

**DETERMINATION OF EXTINCTION COEFFICIENT AND SCATTERING ALBEDO
OF WOVEN FABRICS**

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ABSTRACT. Thermal protective clothing provides more safety and time to allow wearer to complete task or escape from external high heat or fire exposures. Radiation heat transfer is significant in such high temperature conditions. In the present work, radiative properties of various fabrics used for thermal protective clothing are estimated. Experimentally available measured data of spectral directional-hemispherical reflectance and transmittance from literature are used to predict some of the radiative properties. A coupled finite volume radiative transfer equation solver along with genetic algorithm are used for this purpose. Radiative properties of some commonly used fabrics in thermal protective clothing at various heat source temperatures are predicted. Effect of pyrolysis on these properties are also analyzed. It is found that the extinction coefficient of outermost layer of thermal protective clothing is very high as compared to the other inner layers and it plays a significant role in blocking heat transfer to the skin. Scattering in fabrics used for thermal protective clothing is also found significant. The analysis provides valuable data of the radiative properties for woven fabrics used in high heat flux applications. These properties can be used directly to model heat transfer through thermal protective clothing.