INFRARED RADIATION & PAINT DETERIORATION

Referring to Fig. 1 (below), we see that a sizable part of the radiant energy from the sun lies in the long wavelength, infrared end of the spectrum above 740 mm, beyond the visible portion. Practically **all organic materials** absorb infrared radiation as a particular function of their chemical composition. Materials having a large number of chemical groups (**latex resins**) with strong infrared-absorption bands will absorb a large portion of this thermal energy, resulting in a temperature rise that will lead **to film decomposition**.

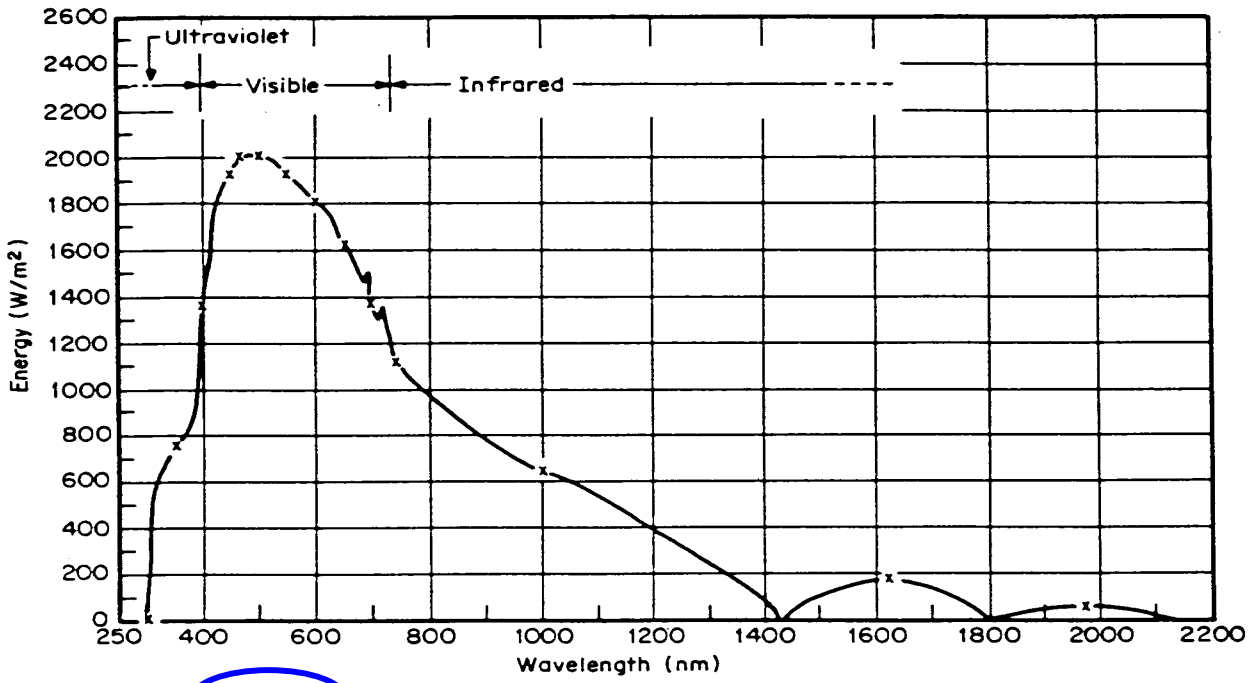
Heat also causes chemical reactions that might not otherwise occur. **Therefore, energy in the infrared spectrum has a very marked effect on the rate of deterioration of organic coatings (paints) exposed to the external atmosphere, especially to direct sunlight.**

Sunlight falling on a painted surface can create temperatures hot enough to be uncomfortable to the hand. This is especially true if the paint is a dark color. Black films, of course, absorb much more energy than do white films, in which a large portion of the energy is reflected or re-radiated. Aluminum flakes can be extremely effective in reflecting solar energy. **The ability of a coating to absorb or reflect heat (emissivity) is becoming an important factor in design for both energy and environmental reasons.**

Another factor is involved in the action of infrared radiation on painted wood. When the temperature of the wood increases, the vapor pressure of the moisture in it increases at an exponential rate. This, in turn, increases the pressure exerted against the paint film from the wood side and can result in rupturing the adhesion of the film to the wood.

Such a rupture creates a pocket in which additional moisture can accumulate, giving rise to liquid-filled blisters. This phenomenon is particularly noticeable when improper construction has allowed an undue amount of moisture to penetrate the wood fibers, where it can follow the wood grain by capillary action. **Although this action of temperature causes the paint film to fail, failure is indirect, since loss of adhesion, rather than the chemical action of moisture on the paint film itself, is the primary cause of failure.**

To avoid this problem, select a coating that has the best reflective properties and is low in viscosity and hence will have a high degree of penetration into the wood and, therefore, will decrease the possible tendency to blister. Old technology NON-CERAMIC coatings cannot protect substrates from degradation caused by Infrared Radiation. **Ceramic filled coatings** are ideally suited to do just that.



ProTek-USA CRICS℠ *Ceramic Reflective Insulating Coating Systems* have the ability to reflect up to 95 % of the solar radiation. Reflecting that amount of energy means less energy working to break the binders that are found in the latex resins.

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