

Work activity or the presence of harmful substances in industrial environments frequently produces airborne contaminants. These contaminants can be controlled by isolating them from the breathing zone, substitution of a less hazardous substance or process, or by providing adequate ventilation. Ventilation is one of the most common engineering control methods, and can be defined as the movement of fresh air into a space in order to replace contaminated air and/or control the temperature in a space.

Natural ventilation usually does not provide a sufficient volume of airflow to ventilate enclosed spaces, or to promptly remove highly toxic airborne contaminants from breathing zones. Mechanically aided ventilation, measured in cubic feet per minute (CFM), is generally classified as either "dilution" (consisting of a supply and exhaust system) or as "local exhaust." A properly designed local exhaust system located at the source of the contamination is extremely effective in removing contaminants.

- The effectiveness and efficiency of supply and exhaust fans will depend upon the volume of air that is moved in conjunction with the proximity to the contamination source. The following principles and safety controls should be considered whenever ventilation systems are utilized:
- A supply fan with a diameter of 1 will produce approximately 10% of its face velocity at a distance equal to 30 diameters from the face opening.
- An exhaust fan with a diameter of 1 will lose approximately 90% of its face velocity at a distance of 1 diameter from the exhaust opening.
- The use of ducting systems will improve circulation and minimize airflow losses.
- Make-up air should be provided where exhaust systems are operating. The make-up air source point should be located so that only fresh, contaminant-free air is introduced into the working space.
- Never use pure oxygen to ventilate a space. An oxygen-enriched atmosphere is extremely explosive.
- Know whether the airborne vapor contaminants you are trying to remove are heavier or lighter than air (which has a vapor density of 1). This will assist you in properly locating exhaust fans at the most effective height.
- All fan motors and control equipment utilized to move combustible or flammable vapors should be of the explosion-proof type. The metallic parts of air-moving devices, including fans, blowers, jet-type air movers, and ductwork should be electrically bonded to a grounded structure.