

Inactivate COVID-19: Thermal Energy & UV-C Light Sanitation Solution to Support the Sanitation of Equipment and the Reuse of Contaminated PPE for Health Care Workers©

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Background: COVID-19 is a highly contagious SARs-CoV-2 coronavirus that is rapidly spreading through both our most vulnerable and healthy populations. SARs-CoV-2 challenges existing healthcare sanitization protocols for medical equipment, patient rooms, and assisted living facilities. The rapid spread of COVID-19 is also causing significant stress on our national supply and availability of PPE for our healthcare workers.

BWR Innovations has developed a line of small, mobile, fuel cell generator/heaters for flexible indoor, or industrial use. The BWR SFC 110 is an 10kW electrical generator that is on a movable cart. The SFC 110 weighs less than 100 lbs. and can be moved to any location and be started instantly.

Solution: The BWR Fuel Cell Thermal Sterilizer with UV-C Light is a dry heat sterilizer designed to produce 60°C (140°F) thermal energy coupled with UV-C light to inactivate a full spectrum of biological contaminants, including viruses, bacteria, and fungi, leaving no residue and no lingering odor. Compared to hand cleaning alone, there's more uniform sanitization coverage throughout the room and significantly less risk of material compatibility issues ***The use of a dedicated sanitation room can also relieve the stress on the PPE supply for our health care workers by facilitating the sanitation and reuse of previously contaminated PPE.***

Dedicated Sterilization Room for Equipment and PPE: An efficient use for thermal sanitization is a dedicated room(s) within a health care facility to sterilize contaminated mobile equipment and healthcare providers PPE. Stretchers, IV poles, blood pressure cuffs, and other equipment travel from room to room and are typically handled by numerous people between cleanings. This thermal sanitation procedure can be done multiple times per day in under 2 hours, providing a confident sanitation protocol.

Methodology: BWR Innovations, collaborating with e1, US Hybrid and Mosebach Manufacturing Company have adapted the SFC110 design to produce a Fuel Cell Thermal Sanitizer that integrates five separate commercial off-the-shelf technologies: **(1)** Methanol to hydrogen generator to produce hydrogen for the fuel cell; **(2)** Fuel cell power generator to produce electricity and thermal energy; **(3)** Resistive heater to convert electricity to thermal energy for primary thermal sanitization; **(4)** UV-C light for secondary sanitization; **(5)** Internet-of-Things telemetry for remote monitoring and management.

Each of the primary components would be located on separate medical quality rolling carts that will be connected through quick disconnect hoses and electrical cords to create a self-contained mobile solution. For a target 500 SF room, it will take 30 to 60 minutes to set up the Fuel Cell Thermal Sanitizer solution and heat the room to the target temperature. The room will be kept at the target temperature for 30 minutes to inactivate contagions. The entire sanitization procedure will take 60-90 minutes and provide thorough thermal sanitization of the room and its contents.

Summary:

- Thermal energy and UV-C light are independently validated and accepted sanitation solutions against a full range of viruses and bacteria, including SARs-CoV-2 coronaviruses. When combined, these two solutions provide an even higher level of sanitation than utilizing each sanitization approach independently.
- The use of a dedicated thermal sanitation room will allow relatively quick, thorough sanitation of hospital equipment and reusable PPE for health care workers.
- This solution will provide a safe, chemical-free application that is mobile, discrete, and free of toxic emissions. It is a clear and compelling alternative to the exclusive use of chemicals and cleaning agents that rely upon varying capabilities and routines to clean and sanitize a room.
- The fully capital amortized cost (including fuel) per sanitized room can range between \$12-\$25/room.