GE Consumer & Industrial
Lighting

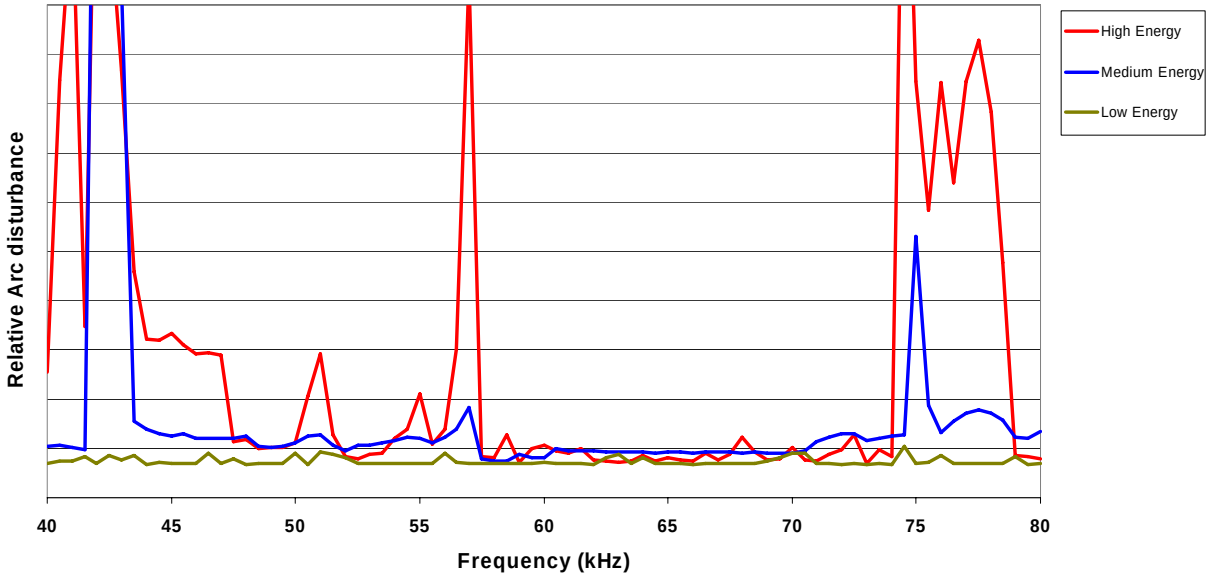
Position Statement for Operation of HID Lamps on Electronic Ballasts:

GE analysis of internal and competitive HID lamps suggests that the most compatible driving waveform for an electronic ballast is a Low Frequency Square Wave (L.F.S.W.) with low higher order harmonic content. L.F.S.W. has been long established as a dependable method of ballasting low Wattage HID lamps with significant industry standards support, both U.S and international. Current industry standards work groups for higher wattage electronic HID ballast have primarily focused on L.F.S.W. domain.

Acoustic Resonance (A.R.) points to be considered:

Analysis of lamp data has shown that there are limited operating bands between 1 kHz to 200 kHz in which an electronic ballast could operate a lamp wattage family without causing unacceptable arc instability due to Acoustic Resonance. Trend analysis of the A.R. maps show that this range extends well beyond 200 kHz. When the A.R. structure maps are overlaid there is no consistent frequency band, which can be identified as a stable location for ballast operation. There are large variations in the A.R. structure maps between multiple lamp vendors and from lamp type to lamp type or burn position. A.R. may cause visual annoyance, lamp cycling, shorten lamp life, and in extreme cases result in arc tube rupture.

Acoustic node map for a 400 Watt ceramic metal halide HID lamp



Specific matched lamp – ballast high frequency systems can be stable, however they limit the extent that the individual members can be modified for future improvements. Additionally, there is no data on the long-term stability of the A.R. maps due to aging of the lamp. Future re-lamping may also create an unstable system due to changes in lamp arc tube geometry or manufacture.

High frequency driving waveforms have been known to create mechanical vibrations with the lamp structure resulting in audible noise.

Lamp performance points to be considered:

Data on Electronic ballast technology has shown that it can greatly improve the lumen maintenance of HID lamps over traditional EM reactor or CWA ballast systems. However, no data are available to support improved lamp performance on High Frequency vs. Low Frequency Square Wave driving waveforms

Conclusions:

GE recommends operation of its high wattage CMH® and PulseArc® QMH HID lamps on electronic ballasts that use a Low Frequency Square Wave output such as the UltraMax® HID ballast, GE-MH-250-400-MAX-208-207 or similar for optimal lamp performance.