Product Comparison Sheet
Tungsten-Halogen vs. High-Pressure Sodium Vapor (HPSV)

Introduction BIRNS manufactures tungsten-halogen underwater lighting fixtures AND high-pressure sodium vapor (HPSV) underwater lighting fixtures. Both types have advantages and disadvantages. As the world's oldest manufacturer (and the manufacturer with the largest worldwide market share), BIRNS does not "push" customers to buy tungsten or HPSV; BIRNS simply provides the technical and commercial information necessary for customers to make fully informed decisions. This comparison chart summarizes the key technical points between the two technologies, and BIRNS staff members are pleased to answer any technical questions. (See a side-by-side comparison of the BIRNS Corona HPSV light to Other Brand HPS-1000.)

HPSV lumenaires are higher-priced, require ballasts and cannot be dimmed. However, they emit much more light and have much longer lamp life, so HPSV lights are much cheaper over time. However, it's very important that replacement lamps be commercially available!

The BIRNS Corona is the world's most advanced nuclear-grade high-intensity light. It can be operated for indefinite periods in air and immersed into cold water without damage. The BIRNS Corona is based on proven BIRNS nuclear lighting technology and HID high pressure sodium vapor lamps.

Feature	Tungsten-Halogen	HPSV
Theory of Operation:	Tungsten-halogen lamps contain a tungsten filament (thin wire) within a glass bulb. The filament provides resistance in an electrical circuit, which generates heat in the filament when the circuit is energized. This heat causes the filament to incandesce: to become "white-hot" and emit visible light. Halide gases are added to prevent blackening of the lamp's inner wall. During lamp operation, tungsten evaporates from the filament, chemically combines with the halide gas fill, and then redeposits onto the filament, thereby maintaining a clean bulb wall. Tungsten is used for filaments due to its high melting point (3655 K) and high strength and ductility. Only part of an incandescent lamp's radiation is visible; most is infrared and radiated as waste heat. An incandescent lamp's efficacy is directly related to its filament temperature. Maximum lighting efficacy (~53 lumens/watt) would be achieved by operating a tungsten filament at its melting point but lamp life would be very short. Thus, tungsten-halogen lamps are made to operate at lower filament temperatures, with less lighting efficacy.	Light in HPSV lamps is produced by passing electric current through sodium vapor under pressure at high temperature. The gas fill is vaporized when the gas attains operating temperature. Sodium is the primary radiating element in the arc, but mercury is added as a buffer gas for color and voltage control, and small amounts of xenon (or, sometimes, argon and neon) are used as a "starting gas". Because long and narrow arc tube geometry is required for maximum efficiency and since starting probes are not used, extremely high voltages (~5Kv) are necessary for lamp ignition. An electronic starter circuit, working with the magnetic component of the ballast, performs the starting function. The starter supplies a high-voltage, high-frequency pulse on each cycle or half cycle of the supply voltage to ionize the starting gas and initiate the starting sequence of the lamp. Once started, the lamp warms up to full light output, during which the color output changes from a dim, bluish-white glow produced by ionized xenon to full brightness with a golden white light.
Input voltage:	220 VAC	220 VAC
Power consumed:	2,000 watts	1,000 watts
Light output:	50,000 lumens	141,000 initial lumens; 132,000 mean lumens
Luminous Efficacy:	25 lumens/watt	132 lumens/watt
Correlated Color Temperature:	2900K	2100K
Lamp lifetime:	2,000 hours	24,000+ hours
Time to full brightness:	<1 second	3 to 5 minutes to 90% of peak output; 60 seconds to 90% of peak on immediate power re-application after momentary interruption
Ballast required?	No	Yes
Dimmable?	Yes	No
Relative initial	100%	~200%

price:		
Relative cost/lumen:	100%	~76%
Relative power cost:	100%	50%