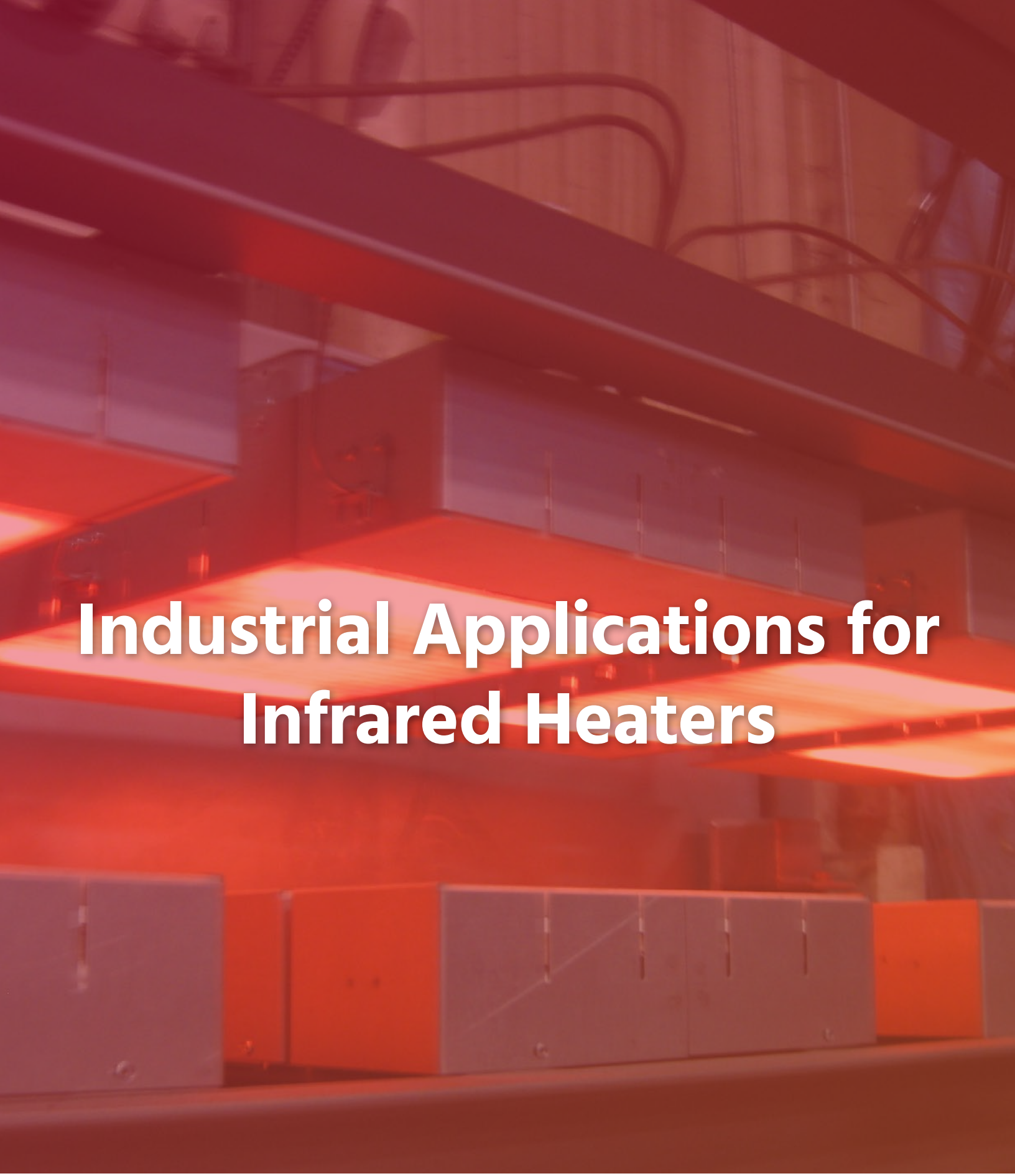


Industrial Applications for Infrared Heaters

CASSO-SOLAR TECHNOLOGIES

Infrared heaters can directly heat surfaces with more efficiency and precision than many other traditional heating methods.

They are easily controlled and can be accurately adjusted to achieve desired thermal profiles and meet material requirements. Infrared heaters heat materials through the use of electromagnetic energy. Since air does not absorb much energy in the infrared spectrum, electromagnetic waves can travel through the air without losing significant amounts of energy, ensuring efficient heating.

Here we will discuss the various benefits and applications of infrared heaters to help you determine if infrared heating is right for your needs.

Benefits of Infrared Heaters

The benefits of infrared heaters fall into three main categories: precision, efficiency, and flexibility. Generating heat through radiation rather than convection or conduction allows infrared heaters to precisely target certain areas of the material. This **"line of sight"** heating restricts energy flow to only the necessary zones rather than heating the entire space or surface. Infrared heaters' innate precision provides a host of additional downstream benefits, including:

- **Lower rejection rates.** Quality control is a convenient byproduct of the precise nature of infrared heating. With targeted radiation waves that are only 1-8 microns long, there is a low probability of melting, curing, or baking the wrong portion of your products.
- **The ability to handle complex heating patterns.** Meticulous controls and zone-specific heating make industrial infrared ovens highly customizable and detailed.
- **Uniform and consistent product quality.** Engineers can control infrared heaters electronically, which eliminates human error and inconsistency. Smart computer-controlled equipment can respond rapidly to any problems or changes to the flow of production.

Another major advantage of infrared heaters is efficiency. Since electromagnetic radiation heating is so precise and targeted, the energy it takes to create the infrared beams transfers into the final product with little waste. The ergonomic setup of these ovens also reduces time, money, and space consumption. Other benefits of infrared heaters include:

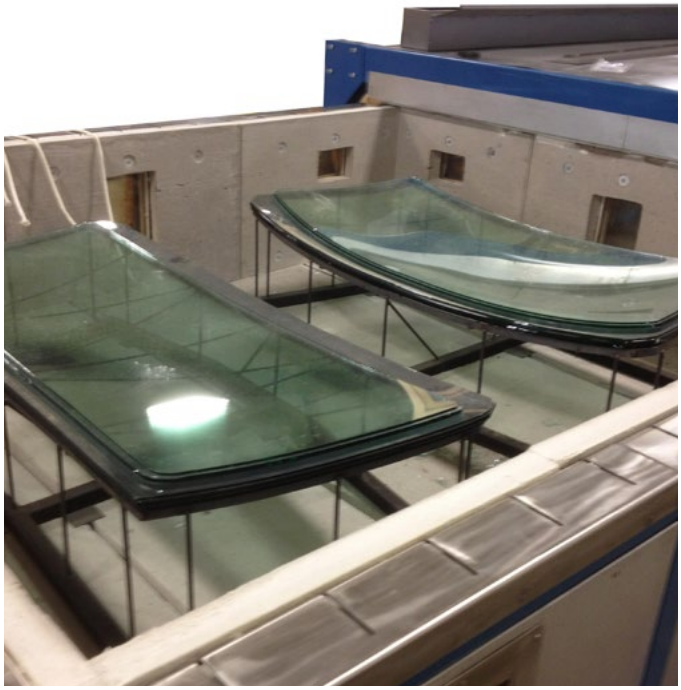
- **Minimal preheating.** Unlike convection ovens which can take hours to warm up, infrared heaters require very little preheating. Typically less than 5 minutes. This not only reduces carbon emissions and electricity waste in the manufacturing process, but it also saves time.
- **No environmental heat loss.** Since the majority of the infrared energy is transferred directly into the final product, less heat leaches out into the surrounding environment.
- **Minimal space requirements.** Infrared heaters are compact and can fit into small spaces on the production floor, especially when custom designed.
- **Greater throughput.** With faster response times and no preheating process, infrared ovens decrease the time it takes to manufacture goods and increase the product's throughput rate.
- **Minimal maintenance.** Radiation heating involves low upkeep costs, and infrared ovens need very infrequent replacement.

Infrared heaters are also flexible, offering a variety of settings, sizes, and strengths to meet demanding application needs. The three main energy ranges used in industrial infrared heaters—short wave, medium wave, and long wave—each offer unique benefits ideal for diverse situations. **Short wave** (0.8-2.5 microns) provides extra efficiency for metal heating, **medium wave** (2.5-6 microns) is a flexible catchall that works for most applications, and **long wave** (6-12 microns) slows down the heating process for more fragile materials that require lower intensity.

Industrial Infrared Heater Applications

With exceptional degrees of precision, efficiency, and flexibility, industrial infrared heaters mesh well with a variety of industries and applications. Some of the most common applications include glass manufacturing, textiles, plastic and film, metals, and specialty products.

Glass Manufacturing



Infrared heaters pair well with glass for a diverse array of fabrication and finishing processes, including bending and annealing glass, efficiently drying paint or other coatings on the glass's surface, processing laminated glass, and more. These glass processes often contain multiple steps, involving heat at several different radiation wavelengths to ensure the most robust, accurate finished product possible.

In the automotive industry, infrared heaters can laminate, dry, and bend glass in several different ways, while other applications such as photovoltaic glass production require a more specialized set of coating and lamination steps. Regardless of the industry, infrared heaters maintain their high efficiency even when working with the demanding thermal profiles of different glass processes.

Textiles

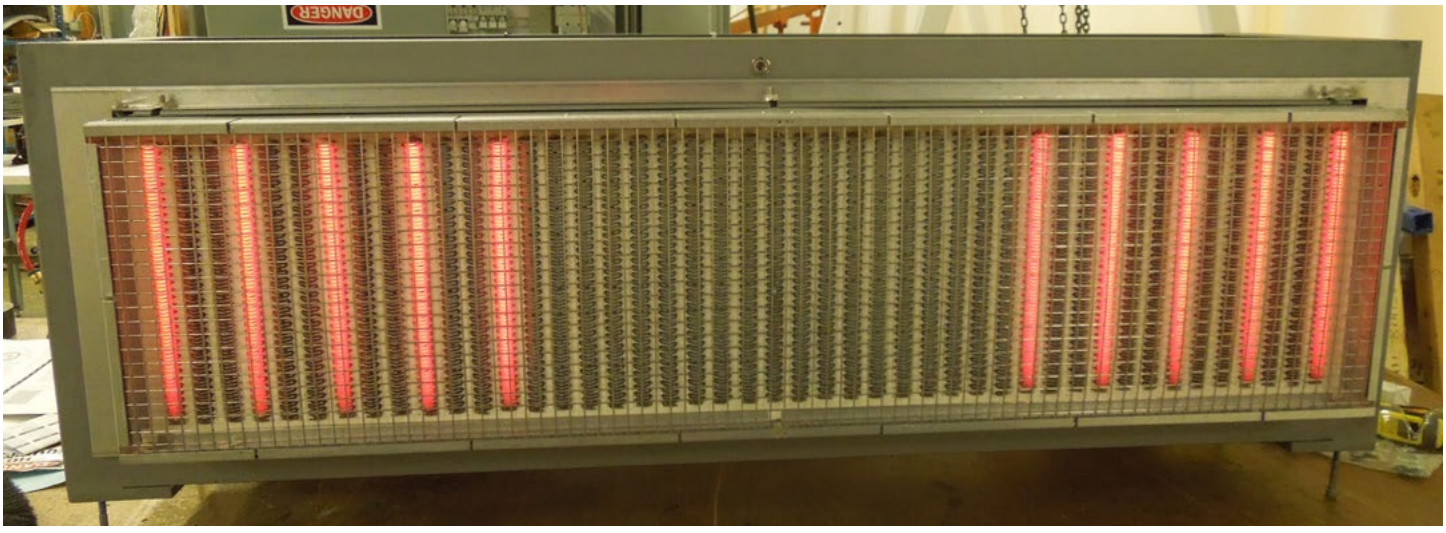
Textile production involves several rounds of heating and drying, a challenge that infrared heating conquers with speed and efficiency. A high-quality infrared system can transfer heat from the heater to the textile at an efficient ratio for both pre- and post-heating. It can also correct and equalize flawed portions of fabric by heating the material in different zones.

Industrial infrared heaters are also ideal for heat-setting synthetic fabrics, such as polyester, without shrinkage. Tight controls that keep temperatures between +/- 2° of the specified target ensure that fragile fabrics will not be damaged or unequally treated during pre-heating, post-heating, heat setting, or drying.

Plastic & Film

To mold plastics and films into their desired shapes, you must carefully apply the appropriate amount of heat during each step of the fabrication process. Medium wavelength infrared energy is most efficient for plastic production, providing a cost-effective and time-saving option for heating plastic and film materials.

Infrared is also the clear choice for thermoforming; when working with materials under 0.25" thick, infrared heaters can raise plastic sheets to the desired temperature while only heating one side of the product. Film stretching is another common plastic molding process performed using infrared heaters, which can split large sections of film or plastic into separate control zones with different heat profiles.

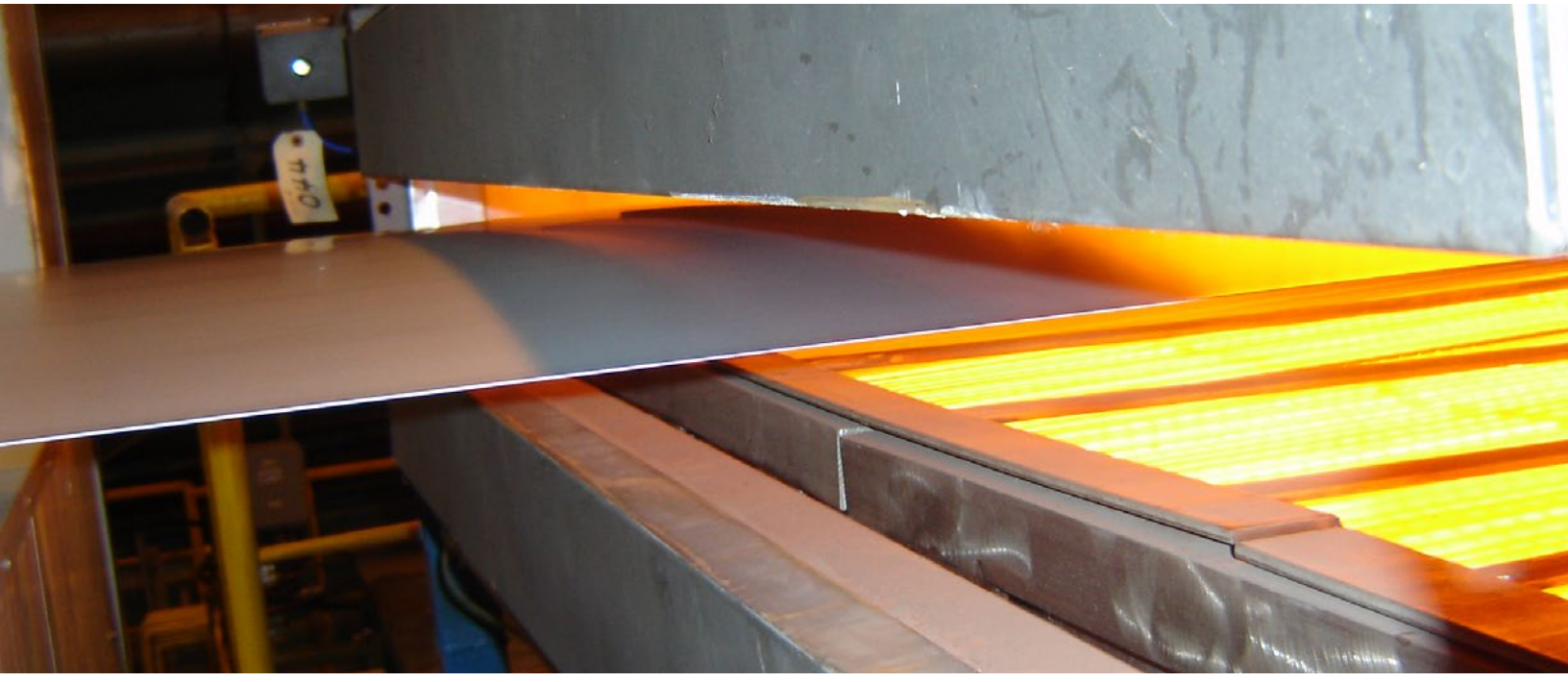


Metals

By heating both sides of a metal strip, electric heaters can efficiently dry metal pretreatment and primer coatings. Working with metals involves short and medium wave processes that direct quick, high-intensity bursts of energy to specified zones of the material. These zones are calibrated based on the strip's width, and each has its own ramp/soak dry/cure settings based on the unique properties of the coating applied to that area. Calibrating based on width provides the additional benefit of electricity and cost savings since you can turn off portions of the dryer when processing narrower materials.

Specialty Products

The versatility of infrared heaters makes them suitable for a range of specialty products. In particular, the precise, controlled wavelengths of infrared heaters make them ideal for exotic products such as high-temperature synthetic polymers and hard alloys, which have grown in popularity in recent years but have stringent heating and drying requirements. Any heater-based process that is applied to these exotic materials should be adequately lab-tested to ensure proper safety and efficiency. At Casso-Solar Technologies, our team of skilled scientists and engineers performs wavelength and heat tolerance testing in the lab before creating any heater-specific processes.



Meet Your Custom Infrared Heater Needs with Casso-Solar Technologies

From energy efficiency to best-in-class precision, infrared heaters offer several key benefits over conduction and convection heating. Whether you are working with textiles, plastics, glass, or more, targeted electromagnetic waves calibrated to specific tolerances can dry, cure, and heat an extensive range of materials.

Optimize your space, energy usage, time, and costs by investing in an industrial infrared heating system designed by the skilled professionals at Casso-Solar Technologies. We provide custom infrared heating and drying solutions from start to finish, and we've been crafting infrared/convection combination ovens, furnaces, conveyor systems, air control, cooling, and PLC-programmed controls since 1960. To see if our services are the right fit for you, **request a quote** today. If you still have some questions about the process, take a look at our extensive **reference library** for more information about infrared heating and related manufacturing technologies.

CASSO-SOLAR TECHNOLOGIES

About Us

Serving our customers since 1960

Here at Casso-Solar Technologies, we provide the complete design and fabrication of infrared heat processing machinery customized to maximize efficiency and productivity at your company. Our infrared systems can provide everything you require for your processing needs including combination infrared/convection ovens, furnaces, conveyor systems, air control, cooling and controls with customized PLC programming.

Contact Us **Reference Library**

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