ENVIRONMENTAL DECLARATION 2020

ENVIRONMENTAL DECLARATION drawn up pursuant to Regulation (EC) No 1221/2009 (EMAS) as well as amended and supplemented by Reg. EU 2017/1505 and Reg. EU No 2018/2026

EMAS
GESTIONE AMBIENTALE VERIFICATA
Reg.n.IT - 000705

SISTEMA DI GESTIONE AMBIENTALE CERTIFICATO
CERTIQUALITY
UNI EN ISO 14001:2015

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Management and Coordination CE.R.I.T. Central Road Of Investment Trusts S.p.A.

CERTIQUALITY S.r.l.
VIA GAETANO GIARDINO 4 – 20123 MILANO

CONVALIDA CONFORMITA'
DELLA DICHIARAZIONE AMBIENTALE
AL REGOLAMENTO CE N. 1221/09
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N E-216/5

IL PRESIDENTE - CESARE PUCCIONI

MILANO 29/06/2021

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COMPANY DETAILS

Company Name: **Cerdomus S.r.l.**

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Delegate for Quality, Safety and Environment: **Mr. Massimiliano Gozzi**

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Italian Tax Identification and VAT Number: **02620780391**

Registration number in the Italian Business Register: **RA- 217992**

On 1 January 2019 Cerdomus S.r.l. was formed from Cerindustries S.p.A, which was born out of the transfer of the Cerdomus Ceramiche S.p.A business unit on 1 October 2009. Cerdomus S.r.l. connects a number of trademarks, including the most important ones, CERDOMUS and PORCELLANA DI ROCCA, which are manufactured in the currently ISO 9001 - ISO 14001 certified and EMAS registered production plant located in Castel Bolognese (RA), Italy.
Based on past experience, the management aims to maintain and increase environmental performance, as it regards the certifications it has obtained not as an objective, but as a springboard to further develop the current environmental management system it has adopted.
The management of Cerdomus S.r.l. has therefore decided to adopt, keep active and improve the Quality and Environmental Management System, complying with international standards such as:

- UNI EN ISO 9001:2015
- UNI EN ISO 14001:2015
- Regulation (EC) No. 1221/2009 (EMAS) as amended and supplemented by EU Reg. No 2017/1505 and EU Reg. No. 2018/2026.

The scope of these certifications is the production and marketing of tiles and trims (special pieces) in fine porcelain stoneware through the process of milling, pressing, drying, glazing, firing, selection, cutting, lapping, packaging, as well as customer service.
The aim of this document is to provide detailed information on production activities and, therefore, on the possible effects that these may have on the environment, and to describe what has been done so far to improve environmental performance, and to set out the objectives and programmes planned for the future.

COMPANY POLICY FOR QUALITY AND ENVIRONMENTAL PROTECTION

Cerdomus Srl considers both the Quality of its processes and products and the protection of the Environment to be of fundamental importance. In order to comply with such values, its policy is to:

- *Pursue continuous improvement of customer satisfaction through the quality, reliability and innovation of its products;*

- *Safeguard the environmental integrity by pursuing continuous improvement of its environmental performance and consequently monitor and optimise consumption and emissions;*

- *Ensure strict compliance by the entire organization with applicable regulation on product requirements and environmental protection, by carrying out continuous checks;*

- *Build and constantly improve the motivation, competence and awareness of staff in terms of its fundamental contribution to achieve the company's business and environmental objectives;*

- *Maintain constant information and constructive dialogue with customers, suppliers, the territory and the people who inhabit it, in order to better understand their needs and expectations and to disclose the company's commitment in terms of quality and environmental protection.*

- *Increase the quality level of business processes, also by improving the infrastructures used for their functioning.*

Cerdomus is committed to continuous and systematic action in order to achieve these objectives. This includes the implementation, maintenance and continuous improvement of a Quality and Environmental Management System.

Cerdomus invites all staff to work alongside the company in maintaining and improving the results already achieved. Cerdomus considers ensuring the Quality of its products, maintaining customers' trust - and, more generally, the trust of all interested parties - and guaranteeing the protection of the Environment to be a commitment and a moral responsibility.

Everyone, within their respective responsibilities and competences, must regard quality of the product and environmental protection as a matter of primary importance and as an integral part of their work. The staff is therefore invited to provide ideas for improvement relating to its area of activities.

Castel Bolognese, 01/07/2019

1. *COMPANY DESCRIPTION AND ACTIVITIES*

1.1 Company presentation

Cerdomus S.r.l. was formed on 1 January 2019 out of the transfer of the company business undertaking of Cerindustries S.p.A.. It then developed further and established itself as a company with a focus on advanced technology, diversification, and product quality.

Its over 40 years of experience, first as Cerdomus Ceramiche S.p.A and then as Cerindustries S.p.a., have enabled the Company to become renowned around the world for its top-quality products and for the constant commitment it has shown by continually investing in plants that meet the highest technological standards, production capacity and respect for the environment.

One of the top companies in the ceramics industry, Cerdomus S.r.l. is based at its modern, well-equipped plant at Castel Bolognese (RA), Italy, not far from the ceramics cluster around Modena, where it is able to maintain its originality in research and production.

Intense research work conducted by a specialized team ensures a range of products with constantly evolving aesthetic characteristics, which undergo regular quality control and are constantly being improved so as to offer a brand of superb quality.

1.2 The history of the company

- Cerdomus Ceramiche S.p.A was founded in 1969, with the establishment of the company on an area for agricultural use, located in Via Emilia Ponente, 1000 in Castel Bolognese (RA), Italy.

- In 1979, it expanded its equipment to accommodate the new rapid single-fired white-paste (white body) mixture technology.

- In 1996, the construction of the modern plant began. This was dedicated entirely to porcelain stoneware in order to create innovative products of superior technical and aesthetic quality.

- 1998 saw the expansion of the porcelain stoneware production facilities and building of the new headquarters. A two-storey metal-and-glass structure, with relief decoration in hand-made brick based on original designs, accommodates the company's administration, sales and marketing departments and showroom.

- In 2002, the company expanded its warehousing space for finished products.

- In 2006, construction began of an extension of the main building to be used for processing finished product.

- In 2007, following this expansion, the company set up its polishing work centre so as to offer the customer the vastest possible selection area for the materials it produced. The same year saw the construction of the new shipping warehouse - located in via Calamello, 1035 – Castel Bolognese (RA) – with a total area of about 85,000m^2, of which about 4,200m^2 is covered.
- In 2008, there began a radical restructuring of the production plant's atomization, glazing, firing and selection units, which optimized and simplified production layout. The company also planned and built internal and external paths, thus clearly demarcating the areas to be used by operating machinery and pedestrian paths.

- On 1 October 2009, following the acquisition by Porcellana di Rocca S.p.A. (with its main plant at Rocca S. Casciano), Cerindustries S.p.A was born from the Cerdomus Ceramiche S.p.A business unit.

- At the end of 2009, Cerindustries S.p.A. ceased production at the Rocca San Casciano site to concentrate production at the factory in Via Emilia Ponente, 1000 in Castel Bolognese (RA).

- In 2011, Cerindustries S.p.A. expanded the polishing work centre's areas at the Castel Bolognese (RA) production plant by introducing production lines and machines for the multi-format cutting of fired materials.

- In 2014, in the Castel Bolognese (RA) production plant, following the disposal of two old firing kilns no longer in use since 2008, a new firing line was installed and a kiln was transferred to that location from the former Rocca San Casciano production site.

- In 2015, the Castel Bolognese (RA) production plant saw the old fired-materials handling plant replaced by a new one consisting of five latest-generation automatic laser-guided vehicles providing increased load capacity.

- In 2016, a new automated large-format line was installed in the selection area.

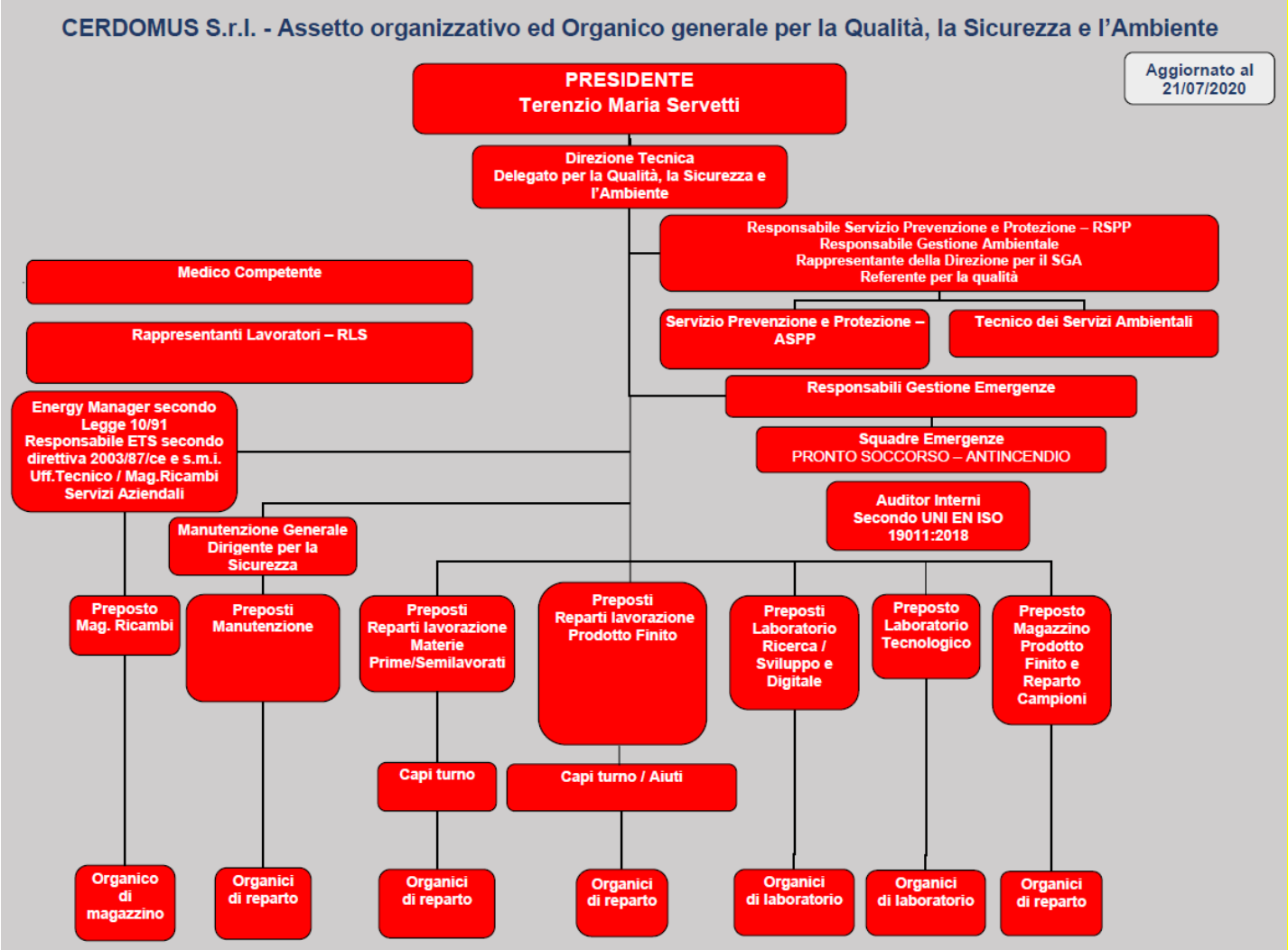
- In 2017, Cerindustries S.p.A. senior management changed. Between the end of that year and the beginning of 2018, the MONO1 operation department (where small size tiles of up to 30x30 cm were produced) and the Special Pieces and l'Astorre Art Ceramics production plant were discontinued since they were by then obsolete.

- In 2018, a new full polishing line was installed alongside the two existing grinding and cutting lines, served by a new waste water treatment plant.

- In 2019, Cerindustries S.p.a. changed its name to Cerdomus S.r.l.

- In 2019, Cerdomus S.r.l. integrated the Environmental Management System also with the ISO 9001:2015, thus implementing the Quality and Environmental Management System.

1.3 Company governance structure



The diagram above shows Cerdomus S.r.l.'s current organisational structure for Quality, safety and environment. The current Director has formally entrusted the plant's Technical Director for safety and the environment with managerial, spending and control powers. The Management Representative for EMS is Engineer Marco Sangiorgi.

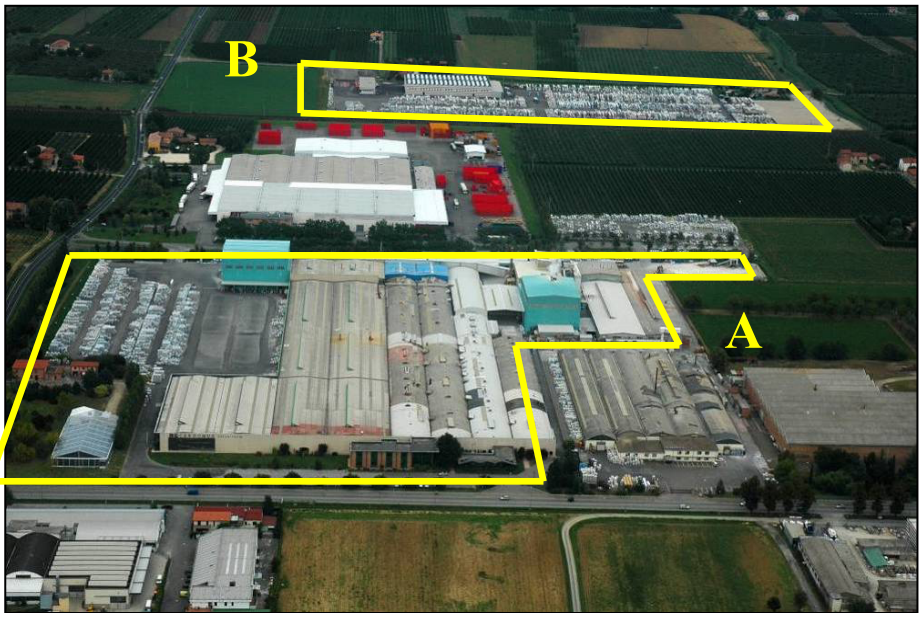
1.4 Geographical placement and urban planning

Cerdomus S.r.l.'s principal assets:

- One production plant in Castel Bolognese (identified as area A in Fig.1.1 on the following page): this is located in Via Emilia Ponente, 1000 and covers a total surface area of approximately 104,000m^2, of which approximately 56,000m^2 are covered. The covered surface includes production areas, warehouses, offices, showroom and service rooms; while the uncovered surface is divided into finished product warehouse, purification areas, parking lots and garden.

- one shipping warehouse (identified as area B in Fig. 1.1. on the following page) is located in Via Calamello, 1035 and covers a total area of approximately 85,000m^2, of which about 4,200m^2 are covered. The covered area includes an office building and a warehouse for the storage of samples.

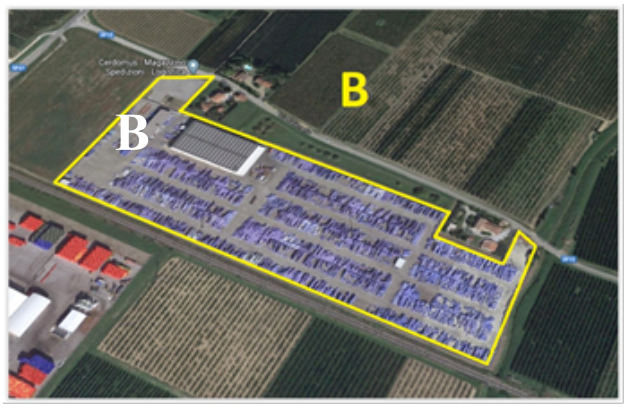
Fig 1.1- Overview of the site –



As it is possible to observe from Fig.1.1, the main site of Cerdomus S.r.l. includes two non-adjacent areas (identified by letters A and B):

- Area A: main production plant comprising raw material storage area, laboratories, water purifier, finished product warehouse, office buildings, showroom, employee car parks;
- Area B: shipping warehouse including the finished product storage area, container loading and shipment area, office buildings and samples warehouse.

Fig 1.2 — Satellite photos of the two areas belonging to the site –



As can be observed from Fig.1.2, the production plant (area A), as indicated by the General Regulatory Plan (GRP) of the municipality of Castel Bolognese, is located in "an already urbanized industrial and workshop area" and borders:

- to the southwest, Via Emilia Ponente S. S. No. 9;
- to the northwest, Via Borello S. P. No. 47;
- to the northeast, Via Della Resistenza and an agricultural area;
- to the southeast, the "La Fabbrica" company and an agricultural area;

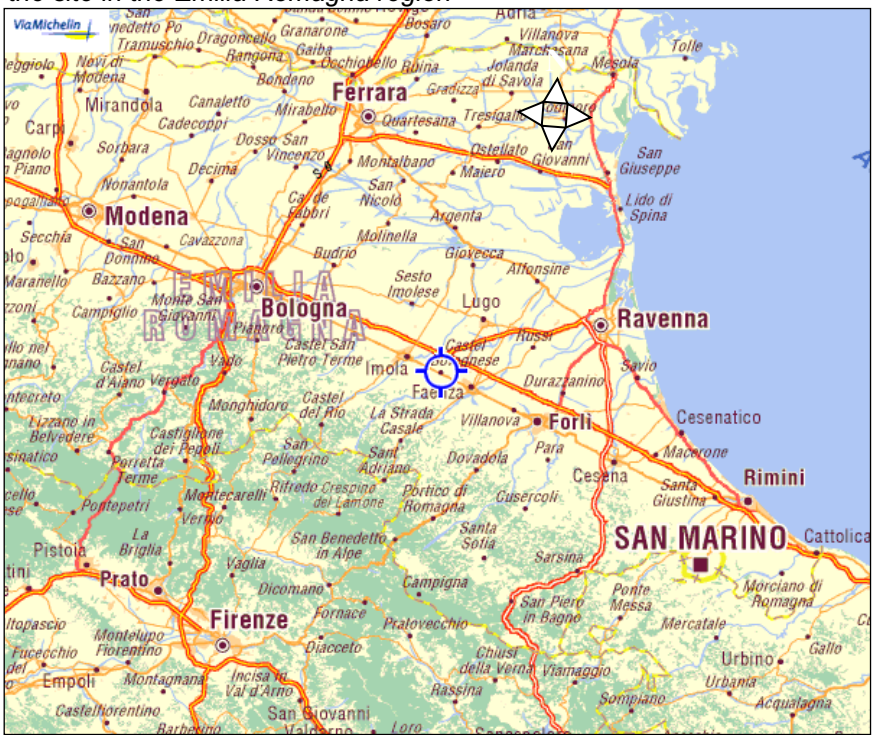
As one can observe from Fig.1.2 of the previous page, the shipping warehouse (area B), as indicated by the GRP of the municipality of Castel Bolognese, is classified as “area for outdoor storage of finished products” and borders:

- to the southwest, the Bologna-Ancona railway line,
- to the northwest, Via Borello S. P. No. 47,
- to the northeast, Via Calamello and a house,

- to the south east, an agricultural area.

As indicated in the following Fig.1.3, the area of the settlement is located in the Po Valley, on the slopes of the Tuscan-Romagna Apennines, along the S. S. No. 9-Via Emilia, and is about 38 km from Bologna, about 30 km from Ravenna and 100 km from Florence.
The production site is located 44 metres above sea level (GPS coordinates: 44 ° 19 '42.47" N and 11°46 '55.00" E); it is located about 2 km west of the centre of Castel Bolognese (RA) and about 7 km east of Imola (BO) and about 10 km west of Faenza (RA).

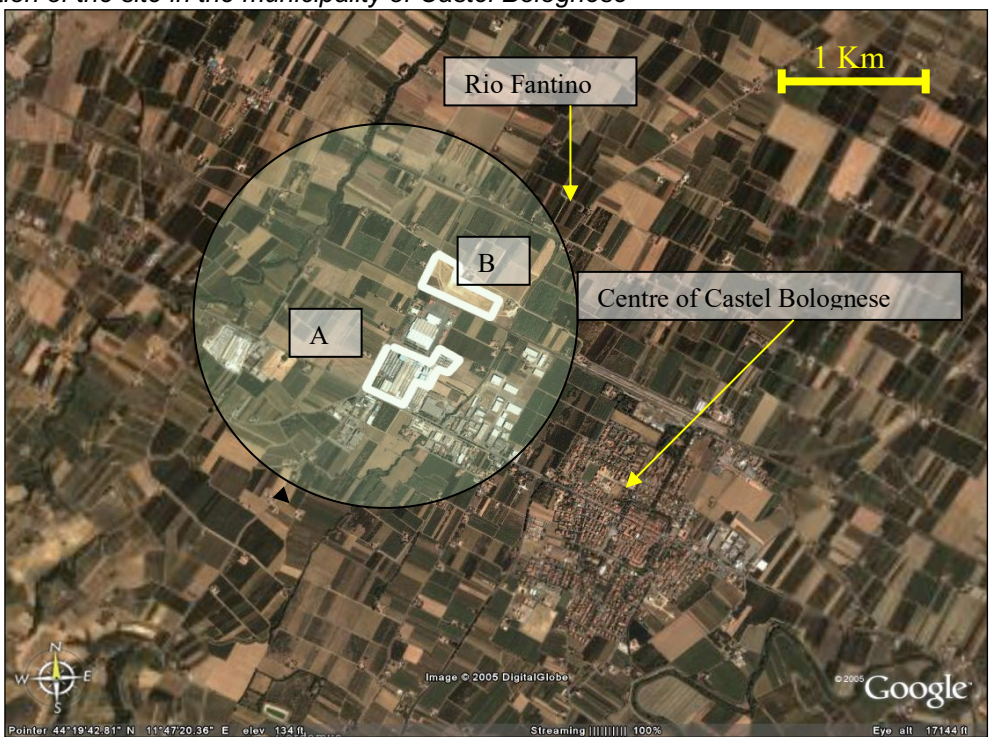
Fig 1.3 - *location of the site in the Emilia Romagna region –*



In Figure 1.4 of the following page, the location of the plant within the municipality of Castel Bolognese is shown, with particular reference to the immediately surrounding area (approximate radius of 1 km).
Within this range, the following are considered to be potentially exposed to environmental impact:

- the Rio Fantino stream;
- agricultural crops;
- several homes.

Fig 1.4 - Location of the site in the municipality of Castel Bolognese -



1.5 Geological and stratigraphic classification of the site

On a local scale, the area of the plant Cerdomus S.r.l. in Castel Bolognese is affected exclusively by Pleistocene sedimentary formations characterized, lithologically and stratigraphically, by 3rd-order terrains of the terraces of the Senio torrent, which are of a clayey-loamy-sandy nature on the surface. The soils of the “terrace” are lenticular and lie over the Plio-Pleistocene grey-blue clays formation that forms the substrate.
The surrounding area is partly urbanized as an industrial-workshop area and partly used as agricultural land, cultivated with orchard and arable land. The granulometry of the lithological particles on the surface is fairly homogeneous, although locally sandy and clayey areas with calcareous concretions called “Cat's brains ” are found. It is extremely difficult to outline these granulometric differentiations as the passage from one to the other is not well-defined but gradual.
There are no morphological and hydro morphological differentiation components at the site under examination or in adjacent ones which may have an impact. At present, surface erosion is practically non-existent. The combination of these phenomena gives rise to a slightly inclined plane towards the northeast with very weak declivity. In the area, there are no prevailing degradative processes related to lithology, structure, acclivity, precipitation intensity and human activities.

1.6 Local hydrology and hydrogeology

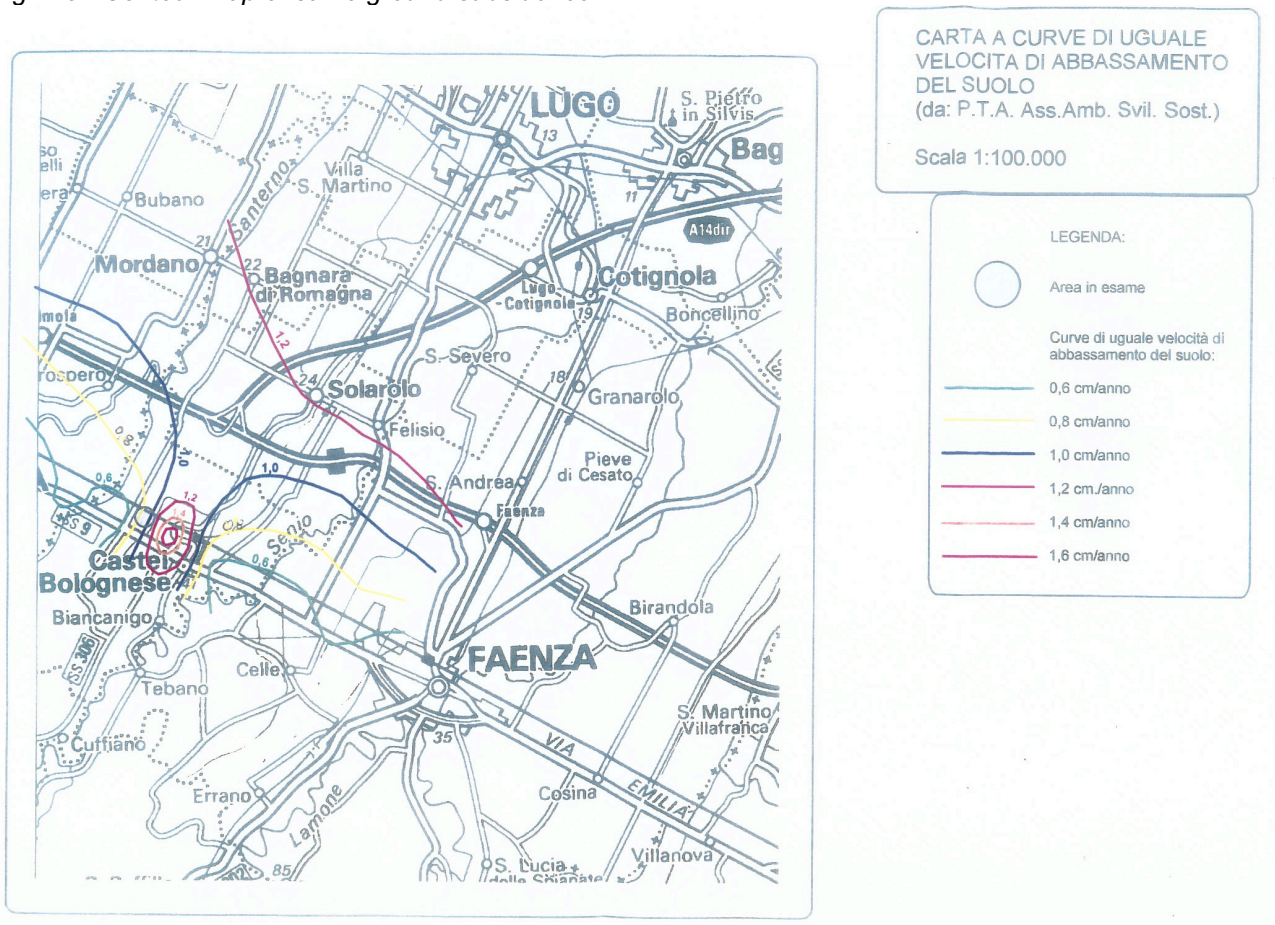
From the local point of view, the area under consideration is gently rolling terrain and the surface water supply is considerably limited and is reduced practically to the only rainwater falling on the area. In the most downstream sector of the plain, groundwater aquifers were set during the recent sandy-loamy floods and are fed mainly by the under-flowing waters of the main streams and by effective infiltration in the relatively more permeable areas.
At present, regulation of surface water is ensured by the system of drainage ditches in the cultivated areas, which drain the water to the main hydrological element represented by the Rio Fantino stream, which flows in the eastern zone and, within the area under investigation, presents hydraulic dimensions which do not represent a flood risk.

1.7 Subsidence in Cerdomus S.r.l. production plant area.

Examining the results of the various analyses carried out over time on local subsidence phenomena in the province of Ravenna obtained by measurement of levelling that has occurred in past years and applying them to the area of Castel Bolognese under consideration, we can deduce the following (See Fig.: 1.5):

- The area surrounding the plant Cerdomus S.r.l. has very low subsidence rates of between 0.8-1.00 cm/year
- In Castel Bolognese's city centre, slightly higher subsidence rates of 1.40–1.60 cm/year were measured but which are not critical compared to other areas of the province, such as those south of Lugo (subsidence rate of 2.80-3.00 cm/year).

Fig. 1.5 - Contour map of same ground subsidence -



2. *PRODUCT LIFE CYCLE*

Porcelain stoneware **ceramic tiles** (also referred to as "**tiles"**) are finishing building materials used for covering floors and walls. Tiles are slabs of various formats and sizes, made from clay, sand, feldspars and other natural substances fired at high temperatures. This material mix, or paste, determines the particular ceramic type of the tiles. The paste mixture is then given shape through special forming processes and is fired in special kilns at very high temperatures (up to 1220 °C). Ceramic tiles are products whose environmental impact is lower than other materials because of the intensity of technological, production plant engineering and manufacturing innovation promoted by the Italian ceramics industry. To establish the **environmental impact of ceramic tiles**, their whole **life cycle** and hence all the phases including extraction, production of raw materials, destruction and final destination of waste have to be analyzed.

The **first of the analyzed phases** refers to the **extraction** and **processing of the raw materials** used in the production of the tiles. The environmental impact of **quarries** can be seen in, on the one hand, the **changes in the landscape,** and on the other in **resource consumption**, **dust emissions** and **waste production**.

The production phase is the main segment of the life cycle. The most significant environmental aspects associated with the manufacture of tiles are: gaseous emissions, water consumption and wastewater discharges, waste, energy consumption and noise; all these aspects are described below in this Environmental Declaration. Cerdomus, subject to its production needs and product quality, looks for suppliers which are closest to its production plant and gives priority to companies with environmental certifications in order to reduce the environmental impact of the transportation of cargo.

Water consumption by the Italian ceramics industry is lower than required since waste water is reused in the production process to limit environmental pollution.

This industry sector in Italy is also able to recycle most of the waste produced. Ceramic processing typically has significant energy requirements. Thanks to technological and plant innovation, the entire sector now consumes less than half of energy compared to the 1970s.

The **next** phase in the tiles' life cycle **is final laying**. Materials used for the laying and filling of joints have little impact toxicologically speaking.

In terms of safety, tiles limit the health and environmental risks associated with laying.

Tiling demolition rounds off the life cycle of this ceramic product. Demolition waste, which is by nature inert, can be disposed of in the environment without any particular risk. In a service life ranking, tiles hold a pre-eminent position compared to other finishing materials. Properly installed tiling can, in fact, last a long time, and thereby generates a smaller amount of debris.

Cerdomus, as a ceramic company with corporate membership of Confindustria Ceramica (Italian Ceramics Industry Association), holds an Italian EPD (Environmental Product Declaration) MEDIA SETTORIALE certification for its products.

This EPD certification is an environmental product declaration that is certified and may be voluntarily disclosed, in accordance with codified criteria, which is gaining global interest as a tool for qualifying and selecting products with environmental value.

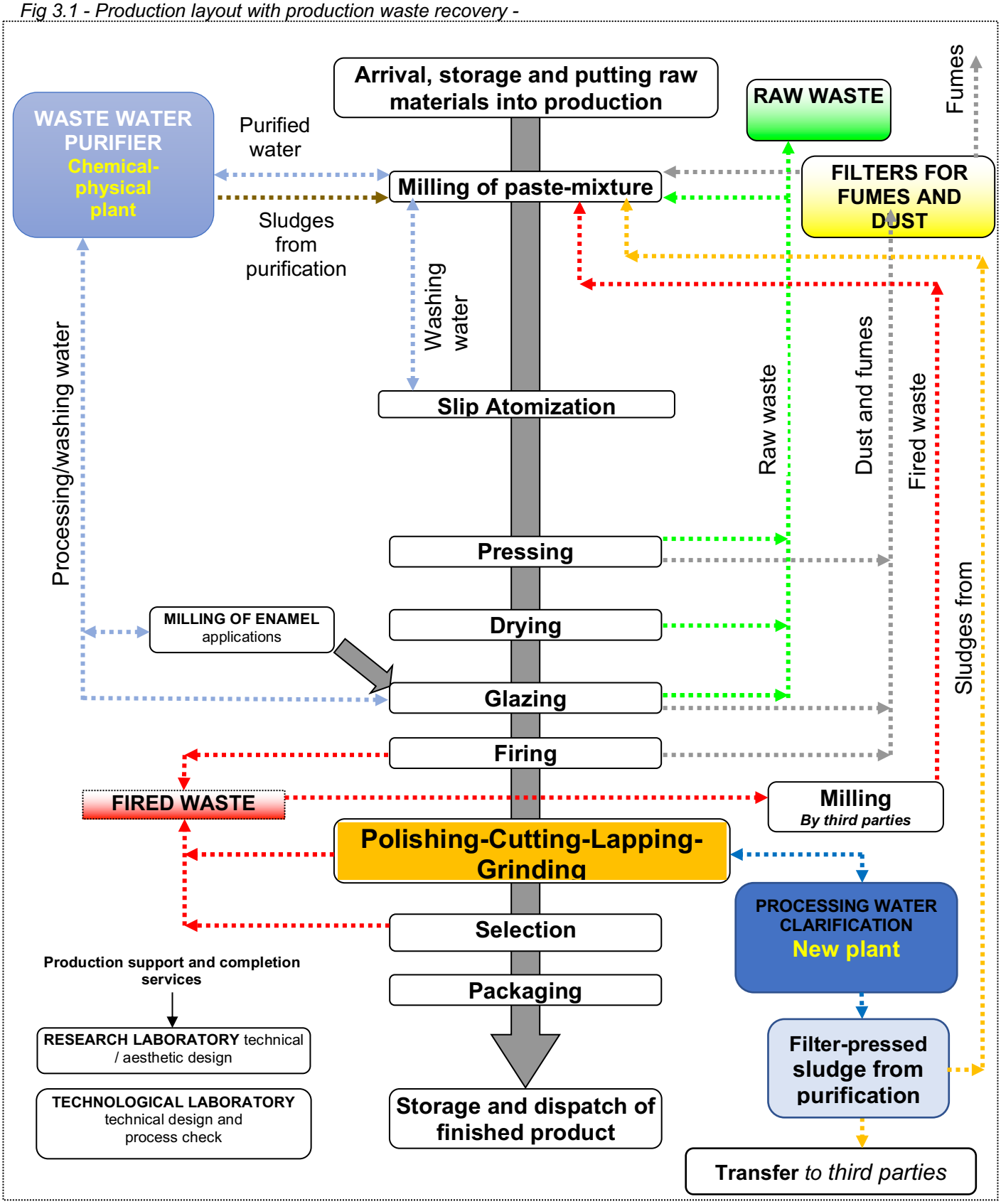
The study analyzes the environmental data of more than 90 Italian companies producing ceramic tiles over their entire life cycle and thus, for the large number of companies involved, is a world first for the construction industry.

The *EPD media settoriale* study presents lower environmental impact data than other similar studies such as the Global Warming Potential (GWP) which represents the effect on global warming expressed in CO2 equivalents. Results that highlight the high levels of environmental performance resulting from the continuous investments that companies have put in place to improve their environmental performance.

In a global market in which sustainability has become a key competitive tool, the EPD media settoriale study will further strengthen the leadership of the Italian ceramic tile industry within all the most prestigious sustainable construction rating systems such as LEED and within green procurement in the public sector (GPP: green public procurement).

3. *DESCRIPTION OF PRODUCTION CYCLE*

Fig 3.1 - Production layout with production waste recovery -



The manufacturing cycle (as shown in Figure 3.1) is divided into a series of operations and activities carried out consecutively; the individual phases of the production cycle, called processes, are generally associated with a specific work centre, appropriately identified within the plant.

Each process supplies the subsequent one a semi-finished product called *output product*; it is instead referred to as an *input product* when it is received by another process.
Production waste (washing water, 'green' waste, fired waste, and sludges from cutting) is reintroduced into the production cycle as shown in Fig. 3.1.
Each raw material, semi-finished product and the finished product must have quality specifications which are controlled by an internal plan certified by a third party issuing the product certification.

3.1 Supply and storage of raw materials for the paste mixture and for the preparation of applications

The raw materials used for the preparation of the paste mixture (referred to below as 'support') are stored separately in special covered boxes and are then loaded into the loading hoppers of the milling plant by means of a loader.
The raw materials necessary for the preparation of applications (enamels, engobes and dyes used for the decoration and colouring of the support) are purchased in Big Bag industrial sacks or other suitable containers and then stored in the dedicated area.

3.2 Milling of raw materials for paste mixture

The process begins with the dosing of clays, kaolins, feldspars, recovery material, water and with the subsequent wet milling within two continuous mills: 1 SACMI MTC054 with capacity of 54,000 litres and 1 MTC041 with capacity of 41,000 litres. In the atomization work centre, there are also five discontinuous SACMI MTD340 mills with a capacity of 34,000 litres each, which, however, to date, are no longer used for the milling phase.
As it exits milling, a liquid solution called slip is produced, which is strained and then stored inside underground tanks equipped with agitators.
The processing/washing water is collected and purified; the water and sludge resulting from this process are reintroduced into the production cycle within the milling mills in the quantities as per the paste mixture formulation.

3.3 Atomization

Atomization phase consists in drying the slip: this process takes place within two SACMI ATM40 atomizers, each with a production capacity of about 12,000 kg/hour. The slip from the underground storage tanks is sent to the ATM machine via high-pressure pumps (30bar) and is nebulized inside it using a nozzle ring. Through a jet of hot air (about 500°C) produced by a methane gas burner, the nebulized slip is dried and transformed into atomized form (“powder” composed of granules with dimensional characteristics and pre-established residual humidity between 5.5% and 6.5%) that is collected at the ATM exit and sent to special storage silos by using conveyor belts.
Both ATMs are equipped with a vein colouring system that allows adding coloured pigments to the slip, thus obtaining an atomized product coloured throughout its mass.

3.4 Pressing

The atomized product is drawn down from the storage silos by means of conveyors and is sent to hydraulic presses that use special isostatic moulds to compact the support and define the shape and type of structure of the product. The output of the presses is “green” tiles with a residual humidity of between 5% and 6%, which are then sent on to the next stage of the drying process. The pressing plant consists of seven SACMI hydraulic presses.
Production waste and the dust collected from the appropriate filtration plants serving the pressing work centres are either reintroduced to the production cycle, if possible, or are disposed of in the proper manner.

3.5 Raw tile drying

The drying phase takes place inside vertical dryers equipped with methane gas burners at an average temperature of about 180°C and consists in the elimination of much of the remaining moisture from the "green" tiles.
Upon exiting the dryers, the tiles are now what is called “raw” and have mechanical characteristics such that they can be wet-decorated (with silk-screen pastes, enamels, engobes and so on) in the subsequent glazing process.
The drying plant consists of seven SACMI vertical dryers.
Here also, production waste and the dust collected from the appropriate filtration plants serving the various operating units are reintroduced into the production cycle, if possible, or properly disposed of.

3.6 Preparation of enamels

The enamel milling work centre produces all the semi-finished products used in the glazing work centre, milling the raw materials for enamelling inside discontinuous mills.
The processing/washing water is collected and sent to the purifier to be then reused within the production cycle.
Recent developments in the technology of digital decoration of tiles have reduced the need to make enamels and semi-finished products with traditional systems, as inks made directly by third parties are used.

3.7 Glazing of raw tiles

The “raw” tiles, coming out of the drying process, move along a motorized transportation line consisting of belts, along which there are conveniently placed machines capable of spreading quantities of enamel and silk-screen pastes of a specific weight on the surface. Technological advances of recent years have significantly changed the decoration process as a result of the introduction of digital screen printing machines, which can reproduce complex graphics imported directly from computer files onto the support using special coloured inks.
At the end of the glazing lines are installed loading machines that transfer the raw enameled and decorated tiles into roller boxes where they are stored pending subsequent firing process.
The glazing plant consists of seven lines for the production of medium/large formats (from200mmx200mm to 1200mmx600mm) of which six are equipped with a digital decorator.
Here also, production waste and dust collected by special filtration systems serving the glazing work centres are reintroduced into the production cycle, if possible, or disposed of properly. Similarly, processing/washing water is collected and sent to the purifier to be subsequently reused within the production cycle.

3.8 Firing

The decorated raw tiles, stored in the roller boxes, are transferred to the firing lines via LGV vehicles; the firing process takes place in continuous roller kilns equipped with methane gas burners, within which the material follows a firing curve composed of a heating cycle (up to a maximum temperature of about 1220 ° C) and subsequently a predetermined cooling cycle which causes the material to take on the desired dimensional, mechanical and surface characteristics.
The firing plant consists of three SACMI roller kilns, of which one is currently still.
At the end of the firing phase, the product can either be sent to the selection and packaging phase or it can be further processed to produce higher-value surface characteristics or dimensions different from those made by the press.
The fired production waste is given to third parties to be ground and brought to pre-established granulometry so that this waste can be reused during the paste milling phase.

3.9 Polishing - grinding - cutting

The new requirements of the market have imposed the need to subject the product to a series of additional processes that give it higher-value characteristics. Additional processing consists mainly of:

- lapping/polishing/surface treatment: the product is processed to obtain a higher surface quality and superior dirt resistance;
- grinding: the product is processed on the edges to obtain more precise dimensions and so it can be laid without joints;
- cutting: the product is cut to produce submultiples of the original format.

Additional processing takes place on one lapping/grinding line, one polishing line and two cutting lines, which also offer asymmetric cutting.
Here also, fired production waste is given to third parties to be ground down to a pre-established granulometry so that this waste can be reused during the paste mixture milling phase. the processing/washing water, on the other hand, is collected and sent to a new dedicated water purification plant, to be then reused within the same department's production cycle of the same department.
From September 2020, up to 20% of the filter-pressed sludge from cutting is added to some types of mix; this was previously sent for recovery through an authorized company.

3.10 Selection of finished product

The last phase of the production cycle consists in the selection and packaging of the product; this process occurs primarily on the automated selection lines that divide the product by class (on the basis of geometrical/dimensional characteristics and the presence of any decoration defects/decolouration) and tone (based on the comparison with the tone of the product sample). The tiles, divided evenly, are then boxed and placed on the pallet.
The selection and packing system is made up of five automated SYSTEM selection lines (served by laser-guided vehicles for pallet handling).
Here also, fired production waste is given to third parties to be ground down to a pre-established granulometry so that this waste can be reused during the paste mixture milling phase.

3.11 Packaging and storage of the finished product

The palletized material is protected by a heat shrink polyethylene cap and then transported outside, using forklifts, to the appropriate storage warehouses to await shipment.

3.12 Shipping warehouse

The finished product, once packed, is stored in two warehouses: one located within the main production site (Area A of Fig.1.1); the other at the shipping warehouse about 1 km from the plant (Area B of Fig.1.1).
The transport of the material between the warehouse placed inside the plant and the shipping warehouse is entrusted directly to a truck owned and handled by a driver working for Cerdomus S.r.l.

3.13 Research Laboratory and Technological Laboratory

The company has a research laboratory in which all new products are designed and developed for industrialization; the technological laboratory carries out quality controls on raw materials, semi-finished products, and finished product.

3.14 Water purifiers

Industrial waste water from the atomization, enamel milling and glazing work centres is carried into the storage tank using booster pumps. Waste water, with added specific flocculants, is sent to a sedimenter using lifting pumps, where the water is clarified by precipitation of the suspended solids contained in the solution. The sedimented part (sewage sludge) is expelled from the lower part of the sedimentation tank, filter-pressed or directly reintroduced in the paste milling stage, while the clarified waters are stored in storage tanks and are reused as milling water or washing water for the production line work centres.
The waste water from the polishing/grinding/cutting work centre is purified through a new water clarification and microfiltration plant; the sludge is then filter-pressed and the solid sludge is reused in certain types of mix.
There is no outward flow of waste water from the production process at the plant.

3.15 Dust purification

Dust generated by the various stages of processing is sucked by special purification plants with fabric sleeve filters, which treat the air before expelling it into the environment. Dust contained in the filter sleeves is collected by an archimedean screw placed on the bottom of the purifier and channelled into special containers: the dust can then be reused or disposed of as raw waste or mixed with water and sent to storage tanks to be then reused during the milling phase.
The production line work centres are served by a total of 15 dust filtration and purification installations, each of which is a regularly checked emission point.

3.16 Fume purifiers

The fumes generated during the firing phase are sent to special sleeve fume purification plants where the filtration takes place by chemical reaction, using hydrated lime as a reagent. The filtering sleeves, coated with lime, retain dangerous substances (such as Fluorine, NO_x and SO_x), which are collected at the filter outlet and properly disposed of by qualified operators.
Two fume filtration and purification installations have been installed to serve the firing work centre.
At the moment, the fumes from the two firing kilns in operation flow into a single filter (E35), so it was possible to close the second (E22) thereby achieving savings in consumption of hydrated lime and electricity. At the end of December 2020, the old firing fumes purification system (E22 emission) was removed to be replaced with a new filtering system. The fumes from the firing kiln currently stopped will be conveyed there. This is to make room for the installation of a new Cogeneration plant which will take place in 2021.
The E35 fume filter is an emission point which is regularly checked.

3.17 Cogeneration

The company has two cogeneration plants:

- one that was owned and managed by HERA Servizi Energia until 31/11/2020 and then, as per the contract between the parties, was acquired free of charge and managed directly by Cerdomus S.r.l. starting from 01/12/2020. This cogeneration plant with a maximum electric power of 3.6 MW consists of an endothermic engine powered by methane gas;
- the other owned by Cerdomus S.r.l., with a maximum electric power of 1MW, consisting of a turbine powered by methane gas. This plant has not been in operation since November 2011 and official notice of plant shutdown was given to the grid operator ENEL Distribuzione on 05/03/2013.

Both plants, in addition to the production of electricity, reuse the thermal energy contained in the exhaust gases inside the atomizers, thus reducing the consumption of methane gas by the ATMs.

A new cogeneration plant is being built at the plant, with an electrical power of 2.5MW (once more based on an internal combustion engine fueled by methane gas). This will replace the existing 3.6MW plant (which came into operation at end 2008 and is at the end of its working life). The new cogeneration plant was sized on the current needs of the plant and will optimize heat recovery towards the atomizer: in addition to directly recovering exhaust gases, the hot water from the engine cooling circuit will be used to preheat the combustion air of the ATM burner and to preheat the slip entering the atomizer through a special heat exchanger.

4. *TRAINING AND PARTICIPATION*

The staff is trained on environmental aspects and shares the company's commitment to the environment and safety and our commitment to staff training (including new recruits) on the environment, safety and hygiene at work is underpinned by a well-established annual training plan. For this purpose, a simple, easy-to-understand information booklet has been drawn up which shows all of the company's activities and forms of protection it has adopted. In addition to this booklet, new entrants are also always provided with and shown the most recent version of the environmental declaration. Staff awareness and training levels are maintained through specific training meetings and interventions, and also by checking how effective the training is. Environmental awareness resulting from training can also be detected from how orderly and clean the plant is.
Table 4.1 shows data on the number of training hours spent by staff on safety and environment issues.
The company’s Safety Officers are informed of the various environmental aspects even during the annual meeting centered on safety and the environment.

Table 4.1 —Staff Training—

Year	Average number of employees	Number of employees hired in the year	Training hours on safety and environment	Total hours worked	Index of training (hours of training/hours worked) x 1000
2017	189	4	980	302,994	3.23
2018	181	5	278	242,786	1.15
2019	172	6	584	259,379	2.25
2020	170	6	309	235,212	1.31

5. *ENVIRONMENTAL ASPECTS OF SITE ACTIVITIES*

All gaseous emissions are subject to an integrated environmental authorisation (AIA), Measure 337 dated 19/08/2009 and measure DET-AMB 2450 dated 23/05/2019 issued by the province of Ravenna, which expires on 18/08/2025.

In the course of the drafting of the initial environmental analysis it was established what were the direct significant, direct non-significant and indirect environmental aspects to which the company would pay particular attention as aspects that have or may have significant impact on the environment.
The updating of these direct / indirect environmental aspects is reassessed every year during the updating of the environmental analysis or following significant changes in the production/plant process, considering mainly:

- Analysis of the legal limits with which the company must comply;
- Changes in production layout or finished product;
- Limits or indicators close to the values recorded by the company;
- Aspects not regulated by laws but essential to maintain a healthful environment (eg. unpleasant odours).

5.1 Significant direct environmental aspects

- Use of non-renewable raw materials such as clay, sand, feldspar and decorative applications consisting of natural elements and pigments; these materials constitute the main mass of the finished product (support) and the decoration of the latter.
- Consumption of Natural Resources (water, electricity, natural gas, diesel)
  - processing water is taken from two authorized wells, while the one for civil use is supplied by the municipal aqueduct and accounted for on invoicing.
  - electricity: used for processing equipment (towing, moving mechanical parts, photocells, etc.);
  - natural gas: used in atomizers, dryers and firing kilns;
  - diesel fuel: used for emergency power generators and automotive for lift trucks and mechanical loaders.
- Waste management: the waste produced on the site is of widely varying nature, identified by the EWC code and regulated by law. Duly authorized companies are used for waste disposal and recovery.
- Emissions into the atmosphere: channelled to the purification plants serving atomizers, firing kilns and dust extraction from the production departments; these emissions are regulated by legal limits, therefore they are monitored according to a control plan.
- Internal/external noise: regularly checked by an authorized company, and regulated by the municipal zoning (externally) and by Italian Legislative Decree 81/08 and subsequent amendments (internally).

- Hazardous substances: the company strictly controls materials that contain potentially hazardous substances, including: used lubricating oil, lubricating greases, enamels, paints, thinners, solvents, fuels.
- Diffuse dust: present in paste mixture milling and atomizers work centres, these emissions consist of dust. Annual checks are carried out on workers' exposure, in accordance with ACGIH and Italian national standards. Raw materials loading-unloading yards are covered, and cleaning is carried out by mechanical means owned by the company. A person is responsible for the daily cleaning of the floor of the plant by means of automatic scrubbers and floor cleaners.
- Asbestos: the main production plant (area A of Fig.1.1) consists of six blocks with Eternit roof covering. Various safety work was carried out on these coverings: in 2003 and 2010 maintenance interventions were carried out by a specialized company that treated the roof coverings with special inert paints and also carried out a partial encapsulation using insulated metal panels.
  In 2019 the asbestos present in the Eternit roof coverings was then remapped and evaluated according to guidelines laid down by the Emilia-Romagna Region with regard to the state of conservation.
  The investigation was also extended to the work areas below the roof coverings, to check for any presence of air-dispersed fibres.
  In 2020 about 360 square meters of Eternit roof coverings were removed and disposed of in the area around Granital.
- Spent oils: deriving from ordinary and extraordinary maintenance activities on hydraulic presses and lubricated screw compressors. Given the quantities, a tank with a volume of 1300 litres was placed in the plant where the waste oils are stored before disposal.
- Greenhouse-effect ozone-depleting substances: there are refrigeration and air conditioning systems containing greenhouse gases. In particular, there are three plants containing R22 gas in quantities exceeding 3kg.
- Greenhouse gas emissions: the company is part of the European scheme for the management and control of greenhouse gas emissions (ETS), with particular reference to the trading of CO2 emission shares, for the reference period 2013-2020.

5.2 Non-significant direct aspects

- Surface water bodies: the only body of water near the production plant is the Rio Fantino stream, but this aspect is not considered significant given the very low probability of contamination of the same with dangerous substances deriving from the activities of Cerdomus.
- Induced traffic: the vehicular traffic deriving from the activities of the production plant does not significantly alter that already present on the roads connecting to the site, since these are the main high traffic arteries (SS Emilia and S.P. Borello).
- Visual impact: the production site and the shipping warehouse are in an already industrialized area and do not significantly alter the landscape.
- State of the soil: both the production plant and the shipping warehouse are built on waterproofed surfaces using asphalt and concrete. The risk of soil contamination is therefore not significant.
- Radioactivity of raw materials, finished product: raw materials used for the paste mixture and consequently the finished product do not present dangerous levels of radioactivity, as shown by the analyses carried out regularly for product certifications required for export to countries outside the EU.
- PCT and PCB: in the production plant, in the medium-voltage receiving and low voltage distribution cabinets, there are seven oil transformers that originally contained PCBs. These transformers were reclaimed during the year 1999 and the verifications carried out in April 2013 confirm the absence of PCBs. There are no installations containing PCT.

- Electromagnetic fields: there are no devices in the production plant or shipping warehouse that generate significant electromagnetic fields, except in non-operational areas, where only informed, trained and specialized personnel can access.
- Waste water discharge: waste water produced is entirely recycled and reused within the production cycle, after treatment in the purifier. Civil waste water is channelled into the Rio Fantino stream water body after separation of the solids in Imhoff tanks. For the shipping warehouse, there is a Single Environmental Authorization for the discharge of domestic waste water not entering the sewerage network issued by the province of Ravenna: AUA No 3173 valid for 15 years.

5.3 Indirect environmental aspects

- Disposal of waste / hazardous substances: check of authorizations of collection and disposal centres responsible for waste collection and verification of authorizations and the suitability of the means of transport used for collection.
- Noise: companies that provide services to Cerdomus are made aware of the environmental aspect under consideration during pre-construction coordination meetings.
- Diffuse dust: companies that provide services to Cerdomus are made aware of the environmental aspect under consideration during pre-construction coordination meetings.
- Environmental performance and practices of contractors and suppliers: preparation of contracts suitable for monitoring activities carried out, delivery of specific instructions relating to environmental aspects. In addition, a declaration of commitment to compliance with environmental standards, monitoring of activities, in particular on waste storage, is required. Also the DUVRI (Single Document On Risks Generated By Interference Between Activities Conducted Simultaneously In The Same Workplace) will be delivered.
- Product packaging disposal: the packaging used consists of stretch film, wooden pallets and cartons. Wood pallets are intended for subsequent reuse, or energy recovery, while paper and plastic packaging, being non-hazardous waste, are intended for subsequent recovery. The company reports on the cardboard packaging indications of recyclability and recovery.
- Product disposal: the finished product, once its life cycle is over, can be disposed of as non-hazardous waste and can be recycled as a filler for environmental restorations, road surfaces and earthworks.

6. *CONSUMPTION OF NATURAL RESOURCES*

The resources that the site uses for its activities are:

- WATER
- ENERGY
- RAW MATERIALS

These resources refer to tile production as shown in table 6.1.

Table 6.1 - Annual production of finished product deposited in warehouse –

Year	Production in tonnes	Production in m²
2017	61,222	2,661,821
2018	47,204	2,052,341
2019	51,865	2,255,013
2020	51,785	2,251,506

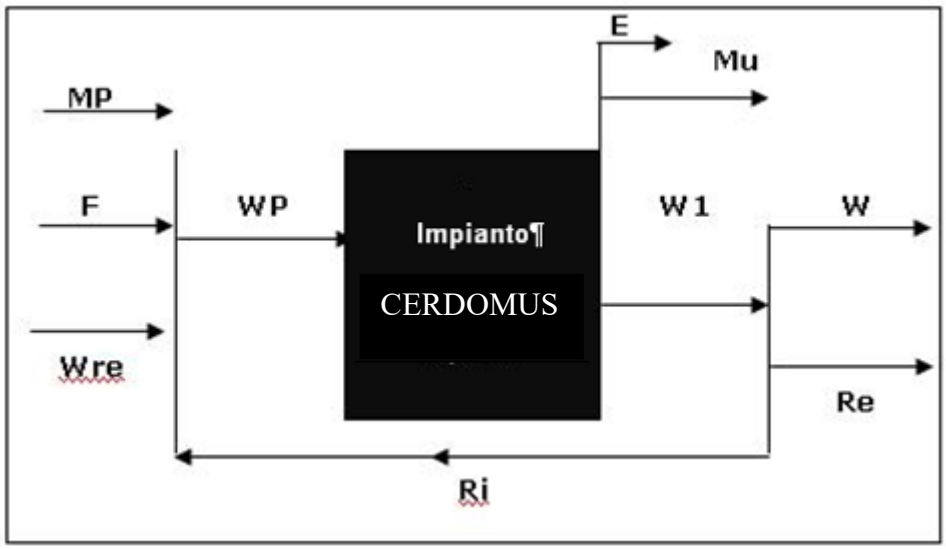
In 2017, production was increased compared to the previous year, since it provided hope for an economic recovery in market developments. In 2018 by contrast, there was a decrease in production levels due to the search of new markets and to the sale of products already in stock on the warehouse. In 2019, production started to rise again also thanks to the ability of the sales management to open new sales channels and markets. This data remained practically at the same levels even as pertains 2020, confirming what was done in the previous year.

6.1 Water

External supply waters are:

a) Industrial water taken from private wells, duly reported (two for processing water and two used exclusively for fire fighting), used in the production stages both as raw material and for washing and cooling systems;
b) Industrial water from other companies that do not have the equipment for the purification and reuse of the same (currently not active);
c) Drinking water of the civil aqueduct, used for all the toilets of the site;
d) First rainwater collected in areas at risk of a chemical spill.

Fig. 6.2 — Water Balance —



Legend

F = Water consumption	**W1** = Produced waste water
WP = Overall water requirement	**W** = Waste water intended for discharge
MP = Water content in the incoming material	**Mu** = Water contained in the materials
Ri = Waste water recycled internally	**Re** = Waste water recycled externally
Wre = Waters from third parties	**E** = water evaporated

Part of the first rain waters, coming from areas not covered by roofs or affected by the loading/unloading or storage of raw materials/semi-finished products, is collected and channelled to the purification plant to avoid chemicals ending up in the Rio Fantino stream in case of chemical spills. In addition, even part of the first rain waters that are collected in the covered yard where the raw materials are stored are channelled to several collection tanks

and used as milling water by means of booster pumps or sent to the water treatment plant. These waters result in considerable savings on water requirements, which are currently not readily quantifiable.
The sludge from the process of purifying water from the atomization, enamel milling, and glazing work centres is recovered and reintroduced into the production process directly during the milling phase of the raw materials that make up the mixture, while the purified water is stored in tanks and reused, mixed with well water, as milling or washing water by the production work centres.
The waste water from the polishing/grinding/cutting work centre is purified through a new water clarification and microfiltration plant; the sludge is then filter-pressed and the clarified water re-injected into the cycle and replenished as needed by well water.

Table 6.3 - Water intake: source, uses, destination and information on recovery or recycling –

Source	Main uses	Final destination	Possibility of recovery/recycling
Private wells	Raw material for loading paste mixture mills	Evaporation as a result of the atomization process and during firing	/
	Washing atomizers	Use as milling water	Use as milling water
	Raw material for loading enamel mills	Evaporation in firing	/
	Washing of enamel preparation mills	Sending to purification plant	Use as milling and washing water
	Washing work centres	Sending to purification plant	Use as milling and washing water
	Replenishing processing water of polishing/grinding/cutting work centre	Sending to polishing/grinding/cutting plant	Fully recovered and recycled
From third parties	Raw material for loading paste mixture mills	Sent to the purification plant	Use as milling and washing water
First rain water	Raw material for loading paste mixture mills	Purification plant	Use as milling and washing water
Public Aqueduct	Civil use	discharge into surface water	/

Table 6.4 - Water consumption, production in t and m^2 and specific index -

Year	Water consumption m3	Finished Product t	Specific consumption m^3 / t F.P.	Finished Product m^2	Specific consumption m^3/ 100m^2 F.P.
2017	45,128	61,222	0.74	2,661,821	1.69
2018	36,438	47,204	0.77	2,052,341	1.77
2019	44,437	51,865	0.86	2,255,013	1.97
2020	42,416	51,785	0.82	2,251,506	1.88

In 2018, water consumption has decreased significantly compared to previous year. This aspect is mainly due to a number of factors, such as:
smaller quantities of finished product deposited in the warehouse (for the reasons listed previously in the comment to table 6.1); a more rational use in the step of milling the paste mixture, differentiating the type of incoming raw materials to the mills milling the mixture; and increasing the workload of the polishing, cutting and grinding work centre that emphasizes the use of purified water instead of water from the well, and finally also because of a

downturn in the market. In 2019-2020, water consumption increased, mainly due to a greater quantity of finished product deposited in the warehouse.

6.2 Energy

Energy consumption has always been an extremely significant aspect for the ceramic industry, considering that 25% of the industrial cost is attributable to energy costs (electricity and natural gas).
For the activities of the production plant, Cerdomus buys the following energy carriers from third-party suppliers: electricity, thermal energy and natural gas. Currently, no energy is produced from renewable sources of any kind.

6.2.1 Electricity

The electricity from the grid is supplied by EDISON Energia while the one produced and consumed by the cogeneration plant installed at the Cerdomus plant was supplied by HERA Servizi Energia until 30/11/2020. From that date onwards, the existing energy service contract has been considered expired and the cogeneration plant became the property of CERDOMUS. In the following Table 6.5 the detail of consumption.

Table 6.5 – Electricity consumption and self-consumption –

Year	Electricity taken from the grid (kWh / year)	GJ	Self-consumed electricity (kWh / year)	GJ	Electricity used (kWh / year)	GJ
2017	2,934,912	10,566	13,638,944	49,100	16,573,856	59,666
2018	4,269,954	15,372	5,528,078	19,901	9,798,032	35,273
2019	3,482,142	12,536	8,533,932	30,722	12,016,074	43,258
2020	3,697,494	13,311	7,413,534	26,689	11,111,028	40,000

From table 6.5 one can see that self-consumed electricity was about 82% of all electricity used in 2017. In 2018 this percentage went down to 56%, in 2019 it went back up to 71%, and then dropped again to 67% in 2020. This variation in the incidence of self-consumed energy on total energy derives from the annual operating hours of the cogeneration plant closely linked to the production of the atomizer connected to it and, in general, to the production structure of the plant. 2017 showed significantly different values from those of the other years shown in the table because, in the first half of the year, the production structure of the plant involved the operation of three firing kilns (which implies a continuous cycle operation of the atomizer and thus of the cogeneration plant connected to it). From that moment on, due to a significant contraction in demand, a kiln was shut down and the production structure was modified to concentrate production in just two firing kilns (which implies fewer hours of operation per week of the atomizer and cogeneration plant, both of which have gone to an operation schedule of 5 days/week).
As for 2018, one can observe significantly lower values of self-consumed energy (due to the shorter production hours of the cogeneration plant), but, at the same time, a significant reduction in the plant's electricity needs. This is because in 2018, due to a further contraction in demand, in order to avoid over-storage of finished products, extraordinary production stops were called and this resulted in a reduction in the operating hours of the plants. Starting from 2019, we can observe a trend reversal: the increase in demand led to an increase in the operating hours of the plants (including the atomizer and cogeneration plant connected to it) and an increase in both self-produced energy and in self-consumption, and an overall increase in the plant's electrical needs.
In 2020 the trend reversal relating to the increase in demand was confirmed, but this is not reflected in the energy data reported in Tab.6.5 due to the pandemic linked to the spread of

COVID-19: indeed, as per Decree from the President of the Council of Ministers, a total production stop of the plant occurred over 6 weeks (from 23/03/2020 to 04/05/2020).
The stop in production for this period led to a reduction in energy requirements (since all production plants were stopped) and the absolute values of self-consumed and total energy of the plant were lower than those of 2019.

6.2.2 Thermal energy

Natural gas is supplied by EDISON Energia; in the following Table 6.6 the detail of consumption.

Table 6.6 –Natural gas consumption –

Year	Total consumption (including services) (Sm^3)	GJ	Consumption for cogeneration (Sm3)	GJ
2017	11,782,248	415,689	4,603,443	162,414
2018	8,951,534	315,819	3,364,659	118,709
2019	10,301,695	363,454	4,084,738	144,114
2020	9,544,918	336,754	3,413,946	120,447

Similarly to the dynamics described for electricity, the consumption of methane is also significantly conditioned by the hours of operation of the cogeneration plant and the reduction of the production pace of the plant. Even in this case, in 2018 one can see a significant reduction of the plant's methane gas consumption compared to 2017. This was due to the reduction in operating hours of the plant's major thermal machines (cogeneration plant, atomizer and kilns) and, from April 2017, to the shutting down of one of the three firing kilns that are currently installed in the plant. Even from a thermal point of view, 2019 marked a reversal of the trend, with an increase in the need for methane (both for the cogeneration system and for the plant at large) resulting from an increase in the hours of operation of both kilns and atomizers as a result of a significant increase in demand.
Just as for electricity, 2020 followed the upward trend as pertains demand but not as pertains the absolute values of methane consumption due to the extraordinary shutdown caused by COVID-19.
In addition to the heat supplied by the combustion of methane (through the burner in the atomizer's air stream and the burners present in the kilns/dryers), the component of thermal energy supplied by the cogeneration plant to the atomizer comes from direct recovery of the exhaust gases of the endothermic engine and from the pre-heating of the combustion air through a water/air exchanger that recovers the heat from the cooling water of the engine itself. The savings from the recovery of the exhaust fumes of the engine that significantly reduces (about 40%) the use of natural gas in the process of atomization should be emphasized.

6.2.3 Energy Balance

Table 6.7 - Energy balance: parameters and indicators for evaluation -

Metrics	Unit of measurement	Indicators 2017	Indicators 2018	Indicators 2019	Indicators 2020
Average specific consumption of **natural gas** referred to the **finished product** unit	GJ/t	**6.61**	**6.51**	**6.82**	**6.33**
Average specific consumption of **electricity** per unit of **finished product**	GJ/t	**- 0.13**	**0.03**	**- 0.06**	**0.11**
Average total specific consumption of **energy** per unit of **finished product**	GJ/t	**6.48**	**6.54**	**6.76**	**6.44**

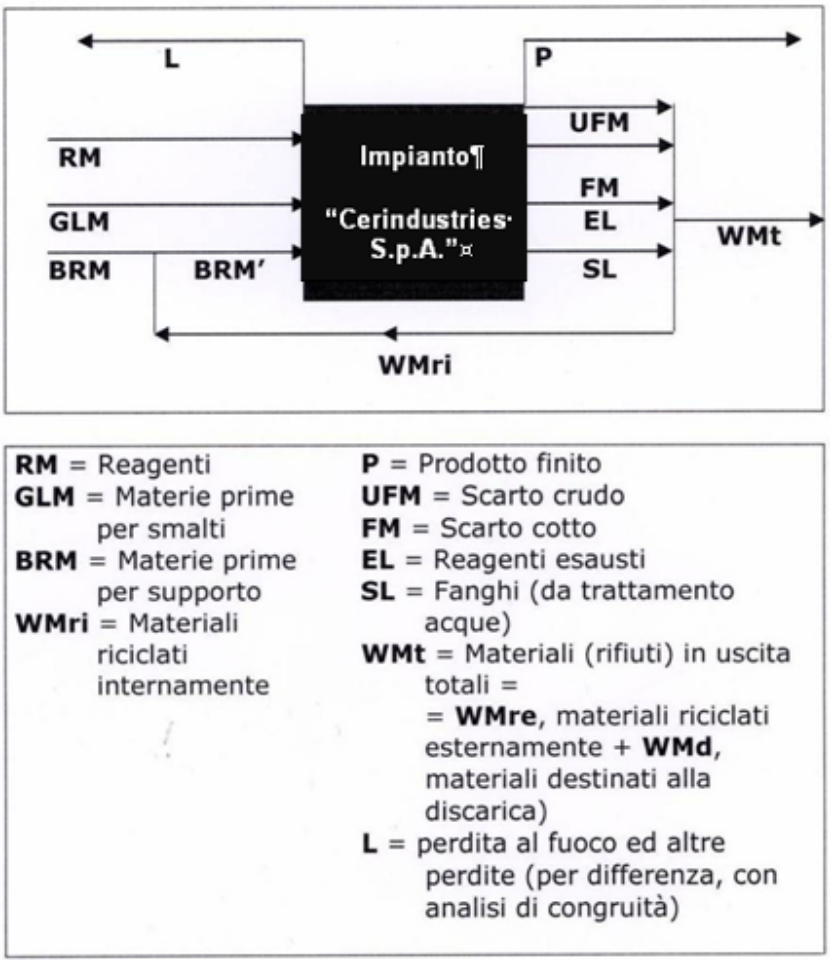
From the indicators reported in the previous Tab. 6.7, it is clear that the real trend reversal occurred during 2020: from 2017 to 2019 the average total specific energy consumption constantly increased while 2020 brought on the lowest value in the four years. This derives from the fact that, starting from the second half of 2017, production was concentrated in just two firing kilns (unlike what happened previously with three firing kilns in operation) with a subsequent decrease in the operating hours of the systems upstream and downstream of the firing phase. This brought on a decrease of about 30% of the total production, which in turn led to a general increase in the inefficiency of the plant. Several extraordinary production stops occurred in 2018, which significantly reduced the plant's general consumption and the indicators connected to it. In 2019, contrary to what transpires from the data reported in Tab. 6.7, production increased by about 8% compared to 2018 yet energy consumption increased as during production stops of short duration (<3 weeks) the kilns were not turned off but only put to a minimum (with subsequent consumption of methane without production). In 2018, on the other hand, the production stops were of such duration that all heating systems were turned off, with subsequent decrease in consumption.
In 2020, despite the six-week extraordinary shutdown due to COVID-19, production fell by only 0.2% compared to 2019; this, combined with the zeroing of methane consumption for the COVID-19 stop, made it possible to reduce the average specific energy consumption.

6.3 Raw Materials

Raw materials used both of clay origin and sand origin have a humidity percentage of generally between 5% and 18% upon arrival.

The diagram below shows the balance of materials in a dry state on site and materials inflows and outflows. The focus here is on the product and the flows of materials that are most directly or potentially associated with it.

Fig. 6.8 –Materials quantities sheet –



The following circumstances are noted:

A. Raw waste **(UFM)** (air purification dust, raw tile waste and water purification sludge) is stored in a covered area and partly recovered in the production of atomized product, while the rest is sent for recovery through authorized disposal companies.

B. All fired waste **(FM)** is sent for recovery through authorized disposal companies.

Table 6.9 (1/2) – Raw materials: phase, type, physical appearance and main constituents –

Phase	Type of raw materials	Physical aspect	Main constituents
Preparation of paste mixture	Clays, sands, feldspars, kaolin	Powdery granular solid	Clay minerals, quartz, feldspars
	Dyes and pigments	powdery	Colouring metallic oxides

Table 6.9 (2/2) – Raw materials: phase, type, physical appearance and main constituents –

Phase	Type of raw materials	Physical aspect	Main constituents
Preparation of enamels, silk-screen pastes and glazing	Frits	Granular and in flakes	Silico-aluminates or silicates or silico-borates of: alkaline earth metals and / or other metallic elements obtained in a combination of different substances during their fusion
	Inorganic raw materials	Powdery	Alumina, kaolin, clays, metal oxides, feldspars
	Organic additives (vehicles-oils)	Liquid	Water, water soluble glycols, polymers of natural origin
	Pigments	Powdery	Low solubility inorganic solids derived from carbonates, silicates and oxides

The raw materials used in the plant are also checked for safety. Clays, sands and feldspars for paste mixture are natural quarry materials, to which no risk phrase is generally associated.
The raw materials for paste mixtures, enamels, dyes, and various reagents are chemical products for which the company reports the amount purchased, the risk phrases, the percentage of the chemical elements contained in the product on the company database for management in the future (e.g. chemical risk assessment).
Cerdomus S.r.l. has at its disposal all the safety data sheets relating to the raw materials purchased (stored in the Technical Office) and these are managed according to procedure by the PRPP (Person Responsible for Prevention and Protection).
All raw materials and semi-finished products are stored inside the sheds and this rule is extended to all products used for production in order to avoid any possibility of spillage to the environment.
The main flows of the balance of dry materials presented in Fig.6.8 are explained in the following Table 6.10.

Table 6.10 – Input raw materials and weight per m^2 –

Year	Consumption of raw materials (t)	Finished Product (m^2)	Quantity of raw materials per unit of finished product (kg / m^2)
2017	66,658	2,661,821	25.0
2018	52,824	2,052,341	25.7
2019	57,270	2,255,013	25.4
2020	55,368	2,251,506	24.6

Since 2017, recycled material has begun to be used in the mix, and in particular fired waste (eco-chamotte) introduced in percentages of up to 2%. From September 2020, up to 20% of the waste produced internally by the sanding/grinding/cutting department (cutting sludge), which was previously sent for recovery through an authorized company, is added to some types of mix after filter-pressing. This led to a decline in the use of raw materials per unit of finished product in 2020 compared to previous years.

7. *WASTE WATER DISCHARGE*

As documented in the previous Chapter 6, at the production plant of Cerdomus S.r.l. there are no outward flows of industrial waste water from the production cycle.

All industrial waste water is sent to the water treatment plants and reused in processing while the water from the toilets flows into the sewer as per permit to discharge civil water (as regards the settlement identified by Area A of Fig.1.1), issued by the municipality of Castel Bolognese by Prot. No. 14504 of 6 Dec.2004, valid for four years and renewing automatically.

Regarding the shipping warehouse located in via Calamello 1035 (Area B of Fig.1.1), there is a Single Environmental Authorization for the discharge of domestic waste water not discharged into the sewerage network, issued on 20/10/2015 by the province of Ravenna: AUA No. 3173 of 20/10/2015 valid for 15 years.

8. *DANGEROUS SUBSTANCES AND PRODUCTS*

The following materials shall be considered as such and kept under control:

- LUBRICATING OIL AND GREASE: the stocks of these materials are placed within specific areas and have a maximum amount of storage of five drums with a capacity of 180 litres each, all positioned in containment basins. They are purchased only when needed.
- ENAMELS: these substances consist of oxides of metals and other substances which have been properly ground, dissolved in water and kept in suspension by means of agitators. When not used in production they are stored in special areas; they form the basis for the colouring and decoration of tiles. Approximately 320,000 kg of enamels are used per year.
- INKS FOR DIGITAL DECORATORS — used for the decoration of products and are already supplied in small closed containers with a capacity of 5 litres. When not used in production they are stored in special areas near the glazing lines. Empty containers are disposed of with CER code 080312*. About 17,000 kg of digital inks are used per year.
- PAINTS, THINNERS AND SOLVENTS: about 20 litres of solvent substances are stored on the site at the spare parts warehouse and the sample work centre; usually they are purchased as required without large storage capacity.
- FUELS: stored in special tanks. Specifically, there are: one above-ground tank for automotive diesel fuel to supply forklifts and loaders; four above-ground tanks for diesel fuel to supply emergency power generators. In the shipping warehouse, there are two above-ground tanks for automotive diesel oil (forklifts). Approximately 26,000 kg of diesel oil are used per year.
- LPG: stored in special storage cages ventilated and placed under lock; on average there are 10 cylinders at the main plant and 20 at the shipping warehouse. In both cases, the cylinders are used for the heat shrink of plastic protective packaging.
  At the shipping warehouse, there is a tank with a capacity of 5000 litres, on loan for use from Autogas Nord, used for heating the processing area inside the samples warehouse.
- PCB: PCB-containing transformers are no longer used in the company, as they have been gradually remediated and/or replaced with equipment that does not contain such substances.
- CHEMICAL REAGENTS: used in the water treatment plant, they are stored in special containers.

9. *EMISSIONS INTO THE ATMOSPHERE*

The risk of introducing polluting substances into the atmosphere is associated mainly with the **channelled emissions** throughout all production operations.

There are **diffuse**, dust emissions, mainly associated with locations where raw waste is collected and raw materials are moved.
Attempts are being made to limit this phenomenon by frequent cleaning of both the production work centres and of the raw material unloading yards, with the use of automatic scrubbers and floor cleaners used by internal personnel.

In 2007 and the following year the old dust collection containers from the purifiers were replaced with collection tanks. The particulates are dissolved in water and sent directly to the milling so as to significantly reduce the dustiness due to transport and storage, in the appropriate boxes, of the collection vessels.

Table 9.1 on the following page lists the authorised emissions, all of which are associated with polluting substance filtration and abatement plants.

All gaseous emissions are subject to an integrated environmental authorisation (AIA), measure DET-AMB 2450 of 23/05/2019 and DET-AMB-2019-3996 of 02/09/2019 (minor amendment) issued by ARPAe Ravenna - SAC, which expires on 18/08/2025.

The main pollutants are: particulate material, fluorine compounds and lead compounds. The authorization conditions also include other pollutants, in particular nitrogen oxides (NOx, expressed as NO_2), sulphur oxides (SOx, expressed as SO_2), volatile organic substances (VOS, expressed as total organic carbon) and the aldehydes.

The systems for purifying the firing fumes coming from the kilns are fabric sleeve filters (usually Teflon-coated Nomex - 500g / m^2) with solid reagent pre-coating (calcium hydroxide used for fluorine absorption).
Filtration systems for dust from the production work centres are equipped with polyester fabric sleeves of 500g/m^2.

The values entered in Table 9.1 are extrapolated from analytical reports and inserted in spreadsheets made available by the Emilia Romagna Region, which take into account sampling point, date, temperature, values and normalized flow rates of the single emission point.

In Tables 9.2, 9.3, 9.4 and 9.5 data on Authorised Mass Flows of pollutants, data measured on installations during self-checks carried out by an accredited ACCREDIA Laboratory and, in the last column, the Emission Factors expressed in g/ m^2 of finished product deposited in the warehouse are reported.

Table 9.1 – Summary of gaseous emissions –

Emission point	Controlled pollutant type	Authorized limit in mg/Ncm
Dryers E1 – E2 – E3 – E4 E5 – E6 - E7	Particulate material	**5**
	Fluorine	**5**
	Lead	**0.5**
	Nitrogen oxides (Nox)	**200**
	Sulphur oxides (Sox)	**500**
	CO	**100**
E19	Particulate material	**30**
E21	Particulate material	**30**
E22	Particulate material	**5**
	Fluorine	**5**
	Lead	**0.5**
	Nitrogen oxides (Nox)	**200**
	Sulphur oxides (Sox)	**500**
	Organic carbon (VOS)	**50**
	Aldehydes	**20**
E23	Particulate material	**20**
	Fluorine	**3**
	Lead	**0.3**
	Nitrogen oxides (Nox)	**350**
	Sulphur oxides (Sox)	**35**
E24	Particulate material	**30**
E27	Particulate material	**10**
E29	Particulate material	**30**
E30	Particulate material	**30**
	Fluorine	**3**
	Lead	**0.3**
	Nitrogen oxides (Nox)	**350**
	Sulphur oxides (Sox)	**35**
E32	Particulate material	**5**
E33	Particulate material	**5**
E34	Particulate material	**20**
E35	Particulate material	**5**
	Fluorine	**5**
	Lead	**0.5**
	Nitrogen oxides (Nox)	**200**
	Sulphur oxides (Sox)	**500**
	Organic carbon (VOS)	**50**
	Aldehydes	**20**
E37	Particulate material	**10**
E38	Particulate material	**10**
E40	Particulate material	**10**

Table 9.2 – Polluting emissions 2017 –

POLLUTANT	No. of emission points for each pollutant	Authorised annual mass flow per pollutant [kg/year]	Annual average Mass Flow from self-checks for each pollutant [kg/year]	Emission factor for each pollutant [g/m²]
Particulate material	18	57,109	3,008	1.13
Lead	5	691	3	0.001
Fluorine	5	5,129	464	0.17
VOS	3	26,718	1,977	0.74
Aldehydes	3	10,687	178	0.06
Sulphur oxides	5	301,212	69,441	26.09
Nitrogen oxides	5	447,198	17,290	6.49

Definition	Value
Production discharged in warehouse [m² / year]	2,661,821

Table 9.3 – Polluting emissions 2018 –

POLLUTANT	No. of emission points for each pollutant	Authorised annual mass flow per pollutant [kg/year]	Annual average Mass Flow from self-checks for each pollutant [kg/year]	Emission factor for each pollutant [g/m²]
Particulate material	15	48,160	1,348	0.66
Lead	4	660	2	0.0001
Fluorine	4	4,822	315	0.15
VOS	2	23,652	947	0.46
Aldehydes	2	9,461	442	0.22
Sulphur oxides	4	270,553	52,504	25.44
Nitrogen oxides	4	434,934	8,913	4.34

Definition	Value
Production discharged in warehouse [m² / year]	2,052,341

Table 9.4 – Polluting emissions 2019 –

POLLUTANT	No. of emission points for each pollutant	Authorised annual mass flow per pollutant [kg/year]	Annual average Mass Flow from self-checks for each pollutant [kg/year]	Emission factor for each pollutant [g/m²]
Particulate material	22	48,824	1,786	0.79
Lead	11	641	4	0.002
Fluorine	11	6,412	540	0.24
VOS	2	23,652	1,228	0.54
Aldehydes	2	9,461	46	0.02
Sulphur oxides	11	388,199	34,974	15.51
Nitrogen oxides	11	476,106	11,153	4.95
CO	7	23,652	-	-
Crystalline silica	1	2,015	-	-

Definition	Value
Production discharged in warehouse [m²/year]	2,255,013

Table 9.5 – Polluting emissions 2020 –

POLLUTANT	No. of emission points for each pollutant	Authorised annual mass flow per pollutant [kg/year]	Annual average Mass Flow from self-checks for each pollutant [kg/year]	Emission factor for each pollutant [g/m²]
Particulate material	22	48,824	2,893	1.28
Lead	11	641	3	0.001
Fluorine	11	6,412	505	0.22
VOS	2	23,652	1,016	0.45
Aldehydes	2	9,461	69	0.03
Sulphur oxides	11	388,199	56,669	25.17
Nitrogen oxides	11	476,106	9,735	4.32
CO	7	23,652	2,229	0.99
Crystalline silica	1	2,015	-	-

Definition	Value
Production discharged in warehouse [m²/year]	2,251,506

9.1 Greenhouse gas emissions

Table 9.6 – Greenhouse gas emissions –

Year	Consumption of natural gas [Sm3/anno]	CO2 emission [t/year]
2017	11,782,248	23,306 **
2018	8,951,534	17,802 **
2019	10,301,695	20,489 **
2020	9,544,918	19,071 **

**Certified CO_2 emissions.

CO_2 emissions, for the years up to 2012, have been calculated taking into consideration only those coming from the combustion of natural gas.
Starting from 2013, with the inclusion of companies in the ceramic sector in the ETS system for the period 2013-2020, CO_2 emissions were calculated as required by law (Italian Legislative Decree 30/2013) and checked by external body, see Table 9.6. The following are the references of Cerdomus regarding the emission trading scheme and the results of the checks carried out:

Plant authorisation No.: 2256
Unique identifier No.: IT000000000205244
Certifying body: Certiquality s.r.l.
ETS emission data validation - 2017: 624/18, audit on 07-08/03/2018
ETS emission data validation - 2018: 624/1/19, audit on 19-20/03/2019
ETS emission data validation - 2019: 624/20, audit on 19/03/2020
ETS emission data validation - 2020: 624/1/21, audit on 10/02/2021

10. *WASTE*

Below is the list of waste produced at the production site, EWC codes, type, classification, type of waste, state, destination and annual production in kg for 2017 to 2020.

Table 10.1 - Waste identification and production data -

EWC Code	p	Waste Type	State	d	Prod. 2017 (Kg)	Prod. 2018 (Kg)	Prod. 2019 (Kg)	Prod. 2020 (Kg)
150101		Paper and cardboard	S	R	35,290	58,050	36,210	32,690
150102		Plastic	S	R	105,560	73,940	77,210	57,060
150103		Wood	S	R	154,160	120,920	96,610	170,090
150106		Mixed packaging	S	R	112,720	120,160	105,090	80,490
170405		Iron and steel	S	R	114,260	63,140	28,060	41,280
101201		Mixture residues (raw waste)	S	R	4,508,910	3,030,640	1,427,970	385,100
101208		Waste ceramics (fired waste)	S	R	1,527,820	1,460,080	1,391,540	1,441,920
080202		Aqueous sludges containing ceramic materials - sludges from cutting	SSS	R	-	12,800	2,297,580	1,272,420
170904		Construction and demolition waste	S	R	900	-	163,000	-
161106		Refractories	S	R	14,200	15,900	16,660	25,220
170202		Glass	S	R	-	3,880	-	-
170604		Different insulating materials	S	S	-	-	-	3,720
160214		Electronic equipment no longer in use	S	R	2,060	1,815	-	751
Total non-hazardous waste sent for recovery				**R**	**6,575,880**	**4,961,325**	**5,639,930**	**3,507,021**
Total non-hazardous waste sent for disposal				**S**	**-**	**-**	**-**	**3,720**
150111*	p	Spent spray cans	S	R	140	-	-	-
130205*	p	Spent oil	L	R	3,420	3,600	1,200	1,200
101209*	p	Spent lime	DS	S	57,480	62,560	45,500	42,220
150202*	p	Absorbents, Filter sleeves	S	S	3,605	1,030	2,340	-
				R	-	-	-	2,228
060201*	p	Calcium hydroxide	DS	S	-	-	-	4,680
120109*	p	Oily emulsions	L	S	3,240	4,940	7,240	-
170603*	p	Other insulation materials	S	S	1,100	200	560	130
200121*	p	Neon fluorescent tubes	S	R	290	100	100	154
170503*	p	Soil and stones containing dangerous substances	S	S	1,615	-	-	-
160211*	p	Electronic equipment	S	R	60	65	40	36
150110*	p	Packaging cont. haz. subst.	S	S	3,660	1,060	800	-
				R	-	-	-	970
080312*	p	Inks cont. haz. subst.	L	S	3,510	1,330	1,240	1,317
160121*	p	Hazardous components	S	S	220	235	-	-
160107*	p	Oil filters	S	R	-	270	-	-
160602*	p	Nickel-lead batteries	S	S	-	100	-	-
160213*	p	Electronic equipment-monitors	S	R	430	250	-	-
160601*	p	Waste lead acid batteries	S	R	-	-	600	600
120112*	p	Spent waxes and fats	SSS	S	50	245	-	-
160708*	p	Waste containing oil	L	S	-	-	9,880	21,120
Total hazardous waste sent for recovery				**R**	**4,340**	**3,945**	**1,980**	**7,388**
Total hazardous waste sent for disposal				**S**	**74,480**	**71,600**	**67,560**	**69,467**
Total waste produced					**6,654,700**	**5,036,870**	**5,709,470**	**3,587,596**

Legend: **h** = Hazardous waste **d** = Destination (**R**: Recovery, **Di**: Disposal) State: **L** = Liquid, **S** = Solid, **DD =** Dusty. **SSS** = Semi-solid sludge

The raw waste material with EWC code 101201, and the fired waste material with EWC code 101208, are treated as waste and are delivered to and recovered externally by authorised disposal companies, for the proportion exceeding the quantities recoverable within the production cycle.

The above quantities refer to the total waste produced both at the production site of Via Emilia Ponente (Area A of Fig.1.1), and in the warehouse of Via Calamello (Area B of Fig.1.1), and extrapolated from the Standard Form Of Environmental Declaration (Modello Unico di Dichiarazione ambientale (MUD)) which is transmitted annually to the Chamber of Commerce, Industry, Crafts and Agriculture (CCIAA) of Ravenna.

Compared to 2017, from 2018 the above data show a marked decrease in the waste produced, which mainly derives from the lower "generation" of both CER 101201 raw waste and CER 101208 fired waste, due to a decrease in production of finished product deposited in the warehouse.
In 2019, on the other hand, there was an increase of waste produced mainly due to the production of cutting sludge with CER code 080202 generated by the installation of the new full-field sanding line, served by a new wastewater treatment plant which came into operation at the end of 2018.
Finally, in 2020, there was a significant decrease in waste produced mainly due to the increase in the percentage of recovery within the production cycle of waste coded CER 101201 and CER 080202.
The indicator of the internal/external re-use factor of waste/residues is, for the four-year period 2017-2020, at the value of about 99.1%.
Waste is managed in the manner summarized in the following table:

Table 10.2 - Waste identification and related management –

EWC Code	Waste Type	Management
150101	Paper and cardboard	Storage in caissons and transfer to authorized company.
150102	Plastic	Pressing and storage in dedicated area and transfer to authorized company.
150103	Wood (mainly broken pallets which are no longer reusable)	Storage in removable containers and transfer to authorised company.
150106	Mixed packaging	Storage in removable containers and transfer to authorised company
170405	Iron and steel	Storage in caissons in dedicated area and transfer to authorized company.
101201	Residues of preparation mixture (raw waste)	Production waste stored indoors, in a dedicated area, delivered to a company authorised for recovery.
101208	Ceramic waste, tiles (fired waste)	Production waste stored in a dedicated area, delivered to a company authorised for recovery.
080202	Aqueous sludges containing ceramic materials - sludges from cutting	Production waste stored indoors in a special removable container in a dedicated area, delivered to a company authorised for recovery.
170904	Construction and demolition waste	Rubble produced occasionally, stored in a dedicated area, granted to a company authorised for recovery.
170107	Mixtures of concrete and bricks	Produced occasionally, stored in dedicated area and handed over to authorised company for recovery.
161106	Refractories	Produced occasionally during maintenance periods, stored in removable containers supplied as required by authorised companies.
170202	Glass	Temporarily stored in special containers and disposed of by an authorised company.
170411	Copper cables	Storage in caissons in dedicated area and transfer to authorised company
160214	Electronic equipment no longer in use	Temporarily stored in special containers and disposed of by an authorised company.
150111*	Spent spray cans	Temporarily stored in special containers and disposed

		of by an authorised company.
160601*	Lead batteries	Temporarily stored in special containers and disposed of by an authorised company.
130205*	Spent oil	Storage in containers in dedicated area and transfer to authorised company. Maximum quantity 500 l.
101209*	Spent lime	Produced by the kiln fume purifier, collected in Big Bags of 300 kg and given periodically to authorised company for disposal.
150202*	Filter sleeves and filter material mixed	Temporarily stored in Big Bags and disposed of by an authorised company.
170503*	Soil and stones containing dangerous substances	Produced occasionally, stored in special containers and disposed of by authorised companies.
120109*	Oily emulsions	Storage in containers in dedicated area and transfer to authorised company.
170603*	Other insulation materials	Produced by the maintenance of firing kilns, collected in Big Bags and delivered to an authorised company for disposal.
200121*	Neon fluorescent tubes	Stored indoors in a special sector and delivered to an authorised company.
160211*	Discarded equipment containing chlorofluorocarbons	Produced occasionally during maintenance periods, temporarily stored in special containers and disposed of by an authorised company.
150110*	Packaging containing dangerous substances	Packaging waste placed on pallets, covered with shrink nylon, delivered to authorised disposal company
080312*	Waste ink containing dangerous substances	Temporarily stored in special containers and disposed of by an authorised company
160121*	Diverse hazardous components (oil-stained pipes)	Temporarily stored in special containers and disposed of by an authorised company
160107*	Oil filters	Temporarily stored in special containers and disposed of by an authorised company.
160602*	Nickel-lead batteries	Stored in special indoor collection containers and transferred to authorised company for recovery.
160213*	Discarded electronic equipment (monitors)	Temporarily stored in special containers and disposed of by an authorised company
061302*	Spent activated carbon filters	Temporarily stored in special containers and disposed of by an authorised company
120112*	Spent waxes and fats	Temporarily stored in special containers and disposed of by an authorised company
160708*	Waste containing oil	Temporarily stored in special containers and disposed of by an authorised company

11. *SOIL AND SUBSOIL*

The land occupied by the site was, before 1969, designated as an agricultural zone. As regards the geographical location and geological classification of the two sites, please refer to Chapter 1 of the present Document. Since the foundation of the company there have never been any forms of pollution of any kind and currently, the uncovered area is waterproofed by means of asphalting and concrete.
Areas used for storing raw materials are all protected by canopies and are not, therefore, affected by the weather. The canopies are equipped with guttering that provides for the normal outflow of rain water to the sewers.
The goods loading/unloading areas are all paved, while the areas dedicated to the storage of raw materials are cemented (containment box).
The operations of unloading the raw materials for the formation of the paste mixture always take place in covered areas.
The technical report assessing the real possibility of soil and groundwater contamination is posted annually on the AIA-IPCC portal pursuant to Ministerial Decree no. 272 dated 13/11/2014; based on the considerations and measures adopted for the prevention and/or reduction of soil and groundwater pollution, it is believed that it is not necessary to proceed with a report.

12. *NOISE*

The CERDOMUS srl plant in Via Emilia Ponente 1000 covers an area of about 105,000 square meters (about 50,000 square meters of warehouse with its production area, offices and showroom) and borders:

- to the SOUTH -SOUTH-WEST with Via Emilia Ponente, crossed by heavy traffic. Past the street there are industrial activities and the R1 Receptor.
- to the WEST -NORTH-WEST with Strada Borello, past which there is an agricultural area and the R2 and R3 Receptors.
- to the EAST with an agricultural area and the R4 Receptor.
- to the NORTH-NORTH-EAST with other industrial warehouses.
- to the EAST-SOUTH -EAST with other industrial activities belonging to the same class.

Receptors R5 and R6 can be found in the storage area located to the NORTH-NORTH-EAST.
The finished product is temporarily stored to the NORTH -EAST area of the main plant and subsequently transported by truck -shuttle to the storage area located to the NORTH of the main plant (with entrance in Via Calamello). The finished products are then loaded on the customers' trucks via forklift trucks.
The processing of floor tiles and coverings is carried out in some "main departments" termed:

- MONO DEPARTMENT 2
- GRANITAL DEPARTMENT
- ATOMIZER DEPARTMENT 1
- ATOMIZER DEPARTMENT 2
- LAPPING AND SQUARING DEPARTMENT

Most emissions remain active 24 hours.
The production and ancillary facilities of the production hall are located inside the warehouses, with external noise input (e.g.: motors, fans, etc.).
In the storage area there are forklift trucks that follow an obligatory path.
Customers' heavy vehicles (about 10-20 per day) only reach the loading and unloading area adjacent to the entrance.

The Municipality of Castel Bolognese is equipped with acoustic zoning which adopt the limits set
by the Italian Prime Ministerial Law D.P.C.M. dated 14/11/1997. The area analyzed belongs to Class IV and V.

The different classes are shown in the table 12.1 – municipal classification (article 1):

Class I - Specially protected areas. This class includes areas in which peace is a fundamental element for their functions: hospitals, schools, rest and recreational areas, rural residential areas, high urban interest areas, public parks, etc.

Class II - Areas intended for mainly residential use. This class includes urban areas mainly affected by local vehicular traffic, with a low population density, with a limited presence of commercial activities and the absence of industrial and craft activities.

Class III – Mixed areas. This class includes urban areas affected by local vehicular traffic or traffic crossing, with average population density with the presence of commercial activities, offices, a limited presence of craft activities and the absence of industrial activities; rural areas affected by activities using operating machinery.

Class IV – Intense human activity areas. This class includes urban areas affected by heavy vehicular traffic, with high population density, with a high presence of commercial activities, offices, and craft activities; areas near major roads and railway lines; ports; areas with limited presence of small industries.

Class V – Mainly industrial areas. This class includes areas affected by industrial settlements and with few houses.

Class VI – Exclusively industrial areas. This class includes areas exclusively affected by industrial activities and without residential areas.

Table 12.1: Absolute noise emissions limit values – Leq in db (A) (article 3) Italian Prime Ministerial Decree dated 14/11/1997

Land use destination classes	Reference Times	
	Daytime (06.00 am-10.00 pm)	Nighttime (10.00 pm-06.00 am)
I specially protected areas	50	40
II mainly industrial areas	55	45
III mixed areas	60	50
IV intense human activity areas	65	55
V mainly industrial areas	70	60
VI exclusively industrial areas	70	70

Receptors:

The current level of noise was measured “pre-work”, i.e. without any kind of ongoing activities, in order to determine future levels of noise.

The sensitive reception point examined is:

R1 – House located to the SOUTH of the plant analyzed (Class IV);

R2 – House located to the WEST of the plant analyzed (Class III);
R3 – House located to the NORTH-WEST of the plant analyzed (Class III);
R4 - House located to the NORTH-EAST of the plant analyzed (Class V);
R5 – House located to the NORTH of the warehouse analyzed (Class IV);
R6 – House located to the NORTH-EAST of the warehouse analyzed (Class IV);

The contributions to the R1, R2, R3 and R4 receptors will be considered for daytime and nighttime, given the operating hours of the plant (24h for most emissions).
The contributions to the R5 and R6 receptors will instead be only considered for daytime, given the operating hours of the warehouse (max 08.00 am-06.00 pm).

CONCLUSIONS

STUDY RESULTS (RECEPTORS) - report dated 11/12/2019, carried out by STUDIO INGEGNERIA Dott. GOZZI COSTANTINO

Receptor	TIME SLOT	Residual level plants off dB(A)	Environmental level plants on dB (A)	Differential dB (A)	dB(A) limit Italian Prime Ministerial Law D.P.C.M. 14 /11/1997	Differential Limit dB (A) allowed
External R1	06.00-22.00	59.2	63.4	4.2	65	5
	22.00-06.00	56.4	56.6	0.2	55	3
External R2	06.00-22.00	56.8	59.2	2.4	60	5
	22.00-06.00	46.0	48.2	2.2	50	3
External R3	06.00-22.00	57.9	59.9	2.0	60	5
	22.00-06.00	46.1	48.1	2.0	50	3
External R4	06.00-22.00	53.4	56.6	3.2	70	5
	22.00-06.00	38.4	41.2	2.8	60	3
External R5	06.00-22.00	53.4	55.6	2.2	65	5
External R6	06.00-22.00	50.5	52.7	2.2	65	5

STUDY RESULTS (BORDER POINTS)

Border point	TIME SLOT	Environmental level plants on dB (A)	Limit dB(A) Italian Prime Ministerial Law D.P.C.M. 14/11/1997
P1	06.00-22.00	64.2	70
	22.00-06.00	58.6	60
P2	06.00-22.00	63.4	70
	22.00-06.00	57.9	60
P3	06.00-22.00	64.6	70
	22.00-06.00	58.5	60
P4	06.00-22.00	55.8	70
	22.00-06.00	52.2	60
P5	06.00-22.00	60.4	70
	22.00-06.00	50.2	60
P6	06.00-22.00	62.4	70
	22.00-06.00	52.6	60
P7	06.00-22.00	69.7	70
	22.00-06.00	59.3	60
P8	06.00-22.00	55.8	70
	22.00-06.00	53.2	60
P9	06.00-22.00	55.5	70
	22.00-06.00	52.6	60
P10	06.00-22.00	58.0	70
	22.00-06.00	50.9	60

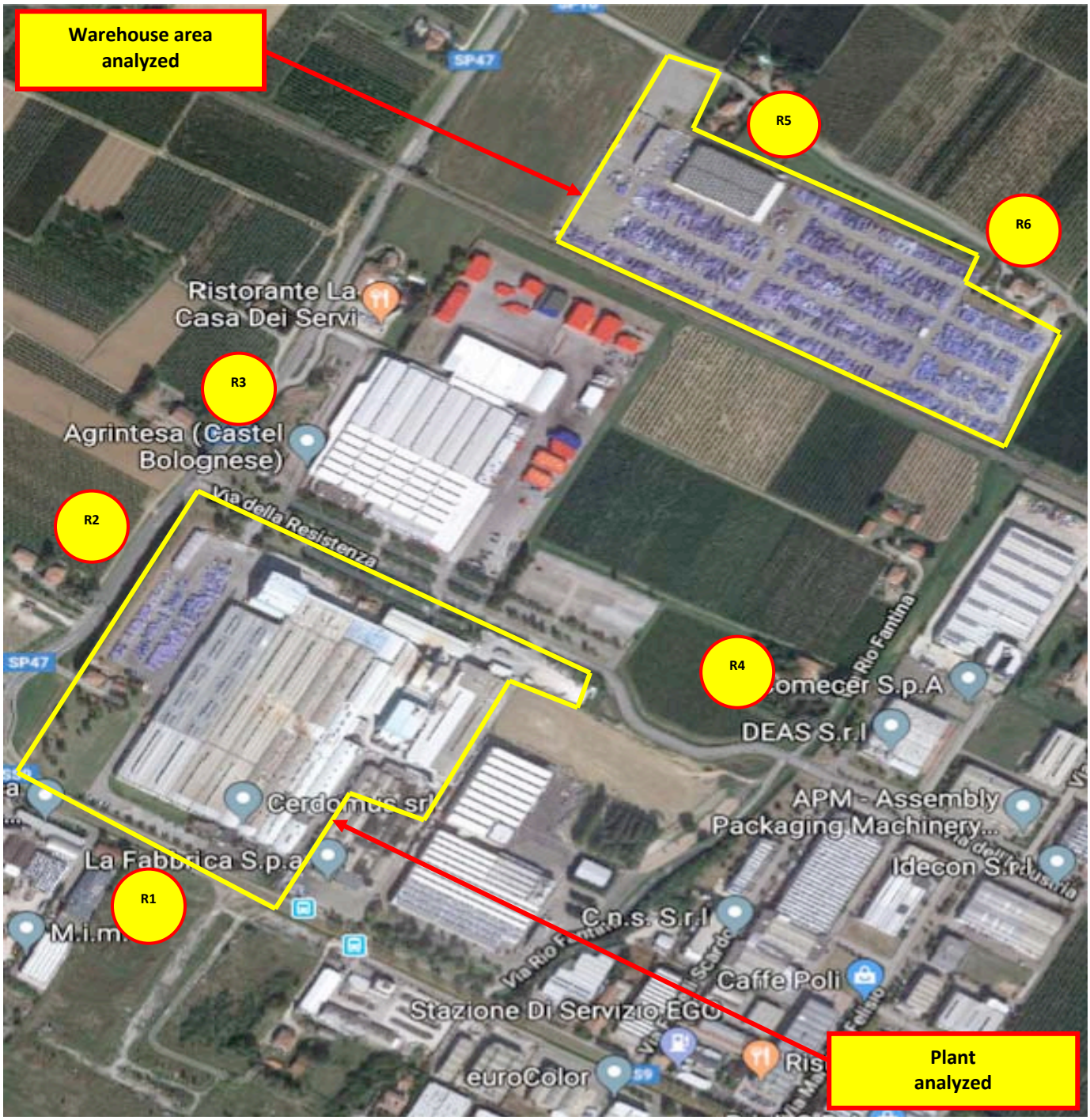
Evaluation of results:

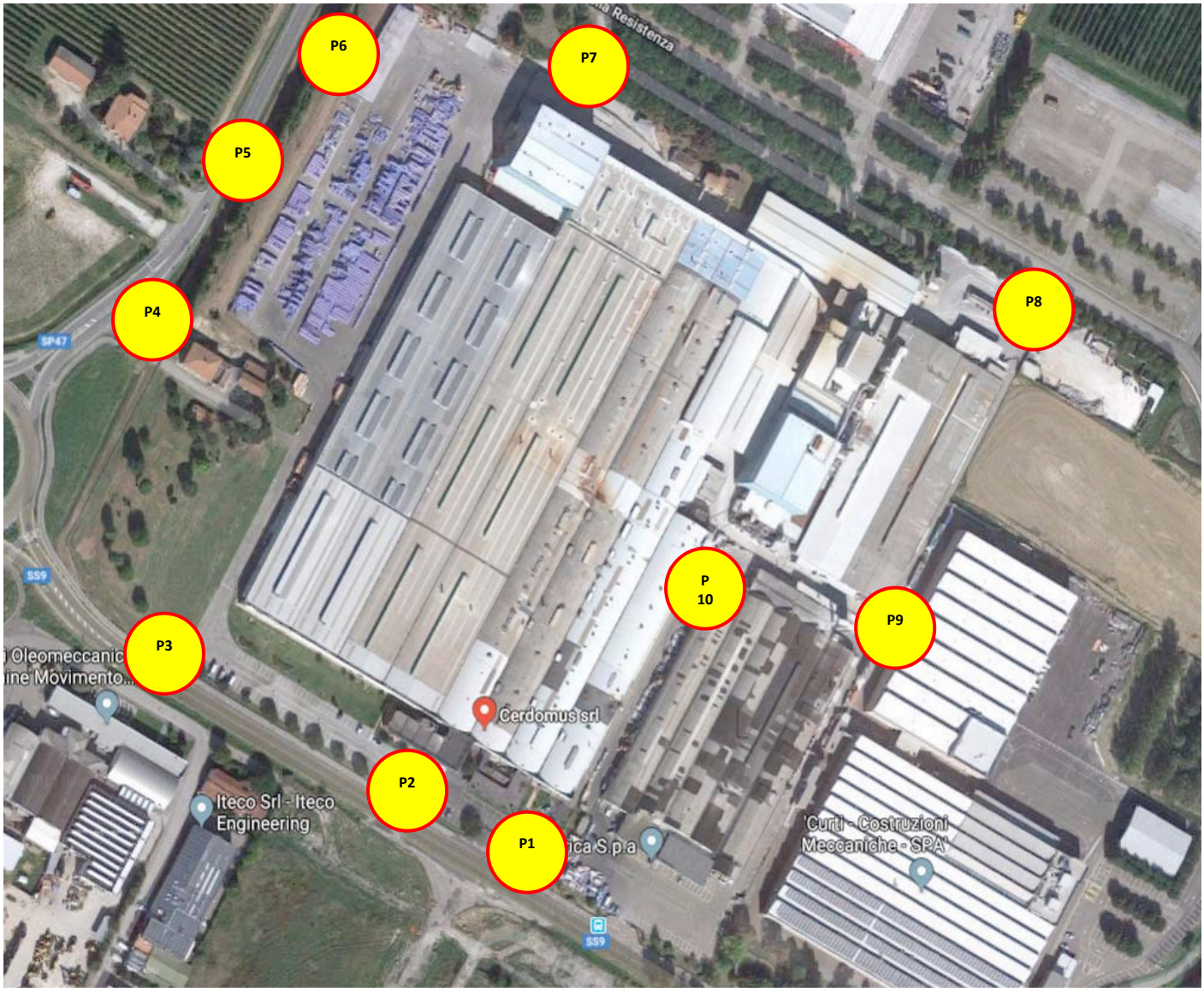
Taking into account the worst conditions imposed in the calculations for precautionary purposes, the study falls within
the set limits.
Comparing the values with the legal limits set by Italian Prime Ministerial Law D.P.C.M. 14/11/1997, all simulations
show that:

1. The absolute noise limits are respected;

2. The differences between the expected environmental noise level, measured within the receptor's window, and that of residual noise (differential criterion) is less than 5dB in daytime and less than 3dB at night.

AERIAL VIEW WITH IDENTIFICATION
OF THE AREA ANALYZED, RECEPTORS, BORDERS, AND VEHICULAR ROAD TRAFFIC





External vehicular traffic movements

The flow of vehicles arriving and departing from both the production plant and the shipping warehouse has never given rise to complaints from the population or local authorities.
This involves a total of 10-20 trucks per day, scarcely material when compared to the more than 1000 heavy vehicles that transit the SS Via Emilia every day on average (Source: Municipal Police of the municipality of Castel Bolognese). Municipality of Castel Bolognese
This heavy traffic has a significant impact on external noise, especially at the production site, which is located on this main road.

13. *BIODIVERSITY*

The Cerdomus site is located in the Industrial Area of Castel Bolognese, divided into two areas, used as a production building and finished product warehousing.
As already mentioned in point 1.3, the surface area of the company includes:

→ the production site of Via Emilia Ponente (area A of Fig.1.1), with a total area of 104,239 m^2 of which 55,720 m^2 of built-up area, from which a biodiversity index is shown:

i_b = *built area/tot.area = 0.53*

The total waterproofed surface is approximately 87,500 m^2, hence a waterproofing index:

i_i= waterproofed area/total area= 0.84

The remaining non-waterproofed area is dedicated to greenery and planting, from which the index:

i_{vp}= *green and planted area/total area= 0.16*

→ the warehouse in Via Calamello (area B of Fig.1.1), with a total area of 84,954 m^2, of which 4,241 m^2 of built-up area, from which a biodiversity index is shown:

i_b = built area/tot.area = 0.05

The total waterproofed surface is approximately 70,000 m^2, hence a waterproofing index:

i_i= waterproofed area/total area= 0.82

The remaining non-waterproofed area is dedicated to greenery and planting, from which the index:

i_{vp}= *green and planted area/total area= 0.18*

In the last three years, the biodiversity and waterproofing indices have not changed for either of the 2 sites.
The outer open areas have asphalt or concrete surfaces to ensure the waterproofing of the underlying soil and thus avoid any form of infiltration of any dispersed substances.
At the production site, part of the run-off water is channelled into collection tanks and then sent to the water purifier.
In the warehouse in Via Calamello, the run-off waters are conveyed to a rolling basin before being let out into a surface water body (Rio Fantino).
In the last three years, the planting index has not changed for either of the two sites.

Since 2014 the company, in collaboration with the trade association Confindustria Ceramica, has introduced best practice phytosanitary rules in the management of the shipping of the tiles to the USA to prevent the introduction of foreign organisms to the ecosystem in that country.
The added value resulting from the application of a monitoring and inspection system following these guidelines can be seen in the following assurances offered the customer:

- Control of the storage and preparation process of the pallet withdrawn from the warehouse and destined for the USA;
- Control of the process of loading in USA-bound shipping containers in order to prevent the presence of pests (eg: gastropods, insects, seeds, etc…);
- Control of service delivery by applying the principles of traceability;
- Verification of the system by persons appropriately trained by The Plant Health Service of the Emilia-Romagna Region.

The certification of the adoption of this best practice for shipping to the USA was carried out in June 2014 by Certiquality and includes the CERDOMUS and PORCELLANA DI ROCCA brands.
Currently, there are 130 certified Italian companies/brands.

14. *EMERGENCY*

With regard to emergency situations, in addition to prevention activities, a number of activities have been planned to ensure prompt and effective intervention.
The emergency plan clearly indicates what actions and practices should be undertaken to ensure personal safety and minimise environmental impact.
Therefore:

- There are first-aid intervention teams who have been properly trained and organized in such a way as to ensure continuous coverage;
- Checks are carried out on first aid and fire fighting equipment to make sure that they are effective, efficient and complete;
- Staff are properly informed of what to do in an emergency;
- To deal with faults in the purification plants, planned, preventive maintenance systems have been adopted by the company so as to always ensure proper operation of the dust and fume suction fans. The company also carries out checks, at specified dates, for any vibrations of moving parts and carries out maintenance routinely whenever there is a malfunction;
- All purification plants are equipped with pressure switches capable of detecting any faults or malfunctions. Controls have daily records;
- Any accidental spills are channelled to the sewage treatment plant;
- Fire drills are planned.
- Alerting and evacuation drills are regularly carried out.

15. *SAFETY AND HYGIENE IN THE WORKPLACE*

Cerdomus S.r.l. has drawn up the risk evaluation document on the basis of Italian Legislative Decree no. 81/2008 in its plant, identifying potential hazard sources and planning improvement measures.

In these analyses account was taken of:

- Technological changes to the plants and / or production methods to be used;
- Preparing risk reduction procedures;
- Verification of measures taken;
- Training and information for all staff.

To measure airborne chemical agents the company carried out, as it does every year, environmental and personal samples (entrusted to the Centro Ceramico laboratory in Bologna) in order to determine the levels of job-related exposure of the workers in compliance with UNI EN 689.

To assess the performance of the site regarding occupational safety and hygiene, statistical parameters extrapolated from the register of accidents and occupational diseases that the company has (see Table 15.1) have been used.

Table 15.1 - Safety and hygiene: parameters and indicators for evaluation –

Year	No. of accidents	No. of hours worked	No. of persons employed	Injury days	Seriousness index	Frequency index	Duration average
2017	3	302,994	189	61	0.20	9.9	20.3
2018	6	242,786	183	213	0.88	24.7	35.5
2019	5	259,379	172	123	0.47	19.3	24.6
2020	2	235,212	170	95	0.40	8.5	47.5

The injury and accident rates improved and decreased in 2020 compared to previous years.

16. *EXTERNAL VEHICULAR TRAFFIC MOVEMENTS*

The flow of vehicles arriving and departing from both the production plant and the shipping warehouse has never given rise to complaints from the population or local authorities.
This involves a total of 20/30 trucks per day, scarcely material when compared to the more than 1000 heavy vehicles that transit the SS Via Emilia every day on average (Source: Municipal Police of the municipality of Castel Bolognese).
This heavy traffic has a significant impact on external noise, especially at the production site, which is located on this main road.

17. *ELECTROMAGNETIC POLLUTION*

At the production site of Via Emilia Ponente (area A) are present:

- One inbound medium voltage electric switch cabinet (15,000 V);
- Three transformer cabinets MV/LV;
- One LV/MV transformer cabinet serving the cogeneration engine owned and operated by HERA Comm;
- One LV / MV transformer cabinet serving the cogeneration turbine (currently not in operation).

All these cabinets are located in generally non-operational areas, and so induced electromagnetic pollution is not considered to be significant.

18. *OZONE DEPLETING SUBSTANCES*

At both sites, there are air conditioning systems for the air conditioning of office, production and canteen/break areas.
All plant and equipment is regularly surveyed and undergoes regular maintenance and cleaning (at least twice a year).
There are 29 systems with a quantity of refrigerant greater than 3kg (of which 3 containing R22). They are checked at least once a year by a qualified professional for leaks, have a proper system booklet, and are entered on the F-GAS portal.
With regard to systems containing R22 there is no planned disposal plan and they will continue to be in operation for the remainder of their useful lives, at which point they will be substituted as required by other systems using newly designed types of refrigerant.

19. *PLANNED OBJECTIVES AND TARGETS*

Objectives	Milestone/s	Indicator	Responsibility	Resources	Completion/ Deadline	Progress
Reduction of energy costs for lighting the internal and external areas of the plant	Installation of LED lights to replace traditional ones starting from the areas of the warehouse where they are used 24 hours a day	**€**	Energy Manager	Technical Department Maintenance Manager HSE	31/12/2021	**IN PROGRESS** The replacement of traditional lights with LED ones is in progress, already carried out for example in the firing area.
	Installation of LED lights to replace traditional ones in the remaining areas of the plant to light				31/12/2023	
Reduction of emissions deriving from the firing of ceramic material and reduction of methane consumption	Shutdown and demolition of 2 firing kilns currently installed in the Cerdomus factory and installation of a new firing kiln with the same production capacity as the two to be removed.	**Nm3/h** **Smc/h**	Managing Director	Production Director Technical Department Maintenance Manager SACMI	30/06/2022	**IN PROGRESS** Defined a new production layout which involves the removal of two of the current three firing kilns with a new generation kiln with equal/higher production capacity.
Increase in energy efficiency	Installation of a new cogeneration plant, 2.5MW in size, optimized according to the company's consumption and with thermal recovery for heating slip waters.	**€**	Energy Manager	Technical Department Maintenance Manager HSE	30/06/2023	**IN PROGRESS**
Mitigation of emissions (noise)	Installation of silencer for chimney E24	**€**	DQA	Technical Department Maintenance Manager HSE	31/08/2021	**IN PROGRESS**
Skills and awareness of staff as pertains the environment	Raising awareness of operating staff on environmental matters. Internal training/information on the correct management of environmental emergencies, with particular emphasis on good practices to be implemented in the event of spillage of substances near surface water	**Man-Hours**	DQA	RQ Environmental Manager HSE	30/06/2021 (replicated annually)	**IN PROGRESS**

20. *GLOSSARY*

Initial Environmental Analysis: written document containing the analysis of performance and of the impact with regards to the company's environmental issues.

Environmental aspect: business activities that interfere and interact with the environment.

Atomization: controlled drying of the nebulized slip using hot air.

Firing: thermal process with which the ceramic material acquires the mechanical and chemical inertia characteristics of the product.

Vein Colouring: mixture colouring process during the atomization process.

dB: decibel, unit of measurement of sound pressure level.

dB (A): sound pressure level expressed in dB whose individual spectrum components have been passed in frequency according to curve A. Weighting A gives greater weight to frequencies ranging from 1000 to 4000 Hz, while reducing that of high frequencies and those below 500 Hz. The levels weighted to and then expressed in dBA are comparable to the auditory response of individuals.

Environmental effects: any total or partial variation, positive or negative, consequent to site activity.

EMAS: EU system which companies carrying out industrial activities can voluntarily join to evaluate and improve the environmental efficiency of industrial activities and to present this to the public with relevant information. The aim of EMAS is to continuously improve the environmental efficiency of industrial activities.

Gaseous emissions: are divided into - channelled, which exit the plants' chimneys; diffuse, which refer to areas of a certain size containing evaporating or vented surfaces of limited capacity.

Drying: thermal process with which almost all of the water contained in a pressed body is eliminated.

Frits: pre-packed glass that is ground and applied to the tile surface. Cooling leads to the solidification of the molten layer thus forming a glass which gives the tile surface both a particular aesthetic aspect (colour brilliance, decoration, etc.) and its technical characteristics (hardness, chemical resistance, etc.).

Vitrification: a process during which the ceramic mass glazes as its crystal lattice changes and it shrinks, loses porosity and increases in mechanical strength.

Injury incidence rate: number of injuries / number of employees x 1000

Nm3: Normal cubic metre, volume measurement unit (reference conditions: temperature T = 0 ° C; pressure P 1013 hPa).

NOx: nitrogen oxides; gases produced in combustion processes due to oxidation of the nitrogen contained in both fuels and combustion air. They can lead, in the presence of other pollutants, to the formation of photochemical smog in the atmosphere, especially in densely urbanized areas.

SOx: sulphur oxides; gases produced in the combustion processes by oxidation of the sulphur contained in both fuels and combustion air. They can lead, in the presence of other pollutants, to the formation of photochemical smog in the atmosphere, especially in densely urbanized areas.

pH: measurement of the concentration of H * ions present in a given solution; they give an indication of acidity or alkalinity of the solution being examined.

Pressing: operation with which the atomized substance takes on a precise geometric shape (that of the tile).

Glazing: a method that involves the application of enamels and silk-screen pastes on the ceramic support.

Glazed or enamel: waterproof vitreous coating.

Porcelain stoneware: ceramic tiles made by pressing, with an unglazed surface or with different surface treatments (glazing, decoration, polishing, etc.). The raw materials are mixtures of clays, feldspars and sands, colouring pigments, etc. Firing takes place at rather high temperatures (over 1200 °C), and the resulting structure is very compact (water absorption must be less than 0.5 %). The technical specification of porcelain stoneware is given in Appendix G of UNI EN 14411.

Digital screen printing: decoration technique using inkjet machines for decorating tiles

21. *MAIN LEGISLATIVE REFERENCES*

CERDOMUS established and maintains active a Quality and Environmental Management System which guarantees the identification and updating of the legislation and other mandatory requirements concerning the company activities, defining responsibilities and operating methods for the collection, verification and control of legal requirements applicable to the organization as well as the monitoring of the organization's documentary and action compliance with the legislation.
CERDOMUS declares to comply with the environmental regulatory provisions applicable to its activities, keeping itself updated through the newsletter of its trade association CONFINDUSTRIA CERAMICA, continuous staff training, and having access to specialized companies' advice.
CERDOMUS declares it has not recorded environmental accidents in 2020 and that it complies with all applicable legal requirements.

Sector	Reference law
External Noise	Italian Prime Ministerial Law. D.P.C.M. 01.03.1991 No. 447 dated 26.10.95 Regional Deliberation 673 of 2004 - Definition of the technical criteria for the preparation of the document DEL Emilia Romagna No. 2053 dated 09.10.2001
Single Environmental Document	Italian Law Decree 152 / 06 Regional Law No. 3 of 20 / April 2012 Significant Impact on the Environment Regional Law No. 20 dated 24.03.2000 – Land Use Regional Law No. 21 of 2004 - Prevention and integrated reduction of pollution
Water	Italian Law Decree 152/06 Article 124 et seq. water discharge Italian Law Decree 152/06 Section III Water Management
Waste	Italian Law Decree 152/06 Waste Management Italian Law Decree 152/06 Article 189 et seq. Italian Law Decree 205 of 03/12/2010 New Italian Law Decree 116/2020 of 26/09/2020
Atmosphere - Air Protection and Emission Reduction	Italian Law Decree 152/06 part five Italian Legislative Decree 59/2005 Legislative Decree 102 dated 30/07/2020: EMISSIONS, mod part IV of Legislative Decree 152/06
Authorisations	Italian Law Decree 152/06 art. 269 Regional Law 21/2004
Asbestos cement roofing	Italian Ministerial Decree 06/09/94
Waste water discharge	Italian Law Decree 152/06 Regional Law no. 5 art. 5 of 01/06/2006 Italian Law Decree 267 Article 107 of 18/08/2002
Environmental Damage	Italian Law Decree 152/06 part six
Greenhouse gas generating plants	Italian Law Decree No. 216 Reg. 21/06/2012 No. 601/2012 EU Impl. of Directives 2003/87/EC and 2004/101/EC
CONAI	Italian Law Decree D.L. 152/06 art. 218, Ann. E point 2, Italian Ministerial Decree 22.04.2014
ETS	Directive 2003/87/EC and subsequent amendments EU Reg. No. 600/2012 EU Reg. No. 601/2012 Italian Legislative Decree 30/2013 Document EA6/03 January 2010
E-PRTR	Regulation (EC) No. 166/2006 art. 4 Italian Presidential Decree 157/2011
MUD - Standard Form Of Environmental Declaration	Italian Prime Ministerial Law. D.P.C.M. 24.12.2018 Ann.4

22. *CURRENT AUTHORISATIONS AND ENVIRONMENTAL CERTIFICATIONS*

Sector of Interest	Institution	Authorisation No	Note
AIA - integrated environmental authorisation	Arpae - Agenzia prevenzione, ambiente, energia dell´Emilia-Romagna (Emilia Romagna Prevention, Environment and Energy Agency) Ravenna SAC (Permits and Concessions Service)	No. 608 of 14/09/2007	
		No. 337 of 19/08/2009	
		n.508 16/11/2009	Transfer
		No. DET-AMB (Environmental Decision)-2018-4551 of 06/09/2018	Non-substantial modification and transfer
		No. DET-AMB-2019-2450 of 23/05/2019	Non-substantial modification and transfer
		No. DET-AMB-2019-3996 of 02/09/2019	Non-substantial modification
Environmental CERTIFICATIONS	ISO 14001:2015 Certiquality	Cert. No. 9677 of 04/07/2019	Annual Renewal
	EMAS - Eco-Management and Audit Scheme Italian National Institute for Environmental Protection and Research (ISPRA)	Reg. no. IT-000705 (15/12/2006 1st issue) Renewal of Validation No. E-216 of 04/07/2019	
Quality CERTIFICATIONS	ISO 9001:2015	Cert. No. 27915 of 14/11/2019 reg. no. IT-118707	Annual Renewal
Waste water discharge	Municipality of Castel Bolognese	Plant Prot. No. 14504 of 06/12/2004	Domestic waste water
	Province of Ravenna	Shipping Warehouse (P5) AUA No. 3173 of 20/10/2015	
Regional concessions for well water withdrawals	ARPAe Regional Agency for environment and energy prevention	No. DET-AMB (Environmental Decision)-2018-6277 of 29/11/2018 SISTEB CODE: BO05A0074 and BO03A0066	
Fire Prevention	Fire-Brigade - Provincial HQ Ravenna	*Production plant:* - CPI prot. No. 00001996 of 17/02/2015, file No. 11293, for activities 2.1.B, 3.7.B, 12.2.B, 34.2.C, 49.3.C, 56.2.C, 74.3.C, 70.2.C, 74.3.C, 49.3.C, 1.1.C of Italian Presidential Decree DPR 151/2011. - Certificate of Periodic Renewal of Fire Safety Compliance (Article 5 of Italian Presidential Decree 01/08/2011 No. 151) of 16/12/2019 valid until 17/12/2024.	
		Shipping Warehouse (P5): - CPI prot. 13157/36597 of 21/10/2010 for activity 3.7.B, 4.3.A, 12.2.B, 34.1.B, 36.1.B, 44.1.B, 70.2.C, 74.1.A of Italian Presidential Decree DPR 151/2011 - Certificate of Periodic Renewal of Fire Safety Compliance (Article 5 of Italian Presidential Decree 01/08/2011 No. 151) of 17/10/2018 valid until	
Plant manager for ETS	A.G.E.S. Italian Min. of Environment	No. 2256 of 2011	

Packaging	CONAI	Member Code No. 12917712	
Electric workshop license	Customs and monopolies agency	Prot.2014°12098 of 14/07/2014	
Italian Economic and Administrative Index REA code	CCIAA - Italian Chamber of Commerce, Industry, Crafts and Agriculture	RA- 217992	

23. *REGISTRATION INFORMATION*

This declaration has been drawn up by:

Marco Sangiorgi (Environmental Manager and Management Representative for EMS) and *Marco Ossani* (Environmental Services Technician) and was officially delivered to all Cerdomus S.r.l. employees, up to the rank of department head.
This document is available and can be downloaded from the website: www.cerdomus.com

The next declaration will be drawn up within 1 year.

The management of Cerdomus S.r.l. undertakes to update all the information contained in the Environmental Declaration annually for the purposes of validation.

The verification of this Environmental Declaration was carried out by accredited environmental verifier *Certiquality - registration number of accreditation IT-V-0001.*

NACE 23.31, rev. 2 (ex 26.30)

Any copies, clarifications or details of this Environmental Declaration may be requested from:

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Castel Bolognese, 17/05/2021