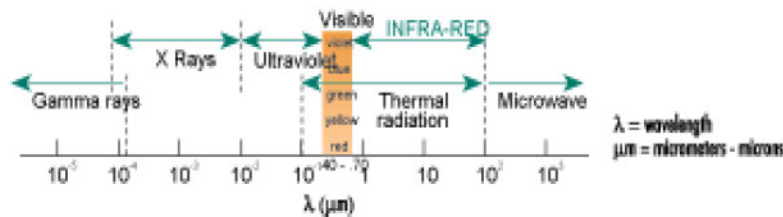


## ELECTROMAGNETIC SPECTRUM WITH THE SCHUBOX™ AND SCHUSHINE™ SYSTEMS.

All bodies with temperatures above absolute zero emit and absorb electromagnetic waves. The Electromagnetic Spectrum consists of gamma rays, x-rays, ultraviolet, visible light, infrared, microwaves, and radio waves. The difference between these types of radiation is their wavelength or frequency. As you move along the Electromagnetic Spectrum, wavelength increases and frequency decreases from gamma rays to radio waves.



Infrared radiation is located between the "visible" and "microwave" sections of the spectrum. This means that infrared waves have wavelengths that are longer than "visible" but shorter than "microwaves".

The radiant energy (or wavelength) of an infrared element depends on its pad temperature: The higher the temperature, the shorter the peak wavelength. All infrared emitters fall into one of three categories on the IR area of the spectrum. This is determined by the maximum wavelength generated by the catalyst emitter:

- Short Wave – 0.76 – 2.3  $\mu\text{m}$  - Poor Absorption on Most Materials
- Medium Wave – 2.3 – 3.3  $\mu\text{m}$  - Fair Absorption on Most Materials
- Long Wave – 3.3 – 10  $\mu\text{m}$  - Excellent Absorption on Most Materials

Each type has distinct characteristics as well as specific amounts of energy. For example, the shortest infrared waves are closest to visible light. Short-wave heaters 'glow' red from light being given off. Longer infrared waves are furthest away and are more readily absorbed by materials and wet surfaces. This helps to illustrate why we use long-wave I.R. in our Schubox®™ and Schushine®™ to cure wet lacquers.



For example, most organic materials, including waterborne, solvent and powder coatings, absorb the maximum infrared energy above 3 microns. Our infrared emitters used in the Schubox™® and Schushine™® produce maximum wavelengths between 4-7 microns, and have proven ideal for many curing applications. Testing has shown that long wavelength emitters are more effective for curing coatings than (electric or gas flamed) short or medium wavelength emitters because shorter wavelengths tend to penetrate the coating to heat the substrate directly, thereby reducing efficiency, melting any adhesives used and damaging pre-treated surfaces by overheating them.

### **Benefits of Infrared**

Infrared heat energy is a form of electromagnetic energy that is either transmitted, absorbed or reflected by matter and can be focused or isolated, enabling such applications as space or spot curing or the finishing of products.

- Radiant heat is electromagnetic wave energy. These waves travel in straight lines at 186,000 miles (299,274 KM) per second.
- It is either transmitted, absorbed or reflected by matter
- It can be focused or dispersed by lenses or prisms.

The presence of radiant heat is practically undetectable except for its effectiveness in raising the temperature of an object when it is absorbed. (I.e. the object gets warmer than its ambient temperature.)



Infrared waves emitted from our Schubox and Schushine flood the area around it with radiant energy the same way a light bulb floods a room with light. The amount of radiant energy absorbed is an inherent property of each substance. i.e. some materials absorb the infrared better than others. The absorption of radiant waves is highly selective which leads to the possibility of many different applications. Eg Glue drying, lacquer curing, leather treatment and powder pre-treatments etc.

We use this radiance in the Schubox™ and Schushine, by reflecting and refracting the energy around the box (or area of Schushine screens) using high-reflection stainless steel and flexible reflective patented material, providing the opportunity to cure deep 3-D objects, such as fully assembled furniture and loaded trolleys.

### **Explosion-proof Catalytic Heaters:**

The catalytic heaters used in the Schubox and Schushine are designed to operate on natural gas or propane (Only Butane with the Schushine). With the Schubox the customer must tell us which type when placing an order. The core component is the platinum-based explosion-proof catalyst technology. The catalyst boasts the most effective conversion of hydrocarbon fuels to infrared energy of any similar product on the market. These catalysts are certified to be used in Zones 1 and 2 hazardous locations. Our emitters are ATEX certified.

