

Beam diam = 0.8 mm

$\frac{1}{e^2} \approx 1.2 \text{ mm}$ Gaussian

$$\lambda = 631 \text{ nm}$$

Table 5a

MPE for an exposure time between 18 μsec and 10 seconds

$$1.8 t^{3/4} \times 10^{-3} \text{ J/cm}^2$$

For an exposure time between 10 seconds and 30,000 seconds

$$1 \times 10^{-3} \text{ W/cm}^2$$

Aperture diameter for eye = 7 mm $\rightarrow$ Area = 0.385 cm^2

Direct exposure, accidental

$$H = 1.8 (0.25 \text{ s})^{0.75} \times 10^{-3} = 0.636 \text{ mJ/cm}^2$$

$$E = \frac{0.636 \text{ J/cm}^2}{0.25 \text{ sec}} = 2.55 \text{ mW/cm}^2$$

$\therefore$ The maximum flux of a visible laser to avoid harm due to accidental, direct exposure is

$$2.55 \text{ mW/cm}^2 \times 0.385 \text{ cm}^2 = 1.0 \text{ mW}$$

AEL is 2 mW @ 639 nm is class 4 laser