Lighted Stand Magnifier Constants

The following is meant to be an addendum to Visibility; Vol. 12 Issue 1 "Stand Magnifier Optical Strategies."

A hand magnifier used near its focal length results in high spherical aberration across the surface of the lens, resulting in uneven magnification across the surface of the lens. For the same reason, stand magnifiers with low maximum usable adds, (which have images with dioptric measurements near infinity), can have uneven magnification across the surface of their lenses, producing target letters that move relative to one another as a stand magnifier is moved across the page. Although stand magnifiers with low maximum usable adds can be convenient for patients wishing to use a stand magnifier with their distance prescriptions, this effect can bother some patients, and even cause them to report nausea. Another associated optical aberration involves color or "rainbows" being seen on the edges of letters, although this is usually less bothersome than letters moving relative to one another. Just as moving a hand magnifier closer to its target reduces these aberrations, using a stand magnifier with a higher maximum usable add involves a much closer optical image, and reduces the problem. It is best to determine the preferred stand magnifier optical strategy independently of stand magnifier lighting. One method is to demonstrate the Coil 5428 with its +7 maximum add producing 6X at the spectacle plane, the Coil 5123 with its (nearly) maximum add of +2.5 producing 6X at the spectacle plane, and the Coil 4206 with its maximum add of +1 producing 6X at the spectacle plane. Demonstrating these three non-lighted stand magnifiers with these adds at the spectacle plane, (near the acuity level they allow), will give a clue to the preferred stand magnifier optical strategy, because the variables of working distance, magnification, and lighting are removed. Because the three stand magnifier lenses are all at the spectacle plane, and magnification is 6X for each, this also eliminates the variable of field. It does not, however, eliminate the effect of lens aberrations on usable field, which is in part what we are intending to examine.

As review, rational clinical use of stand magnifiers requires a knowledge of their constant enlargement factors, (E), as well as their maximum usable spectacle adds, (which function when stand magnifiers are at the spectacle plane). Both these values have been found by subjectively measuring the stand magnifier's maximum magnification in conjunction with its maximum usable spectacle add, which is then set equal to E times the power of the maximum spectacle add, divided by four.

(E/4) TIMES THE POWER OF A SPECTACLE ADD USED WITH A STAND MAGNIFIER EQUALS THE MAGNIFICATION OF THAT PARTICULAR STAND MAGNIFIER/ADD COMBINATION.

Lighted Stand Magnifier Constants

COIL 4.7X LED (4.5X MAX/+4MAX ADD = E/4)
COIL 5.4X LED (5.5X MAX/+3MAX ADD = E/4)
COIL 7.1X LED (7X MAX/+4MAX ADD = E/4)
COIL 8.7X LED (8X MAX/+1MAX ADD = E/4)
COIL 10.1X LED (10.5X MAX/+1.5MAX ADD = E/4)
PEAK 1966 10X INCANDESCENT (10X MAX/+4MAX ADD = E/4)
COIL 12.0X LED (12X MAX/+3MAX ADD = E/4)
COIL 14.7X LED (15X MAX/+2MAX ADD = E/4)
PEAK 2023 15X INCANDESCENT (15X MAX/+4MAX ADD = E/4)
SCHWEIZER 8X (8X MAX/+4 MAX ADD = E/4)
TASK VISION 8X (8X MAX/+1 MAX ADD = E/4)
BESSER 7X (7X MAX/+5 MAX ADD = E/4)
BESSER 6X (6X MAX/+4 MAX ADD = E/4)
BESSER 5X (5X MAX/+6 MAX ADD = E/4)
BESSER 4X (4X MAX/+4 MAX ADD = E/4)
POWER MAG 5X (5X MAX/+5 MAX ADD = E/4)