

Industrial Combustion for the World



**Duomo (UK) Ltd** is the **ESA Pyronics** UK distribution partner.  
[www.duomo.co.uk/product-category/process-combustionburners/](http://www.duomo.co.uk/product-category/process-combustionburners/)

# Mission and value proposition

## Our mission

We are Italian leaders in industrial combustion, providing a complete range of top quality products, technologies and solutions.

### Our promise is simple we will:

- Give functionality, control and productivity to your furnace.
- Reduce your energy costs.
- Reduce hazardous emissions.
- Ensure compliance and safety.

Our turn-key solutions are famous for being creative, and rely on a history of thousands of cross industry installations with global leaders.

## The value we offer

### Burners and components

40 families of top quality and reliable industry specific burners. EN298 certified burner controls. EN88 certified pneumatic components.

### Engineering systems

PED compliant customized skid-mounted fuel feeding lines. Automation hardware & software.

### Know how

Thorough understanding of combustion technologies and applicable regulations. 40 years experience on-field in all temperature processes. A remarkable manufacturing tradition and passion for innovation.



A view of ESA in Curno, Bergamo Italy.

### Company & group values

We are specialized in combustion and are independent. We establish long-term partnerships in a Group frame culture based on integrity, financial stability, sustainability.



Jon Farmer - Duomo (UK) Ltd Sales Director and  
Andrea Baio R&D/Technical Dept. Manager of ESA Pyronics



# The company

## ESA and its Group

**ESA** is part of the **SIAD Group**, leader in technical gases since 1927, and today associated with **PRAXAIR Inc.**, world leader in gases and Fortune 500 company. SIAD Group has been yielding a profit for the last 75 years and is strongly committed to integrity sustainability, innovation, allowing technological, marketing and financial synergies.

## ESA milestones

- **1975** Incorporation.
- **1976** Becomes Pyronics exclusive dealer.
- **1980** Starts manufacturing its own products lines.
- **1985** Internalizes electronics.
- **1992** Invents first burner Esa Estro electronic controls.
- **1994** ISO 9001 certification.
- **2001** Internalizes software.
- **2003** Purchases Pyronics s.a.
- **2005** Inaugurates the biggest European R&D test center.
- **2007** Internalizes welding.
- **2014** Starts up ESA India.

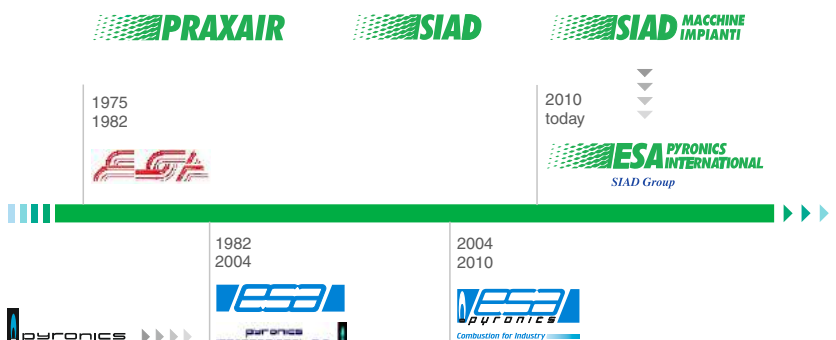
Today ESA operates directly in Italy, Belgium and India, with 70 high-skilled workers on 8000 sqm facilities, indirectly with a world network of 40 authorized agents.

ESA is **independent** (it does not manufacture furnaces), and highly **specialized** in combustion with a complete other solution.

**COMPANY WITH  
QUALITY SYSTEM  
CERTIFIED BY DNV GL  
= ISO 9001 =**



A view of ESA S.p.A. in Curno, Bergamo Italy.



Pyronics s.a., Charleroi, Belgium.



ESA Manufacturing Pvt. Ltd., Pune, India.












ESA is member of the national and European committee of combustion manufacturers **CICOF** & **CECOF**, where it collaborates in establishing EU regulations & standards.



# Standard and customized burners



Radiation	Convection							Radiant		Indirect		
												
Oxy Fuel	 Long flame high speed	 Long Flame / Low speed		 Tunnel	 Linear	Packaged	 Radiant Flame	Radiant Tubes Burners	Infrared			
NG OXYGEN	NG (LPG)		NG (LPG) OFF GASES	OIL/GAS	PREMIXED		NG (LPG)					
HT AGO LF	Metallic/SiC EMB EMB-SIK EMB-SIK-DA	Self Recu- perative REKO-FF	Rege- nerative REGE	NM ENM XNM RE	12XDF EXDF XDF ENM-DF	E-THERM ENR	AB ABM ABM 3Z PYROLINE	FC EPB	RAD RAD NxT	SW ESW REKO-SW	RT REKO-RT	SHELL-TEC IRC-1 BR70 ABM IR

More than 40 different families of burners up to 20MW in a wide range of temperature and applications.

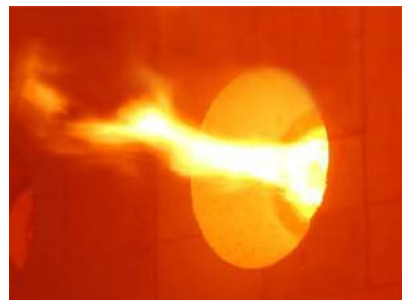
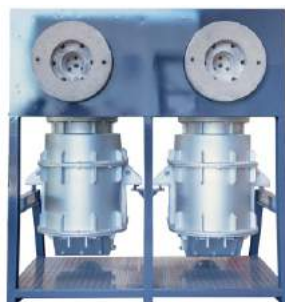


Special burners customized solutions.

# High velocity burners

## Self-regenerative burners REGE-NxT

NG, LPG, light heavy OIL  
Flameless / Multistage (**NxT**)



## Self-recuperative burners REKO-SIK

NG, LPG  
- Free flame **FF**  
- Radiant tubes **RT**  
- Sidewall flame **SW**

## High velocity burners EMB

NG/LPG  
- Metallic **EMB**  
- Refractory head **BH**  
- Silicon carbide head **SIK**  
- Staged air/flameless **NxT**



## Long flame burners NM & XNM & ENM

NG/LPG, OIL, Off gases  
- Refractory **NM & ENM**  
- Excess air **XNM**  
- Low NOx / staged air **NxT**  
- Multihead (2, 4, 6 heads)

## Long flame oil / gas burners EXDF & ENM-DF

NG/LPG, light/heavy OIL  
- Refractory body **EXDF**  
- Staged air **ENM-NxT-DF**



# Radiant burners

## Oxy fuel burners AGO-NxT & HT & FL

- High turbulence **HT**
- Oxygen/air **AGO-NxT**
- Multihead / Multistage
- Several custom configurations



## Flat flame burners SW & ESW

- High radiative components
- Low CO generation even at low fire
- Long life refractory

## Radiant flame burners RAD

- Radiant flame **RAD**
- Radiant cone



## Radiant tube burners RT Plug-in recuperators Radiant Tubes

- Two-stages burner for radiant tubes **RT**
- Radiant tubes in **I, U, W, M, P, double P** profiles

## Ignition pilots High blast torches

- Pilot burner **PBC**
- Packaged pilot **PBST**
- Pilot head **BTC & BTSA**
- High blast torches **HBT**





# Premixed burners

## Ribbon premixed burners AB & ABM & PACKAGED

- External mixer **AB**
- Integrated mixer **ABM**
- 3 zones version **ABM 3 zones**
- Packaged **ABM packaged**

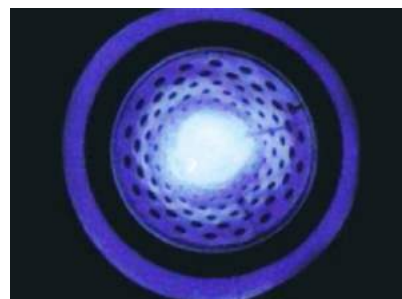


## Premix linear flame burners PYROLINE

Fully customizable burning modules

## Packaged burners FC & EPB

- Fixed air **FC** metallic cone
- Modulating air **EPB**



## High velocity premixed burners E-THERM & ENR & LCL

- High efficiency
- High performance
- Maximum flexibility

## Indirect radiant Infra-red burners SHELL-TEC & IRC-1



# Ignition and control systems (BCU)

## Electronic devices

Certified burner ignition and detection control devices in p.o. mode (EN746/II) pressure transmitters, UV probes, ignition and detection electrodes, high voltage electric cables, ceramic connectors and transformers.



**ESA ESTRO-PO**  
permanent operation  
burner control



**ESA ESTRO**  
burner control



**ESA GENIO-S**  
permanent operation  
burner control



**ESA GENIO-PRS**  
permanent operation  
burner control



**ESA REFLAM**  
flame indicator



**ESA PROG-1**  
parameter  
programmer



**ESA TRAFO**  
ignition  
transformer box



**TAR**  
ignition transformer



**C-2 - C-5 - C-6 - C-7 - VS - GVR**  
high voltage cable and connectors



**SHUTTER**  
for UV  
probes



**UV-2**  
high sensibility  
probes



**EN - IGE - DSE - WAND**  
ignition /detection  
electrodes

## Communication

ESA develops and supplies communication cards for control devices working in serial communication, using ECS our own communication systems converter to universal buses (Profibus®, DeviceNet®, Ethernet®, and Profinet®)





# Communication systems



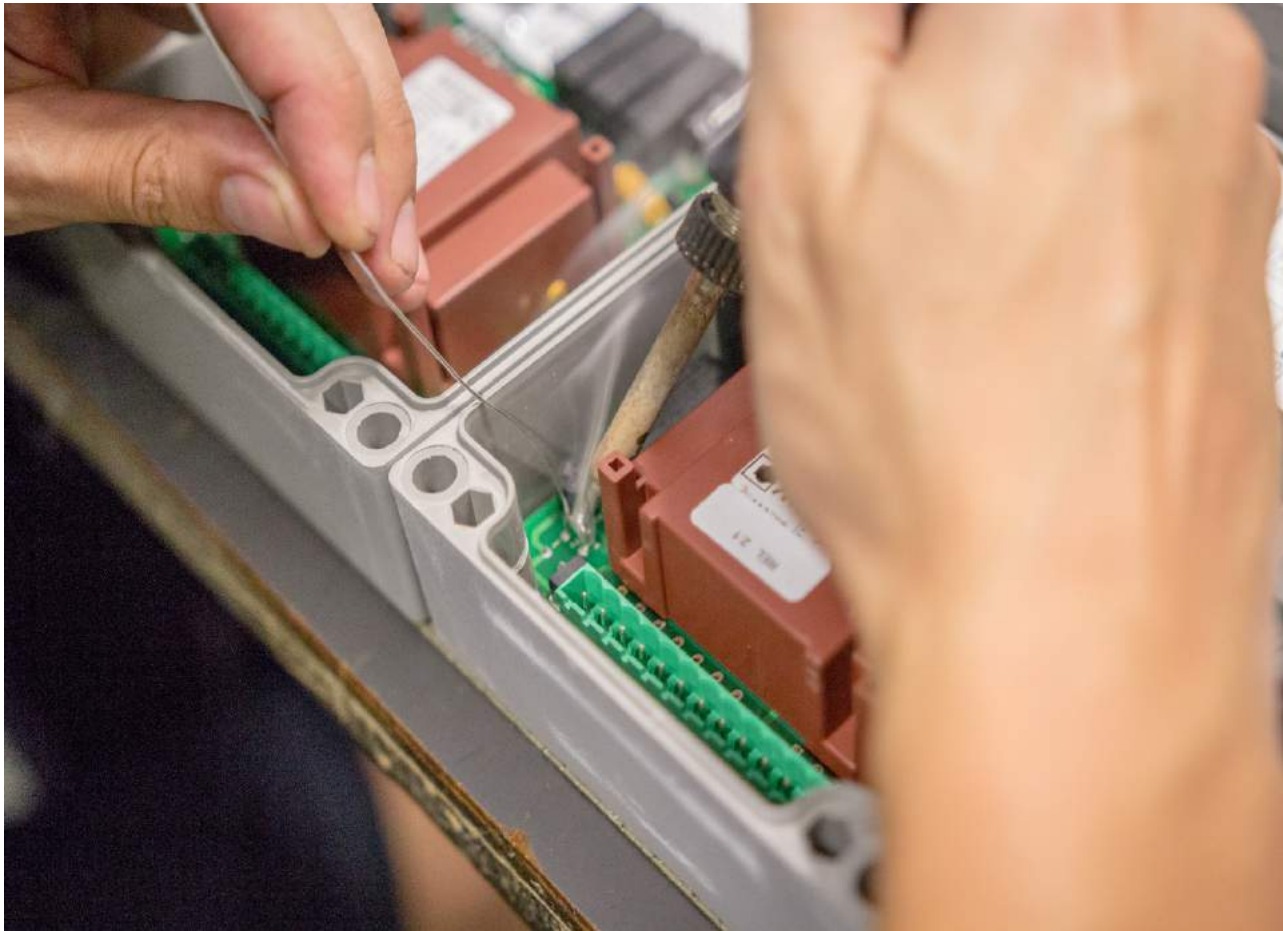
**ESA ECS DRIVER**  
serial communication  
interface for flame controls



**ESA PLEX-COM1**  
serial converter  
for flame controls



**ESA PLEX-STD**  
multizone serial  
controller for flame controls



**ESA PLEX-COM2**  
serial converter for flame controls



**ESA BRIDGE**  
serial gateway



**ESA DPG-E**  
portable differential pressure gauge



**ESA PT-II**  
flow rate and pressure transmitter

# Fluid-dynamic and measurement systems

## Regulators

ESA pressure regulators are EN88 certified and known for their precision. Models are available for gaseous and liquid fuels and high temperature (up to 200°C).



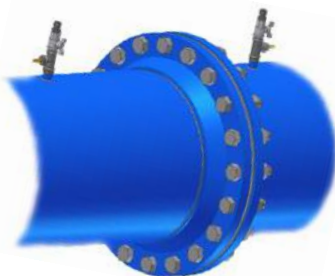
**BZR-REG-II (EN88)** zero governor pressure regulator  
**FCR-REG-II (EN88)** combustion ratio regulators



**AR (EN88)** air/gas ratio control valve  
**RFG** oil regulators



**TDL** impulse lines



**POP-WAC** simple measuring discs

## Control & measurement devices

Manometers, calibrated flanges and flow meters for easy measurement and calibration.



**MAXITROL** zerogovernor for blast pilots



**POP-U-S** orifice flow meters with chamber measuring rings



**PF & PFP & PFF & PSP** coupled flanges



**SAM & MAG** pressure gauges



# Mixers and valves

## Valves and solenoids

Safety and regulation control valves and solenoids.  
Esa SERIO modulating actuator.



**FMT**  
flanged  
mixing tees



**GAF**  
manual  
gas adjuster



**ESA-SERIO**  
electric servomotor



**TBV-CMAP**  
motorized threaded  
butterfly valves



**TBV**  
manually threaded  
butterfly valves



**TO-F & TO-M**  
throttle orifice



**VM-R**  
solenoid valves  
rapid open/close



**VM-L**  
solenoid valves  
rapid open /slow close



**MRBV & MRBV-CMAP**  
modulant motorized butterfly valves



## Mixers

Venturi, atmospheric, high or low pressure mixers for premixing and proportional mixing.



**MF - MM & EMF - FLOMIXER**  
venturi mixers





# Skid and burners accessories / Services

## Accessories

A complete range of accessories for burners as gas adjusters, peep sights, inspection ports, high voltage cables, connectors etc... and for gas skids as filters, flexible connectors etc...



**FN - ESA FLEX - INOXESTENS**  
flexible compensators



**PSLT & PSHT & CR**  
peepsights, elbows  
and furnace observation ports



**SILICON CARBIDES**



## Technical services

- Technical support.
- Maintenance and revamping.
- Installation/start up.
- Repairing.

## Pre sale services

- Feasibility study.
- H&S Audit and compliance.

- Market parts procurement.

## Sales related services

- Complete documentation.
- Advanced order processing.
- On time delivery.
- High quality packaging.

## After sales services

- Full warranty.



*Training on control devices.*

- Spare parts stock granting.
- Training courses.



*Our warehouse for spares*

# Engineering, software & hardware

## Fuel feeding lines

We design, assemble and test decompression, feeding, or skid-mounted lines. We manage any kind of fuel and oxydant: NG, LPG, air, oxygen, oil, hydrogen, off gases (COG, BFG...) in various pressures and capacities, according to applicable regulations (PED, ATEX & EN746).



Sample of oxy fuel skid.



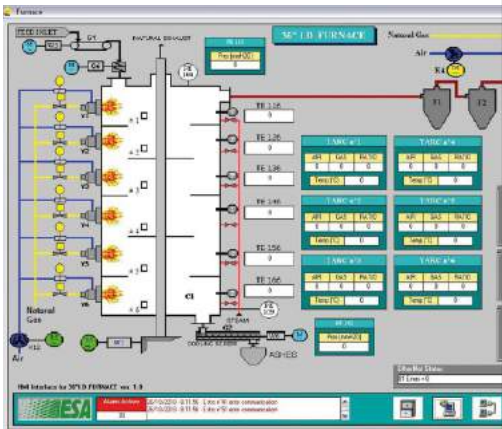
## Automation hardware and software

ESA wholly deals with automation skids, developing internally both the hardware elements (control panel, sensors, actuators, PLC etc...) and the software for control, regulation and safety. Hardware components and software are supplied in compliance to EN746 regulations and up to SIL3 safety integrity level.

ESA acquired specific experience and skills on Oxy fuel skids thanks to the synergies with SIAD & Praxair Group.



Bespoke Electrical control panels.





# Production

It is ESA's goal to grant quality consistency, on-time deliveries and excellent economic conditions. Our quest has led to internalize most of the design and manufacturing phases.

## Assembling & welding

Assembling of components and skids by qualified staff according to ISO procedures. PED pipe lines performed by certified welders. Degreasing for oxygen use, internal calibration and testing devices for



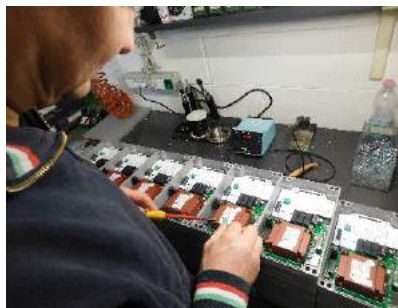
## Refractory laboratory

Highly skilled workers, and innovative technologies to provide long life to our built-in refractory burner blocks and/or concrete insulated burner bodies.



## Electronic device lab

Assembling, programming, testing of ignition control devices, sensors, electronic devices, communication cards. Certifications according to EN298 and conformity to EN746.



## Technical office

Design and planning of engineering systems. Use of full 3D techniques, ESA calculation software, PDM for complete project filing.



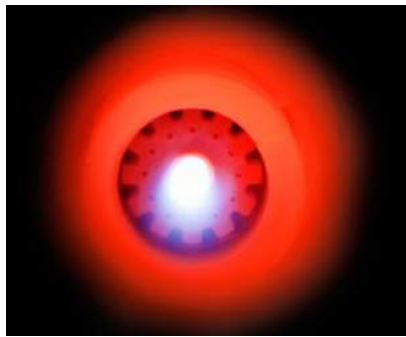
## Skid automation lab

Skid Automation and final testing laboratory. Logic and software up to SIL 3 level.





# Technologies and R&D test center



## R&D combustion center

### ESA has the biggest R&D Centre in Combustion Technologies in Europe:

- 1000 sqm with 8 test furnaces up to 4MW and preheated air up to 550°C.
- Flue gas and combustion parameter analyzers.
- Cooled camera videos.
- One test furnace designed for testing with a flue gas extractor.
- Fuel facilities include oxygen tanks with evaporator, tanks with preheater.

ESA R&D center



Milco Dalfovo and Phillip Wild of Duomo



- For heavy oil special gas bottles supplied by the SIAD lab.
- The Center is credited with Questio - Regione Lombardia, carrying out research on innovative combustion technologies.



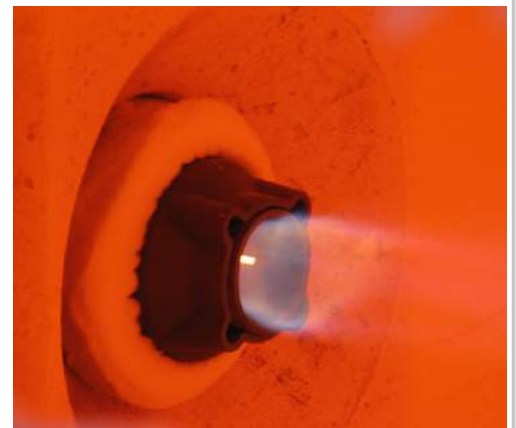
## Technology portfolio

### Energy Saving:

- Self heat recuperation and regeneration.
- Permanent pneumatic stoichiometry.
- Pulse firing logic.
- Oxy fuel technologies.

### Burners Features:

- Study of flame structure and burner material properties according to process requirements
- Dual fuel burners.



- Off gas exploitation.
- Multihead burners.

### Emission reductions:

- Multistage burners.
- Flameless oxidation.
- Flue gas recirculation.
- Selective catalytic reduction.

### Safety:

- Flame ignition and detection.
- Development of own test equipment.
- Nozzle design for stable flame in all regulation ranges.



## High Temp. application: some recent installations

### STEEL

#### Continuous annealing line

**SSAB/RUKKI Group** (Sweden)

Supply of 233 burners.  
Recuperator, feeding lines;  
regulation & ignition systems for  
LPG reached 9% to 14% fuel  
saving and extension of the  
radiant tubes' life spam.



### STEEL

#### Forging Furnace (new)

**Italian leader** (Italy)

Supply of n° 5 couples of  
regenerative burners "REGE-9-  
NxT" reaching up to 40% energy  
saving.

### STEEL

#### High temperature furnace (new)

**Italian leaders** (Italy)

Supply of no. 66  
Self Recuperative  
Reko 4 Free Flame burners.



### STEEL

#### Galvanizing furnaces (new)

**BHUSHAN steel** (INDIA)

Supply of BFG/Oxygen/Lpg  
burners AGO, feeding lines to  
exploit LCV blast furnace gas  
previously ejected into the  
atmosphere.

### LIME

#### Limestone calcination kiln (new)

**CIMPROGETTI**

Supply of feeding skid and  
multifuel burner for blast furnace  
gas, light oil and natural gas.





# High Temp. application: some recent installations

## ALUMINIUM

### Rotary Furnace (revamping)

#### RAFFMETAL (Italy)

Supply of feeding lines, ignition and regulation software for 20MW multihead burner in secondary aluminium recovery.



## COPPER

### Shaft Revamping

#### KME group (Italy)

Supply of E-therm premix high speed burners, sidewall feeding lines, safety and regulation skids.

## GLASS

### Glass blending furnaces (new)

#### Pilkington/NGS (Italy)

Supply of radiant cone burners, sliding burners and radiant tube burners for automotive applications.



## ROCKWOOL/GLASS WOOL

### Melting furnace and fiberizer

#### World Leader

Supply of safety regulation, oxy-fuel skids and immersed burners for glass wool and rockwool manufacturing.

## CERAMIC

### Frite Furnaces

#### World Leader

Supply of nozzle mix sidewall burners with ignition and detection systems in permanent operation mode.





# High Temp. application: some recent installations

## ALUMINIUM

### Tilting Furnace

#### PHELPS DODGE (Brasil)

Self regenerative burners (total 5.6 MW) in aluminium tilting furnace «50 tons». Reached 45% fuel saving compared to cold air burners.



## HOT DIP GALVANIZING

### Immerged Combustion

#### Italian leading drawery

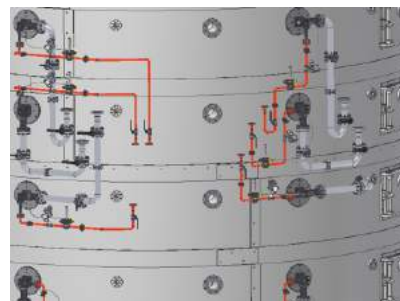
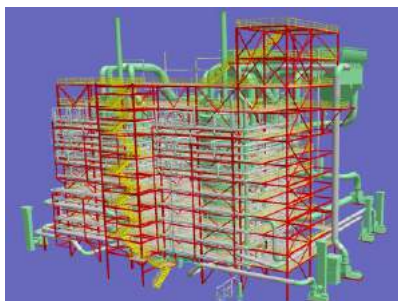
Self recuperative REKO-3-RT burners for radiant tubes with burners control systems.

## PETROLCHEMICAL

### no. 8 Vertical Earth Furnace

#### SAUDI ARAMCO & SAIPEM

no. 456 high turbulence burners  
no. 456 BCU in ATEX-22 boxes resistant to up 70°C  
no. 456 BZR for liquid propane at 90 °C



## CHEMICAL

### CMI MGCL<sup>2</sup> Spray Roaster

#### ICL GROUP

no. 68 NM burners  
no. 12 ENM burners  
on 5 furnaces a complete control logic and feeding line on skid.

## COPPER

### Walking Beam Furnace

#### KME

no. 4 EMB burners  
no. 66 ESW sidewall burners  
Maximum ratio precision, heat uniformity and fuel saving.



# Low-medium Temp. application: recent installations

## CERAMIC

Tile Dryers (new)

**World Leader**

Supply of radiant tubes and “RT” radiant tube burners.



## FOOD (Bakery)

Direct Firing

Oven for biscuits

**LASER (OEM)**

Supply of ABM Ribbon linear burners with integrated mixer and permanent individual regulation, electronic control devices.

## FOOD (Bakery)

Pizza Oven

**Leading OEM (Italy)**

Supply of Pyroline linear burners in custom configuration for Pizza Ovens. Electronic control devices.



## Packaging

**SMIPACK (OEM)**

Supply of ribbon burners for bundling and shrinking tunnels.

**Cremation**

**Panta Rei™ (OEM)**

Supply of double fuel burners for the first mobile crematorium.

## Special application

Pyroline linear burners mounted in a special heat treatment application.

Shell-Tec special infrared burners for heating cart.



# The ESA Pyronics group



## **ESA S.p.A.**

Via Fermi 40,  
I-24035 CURNO (BG) - ITALY  
Tel: +39 035 6227411 - Fax: +39 035 6227499  
[www.esapyronics.com](http://www.esapyronics.com) - [esa@esacombustion.it](mailto:esa@esacombustion.it)  
GPS: N 45 41.162 - E 9 37.264

## **Pyronics International s.a.**

Zoning industriel, 4ème rue,  
B-6040 JUMET - BELGIUM  
Tel: +32 71 256970 - Fax: +32 71 256979  
[www.esapyronics.com](http://www.esapyronics.com) - [sales@pyronics.be](mailto:sales@pyronics.be)  
GPS: N 50 27 27.90 - E 4 27 07.97



## **Duomo UK Ltd.**

5 The Furlong  
Berryhill Industrial Estate  
Droitwich  
Worcestershire. WR9-9AH  
[www.duomo.co.uk/product-category/process-combustionburners/](http://www.duomo.co.uk/product-category/process-combustionburners/)  
Tel: 01905 797989 - Fax: 01905 774296 Email: [sales@duomo.co.uk](mailto:sales@duomo.co.uk)  
Contact: Jon Farmer - Sales Director Email: [jonathan@duomo.co.uk](mailto:jonathan@duomo.co.uk)

[www.esapyronics.com](http://www.esapyronics.com)

## **ESA S.p.A.**

I-24035 CURNO (BG) Italy - Via Fermi, 40  
Fiscal Nr.: 03428410157 - VAT Nr.: (IT)00793030164  
Share Capital euro 1.000.000,00 paid up  
N: 03428410157 Reg. delle Imprese di Bergamo  
R.E.A. Bergamo N. 173124

Tel: +39 035 6227411  
Fax: +39 035 6227499

[www.esapyronics.com](http://www.esapyronics.com) - [esa@esacombustion.it](mailto:esa@esacombustion.it)