

# PORTABLE 2 UV CURING SYSTEM

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OPERATING INSTRUCTIONS



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## DISCLAIMER

### **WARNING:**

- 1.) When operating this unit, air flow must be fully unobstructed
- 2.) User must provide appropriate shielding to protect against UV radiation exposure.
- 3.) Heat generated from the lamp must be effectively evacuated from within the lamp housing.

**RECOMMENDATION:** We recommend a minimum of 10 CFM of air flow within the lamp housing per 100 watts/inch energy supplied to the UV lamp. **IMPORTANT NOTE:** Excessive cooling will diminish lamp operating voltage and effectiveness.

**\*In systems provided with a shutter:** If the shutter is activated (closed), switch lamp power to low (standby) power. Failure to do so will cause the lamp to overheat, and may cause electrical component (fans, wiring, etc.) failure.

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## I. Overview

Maintaining a UV curing unit is critical as UV lamps must operate at their peak performance to provide a full cure. CON-TROL-CURE has designed and developed this irradiator system to provide ease of maintenance, flexibility, maximum efficiency and highest UV output.

Using field research and state of the art technology, the P2 irradiator requires less effort to produce maximum output with minimal waste. With a maintenance-friendly design, the ability to replace the reflector quickly is a key design feature in our lamp system. The P2 system aims to achieve quick, easy and inexpensive reflector replacement by allowing the elliptical half-side reflectors to be removed and replaced within five minutes.

Since you can change the lamp's retrofitted components easily, and, therefore, frequently, you can be assured of maintaining consistent, high UV output. This cost-effective approach ultimately provides the highest level of assurance for effective UV curing.

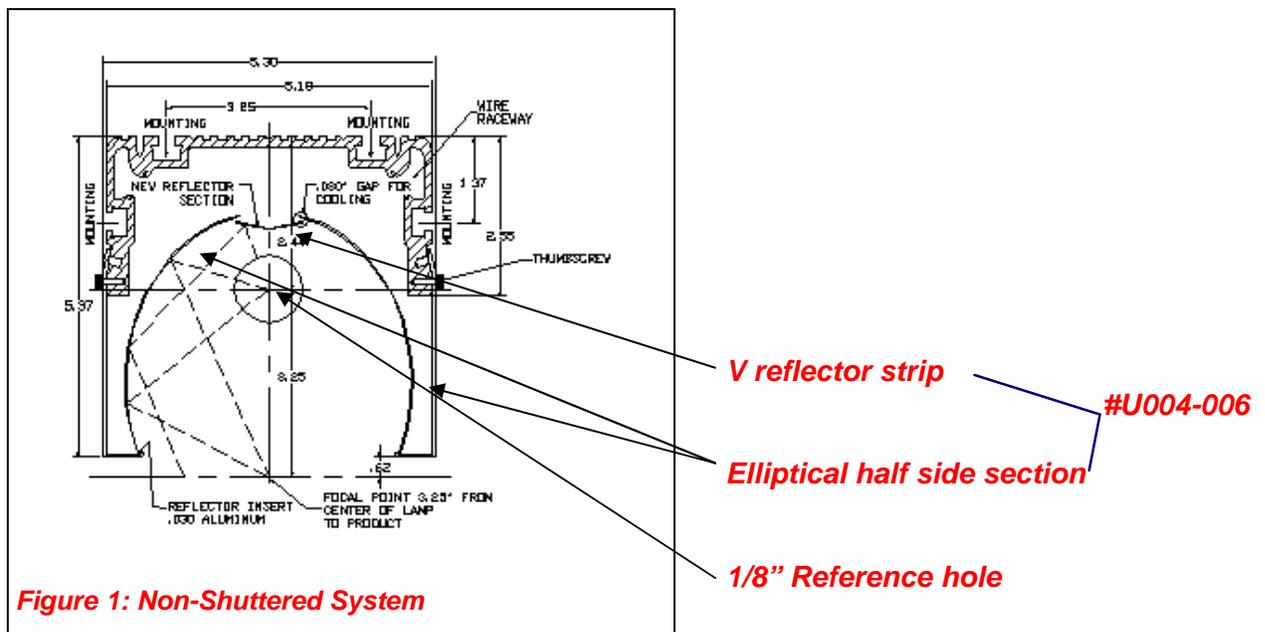
## II. Introduction

High intensity, medium pressure, mercury vapor lamps can generate extreme heat and corrosive temperatures. However, the P2's components (thin reflector sheets, gap for cooling and fans) are designed to withstand the harsh environment created within a UV curing chamber, and to provide optimum cooling.

IMPORTANT: UV radiation can cause severe burns to eye and skin. Use protective materials (goggles, glasses), filter screens and curtains to ensure personnel safety. Proper maintenance procedures, including maintaining an inventory of spare lamps and reflectors, should also be practiced in order to prevent downtime.

## III. Positioning

As this is a portable device, positioning of this unit for different applications will provide varying cure results. As a benchmark of performance, and to properly position the P2 for most effective curing, please note the lamp's optimal focal point is 3 ¼" measured from the 1/8" (3 mm.) reference hole in the lens housing end plate to the substrate surface. (see Figure 1). The focal point has been factory set for optimum performance.



## IV. Cooling of Lamp

Cooling is accomplished by a thermally activated fan located at one end of the P2's lamp housing. The fan blows air across both sides of the reflector and away from the lamp. The airflow changes drastically if the fan blows against any static pressure caused by obstructions, therefore, ensure that the fan operates completely unobstructed.

\*Important note: The fan will only turn on when the lamp reaches operating temperature. This can take 10-20 minutes depending on the positioning of the housing.

## V. Shielding

UV radiation can cause severe burns to eye and skin. Looking directly at the UV light should be avoided. Wearing sufficient shielding and following safety practices are effective protective measures. Personnel must be taught proper precautionary procedures in order to avoid the possibility of skin and eye irritation.

The cornea, lens and retina have been shown to be susceptible to damage from light in the ultraviolet, visible and infrared range. By using shielding materials, you can greatly reduce this hazard to a safe level. OSHA requires employers to make available and require employees to wear suitable eye and face protection where eye injuries may occur. In order to help comply with OSHA requirements and provide safety for your personnel, we offer an array of safety glasses and filter materials, which were carefully selected for the needs of UV applications.

Protect the eyes by wearing safety glasses or goggles. They provide the best protection from large amounts of UV and visible light. UV Filter Safety Glasses protect the eyes by absorbing short-wave UV radiation to up to 400nm (yellow - # I005-018) (green - # I005-020) (clear - # I005-021) (gray - # I005-022). Disposable UV Filter Glasses (# I005-023) are offered at very low cost to encourage safety-wear even for people visiting your production shop. UV Viewing Goggles' glass filter offers maximum eye protection from UV light (# I005 - 016).



**Figure 2: UV Filter Safety Glasses**

UV Filter Screens and Blackout Curtains can also be used to protect personnel from the potential harm of overexposure to UV radiation. However, this is not intended as a substitute for approved eye protection necessary for direct and close range viewing.

The Portable UV Filter Screen (# F007-010) will block ultraviolet light emitting from the UV curing equipment. These self-standing screens absorb and filter light waves to 600 nanometers. UV Blackout Curtains (30" x 40" - # F007-018), (37" x 48" - # F007-019), (40" x 50" - # F007-020), (40" x 60" - # F007-021) block out UV light, eliminate light leakage, and allow optimum light penetration.

Electrical connections and wires should be examined on regular basis. A harsh UV curing environment produces excessive heat, UV light and (usually) ozone. Exposure to harsh UV will deteriorate the integrity of internal components. However, parts of the irradiator (thin reflector sheets, gap for cooling and fans on top of the lamp housing) are designed to withstand the harmful effects of UV.

We strongly recommend maintaining an inventory of replacement parts to prevent downtime.

## VI. Lamp mounting

Before replacing a lamp be sure that the unit has been disconnected from its power source and, if the unit was in use, that the lamp and lamp housing have completely cooled. Two spring loaded lamp holders hold the lamp in place and provide electrical current to the lamp (Figure 3). To install lamp in the lamp housing:

1. The new lamp must be completely free of dirt, grease or fingerprints- failure to do so will contribute to shorter lamp life and decreased performance. Clean the lamp thoroughly using UV Process' Lamp and Reflector Cleaning Solution (#A002-019) and a lint free, non-scratch wiping pad such as Webril Handi-Pads (#J006-030). When handling the lamp for installation use Cotton Inspection Gloves (#I004-002).
2. Hold the lamp at its middle and insert one end through the unslotted reflector end (Figure 4).
3. Then slide the flattened end of the other side of the lamp down through the slot in the other end reflector (Figure 5).

Figure 3



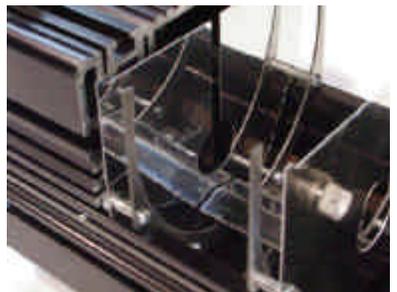
Spring loaded lamp holder

Figure 4



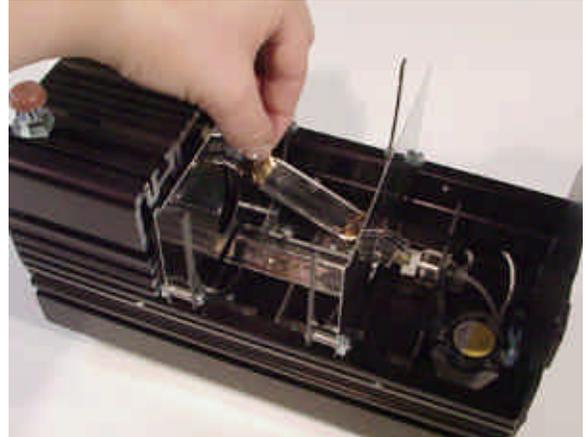
Unslotted reflector end

Figure 5



Slotted reflector end

4. Insert the ceramic lamp end into the lamp holder on the unslotted side and apply pressure along the length of the lamp, pushing the lamp into the spring-loaded lamp holder (right) until the opposite end of the lamp is free to be inserted into its lamp holder.
5. Inspect your installation to be sure that the lamp is properly seated in the two lamp holders by moving it from side to side to feel the spring tension at both ends.



Installing the lamp in the holder

**\*\*\* When installing any lamp, do not touch the quartz envelope directly. Always wear cotton inspection gloves. Do not allow fingers or hands to touch the lamp body after cleaning or during lamp mounting. Dirt and foreign particles can cause a lamp to fail or create an obstruction of the UV light. \*\*\***

## VII. Chassis Mounting

The P2 housing features slots along the length of its exterior shell which accept ¼" bolts for attaching different brackets. Configure your P2 mounting needs utilizing these channels.

## VIII. Electrical/Start-up

With the lamp and reflector secured in place, and all shields locked down, you are ready to power up the unit.

Plug the female end of the power cord into its grounded outlet at the base of the P2. Plug the male end into a grounded 110V, 15A service outlet. With the reflector and lamp directed away and shielded against harmful exposure, turn the unit On.

The P2 will require approximately 10 minutes to reach stabilization. After the warm-up period is complete, the lamp is ready to use for your curing application.

**IMPORTANT:** Remember to wear UV protective eye wear and clothing when operating this system. Also protect from heat exposure as unit temperature may significantly exceed 125°F.

## IX. Cleaning

Dust and dirt on the lamp should be removed prior to installation to assure that they do not contaminate the quartz. Dirt on the lamp and reflector can cut curability dramatically. Accumulation of deposits during production will prevent uniform delivery of light, reduce UV intensity and lessen cure efficiency. The lamp will absorb the UV energy and turn it into unwanted infrared.

Avert equipment failure by proper maintenance. Keeping a log will define future operating procedure and maintenance programs. Prevent costly downtime and ensure maximum UV output by having a routine clean up of irradiator system. All components should be cleaned.

### C.1. Cleaning the lamp and Reflector

Lamp and Reflector Cleaning solution (Part # - A002-019) will prevent of foreign matter from accumulating on the lamp and reflector. Regular use of this cleaning solution to clean lamps and reflectors will ensure optimum light transmission and consistent peak performance.

Dampen the lint-free wiping towel (Part # - A002-021) with the said lamp cleaning solution. Wipe the UV lamp directly with the dampened cloth. Dry and polish lamp with a clean wiper. Use a lint free wiper that contains no chemical binds.

Always wear cotton inspection gloves (Men's - #1004-022) (Ladies' - #1004-031) when handling the UV lamps. Do not allow fingers or hands to touch the lamp body after cleaning or during lamp mounting.

The CON-TROL-CURE UV Lamp and Reflector Maintenance Kit (see Figure 14) contains everything you need to clean UV lamps and reflectors thoroughly: cleaning solution, soft, lint-free wiping towels and cotton inspection gloves.



**Figure 7: Lamp and Reflector Maintenance Kit**

## X. Changing Reflectors

The reflector is a vital component in the irradiator system since it affects the amount of light focused on the curing surface. During production, various deposits accumulate on reflector surfaces and will greatly lessen cure efficiency.

You may choose to replace the reflector rather than clean it. It is advisable to change the reflector once they become contaminated, scratched, or once their mirror-like appearance.

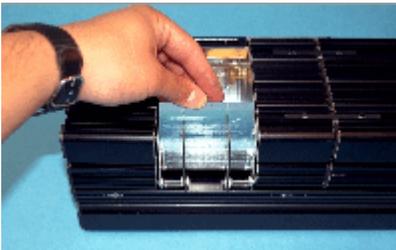


**Figure 8: View of Reflectors**

The P2's design allows easy, low-cost reflector replacement so you can change the reflector as frequently as necessary, quickly and economically. The lamp housing reflector kit consists of the "V" reflector strip and elliptical half sides (see Figure 1).

Replace the V reflector strip, elliptical half side section (V reflector strip and elliptical half side section - #U004-006) found on the center of the lamp housing by alternately twisting it behind the hooks of the rib. Make sure the hooks are alternately opposite each other. If the first hook on the first rib is on the right side, the second hook on the second rib must be on the left side of the lamp housing.

Highly polished reflector ends are critical since the lamp degradation begins at the lamp's ends. The reflector end (#U004-009) helps ensure greater consistency along the entire length of the lamp.



**Figure 9: With side shield removed, reflectors can be easily replaced.**

By removing the side shield on the lamp, the elliptical half side reflectors pop out for easy replacement.

Changing reflectors frequently is a cost-effective measure, since it provides the highest level of assurance for effective and consistent UV curing. When cleaning reflectors, use the same cleaning procedures as recommended for cleaning lamps. Never use abrasive cleaning compounds or steel wool. These harsh products will remove its reflective finish and reduce the reflector's efficiency.

## XI. Inventory of replacement parts

Lamp burnout and failure cannot be predicted. Avoid costly downtime by keeping a proper inventory of replacement parts. We stock a huge variety and inventory of UV lamps. Since our volume of lamp purchasing is greater than any equipment manufacturer, our prices are competitive with other lamp sources.

In addition to lamp and reflector maintenance supplies, be sure to purchase filter materials, ballast and condensers.



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