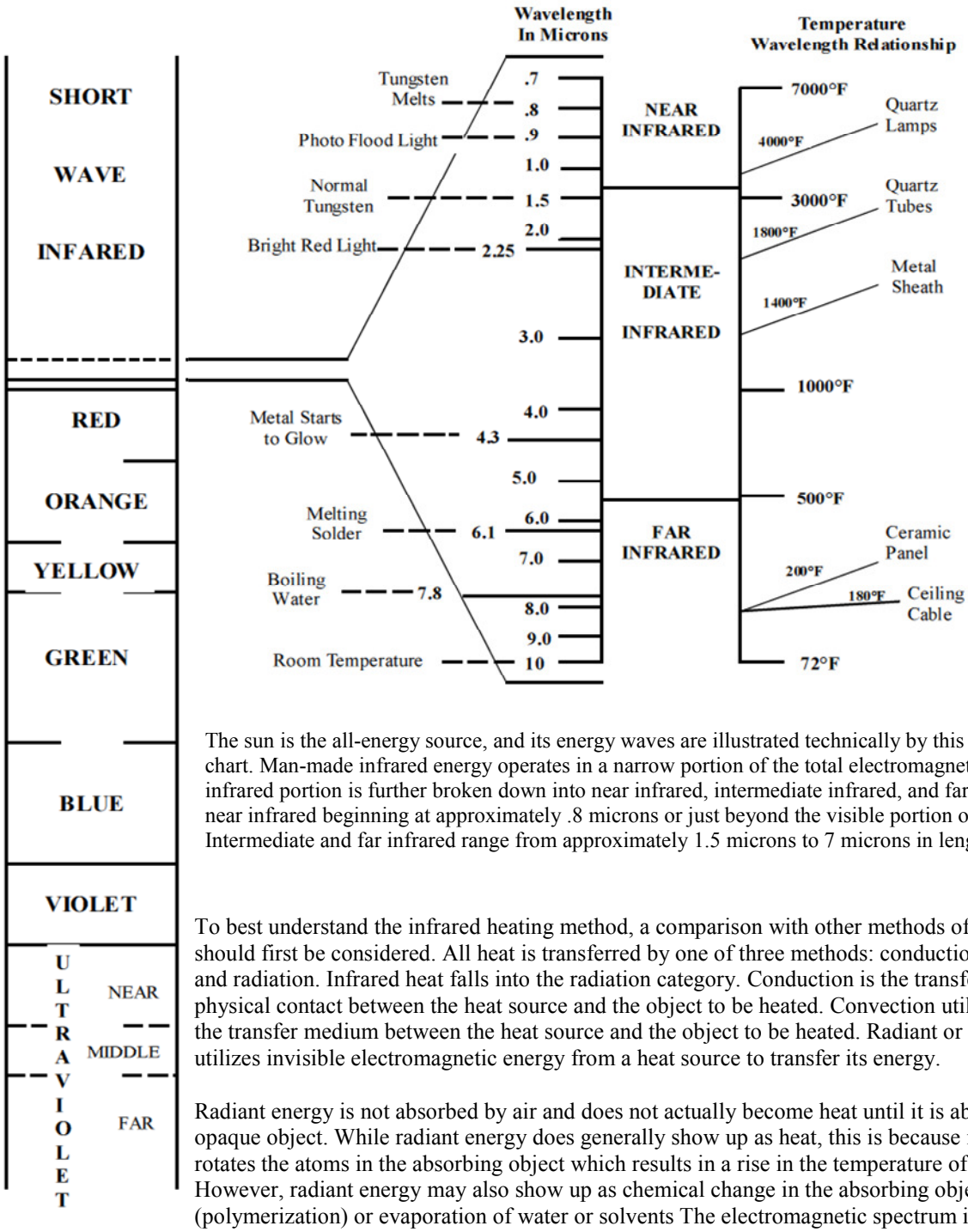
Southeast Thermal Systems LLC

Definition of Infrared

ELECTRIC INFRARED AS PART OF THE ELECTROMAGNETIC SPECTRUM



The sun is the all-energy source, and its energy waves are illustrated technically by this wave-length chart. Man-made infrared energy operates in a narrow portion of the total electromagnetic spectrum. The infrared portion is further broken down into near infrared, intermediate infrared, and far infrared: with near infrared beginning at approximately .8 microns or just beyond the visible portion of the spectrum. Intermediate and far infrared range from approximately 1.5 microns to 7 microns in length.

To best understand the infrared heating method, a comparison with other methods of heat transfer should first be considered. All heat is transferred by one of three methods: conduction, convection, and radiation. Infrared heat falls into the radiation category. Conduction is the transfer of heat by physical contact between the heat source and the object to be heated. Convection utilizes heated air as the transfer medium between the heat source and the object to be heated. Radiant or infrared heat utilizes invisible electromagnetic energy from a heat source to transfer its energy.

Radiant energy is not absorbed by air and does not actually become heat until it is absorbed by an opaque object. While radiant energy does generally show up as heat, this is because it vibrates and rotates the atoms in the absorbing object which results in a rise in the temperature of that object. However, radiant energy may also show up as chemical change in the absorbing object (polymerization) or evaporation of water or solvents The electromagnetic spectrum is illustrated below. Infrared is that portion of the electromagnetic spectrum bordering on visible light at one end of the spectrum and extending to the microwave region of the radio spectrum –between 1 and 6 microns. (Microns are the unit of measurement for infrared wavelengths.)

Infrared is the most efficient of all forms of radiation in the electromagnetic spectrum where the transfer of heat is concerned. Infrared has many of the same properties as visible light: it travels at the speed of light in straight lines from its source, it can be directed into specific patterns by optically designed reflectors and because of the diffusion of the rays it decreases in intensity as it travels outward from its source. In a similar way to radio waves infrared can be divided into long, medium, and short wavelengths.