



Clean Rooms

Our clean rooms are designed to maintain extremely low levels of particulates, such as dust, airborne organisms, or vaporized particles and can be designed for cold extremes with HEPA-filtered cold clean rooms maintaining temperatures from -20°C to +40°C.

STANDARD FEATURES

- Clean room design standards from Class 100 to 100,000 (ISO 5 Grade B to ISO 8 Grade D)
- Modular metal skinned panels with urethane insulated tongue and groove construction for chamber enclosure, featuring smooth, non-shedding painted aluminum, galvanized steel, or stainless steel
- “Cam-locking” clean room panel seams sealed with Food and Drug Administration (FDA)-approved sealants for a smooth cleanable surface
- Internal stainless ceiling plenum housing mounted above lay-in tiles
- Totally accessible hinged drain pan for maintenance and cleaning of all interior plenum components
- PSC fan motors for energy efficiency, which are rated for operating temperatures and remoted from chamber interior when necessary
- Automatic defrosting with refrigerant hot gas and/or electric heat for quick and efficient operation
- Uniform horizontal and vertical air distribution through ducted terminal lay-in HEPA filters in aluminum housings or complete pressurized plenum ceiling
- Support achieved with anodized aluminum T-bar drop ceiling network
- All solid “filler” clean room tiles constructed of non-shedding acoustical material
- Perforated metal diffuser grills to protect terminal filter media
- Terminal filters provided with adjustable air-flow damper and static pressure port
- Stainless false wall air returns at floor level for ceiling plenums or air handlers
- Returns feature gross mesh or pleated filters within “ledge” free channels
- Sealed utility and sprinkler access penetrations
- Semi-hermetic, continually operating compressors for extended equipment life and increased control and uniformity
- Fully accessible control panel to efficiently and securely house all controls, alarms, and recording devices
- Touchscreen system control of chamber parameters
- Fluorescent clean-room style lay-in troffers or tear drop fixtures for chamber illumination
- Factory leak testing of all refrigeration assemblies prior to shipment
- Bench testing of complete control panel and electrical devices prior to shipment
- Applicable ISO listing 9001:2000 applies

**Infinitely
Precise.
Ultimately
Reliable.**

STRUCTURAL/ELECTRICAL OPTIONS

- Chamber panels including installation built to Factory Mutual 4880. (FM4880)
- Insulated panel finishes for walls and ceilings are embossed/smooth white galvanized steel and stainless steel. Available floor panel finishes are galvanized and stainless steel
- 4-20mA DC retransmission, RS 485, ethernet
- Control Panel certification built to CSA 22.2
- Controls such as Allen Bradley, Siemens, or others available as requested
- Complete 100-percent redundant control panel systems
- Electrical wiring to National Electric Code (NEC) standards for Class I Division I or II environments
- Maximum product security through dead-bolts or locking bars, and security locking mechanisms furnished with internal emergency relief
- Open wire free standing and top track shelving available
- Standard and custom shelving, casework, and chromatography support racking
- Heated Thermopane view window for door or wall panels
- Heated Access ports and pass throughs
- Surface mounted vapor proof duplex outlets, plug mold, or recessed outlets
- Vinyl floor mat runners in open areas or seamless floor covering over complete area
- Exterior/interior door ramps
- Emergency lighting systems

MECHANICAL OPTIONS

- Perforated Lexan ceiling designed to deliver low velocity air uniformly throughout the entire chamber
 - Approaches laminar flow
 - Lay-in tiles are prismatic for light diffusion
- Complete, stainless-steel finish for ceiling plenum and evaporator housing, including drain pan
- Copper, phenolic coil with coated evaporator-fin construction for corrosive environments
- Exhaust fans with stainless-steel filtered air intake or dampered connection ports for host building supply and return air
- Base level dehumidification with a proportional reheat package
- Extended range dehumidification by BES-developed and field-proven proportional air volume regenerative desiccant drier
- Extended range humidification by independent passivated stainless-steel steam generator, designed for pure water supply
- Point-of-use water purification systems for steam generator supply water
- Complete, 100-percent redundant backup refrigeration systems with automatic switch over
- Vertical wall plenum configuration for increased chamber loads requiring greater evaporator coil surface area typical of industrial applications
- Available designs for volumetric temperature uniformity down to $\pm 0.5^{\circ}\text{C}$
- Available designs for humidity control down to $\pm 3\%$ RH
- Conditioning packages designed to use chilled water systems in host building for chamber cooling
- Non-refrigerated cooling using building ventilation available for certain applications
- Hermetic compressor packages for low-capacity cooling applications.
- Remote air handlers to remove mechanical components from chamber interior and increase air volume
- Air returns designed to be integrated into the insulated room wall panels

