

## High Level Liquid Disinfection Using Far-UV Sterilray™ Lamps

### Mechanical Advantage:

Far-UV Sterilray™ lamps consist of a tube inside a tube design. The annulus formed between the two tubes is the illuminating volume. This design permits liquids to be flowed through the center permitting the highest coupling efficiency of the light into the fluid. All other approaches using UVC fluorescence tubes and xenon flash tubes must place the light tube next to the liquid tube and try to reflect the light into the liquid.

Light absorbance and the opacity of the liquid determine the thickness of the liquid to ensure optimum treatment. Clean water can be treated up to 10 cm thick; whereas, milk requires a 1-2 mm thickness. Fruit juices and broths of various types fall in between these values.

For lower volumetric flows, a reflector tube is inserted into the center to form a liquid thickness that optimizes the treatment. For higher volumetric flows, a second Far-UV Sterilray™ lamp is used. The outer lamp reflects the light inward and the inner lamp reflects the light outward. Both lamps treat the annular volume at the same time, so the thickness of the liquid region can be doubled. Volumetric flows of over 5000 gallons per hour can be treated at dose levels of 3-5 Joules/liter with the current Sterilray lamp designs. Treatment for milk is generally at 1 joule/liter.

### Power Advantage:

Far-UV Sterilray™ lamps power can be continuously varied, unlike UVC fluorescent lamps. Since cost of any process is a function of power, having the ability to adjust treatment power with the application is very important to the overall program costs. Critical to controlling power is determining the log reduction required to satisfy the program goals. Treatment dose is a function of power and time. For the same treatment time, the power required to get a 4 log reduction is twice that required to get a 2 log reduction. Consequently, controlling flow and power provides the greatest opportunity to control operating costs.

### Treatment Advantage:

Far-UV Sterilray™ lamps produce two unique and narrow line wavelengths that are very different from UVC and Xenon flashlamp wavelengths. Far-UV Sterilray™ lamps emit wavelengths that have maximum absorption at the sensitive chromophores of microorganisms, molds and fungi. Comparative tests show they are 10 to 1000 times more effective. Far-UV light actually breaks bonds in the DNA and protein structures and doesn't rely on photo-chemical changes to stop microorganism replication. Maximum destruction occurs when both Far-UV lamps are used. Adding UVC light had no additional effect.

### Electrical Advantage:

Far-UV Sterilray™ lamps operate on RF power and do not have electrodes penetrating the gas discharge that degrade with use and time. The lamps do not contain mercury or other dangerous materials. Their design life is not limited to on/off switching, they immediately reach optimum optical emission, and emit uniformly over the full length of the lamp. Current lamp dimensions range from 0.7 cm (marker size) to 10 cm in diameter and 60 cm long. Lengths can be extended up to 2 meters. Lamps are continuously operating in a NH hospital at 24/7 for over 1 year and show no degradation.

## MicrobeBuster

Using Far-UV Sterilray™ Technology



MBL Series: Far-UV liquid treatment units are designed specifically for commercial, and light commercial applications. They utilize proven Far-UV Sterilray™ technology to safely and effectively disinfect liquids used in everything from soft drinks to shampoo to medical products. These economical fixtures are available in a wide range of flow rates, making them ideal for individual point-of use applications as well as the final disinfection step prior to product filling.

- \* Dry, chemical-free disinfection.
- \* Instant-on lamp for easy operation.
- \* Automatic cut-off optional.
- \* Green- environmentally friendly.
- \* No mercury or other dangerous materials in the lamp.
- \* No residue left behind.