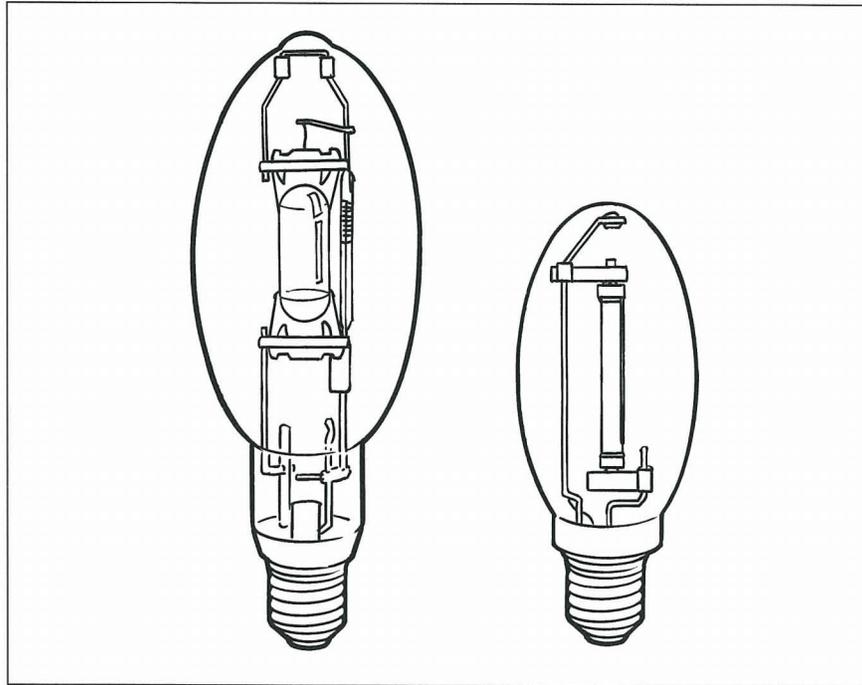


# High-Intensity Discharge



High-intensity discharge (HID) lamps include mercury vapor, metal halide, and high-pressure sodium lamps. This family of lamps contains some of the most efficacious lamps. All are nondirectional light sources, and all require a ballast for operation.

Some white mercury vapor lamps have phosphor coatings and have better color qualities than clear lamps. Although they are more efficacious than incandescent lamps and can be inexpensive, mercury vapor lamps are not as efficacious as most fluorescent lamps or other HID lamps of equivalent light output.

Metal halide lamps are more efficacious than mercury vapor lamps and have a higher CRI. Compact metal halide lamps come in lower wattages. Most metal halide lamps require an enclosed luminaire or other protective measure to guard against possible end-of-life rupture and to filter ultraviolet light, although some of the new low-wattage types are available for use in open fixtures.

High-pressure sodium lamps require a ballast with a high-voltage starter because, unlike mercury and metal halide lamps, they do not contain starting electrodes. High-pressure sodium lamps produce a yellow-white light and are not appropriate where good color rendering is important; however, there are two types of improved-color high-pressure sodium lamps: white and “improved color.” White high-pressure sodium lamps have CCT ratings that approach those of incandescent lamps. In both types, efficacy is significantly reduced compared to standard high-pressure sodium lamps, but is still much greater than incandescent lamps.

## Qualities

**Color:** Generally poor, although good color rendering is available from some metal halide and improved-color high-pressure sodium lamps. The color appearance of metal halide and improved-color high-pressure sodium lamps may shift over time.

**Light Output:** High.

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Lamp Type	Rated Lamp Watts	Input Power (Lamp + Ballast Watts)	Average Rated Lamp Life (hours)	Light Output (lumens)	CCT (K)	CRI	Typical Price per Lamp (\$)
<b>High-Intensity Discharge</b>							
High-Pressure Sodium	35	53	16,000	2,250	2,100	22	18.00
High-Pressure Sodium	50	64	24,000	4,000	2,100	22	18.00
High-Pressure Sodium	70	95	24,000	6,300	2,100	22	18.50
High-Pressure Sodium	100	130	24,000	9,500	2,100	22	19.00
Metal Halide	70	95	10,000	5,000–5,200	3,700–4,000	65–70	27.00
Metal Halide	100	125	10,000	8,500–10,000	3,700–4,000	65–70	27.00
Mercury	75	93	16,000–24,000	2,800–3,150	5,700	22–50	23.00
Mercury	100	125	24,000	3,850–4,300	5,700	22–50	17.00
Mercury	175	200	24,000	7,850–7,950	5,700	22–50	17.00

CCT = Correlated Color Temperature    CRI = Color Rendering Index

## Energy and Cost

**Wattage:** HID lamps require a compatible ballast, which consumes some power during lamp operation.

**Efficacy:** High.

**Life:** Very long (up to 24,000 hours).

**Cost:** Higher than incandescent and fluorescent lamps. Mercury vapor lamps are less expensive than high-pressure sodium or metal halide lamps, but are less efficacious. Electric utility company incentives may offer substantial savings.

**Where to Buy:** Builders and electrical supply stores, lighting stores, and manufacturer and mail-order catalogs offer HID lamps and luminaires.

## Use

**Installation:** Interior applications include situations where lamps are used for extended periods of time. Compact HID lamps are sometimes used as an alternative to incandescent downlights, uplights, and accent luminaires. Potential users should note that the efficacies of low-wattage HID lamps, including compact types, are much lower than the higher-wattage HID lamps of the same type. HID applications for homes include lights that are left on for long periods of time for security or fire stairs in multi-family housing.

**Luminaires:** Metal halide lamps often require an enclosed luminaire or other protection. HID lamps are most frequently used in exterior lighting applications.

**Controls:** Not easily dimmed. Do not use motion detectors to operate high-intensity discharge lamps because of their warm-up and restart characteristics.

**Cautions:** Magnetic ballasts can have an audible hum. HID lamps require several minutes to reach full light output (warm-up time) and, once extinguished, may not be able to relight for several minutes; this period is called the restrike time. Manufacturers have developed several strategies to improve the lamps' warm-up and restrike times, but these strategies lower the efficacy of the lamps.

For more information refer to

**Designs:** Multi-Family Fire Stairs

**Other Lamps:** Incandescent, Fluorescent