

## COSMEDICO TECHNICAL ADVISORY: 200 - Watt VHR Lamp & Ballast System

Certain Sun Capsule tanning booths employ a 200w ballast and lamp system supplied by Cosmedico. This system consists of a CosmoPower® 200w ballast (part #74234) in combination with a CosmoLux® 200w/1.8M VHR® lamp (part #16128).

This 200w ballast was specifically designed to operate in a "lead-lag" circuit configuration, and not in the traditional parallel capacitor method.

When the 200w #74234 ballast is used in a "lead-lag" circuit, a capacitor is wired in series with every other ballast. For example: in a 60 lamp booth, 30 ballasts will have a series wired capacitor and 30 ballasts will have no capacitor. The ballast with capacitor regulates current in the lead or capacitive lamp; the ballast without capacitor regulates current in the lag or inductive lamp.

Using this circuitry, both lamps are driven at current and wattages that are greater than the ability of the ballasts if the ballasts were to be wired in the traditional (parallel capacitor) method. At 230V 60Hz, the capacitive VHR® lamp consumes slightly over 200w; the inductive VHR® lamp typically reads about 2 or 3 watts greater.

In order to regulate and balance the output between lamps (capacitive vs. inductive) the series wired capacitor must have precise values and close tolerances ( $\pm 2\%$ ).

What is most important to understand is that there is no benefit in simply running lamps at elevated wattages. Wattage is a measure of consumption, not output. To justify operation of the



lamp at these greatly increased wattages, there must be an increase in the UV output and irradiance of the CosmoLux® VHR® lamp.

This is exactly what happens in this 200w system. The increase in lamp consumption (wattage) is accompanied by an almost linear increase in the lamp's UV production. When consumption is increased by 25%, from 160w to 200w, there is an increase in UV irradiance of about 23%.

The benefit of this increase in UV is that the time required to get to the maximum exposure of 4 MEDs is decreased significantly. The 200w system is able to deliver a full exposure session in under 10 minutes.

Attending the increase in UV production is an increase in the radiant and convected heat produced by both the ballast and lamp. This requires the equipment maker to provide additional air flow (cooling) to remove the added heat from both the components and the cabin.

This high wattage operation places great demands on the VHR® lamp. Lamps operating at these loadings see levels of stress never experienced in any other tanning or general lighting application.

In developing the 200 watt system, it became apparent that a "new" lamp was required for this application. The new lamp would feature a modified

gas fill and a more robust cathode than any previous lamp. This resulted in the development of the VHR® 200/1.8M lamp — a lamp designed specifically for high wattage operation.

Our recommendation is that the original 160w VHR® be used in combination with ballasts that operate the lamp at 140-160w, while the VHR® 200 be limited to applications where the lamp is driven at 180-200w.

As mentioned earlier, the design objective of the system was to lower the exposure time (session time) of the equipment. Short exposure times are much preferred for booth applications because the client is required to stand for the duration of the session.

Additionally, the salon owner benefits from the standpoint of "equipment utilization". A 200w booth averages over eight (8) sessions per operating hour.

However, there is a modest downside to "high wattage operation", and that is the effect upon lamp life. In normal mode, a VHR® lamp will have a usable life of 800+ hours. However, at 200 watts, lamp life is reduced to about 600 hours.

The manufacturer of the 200W Sun Capsule describes this as a "very acceptable tradeoff — 600 hours equals 36,000 tanning minutes. At only \$1.00 per minute, the 200 watt Sun Capsule generates \$36,000 of income on a single set of lamps."

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