

HVAC Systems — Evaluating and Protecting From Chemical or Biological Attack

Schools and municipal entities can be subject to vandalism and acts of terrorism due to their high profile in the community. Heating, ventilating, and air conditioning (HVAC) systems are often easily accessible, and can be used to rapidly disperse chemical or biological agents into the air that is circulated throughout buildings. Outside air intakes or other access points within the building can be used to introduce these contaminants into HVAC system.

Ventilation System Risk Evaluation

In order to evaluate your schools or municipal buildings susceptibility to chemical or biological attack it is beneficial to have an understanding of your HVAC systems strengths and weaknesses. Some things to consider when evaluating system susceptibility to chemical and biological attack include:

- Full mechanical drawings of the existing ventilation system are necessary to determine the location of the outdoor intakes, make up air intakes, filtration, and distribution systems. Knowing where the ventilation systems controls are and how they operate is also an important part of understanding the operation and design of the HVAC system.
- Knowing what types of filters are provided to mitigate the entrance of certain contaminants can help to understand what, if any, risk reduction is obtained from filtration. In most cases filtration will only be for large particles and the level of protection afforded is minimal.
- Determine the number of independent air handling units (AHU) systems, and what are the capabilities to zone off, or isolate one system from another.
- Obtain a description of the security systems related to the AHU. Where are the AHU's located? How do you gain access to these rooms or rooftops? What types of locking mechanisms are in place and who has access to the AHU's?
- Determine what types of monitoring systems exist. Are the HVAC functions and failures capable of being monitored remotely or is it required that an individual access the AHU's to diagnose a system failure?
- Is there an operation and maintenance plan in place to service the ventilation system? Are signs of vandalism reported? Who is responsible for operations and maintenance of the HVAC system? If outside vendors are utilized how is the contractors' staff screened for background and qualifications?
- Knowing what zones are supplied by the individual HVAC systems gives you the ability to estimate the maximum number of employees working in a specific area. This type of information is helpful in evacuation planning.

Suggestions for reducing the vulnerability of HVAC systems in schools and municipal buildings include¹:

Building Air Intakes

- Design air intakes so they are not readily accessible from outside the building.
- Make ground level intakes less noticeable.
- Install screens or louvers over intake grills.
- Provide surveillance and monitor areas around accessible intakes.
- Incorporate physical security such as fences and locked gates to limit access to air intakes.

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Air Handling Equipment

- Secure inside and outside areas where equipment is located.
- Restrict access to authorized personnel, and check credentials of service personnel.
- Screen and supervise personnel with access to equipment.

HVAC System Maintenance

- Change air filters before they become overloaded. If practical, install HEPA filters.
- Clean ducts and equipment to prevent build-up of materials that may harbor bio-contaminants.

HVAC System Capability to Remove Air Contaminants

- Upgrade particulate removal equipment to minimum efficiency reporting values (MERV) of 11 or higher.
- Install activated carbon (GAC) or potassium permanganate-impregnated alumina (PIA) filters to remove gaseous contaminants.

Hazardous Materials Used on Site

- Control access to building cleaning supplies and other hazardous materials.
- Inspect all packages and deliveries.
- Restrict the ability of building occupants to store and use hazardous materials on site.

Emergency Procedures for Chemical or Biological Releases

- Consult with HVAC professionals, local law enforcement, or FBI on current security recommendations.
- Inform all building personnel and occupants of emergency.

References

1. ISO Services Properties, Inc.