IR LAMP

IR HEATERS

helios quartz


Helios Italquartz Srl
Made in Italy CE

Founded in 1940, Helios Quartz has been a major international supplier for the manufacturing of infrared (IR) quartz emitters in single and twin tube, in short, medium and fast medium wave-lenght.

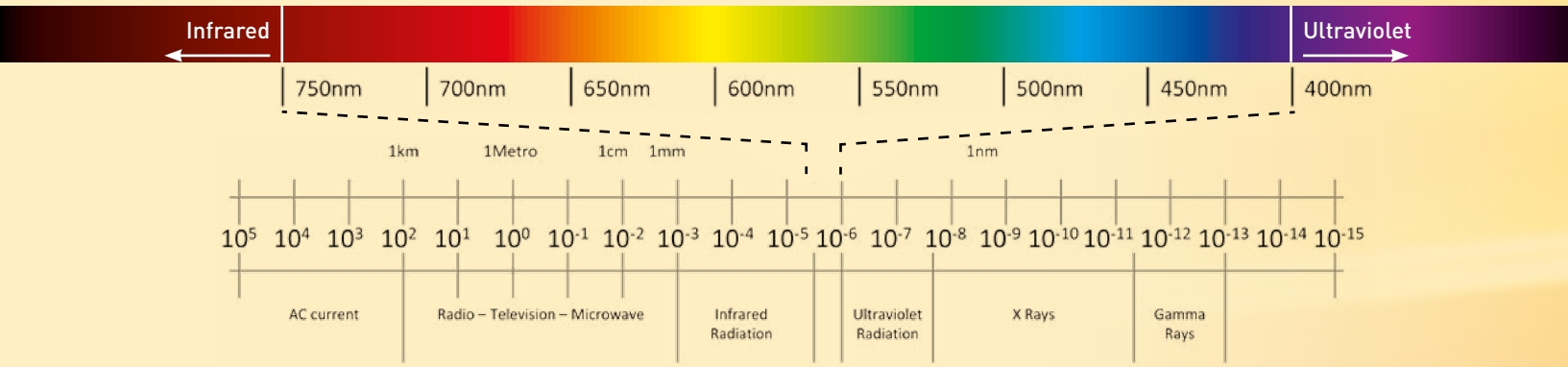
Helios quartz is also specialized in Quartz Glass processing, manufacturing of UV Lamps and specialized Equipment for Industrial, Scientific, and Medical applications.

HEATING BY RADIATION

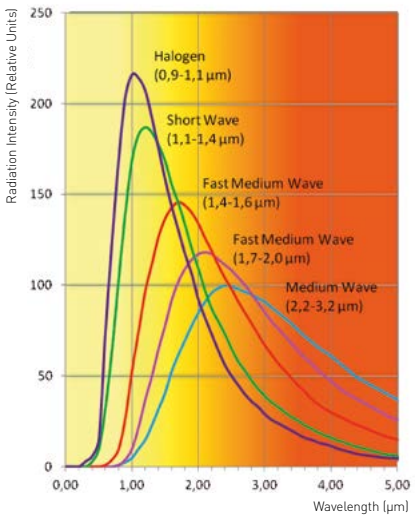
Radiation, compared to convection and conduction, is the most powerful and efficient way of heating a material. In fact radiation does not need to come into direct contact with the surface of the products to be heated up and does not require the presence of any intermediary agent such as air.

Radiation operates with the transmission of energy through electromagnetic rays emitted by a heating element. The heating performance is influenced by the following peculiarity: heating element temperature, heated body capacity to absorb radiant heat, shape, position and distance between the heated body and the heating source.

As illustrated in the following picture, the wavelengths of infrared ("IR") are placed in the range of the electromagnetic spectrum from 750 nm to 1 mm, between the red zone of the visible spectrum and the microwaves.



In particular, the infrared wavelengths range generated by the IR quartz emitters, are located in the range of 3,5 µm (medium wave) and 0,9 µm (short wave).
Depending on the type of material to be heated it is possible to use different types of IR wavelengths to reach the maximum propagation of energy and to obtain a faster and more efficient heating process.

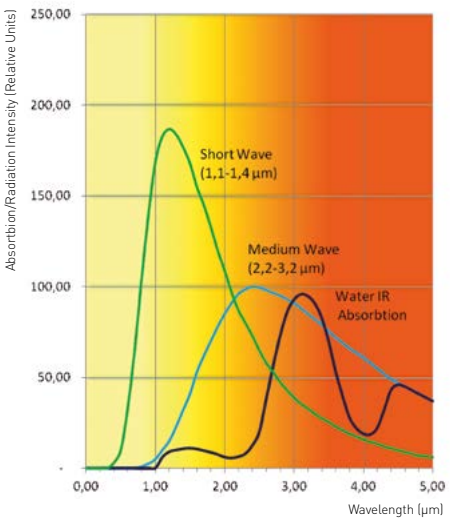


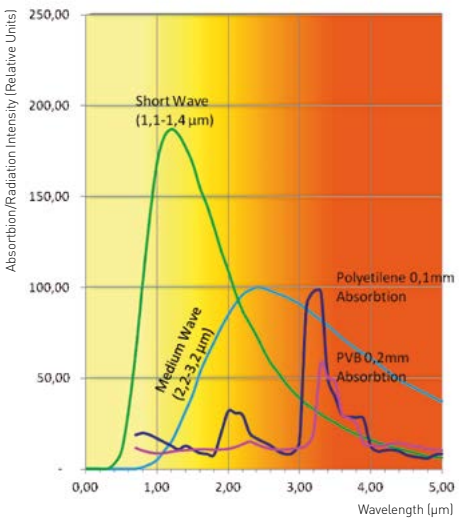
The picture on the left shows all the radiation intensity curves for halogen, short wave, medium and fast medium wave emitters.
The graphs on the right represent the absorption spectrum of the IR radiation, for water, polyethylene and PVC. In all of these three cases there is a considerable absorption peak of the IR radiation between 2,5 and 3,5 µm , for this reason the more effective IR quartz technology to be used for the heating process of above mentioned materials are the medium wave emitters compared with the short wave and halogen lamps.

The IR heaters, if compared with traditional heating systems that use the hot air, emit more energy for unit surface and this energy could be focused, concentrated, directed and reflected just like the light.

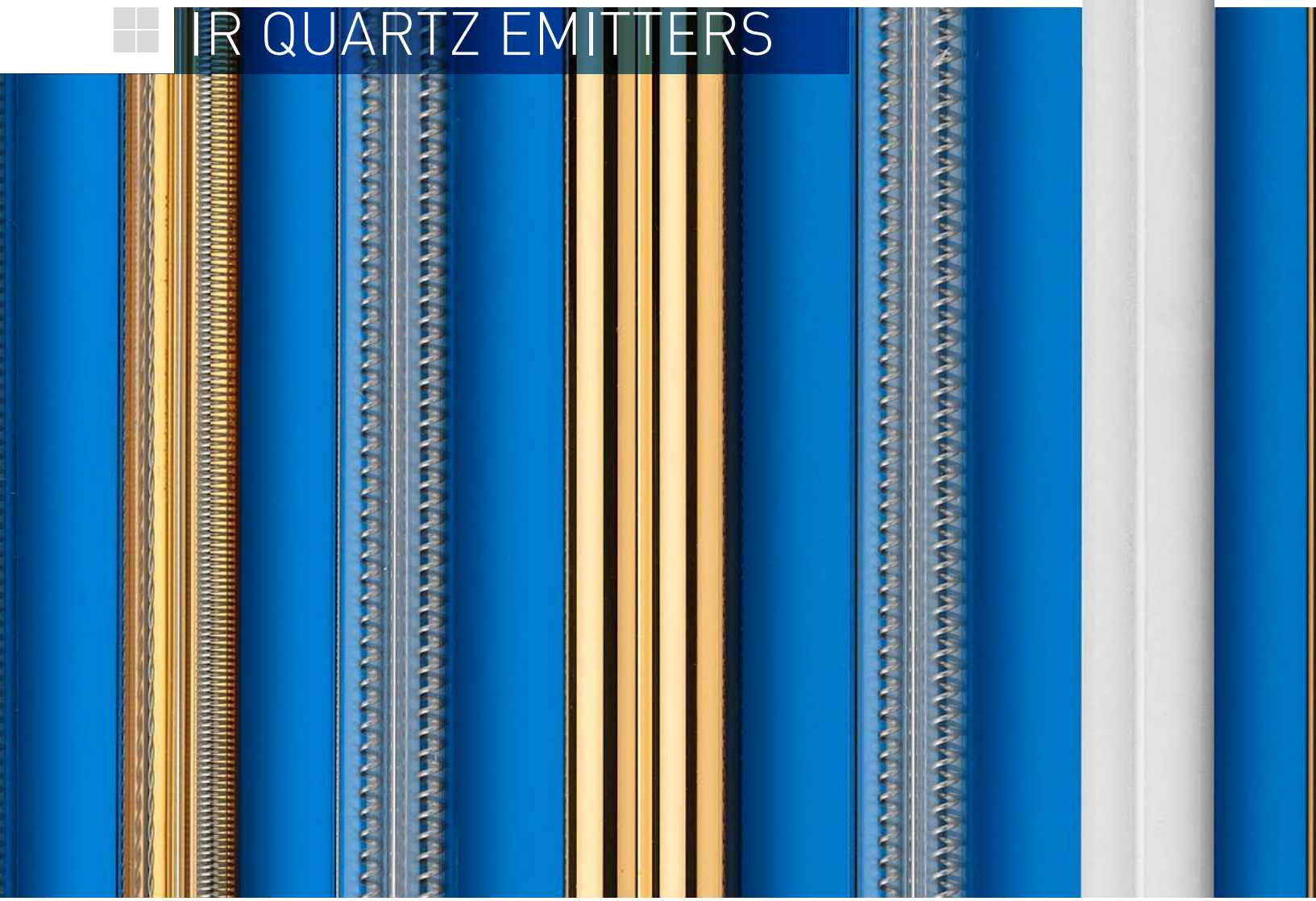
The use of this technology can give enormous benefits in order of:

- **SPEED HEATING PROCESS:** IR quartz emitters need short time to switch on and switch off (few seconds); this fact reduces the time of operation and optimizes the homogeneity of the heating up of the material;
- **ENERGY SAVING AND LESS HEAT GENERATION IN THE SURROUNDING AREA**: due to the fast switch on of the IR emitters, it is possible to start them and concentrate the heat only where and when it is really necessary;
- **EASY CONTROL OF THE EMITTERS**: the emitters can be controlled by wave modulators or they can work in simply ON/OFF way;
- **ABSENCE OF DIRECT CONTACT WITH THE MATERIAL AND NO SURROUNDING AREA CONTAMINATION**: working by the radiation, IR emitters do not need to be in contact with the material to be heated;
- **SMALLER SIZES AND DIMENSIONS OF IR QUARTZ HEATING MODULES AND OVENS RESPECT OF TRADITIONAL HOT AIR HEATING EQUIPMENTS**: the small dimension of the IR quartz emitters and their convenient shape simplify the machinery construction design and the maintenance process of the heating area.





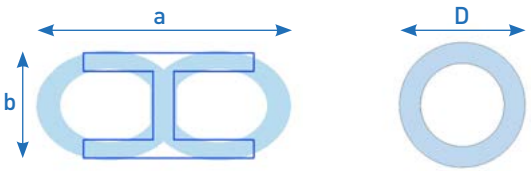
IR QUARTZ EMITTERS



Helios Quartz IR quartz emitters are made by a quartz tube with a filament inside.
The choice of quartz glass is not a coincidence, in fact this extraordinary material is totally transparent at IR radiation, can stand constant working temperature of more than 1000°C and it is chemical agents resistant.

Helios Quartz uses two kinds of quartz tubes to host the filament: single tube and twin tube.
The twin tube provides the best mechanical resistance, thanks to its reverse "H" shape, and it allows to manufacture emitters up to 6,5 meters in length.

The tables shown on the right indicate standard sizes and lengths for both single and twin tube emitters.



section a x b (mm)	Maximum Length L (mm)
18 x 9	1000
22 x 10	2500
33 x16	6500
18 x 8	1000
22 x 11	2500
33 x 15	6500

Outer diameter D (mm)	Maximum Length L (mm)
10	1100
12	1500
13	2000
16	2500
18	3500
26	→ 4000

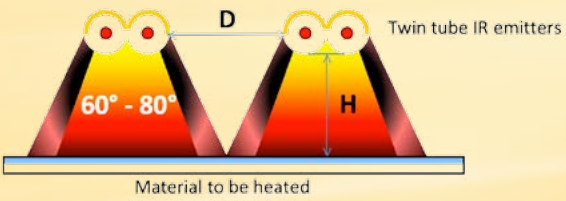
REFLECTORS

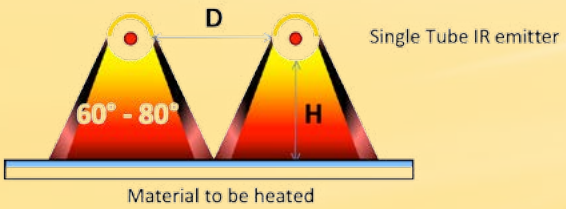
To better convey and focus on the material all the energy emitted by the lamp, it is possible to apply a special reflector directly on the quartz tube.

The reflectors usually applied by Helios Quartz on its emitters are the following:

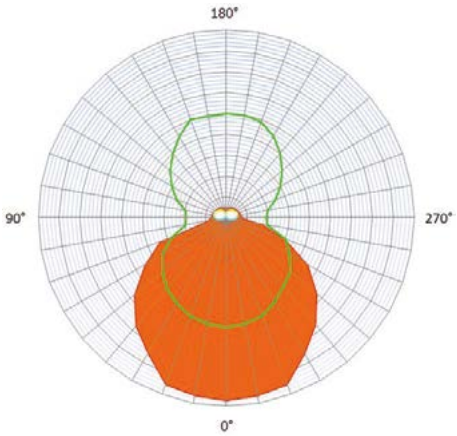
1. **GOLD REFLECTOR** is a gold layer, fixed directly on the quartz tube. It's able to reflect more than 90% of IR radiation and if properly cooled it can reach the working temperature of about 600°C;
2. **WHITE REFLECTOR** is a with ceramic layer, fixed directly on the quartz tube. It's able to reflect about the 70% of IR radiation, so it is less effective compared to the gold one , but it can resist up to a working temperature of about 900 - 1000°C;
3. **RUBY REFLECTOR** is used to mitigate the IR radiation intensity of the filament. It is usually fixed all over the quartz tube in combination with another reflector;

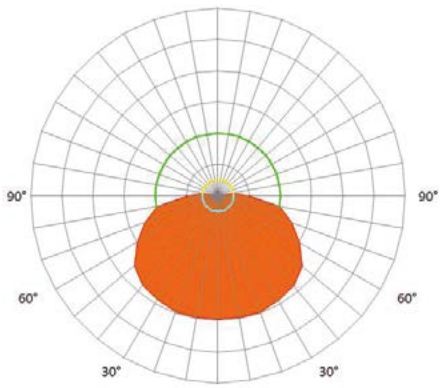
The use of a coating reflectors on the quartz emitter tube has many advantages in term of improved energy transferred on the material, with the result of a faster heating process. Through the appropriate reciprocal positioning of the emitters inside the machinery and their distance from the product to be heated it is possible to obtain an additional increase of the irradiated energy.



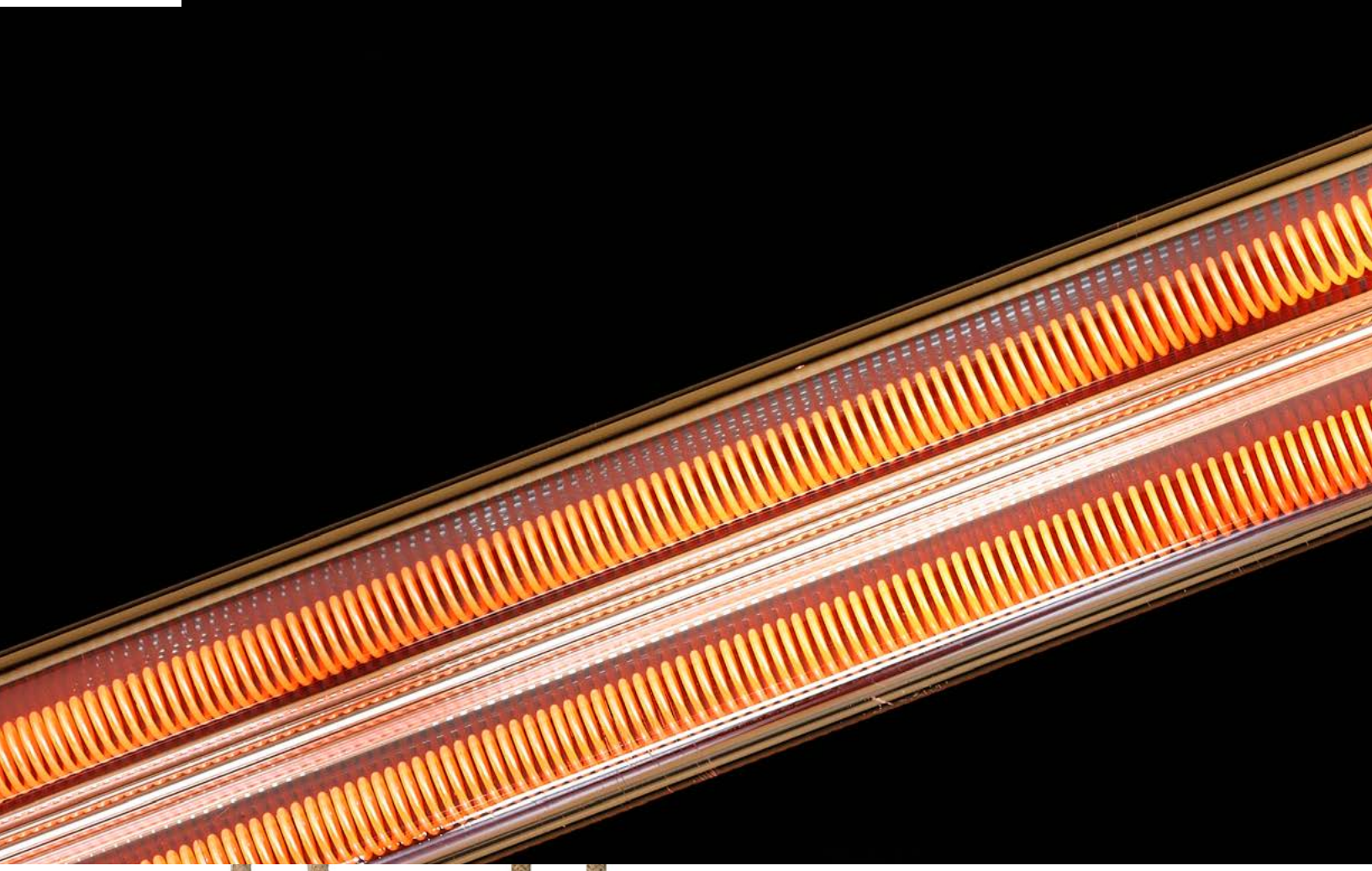


In the following graphs are represented the distribution of the irradiation of the IR single and twin tube emitters (green line) compared to the irradiation of the same emitters provided with gold reflectors (orange line).





IR MEDIUM WAVE QUARTZ EMITTERS

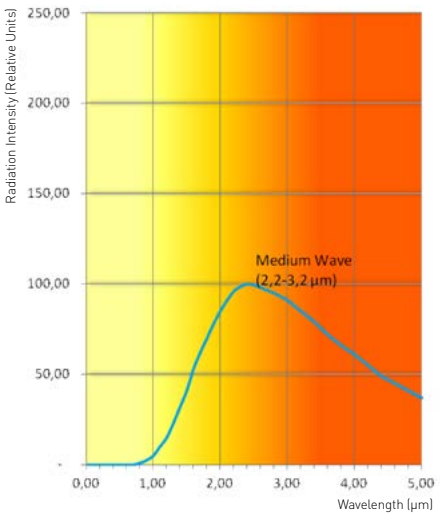


The IR Medium Wave radiation is positioned in the range of 2,2 e 3,2 µm as shown in the graph on the right.
Helios Quartz can design and realize the right IR emitter with the peak of radiation centered on the maximum IR radiation absorbance of the material to be heated; this allows to obtain the most efficient heating process with the less energy consumption.

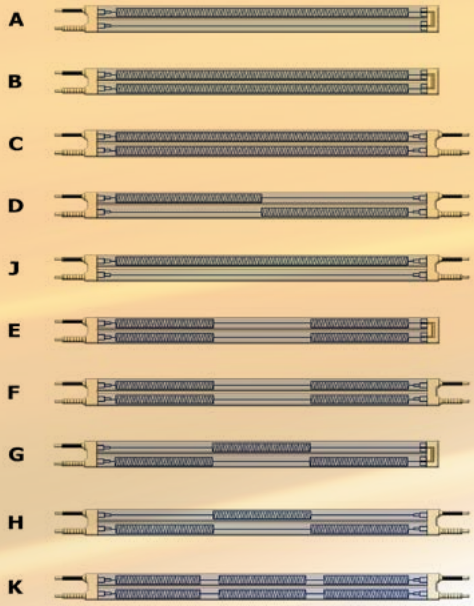
The IR Medium Wave emitters are particularly suitable for the fast heating of surface parts or thin thickness materials.
Plastic, water and other solvents absorb particularly well the radiation at this wavelength.

The main characteristics of IR Medium Wave emitters are:

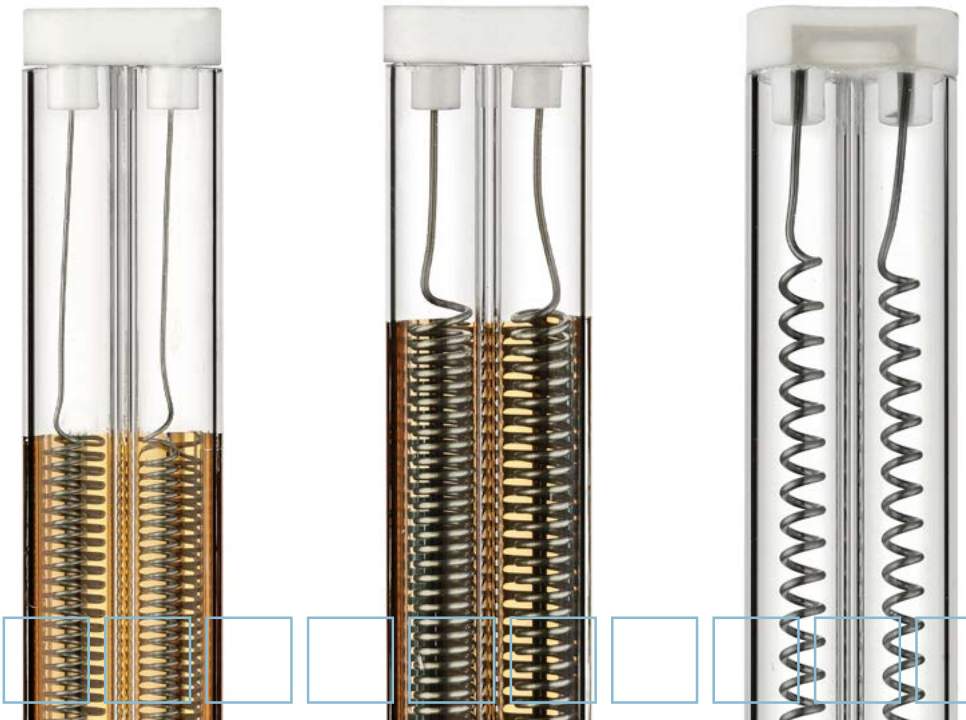
Twin tube standard section • 18 x 9 mm • 22 x10 mm • 33 x16 mm
Radiation peak in the range of 2,2 - 3,2µm
35 W/cm maximum density of nominal power (to be verified in prototype phase)
60 kW/m^2 maximum surface power density
Filament Response time to Switch on /off between 30 and 70 seconds
Long lifetime of the emitter
Horizontal working position but on request there is also the possibility to design and realize vertical working emitters
Possibility to apply a reflector directly on the quartz tube, to better convey and focus all the energy emitted on the material

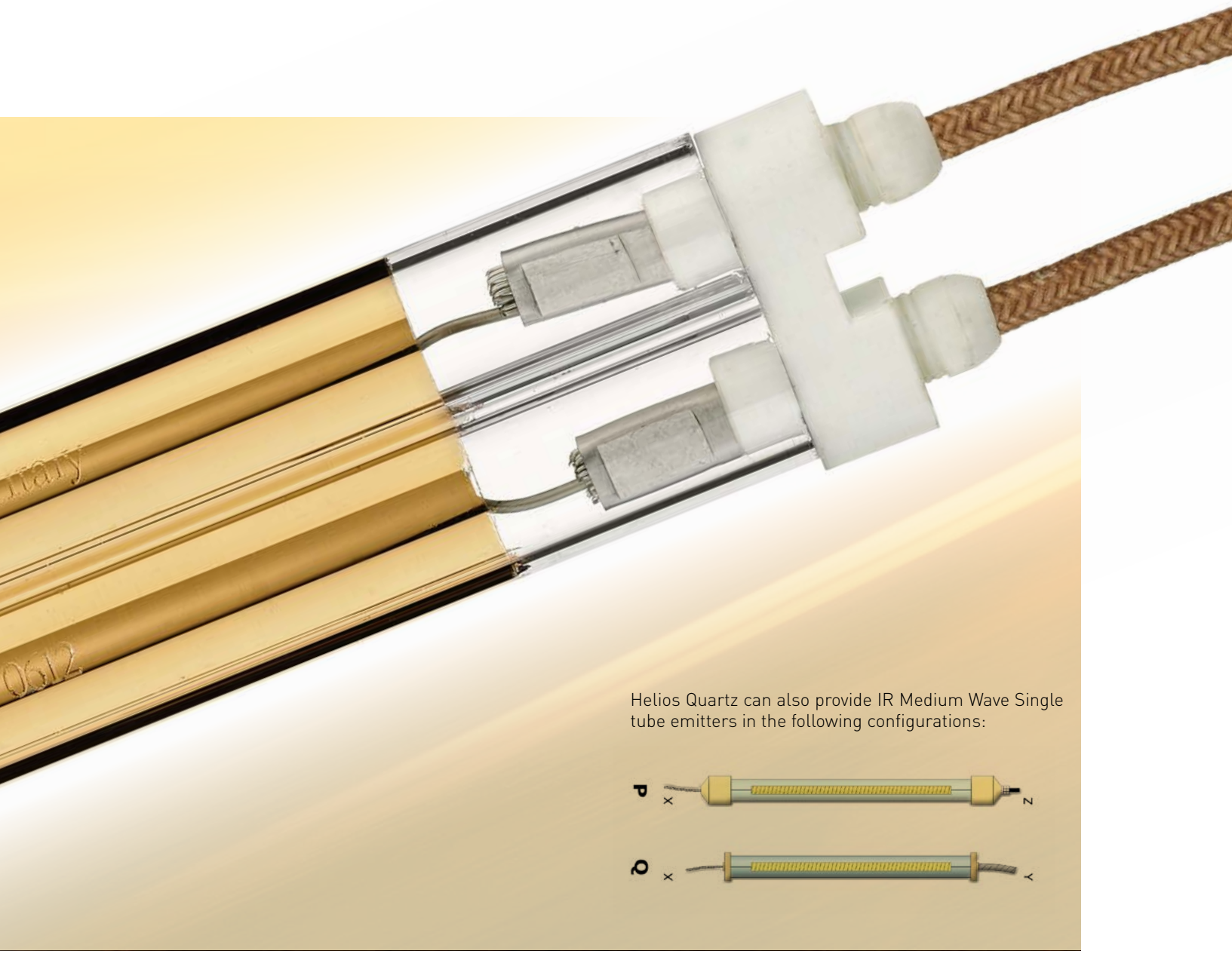


IR MEDIUM WAVE QUARTZ EMITTERS



Helios Quartz Technical Department can realize twin tube IR emitters with different filament configuration. This allows an extraordinary flexibility both in term of heated area modularity and cables position.
In the picture aside there are represented some of the most common filament configuration.





Helios Quartz can also provide IR Medium Wave Single tube emitters in the following configurations:

IR Medium Wave Single tube emitter although technologically outdated by the twin tubes emitters in some circumstances are considered still very useful, efficient and reliable thanks to the easier installation and lower production cost.

Helios Quartz, thanks to its long track record and wide set of products always in stock, can advise the customer choosing the right emitters for the specific application. Furthermore the Technical Department can also design the emitter based on the customer's specific technical instructions:

- total length of the emitter
- length of the heating part
- filament and ending configuration
- power
- voltage

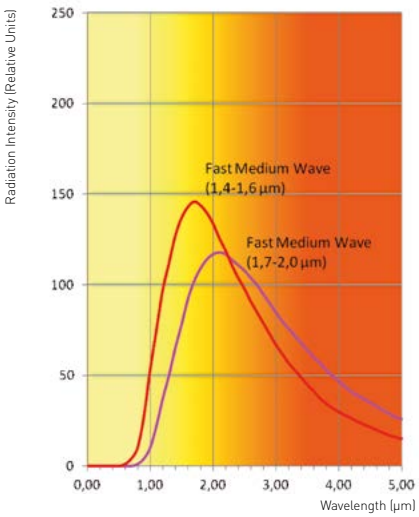
IR FAST MEDIUM WAVE QUARTZ EMITTERS

The IR Fast Medium Wave radiation is positioned in the range of 1,4 e 1,6 µm as shown in the graph on the right.
Helios Quartz can design and realize the right IR emitter with the peak of radiation centered on the maximum absorption of the IR radiation of the material to be heated; this allows you to obtain the most efficient heating process with the less energy consumption.

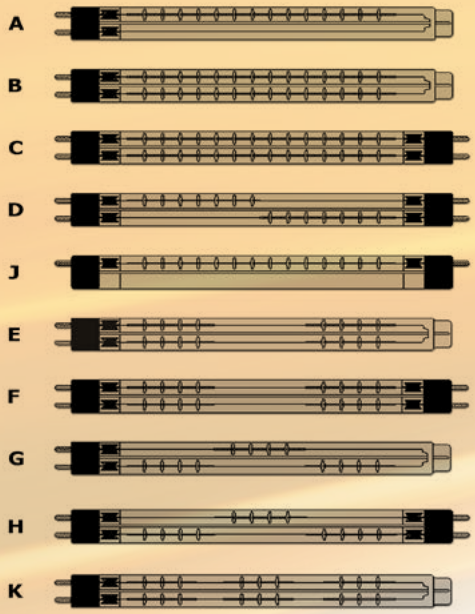
The IR Fast Medium Wave emitter, is the optimal compromise when one specific application requires at the same time the IR radiation of the Medium Wave emitters and the fast response time in the switching on/off proper of the Short Wave emitters.

The main characteristics of IR Fast Medium Wave Emitters are:

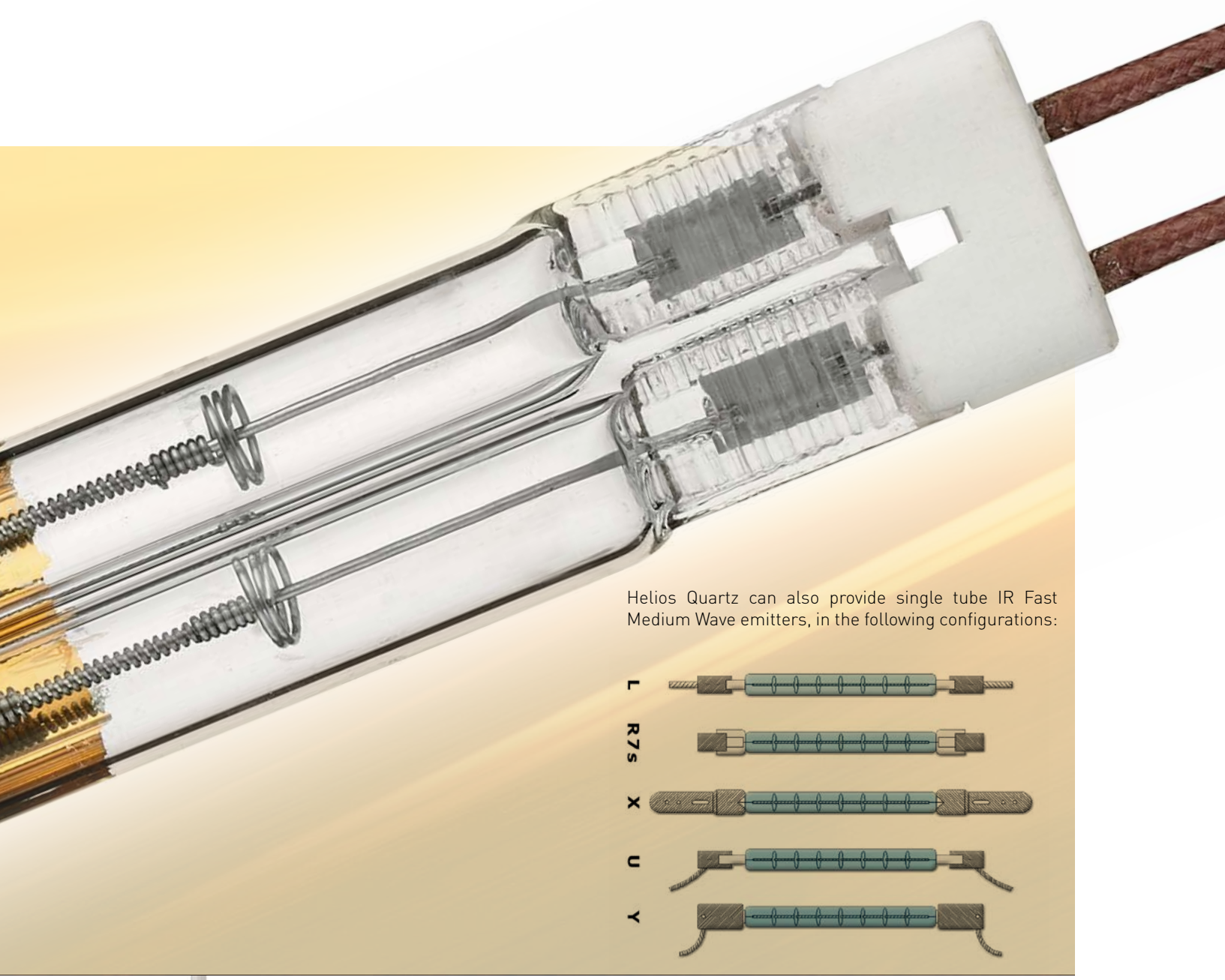
Twin tube standard section • 18 x 8 mm • 23 x11 mm • 34 x15 mm
Radiation peak in the range of 1,4 - 1,6µm
50 W/cm maximum density of nominal power (to be verified in prototype phase)
130 kW/m^2 maximum surface power density
Horizontal working position but on request there is also the possibility to design and realize vertical working emitters
Possibility to apply a reflector directly on the quartz tube, to better convey and focus all the energy emitted on the material



IR FAST MEDIUM WAVE QUARTZ EMITTERS



Helios Quartz Technical Department can realize twin tube IR emitters with different filament configuration. This allows extraordinary flexibility both in terms of heated area modularity and lead wire position.
In the picture aside there are represented some of the most common filament configuration.



Helios Quartz can also provide single tube IR Fast Medium Wave emitters, in the following configurations:

Helios Quartz thanks to its long track record and wide set of products always in stock, can advise the customer choosing the right emitters for the specific application. Furthermore the Technical Department can also design the IR Fast Medium Wave filament with a peak that covers the wavelength range from 1,7 up to 2,0 µm and manufacture the emitter based on the customer's specific technical instructions:

- total length of the emitter
- length of the heating part
- filament and ending configuration
- power
- voltage

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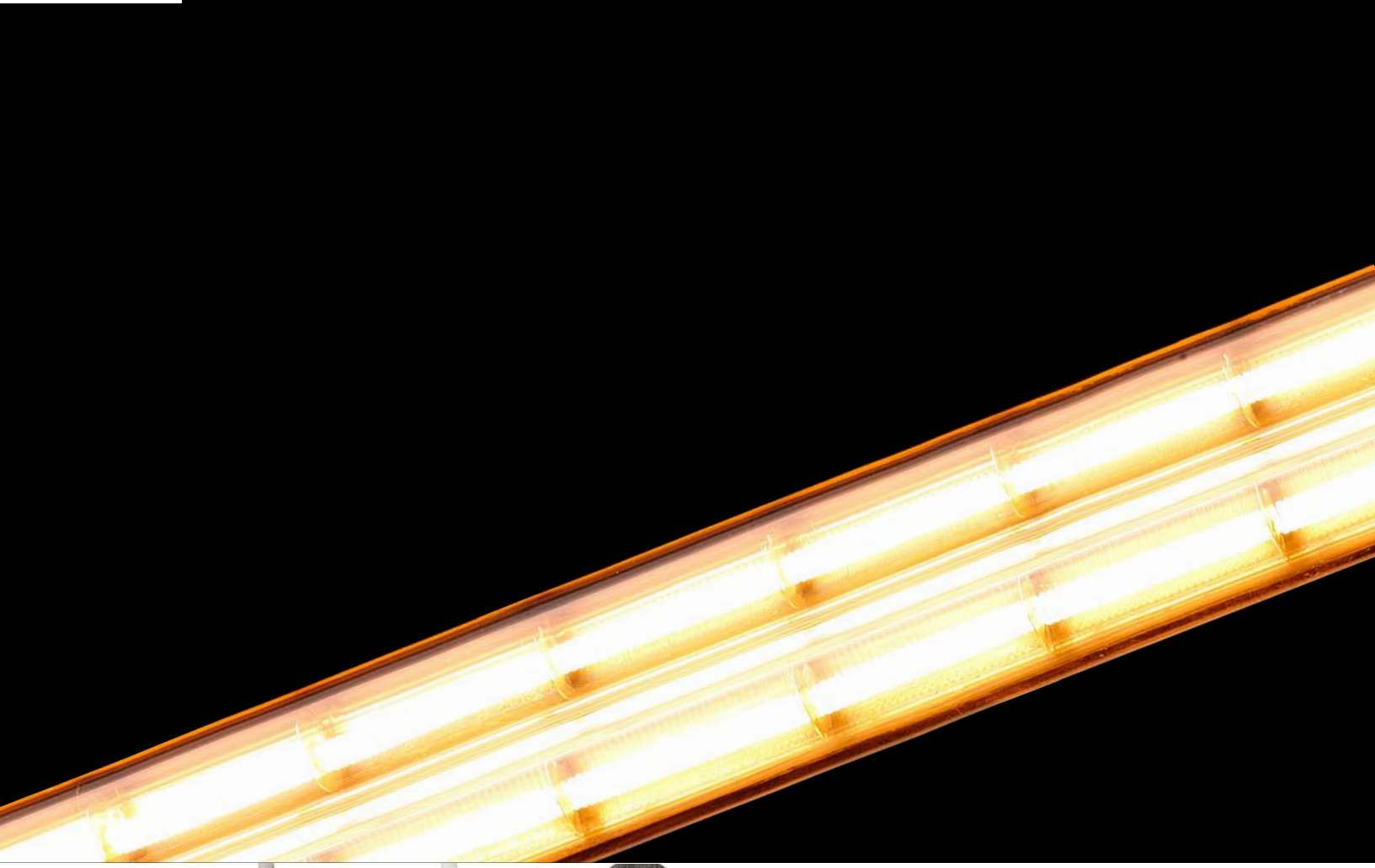
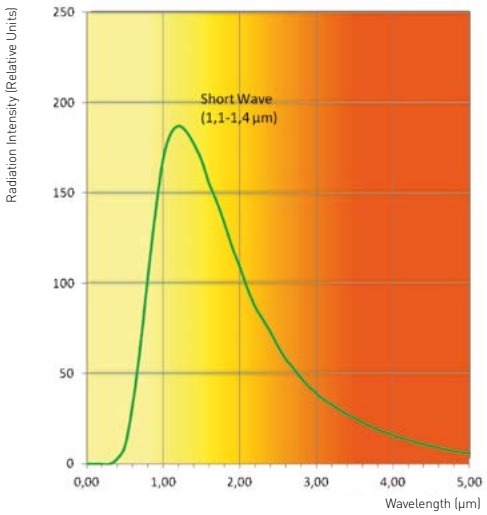
IR SHORT WAVE QUARTZ EMITTERS



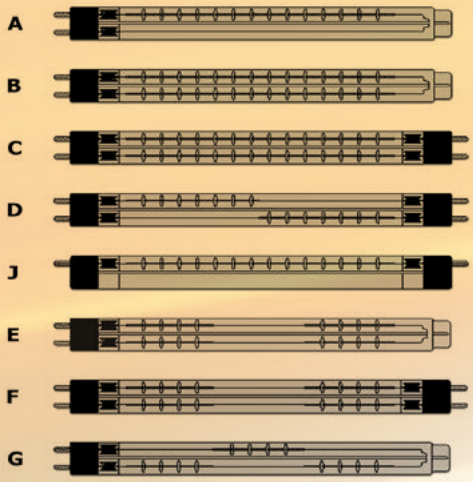
The IR Short Wave radiation is positioned in the range of 1,1 e 1,4 µm as shown in the graph on the right.
Helios Italquartz can design and realize the right IR emitter with the peak of radiation centered on the maximum absorption of the IR radiation of the material to be heated; this allows to obtain the most efficient heating process with the less energy consumption.
The IR Short Wave emitter is characterized by high heating power and it is particularly recommended in those cases where is important to have a fast response switching on and off time.

The main characteristics of IR Short Wave emitters are:

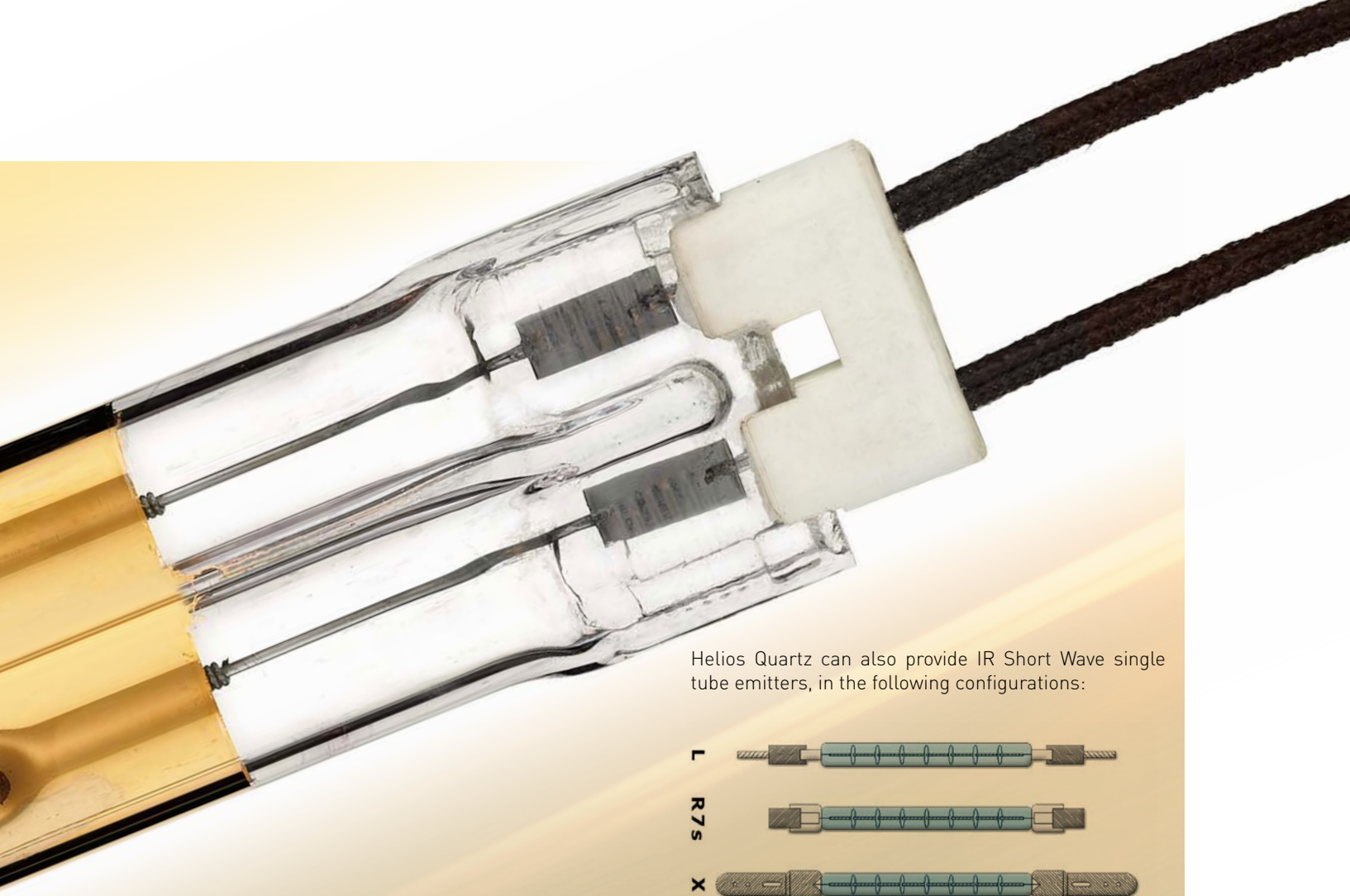
Twin tube standard section • 18 x 8 mm • 22 x11 mm • 33 x15 mm
Radiation peak in the range of 1,1 - 1,4µm
80 W/cm maximum density of nominal power (to be verified in prototype phase)
200 kW/m^{t} maximum surface power density
Filament Response time to Switch on /off 1- 2 seconds
Horizontal working position but on request there is also the possibility to design and realize vertical working emitters
Possibility to apply a reflector directly on the quartz tube, to better convey and focus all the energy emitted on the material



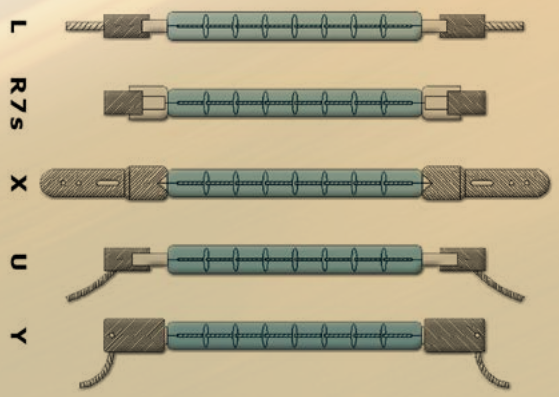
IR SHORT WAVE QUARTZ EMITTERS



Helios Quartz Technical Department can realize twin tube IR emitters with different filament configuration. This allows an extraordinary flexibility both in term of heated area modularity and cables position.
In the picture aside there are represented some of the most common filament configuration.



Helios Quartz can also provide IR Short Wave single tube emitters, in the following configurations:



Helios Quartz, thanks to its long track record and wide set of products always in stock, can advise the customer to choose the right emitters for the specific application. Furthermore the Technical Department can also design any IR quartz emitter based on the customer's specific technical instructions:

- total length of the emitter
- length of the heating part
- filament and ending configuration
- power
- voltage

helios quartz

IR QUARTZ DIPPING HEATERS

Helios Quartz, taking advantage from the physical properties of quartz glass such as high temperature resistance (>1100°C), excellent permeability for UV and IR radiation, total resistance to thermal shock phenomena (very low expansion coefficient) and perfect resistance to corrosive agents, produces special IR quartz dipping heater elements suitable for warming up liquids.

The IR quartz dipping heaters are made out of quartz glass tube closed on one side and with an insulated electrical connection on the other side.

Helios Quartz produces its standard models with a heating length ranging from 200mm up to 1500mm and a power between 300W and 4000W.

IR QUARTZ EPIRADIATOR

IR Quartz Epiradiators, taking advantage of quartz glass transparency to IR radiation, its resistance to corrosive agents and to thermal shock, are widely used in laboratories and chemical factories.
They are composed by waterproof quartz glass chamber in which is fixed the IR filament that is electrically connected to the power supply through a practical perfectly insulated fused silica handle.
They are normally used to evaporate liquid solutions.
The peak of the IR emission is about 2.3µm and the energy is completely absorbed by the liquid surface that evaporates without boiling, leaving the remaining solution and the liquid container wall almost cold.
Our 500W Quartz Epiradiator placed 4cm over the liquid surface is able to evaporate about 400cc of water per hour.

SPECIAL EMITTERS

Thanks to the great experience in the production of IR emitters and in the second working of quartz glass items, Helios Quartz can design IR emitter with non linear shapes.

- Circular Shape
- Omega shape
- Oval shape
- Linear shape with ending part of the emitter coming out at 90° from the lamp body
- Special shape that follows the profile of the object need to be heated

Through the circular, omega and oval shape emitters it is possible to heat up a tubular object by using only one emitter; these type of heaters are particularly appreciated for several application in automotive industry , in the plastic heating application such as welding, bending and heating plastic parts.

PRODUCTS IDENTIFICATION

Helios Quartz, a TUV ISO 9001 certified company, keeps record of all the information of every single batch of production, for this reason each emitter manufactured by Helios Italquartz is marked with an identification code placed over the tube (like in the following picture) that can guarantee the complete traceability of the product.

MAIN APPLICATIONS

painting,varnishes and inks drying	heating PET for thermoforming	adhesive curing
mirror silver paste drying	tile production	leather curing
glass bending and lamination	painting car bodyshells drying	fruit a and vegetable dehydrating
laminated glass cutting	deumidification	chocolate melting
PVB heating	mold drying	bottle sterilization
acoustic panel hardening	glass and ceramic serigraphy	textile fibre drying
printed circuit welding	rubber drying	capacitors plate drying

ACCESSORIES

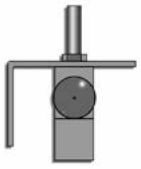
CABLES

Helios Quartz uses particular attention in the selection of all the components and materials involved in the production of its IR quartz emitters; the cable is a very important issue.

The standard emitters are provided with two kinds of cables that work up to 250°C or up to 400°C. On request it is also possible to equip the IR quartz emitters with special wire that can reach working temperature up to 700° C or up to 1100° C.

ACCESSORIES FOR INSTALLATIONS

Helios Quartz always suggests to use, in combination with its IR emitters, special steel holders very helpful during the emitters fitting up process into the ovens. These special supports are specifically realized with a particular steel that can reach very high temperature (more than 1000°C), with a controlled dilation that keeps the memory of the original shape. In according to each particular case, Helios Quartz Technical Department can introduce the right holder for the required IR lamp, advising and suggesting the costumers in the choice of the best assembly solution. The available holders, for twin tube emitters, are represented in the following pictures:



Lateral support with stirrup and knurl

Central support

Lateral support with stirrup

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