



**LEISTER**

- + efficient
- + responsive
- + modular
- + economic

**KRELUS INFRARED**

# The fast **KRELUS** infrared heaters

Leister's KRELUS infrared heaters emit medium wave infrared radiation. This is particularly well absorbed by plastics, paper, wood and water. Special metal foils are used as emitters to ensure homogeneous energy distribution and high efficiency.

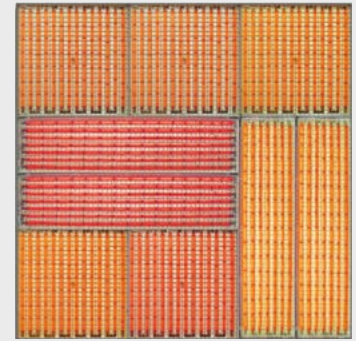
Intensities of up to 60 kW/m<sup>2</sup> are achieved.

The outstanding properties apply both to modular heaters, which can be individually combined into heater fields, and to specific heaters, which are custom-made.

#### Characteristics

- very short reaction time
- very good controllability
- high efficiency
- low heating of the rear side of the heater
- robust construction

In addition to **modular heaters**, KRELUS also manufactures **customer-specific heaters**. The associated controls, which ensure safe and efficient operation, are also part of the product range.



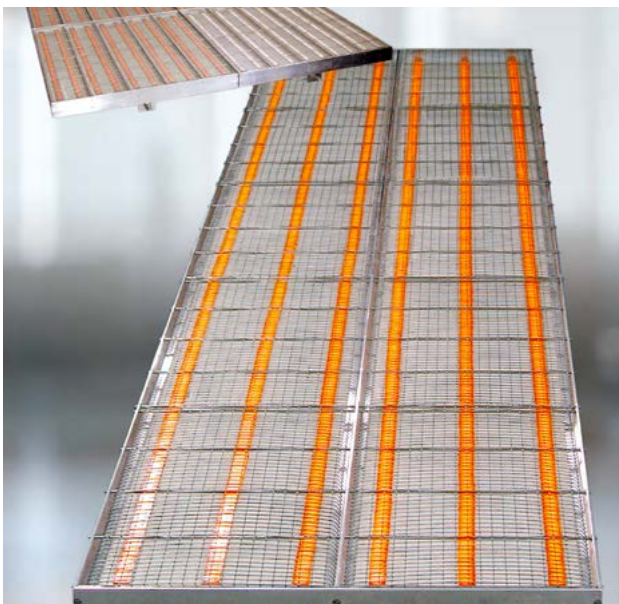
Heater field, combined of different modular infrared heaters

## The Module-heaters

The KRELUS Module-Heaters can be used as single sources or individually combined to heater fields.

All Module-heaters have a short reaction time and are continuously controllable. In order to achieve a homogeneous temperature distribution with large heater fields, individual zones can be controlled separately.

Thanks to the modular design, single heaters can be exchanged easy and quickly.



Custom-made heaters – profile heaters

## Heating and cooling behavior

In addition to the high level of efficiency, the very fast reaction of the metal foil emitters is a major advantage for customers. The heating foils glow after only a few seconds and emit the full power of the infrared radiation. After switching off, the heater cools down just as quickly. This means that the emitter can also be switched off during short production interruptions, which saves energy and costs. Furthermore, material that remains under the heater during production interruptions will not be damaged.

Technical Data  
**KRELUS-Module-heater – standard voltage**



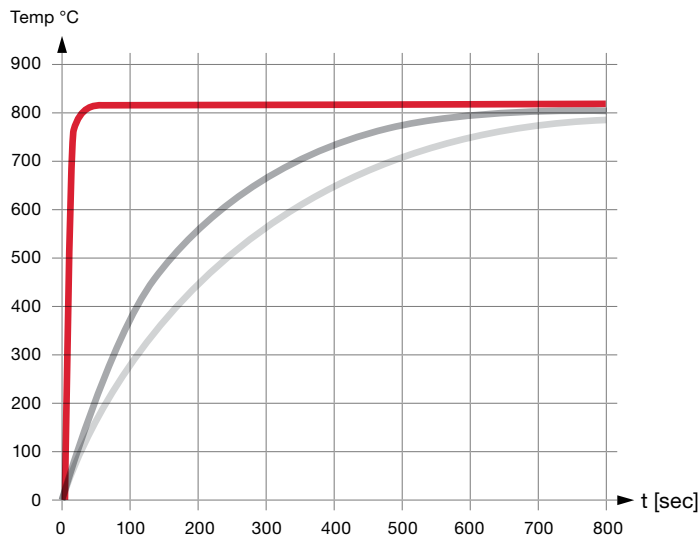
Type	<b>MINI G14-25 M</b>	<b>MINI G7-50 M</b>	<b>MINI-MINI G14-25 MM</b>	<b>MINI-MINI G9-40 MM</b>
Dimensions mm (l × w × h)	248 × 248 × 65	496 × 123 × 65	248 × 123 × 65	398 × 79 × 65
Power kW	1,3/1,7/2,0/2,5/3,1/3,6	1,3/1,7/2,0/2,5/3,1/3,6	1,0	1,0
Voltage V	200 – 240	200 – 240	200 – 240	200 – 240

**KRELUS-Module-heater – special voltage**

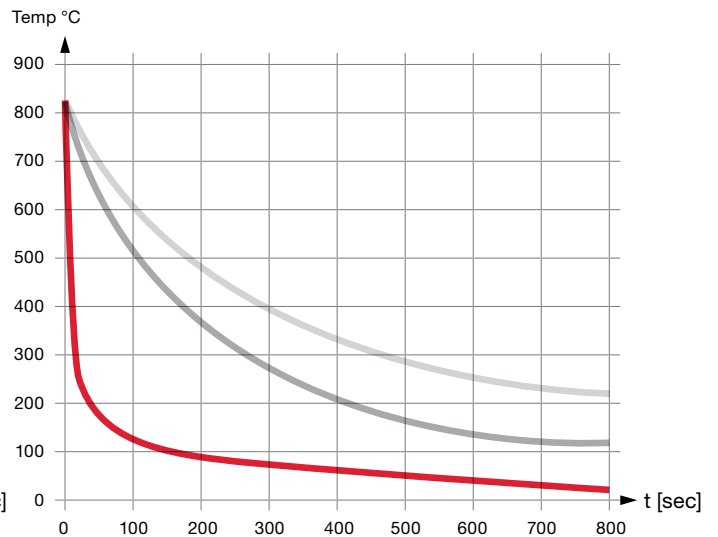


Type	<b>SUPER-MINI G11-12 SM</b>	<b>SUPER-MINI G5-25 SM</b>	<b>MICRO G3-12</b>	<b>MICRO G3-6</b>
Dimensions mm (l × w × h)	123 × 123 × 50	248 × 61 × 50	123 × 37 × 36	61 × 37 × 36
Power kW	0,54/0,96	0,54/0,96	0,26	0,13
Voltage V	77	77	21	10,5

**Typical heating diagram**

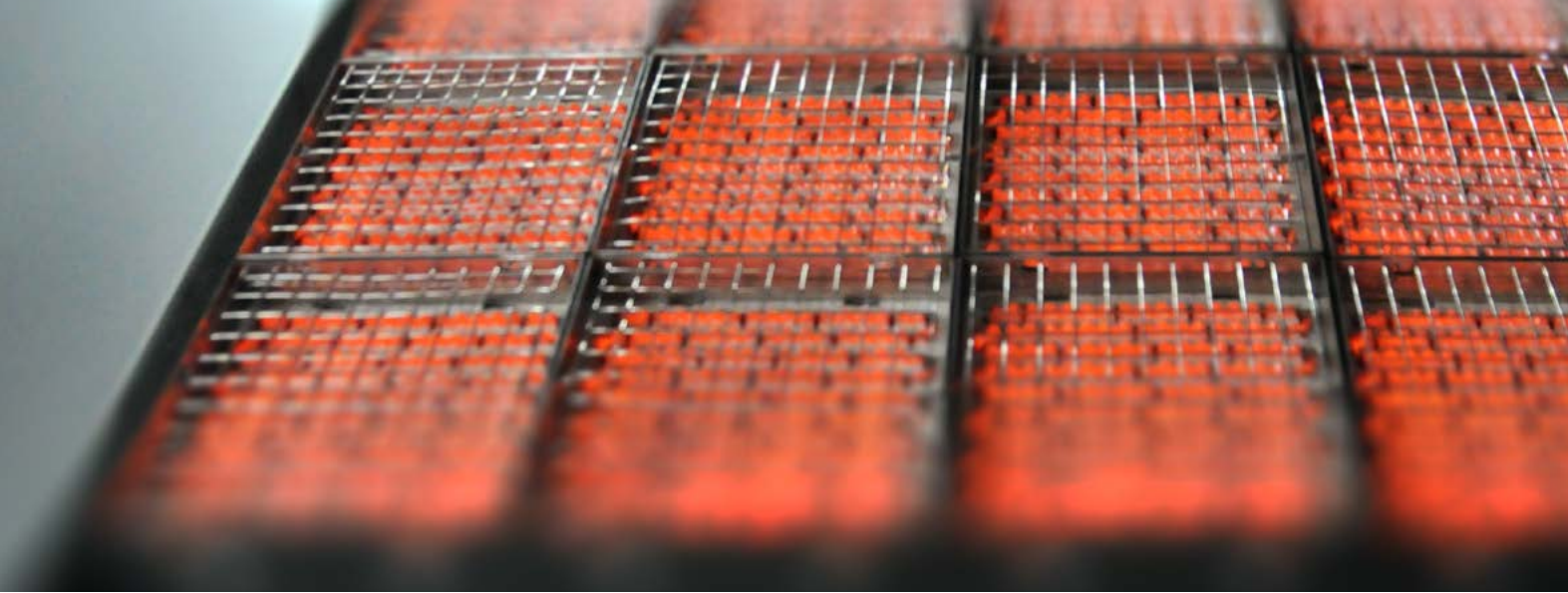


**Typical cooling diagram**



KRELUS Infrared heaters — —  
 Quartz heaters — —  
 Ceramic heaters — —





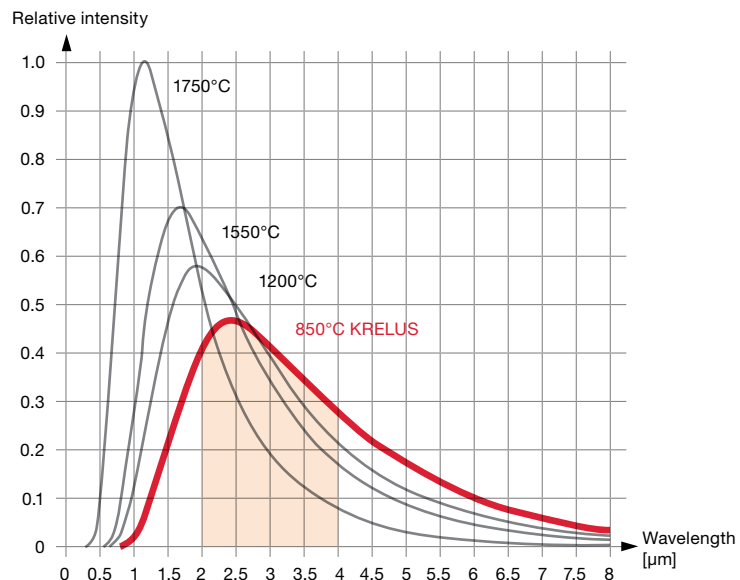
## Radiation heating

The infrared radiation is a part of the electromagnetic spectra and lies between the visible light and the microwave radiation in the wavelength range of  $\sim 1-1000\mu\text{m}$ . The technically relevant range for heating is typically given as  $1-10\mu\text{m}$ . A wavelength under  $1.4\mu\text{m}$  is referred to as short wave, between  $1.4\mu\text{m}$  and  $3\mu\text{m}$  as medium wave and over  $3\mu\text{m}$  it is called long wave radiation.

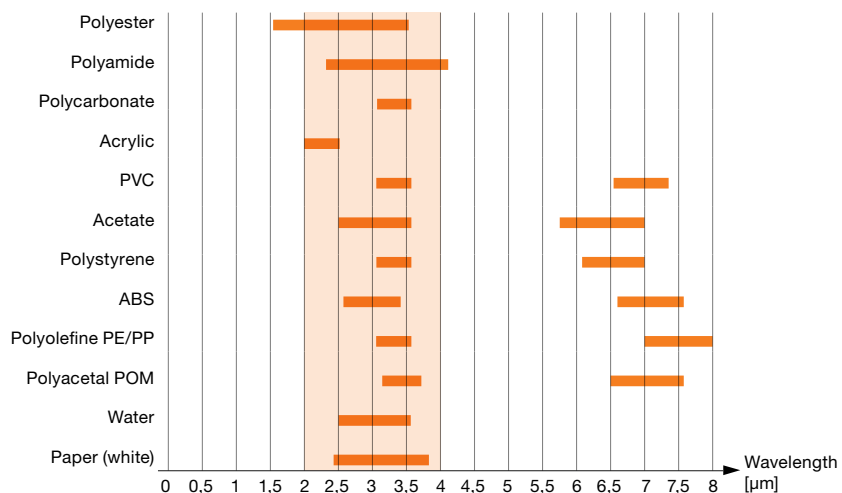
When the radiation interacts with material, absorption, transmission and reflection occur. Absorption is decisive for heating. Many materials, e.g. all plastics, paper and water, absorb medium wave infrared radiation particularly well (see graph).

The KRELUS infrared heaters are made of metal foils that reach a temperature of about  $850^\circ\text{C}$  at maximum power. This temperature corresponds to a peak wavelength of  $2.5\mu\text{m}$ . The heaters therefore emit primarily in the medium wave infrared range, where the absorption of many materials is most efficient.

### Emission spectra of infrared heaters



### Absorbing properties of various materials





Homogeneous heating of an organo sheet  
Source: Fraunhofer IPT

## Applications

**KRELUS infrared heaters are used in many ways. Wherever flat material has to be heated precisely and efficiently, KRELUS infrared heaters are the first choice.**

### Industries

- plastics processing
- automotive
- packaging industry
- food industry
- paper manufacturing
- printing machines

### Applications

- textile, paper and film coating
- predrying and preheating
- embossing, laminating and concealing
- thermoforming
- composite processing

In all these applications the unique characteristics of KRELUS infrared heaters are highly beneficial.

### Characteristics

- responsive
- precise
- powerful
- efficient
- custom-made
- economic



KRELUS infrared preheating for embossing machines  
Source: Kampf LSF GmbH, Laussig, Germany



Source Picture Title page: Fill GmbH, Gurten, Austria

Composite Components – Hybrid Injection Molding

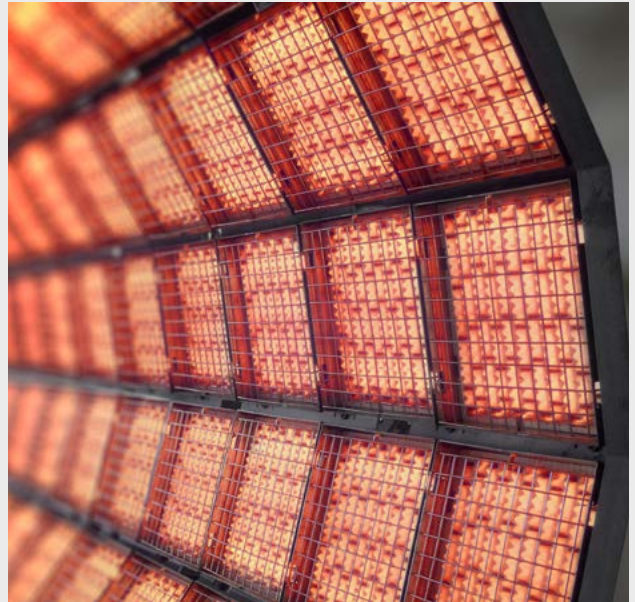


With the KRELUS infrared heaters, Leister has expanded its portfolio in the infrared range with industrially usable, high-performance infrared heaters.

KRELUS heaters have been convincing customers for more than 40 years with demand-oriented solutions.

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