

PROTECTION - SCIENCE AND TECHNOLOGY ADVANCES FOR CHEMICAL AND BIOLOGICAL PROTECTION

Supplemental Filter For Enhanced Tics Removal

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The Supplemental Filter protection system was created to operate inline with the Fan Filter Assemble (FFA) and the M98 filter to offer downstream protection against Toxic Industrial Chemicals (TICs). Since the Supplemental Filter would run congruent with the M98, additional CBRNE (chemical, biological, radiological, nuclear, and explosive materials) protection is not an additional priority. The structures in need of air filtration in the field are extensive, specifically shelters and tents.

Guild Associates, Inc. has manufactured a protection system comprised of the Supplemental Filter housing, which contains four individual and interchangeable panel filter elements. These panel filters are rectangular elements, consisting of media loaded webbing, that fit securely in the Supplemental Filter housing. Within the panel filter elements, several layers hold three distinct media types, creating a diverse and multi-faceted filter technology. The panel filter elements are set parallel to each other and the direction of air flow. Vanes are integrated between the row of filter elements to uniformly direct flow across the faces of the panel filter elements. As opposed to radial filters, such as the M98, the fit and form of the panel filter elements allow a higher surface area of contact with the contaminated air stream. Thus, the same rate of air flow can be scrubbed with a lower pressure drop at a flow rate of 400 SCFM. A low pressure drop is necessary to lessen the burden on the system, especially since said system is already burdened by the pressure drop associated by the M98. The pressure drop across the M98 is the minimum of 4 inH₂O, whereas the Supplemental Filter housing (containing four panel filter elements) notes a pressure drop around 3 inH₂O. The interchangeable filters allow for the Supplemental Filter housing to be used several times. By removing the inlet face plate, all four panel filters are accessible for removals and installations. The housing unit itself is portable with handles that fold out to allow a four man carry. The panel elements are easy to transport as they are rectangular and flat, allowing for easy stacking and packaging. Guild Associates' Supplemental Filter offers protection against ammonia, nitrogen dioxide, and formaldehyde, which are representative of the highest risk TICs.

Baseline testing for the panel filter elements with ammonia, nitrogen dioxide, and formaldehyde has been completed and will be used as a point of reference for all future testing. The prototype Supplemental Filter unit was run for over 50 minutes with an ammonia challenge of 1,000 mg/m³ with an air flow rate of 400 SCFM. The next phase of the testing effort requires the Supplemental Filter unit (including the panel filter elements) exposure to one or more of the following tests: high temperature, low temperature, temperature shock, shock, pressure at altitude, accelerated aging, and vibration. Further testing on those panel filter elements is currently underway to confirm their durability and functionality. Overall, the Supplemental Filter technology has the potential to provide collective protection to millions of service men and women stationed globally.