

HEALTH, REGULATORY AND EQUIPMENT SAFETY ISSUES RELATED TO INDUSTRIAL MICROWAVE APPLICATIONS

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Microwave and radio frequency technologies are increasingly being investigated for use in existing and new materials processes. Particular advantages and benefits have been identified for applications in ceramics. As progress is made towards commercializing these applications, the people involved who are unfamiliar with microwave/RF processing equipment will have questions about the associated health and safety issues. An understanding of issues relating to health effects, regulatory safety standards, equipment design practices and guidelines for safe equipment use is essential to making informed decisions about and planning for the implementation of microwave/RF processing technologies.

Health effects associated with microwave/RF processing have been investigated in several important areas, including epidemiological studies of cancer and non-cancer athermal effects, thermal hazards, cardiac pacemakers and high voltage. The epidemiological studies of athermal effects generally fail to establish a relationship between exposure to “non-ionizing” radiation, although they also do not conclude that such relationships do not exist. However, hazards associated with thermal effects, pacemakers and high voltage are more easily demonstrated and sufficiently characterized to provide a thorough understanding for development of safety guidelines.

Various government bodies worldwide have developed regulations and guidelines for the safe use of microwave/RF energy for industrial processing. Standards have been established for maximum allowable emissions as well as equipment design and operation. These standards have resulted in a number of design practices that are typically employed in industrial processing systems, many of which are specific to microwave/RF processing while others are applicable to all industrial equipment. But regardless of how safely a system is designed, certain precautions must be taken by the equipment operators and service personnel to prevent exposure to inherent hazards and ensure continued safety.