FAQs: Metal Halide Lighting

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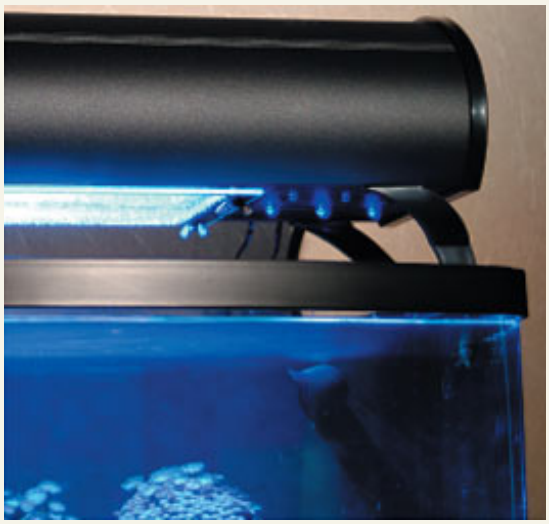

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What are metal halide systems?

Metal halide systems are high intensity discharge (HID) lighting systems popular among many aquarium hobbyists. Metal halide bulbs are comprised of a main glass bulb with a series of wires connecting another glass bulb (arc tube) within it. When electricity passes through the arc tube, the gases and metal salts contained within the tube produce light. Unlike other high intensity discharge lighting systems (e.g., sodium or mercury vapor lights), the light spectrum and the color rendition produced by metal halides is suited for aquarium use.

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What are the benefits of metal halide systems?

The main benefit of metal halide systems is the intense illumination they provide. This primary characteristic also has a secondary, space-saving benefit as well. A single metal halide fixture is capable of providing several hundred watts of light energy while other lighting systems require multiple units to provide the same light output.

Metal halide systems also offer a unique aesthetic benefit that cannot be reproduced by fluorescent lighting systems. The concentrated light emission of halide bulbs creates a beautiful shimmering effect. "Glitter lines" are produced when ripples or movement on the water's surface catches and reflects the light. The effect is a breathtaking display of light that gives the aquarium a more natural appearance.

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Are there different types of metal halide bulbs?

Metal halide bulbs are generally available in two styles - either a single-ended screw base or double-ended (HQI) style. Just like any other light bulb, these bulbs are available in different wattage and color temperatures. But more importantly, metal halide bulbs are differentiated by the manner in which they start, falling under either "probe-start" or "pulse-start" systems. It is crucial to distinguish the different bulb types to accurately match metal halide bulbs/wattage to their ballast type to ensure proper operation. Metal halide systems are system-specific and the "wrong" bulb will not work with incompatible systems. In some situations incompatible bulbs may start but usually experience dramatic color shift, light loss, tend to have a shorter bulb life and can potentially cause severe damage.

Most American-made metal halide bulbs are probe-start bulbs while most European-made metal halide bulbs are pulse-start bulbs. Double-ended or HQI (Mercury Quartz Iodide) bulbs require HQI fixtures and ballasts to work. Since many metal halide systems are system-specific, the easiest way to ensure bulb compatibility and proper operation is to pair metal halide bulbs of the appropriate wattage with a ballast and light fixture from the same manufacturer.

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What is the difference between "probe-start" and "pulse-start" bulbs?

The main difference between these two bulbs is the internal components necessary to start the bulbs and the subsequent manner in which they are started. Probe-start metal halide bulbs contain a starting electrode within the arc tube and the lamp is started when the ballast sends a current to the starting electrode to ignite the lamp. Contrary to probe-start bulbs, pulse-start bulbs do not have a starting probe and the ballast sends a high-voltage pulse directly across the main electrode to start the bulb.

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Will I be able to use metal halide bulbs with other lighting systems?

Though the base of screw-in metal halide bulbs are threaded like incandescent lamps, they require a special socket designed specifically for metal halide bulbs. Also, the mogul base of most metal halide bulbs is too large to fit conventional incandescent sockets. Metal halide bulbs require fixtures and sockets specific to metal halide systems to accommodate the operating voltage and the high temperatures associated with metal halide bulbs.

Metal halide systems are system-specific and are not interchangeable. For optimal performance and safe operation, always use compatible bulb type, bulb wattage, light fixture and ballast system.

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What is a ballast?

A ballast is a device that provides the correct starting voltage and regulates the current going to the bulb during operation. There are two types of ballasts available for metal halide bulbs - magnetic ballasts and electronic ballasts.

Electronic ballasts are relatively new to the industry and feature a smaller, cooler-running design. Not only do electronic ballasts produce less heat, they are also more energy efficient and enable a longer bulb life. For example, bulbs used with electronic ballasts can last from 18 to 24 months without significant losses in spectrum or intensity. Bulbs in a similar system with a magnetic ballast system will require replacing after 10-12 months of operation.

Metal halide ballasts are designed to fire specific bulb types as well as particular wattage. It is important to use properly rated compatible bulbs with the ballast to ensure safe and proper operation.

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Where should the ballast be placed?

Ballasts for metal halide systems should be located in an area where the heat it produces does not affect aquarium water temperature. Place the ballast in an open, and easily accessible area. It may be a good idea to use a ventilation fan to disperse the heat and to improve air circulation. If placed in the cabinet below the aquarium, incorporate a ventilation fan and make sure the ballast is placed in an area furthest away from the sump area.

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What are some common aquarium applications for metal halide systems?

Metal halide fixtures are ideal for aquariums, such as reef aquariums, with inhabitants that require high lighting conditions. Metal halide systems are also used for very large aquariums or aquariums deeper than 24 inches where other lighting systems may not be powerful enough to provide adequate illumination.

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How do I select the proper wattage metal halide bulb in relation to aquarium depth?

The depth of an aquarium affects light penetration and light intensity.

175 Watt - Recommended for aquariums up to 20' deep or mixed corals with a few SPS and clams placed high in aquarium.

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250 Watt - Recommended for aquariums up to 30' deep with mixed corals including SPS and clams.

400 Watt - Recommended for aquariums up to 48' deep or a dedicated SPS and clam aquarium.

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How often do metal halide bulbs need replacement?

Bulb life will vary depending on use as well as ballast type. In general, metal halide bulbs used with electronic ballasts can last from 18 to 24 months without significant loss in spectrum or intensity while bulbs in a similar system with magnetic ballasts will require replacing after 10-12 months of operation.

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Are there any special concerns regarding the use of metal halide fixtures?

The main concern regarding metal halide fixtures is the amount of heat generated by the bulbs as well as the ballast system. If proper ventilation or air movement is not provided, trapped heat within the light fixture or canopy can affect the performance of the fixture as well as increase aquarium water temperature.

It is important to position a metal halide light fixture approximately 12 inches above the water's surface to allow adequate air circulation and to minimize heat transference. Use fans to provide supplemental air movement to dissipate excess heat. Despite efforts to improve air circulation, large or elaborate systems using metal halide fixtures may require the use of a water chiller, especially during warmer months. Minimizing heat transference and maintaining acceptable water temperatures may be a challenge when using metal halide systems.

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What kind of maintenance is required for metal halide systems?

To help maintain optimal light output, keep the protective lens clean and free of salt or mineral buildup. Before performing any routine maintenance, always allow the metal halide systems (bulbs and the ballasts) to cool completely.

When replacing bulbs, avoid touching the bulb(s) with your bare hands and be sure to wipe off any fingerprints with a clean lint-less soft cloth. Debris or oils left on the bulbs can damage the bulb(s) as they heat up. The use of a timer is recommended to regulate the operation of metal halide systems since repeated or excessive cycle of turning metal halide bulbs on and off can reduce bulb life.

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My metal halide bulbs seem to take a long time before lighting. Is this normal?

Yes. Due to its characteristic combination of various gases and metal salts within the bulb, metal halide bulbs require time to "warm up" (usually 5 to 20 minutes) until it reaches optimal light and color output. Also, new metal halide bulbs require a break-in or burn-in period of approximately 100 hours before bulb performance stabilizes.

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