Part 26 Ventilation Systems

Highlights

- Section 386 lists the circumstances under which a mechanical ventilation system is typically used to control worker exposure to hazardous substances or atmospheres.

- Section 387 requires employers to have ventilation systems designed, installed and maintained in accordance with established engineering principles.

Requirements

Section 386 Application

If a mechanical ventilation system is chosen as a method of controlling worker exposure to a contaminant, dust or hazardous atmosphere, the system must meet certain minimum requirements for design, maintenance and operation. While this Part specifies minimum requirements, employers are free to exceed them.

Section 387 Design

Subsection 387(1) Design

The design of a mechanical ventilation system depends on workplace conditions. These conditions include the types of substances and processes used and design of the building. The requirement to design, install and maintain the mechanical ventilation system using established engineering principles allows the employer the flexibility to use equipment that best suits the workplace conditions.

Guides that are commonly used and represent established engineering principles associated with ventilation system design include, but are not limited to:

Industrial Ventilation — A Manual of Recommended Practices, published by the American Conference of Government Industrial Hygienists (ACGIH);

📖 *Industrial Ventilation — A Manual of Recommended Practices*, published by the American Conference of Government Industrial Hygienists (ACGIH);

📖 Standard 62-2001, *Ventilation for Acceptable Indoor Air Quality*, published by the American Society of Heating, Refrigeration and Air Conditioning Engineers Inc. (ASHRAE).

Factors that need to be considered in the design, maintenance and installation of a ventilation system include the following:

(a) type of contaminant(s);
(b) concentration of contaminant(s);
(c) nature of tasks being performed at the workplace;
(d) location of equipment and workers at the workplace;
(e) building ventilation systems already in place;
(f) layout of the building and specifics of the work area such as layout, equipment, furnishings, etc.;
(g) location of ventilation exhausts and intakes;
(h) physical parameters such as temperature, pressure and humidity at the workplace, volume of make-up air required, etc.;
(i) types and configurations of equipment, ducting and other components of the ventilation equipment, including fans.

Mechanical ventilation systems must be maintained and operated according to the manufacturer's specifications. This ensures that the systems provide a safe and healthy breathing environment for workers.

Subsection 387(2)(a) Exhausted air re-entering the workplace

One of the most important considerations in the design and operation of a ventilation system is to ensure that exhausted air does not re-enter the workplace, particularly if the purpose of the system is to remove contaminants. Issues to consider include the location of exhausts relative to air intakes and existing and foreseeable air circulation patterns outside the building.

Subsection 387(2)(b) Make-up air

An adequate volume of make up air must be provided to ensure that the effectiveness of the ventilation system, or other ventilation systems in the building, is not compromised.

The design of a ventilation system must consider both the supply and exhaust systems. If the quantity of air exhausted from the work area is greater than the quantity of air supplied, the interior of the building will be at negative pressure. This will cause the uncontrolled entry of air into the building through cracks, walls, windows and doorways. This can reduce system performance, possibly leading to loss of contaminant control and a potential health hazard. If make up air is not provided, ventilation system fans may be running without moving any air or removing contaminants.

Subsection 387(2)(c) Recirculating systems

If it is not practicable to exhaust a ventilation system to the outdoors, a recirculating air system may be needed. Examples of recirculating air systems include portable fume hoods used for welding, electrostatic precipitators, and dust filters. If the air passing through the system must be recirculated back into the building, care must be taken to ensure that this does not result in an increased concentration of contaminants in other parts of the building.

For this reason the concentration of a contaminant exhausted from the recirculating system must not exceed, where reasonably practicable, 10 percent of its occupational exposure limit. If the system cannot be designed to reduce the exhausted contaminant's concentration to less than 10 percent of its occupational exposure limit, the employer must be able to provide a reasonable justification

Section 388 Safety

Subsection 388(1) Warning workers

If a mechanical ventilation system fails, a method of immediately warning and protecting workers must be in place. The warning system can be as simple as streamers of tissue paper attached to a fume hood or as sophisticated as audible alarms and warning lights. Any effective system may be used as long as workers understand the warning.

Subsection 388 (2) Training

Section 21 requires that if a worker may be exposed to a harmful substance at the work site, the employer must establish work procedures that minimize exposure and ensure that each worker affected is trained in the procedures, uses the training and is instructed regarding the health hazards associated with exposure to the substance.

As required by section 13 of the *Occupational Health and Safety Regulation*, if an employer develops work procedures, the employer must ensure that all workers affected are made familiar with the procedures before they start work. If workers are required to use safety equipment or personal protective equipment, the employer must ensure they are trained in the application, care, use, maintenance and limitations of that equipment.

Workers who use or depend on a ventilation system for their health and safety must be trained to operate it properly and the procedures to follow if the system malfunctions. Workers responsible for system maintenance need to be trained in its proper operation and the manufacturer-recommended maintenance procedures.