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Several years ago, Ceramic Metal Halide (CMH) technology was introduced to the lighting industry. Like most new lighting technologies, it has taken some time for these great new lamps to be universally adopted, but today you can find them almost anywhere. CMH lamps were introduced to provide a high quality, energy efficient, alternative to incandescent and halogen light sources.

In order to accomplish this, the lamp technology had to solve many of the problems inherent in older style quartz metal halide lamps such as high lumen depreciation, low color rendition, and poor color consistency. We've all seen projects in which some of the metal halide lamps look white, some blue, some pink, etc.

By contrast, CMH lamps offer high CRI (Color Rendering Index) values in the 80-90 range, color temperatures of 3000K or 4100K, and are guaranteed not to color shift more than +/- 200k over the rated lamp life. They also have improved lumen maintenance characteristics.

CMH lamps are available in ranges from 20 watts through 400 watts, and in most standard configurations including ED17, PAR20, PAR30, PAR38, and T6. One of the newest types is designed specifically as a direct lamp retrofit for 400 watt High Pressure Sodium lamps. This retrofit offers far better color quality without requiring

ceramic metal halide.

the replacement of existing ballasts.

• Accent Lighting

Accent lighting has traditionally been dominated by incandescent and halogen sources due mainly to excellent color quality, source flexibility, and good optical control. Standard Metal Halide and color corrected High Pressure Sodium lamps have been used as energy efficient replacements for some accent lighting applications with mixed success. Problems with color quality and consistency have been limitations of these lamp technologies.

CMH lamps overcome most of the problems of the older style energy efficient lamps while producing crisp light with excellent color rendition and optical control that is almost identical to halogen sources. In fact, many of the available CMH lamp types have been specifically designed to be optically equivalent to the halogen sources they are designed to replace.

• Recessed Downlighting

In high volume spaces, with ceiling heights from 14'-30', lighting has generally been provided by Incandescent or Halogen PAR lamps, or by Metal Halide luminaires equipped with ED17 lamps and 10"-15" reflectors.

Using halogen sources in these retail spaces is inefficient since most of the electricity that is consumed by the lamp is turned directly into heat and not light. This type of application also quickly turns into a maintenance nightmare since an electric lift must be used, or scaffolding installed, to accommodate a 1,000-3,000 hour relamping cycle.

Standard Metal Halide lamps offer a more efficient source of light in these spaces, and will reduce maintenance costs by extending the relamping cycle. Unfortunately, the quality of light is generally inferior. One should also consider the aesthetic appeal of a ceiling surface pocked with very large aperture reflectors that produce as much glare as usable light.

Imagine now that the same space may be efficiently lighted using CMH PAR20, PAR30, or PAR38 lamps recessed into luminaires with small apertures in the 4"-6" range. Using this approach, we produce light of equivalent quality to the Halogen source we seek to replace, extend the relamping cycle by three to four times, and

virtually eliminate the glare we would experience from large aperture downlights.

• Retail Lighting

Perhaps the best opportunity for the use of CMH lamps is in retail spaces. Retail lighting generally requires point source accent lighting and high contrast ratios. Most retail lighting in the United States is still delivered by inefficient halogen track heads or recessed accent adjustable luminaires.

We've already seen that CMH lamps may be effectively used in place of halogen sources for accent lighting. 35 watt PAR20 lamps and 70 watt PAR30 lamps are particularly effective at lighting merchandise when used in track heads or other accent luminaires. Many retailers throughout the country are moving to these sources to save electricity and radically reduce maintenance costs.

• Color Critical Applications

While the color rendition of CMH lamps is excellent, spaces like museums or galleries have specific requirements. While the light that is being delivered is perceived as "white," the spectral distribution of the source is not truly continuous like sunlight or halogen light. Some colors may be slightly muted while others are enhanced changing the perception of art.

• Dimming

It is possible to dim metal halide lamps, but the technology remains prohibitively expensive for most applications. If the lighting system needs to be controlled over a wide range of light levels, e.g. note taking downlights in a classroom, stick with Halogen IR PAR lamps or choose dimmable fluorescent sources.

• Benefits

More efficient than halogen
Better color quality than Standard MH
Better lumen maintenance
Better color consistency than Standard MH
Lower operating cost

• Drawbacks

Higher initial cost
Requires a ballast
Not easily dimmable
Requires restrike time

Retailers may realize the greatest energy and maintenance savings by using CMH light sources in their stores.