The human eye responds to low light levels by enlarging the pupil, allowing more light to enter the eye. This response results in a difference between measured and perceived light levels. A lamp that is dimmed to 10% of its maximum measured light output is perceived as being dimmed to only 32%. Likewise, a lamp dimmed to 1% is perceived to be at 10%.

Design example

At full brightness, the measured light in a space is 60 foot-candles. At the lowest dimmed level, 10% perceived light is desired.

- 1% measured light (0.6 fcd) is perceived as 10% (desired result)
- 5% measured light (3 fcd) is perceived as 22% (2x brighter than desired)
- 10% measured light (6 fcd) is perceived as 32% (3x brighter than desired)

Formula: Perceived Light (%) = $100 \times \sqrt{\frac{\text{Measured Light} (%)}{100}}$