



GEA



IMAFORNI



Ovens

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engineering for
a better world

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Baking tunnel ovens

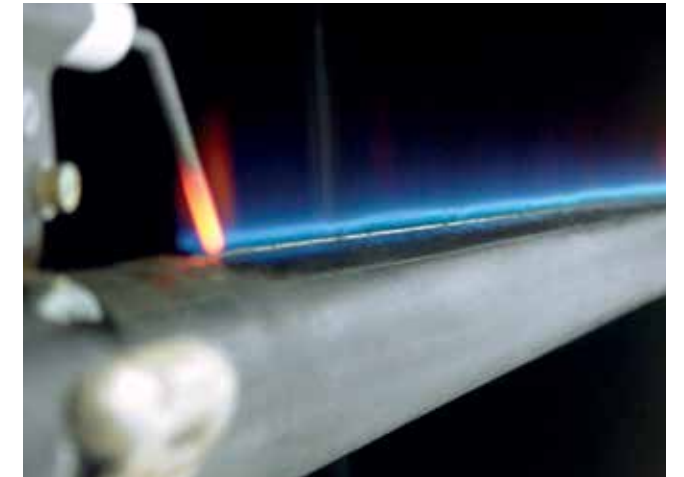
An ideal baking solution for every product

GEA Imaforni understands that every product will have specific baking requirements, and that even subtle differences in heating methods, temperature, humidity and residence time in the oven can affect final quality and consistency.

Using our industry and technology know-how we have designed a full range of ovens, including direct gas-fired, indirect cyclotherm ovens, indirect convection, and electric ovens; hybrid ovens, special ovens and pilot ovens. We can configure a system that will offer the ideal baking conditions for any product.

Ovens can be supplied with working widths of up to 2000 mm for biscuits, cookies, crackers and snacks, and up to 4000 mm working widths for cakes, pies, pastry and pizzas.

GEA Imaforni also configures conveyor systems to match your product type, capacity and throughput. Conveyor systems can be supplied with continuous metal bands for soft-dough, cookies or batter, or with light/heavy wire-mesh bands for hard sweet biscuits and crackers. For products baked on trays we offer slat-type conveyors and systems with wire mesh linked to lateral side chains. And for traditionally fast-baked pizza products we supply stone tiles for high-quality, authentic pizza texture and flavor. GEA Imaforni oven technology is modular, which means that we can precisely configure the heating system for each zone, and adjust zone length to meet any baking requirement. Built using the highest quality materials and components, our ovens are designed using state-of-the-art 3D modelling and dynamic



simulators, so that we can optimize every part of the design, and test and evaluate new solutions for our customers.

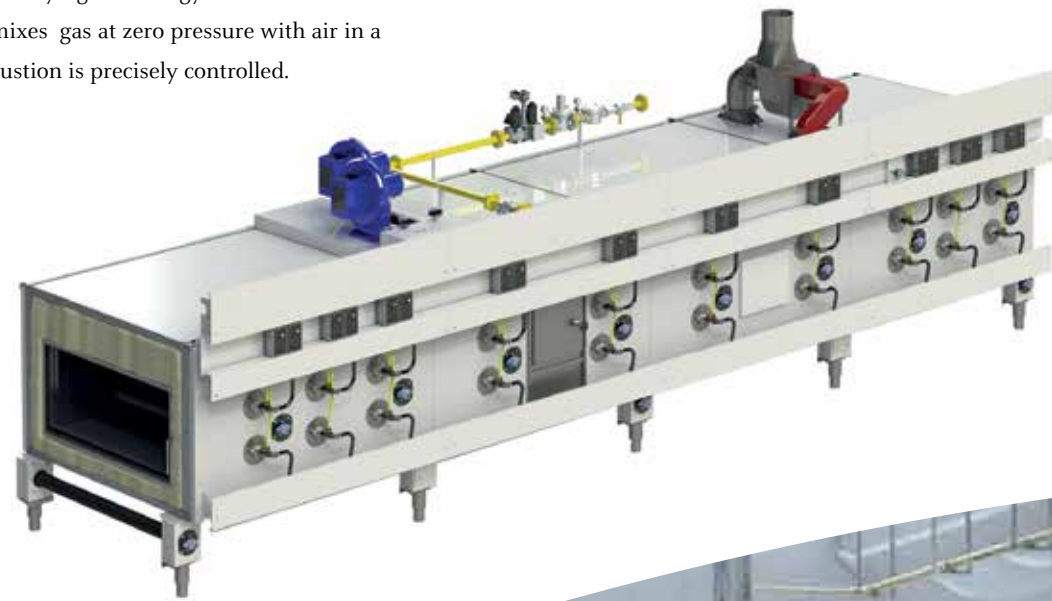
Optimized oven design, combined with high levels of automation, such as automated extraction dampers, help to save energy and reduce emissions to the atmosphere.

And because we recognize that you may want to try out new recipes and processes before investing in commercial-scale equipment, we offer a comprehensive range of pilot ovens that are ideal for manufacturing smaller batches for field tests and trials.

Our customers can be confident of reliable, uniform baking, for every product, and for the whole lifespan of every component and technology. And of course, all GEA Imaforni equipment meets the strictest hygiene and safety standards.

Direct gas fired oven

Direct gas-fired ovens are ideal for products that require high heating. GEA Imaforni can design systems that use either natural gas or LPG. The underlying technology is based on the Venturi principle, which mixes gas at zero pressure with air in a mixing pipe, so that combustion is precisely controlled.

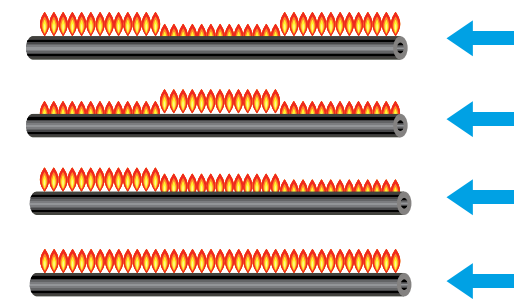


Direct gas fired burner complete with its dedicated control system for ignition and flame detection

GEA Imaforni technology allows independent control of heat at the top and bottom of each oven zone, by regulating the two combustion air fans that control the volume of gas being fed to the burners.

The user-friendly human-machine interface (HMI) can display the ratio of top and bottom heating as a sliding bar graph, which makes it easy for the operator to independently adjust top and bottom heating and view the temperature in real time.

GEA Imaforni ovens include an automatic moisture extraction system in each zone to allow precise adjustment of humidity as products move through the oven.



The flame height can be adjusted differentially across the width of a tri-zone burner to precisely control heating



Direct gas fired oven with stainless steel covers

Radiating - cyclotherm ovens

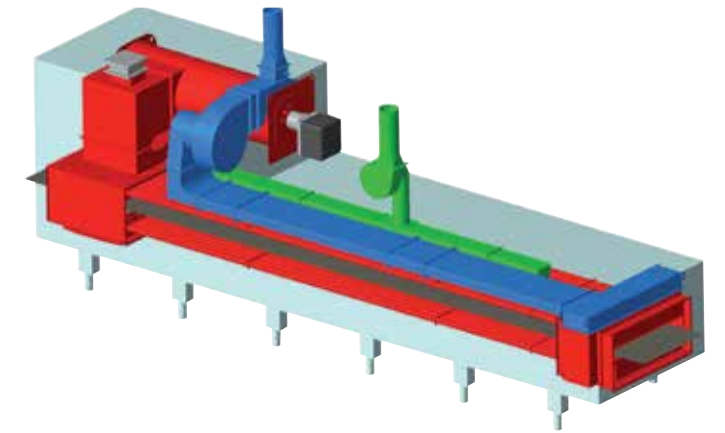
The indirect radiating oven – also known as a cyclotherm oven – transfers the heat to the product by radiation.

It means the products do not come into direct contact with the combustion gases.

Each oven zone consists of a set of tubes above and below the baking conveyor, which carry hot gases that has previously been produced by a burner.



At the end of each baking zone the hot gases are collected by a plenum and return by a fan to the burner, where they are re-heated to the working temperature and sent back to the tube circuit. Automated extraction dampers automatically control the humidity in each zone making it possible to achieve the required softness in the baked products.



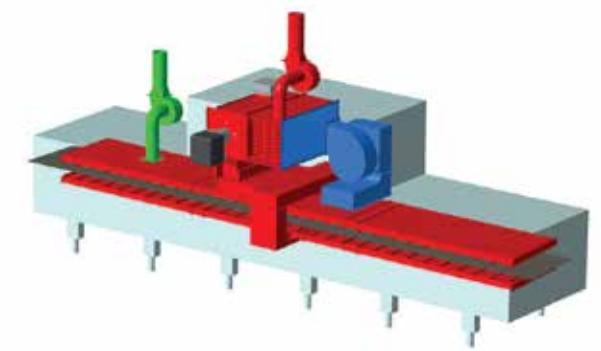
Computer-aided configuration of a cyclotherm oven zone



Indirect convection ovens

GEA Imaforni configures effective, highly controllable indirect convection oven technology, which is ideal for baking delicate products. The ovens are built around a baking chamber with a plenum duct positioned above and at the bottom of the baking conveyor. Air is heated by passing it through a dedicated heat exchanger, and is then blown out gently to heat the products evenly. The dough does not come into direct contact with combustion gases.

Heat transfer is by convection, and has a pronounced drying effect on the dough. Each oven zone is configured with an automated humidity extraction system, which managed humidity levels in the oven chamber and so helps to optimize the level of moisture in the product.



Computer-aided configuration of an indirect convection oven zone



Hybrid ovens



Hybrid ovens: direct gas fired and indirect convection configuration. Please note the enclosures installed on the return of the baking conveyor which can be supplied on request

Mixed heating versatility for ideal product baking

Hybrid ovens comprise multiple sections that use different heating systems. GEA Imaforni specialists work closely with customers to design the optimum oven configuration for every product or process.

Cracker and hard sweet biscuits, for example, are commonly baked in a hybrid oven that includes a direct gas fired section at the front end, followed by a indirect convection system. Rotary molded or wire-cut products might require a hybrid oven that includes an initial cyclotherm section, followed by indirect convection heating.

Hybrid ovens advantages

Hybrid ovens from GEA Imaforni can offer significant advantages over single heat transfer systems for some types of product, and may even allow the to increase the baking capacity. Dependent upon the product, some benefits of a hybrid system might include:

- flexibility: different products requiring different baking profiles can easily be baked using the same oven
- improved ability to control the level of moisture in the final product, and so reduce the risk of “checking” in biscuits
- improved crispness, and better control of general texture
- uniform color of baked products across the width of the oven

Hybrid oven with a direct gas fired and indirect convection configuration



Control systems

Tailored automation for precise control and top quality baking

GEA Imaforni specialists can configure a control system to help monitor and automate adjustment of all baking parameters, so that every product is baked to the same high quality that our customers expect.

A basic control system will usually include a PLC and one thermoregulator for each zone in the oven. The thermoregulator acts to precisely adjust the heat in each zone and so maintain the required temperature.

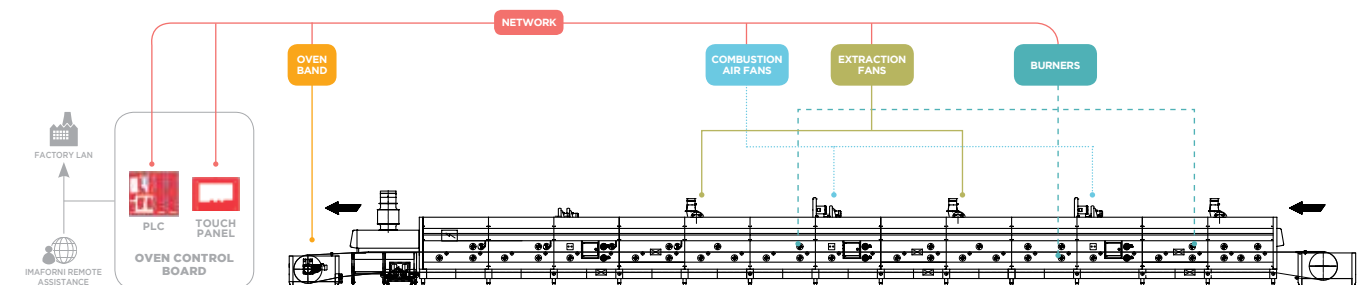
The PLC also communicates with every oven component, to oversee safety, start-up and shutdown procedures, and also control operation of the conveyor and alarms.

A recipe storage function automatically retains settings programmed in by the operator, so that switching between baking profiles for different products is quick and easy. We understand that delays and down time are costly, so our control systems include user-friendly touch-screen panels that make it quick and easy for operators to view all of the different working oven parameters and change them manually, as required.

Skilled GEA Imaforni engineers can even offer remote in-line assistance for troubleshooting or software modifications, while oven settings and alarm data can easily be made available to outside supervisors.



HMI panel displays the programmed, and actual temperatures of each oven zone, using a bar graph-type display, which makes it easy to compare and adjust settings if required



Auxiliary equipment

Options to boost process and plant efficiency

GEA Imaformi equipment and systems are engineered to give optimum performance and efficiency, and to save resources. We also offer auxiliary equipment and modifications that can help to solve specific processing, layout or technological issues, further reduce manual intervention, and speed cleaning and product change-over.



Outfeed drum suitable for wiremesh and steel band conveyors



When space is tight, a band water cooling system can be installed at the oven outfeed. This setup helps to ensure that products are not damaged when they are detached from the oven band



An automated pneumatic tracking system for the oven conveyor ensures accurate conveyor speed and transit through the oven



Scraping blades clean the oven conveyor, reducing manual tasks and reducing down time



A band greaser for a solid steel band applies precise amounts of grease, so that products do not stick, and losses are reduced

Auxiliary equipment



Manholes on the non-control side allow easy and quick access to the baking chamber for cleaning or maintenance purposes



Pneumatic tension system



A motorized brush system makes fast work of cleaning a wire mesh conveyor



Configuration options include installing a water jet cleaning system for the oven wire mesh conveyor



Detail of the water jet system



Spring loaded guides for mechanical centering of the oven conveyor. They are installed in the baking chamber and in the return section of the conveyor

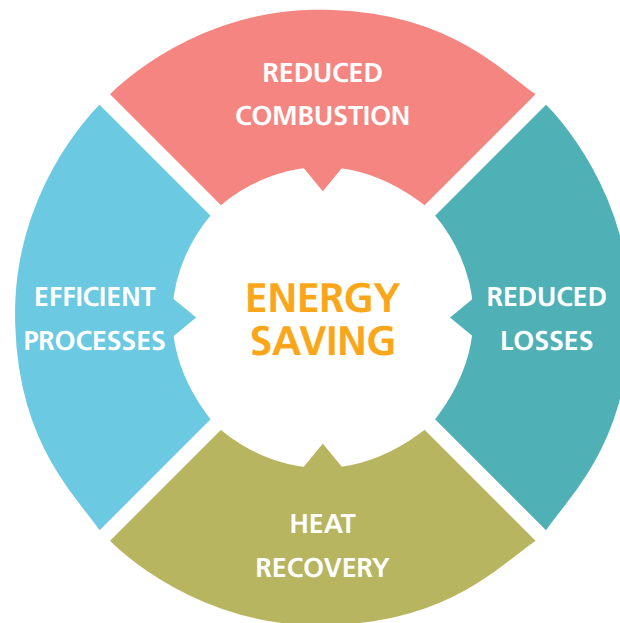
Saving energy

New generation ovens equipped with energy recovery systems

GEA Imaformi has always focused on developing sustainable equipment and solutions that reduce energy use, waste and emissions, so that our customers can save costs and meet environmental and sustainability goals.

Our ovens can be equipped with optional heat recovery systems that cut energy consumption by up to 30% and recirculate excess heat to other areas of the plant. The amount of energy saved will depend on factors such as the oven heating system, type of product and baking profile.

Energy usage is further reduced by the use of high-density rock wool insulation to minimize the amount of heat that is lost through the oven walls, while automatically controlled extraction dampers helps to save energy and reduces emissions to the atmosphere.



Heat recovery system channels heat from the oven back into the plant



Main exhaust collection duct is connected to the oven heat recovery system



Electric heater for the electric oven

GEA Imaformi electric ovens are versatile and can be used to bake all manner of products. Constructed along similar lines of design to direct gas-fired ovens, they use electric heating elements instead of gas burners. Electric ovens are widely used in the baking industry, particularly in regions where there is no ready access to gas fuel, but an electricity supply is easily obtained. When baking using an electric oven, the only waste products discharged to the atmosphere are those released by the dough components during the baking process. For this reason electric ovens are commonly referred to as a 'zero impact' solution.



Using electric oven technology the only emissions are those released by the dough components during baking

Electric Ovens: zero impact solution



Special ovens

GEA Imaforni uses its global industry knowhow and technical expertise to design and build special tunnel ovens for bakery products and processes that require highly detailed, or unusual oven conditions.

Working with partners that have specialized or niche expertise, we can also provide turnkey lines for manufacturing just about any product baked anywhere in the world.



A special oven with a stone-based conveyor, which will bake perfect pizzas at the required high temperature and fast transit time



Muffin production



Italian traditional Panettone cake

Every product has unique baking requirements, and little differences in heating methods, temperature, humidity and residence time in the oven can all affect quality and consistency. We design, configure and install tunnel ovens, with working widths up to 4000 mm, for special products such as, lady fingers,

puff pastry products, croissants, and pizza on trays. Our designs are modular, so we can customize the heating system for each zone, as well as zone length, to meet any requirement.

Pilot lines

Tailor-made test equipment and expertise

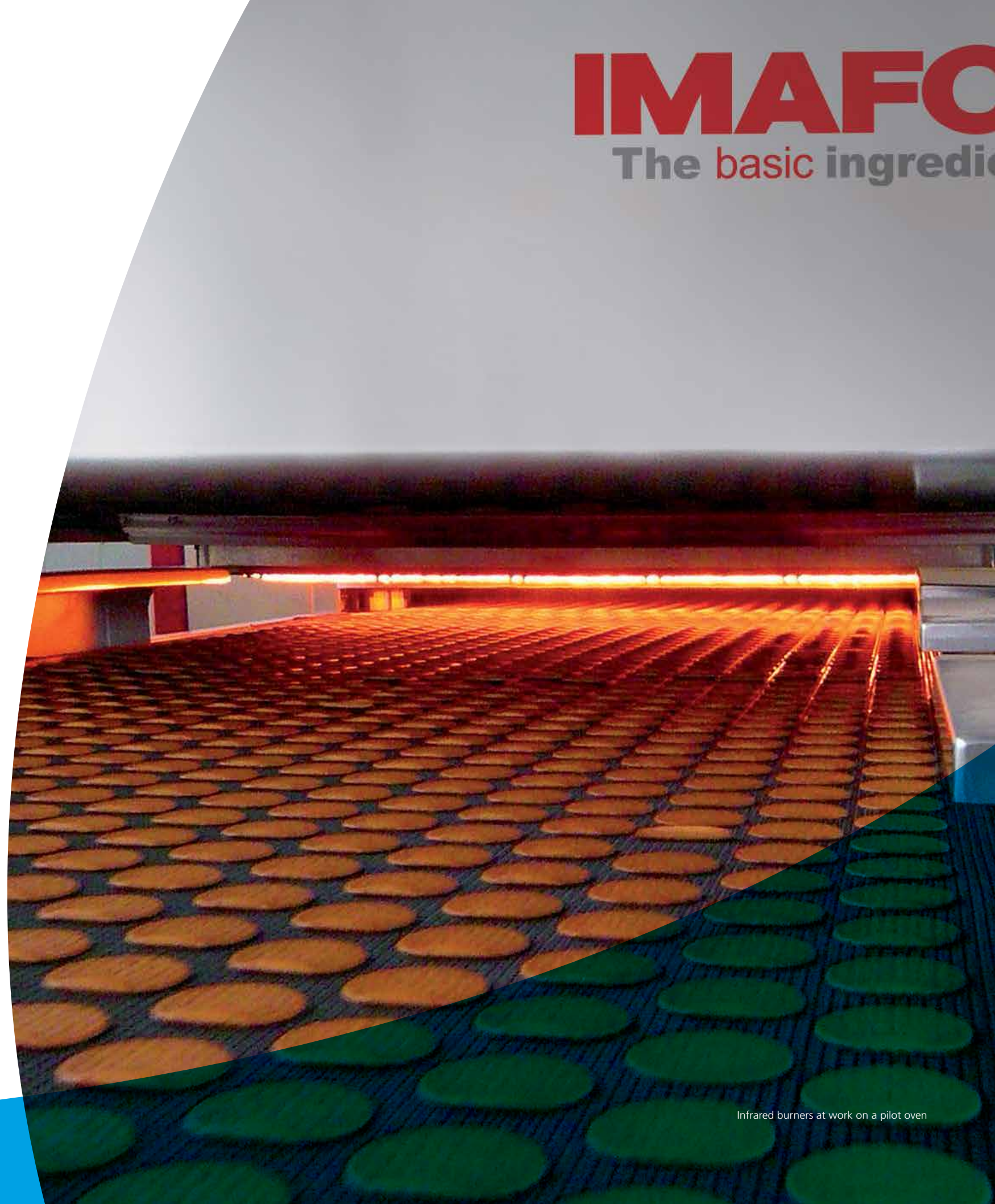
GEA knows that customers may want to test out new equipment and processes before investing in commercial-scale lines. GEA Imaforni can provide tailor-made pilot lines comprising standard width industrial machines in advance of a short oven. Our pilot systems offer the same level of performance as an industrialized line. We can then make scaling up from test to full-scale commercial production easy and seamless. Our experience is always at your disposal, and our confidentiality is assured.



Pilot oven with mixed indirect and convection electric heating systems, 400 mm wide

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The basic ingredie



Infrared burners at work on a pilot oven



We live our values.

Excellence • Passion • Integrity • Responsibility • GEA-versity

GEA is a global technology company with multi-billion euro sales operations in more than 50 countries. Founded in 1881 the company is one of the largest providers of innovative equipment and process technology. GEA is listed in the STOXX ® Europe 600 Index. In addition, the company is listed in selected MSCI Global Sustainability Indexes.

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