NATIONAL NUCLEAR SECURITY ADMINISTRATION

Infrared Heating Technologies

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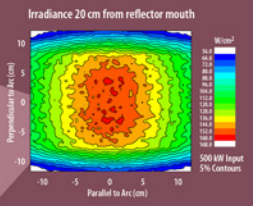
Plant Directed Research, Development, and Demonstration (PDRD) at Y-12 is investigating infrared heating technologies for melting high-temperature scrap materials, creating new furnace designs, and improving casting. Research on replacing traditional salt baths with infrared heating lamps is also being conducted.

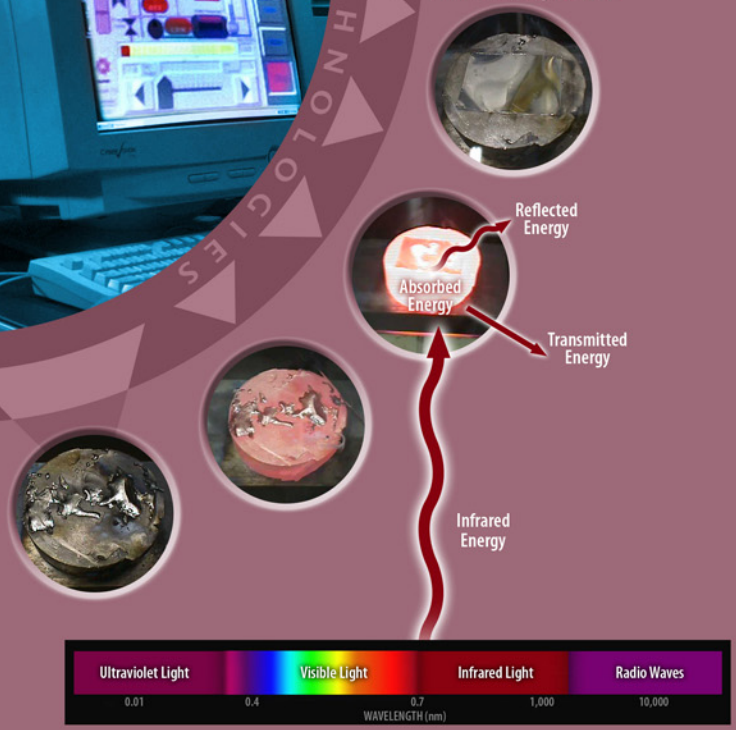
Energy density: 140–170 W/cm² at 20 cm focal length



BENEFITS

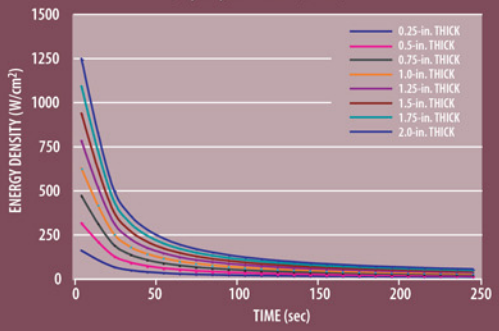
- Provides a cost-effective and efficient method
- Creates a safe, non-contact work environment
- Uses a simple, fast, uniform method for heating and melting a variety of materials
- Generates enough energy to melt or vaporize any material

Tantalum shown in successive states of infrared melting at 3000°C



Energy Density vs. Time to Melt at 1300°C for Various Metal Thicknesses

(Gray body, MP = 1300°C, e = 0.5)



Y-12 National Security Complex

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