

## THE RESULTS ARE IN

Two independent studies have conclusively confirmed: PURO UV Disinfection Lighting, powered by Violet Defense® technology, **inactivates up to 99.99% of live SARS-CoV-2 virus on glass, stainless steel, plastic and N95 mask material**

### MATERIALS

The following surfaces were tested within the wells of a 24 well plate in triplicate: glass coverslips, 0.5 cm<sup>2</sup> stainless steel squares, a plastic tissue culture plate well, and 0.5 cm<sup>2</sup> squares material from a 3MTM Aura™ 9210+/37192 N95 particulate respirator.

Vero E6 surrogate host cells were plated into test wells 24 hours prior to infection.

Ten-fold serial dilutions of SARS-CoV-2 containing samples were added to the test wells (100 µL) and virus was adsorbed for 1 hour with shaking at 15-minute intervals. After the adsorption period, 1 mL of growth substrate was added to the test wells and the plate was incubated at 37C with 5% CO<sub>2</sub> for 72 hours. After incubation, cells were fixed with 10% neutral buffered formalin, washed, and stained for plaque visibility. Plaques were quantified and recorded as pfu/mL.

### METHODS

The Helo F2 unit was placed in the center of the biosafety cabinet. The 24 well plate containing test samples and UV dosage meter (ILT2500) were placed 1 meter away facing the Helo F2 device.

The 24-well plate containing the surfaces to be tested were positioned so that the plate was nearly vertical (roughly 85 degrees) and approximately 3 inches above the surface of the biosafety cabinet to avoid UV shadowing.

UV dosage meter was set to Flash mode and zeroed to

account for ambient UV. Once zeroed, the UV dosage meter was set to "integrate" mode to measure UV dosage over time and total pulse-counts.

The Helo F2 unit was initiated using an electronic timer set to the indicated exposure time with an additional minute added to account for the device startup procedures. UV dosage for a given timepoint was recorded as mJ/cm<sup>2</sup> along with the respective pulse-count.

To determine the effectiveness of the Helo F2 unit in inactivating SARS-CoV-2 from glass, stainless steel, and plastic surfaces, and 3MTM Aura™ 9210+/37192 N95 particulate respirator material were exposed to pulsed UV light for 1, 3, 5, 10, 15, and 30 minutes from a distance of 1 meter (Figures 1&2).

In tandem with testing the effectiveness of the Helo F2 unit of inactivating SARS-CoV-2 virus from different surfaces, functionality testing of UV dosage cards was completed to determine a colorimetric change upon exposure to increasing doses of UV light. To test this, 4 test pieces of experimental UV dosage card material were included in each UV exposure timepoint.

Intended functionality UV dosage cards was confirmed with a significant color change occurring with increasing doses of UV (Figure 3). The color change was even across all 4 cards tested at each timepoint, indicating a high degree of reproducibility across the material. These cards would be intended for end-users to ensure that a high enough dosage had been applied for SARS-CoV-2 virus inactivation.



**RESULTS**





























**Figure 1.** Logarithmic Reduction ( $\log_{10}$ ) of Live SARS-CoV-2 Virus from Test Surfaces Over Time

SURFACE	HELO F2 UV EXPOSURE TIME (minutes)					
	1	3	5	10	15	30
Glass	-1.13 log	-2.22 log	-3.07 log	-4.03 log	-4.37 log	-4.37 log
Stainless Steel	-1.18 log	-2.26 log	-3.09 log	-3.76 log	-4.52 log	-4.52 log
Plastic	-0.44 log	-2.44 log	-3.07 log	-4.43 log	-4.43 log	-4.43 log
N95 particulate respirator	-0.49 log	-1.41 log	-1.51 log	-2.55 log	-2.86 log	-4.14 log

**Figure 2.** Percent Reduction of Live SARS-CoV-2 Virus from Test Surfaces Over Time

SURFACE	HELO F2 UV EXPOSURE TIME (minutes)					
	1	3	5	10	15	30
Glass	>90%	>99%	>99.9%	>99.99%	Undetectable	Undetectable
Stainless Steel	>90%	>99%	>99.9%	>99.9%	Undetectable	Undetectable
Plastic	<90%	>99%	>99.9%	Undetectable	Undetectable	Undetectable
N95 particulate respirator	<90%	>90%	>90%	>99%	>99%	Undetectable

**Figure 3.** UV Dosage Cards Correlated to UV Dosage Meter (mJoule/cm<sup>2</sup>) for Inactivation of SARS-CoV-2 Virus

DOSAGE CARD/METER	HELO F2 UV EXPOSURE TIME (minutes)					
	1	3	5	10	15	30
1. 						
2. 						
3. 						
4. 						
mJoule/cm <sup>2</sup>	3.14	10.20	17.20	34.90	52.50	103