NobleLight® | Infrared Emitters for Industrial Processes



excelitas®

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Excelitas – Decades of experience

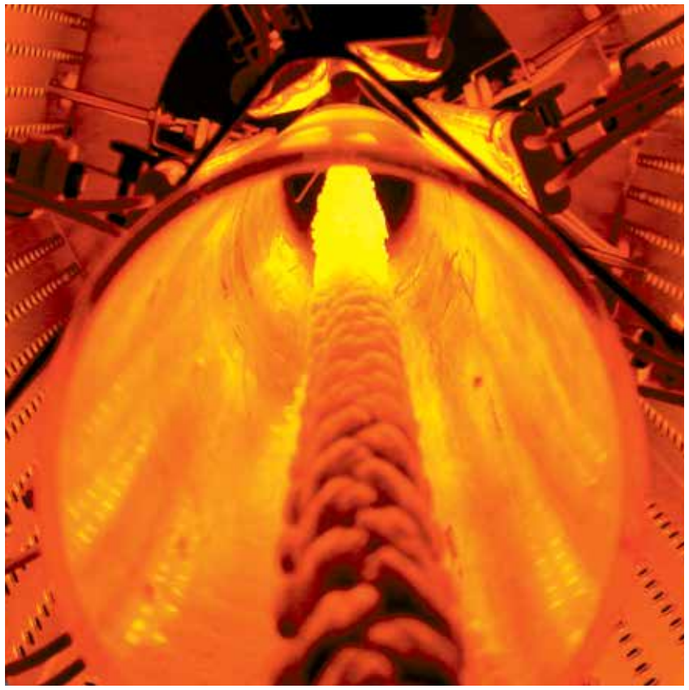
With a background of many decades of of experience, Excelitas develops, manufactures, markets and distributes a wide range of Noblelight infrared and ultraviolet emitters and components which find application in all important sectors and areas of industry.

Excelitas - A Powerful Partner

Industrial heating processes must be constantly improved. A Noblelight emitter is always matched to the process - and not vice versa. Experience with thousands of heat processes, own application centers and competent and responsive people are the foundation to make heat processes faster, more energy-efficient, space saving and quality-orientated.

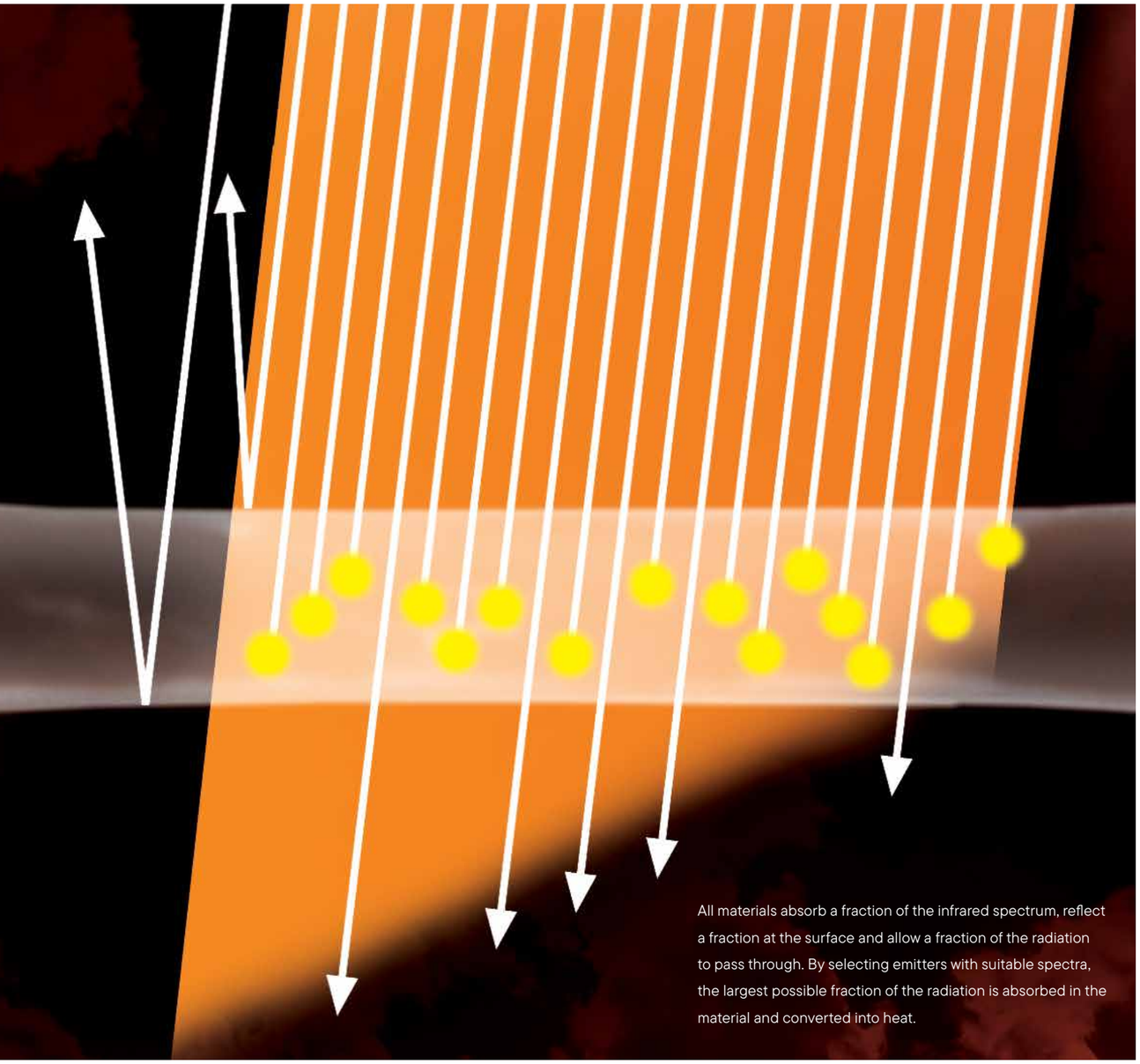
Modern production processes need intelligent heat

Today, there is hardly a product that has not come into contact with infrared heat at least once during its manufacturing process - and the tendency is rising. This makes it all the more important to select the right emitters for every application. Excelitas covers the full spectrum of technically usable wavelengths and helps to find the optimum light source for the individual process. Perfectly matched infrared emitters allow heating processes to be carried out at great efficiency and with the right amount of energy. Reliable and reproducible manufacturing processes save costs.



Infrared Inelligent Heat

Precise and Efficient



All materials absorb a fraction of the infrared spectrum, reflect a fraction at the surface and allow a fraction of the radiation to pass through. By selecting emitters with suitable spectra, the largest possible fraction of the radiation is absorbed in the material and converted into heat.

All materials absorb some of the infrared radiation, reflect some of it on the surface and allow some of it to pass through. By selecting emitters with suitable spectrum, as much of the radiation as possible is absorbed in the material and converted into heat.

Quartz glass infrared emitters frequently prove superior to conventional heating sources such as warm air, steam, ceramic, gas or metal emitters, because they transfer large amounts of energy very quickly and can be precisely matched to the product and the manufacturing step – the ideal heating process.

- Infrared radiation requires neither contact nor intermediate transfer medium
- Fast response times allow controllable heat
- Heat is applied precisely where and only for so long as it is required

Compared to hot-air ovens, this often means lower energy consumption, higher production speeds, less production space and better heating results.

To achieve successful process heating, it is important that the infrared emitter is carefully matched to the properties of the product to be heated in terms of its wavelength, its shape and its power output. Radiation which precisely matches the absorption characteristics of the product is quickly converted into heat in the product, without unnecessary heat being transferred to the surroundings. It also saves time and money if products can be transferred quickly for further processing after the heating stage.

The correct wavelength

Depending on the temperature of the heating element, an infrared emitter delivers distinctly different radiation at various wavelengths.

It is important to select the correct emitter for the product, as the wavelength has a significant influence on the heating process. Short wave radiation can penetrate deep into some solid materials and ensure a uniform through heating.

Medium wave radiation is absorbed mostly in the outer surface and predominantly heats the surface. Medium wave radiation is particularly well absorbed by many plastics, glass and especially water and is converted directly into heat.

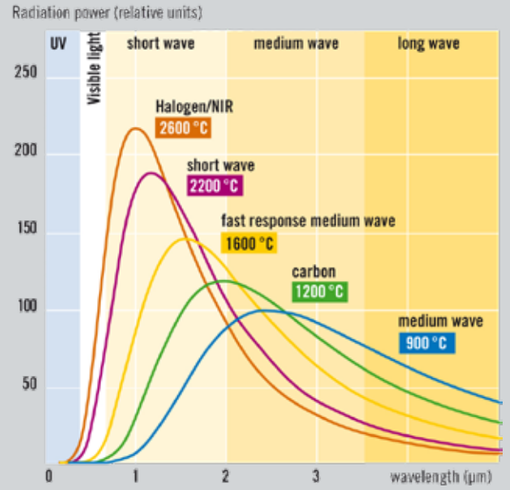
PROPORTION OF HEAT

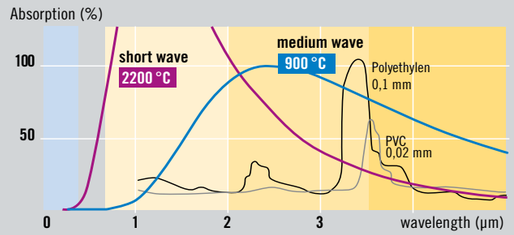
	< 2 µm	2–4 µm	> 4 µm	Typical Emitter
600 °C	2,2%	37,2%	60,6%	Ceramic/Metal Sheathed
900 °C	13,0%	46,4%	40,6%	Standard Medium Wave
1200 °C	26,1%	46,9%	27,0%	Carbon
1600 °C	43,2%	40,1%	16,7%	Fast Response Medium Wave
2200 °C	62,5%	28,7%	8,8%	Short Wave
2700 °C	73,3%	21,0%	5,7%	Halogen/NIR
3000 °C	77,9%	17,6%	4,5%	High Power Halogen/NIR

CORRECT SELECTION OF HEATERS

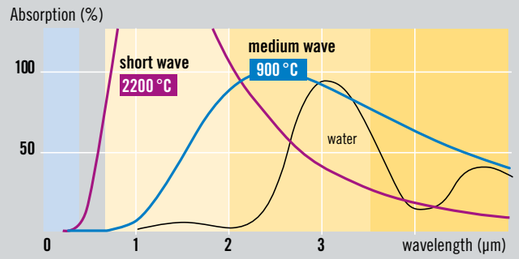
If the temperature of the heating element of a short wave emitter is greatly reduced, medium wave infrared radiation can be emitted. However, the emitter power output then drops so much that economical heating is no longer possible. Consequently, for applications in the medium wave range, only medium wave emitters should be used, as these offer five times the power out put at the same temperature.

Spectral radiation curves for different infrared emitters, normalized to the same power.





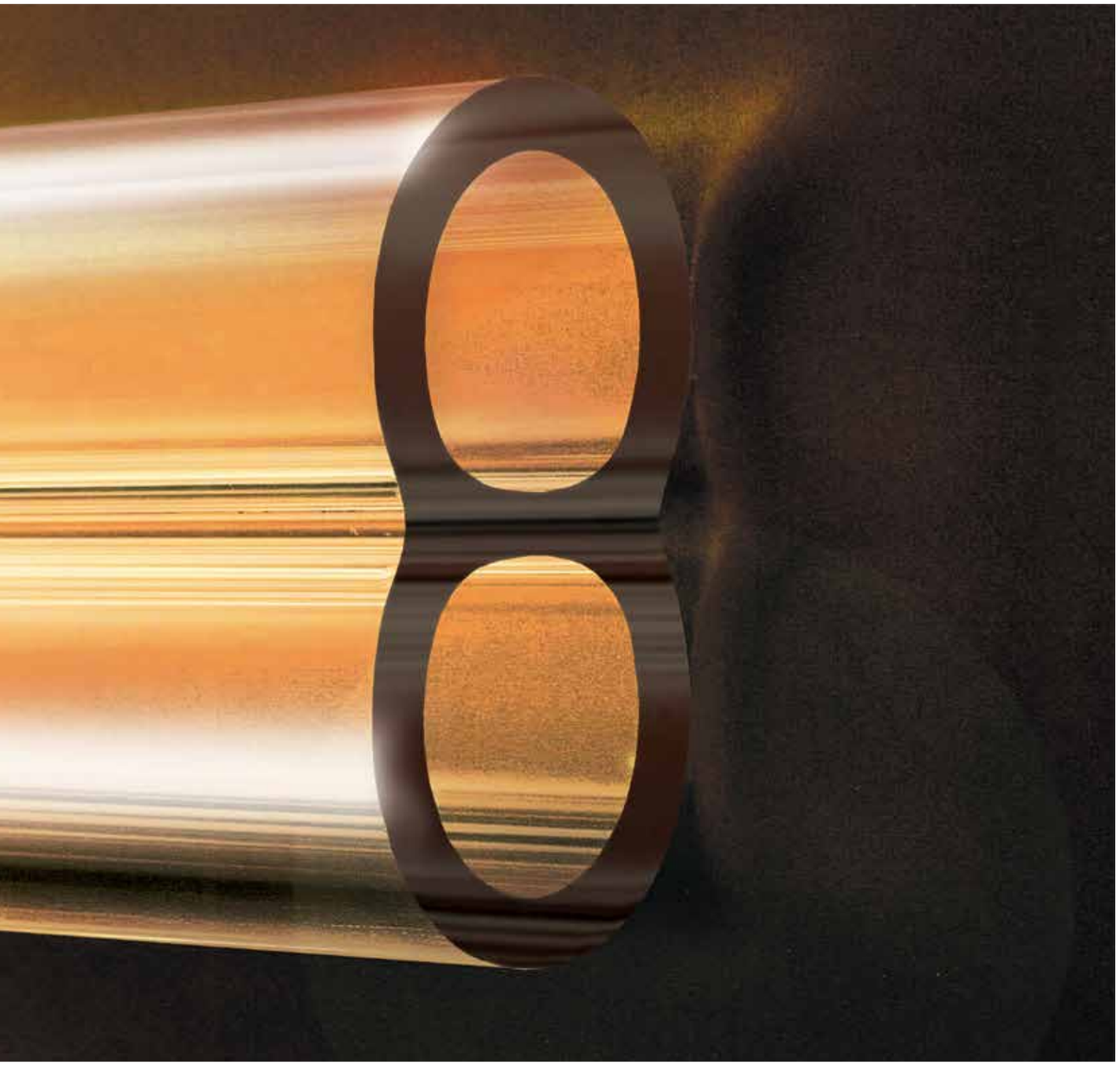
Plastics such as polyethylene and polyvinylchlorid are particularly good absorbers of infrared radiation in the medium wave region.



Water evaporates more quickly with medium wave infrared emitters as water absorbs radiation particularly well in this region.

Golden 8

Packaged Heat at the ready



A reliable sign of competence and quality in infrared heating technology: the Golden 8!
The emitter cross-section of a twin tube in the shape ofan eight, the golden reflector - the golden 8 stands for all our twin tube emitters and is the starting point for constantly new solutions for heating processes.

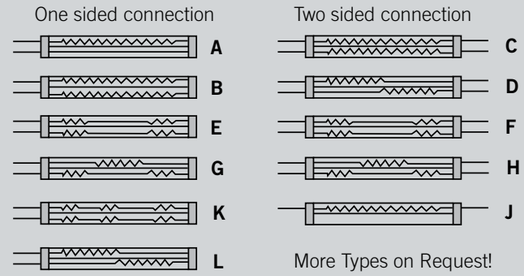
Quartz Glass
Golden 8 infrared emitters are manufactured from high quality quartz tubes. Quartz glass is very pure and provides good transmission and temperature resistance.

Twin Tube
The unique twin tube design offers high radiation power and very good mechanical stability – allowing emitters of lengths up to 6.5 metres. Wave lengths, dimensions and filaments are matched to requirements.

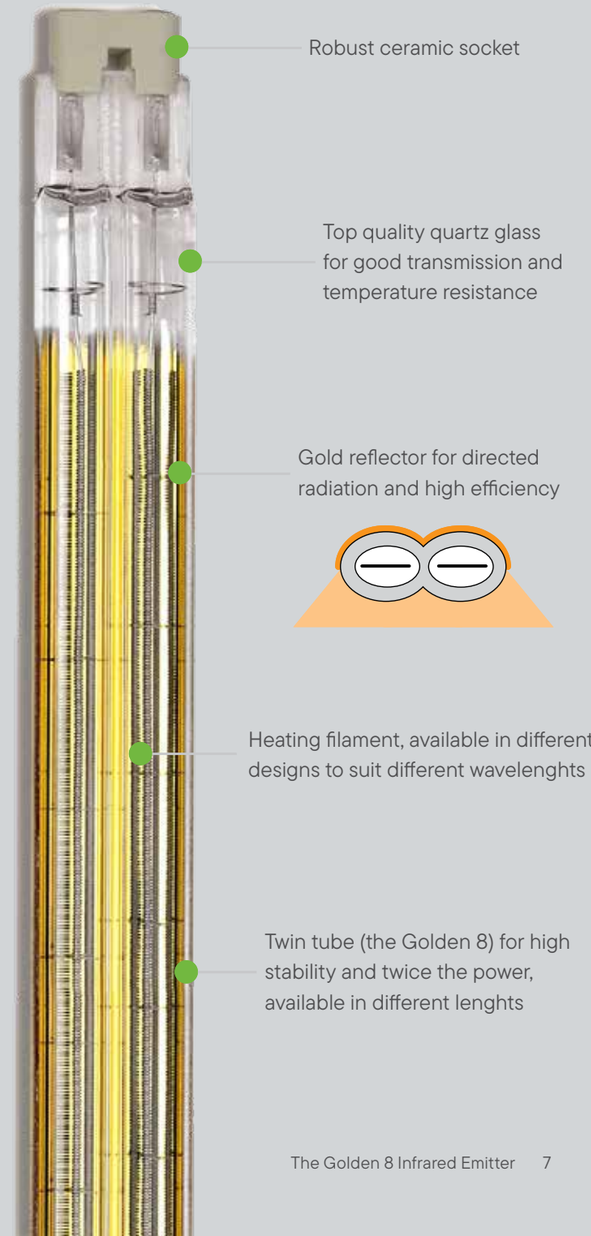
Gold Reflector
Noblelight infrared emitters with gold reflector can emit heat directly to the product. A gold coating on the infrared emitters reflects the infrared radiation. Consequently the infrared radiation impinging on the product is virtually doubled.

QRC® nano reflector
The evolution among reflectors is the QRC® (quartz reflective coating) nano-reflector, which consists of high-purity quartz material with which the quartz glass light tube is coated. QRC is resistant to aggressive environments, ideal for high-temperature processes or in a vacuum.

DESIGN OF THE TWIN TUBE EMITTER



EMITTER CHARACTERISTICS



Carbon twin emitters flow and cure powder coatings efficiently



Infrared emitters need a flexible but firm holder so that they can operate correctly



Carbon Infrared Emitters CIR®
Carbon infrared emitters feature a unique heating filament design so that medium wave radiation offering very fast reaction times is possible. All Carbon infrared emitters CIR® offer high surface power densities and speed up heating processes at high efficiency.

Comprehensive tests have shown that Carbon emitters dry waterbased coatings significantly more efficiently than short wave infrared emitters. A Carbon infrared emitter may require only up to 30% of the energy for the same drying process as as conventional short wave infrared emitter.
Moreover, many materials such as glass and plastics show a decided preference for thermal radiation in the medium wave region.

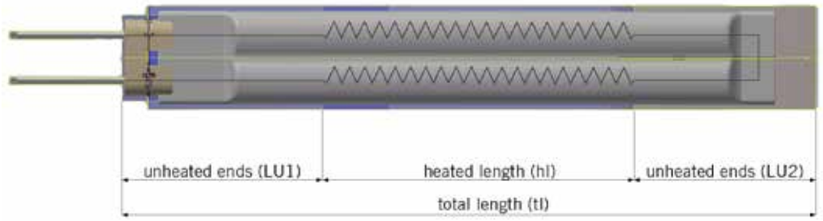
Carbon Emitters
combine medium wave radiation at high Watts density with response times in terms of seconds.

Short wave twin tube
are similar to halogen emitters in terms of spectrum but offer significant benefits in terms of lifetime, strength and durability.

Fast response medium wave emitters
are twin tube emitters with a spectrum between those of short wave, and medium wave emitters.

Medium wave emitters
distinguish themselves with their high cost-efficiency, stability, and operating life.





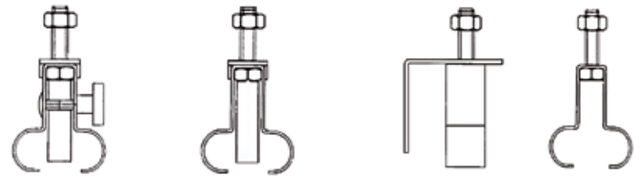
TECHNICAL DATA

Twin tube emitter	Short wave	Fast response medium wave	Medium wave	Medium wave +	Carbon
Max. specific power W/cm	200	80	18/20/25	35-50	60
Max. heated length mm	4700/2400*	4700/2400*	1000/1600/4900*	1000**	2500
Cross-section mm	34x14 23x11	34x14 23x11	18x8 22x10 33x15	33x15**	34x14
Filament temperature °C	1800-2400	1400-1800	800-950	1050	700-1470
Peak wavelength µm	1.0-1.4	>1.4	2.4-2.7	2.4-2.7	2
Max. surface power density kW/m²	200	150	60	80	110
Response time s	1	1-2	60-240	60-240	1-2

* Depending on cross-section
** Potential expansion possible, please contact us to discuss

CLAMP & HOLDING SPRINGS

Every infrared emitter needs a clamping- and holding-spring to ensure that the emitter is held correctly. For further information please contact us!



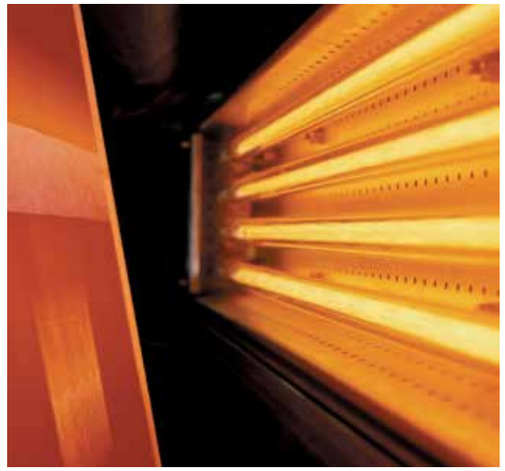
STARTING CURRENT

When switching on an emitter, it can reach peak current in a very short time. This needs to be considered when designing your system.

Round Tube Emitters







TECHNICAL DATA

Round tube emitter	Short wave	Fast response medium wave	Carbon
Max. specific power W/cm	<200	80	40
Max. heated length mm	1138/1622*	1138/1622*	1600
Cross-section mm	10 13.7	10 13.7	19
Filament temperature °C	1800-2400	1400-1800	700-1520
Peak wavelength µm	1.0-1.4	>1.4	2
Max. surface power density kW/m²	200	150	85
Response time s	1	1-2	1-2

* Depending on cross-section

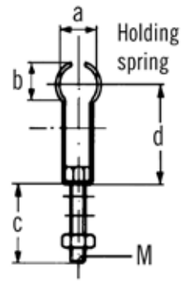
For many applications, an infrared emitter consisting of just a heating element in a quartz tube is the perfect choice. Such emitters are, in the main, shorter than twin tubes. Obviously, round rube emitters can also be fitted with a gold reflector.

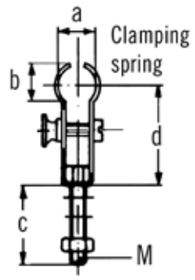
Carbon round tube



CLAMP & HOLDING SPRINGS

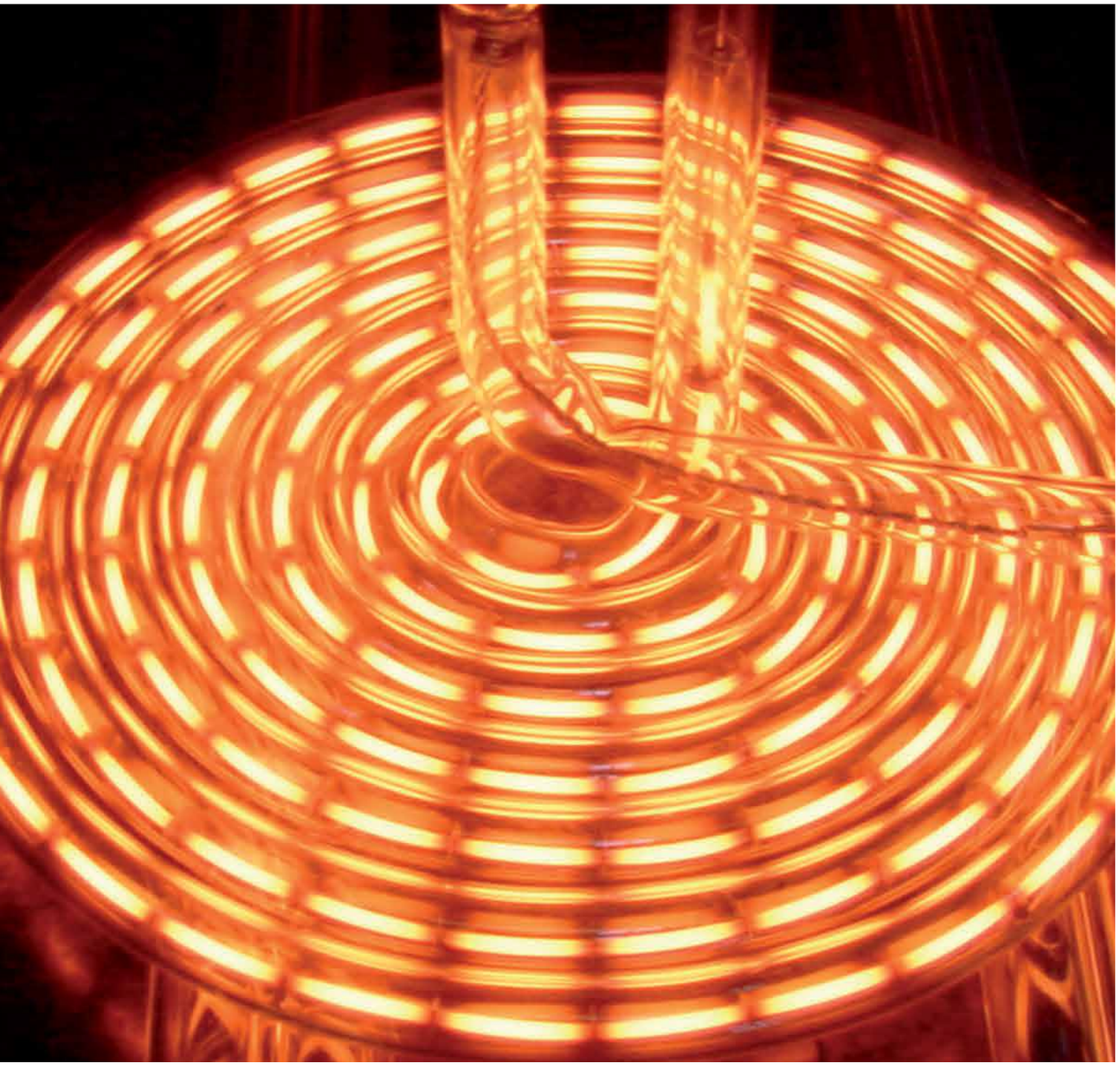
Every infrared emitter needs a clamping- and holding-spring to ensure that the emitter is held correctly. For further information please contact us!





Special Emitters

Heat precisely where it’s needed



Edges, corners and contours are followed exactly and heated in a focused manner



To rivet two parts together, an omega emitter only needs to heat rivets, not the entire part



Noblelight infrared emitters are precisely matched. They heat large surfaces as well as small edges and complex geometry work pieces. The potential to switch the infrared emitters on and off in seconds allow significant savings in both energy and operating costs.
Energy losses to the environment are incredibly small and production process times can be reduced or more parts can be produced in the same time.

Contoured Emitters

Individually shaped emitters can follow work piece corners and edges to allow any required bending process or for the local activation of adhesives.

Small Surface Emitters

Short wave emitters heat complex geometries so that two surfaces can be joined without adhesive.

Omega Emitters

Circular short wave emitters for hot staking. With heat up and cooling times in terms of seconds, very short process times can be realised.

QRC® Emitter

Many sensitive heating processes run faster, more efficiently and more stable when infrared emitters with the QRC reflector are used. The nano reflector has very good heat resistance

and is also resistant to acids, alkalis and other aggressive substances. Consequently, emitters with this reflector can be used even in manufacturing processes where the manufacturing plant requires regular cleaning with corrosive cleaning agents. Also QRC heaters can be bent or formed to fit exactly to edges or contours of a product.

INFRADRY®

Infradry modules combine infrared heat and air management very efficient. Intensive infrared heat with controlled air introduction and extraction ensures effective drying.

Infradry combi allows an air extraction within the infrared emitter field for the first time. In contrast to conventional dryers, the moisture is removed directly in the process area.



Application Center

Practically-based Support







There is scarcely a product manufactured which does not pass at least once through a heating process during its manufacture. Coatings are dried, adhesives activated and plastics heated before forming.

More efficient heating processes are achieved by better energy utilization. As a result, heating is shorter, in terms of time or in terms of space requirement, so that the complete production plant is more cost-efficient.

You have to understand the different applications to exploit infrared heating productively. Excelitas has set up Applications Centers to increase its knowledge through investigations and tests and to share experiences with customers. We offer all customers the opportunity to clarify important questions in a practical manner:

- Can my process be optimized with infrared?
- Is my material suitable for infrared?
- Which emitters are best suited to my process?
- How should these emitters be designed?
- How can they be integrated into my production process?

Application examples:

Coating more efficiently

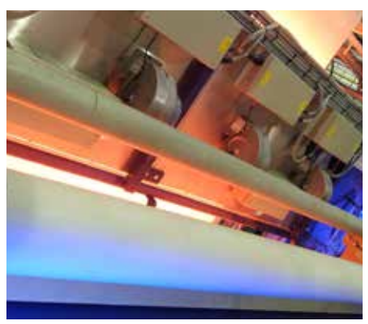
Competition is forcing the coating industry to reduce energy costs and shorten production times. An upstream infrared module brings the product to the right temperature, which the existing dryer then maintains for as long as necessary. An infrared heating zone upstream of an existing dryer helps to maintain and often even increase product throughput.

Better processing of foodstuffs

Carbon infrared emitters can be used to brown the breadcrumb topping or other garnishing on ready meals, without cooking the meal through. Carbon emitters prove more efficient than conventional heating sources, saving energy and valuable production space, as well as minimizing maintenance costs.

More efficient car manufacture

Crease-free seat covers, matching panelling, precisely deburred steering wheel caps and cleanly welded containers for wiper fluid or brake fluid - infrared emitters are precisely adapted to the material and process and thus heat in a targeted and precise manner. This helps to automate industrial processes, saving time, energy and costs. Batteries require electrodes. Metal foils are coated and dried for this purpose. Infrared systems and CAE simulations optimise the processes required for efficient production.







GOLDEN 8 STANDARD EMITTERS

	Power [Watts]	Voltage [Volts]	Heated Length [mm]	Total Length [mm]	Emitter type
MEDIUM WAVE	500	230	300	400	B
	1000	230	500	600	B
	2000	230	800	900	B
	2500	230	1000	1100	B
	3250	230	1300	1420	B
	3750	230	1500	1600	B
	4100	400	1700	1800	B
	4500	400	1800	1920	B
	5750	400	2300	2400	B
	6250	400	2500	2600	B
	2500	230	1200	1300	C
SHORT WAVE	3000	400	1000	1100	A
	600	115	80	145	B
	1500	230	200	300	B
	1200	230	340	405	B
	3000	400	500	600	B
	3000	400	500	600	B
	3000	230	500	650	C
	4200	230	700	850	C
	6000	400	1000	1150	C
	7000	400	1300	1450	C
CARBON	3600	230	600	745	B
	4000	230	700	845	B
	6000	400	1000	1145	B
	6600	400	1100	1245	B
	7500	230	1250	1400	C

Enabling the future

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