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CERTEK
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High Level HVAC Protection in a Chemical, Biological, and Radiological (CBR) Environment

When protecting personnel from the effects of military grade chemical, biological agents, and Toxic Industrial Materials (TIM) or Toxic Industrial Chemicals (TIC) the use of specialized AHU in conjunction with High Efficiency Particulate Air-filtration (HEPA) and High Efficiency Gas Absorbers (HEGA) with a positive pressure to the outside at 75 Pa (0.30 in wg) must be incorporated into the design.

When designing your CBR filtration system keep in mind the agents you are protecting against. HEGA filters come in multiple configurations and a Whetlerized filter must be used to protect against warfare gases. Filters designed for solvents are normally coconut shell based and have a carbon tetrachloride activity of 60%. HEGA filters designed for warfare gases are normally charcoal based, specially impregnated to absorb toxic warfare gases.

The design of your system should include room isolation, return air filtration, outside air filtration, relief air, and isolation with controlled dampers.

Normally your air-handling unit will pull outside air through an 85% pelted bag filter in your AHU. Once the air is conditioned, it should pass through the filtration system closest to the protection zone as possible. This will ensure no infiltration of unwanted contaminants. Welded stainless steel ductwork that has passed a leak test is recommended. Helium tested ductwork is preferred.

The following configuration of the filter bank is recommended but your risk assessment may change the configuration.

Conditioned air should pass through a pre-filter (Filter 1) to extend the life of the HEPA and HEGA filters. Filter 2 is the HEPA filter rated at 99.97% at 0.3 micrometer partial. Filter 3 is the HEGA filter (Carbon Absorber). Filter 4 is the redundant HEGA filter, and Filter 5 is the redundant HEPA filter. This configuration will provide the highest protection and redundancy.

Outside air is pulled into a mixing box that consist of return air and a relief air. The mixed air is pulled into the air handler then blown through the filter bank.

IMPORTANT NOTE: The following outlined AHU will not protect from an internal release that could migrate through doors, walls, windows, and other unprotected areas.

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