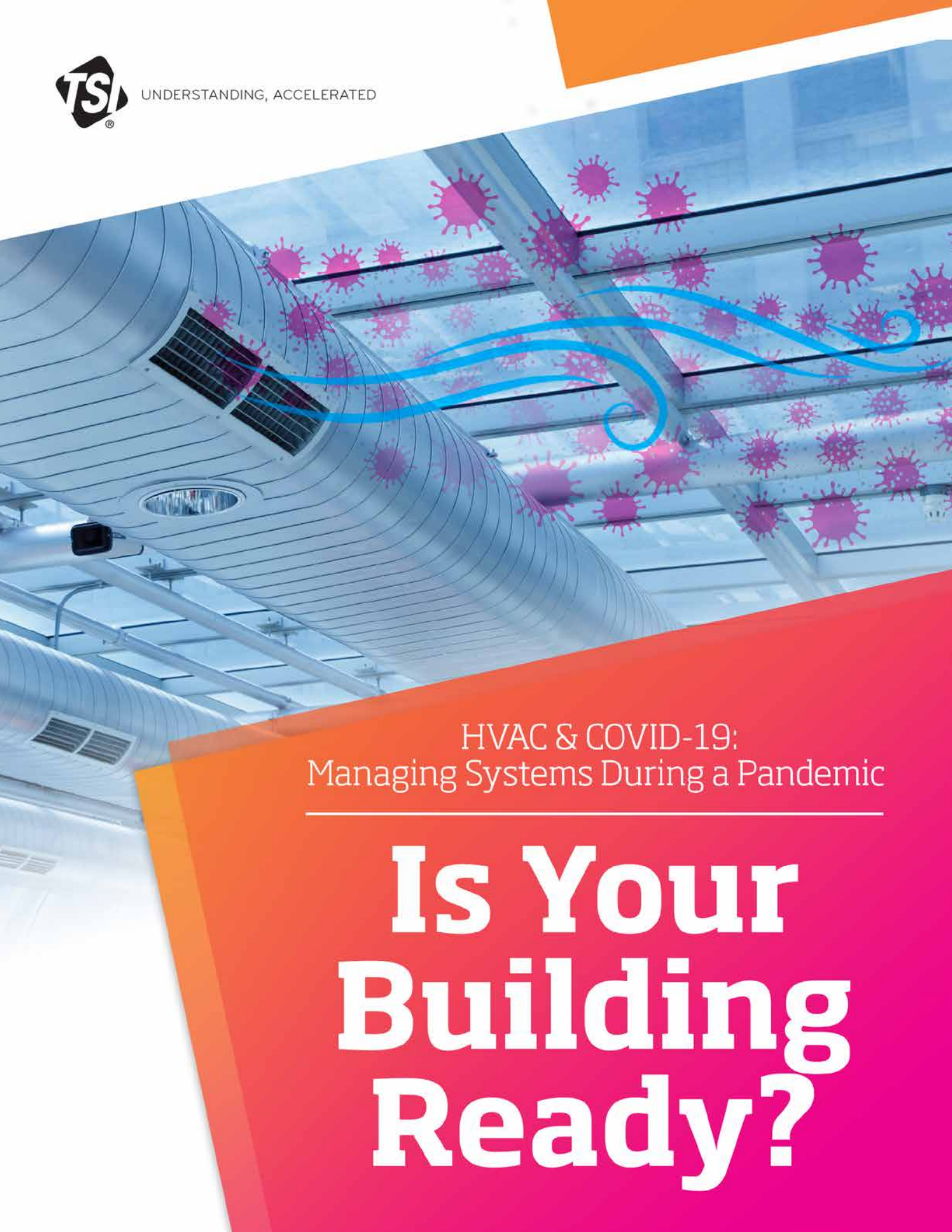




UNDERSTANDING, ACCELERATED



HVAC & COVID-19:  
Managing Systems During a Pandemic

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# Is Your Building Ready?

# HOW HVAC SYSTEMS IMPACT THE SPREAD OF COVID-19

Is your building ready to safely open with the presence of the 2019 Coronavirus (COVID-19)? As we continue to learn more about COVID-19, research shows the virus can be transmitted through the air. When an infected individual breathes, speaks, coughs, or sneezes, the virus can be transmitted via particles in the air. To help counteract the spread of COVID-19, a building's HVAC system can play an important role.



## YOUR VENTILATION SYSTEM AND COVID-19

Businesses must evaluate the operational capacity, and increase, improve, and maintain ventilation provided throughout the building. Increasing the amount of outdoor air entering the building may help reduce the spread of COVID-19. Bringing in more fresh, outdoor air into the building helps to dilute the air of particles, gases and odors. It also reduces the amount of recirculation back into the system.

### LISTED BELOW ARE SOME IMPORTANT STEPS:

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1. Increase the outdoor air-percentage to increase dilution of contaminants, and eliminate recirculating, whenever possible, while maintaining indoor air-conditions.
2. For heating-ventilation-air-conditioning systems that recirculate air, businesses need to improve central-air filtration to at least the MERV-13 or the highest compatible with the filter rack (at least MERV-14 preferred) and seal the edges of filters to further limit by-pass around the filters.
3. Replace and upgrade air filters prior to re-occupancy.
4. Run systems on full economizer as outside air-conditions allow.
5. Consult an HVAC professional to ensure proper ventilation is maintained.





## THINGS TO CONSIDER:

- + **Increasing the amount of outdoor air entering a building must also coincide with increasing the amount of air exhausted from the building.** If only the outdoor air intake rate is increased, building pressures will increase and create issues such as difficulty opening and closing doors, additional noise at entrance doors and between spaces, possibly affect the pressure dependent spaces.
- + **The ability of the HVAC system to maintain space conditions when increasing the amount of outdoor air.** More outdoor air requires more conditioning of the air before being delivered throughout the space. This requires evaluating the heating and cooling coil efficiencies to determine if it can handle the increased heating and cooling demands, which coincides with increasing pump flow through the hydronic system to maintain indoor comfort levels. Increasing outdoor air will require increasing the heated or chilled water flow through the coil, in order to meet indoor temperature requirements and design expectations.

For more information, please see the CDC's *Guidance for Reopening Buildings After Prolonged Shutdown or Reduced Operation*.

# HUMIDITY AND VIRUS TRANSMISSION

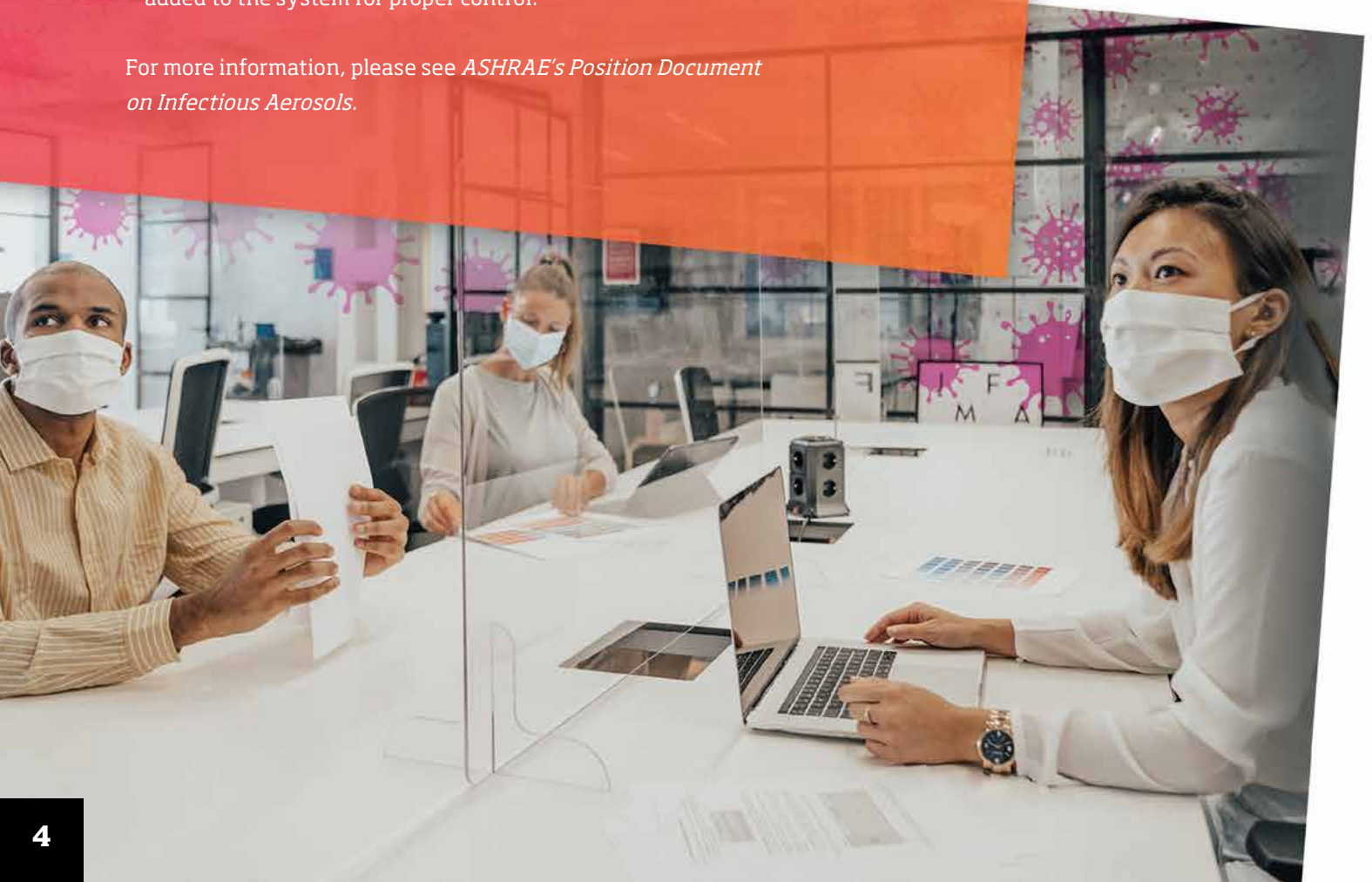


Studies have shown that virus transmission is reduced when the humidity is between 40 and 60% relative humidity (RH). Increased indoor humidity is only possible if the HVAC system has the capacity to meet the recommended levels, which may be higher than what was originally intended in the design phase. Additional humidification or dehumidification capacity may need to be added to the system for proper control.

## THINGS TO CONSIDER:

- + **Increased indoor humidity is only possible if the HVAC system has the capacity to meet the recommended levels**, which may be higher than what was originally intended in the design phase.
- + **Additional humidification or dehumidification capacity** may need to be added to the system for proper control.

For more information, please see *ASHRAE's Position Document on Infectious Aerosols*.





# FILTER EFFICIENCY AND VIRUS CONCENTRATION

Droplets or particles containing the virus will move through your HVAC systems, including the air filters. Increasing the filter efficiency to MERV 13 or higher can help capture a higher volume of pathogens. MERV filters rated 13 and higher do a better job of removing particles in the 0.3 to 1 micron range, and many of the virus particles are in that size range. It is also important to note that the virus is not one size - it may be attached to a larger droplet containing moisture and dust, which aids in capture by the filter media.

## THINGS TO CONSIDER:

- + **Higher efficiency filters require greater air pressure force the air through the filter.** The HVAC systems supply fan must be able to overcome the additional resistance in order to deliver the design airflow requirement throughout the building. Proper care must be taken when replacing filters since they may not fit properly, creating gaps. Air will take the path of least resistance and will find its way through any gaps between the filter and frame it is mounted in. This will be more of a concern due to the added pressure drop that higher efficiency filters place on the system.
- + **Potential air leakage may occur within the air handler upstream of the filter.** More fan power used to overcome the filter resistance increases the static pressure upstream of the filter which the system may not be rated for create leaks

Learn more about improving filtration on ASHRAE's website:

[ashrae.org/technical-resources/building-readiness#upgrading](https://www.ashrae.org/technical-resources/building-readiness#upgrading)



# WHAT ARE MY NEXT STEPS





# HIRE A PROFESSIONAL

These systems and the impact on the space and comfort can be complex. It is important to hire a professional HVAC TAB (Testing, Adjusting, and Balancing) firm to test and set your systems properly. Anytime major adjustments are made to the HVAC system, especially those that were not part of the original design intent, it requires professionals to inspect the system and to make recommendations to the building owners.

- + Professional HVAC firms are often members of and certified by the following industry associations:
  - + Associated Air Balance Council (AABC) [www.aabc.com](http://www.aabc.com)
  - + National Environmental Balancing Bureau (NEBB) [www.nebb.org](http://www.nebb.org)
  - + Testing, Adjusting and Balancing Bureau (TABB) [www.tabbcertified.org](http://www.tabbcertified.org)
- + If you have a Facility Management Team who can perform these tasks, be sure they are trained properly.

# FOLLOW GUIDANCE

Key organizations such as the Centers for Disease Control (CDC), American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), and local government agencies provide guidance regarding HVAC system settings. Be sure whoever is performing the HVAC control/setting work is following this guidance.

- + CDC  
[cdc.gov/coronavirus/2019-ncov/community/organizations/businesses-employers.html](https://www.cdc.gov/coronavirus/2019-ncov/community/organizations/businesses-employers.html)
- + ASHRAE  
[ashrae.org/technical-resources/resources](https://www.ashrae.org/technical-resources/resources)



# PROFESSIONAL INSTRUMENTS FROM TSI

Setting HVAC controls properly involves using instruments which measure key parameters such as air velocity, air flow, temperature, humidity, and pressure. The instrumentation used often needs to meet specifications on accuracy and range in order to be effective. Be sure whoever is doing this work is using professional, accurate instrumentation in order to ensure the work is done properly.

- 1 ACCUBALANCE AIR CAPTURE HOOD 8380**  
+ Measures:  
+ Air Flow
- 2 VELOCICALC® MULTI-FUNCTION VENTILATION METER 9565-NB**  
+ Measures:  
+ Air Velocity  
+ Temperature  
+ Humidity  
+ Differential Pressure
- 3 VELOCICALC® MULTI-FUNCTION VENTILATION METER 9565-NB (WITH PROBE)**  
+ Measures:  
+ CO  
+ CO<sub>2</sub>

TSI Incorporated has been designing and manufacturing professional HVAC and IAQ instrumentation for over 50 years.

For the latest information regarding HVAC systems and COVID-19, visit [tsi.com/IAQ-COVID-19](https://www.tsi.com/IAQ-COVID-19)



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