SDERC Lighting Display

Street Lighting: 85-Watt Induction Lamp Cobra Head
Location: ERC Lobby

Technology Description: Induction lamps are essentially fluorescent lamps without cathodes or electrodes, so there is nothing to wear out inside the lamps. These 100,000 hour rated "electrodeless" lamps can last four or five times longer than conventional High Intensity Discharge (HID) lamps. Induction lamps are driven by a ballast or generator, which raises the normal supply frequency to 2.5MHz (similar to a microwave oven). The connected coil induces current through the ionized mercury. The display model is equipped with a 6500K 85W induction lamp with a CRI of 80. The lamp produces 6000 initial lumens and has 70% lumen maintenance at 100,000 hours. Conventional HID lamps which are typically used for street lighting, are low pressure sodium (LPS) which have a 0 CRI, high pressure sodium (HPS) which have a 22 CRI, and metal halide (MH), which have a 65-70 CRI. Excluding areas like San Diego, which has a nearby observatory, the most common street lighting lamp is HPS. The lumen level for the 150-Watt High Pressure Sodium (HPS) lamp displayed is 15,600 lumens; lumen maintenance is 80% at 24,000 hours (end of life).

Based on the way the human eye perceives light, the effective lumens of the lamps are determined using the scotopic/photopic ratio of the light. The 6500K induction lamp has an S/P ratio of 2.14 and the HPS lamp has an S/P ratio of 0.62. This ratio, raised to an exponent appropriate for the application, in this case 0.5, is multiplied by the catalog lumens of the lamp to determine the effective lumens. In this case, the induction lamp effective initial lumens are 8,777 versus 12,283 for the HPS lamp. The corresponding efficacy of the induction lamp is 103 lumens/watt and 82 lumens/watt for the HPS.

Applications: Outdoor lighting. The display fixture type is specifically designed for street or parking lot lighting.

Energy Savings: The 150-Watt High Pressure Sodium (HPS) lamp consumes 165W with the ballast. The 85-Watt Induction Lamp consumes 88W and saves 77W per lamp. If used in a streetlight application, the 85W Induction Lamp would save 404 kWh/yr and $60.60/yr (based on 4,165 hrs/yr and $0.15/kWh) over the 150W HPS lamp.

Costs: Currently, induction lamps cost approximately ten times more than conventional HIDs. When induction lamps are replaced, the ballast/generator should be replaced at the same time.

Donated Product: SDREO would like to formally thank Ken Lau at PowerLux for donating the fixture and lamp. For more information please contact Ken at (760) 727-2360 or klpowerlux@aol.com.

Discussion: With numerous Chinese manufacturers and volume increasing on the Philips and Sylvania induction systems, pricing should come down significantly, making induction more cost effective for many applications. With so many Chinese manufacturers, that we may never have heard about before, having to deal with warranty issues and replacement parts for such long rated life systems could be difficult. It is recommended to only buy from these manufacturers if they set up some kind of insurance or bonding.