

EMITTED ENERGY CORPORATION



Our **People**, Our **Quality**, Our **Support**, Our **Solutions**

OPERATING INSTRUCTIONS

INFRARED EMITTERS

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1. SAFETY INSTRUCTIONS



Caution! Disregard of the safety instructions or improper operation of the infrared emitter can lead to damage to the materials and personal injuries.



The infrared emitter must be operated only by specialists or personnel properly trained. Specific operating instructions are to be compiled and proper training of all operating personnel.



Machine manufactures using Emitted Energy IR emitters must observe the directives included in these instructions.



The safety and functional reliability of these IR emitters are only guaranteed if the user services with spare parts provide by Emitted Energy.

1.1 Infrared / Heat radiation



Infrared radiation is referred to in physics as electromagnetic waves in the spectral range between visible light and longer wave microwave radiation. The wavelength range from 770nm to 1nm is for IR radiation. Visible light is in the range of 350-780nm.

An infrared emitter emits infrared and also a small amount of visible radiation. The higher the color temperature of the emitter, the higher the proportion of visible radiation.

| IR emitter | Color temperature | IR radiation |
|------------------------------------|-------------------|---------------------------|
| Short wave emitters | 2000°C | 0.75 μ m -2.6 μ m |
| Fast response medium wave emitters | 1600 °C | 0.9 μ m -3.2 μ m |
| Medium wave emitters | 900 °C | 1.3 μ m -5.0 μ m |

Danger to health

Infrared radiation is an intense heat source and must be respected!

Extreme heat radiation of the type associated with IR emitters can be compared to the intense heat and light generated by the sun.

Infrared radiation may cause irritation to the skin and the eyes.

- Effects may be skin burns, severe with long term exposure
- Infrared related cataracts (for extremely long, constant exposure over multiple years)

1.2 Danger of fire



IR emitters become extremely hot when in operation. Flammable materials in close proximity of IR emitters may catch on fire.

Before using any heating process, all flammable materials near the IR emitters must be removed. The heating process controls should be designed for very fast shut-down and turn-off of the emitters in case of fire. Fire detection devices are recommended to warn of any flame or excess heat.

1.3 Danger of explosion



There is a danger of explosion due to solvent vapor or the accumulation of dust material in close proximity to IR heating devices. Precautions should be taken to avoid any flammable vapors or accumulation of flammable dust in and around the IR emitters and their enclosures.

Vapors and dusts should be removed in and around IR heating devices.

1.4 Danger of breakage

Infrared emitters are constructed of pure quartz glass and a spiral wound heating filament.

Quartz glass is very brittle and may either chip or break fairly easily. The broken quartz glass pieces can easily cut someone. Caution must be taken to properly handle the emitters and inspect them periodically for any defects, replacing those that are damaged with only Emittent Energy replacement IR lamps.

2. CAUTIONS FOR THE USE OF IR EMITTERS



IR emitters may be used only for industrial heating and drying processes.

The IR emitter must be operated with a supply voltage no higher than its designed and specified voltage.

Installation of IR emitters in a heating device must be such that the following conditions are maintained:

- For short wave emitters the temperature at the 'pinch' terminal end cannot exceed 250 degree Centigrade.
- When the IR emitters are on continuously, the temperature on the gold reflector surface should not exceed 600 degree Centigrade.
- The insulated connection lead has a maximum permissible operating temperature of 230 degree Centigrade. The standard length of the lead should be 500mm.

In general the life of the IR emitters will be extended when the temperatures of these described areas are kept below the maximum.

3. HANDLING OF IR EMITTERS

The IR emitters are packaged so to avoid handling with bare fingers and avoiding contact with any harmful object. When they are removed from the protective wrapping one should wear clean cotton gloves. This will avoid fingerprints on the quartz tubes.

Fingerprints on the quartz tube will cause radiation losses and possible IR lamp failure.

Guidelines for handling IR emitters:

- Grip the emitter only by the glass tube, and not by the connection cable or the ceramic
- Carry the emitter with both hands
- Carry the emitter so that the cross section faces up to avoid bending and breaking
- Always wear cotton gloves with handling the IR emitters
- Avoid excessive pressure at the pinch point ends of the emitter
- **Do not** install emitters vertically. This will result in early failure of the emitter. Special emitters are required for vertical installations and available from Emitted Energy

4. ASSEMBLY AND INSTALLATION INTO HEATING DEVICES



Wear protective eyewear or goggles when handling and installing IR emitters or replacing emitters for your protection from potential broken glass fragments.

To install our IR emitters, one, two or more of our specially designed clamps can be used. These clamps are designed to safely grip the quartz tube without damage.

The installation should be on a stable mounting surface to avoid twisting and putting any stress onto the emitter.

Do not install emitters vertically. This will result in early failure.



Do not pull the connection cable or bend it to more than a 30mm radius.

After installation, the quartz tube of the IR emitter must be cleaned of any soil, perspiration, or fingerprints. Please use the provided clean cloth or suitable cotton cloth, with denatured alcohol to clean the surface of the tube.

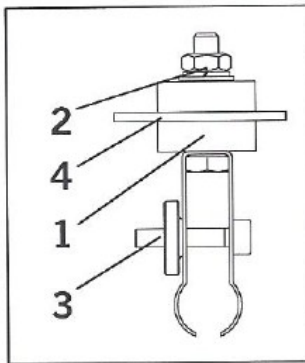


The gold-coated reflector side of the emitter must not be cleaned.

4.1 Short wave single or twin tube IR emitters

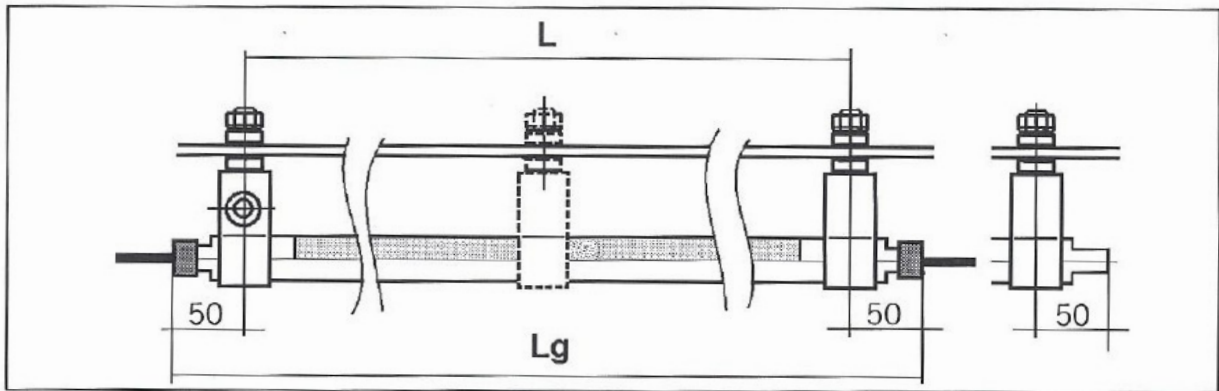
The standard infrared emitter is designed for **horizontal** use only. If used in the vertical position, the filament will sag and reduce the life of the emitter. Emitted Energy offers specially designed and manufactured IR emitters for vertical installation.

Emitted Energy offers specially designed spring clips for use when mounting IR emitters. These clamps are designed to hold the quartz tube and should not be used on the ceramic ends of the emitters.



- 1 Ceramic washer (2)
- 2 Fastening nut
- 3 Knurled nut
- 4 Heater/machine fabrication materials

The gold reflector surface of the emitters should be facing the mounting clamp when installed properly.



The mounting clamps should be positioned as shown above. Where the emitter is longer than 1000mm a third clamp is recommended.

5. ELECTRICAL CONNECTION



A certified electrical technician should be used for all electric connections of the IR emitters.

IR emitters have a particular output tolerance range. After installation of one or many emitters into a heating system, the overall power consumption must be considered to ensure compliance with the machine specification.

6. MAINTENANCE

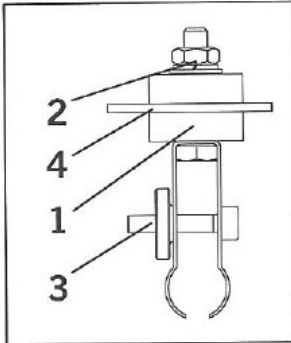
Regular inspection is recommended to check the function and cleanliness of the IR emitters. If the quartz glass is dirty it should be cleaned as described in the above chapter 4 'Assembly'. If the emitter is not kept clean, the life of the emitter will be greatly reduced.

Defective emitters should be replaced

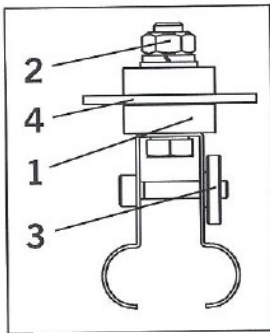
7. Disposal of infrared emitters

Infrared emitters do not contain any objectionable materials, and can be disposed of as normal commercial or household waste.

8. ACCESSORIES



Single tube emitter clamp part number EERP0002



Twin tube emitter clamp part number EERP0001

A NOTE ABOUT OUR PRODUCTS

We have tried to list in the above document the items that would be of interest to the customer of our IR emitters. This document is not all inclusive of the many ways that one can be injured or the emitters damaged. If you have additional questions about the care and use of infrared emitters, please inform Emitted Energy and we will answer your questions.

Our emitters are designed to generate radiation, but are not themselves the machine or equipment being used to manufacture or change properties of materials. Our emitters are components of the machine or equipment. It is the responsibility of the machine or equipment manufacture to provide adequate safety to keep everyone out of harms-way.

The machine or equipment manufacture is the responsible party to ensure that the emitters are properly installed in their machine or equipment, and that the system in total complies with all safety requirements.

Emitted Energy personnel will assist the user of our products with any technical questions, along with specialized testing in our laboratory.

Please contact us at Emitted Energy with any questions about our products.

Roy Ray
Vice President
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