



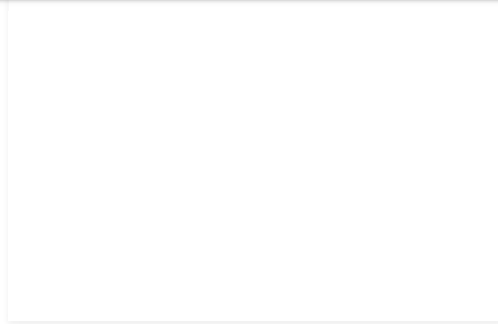
CORONAVIRUS NEWS

UV Light, BPI Among Industry Responses to Kill, Control Virus

CLARK'S REMARKS: Firms are rallying to address every aspect of the COVID-19 crisis. Our sustainability columnist highlights a few promising processes.

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In response to the COVID-19 pandemic, many manufacturers have converted their usual manufacturing operations to making products for health care workers and patients.

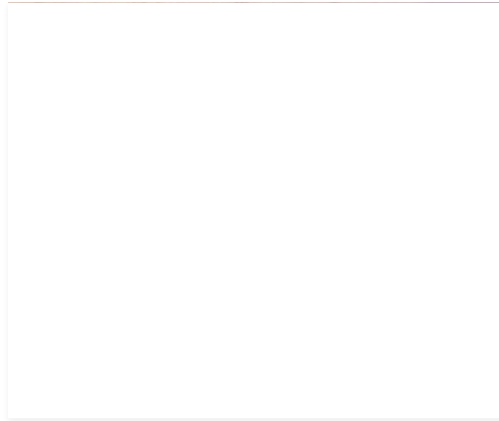
For example, GM and GE are manufacturing ventilators in plants usually dedicated to cars and jet engines, and Mattel is making face masks from Barbie and Fisher-Price fabric. Even smaller manufacturers have stepped up to the plate. For instance, Minnesota-based MyPillow, known for its pillows, sheets, and mattress covers, is now also making face masks, and Avant-Garde Design, a small company in Palm City, FL, is 3D-printing face shields instead of the custom auto interiors for which they are known.

Our industry is also offering technology to assist in efforts to contain the virus. Many manufacturers offer UV light systems for HVAC coils and ductwork. Broad-spectrum UV light, with wavelengths of 200 to 400 nm have long been recognized as effective against viruses, including the SARS-CoV-2 (novel coronavirus) that causes COVID-19, because it apparently destroys the viruses' DNA bond.

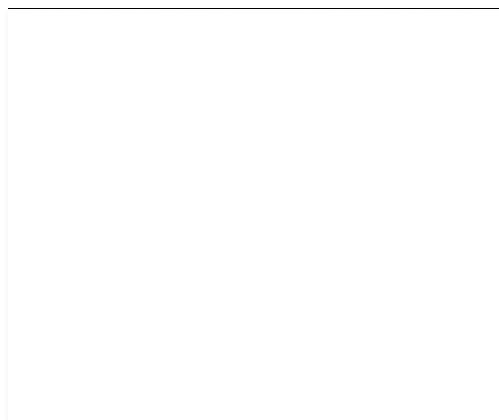
According to the Chinese National Health Commission, which has to-date had the most experience with this virus, a UV intensity of $>1.5 \text{ W/m}^3$ for not less than 30 minutes will kill the virus on surfaces within three feet. For temperatures below 68°F, or above 104°F, and where RH >60 percent, longer exposure times are needed. Unfortunately, broad-spectrum UV light can be harmful to humans, causing skin cancers and cataracts, so it is not ideal for disinfecting indoor spaces. However, a narrower spectrum of UV light in the range of 207 to 222 nm, known as far-UVC, has been shown to effectively kill viruses without penetrating (and damaging) human skin or eyes.

A 2018 study by researchers at Columbia University Medical Center and published in [Nature's Scientific Reports](#), showed that far-UVC "efficiently inactivates airborne aerosolized viruses, with a very low dose of 2 mJ/cm² of 222-nm light inactivating $>95\%$ of aerosolized H1N1 influenza virus" and concluded that "continuous very low dose-rate far-UVC light in indoor

Another process, known as bipolar ionization (BPI), can both neutralize microbes (including viruses) and may also lower outside air requirements by reducing particulate and volatile organic compounds (VOC). When a molecule is decomposed into atoms, free electrons are generated. Negative ions are molecules with free electrons and positive ions are molecules lacking an electron. These bipolar ions (negative and positive) are unstable and will seek out atoms and molecules in the air with which to trade electrons.



According to Dr. **John Oxford**, internationally recognized virologist and professor at the Institute of Cell and Molecular Sciences at St. Bartholomew's and The Royal London Hospital, Queen Mary's School of Medicine and Dentistry in London, BPI has proven to be effective against a number of viruses: N1N1 influenza, H5N1 avian influenza (bird flu), and corona. The mechanism by which BPI inactivates airborne viruses is that the bipolar ions, according to Dr. Oxford, surround the hemagglutinin (surface proteins that form on organisms and trigger infections) and change into highly reactive hydroxyl radicals. These take a hydrogen molecule from the hemagglutinin and change into water. The ions destroy the virus surface structure, in the case of coronavirus the spikes, on a molecular level. As a result, the virus cannot cause infection, even if it enters the body.



stay safe!

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