EFFECTIVITY OF POLYCARBONATE FRONT COVER ON LAMINAR FLOW CABINET AND PCR CABINET IN PROVIDING UV PROTECTION

Equipment and Materials

- UVX Radiometer (SN: E28803 & E32267) from Ultra Violet Products Incorporated
- Esco Airstream® PCR-3A1

Objective

This report aims to investigate the effectiveness of polycarbonate front cover of Laminar Flow Cabinet and PCR Cabinet in providing user protection against UV.

Testing Proper

The cabinet used for the test was an Airstream® PCR Cabinet (PCR-3A1) fitted with UV lamp and front cover. The results will reflect for both Esco LFC and PCR cabinets since they both use polycarbonate as its front cover material. *Figure 1* shows measurement of light intensity inside the working area with an activated UV lamp. The value obtained was **116.4 µW/cm²**.

Figure 1. Initial measurement of light intensity inside the cabinet with a fitted operating UV lamp and front cover for protection of investigators.

The testing was done by:

1. **Putting marking on the surface of the polycarbonate front cover.** The markings should be equally distributed to six zones to ensure all areas are covered when UV intensity is measured.

2. **Measuring of UV light intensity across the surface of polycarbonate front cover.** An Ultraviolet Radiometer (Figure 2) was used to measure the radiation intensity emitted through the front cover. The scanning was done at about 1 cm away from the surface and the values registered from UV Radiometer was recorded. Figure 3 shows the measuring and scanning using the UV Radiometer.

Figure 2. Radiometer used for UV measurement.

Figure 3. Measuring UV Light Intensity using Radiometer.

3. **Recording the values and obtaining the average light intensity measured in the polycarbonate front cover.** The average was obtained by solving for the mean value.

Results

The UV light intensity measurement resulted in a mean value of 0.3µW/cm^2. UV decontamination is usually performed for 15 minutes for effective decontamination. In terms of dose, this would result to 0.27 mJ/cm^2 at 1 cm away from the front cover.

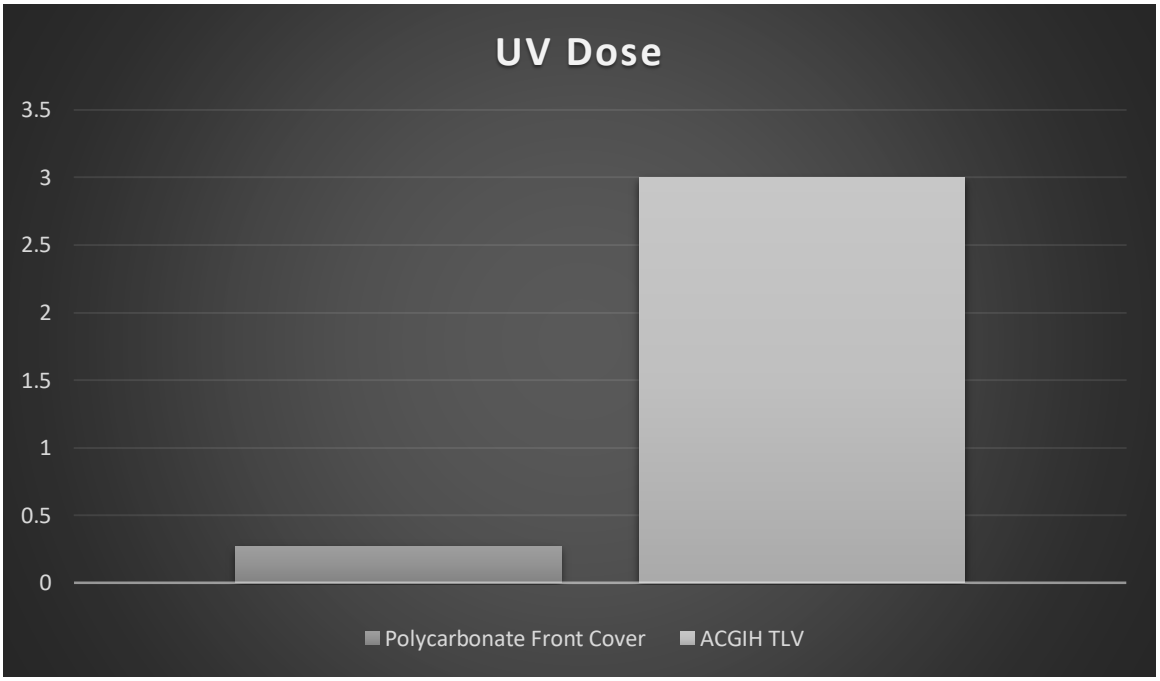

Figure 4. Diagram of mean UV dose measured in contrast with ACGIH TLV,

Discussion

The threshold limit value (TLV) set by American Conference of Governmental Industrial Hygienists (ACGIH) for UV-C exposure should not exceed 3.0 mJ/cm^2. The measured dose is about 11 times lower than the TLV.

This indicates that the polycarbonate front cover effectively protects the user even when staying 1 cm away from the front cover throughout the duration of UV decontamination.

Conclusion

It was concluded that the polycarbonate front covers of PCR cabinet and Laminar Flow cabinet were effective in providing UV protection to the users since the mean value of the calculated dose was 11 times lower than ACGIH TLV for UV-C exposure. Thus, polycarbonate front cover is UV absorbent.