

TECHNOLOGY APPLIED TO DRYING AND FIRING

PROSEC

DRYING
AND
FIRING
PROCESSE

YOUR OBJECTIVES, OUR RESPONSE AND COMMITMENT

Quality is the essence of PROSEC, it is not an aim, it is our way of being and of working.

DRYING AND FIRING PROCESSES

PROSEC

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TECHNOLOGY

PROSEC



PROSEC is a company devoted to the manufacture of kilns, dryers, and equipment for industrial drying and firing applications.






The company is made up of a group of professionals with over 30 years' experience in designing and manufacturing kilns and dryers.

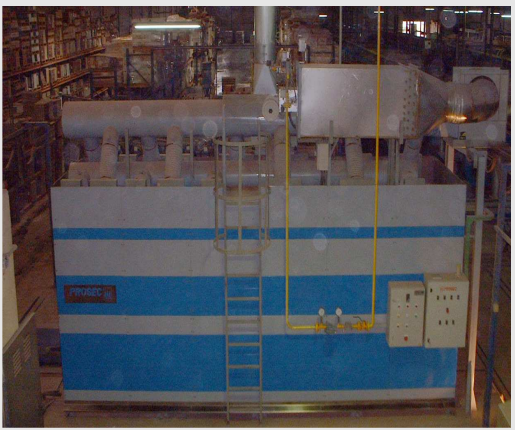
We develop equipment and systems for the production of ceramic floor and wall tile, glazed roof tile, extruded tile, pottery, hollow brick, etc. We also build and install equipment and technology for drying and treating marble and natural stone.


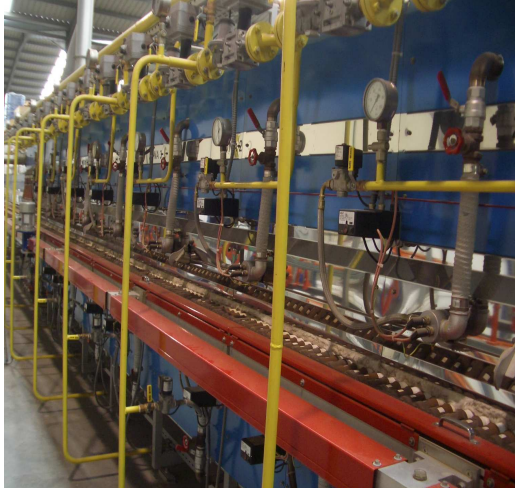
PROSEC offers services such as:

- + Assembly and start-up.
- + Technical after-sales services.
- + Technical support in the drying and firing of materials.
- + Study, modification, and improvement of insulation.
- + Regulation and control of firing curves.
- + Cooling control and/or enhancement.
- + Kiln lengthening in order to raise production capacity.
- + Relocation, revision, and installation of second-hand facilities.

General scheme of the equipment manufactured::

TYPE	FIELD OF APPLICATION	Detail
<p>Single-deck roller DRYER by means of:</p> <ul style="list-style-type: none"> + Hot air + Radiant tubes + Chamber burners 	<p>Different drying applications in ceramics and other materials depending on material properties.</p> <p>Ceramic tile: Drying after pressing, Cutting and polishing of ceramic floor and wall tile.</p> <p>Pottery: Ceramic food containers, ceramic tableware, etc.</p> <p>Marble and natural stone.</p> <p>Glass.</p>	 
<p>Mesh DRYER by means of:</p> <ul style="list-style-type: none"> + Hot air. + Radiant tubes 	<p>Different applications:</p> <p>Ceramic tile: For cutting small-sized items, in ceramic floor and wall tile.</p> <p>Pottery.</p> <p>Marble and natural stone.</p> <p>Glass.</p> <p>Cardboard.</p>	
<p>Infrared DRYER:</p> <ul style="list-style-type: none"> + Gas-fired. + Electric. 	<p>Ceramic tile: Glazing lines</p> <p>Marble: Drying and/or surface heating of slabs and plates.</p>	
<p>Chamber DRYER:</p>	<p>Ceramic tile: Drying and/or heating of ceramic tiles.</p> <p>Pottery</p> <p>Marble: Drying, heating, and curing of slabs and plates.</p>	

TYPE	FIELD OF APPLICATION	Detail
Box PRE-DRYER	<p>Kiln entrance in order to remove residual moisture and preheat the pieces, improving material entry conditions and reducing kiln energy consumption.</p> <p>For Ceramic tile: floor and wall tile.</p> <p>Pottery: Ceramic food containers, ceramic tableware, etc.</p>	

TYPE	FIELD OF APPLICATION	Detail
Single-deck roller KILN	<p>Ceramic tile:</p> <ul style="list-style-type: none"> + Floor and wall tile + Porcelain tile + Trims + Extruded floor tile <p>Pottery: Ceramic food containers, ceramic tableware, ...</p> <p>Glazed roof tile</p> <p>Glazed face brick</p>	 

THE PROSEC KILN



The key characteristic of this kiln, designed and developed as the most versatile kiln on the market, is its inner lining of lightweight insulation bricks under the roller plane and latest-generation ceramic fibre lining in the upper part (with low thermal inertia, far below that of brick, greater insulation capacity, and high refractoriness).

The walls are made up of fibre blocks rigidly secured together with microporous panels in the second fire face, which provide an airtight closure that assures minimum emissivity and maximum uniformity in the inner conditions of the chamber.

The vault, also made of compact fibre elements, is suspended from the structure and allows access into the kiln at any point.

The material is transported by a plane of rollers, each driven by independent gears. The rollers are arranged in sections with motors regulated by frequency inverters. Optionally, this can be implemented with chains instead of gears.

The combustion system consists of high-speed, low-pressure burners, with a wide adjustment range, equipped with silicon carbide nozzles and automatic ignition and flame control devices.

The burners are arranged in regulation groups according to the different kiln zones, and are controlled by motorised valves



Process parameter control is regulated by different systems:

- + Temperature controllers: with a high-precision microprocessor with a PID system for the motorised gas valves in the different kiln zones.
- + Automatic control of cooling pressure, and automatic or semi-automatic control of gas extraction.
- + Cooling regulation by a frequency inverter and motorised valves.
- + Automatic burner ignition and switch-off system against excessive temperature variations.
- + Computer system linked to the control panel, which enables the firing curve to be displayed in analogue and digital form and provides direct read-out and information on alarms, storage of production curves for different models, etc.



BECAUSE THE **PROSEC** KILN

is a tool that facilitates production management, responding to each manufacturer's particular needs.

It is defined by a series of advantages, which materialise in:

+ OPERATIONAL FLEXIBILITY:

The kiln allows rapid start-ups and shut-downs: it can be up and running in 2 to 5 hours, depending on kiln size. The system avoids the problems of refractory lining with low thermal shock resistance, which reduces agility even in emergency cases.

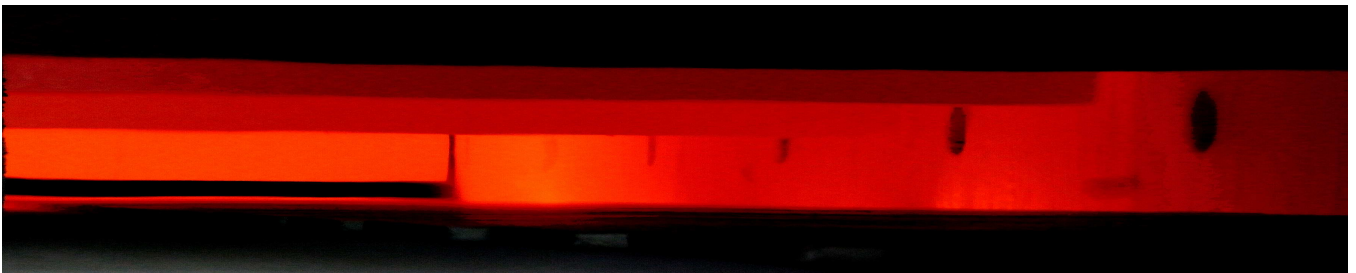
The kiln is well suited for scheduling plant work for a work week: the system enables COMPLETE kiln shut-down over the weekend, without requiring auxiliary workers.

Owing to the kiln's characteristics, any plant operating method can be used: continuous, weekly, or daily, thus eliminating the unproductive costs relating to kiln management. The labour costs entailed in controlling and watching kilns during unproductive periods (weekends at maintenance temperature, etc.) constitute manpower costs that do not lead to greater production.

The relatively inflexible working systems in kilns with refractory brick insulation require production of large lots in order to justify keeping the kiln running. Management of the ensuing stock then raises store-related costs.

+ ENERGY CONSUMPTION:

Owing to the properties of the materials and the way they are made, these materials provide a greater insulation capacity, minimum absorption in the walls, a perfectly airtight closure and, therefore, greater stability of the inner chamber conditions. Energy consumption is reduced as a result of the shorter service start-up time and the rapid, complete shut-down.



+ MAINTENANCE:

The system's properties translate into fewer maintenance requirements and, owing to the kiln's construction characteristics, maintenance is carried out in short periods of time, entailing lower labour costs and less downtime.

The system suppresses the troublesome parts of other kilns, such as the so-called roller insets or wall insets, which frequently give rise to operating problems, either owing to friction with the rollers, sectioning them completely, or by making roller extraction difficult and even preventing this when dirt rings form on the rollers as a result of some ceramic tile cleaning failure.

+ PRODUCTION:

The PROSEC kiln is appropriate for manufacturing many different types of products: third- and fourth-fire products, stoneware tile, red-body and white-body ceramic tile, porcelain tile, special ceramics, glazed roof tile, extruded floor tile, and even hollow brick.

The PROSEC kiln, therefore, enhances the energy consumption–production relationship and, in particular, provides a tool that allows production to be carried out under customised conditions, without production needing to adapt to the conditions imposed by other types of kiln.

A line of such characteristics enables manufacturing to be tailored to demand, without interrupting other production work and avoiding stocks. It also allows work shifts to be eliminated, especially night and holiday shifts, with a complete plant shut-down, without any energy consumption.

It minimises operating and maintenance costs.

At present, in a supply side characterised by the offer of a great quantity of products, inundating the market with very similar models and sizes, in contrast to actual consumer trends that focus on small lots of exclusive products, a kiln that allows customised products to be manufactured, when they are needed, at reduced costs, is the kiln that will yield the greatest benefits and perform most efficiently for a company.



COMPANY

PROSEC offers its clients all the services that complement manufacturing, such as complete technical assistance, engineering and R&D&I, modifications of running plants (control, combustion, insulation, extensions, relocations, etc.), repairs and spare parts.

True technical support consists of not limiting oneself strictly to the supply of materials, and PROSEC provides know-how for drying and firing operations.



PROSEC staff offer over 30 years' experience in the design, manufacture, assembly, and start-up of roller kilns.

Our staff, formerly in charge at MORI IBERICA, has equipped the main companies in the ceramic tile manufacturing sector in Castellon, Spain, with roller kilns. The companies include Porcelanosa, Pamesa, Cerámica Vives, Gres de Nules, Zirconio, Gres de Valls, Gaya Fores, Cerpa, Cerypsa, Inalco, Peronda, Azteca, Estilos Cerámicos, Azulejos Sanchis, Azulejera Alcorense, Hispano Azul, Incea, Cerámica Gómez, Mainzu, La Aranda Alcorense, Keraben, etc.

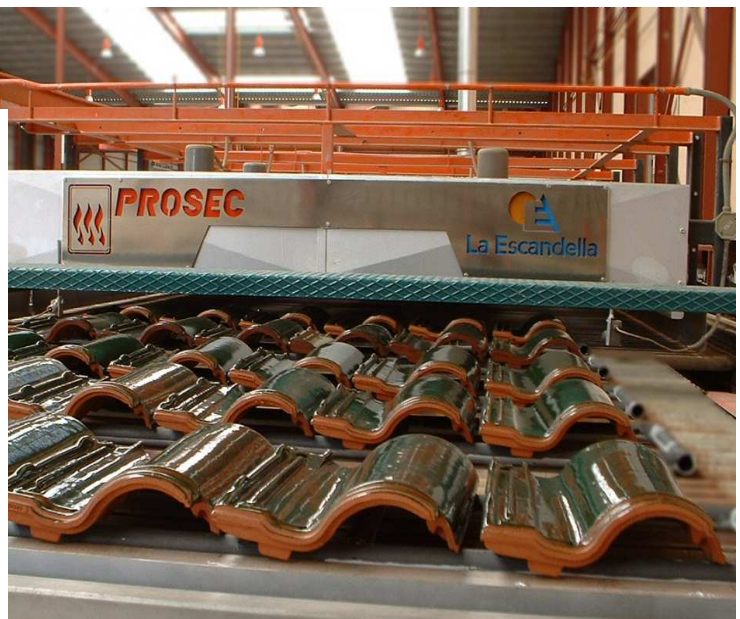
OTHER ACTIVITIES

Particularly noteworthy has been PROSEC's technical and technological contribution to single-deck roller kilns for manufacturing **glazed roof tiles**, which has enabled production to be significantly increased, shortening firing cycles, minimising product losses, notably enhancing end product quality, and incorporating and adapting kilns, as well as auxiliary devices.

These installations provide full process automation, suppressing much of the manpower required in each process phase.

The decision concerning the degree of automation is always taken by the client, based on parameters such as required capital outlay, available space, etc.

Our experience and technology have been incorporated at the main companies in the sector, including Tejas Borja, La Escandella, Hijos de Ramon Borja (Uralita Group).





The marble and natural stone Industry:

We have entered the sector by contributing new patented technology for product development and manufacture in the preparation stages of the different elements and in final curing.

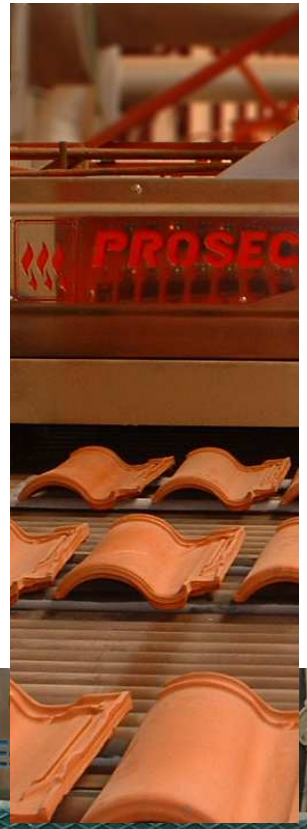
With regard to these activities, our collaboration in the different companies has been continuous; particularly noteworthy have been the major operations, owing to their number and magnitude, at factories belonging to the LEVANTINA Group, a benchmark company on a national and global level in the sector.

New equipment for drying, curing, and uniform heating of the materials, and substitution of a great part of the technology, remodelling facilities in order to raise their efficiency (lower energy consumption, enhanced uniformity, increased production, and higher quality).



In addition, **PROSEC** carries out reforms and/or modifications in plants and facilities, such as:

- + Improvement of the insulation in order to reach higher working temperatures, or repair of the original, deteriorated insulation.
- + Substitution of refractory vaults by latest-generation fibre beams, eliminating the problems of thermal shock.
- + Substitution and adaptation of combustion equipment.
- + Increasing the number of regulation zones to improve control of the firing curve.
- + Improvements in cooling regulation, control, and power.
- + Kiln lengthening to increase production.
- + Kiln relocation.
- + Etc.





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