed to ensure products with consistent quality and environmental charac-

teristics compatible with the limits of the law and regulations. All Matrix® products are subject to strict controls: analysis includes the major inorganic constituents and heavy metals and are carried out on samples that represent the average production of the plant. Main organic pollutants are regularly measured on a monthly basis in the Matrix ® Standard and their values are always equal to zero or extremely low. Officina dell'Ambiente has set up a chemical laboratory equipped with modern instrumentation and directed by a chemist regularly enrolled with the professional Order. The instrumental equipment is able to realize inorganic analysis with particular reference to complex mineralogical matrices such as slag from incineration (ball mills, digester oven, muffle for mergers alkaline, inductively coupled plasma spectrometer for the determination of metals). In addition physical and mechanical tests are performed, as required to maintain the EC labels, and the same laboratory is suitable for carrying out independently mixtures of concrete and mortar together with a number of measurements according to the UNI EN rules. Alternatively, highly qualified external laboratories are employed.

Product certification

According to Directive 89/106/EC, building materials may be sold only if they possess EC marking in accordance to the corresponding technical standard. For almost all of the applications of Matrix® products, EC marking is required.
Obtaining this marking requires the existence of the Quality Control System, known as FPC (Factory Production Control) that once implemented is subject to certification by an independent body (ICMQ, certificate number 1305-CPD-0661). Officina dell'Ambiente S.p.A. has been certified at the beginning of 2008 and the FPC system covers four products for a total of eight EC marking in accordance with the technical standard.

All products of the Matrix® Family play an important role in the LEED certification scheme as they contribute to the achievement of credits related to the section "Materials and resources" either for category 4 (recycled content) and category 5 (regional materials) . To facilitate the acquisition of credits by customers working in eco-sustainable building, the recycled content in Matrix® products, which is equal to 100% post-consumer waste, has been established using the requirements of the standard ISO 14021. The result is a self-declared environmental statement (in accordance with ISO 14021) whose accuracy has been subjected to independent validation of ICMQ certification.

Improvement strategy

Based on the results of the LCA study and maintaining what has already been reported in the EMAS Environmental Declaration, improvement goals set by Officina dell'Ambiente for Matrix® products include the extension of the CE marking to one more Matrix® product at least and the reduction of environmental impacts of Matrix® products through the review of the logistics of transporting of waste input.

Differences versus previous versions of the EPD

Compared to the previous version of this EPD, changes were made with the objective to achieve better results of the calculation of the environmental performance of the product.
Besides having gained more accurate data on the production, improving the allocation of consumption, the database used was updated, from Ecoinvent in version 2.2 to version 3.01. Finally characterization factors for global warming were updated (the GWP 2007 was used in the previous version of EPD, while the GWP 2013in this one).
The environmental performance of Matrix products has improved for almost all environmental indicators considered: global warming, the formation of photochemical smog, acidification, eutrophication and human toxicity decreased be-

tween 3 and 12% compared to the previous year, while for the ozone deplation layer, ecotoxicity in fresh and marine waters are decreased between 35% and 58%. The total consumption of primary resources of energy, consumption of secondary material and hazardous and non-hazardous waste are smaller than the previous version.

The only indicators that slightly increased are ecotoxicity in soil, the total consumption of primary non-renewable energy resources, land use and water consumption: the variation is probably linked to the improvement in the collection and analysis of data.

3 REFERENCES

- *Valutazione del ciclo di vita della famiglia di prodotti Matrix®: Matrix® Standard, Sand Matrix® e AGMatrix®®*, Ambiente Italia srl, 26 Febbraio 2015
- *Dichiarazione Ambientale EMAS*, Officina dell'Ambiente S.p.a., Reg. 1221/2009, Anno 2014
- *General Programme Instructions for the International EPD System*, version 2.01 dated 2013-09-18
- *PCR 2012:01 versione 1.2 datata 2013-03-15*; Gruppo CPC: Construction products
- *UNI EN 15804:2014 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products*
- *ISO 14040:2006 Environmental management – Life cycle assessment - Principles and Framework*
- *ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guideline*
- *Separazione e recupero dei metalli e valorizzazione delle scorie di combustione dei rifiuti urbani*, Dipartimento di Ingegneria Idraulica, Ambientale, Infrastrutture Viarie, Rilevamento del Politecnico di Milano, 2010; autori: M. Grosso, L.Rigamonti, L. Biganzoli

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Officina dell'Ambiente S.p.A. http://www.matrixoda.it
International EPD® system http://www.environdec.com

EPD from the same product category but referring to different programmes can not be compared.
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The certification body Bureau Veritas Italia is the manager of the contract with Officina dell'Ambiente.