

COVID-19 PROPOSED HVAC DESIGN MEASURES

In response to the COVID-19 pandemic, below are JonesDBR's proposed HVAC design measures that will help prevent the spread of viruses and other harmful bacteria. JonesDBR recommends the use of any of the options indicated below based on the owner's requirement, the facility type, maintenance impact, and cost. Please note that none of these options are proven yet to eliminate the COVID-19 virus.

RETROFIT OF EXISTING HVAC SYSTEMS

OPTION #1

1. Replace filters on existing Air handling units with MERV 13 filters.

- Existing filters are most likely to be MERV 11, MERV 8, or less.
- Using more efficient MERV 13 filters increases the static pressure of the AHU fan which would require readjusting the motor sheaves and rebalancing the AHU CFM
- In some cases, it may be necessary to replace the AHU fan motor with a larger one if the existing fan motor HP is maxed up. This may require electrical changes.

2. Add Bi-polar Ionization and cold plasma system to existing AHU's or ductwork per ASHRAE IAQ procedure. These electronic devices create free ions that can effectively break down a wide variety of harmful organic, bacterial contaminants, and chemical compounds into a less complex and safe form.

- Bi-Polar Ionization and Cold Plasma systems can provide some cleaning of airborne viruses, and viruses on space surfaces.
- Bi-Polar systems can react with human tissues in airways and may not be recommended in places with people that have compromised health conditions.

- Some modifications may be required to the existing AHU including ductwork, piping, and housekeeping pad to accommodate the addition of Bi-Polar equipment.
- Adequate power and controls need to be provided per equipment manufacturer requirements.
- Field installation is approximately \$1.00 per CFM for (materials and labors).

OPTION #2

1. Replace filters on existing Air handling units with MERV 13 filters.

- Existing filters are most likely to be MERV 11, MERV 8, or less.
- Using more efficient MERV 13 filters increases the static pressure of the AHU fan which would require readjusting the motor sheaves and rebalancing the AHU CFM.
- In some cases, it may be necessary to replace the AHU fan motor with a larger one if the existing fan motor HP is maxed out. This may require electrical changes.

2. Add UV light on the inlet side of the AHU cooling coil.

- Could require adding a section to the AHU to host the UV light if there is not adequate space inside the AHU coil section.
- Some modifications may be required to the existing AHU including ductwork, piping, and

housekeeping pad to accommodate UV light.

- Adequate power and controls need to be provided for the UV light per equipment manufacturer requirements.
- This technology is great for keeping cooling coils and drain pans clean but has very little effect on airborne viruses.
- UV light cost for field installation is approximately \$1.25 per CFM (materials & labor).

OPTION #3

1. Add Genesis Air system or equivalent equipment to existing AHU's or ductwork. This system uses oxidative technology to clean surfaces and reduce airborne viruses and bacteria.

- MERV 13 filters capture large and some small particles
- Ultraviolet germicidal irradiation (UVGI) energizes the photocatalyst and cleans surfaces
- Photocatalysis uses titanium dioxide energized by UV light to produce hydroxyl radicals. Hydroxyl radicals reduce and oxidize biologics in the air stream such as mold, bacteria and viruses and reduces concentrations of VOCs
- Some modifications may be required to the existing AHU including ductwork, piping, and housekeeping pad to accommodate the Genesis system
- Adequate power and controls need to be provided for the Genesis system per

equipment manufacturer requirements

- Genesis Air system cost for field installation is approximately \$2.00 per CFM (materials and labors).

In conjunction with the above options, the following measures are recommended for existing air handling systems:

- Increase ventilation on the existing HVAC system per ASHRAE 62.1.
- Inspect and clean the existing ductwork system as needed per ASHRAE and NADCA standards.

NEW HVAC SYSTEMS

- The options indicated above can also be used in the new HVAC systems during the design phase.
- HEPA filters with 99.97% efficiency are another option that can be used for a new air handler system. These filters can capture airborne viruses but are not proven to capture the COVID-19 virus. HEPA filters increase the AHU length, static pressure, and the horsepower requirement.
- Upfront added cost and AHU's space requirements should be considered when using HEPA filters. The estimated added cost of HEPA filters (material only) to an AHU is \$0.35 per CFM.



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ABOUT JONESDBR

Formed in 2010, JonesDBR Engineering Company, LLC is a minority-owned mechanical, electrical and plumbing engineering firm that specializes in system designs for higher education institutions.

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