

Responsible lighting design requires that we understand how our vision changes with age. We read text by seeing the contrast between the text and the background. What is the impact of age on our ability to read?

As explained below, compared to a 20 year old reader, the average 50 year old will need twice the footcandle level to read 10 point type.

The IES recommends 30 footcandles for this task, at age 20<sup>1</sup>. That would double to 60 footcandles at age 50. But the aging process does not stop at 50. By 2015, 1 out of 5 office workers will be 60 years or older<sup>2</sup>. Those workers will need 75 footcandles to see 10 point type as clearly as they did when they were 20.

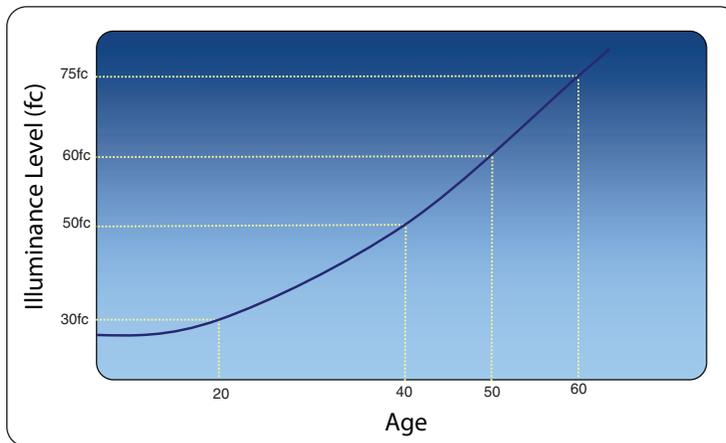


Figure 10-13 of the IESNA Lighting Handbook Ninth Edition shows an estimate of how age and vision are related. The chart above shows the impact of how we need more light as we get older.

### How does this happen?

There are two changes to our visual system that create this decrease.

1) Our lens (technically called the crystalline lens) is responsible for focusing an image of the outside world on the retina at the back of the eyeball. It gets thicker as we get older. This reduces the amount of light energy that reaches the photoreceptors that make up the retina. It also scatters the light more

<sup>1</sup> IESNA Lighting Handbook (9th edition). 10-13, 10-15, Interior-13

<sup>2</sup> US General Accounting Office - "Older Works - Demographic Trends Pose Challenges for Employers and Workers." Nov. 2001

diffusely, reducing the contrast and clarity of the visual image.

2) Our pupil size gets smaller with age, which further decreases the amount of light even before it passes through the crystalline lens.

Research conducted for the California Energy Commission demonstrates that task lighting is the most cost effective and least energy intensive approach to support an aging workforce. Finelite task lighting provides workstation specific control, right at the user's fingertips. Use task lighting and digital control systems can be simplified, or even eliminated.

The following examples show how the decrease in retinal illuminance causes a decrease in the ability of the viewer to see contrast between text and background.

**This is text on white background at age 20.**

**This is text on white background at age 40.**

**This is text on white background at age 60.**

Task lighting by Finelite allows the individual to raise the illumination levels for paper-based tasks to suit their individual needs and preferences.