**DAYLIGHT LIGHTING**
Hydrargyrum (Mercury) Medium-arc Iodine = H.M.I.

The H.M.I. bulb was first introduced by Osram in the early Seventies. This discharge bulb consists of two electrodes included in a quartz envelope containing a specific mix of rare earth gas.
The combustion of the electric arc forming between the two electrodes amidst the rare earth gas produces a white light close to the spectrum of daylight temperature as defined by physician William Thomas Kelvin.

Medium Source Rare-earth gas = M.S.R. In 1988 Philips developed a single ended version of the H.M.I. double ended bulb. The term MSR was used by Philips to designate this type of H.M.I. The single ended HMI produced by Osram is called H.M.I. SE. Other lamp manufacturers like Wolfram, L.S.I. and Kotto. have since then developed their own codes.
The single ended bulb not only allows the reduction of size and weight of lighting fixtures but it also led to the design of a new type of light source-Pars.

H.M.I. has become a generic term so we will use this name to designate both HMI and MSR bulbs.

**The success of the H.M.I. bulb can be explained by the following advantages :**

**Daylight balanced :** The fact that H.M.I. bulbs are already daylight balanced avoids the use of conversion gels which can reduce the light output by half (one stop).

**Less heat :** Incandescent lamps generate a lot of infra-red as the light is produced by a red hot burning filament. H.M.I. has very limited amount of infra-red in its spectrum and generates far less heat and more comfort on the set.

**Greater light output:** The efficacy of a bulb is expressed in Lumen per Watt. For example: a 200W bulb which produces 5000 lumen at a distance of one metre will have an efficacy of 25 Lumen/Watt (5000 Lumen/200W ).

**Light bulb manufacturers publish the following data:**
H.M.I. = 75 to 95 Lumen/Watt
Tungsten (or incandescent) = 15 to 25 Lumen/Watt

The H.M.I. technology offers an output 4 to 5 times greater than an incandescent. This difference becomes even more obvious when the incandescent fixture has to be corrected with a blue gel to bring it up to daylight colour temperature.

**Less power consumption:**
The efficacy of the H.M.I. bulb allows the cinematographer or videographer to use less powerful units to get an equivalent f-stop. This parameter is very useful when shooting on location where power can be very limited (10 or 16 amps circuit, small generators or batteries).

**Example:** On a 10 amp circuit, you can plug up to 2300W (10 Amps x 230 Volts) which allows you to use 1 x blonde (2kW) or 2 x redheads (800W).
With the H.M.I. technology, using 3 x 400W would give twice the amount of light. If colour correction gel is used on the tungsten units to adjust to the outside daylight it would give nearly four times more light.

**Reliability of the H.M.I. bulb:** The tungsten bulbs being used in blondes and redheads are known for being fragile during operation. The filament, when red hot, becomes fragile and can break easily with a small shock. As H.M.I. bulbs don't have a filament but an electric arc, they can be moved a round while working without this risk. Burning time is over 200 hours on a 200W H.M.I. and between 400 and 800 hours with the more powerful bulbs.

The most common criticisms of H.M.I. technology are the price and the warming up time of the bulb. The warming up process lasts about one minute and is caused by the characteristics of the rare gas. To start the bulb, a high voltage is required to ignite the combustion of the different gases.
This creates a chain reaction seen during this warming up period. In order to accomplish this complex phenomenon a striker placed in the fixture and an external ballast are necessary. We are far from the basic on/off switch used in incandescent lighting.

**HOW DOES IT WORK ?**
To better understand the purpose of the ballast and striker, let's look at what happens when we start up a H.M.I. unit. The ballast delivers an output current of 300 Volts to the striker. The striker turns this current into high voltage (30 000V to 70 000V depending on the bulb's rating).

High voltage is directed to the bulbs to form an arc between the two electrodes. As soon as the arc is created, the ballast drops to 30V, then slowly increases until it stabilizes in the region of 70V for small wattage lamps and up to 225V for the bigger units.

BASIC GUIDELINES FOR BETTER USAGE OF HMI LAMPS
1) Avoid switching off unit while the bulb is still warming up. Warm up takes about 1 minute.

2) The outer bulb of the lamp shouldn't be touched with bare hands. In case of contact with bare fingers, clean the bulb with alcohol (once the bulb has cooled).

3) How to know when the bulb is dead. At the end of its life, the bulb will switch off while running. Note that you can still strike it again but it will switch itself off after a short while anyway (approximately 1 minute).

4) When replacing a bulb ensure that it is plugged into the lamp socket fully. If not, it might cause arcing around the pins of the bulb.

5) If you experience difficulty when striking the bulb, contact us immediately. Do not continue to attempt starting it, as this could damage the ignitor or the ballast.

6) HMI bulbs are hot re-strike. This means that they can be cut off and struck again without waiting for cooling off . Between one and two minutes after you turned it off, it will be harder to re-strike. Re-strike is usually possible, but in the case of aging bulbs it can be more difficult. By waiting an extra minute before re-striking aging bulbs this problem should be eliminated, unless the bulb is completely dead.

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