



The most common HID lamps are metal halide (MH) and high pressure sodium (HPS). Efficacy in lumens-per-watt (LPW), lamp life, and cost are economic characteristics of a HID lamp which can be analyzed objectively. Color and color rendering properties, however, are much more subjective. The photo shows a facility with two types of systems.

Left side of picture: 400 watt low bay aluminum HPS fixtures (yellow light source) with a Color Rendering Index (CRI) of 25. **Lamp:** 50,000 initial lumen. **Fixture wattage:** 464 Watts.

Right side of picture: 400 watt high bay glass MH fixtures (white light source) with a CRI of 65. **Lamp:** 36,000 initial lumen. **Fixture wattage:** 458

Metal halide systems are the preferred HID source for applications where color rendering is important. It is common for workplaces with 400 watt HPS systems to be retrofitted to a 400 watt MH systems.

What is Pulse Start?

A change in the lamp and ballast construction allows pulse start metal halide lamps to start using a high voltage ignitor in the ballast instead of a starting electrode (probe) in the lamp. The result is a "white light" system that challenges high pressure sodium's long lamp life, high lumen output and quick starts capabilities.

Benefits of Pulse Start HID Ballast/Lamp System!

- ▶ Longer lamp life
- ▶ Superior color rendition to HPS
- ▶ Faster restrike time
- ▶ Better lumen maintenance
- ▶ Improved lamp-to-lamp color consistency
- ▶ Colder starting temperatures
- ▶ Reduced color shift
- ▶ Faster warm-up time
- ▶ Less arc tube blackening

Lamp:

- ▶ **Probe Start Lamp**
A traditional or probe start metal halide lamp has an internal starting electrode or probe. A high open circuit voltage from the ballast initiates an arc between the two starting electrodes at one end of the arc tube. Once the lamp reaches full output, a bi-metal switch closes to short out the probe and discontinues the starting arc.
- ▶ **Pulse Start Lamp**
A pulse start lamp has an improved arc tube design and an increased fill pressure. An ignitor in the pulse start system delivers a high voltage pulse directly across the lamp's operating electrodes to start the lamp, eliminating the probe and bi-metal switch needed in probe start lamps.

Ballast:

- ▶ **CWA**
Constant Wattage Autotransformer (lead-type regulator), the most widely used HID ballast today, offers good ballast regulation and moderate ballast losses. Available for probe start metal halide and high-pressure sodium lamps.
- ▶ **Pulse Start Ballast**
The pulse start system uses a dedicated ballast that includes an ignitor. This eliminates the need for the starting probe and bi-metal switch in the lamp. There are three designs of pulse start ballasts, each has its own characteristics. As in all ballast designs, the ballast must match the electrical requirements of each specific lamp. The American National Standards Institute (ANSI) has applied specific identification codes to each pulse start system.

SCWA

Super Constant Wattage Autotransformer, the pulse start version of the CWA ballast, offers good ballast regulation and moderate ballast losses. For pulse start metal halide lamps only.

LLSCWA

Low Loss Super Constant Wattage Autotransformer, this ballast has all the benefits of an SCWA ballast, but with reduced energy consumption. For pulse start metal halide lamps only.

LLRPSL

Linear Reactor, designed as an energy savings system, 277-volt only, is used in areas with very little line voltage variation. Auxiliary quartz options are not available. For pulse start metal halide lamps only.

RLB Regulated Lag Ballast (LAG-type regulator, "reg-lag"), exhibits the best ballast regulation, is used in areas where excellent line dip tolerance is critical. For pulse start metal halide lamps only.

Standard HID System	Input Wattage	Initial Lumens (Clear lamp)	Mean Lumen (Clear Lamp)	Average Rated Life
400W Metal Halide (CWA)	458	36,000	23,500	20,000
Pulse Start HID System	Input Wattage	Initial Lumens (Clear lamp)	Mean Lumen (Clear Lamp)	Average Rated Life
400W Metal Halide (SCWA)	455	41,000	31,000	20,000
T12 Fluorescent System	Input Wattage	Initial Lumens (Clear lamp)	Mean Lumen (Clear Lamp)	Average Rated Life
(2) F96T12HO	253	18,400	16,560	12,000

New installation fixture count is based solely on lumen data, but this is only an approximate count. Total actual fixture count for a new installation may vary depending on actual conditions, such as maintenance factors, room cavity ratios, etc... The calculator is not intended to replace an application software program (Visual 2.0), that will provide an accurate fixture count.

Date:
Pulse Start Calculator

Project: Sample

Title:
Call 1-800-315-4963 for technical assistance.

Company:

Designer:

Fixture Series:

# of Fixtures	Current System	One For One System	Lumen Output	Current System Annual Energy Cost	New Installation Fixture Count
100	400 MH (M59) CWA	320 MH (M154) LLRPSL	Mean Lumens	\$36,009.79	89
Lumen Output	23500	26400	New Installation System	One for One Annual Lighting Cost	New Installation Annual Energy Cost
Input Wattage	458	370		\$29,090.88	\$25,890.88
Life of Lamp	20000	20000			
Total Input Watts	45800	37000	32930	Annual Energy Savings	Annual Energy Savings
Schedule	Operating Hours	8736	hours/ year	\$6,918.91	\$10,118.91
Monday-Friday	24	Electric Rates (\$/Kwh)		19.21%	28.10%
Saturday	24	\$0.100			
Sunday	24	<small>The information provided is based strictly on published information from lamp and ballast manufacture. This is for estimate purposes only! Up to date details specific to input wattage and mean/initial lumens should be verified with specific ballast and lamp manufacture.</small>			
Total hours / week	168				
Estimated Initial Capital Cost	\$7,298	Simple Payback (Months)		13	9

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