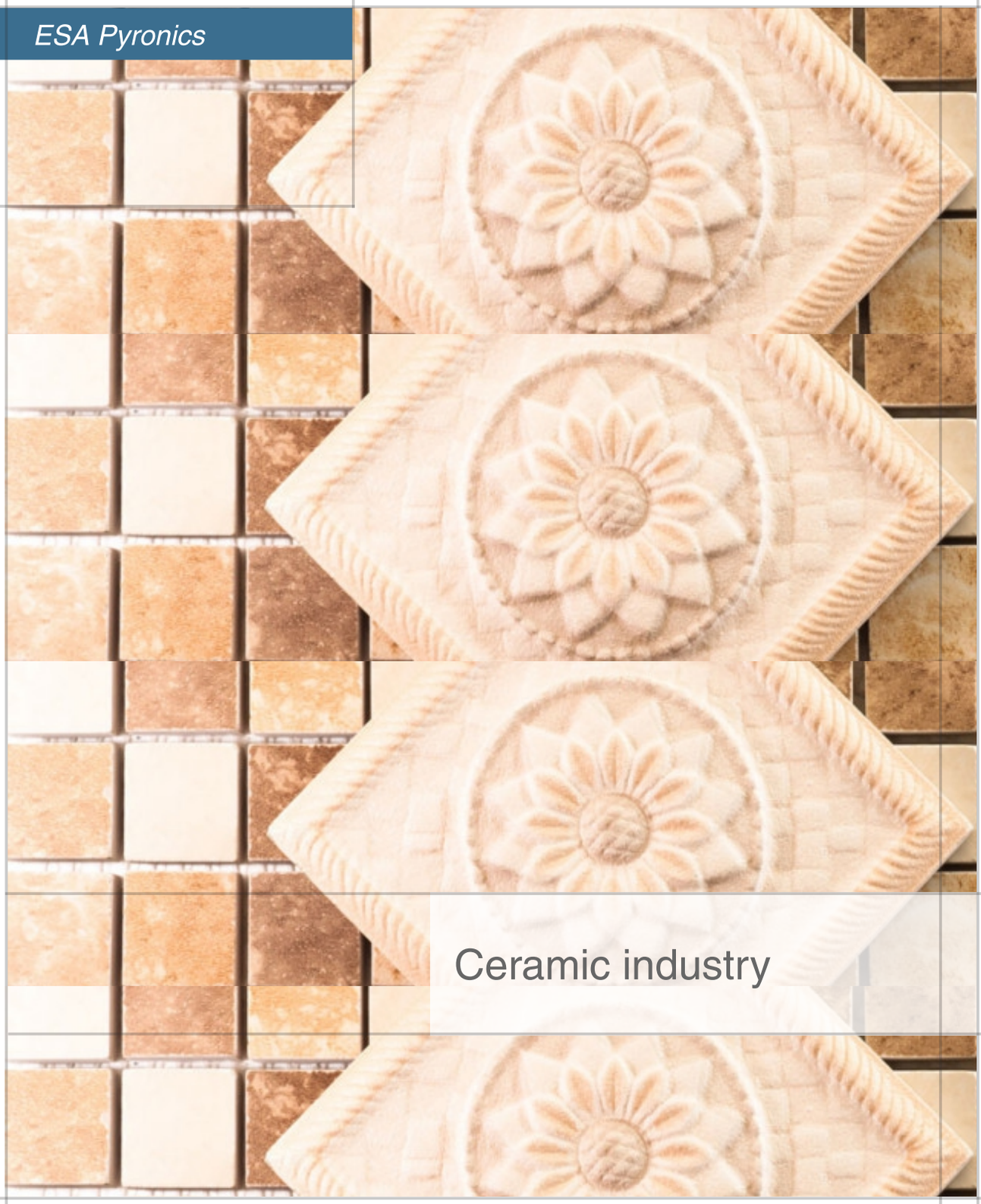
ESA PYRONICS INTERNATIONAL
SIAD Group

ESA Pyronics



Ceramic industry

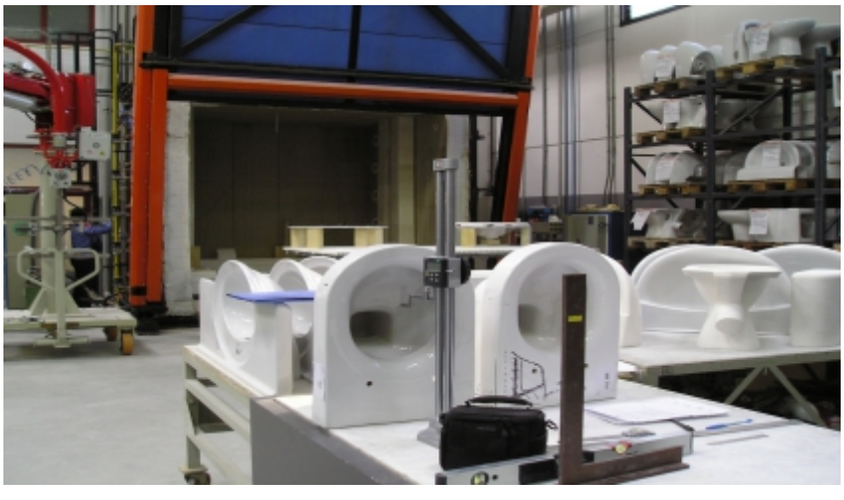
Tiles, extruded products white ware & bricks

Ceramic solutions

ESA Pyronics has developed unique expertise in the ceramics industry for over 40 years accompanying the development and constant transformation of the Italian industry which is, historically the first in the world in this sector.

ESA, also thanks to its location (less than 100 km from the district **Modena - Sassuolo - Faenza**, has been serving all the major brands of the Italian industry, manufacturers of finished products or furnaces manufacturers ovens for years.

The accumulated experience, which is unique in many respects, allows to supply, exclusive products, technologies, solutions, for the production processes of tiles, bricks and extruded.

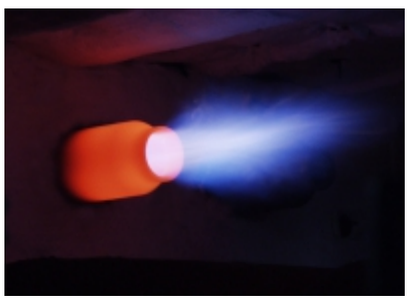


Some installation with ESA burners and systems.

Burners for tunnel and chamber furnaces

Ceramic solutions

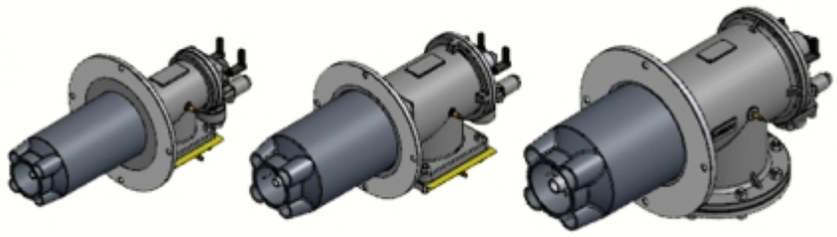
Tunnel furnaces are long chambers in which the wares are loaded on trolleys, which are pushed on a rail at constant or pulsed speed through the kiln. At the entrance the temperature is increased steadily by the combustion products (flue gas, hot air) then once inside the firing zone the wares are directly fired. They finally release heat, passing throught cooling and after-cooling zones. Temperatures reached are very high (1300C°) and the furnace size is commonly very large, so the main combustion problems are linked to the requirement of homogeneity in temperatures and in atmosphere composition. It is a kind of heavy duty furnace, requiring reliable and "robust" burners. In simpler **chamber / shuttle furnaces** the process is divided chronologically and not spatially, so the burners must be flexible enough to provide the different heat requirements which in continuous furnaces correspond to different zones.



EMB burners

To meet these requirements ESA developed the **EMB burner family**, characterized by extreme reliability, flexibility, strength. EMB generates a medium/high speed flame able to work in excess air (up to 400%), thus insuring temperature and atmosphere homogeneity. EMB, also, allow the widest turndown in the category (1.10), so that they can be used for any heating purpose or receipt, and are supplied in 8 capacities from 20 to 900 KW, in SIC, metal or refractory. EMB work with cold or recuperated air: in this second case they are sold as NxT version, with double staged air, in order to lower NOx emissions.

Data sheet reference:
E3004, **E3506,**
E3507 & E3508



Advanced combustion technologies

Pulse firing logic

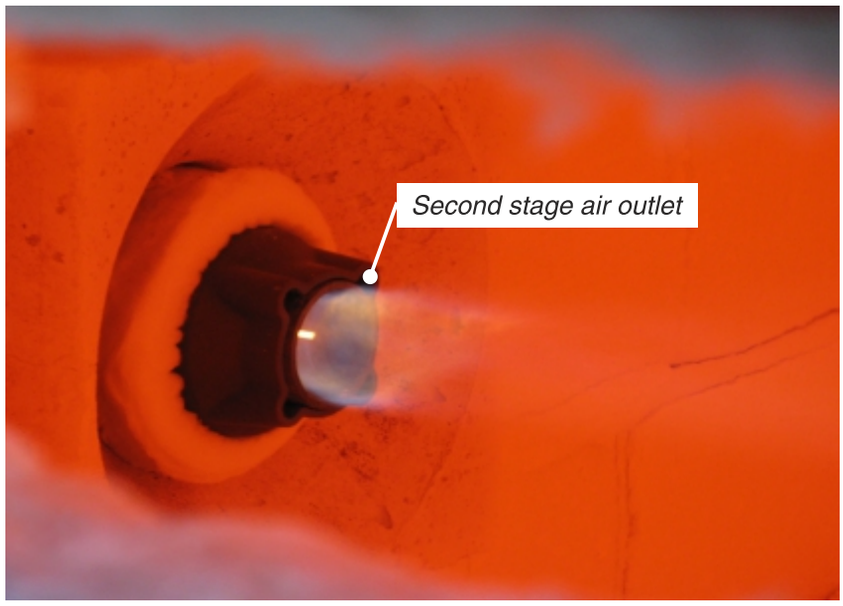
The EMB & REKO burners are perfect for using the exclusive off/min/max ESA **pulse firing logic**, where the burner is used intermittently but without ever switching off. This aspect increases the efficiency and lifetime of the components.
ESA supplies a complete system that provides specific software and hardware: the **ESA PLEX-PULSE** card, the A version of the ESA ESTRO flame control device, the ESA SERIO-TPF servomotor in 3 stage setting as well as the local pulse firing display.

Data sheet reference:
E3004, E7108,
E7014 & **E7301**

Double stage combustion air version NxT

In case the combustion air (or gas) is mixed in separate stages of the burner, it is possible to modulate and control the flame temperature and structure, strongly reducing the formation of NOx.
The burner is provided with more than one air (or gas) source, that corresponds to each combustion stage; each source is regulated with its own air/gas ratio. In the first stage the ratio tends to be in excess of gas (or of air), while during the second stage the combustion is completed.

Data sheet reference:
E3507

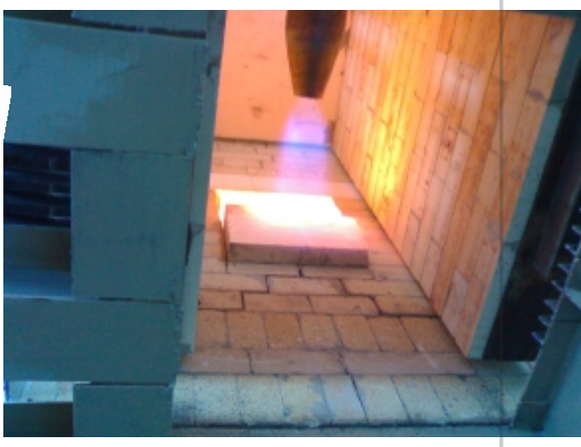


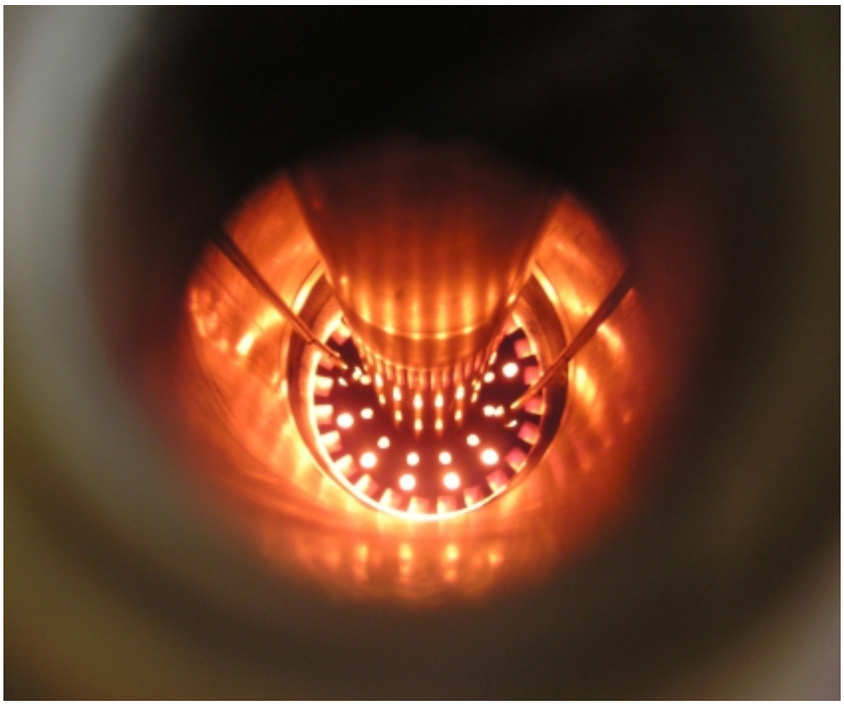
Solutions for brick furnaces

EMB in version with special extension for brick furnaces

EMB burners with combustion head in Silicon carbide are available also with a metallic extension to adapt to the thicker wall of brick furnaces. Peformance does not change.

Data sheet reference: **E3507**





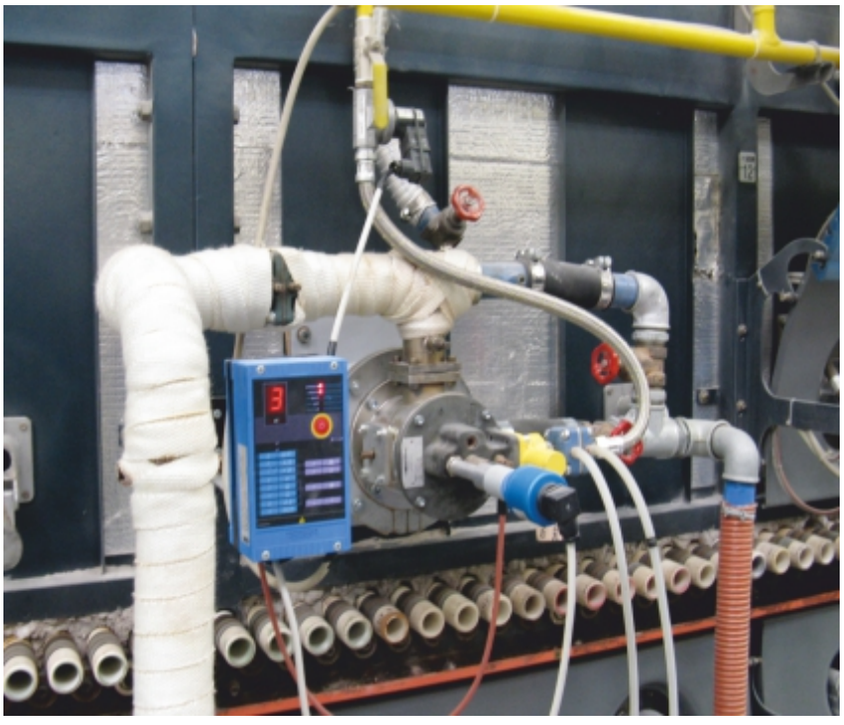
Burners for roller furnaces

Continuous roller furnaces for tiles and extruded products

In **roller furnaces** the products (tiles, extruded, whiteware…) are continuously conveyed over a layer made up of a series of ceramic rolls, along the different temperature zones in which the kiln is divided must.
In single-layer furnaces, burners are situated above and underneath the rollers, in double-layer furnaces, there are two different layers divided by a roof and therefore you have four lines of burners. As the main advantage of roller furnaces is the lack of cumulative conveyor pressures or tensions (as in belt, chain or pusher furnaces), each manufacturer developed various cynematic solutions, to allow best possible movement regulation and optimize cooking receipts. Also due to the growing demand for machines that able to process a variety of products, burners which optimize furnace cynematics and thermodynamics will have to ensure **temperature uniformity**, **promptness** and **extreme precision** also in cooling phases. But first of all, they minimize heat consumption. It is therefore indispensible to use ESA innovative **Self Recuperative Burners** (**REKO**) that besides being provided with necessary features, produce top energy-saving levels both in high fire and low fire conditions.

Data sheet reference: **E3901**

Some REKO burner installation on roller furnaces.



Free flame self recuperative burners

Continuous roller furnaces for tiles and extruded products

Self recuperative burners recycle the heat of exhaust gases to preheat the combustion air before it gets mixed with the fuel. To do this they incorporate a heat exchanger inside the body that can be built in various metallic or ceramic material (SiC). There are many advantages in using a recuperator that is integrated in the burner.

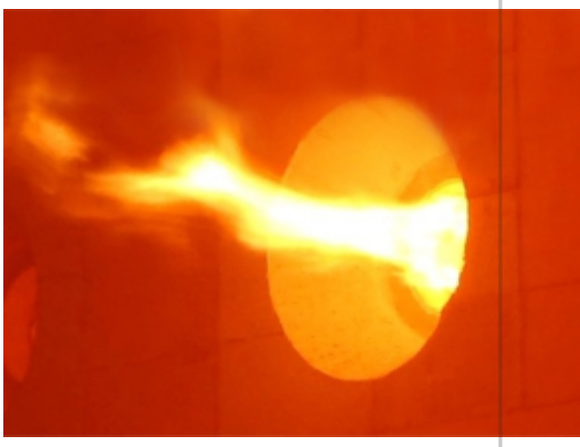
- Higher efficiency is allowed in the combustion process (especially when the working temperature increases) that can reach up to 80% compared with the efficiency of a traditional cold air burner that is still used in many applications.
- Compared with an external heat exchanger, the use of a self recuperative burner is also more practical, flexible and economical.
- Economical, since engineering and installation expenses are reduced as an external heat exchanger must be designed specifically, whilst the self recuperative burners constitute a preassembled “package” with the necessary instruments that are very easy to assemble and replace. Practical, as they are much easier to replace when revamping already existing furnaces thanks to universal adapting flanges.
- Flexible, because if there is a problem, in an external exchanger the entire furnace must be stopped whereas with an integrated exchanger, just the single burner can be fixed.

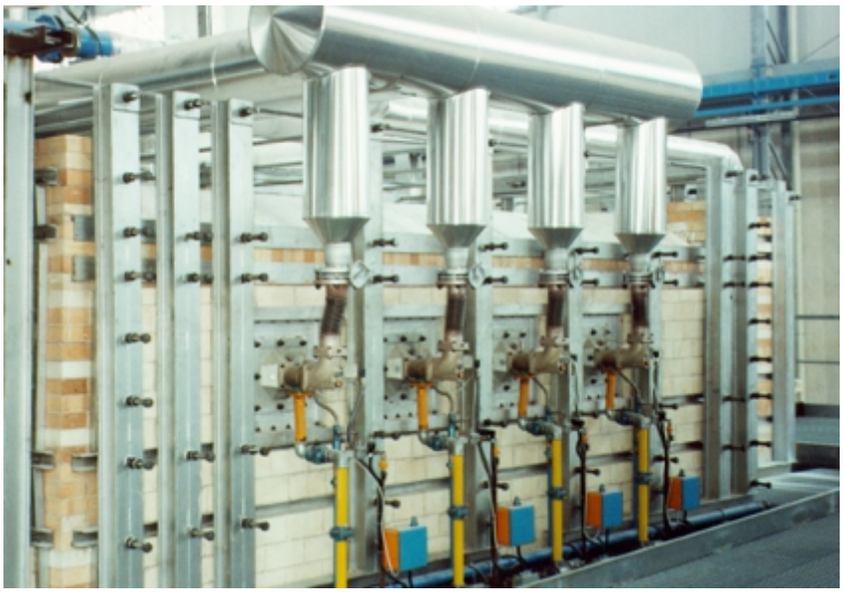
Data sheet reference:
E3901FF

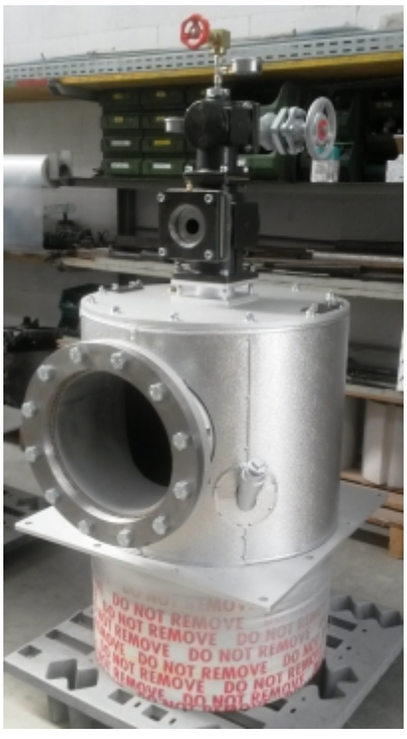
Nozzle Mix burners for frites / enamelling furnaces

NM, ENM & XNM burners

The high temperatures and the need for maximum homogeneity are the base for the design of long-flame **NM burner** series: **ENM, NM, XNM**. Characterized by a very long stabile flame, they are designed for high capacities but available anyways from 10kW to 17MW. They use cold or preheated air (and in that case are supplied in the NxT version, with staged air or withflameless kit, to lower NOx).The NM family is also available in multihead configuration,and can be fed with various fuels: NG/OIL /LPG. All NM families are famous for the extreme precision in firing ratio and in extremely difficult working conditions. For this reason these burners are considered the best solution for frit furnaces.
The XNM version allows to maintain a stable flame working with up to 800% air excess.







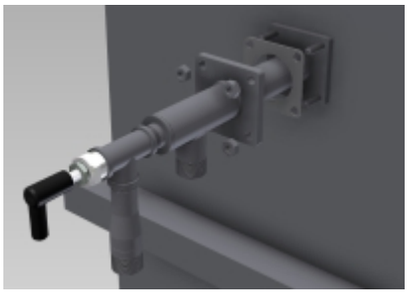
Data sheet reference:
E3501, **E3502** & **E3400**

Oxy fuel solutions for frites furnaces

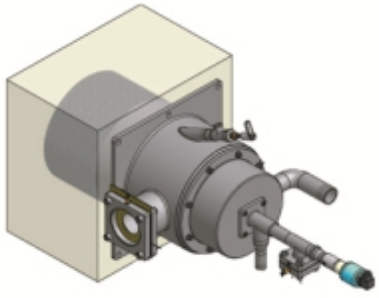
Oxy fuel burners

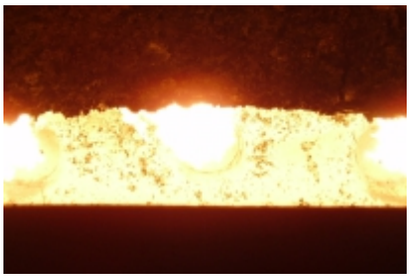
Oxy fuel combustion, allows to quickly reach the high temperatures required by enamelling furnaces with the advantage of maintening low NOx levels. ESA provides several kinds of oxy fuel burners including Air,Gas and Oxy fuels (AGO) models,(multilayer, water cooled,multihead…).

HT is just the most standard and simplest solution, available in several capacities **up to 20MW**. ESA has long-term experience in oxy fuel systems thanks to the synergies with SIAD Group, who is one the leaders in Europe for O2 manufacturing. ESA also can take provides regulation, software, skids or feeding lines along the furnace, well as instrument procurement and selection.



Data sheet reference:
E3700, **E3710** & **E3720**



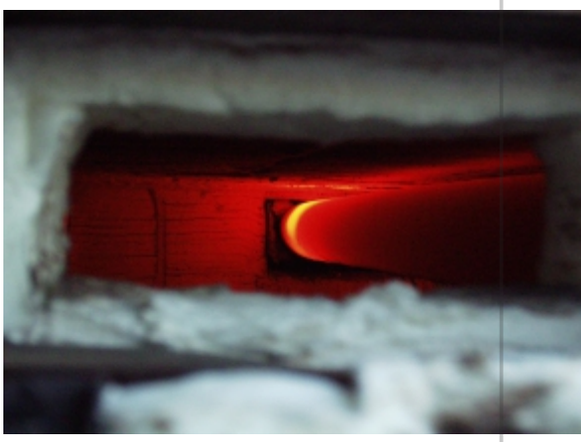


Drying furnace and roller furnaces

Radiant tubes
RT burners

RT are a simple and effective solution in indirect combustion. Their main feature is **dual air mixing**: the primary air mixes on the combustion head; the secondary air, completes the mixing making the flame longer. A diluted flame extends the life of the radiant tube and increases the heat transfer efficiency.

RT is an extremely precise burner that must always work with a modulating system including a **BZR/FCR** regulator, that adjusts the gas flow to the air flow in suring stoichiometry. RT are available in various capacities between 20 and 200KW, working with or without recuperators.
RT burners are also suitable for low temperature application as the tile drying furnaces.



Data sheet reference:
E3900

Smart accessories for ceramic sector

Air & gas regulator AR

Designed for roller furnaces with fixed air and modulating gas, **AR-REG-II** creatively revolutionized the standard technology, resulting in energy saving of 20%. In roller kilns, during various stages of production, the gas flow is reduced, while the air flow remains unchanged with the result of "cooling" the oven. With AR, the pneumatic signal resulting from gas regulation is conducted to the pneumatic regulator on the air line, **modulating the air flow rate at the stoichiometric level**. AR can be applied in various configuration revamping existing furnaces, with great energy saving (up to 30%).

Control device ESA GENIO PRS with pressure indicator

Together with the standard electronic products like ESA ESTRO or ESA GENIO, largely used in the ceramic industry, ESA we have developed this version, **ESA GENIO PRS** including a display for checking the combustion AIR pressure. This is an economic and simple system to help the operator checking the status of burner also to see if there might be any major regulation problems.

Data sheet reference:
E5301, **E7022** & **E7014**

The ESA Pyronics group

ESA Pyronics International Represented by

PROLIFIC HEATING INTERNATIONAL CO., LTD

11/11 Moo 11 Soi Kingkaew 37, Kingkaew Rd.,

Rachatava, Bangplee, Samutprakarn 10540 - Thailand

Phone: +66 2 170 8171

email : prolific@phiheating.com

website: www.phiheating.com

Printed in Italy
CERukR00/17

ESA PYRONICS INTERNATIONAL
SIAD Group

www.esapyronics.com