

DEVELOPMENT OF A FREE-AIR TURNABLE ELECTRIC ARC SOURCE FOR FULL SCALE THERMAL RADIATION AND BLAST TESTING

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The paper describes the development and testing of a 500 KW radiant output (2 Megawatt power input) arc source for use in simulation of nuclear weapon thermal radiation output. The arc source is designed to operate in free air with no glass parts and is resistant to more than 50 psi overpressure. The radiant source is tuned by a gas mixture to allow simulation of nuclear weapon thermal radiation spectrums. The electrical power used to drive the arc is provided by a small battery bank with a simple switching system. The arc source is designed to be low in cost, but highly portable. The arc described in the paper is designed to be used as a module in a large thermal radiation simulator and is therefore resistant to fracticide effects from other arc sources in its vicinity. Measurements of spectral output, target incident flux, and radiant power efficiency, are described in the paper. Photographs of the arc source during setup and testing are provided in the paper. Effects of the arc on selected materials and a map of its radiant flux field are also presented.