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The Chemical Agent Super Chamber is an environmental test chamber designed by Merrick & Company to provide a controlled environment for performing chemical challenge testing on a variety of materials, including military battlefield garments and equipment.

As a design subconsultant, Merrick teamed with a fabrication contractor to provide the client with a turnkey system. Merrick provided the conceptual and detailed design, as well as fabrication and startup support and performance testing.

The system consisted of a modular enclosure (12' wide by 12' high by 24' long) constructed from 316L stainless steel, a support structure, lighting and appurtenances, and two modules of skid-mounted support equipment for conditioning the internal environment and scrubbing the effluent gas stream.

The system was designed for safety in operation by maintaining the primary chamber at a negative differential pressure of 0.75 inches WC; it featured door interlocks for the tool ports and man entry doors when in operating mode. The exhaust flow was drawn into the 99.99% efficient fume scrubber to pre-treat hazardous materials. The exhaust system is equipped with redundant blowers and scrubbers.

The custom environmental control system allows a wide temperature range of -25°F to 130°F, (+/-1°F) and relative humidity control of 5 to 95% non-condensing (+/-2°). The temperature control equipment skid consisted of a specially modified 30-ton commercial fluid chiller, a 12kW desiccant-type air dryer, and a moisture injection system.

