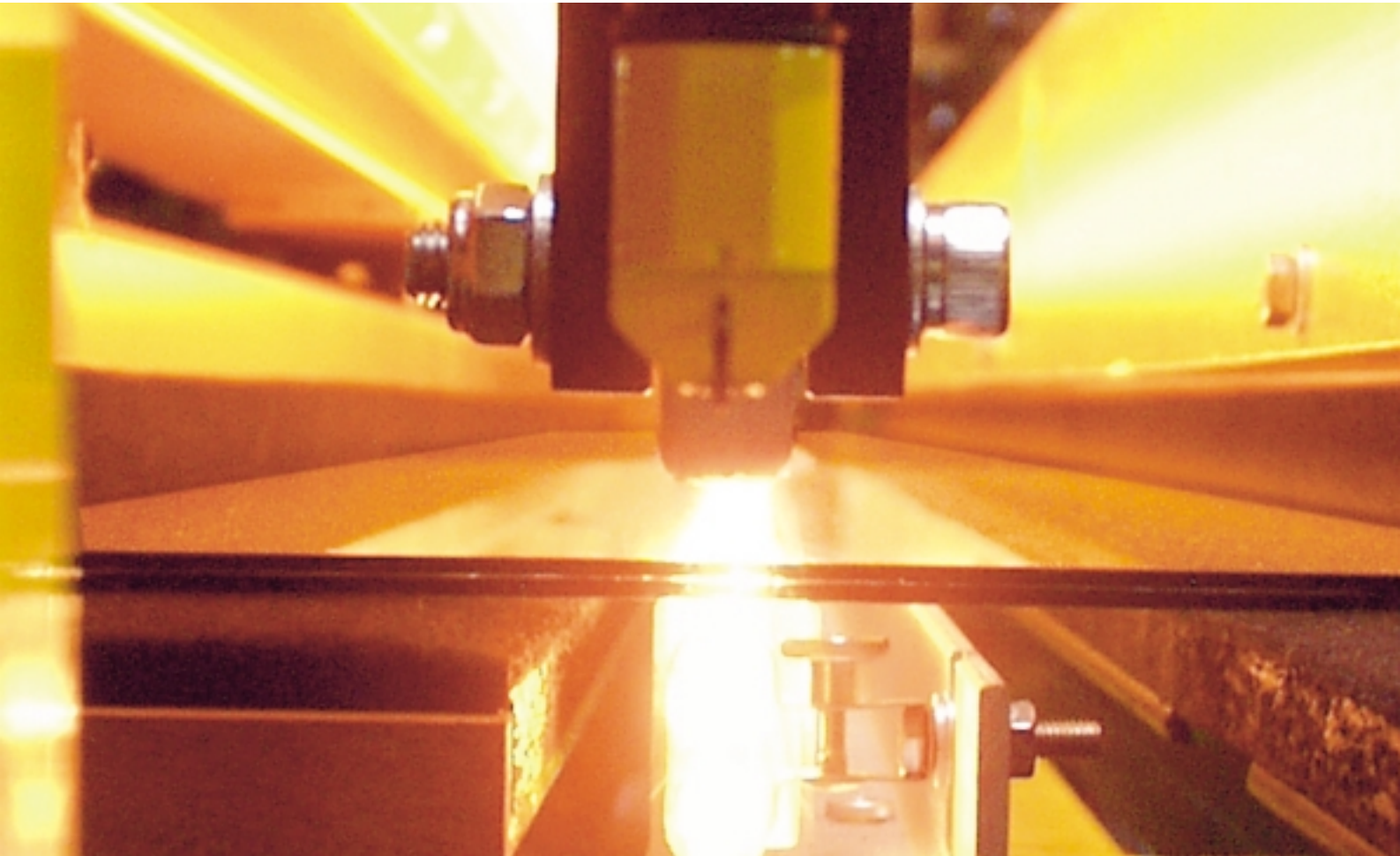


# Heraeus



## Infrared Heat for Glass Processing



Heraeus Noblelight



Infrared Halogen Emitters NIR

# The Right Wavelength to Optimize the Result



Infrared Halogen Emitters NIR

**Infrared radiation transfers heat directly and at high efficiency. Infrared heating technology means heat only where it is needed, at the optimum wavelength for the material and in line with the process.**

## Modules

Infrared modules are built in the sizes to suit customer systems, with the optimum infrared emitters and with the power output necessary for the process.



Short Wave Infrared Emitters

## Infrared Halogen Emitters NIR

Halogen infrared emitters with a spectrum in the near-infrared region, a maximum power output of 1000 kW/m<sup>2</sup> and very fast response times.

## Emitters for Targeted Heat

meet all requirements in finishing processes, where only very small or curved faces, edges, borders or defined contours of the product need heating. For this Heraeus has developed purpose built products such as contoured emitters, small surface emitters, Omega emitters and emitters for heating hot rivets.

## Short Wave Infrared Emitters

Infrared emitters in the short wave region. Twin tubes with lengths of up to 2.4m and high maximum power output of 150 kW/m<sup>2</sup>.

Common to all of these emitters is their focus in shape, size and spectrum to the desired process. Heat is produced in a targeted fashion exactly where it is needed. Consequently energy losses to the surrounding area are very small.

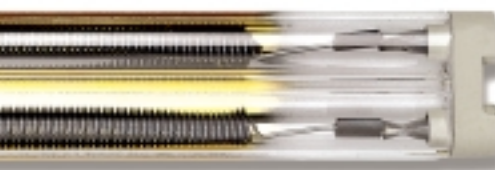


Fast Response, Medium Wave Infrared Emitters

## Fast Response, Medium Wave Infrared Emitters

Emitters, with an improved output in the medium wave (2-4micron). Response times as fast as short wave, with a maximum power output of 120 kW/m<sup>2</sup> and lengths up to 6.3m

Infrared emitters are produced as round tube or twin tube. **Twin Tube Infrared Emitters** have a high mechanical stability and can be produced in every required length up to 6.3m



Medium Wave Infrared Emitters

## Medium Wave Infrared Emitters

Standard emitters with a medium wave spectrum, solid, flexible in construction, lengths (up to 6m) and power output (max. 50 kW/m<sup>2</sup>), especially suitable for continuous processes.

A **Gold Reflector** on the IR emitters reflects the IR radiation; the effective radiation onto the object is therefore roughly doubled.



Carbon Round Tube Infrared Emitters CIR

## Carbon Infrared Emitters CIR

CIR emitters combine a medium wave spectrum with fast response times and high power outputs. These emitters are produced as round tube- or twin tube emitters, in lengths up to 3m, with maximum power outputs of 100 kW/m<sup>2</sup> for round tube or 150 kW/m<sup>2</sup> for twin tube emitters.

According to the application, different wavelengths are suited in different ways for the process, in terms of effectiveness. Heraeus is a specialist in customer-specific infrared emitters and helps in the selection of the optimum emitter. Heraeus creates the conditions for solutions, which are exactly matched to the requirements of the user. The development of emitters concentrates on the requirements of the customers utilizing the latest state of the art technology.



Carbon Twin Infrared Emitters CIR

# Infrared for the Glass Industry – Effective Results for the Process

**Many process stages in glass processing need heat. In an increasing number of cases, infrared heating technology offers excellent provision for solving the heating problems in these process stages, effectively and efficiently.**

## **Drying of Paint and Coating on Glass**

Whether it's a screen print on car wind-screens, coatings on mirror backs or paint on decoration glass – the widest range of coatings on glass are dried reliably and in-line with infrared emitters. Infrared radiation penetrates into the material and dries the lacquer film from the inside outwards, skin- or blister formation on the surface is prevented and the drying of the lacquer or coating is speeded up. The result is a brilliant surface quality. Compared with warm air drying, time, space and energy are saved.

## **Laminated Glass**

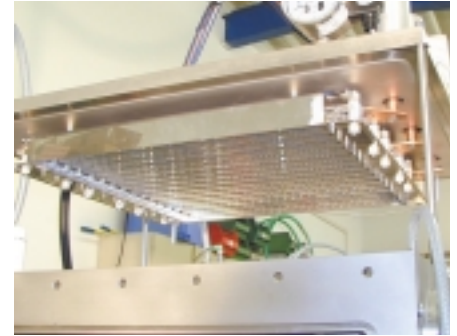
The manufacture and processing of laminated glass requires a few heating stages, which can be accomplished very well with infrared emitters. Laminated glass is produced from several sheets of glass, which are separated and joined by a PVB plastic foil. This process requires several heating steps that can be done by infrared radiation very efficiently. Laminated glass made in very large sheets often needs to be split up into smaller pieces. A method currently used is to score the glass, break it and then separate the foils. The foils can be separated particularly well with the aid of infrared radiation. A fast response medium wave infrared emitter, with a gold reflector, heats the foil only in the small crack resulting from the glass breakage. The foils can then be easily separated by pulling them apart or with cutting tools. Heraeus twin tubes can be produced in lengths of up to 6.3m and allow the cutting of the large sheets in one step.

## **Annealing, the Stabilization of Glass by Heat**

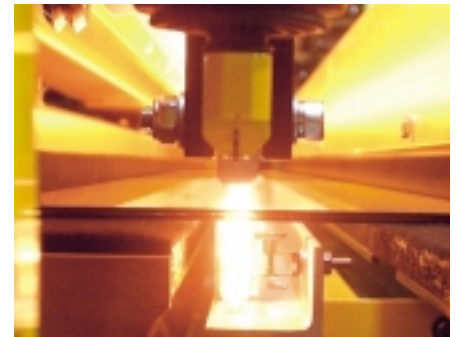
Glass develops stresses when it cools off, for example after forming. These stresses can cause the glass to shatter during subsequent processing. To remove such stresses in glass and so to reduce scrap during manufacture, glass is subjected to an annealing process, at a controlled temperature profile. Infrared emitters are particularly suitable for this because of their excellent controllability. An annealing tunnel with infrared modules can be individually regulated with a fast response to effectively produce maintenance-free products such as incandescent bulbs and energy-saving lamps in an energy efficient way.

## **Operations in Vacuum**

In the production of thin film solar cells, float glass sheets are heated so that they can be coated. This takes place in vacuum plant. Infrared emitters, which generate heat directly in the vacuum space, can heat the float glass very effectively. Heraeus can modify emitters for operation in vacuum by means of special sockets and leads with special voltages if required.



**Vacuum chamber with Infrared Emitters**



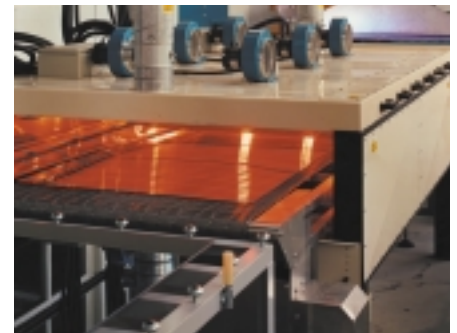
**Cutting of laminated glass**



**Production of light bulbs**



**Preheating of glass prior to application of PU foam**



**Drying of coatings on glass**

# Tested, Checked and Proven

## Know-how with tradition

Heraeus Noblelight has many years' experience in infrared heating technology and provides individual advice and service. Heraeus offers its customers the capability for proving trials in its in-house Applications Center or on-site with experienced technical assistance.

Heraeus has Application Centers in Kleinostheim (D), Liedekerke (B), Bromborough (GB), Atlanta (USA) and Cavenago Brianza (I).

Here you can examine the effects of infrared and the different infrared spectral radiation on your product as well as measure the temperature distribution during the heating process. From these results Heraeus engineers can calculate the required power output and other parameters needed for your new thermal process.

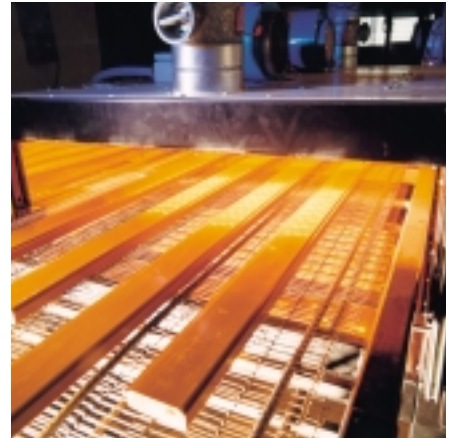
In addition we offer a range of portable test equipment which can be used for an online appraisal of the benefits of infrared.

## Areas of Application in the Glass Industry

- Heating
- Drying
- Coating
- Laminating
- Annealing



Tests in the Application Center



Tests with customer materials

## Heraeus is your partner for industrial heating processes in

- Glass
- Plastics
- Textiles
- Automotive
- Semi-conductor Manufacture
- Food Processing
- Print and Paper
- Electronics
- Metals

Heraeus sales engineers use 30 years of company experience from all major industries to give you expert guidance during the initial stages of your thermal process design.



Drying trials on-site with portable test equipment

Source information

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# Heraeus

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Heraeus Noblelight, Inc.  
2150 Northmont Parkway, Suite L  
Duluth, GA 30096/USA  
Phone +1 (770) 623-6000  
Telefax +1 (770) 418-0688



Reg. No. 39254

