

Environmental Product Declaration

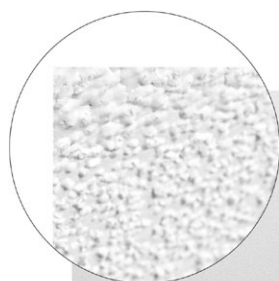


Issuance date: 01.07.2014

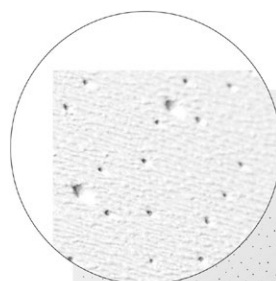
Validity date: 01.07.2019



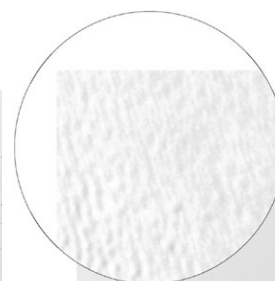
ITB is the member of The European Platform for EPD program operators.



CASOBIANCA



CASOSTAR



CASOROC

EPD program operator

Building Research Institute (ITB), 00-611 Warsaw, Filtrowa 1
www.itb.pl; www.zb.itb.pl/epd

Manufacturer

Saint-Gobain Construction Products Polska Sp. z o.o.
Rigips Office: 9 Cybernetyki St., 02-677 Warsaw
Factory: Szarbków 73, 28-400 Pińczów
Telephone number: +48 22 457 14 57
Fax number: +48 22 457 14 55
Internet address: www.rigips.pl
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Basic information

This declaration is the type III Environmental Product Declaration (EPD) based on EN 15804 and verified according to ISO 14025 by external auditor. It contains information about the impact of declared construction materials on environment and their aspects verified by the independent Advisory Board according to

ISO 14025. Basically, a comparison or evaluation of EPD data is possible only if all the compared data were created according to EN 15804 (see point 5.3 of the standard).

Life cycle: A1-A3 modules in accordance with EN 15804 (Cradle to Gate)

The year of preparing the characteristic: 2014

Declared durability: Under normal conditions gypsum plasterboard is expected to last the service life of a building (60 years).

PCR: PCR-26-PL/EN 15804

Declared unit: 1 kg of gypsum Gypsum ceiling tile (recalculation to 1m² by product's weight; 6,2 kg/m²)

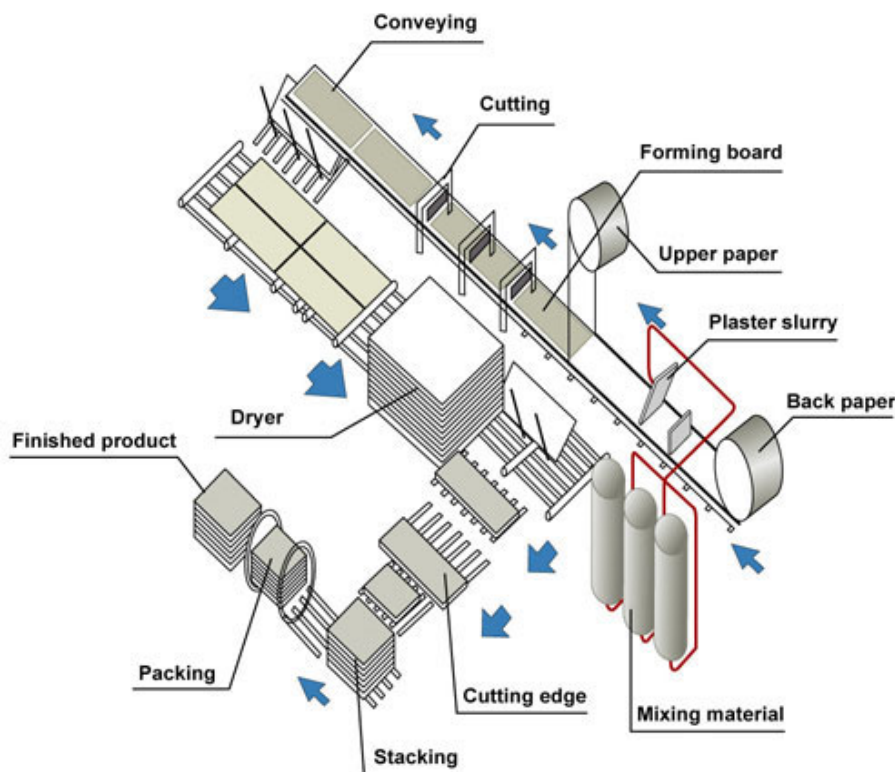
Manufacturer and Product Information

Rigips exists on the Polish market since 1994 and is engaged in manufacturing gypsum products (from own natural stone mined); plaster - plasterboards and drywall systems: walls, shaft walls, ceiling tiles and other building elements.

Gypsum ore is mined in RIGIPS open mine near (2 km) manufacturing plant in Pińczów. RIGIPS is a manufacturer of gypsum and anhydrite for further processing (dry powder products). Raw gypsum ore is reprocessed into a variety of products such as a port-

land cement additive, industrial and building plasters, and RIGIPS plasterboard, ceiling tiles and gypsum blocks. Natural gypsum is inert, non-toxic materials, harmless to human life in its natural state.

To produce RIGIPS ceiling tiles stucco from calciner is first mixed with dry additives such as starch, fiberglass and others. This dry mix is combined with water, foam, accelerators in a mixer at the head of a board forming line. The slurry is then spread on the moving belt conveyor between 2 paper sheets. The edges of the paper are scored to allow precise folding of the paper to form the edges of the board. As the wet board travels the length of a conveying line, the calcium sulfate hemihydrate combines with the water in the slurry to form solid calcium sulfate dihydrate, resulting in rigid board. The board is rough-cut to length, and it enters a multideck dryer, where it is dried by direct contact with hot combustion gases. The dried plasterboard is conveyed to the board end sawing area and it is trimmed and bundled for shipment. The dried board is conveyed to the board end sawing area. Board is cut on 600x600mm or 600x1200mm. After this process ceiling tiles are impregnated, covered by structure and colored. The end of line is packaging process.



Rigips from the beginning of its operation shows continuous concern on issues related to proper working conditions, care for the environment and the highest quality of products. Result of these efforts was the implementation of:

- quality management systems based on ISO 9001
- occupational health and safety based on PN-EN 18001
- environmental protection based on ISO 14001

The mentioned systems have been integrated in 2010 into Integrated Quality Management System after audits carried out by SGS Poland Sp. z o.o.,

which is part of the SGS - the world leader operating in the field of control, verification, testing and certification. Rigips certificates issued by SGS Po-

land are accredited by United Kingdom Accreditation Service (UKAS).

Product type

According to PN-EN 520 + A1:2010 standard:

Standard designation	Type of application	Commercial name
Gypsum Board Products	<ul style="list-style-type: none"> It should be used for making coffer suspended ceilings in interiors where the relative humidity does not exceed 90%. 	Casoprano CASOBIANCA
Gypsum Board Products	<ul style="list-style-type: none"> It should be used for making coffer suspended ceilings in interiors where the relative humidity does not exceed 90%. 	Casoprano CASOSTAR
Gypsum Board Products	<ul style="list-style-type: none"> It should be used for making coffer suspended ceilings in interiors where the relative humidity does not exceed 90%. 	Casoprano CASOROC

Application for which the product is to be used

Casoprano CASOBIANCA	
Description	<ul style="list-style-type: none"> gypsum ceiling tile for suspended ceilings
Properties	<ul style="list-style-type: none"> Ceiling panel made of the plasterboard. Fine marble sand on surface creates natural, "plaster-look-loke" pattern without perforation.
Colour	<ul style="list-style-type: none"> Colors: white (NCS 0300), grey (NCS 1005R80B), yellow (NCS 0515G90Y), vanilla (NCS 0505Y40R)
Casoprano CASOSTAR	
Description	<ul style="list-style-type: none"> gypsum ceiling tile for suspended ceilings
Properties	<ul style="list-style-type: none"> Ceiling panel made of the plasterboard with a smooth surface and random needle perforation.
Colour	<ul style="list-style-type: none"> Colors – white NCS 0300.
Casoprano CASOROC	
Description	<ul style="list-style-type: none"> gypsum ceiling tile for suspended ceilings
Properties	<ul style="list-style-type: none"> Ceiling panel made of the plasterboard with smooth, not perforated surface.
Colour	<ul style="list-style-type: none"> Colors: white (NCS 0300), grey (NCS 1005R80B), yellow (NCS 0515G90Y), vanilla (NCS 0505Y40R).

Technical parameters

CASOBIANCA, CASOSTAR, CASOROC	
Edge	<ul style="list-style-type: none"> A
Modular size	<ul style="list-style-type: none"> 600x600x8 mm
Weight	<ul style="list-style-type: none"> 6,2 kg/m²
Fire reaction Class	<ul style="list-style-type: none"> A2-s1-d0
Sound absorption aw	<ul style="list-style-type: none"> 0,1
Sound insulation	<ul style="list-style-type: none"> 41 dB
Light Reflection (Casobianca)	<ul style="list-style-type: none"> 85%
Humidity resistance RH	<ul style="list-style-type: none"> 90%
Thermal insulation	<ul style="list-style-type: none"> 0,23 W/m²K
Manufacturing site	<ul style="list-style-type: none"> Szarbków 73, Poland

Allocation

In manufacture of plasterboard, stucco from calcinator is mixed with dry additives such as starch, fiberglass and others. This dry mix is combined with water, foam, sugar, silicone, accelerators and shredded paper in a mixer at the head of a board forming line. The slurry is then spread on a moving belt conveyor between 2 paper sheets. The edges of the paper are scored to allow precise folding of the paper to form the edges of the board. As

the wet board travels the length of a conveying line, the calcium sulfate hemihydrate combines with the water in the slurry to form solid calcium sulfate dihydrate resulting in rigid board. The board is rough-cut to length, and it enters a multideck dryer, where it is dried by direct contact with hot combustion gases. The dried board is conveyed to the board end sawing area and it is trimmed and bundled for

shipment or for further processing of CASO products.

The ceiling tiles production is a single line process without co-products. All impacts from mine are allocated in gypsum stone. Impact of gypsum stone is in A1 module. 100% of input product impact is allocated to final product. Calcination process is included in Stucco production – A1 (Separated RIGIPS EPD). 100% of impact from

line production is allocated to plasterboards. Other Rigips product as Rigips gypsum blocks are inventoried as separated production line. Municipal waste and waste water of whole factory were allocated on mass basis between all co-products. Electricity and gas consumption was inventoried on every production process separately.

System limits

The life cycle analysis of the examined products covers A1-A3 modules (Cradle to Gate) in accordance with EN 15804+A1. Its include production, including: mixing of gypsum with additives (A1), forming the boards (A1), drying (A1), cutting (A3), impregnating (A3), coloring and packaging (A3) and pelleting (A3). All raw materials and energy consumption inventoried in factory all sub products (table 1) were included in calculation. Office impacts were also taken into consideration.

Data collection period

The data for manufacture of the examined products refer to the year 2013. The life cycle assessments were prepared for Poland as reference area (officially published statistical national electricity mix for 2013).

Data quality

The values determined to calculate the LCIA originate from verified LCI RIGIPS inventory data. This data was verified by ISO auditor.

Assumptions and estimates

Impacts for each product stage and factory process were inventoried and calculated separately. All raw material consumption, emission water used were specific. Emission into air from gas heat production was estimated using formal conversion factors.

Databases

The data for the A1 processes come from the following databases: Gypsum (EPD Rigips), sand (specific), LCI questionnaire (Energy, Waste, Water, Emissions), ITB (paint, packaging), Tauron (Electricity), Heat (Górzyński). Data quality analysis was a part of external audit.

Note

Specific information on application and other actions with these products are described in detail in the technical data sheet available on the producers website.

Raw materials and energy

Table 1. Raw materials

No	Name of raw material	Total used in production [kg]	Approx. in product [kg/m ²]
1	RIGIPS Gypsum Board	6 432 647	8,8
2	Paint	138 929	0,19
3	Sand	55 152	0,076
4	Paper (packaging)	13 004	0,018
5	Foils	9 512	0,013
6	Palet	72 340	0,1

Table 2. Energy consumption

No	Name of raw material	total used in production	Approx. [kWh/m ²]
1	Electricity	201027 kWh	0,28kWh

Emissions (LCI) and their impact on the environment

Table 3. Emissions into air generated during production stage A3

Air emission	Unit	Used on product [kg/m ²]
CO ₂	kg	0,3
SO ₂	kg	0,001
NO _x	kg	0,0001

Table 4. Emissions into water generated during production stage A3

Water emission	Unit	Total
Water consumption	m ³	6662
Waste water	m ³	6662
BOD	mg/l	19,0
COD	mg/l	67,5
Suspended matter	mg/l	36

Table 5. Waste generated in the phase of product manufacturing A3

Waste code	Unit	Total in production [Mg]	Destination
150101	Mg	99,5	Recycling
150102	Mg	10,47	Recycling
170201	Mg	5,3	Energy recovery
170407	Mg	3,94	Recycling
160213	Mg	0,156	Dangerous
150110	Mg	0,43	Dangerous
160304	Mg	0,4	Landfil
190805	Mg	4,0	Landfil

Environmental characteristics (LCA)

Table 6. Environmental characteristic for CASO gypsum ceiling tile for suspended ceilings (1kg)*

Environmental assessment information (MND – Module not declared, MD – Module Declared, INA – Indicator Not Assessed)																
Product stage			Construction process		Use stage							End of life				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport to construction site	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse-recovery-recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
MD	MD	MD	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Environmental impacts: 1 kg						
Indicator	Unit	A1	A2	A3	A1-A3	
Global warming potential	[kg CO ₂ eq.]	0,311	1,28E-06	0,048	0,359	
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	3,64E-08	0,000	4,05E-10	3,68E-08	
Acidification potential of soil and water	[kg SO ₂ eq.]	0,002	9,50E-09	0,000	0,002	
Eutrophication potential	[kg (PO ₄) ³⁻ eq.]	2,62E-04	1,65E-09	1,18E-05	2,74E-04	
Formation potential of tropospheric ozone	[kg Ethene eq.]	8,44E-05	6,28E-10	1,11E-05	9,56E-05	
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	0,003	6,17E-08	0,000	0,004	
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	3,856	7,03E-05	0,369	4,225	

Environmental aspects on resource use: 1 kg					
Indicator	Unit	A1	A2	A3	A1-A3
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	0,147	7,38E-05	0,04	0,188
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	0,000
Use of non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	0,000
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	4,049	1,78E-04	0,40	4,449
Use of secondary material	[kg]	0,000	0,00	0,00	0,000
Use of renewable secondary fuels	[MJ]	0,000	0,00	0,00	0,000
Use of non-renewable secondary fuels	[MJ]	0,000	0,00	0,00	0,000
Net use of fresh water	[dm ³]	0,031	0,00	0,016	0,047

Other environmental information describing waste categories: 1 kg						
Indicator	Unit	A1	A2	A3	A1-A3	
Hazardous waste disposed	[kg]	3,21E-07	0,00	1,86E-06	2,18E-06	
Non-hazardous waste disposed	[kg]	5,00E-03	0,00	2,13E-05	5,02E-03	
Radioactive waste disposed	[kg]	0,000	0,000	0,000	0,000	
Components for re-use	[kg]	0,000	0,000	0,000	0,000	
Materials for recycling	[kg]	1,17E-05	0,000	2,24E-03	2,25E-03	
Materials for energy recovery	[kg]	0,000	0,000	3,62E-04	3,62E-04	
Exported energy	[MJ]	0,000	0,000	0,000	0,000	

* To re-calculate impact of 1kg of CASO gypsum ceiling to 1m², please multiply the impact values from table 6 by the board weight of 1m² (see table 7). All weights of the different board types are allowed in the product information labels or on the RIGIPS web-site.

Environmental characteristics (LCA)

Table 7. Environmental characteristic for CASO gypsum ceiling tile for suspended ceilings (1m²)

Environmental assessment information (MND – Module not declared, MD – Module Declared, INA – Indicator Not Assessed)																	
Product stage			Construction process		Use stage								End of life				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport to construction site	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse-recovery-recycling potential	
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
MD	MD	MD	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	

Environmental impacts: 1 m ²						
Indicator	Unit	A1	A2	A3	A1-A3	
Global warming potential	[kg CO ₂ eq.]	1,865	7,68E-06	0,288	2,153	
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	2,18E-07	0,000	2,43E-09	0,000	
Acidification potential of soil and water	[kg SO ₂ eq.]	0,010	5,70E-08	0,002	0,012	
Eutrophication potential	[kg (PO ₄) ³⁻ eq.]	1,57E-03	9,90E-09	7,06E-05	0,002	
Formation potential of tropospheric ozone	[kg Ethene eq.]	5,07E-04	3,77E-09	6,68E-05	0,001	
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	0,021	3,70E-07	0,002	0,023	
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	23,138	4,22E-04	2,214	25,352	

Environmental aspects on resource use: 1 m ²						
Indicator	Unit	A1	A2	A3	A1-A3	
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA	
Use of renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA	
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	0,880	4,43E-04	0,247	1,128	
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA	
Use of non-renewable primary energy resources used as raw materials	[MJ]	INA	INA	INA	INA	
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	24,295	1,07E-03	2,400	26,696	
Use of secondary material	[kg]	0,000	0,00E	0,000	0,000	
Use of renewable secondary fuels	[MJ]	0,000	0,00	0,000	0,000	
Use of non-renewable secondary fuels	[MJ]	0,000	0,00	0,000	0,000	
Net use of fresh water	[dm ³]	0,184	0,00	0,096	0,280	

Other environmental information describing waste categories: 1 m ²						
Indicator	Unit	A1	A2	A3	A1-A3	
Hazardous waste disposed	[kg]	1,93E-06	0,00E	1,12E-05	1,31E-05	
Non-hazardous waste disposed	[kg]	3,00E-02	0,00E	1,28E-04	3,01E-02	
Radioactive waste disposed	[kg]	0,000	0,000	0,000	0,000	
Components for re-use	[kg]	0,000	0,000	0,000	0,000	
Materials for recycling	[kg]	7,02E-05	0,000	1,34E-02	1,35E-02	
Materials for energy recovery	[kg]	0,000	0,000	2,17E-03	2,17E-03	
Exported energy	[MJ]	0,000	0,000	0,000	0,000	

The standards used widely in Europe to evaluate VOC levels in plasterboard products are EN 13419 & ISO 16000. RIGIPS plasterboard is estimated not to contain a VOC content or Formaldehyde content which exceeds the requirements of European voluntary labeling schemes connected with indoor air quality

Verification

The process of verification of an EPD is in accordance with EN ISO 14025, clause 8 and ISO 21930, clause 9. After verification, this EPD is valid for a 5-year-period. EPD does not have to be recalculated after 5 years, if the underlying data have not changed significantly.

The basis for LCA analysis was EN 15804		
Independent verification corresponding to ISO 14025 & 8.3.1.	<input checked="" type="checkbox"/> external	<input type="checkbox"/> internal
Verification of EPD: dr eng. Aleksander Panek (KT 307 President)/ prof. Dariusz Heim		
LCI audit and input data verification: msc eng. Dominik Bekierski		
LCA: dr eng. Michał Piasecki		
Verification of procedures and declaration: dr eng. Halina Prejzner		

Normative references

- ISO 14025:2006, Environmental management – Type III environmental declarations – Principles and procedure.
- ISO 21930:2007, Sustainability in building and construction – Environmental declaration of building products.
- ISO 14044:2006, Environmental management – Life cycle assessment – Requirements and guidelines.
- ISO 15686-1:2000, Buildings and constructed assets – Service life planning – Part 1: General principles
- ISO 15686-8:2008, Buildings and constructed assets – Service life planning – Part 8: Reference service life
- EN 15804+A1:2013, Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.
- EN15942:2011, Sustainability of construction – Environmental product declarations. Communication format business-to-business