

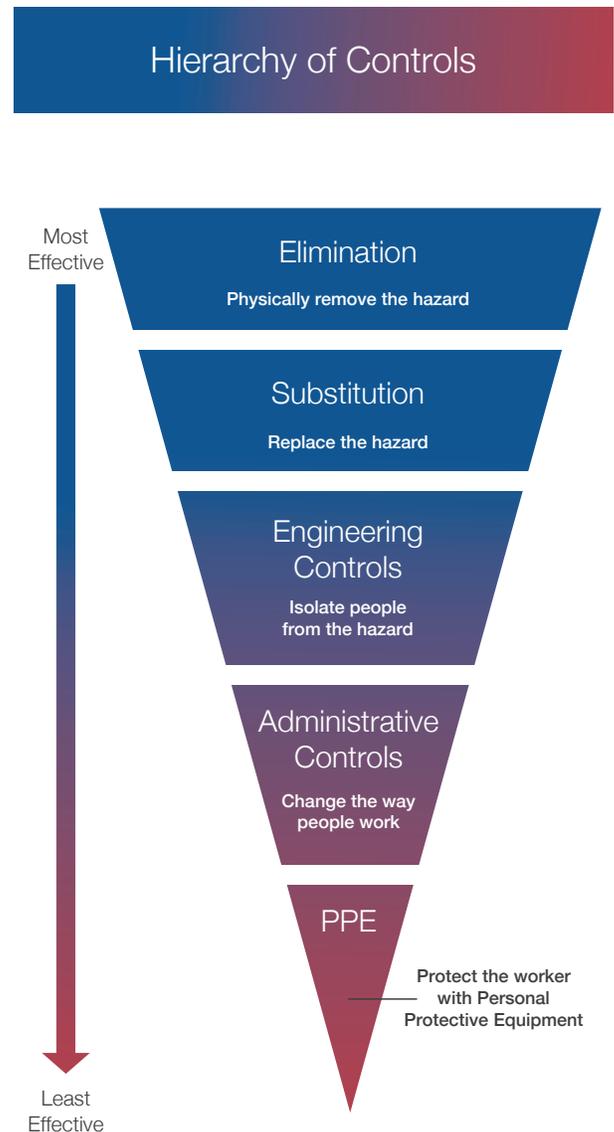
Ventilation Strategies to Reduce the Risk of COVID-19 in Manufacturing

This online document was created by the National Occupational Research Agenda (NORA) Manufacturing Sector Council's COVID-19 workgroup. The NORA Manufacturing Sector Council brings together individuals from business, labor, academia and government to share information, form partnerships, and promote solutions that improve workplace safety. The COVID-19 workgroup is primarily led and operated by non-government members, in order to tailor practices to manufacturing-specific needs. Shortly after the pandemic began, the workgroup assembled to identify information that was not readily available and would be helpful to keep workers safe.

The following information is a collection of data, implementation strategies and testimonials on the use of outdoor air, existing industrial ventilation, and heating, ventilation and air conditioning (HVAC) systems to reduce the spread of COVID-19 at manufacturing facilities. These steps can be an important element in a facility's health and safety plan when implemented within the Hierarchy of Controls, which are control measures, moving from most effective to least effective.

The virus that causes COVID-19 spreads between people more readily indoors than outdoors. Ventilation is a key engineering control at the point of the generation of infectious agents, where the source is infected people.

While the specific mechanisms of exposure remain under investigation, the Centers for Disease Control and Prevention and World Health Organization agree that the predominant infection pathway is through close contact with an infected person, particularly in enclosed spaces and crowded conditions. Ventilation practices can reduce the concentration of viral particles in the air, protecting occupants by lowering exposures. It is critical therefore that employers and employees consider developing and implementing ventilation measures as an important element of employee protection, in addition to the basics of physical distancing, use of face masks, hand hygiene, and frequent surface disinfection.



How ventilation can be used to reduce the potential for spread of COVID-19

The COVID-19 pandemic has challenged the manufacturing community to simultaneously manage business operations while greatly enhancing safety procedures. With a seemingly unlimited amount of recommendations from health experts, it can be hard to find the most comprehensive and effective guidance that best fits each unique facility. To help address this challenge, the COVID-19 Workgroup is sharing the following expert information because it is thorough, straightforward and comprehensible.

1 *ASHRAE Epidemic Task Force Building Readiness Guide, 8/19/20. 119 pages*

ASHRAE, formerly known as the American Society of Heating, Refrigerating and Air-Conditioning Engineers, is a global leader in building systems, energy efficiency, indoor air quality, refrigeration and sustainability. The *Building Readiness Guide* provides information and checklists for how buildings should be operating and how to practically check its operation. The guide provides information on how to evaluate existing systems, improve filtration, maintenance checks, energy savings considerations and other topics.

2 *AIHA Reducing the Risk of COVID-19 using Engineering Controls, 8/11/20, 7 pages*

AIHA, the American Industrial Hygiene Association, details dilution ventilation and effective engineering controls to reduce the risk of COVID-19. Importantly, the report notes, “the industrial hygiene profession has long recognized that engineered solutions to reduce exposure to hazardous agents offer much greater protection than PPE or administrative controls in most workplace settings.”

3 ***ASHRAE Position Document on Infectious Aerosols, 4/14/2020, 20 pages***

This document contains information about the potential for HVAC systems to affect the spread of infectious aerosols. Although initially written prior to the current pandemic, additions were made specifically addressing this issue. The document gives recommendations to decrease the risk of disease transmission through proper design and operation of HVAC systems. Other strategies are presented regarding facilities management and infection control practices. Topics addressed include airflow movement, filtration, temperature and humidity control, UVGI, and source control strategies.

4 ***ACGIH White Paper: Ventilation for Industrial Settings during the COVID-19 Pandemic, 8/14/2020, 18 pages***

ACGIH, the American Conference of Governmental Industrial Hygienists, discusses strategies that may be used in industrial spaces to reduce the potential for disease transmission from infectious aerosols, specifically SARS-CoV-2, the virus that causes COVID-19. The hierarchy of controls is employed to identify important areas to address in protecting workers. Topics include general ventilation, local exhaust ventilation, filtration, building pressurization and the use of fans. The document also has a list of recommendations as well as useful resources for additional information.

5 ***How to use ventilation and air filtration to prevent the spread of coronavirus indoors, 8/10/20, 3 pages***

Shelly Miller, Professor of Mechanical Engineering at the University of Colorado Boulder, provides a general overview of how outside air circulated through a building's HVAC system can reduce the spread of COVID-19. Miller also discusses using CO₂ levels to measure air circulation and what you need to know about air purifiers and air cleaners.

Testimonials on Implementation and Problem Solving

As manufacturers have learned, it can be difficult to implement health and safety guidance during the ever-changing COVID-19 pandemic. Below you will find resources and testimonials from experts that have used ventilation systems to reduce the impact of COVID-19 associated risks and what manufacturers and workers need to know before, during and after implementing these strategies.

1 *Indoor Air Quality Assessment. Trane Technologies.*

Trane Technologies partners with manufacturers to evaluate air quality in facilities and to create guidance based on system performance.

2 *Testimonial from ALOM President & CEO*

ALOM President and CEO Hannah Kain describes how their team identified ventilation as an effective tool to reduce the risk of COVID-19 and how ALOM overcame significant challenges, including the wildfires in California.

3 *Reducing Airborne Pathogen Transmission in Heated-and-Ventilated-Only Manufacturing Settings, Big Ass Fans*

Big Ass Fans provides recommendations and things to consider for older manufacturing facilities or ones that do not have existing heating or cooling systems.