Maximum Permissible Exposure for Extended Sources

Maximum permissible exposure (MPE) to laser power or energy per pulse has been established for a wide range of wavelengths and exposure durations. Separate exposure limits exist for purely thermal effects and photochemical damage to cells. Extended sources expose a larger portion of the retina, thus reducing the hazard and making determination of the actual hazard more difficult. Although the retinal thermal exposure limits are provided as irradiance or radiant exposure, the photochemical limit is provided as integrated radiance. A correction factor can often be used to modify point source MPEs for computing thermal hazards to extended sources, even for rectangular or elliptically shaped beams. A correction factor method is proposed for computing the hazard due to photochemical effects, which would parallel the method currently used for thermal effects. Currently, a correction factor method is not available for computing laser hazards due to photochemical processes.