

SECTION 13036 (13 21 13)

CLEAN ROOMS - MODULAR

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\*\* NOTE TO SPECIFIER \*\* Terra Universal; Critical Environment Equipment.

This section is based on the products of Terra Universal, which is located at:

800 S. Raymond Ave.

Fullerton, CA 92831

Phone: 714-578-6000

Email: [info@TerraUniversal.com](https://arcat.com/rfi?action=email&company=Terra%2BUniversal%2C%2BInc.&message=RE%3A%20Spec%20Question%20(13036ter)%3A%20&coid=43448&spec=13036ter&rep=&fax=714-578-6020)..

Web: www.terrauniversal.com

[[Click Here](https://www.arcat.com/company/terra-universal-inc-43448)] for additional information.

Terra Universal is the leading manufacturing expert in critical environment applications with over 35 years of engineering and fabrication experience in controlled-environment applications including semi- conductor, aerospace, electronics, and R&D.

One-Stop Product Source - Terra manufactures and supplies comprehensive lines of critical environment solutions, including modular cleanrooms, pass-throughs, glove boxes, laminar flow benches/fume hoods, desiccators, and furnishings and supplies designed to meet rigorous cleanliness requirements.

Custom Engineering and Manufacturing - Staffed by experienced designers and critical-environment specialists, Terra remains dedicated to meeting the challenges that customers face today through advanced-technology engineering and state-of-the-art manufacturing techniques using a variety of cleanroom- and lab-compatible materials.

1. GENERAL
   1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. ISO air cleanliness ratings.
    2. BioSafe® modular cleanrooms with wall panel system.
    3. BioSafe® standalone wall panel system
    4. Custom hardwall modular cleanrooms.
    5. Custom softwall modular cleanrooms.
  1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. 13 20 00 - Clean Room Pass-Through Chambers.
    2. 23 41 33 - Cleanroom Filtration.
    3. 08 34 00 - Cleanroom Doors.
    4. 08 56 00 - Cleanroom Windows.
    5. Division 23 – HVAC; mechanical services and connections.
    6. Division 26 – Electrical; electrical power service and wiring connections.
  1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. ASTM International (ASTM).
    2. Current Good Manufacturing Practice (CGMPP): Regulations enforced by the FDA.
    3. FM Global (FM).
    4. Food and Drug Administration (FDA),
    5. Institute of Environmental Sciences and Technology (IEST).
    6. International Standards Organization (ISO):
       - 1. ISO 14644-1; Federal Standard 209E.
    7. Underwriters Laboratories (ULus): United States.
    8. Underwriters Laboratories Canada (cUL).
  1. SUBMITTALS
     1. Submit under provisions of Section 01 30 00.
     2. Product Data:
        1. Manufacturer's data sheets on each product to be used.
        2. Preparation instructions and recommendations.
        3. Storage and handling requirements and recommendations.
        4. Typical installation methods.

\*\* NOTE TO SPECIFIER \*\* Delete if not applicable to product type.

* + 1. Verification Samples: For each finished product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and finish.
    2. Manufacturer's Certificates: Certify products meet or exceed specified requirements.
    3. Shop Drawings: Include details of materials, construction, and finish. Include relationship with adjacent construction.
  1. QUALITY ASSURANCE
     1. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum of ten years documented experience.
     2. Installer Qualifications: Company specializing in performing Work of this section with minimum five years documented experience with projects of similar scope and complexity.
     3. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.
  2. PRE-INSTALLATION CONFERENCE
     1. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.
  3. DELIVERY, STORAGE, AND HANDLING
     1. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
     2. Protect from damage due to weather, excessive temperature, and construction operations.
  4. PROJECT CONDITIONS
     1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
  5. WARRANTY
     1. Manufacturer’s standard limited warranty unless indicated otherwise.

1. PRODUCTS
   1. MANUFACTURERS
      1. Acceptable Manufacturer: Terra Universal, which is located at: 800 S. Raymond Ave., Fullerton, CA 92831; Phone: 714-578-6000; Email: info@TerraUniversal.com; Web: www.terrauniversal.com.

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
    2. Requests for substitutions will be considered in accordance with the provisions of Section 01 60 00.

\*\* NOTE TO SPECIFIER \*\* Delete article not required.

* 1. ISO RATED AIR CLEANLINESS RATINGS

\*\* NOTE TO SPECIFIER \*\* Delete ISO Class designations aka ISO Air Cleanliness Rating not required.

* + 1. Class ISO 14644-1; Federal Standard 209E.
       1. Particle Concentration Designation Definitions:

\*\* NOTE TO SPECIFIER \*\* Delete the following particle concentration designations as required based on ISO Classifications chosen.

* + - * 1. Concentration limits are not applicable due to very high particle concentration.
        2. Sampling and statistical limitations for particles in low concentrations make classification inappropriate.
        3. Sample collection limitations for both particles in low concentrations and sizes greater than 1µm make classification at this particle size inappropriate, due to potential losses in the sampling system.
        4. n order to specify at this particle size in association with ISO Class 5, the macroparticle descriptor M may be adapted and used in conjunction with at least one other particle size.

\*\* NOTE TO SPECIFIER \*\* Applications: Automotive, Environmental Research, and Food Manufacturing. Delete cleanroom design options not required.

* + - 1. Air Cleanliness Rating: ISO 8 (Class 100,000):
         1. Maximum Particle Concentration per cu m: .1µm|.2µm|.3µm|.5µm|1µm|5µm:

c|c|c|3,520,000|832,000|29,300.

* + - * 1. Average Airflow Velocity: 1 to 8 fpm (0.005 to 0.041 mps).
        2. Air Changes per Hour: 5 to 48.
        3. Ceiling Coverage: 5 to 15 percent.
        4. Cleanroom Design: Hardwall.
        5. Cleanroom Design: Softwall.
        6. Cleanroom Design: BioSafe® Wall Panel System.

\*\* NOTE TO SPECIFIER \*\* Applications: Nutraceutical Development, Drug Compounding, and Cell Culture. Delete if not required. Delete cleanroom design options not required.

* + - 1. Air Cleanliness Rating: ISO 7 (Class 10,000):
         1. Maximum Particle Concentration per cu m; .1µm|.2µm|.3µm|.5µm|1µm|5µm:

*c*|*c*|*c*|352,000|83,200|2,930.

* + - * 1. Average Airflow Velocity: 10 to 15 fpm (0.051 to 0.076 mps).
        2. Air Changes per Hour: 60 to 90.
        3. Ceiling Coverage: 15 to 20 percent.
        4. Cleanroom Design: Hardwall.
        5. Cleanroom Design: Softwall.
        6. Cleanroom Design: BioSafe® Wall Panel System.

\*\* NOTE TO SPECIFIER \*\* Applications: Medical Devices, Life Science, Operating Rooms. Delete if not required. Delete cleanroom design option not required.

* + - 1. Air Cleanliness Rating: ISO 6 (Class 1,000):
         1. Maximum Particle Concentration per cu m; .1µm|.2µm|.3µm|.5µm|1µm|5µm:

1,000,000|*237,000*|102,000|35,200|8,320|293.

* + - * 1. Average Airflow Velocity: 25 to 40 fpm (0.127 to 0.203 mps).
        2. Air Changes per Hour: 150 to 240.
        3. Ceiling Coverage: 25 to 40 percent.
        4. Cleanroom Design: Hardwall.
        5. Cleanroom Design: Softwall.
        6. Cleanroom Design: BioSafe® Wall Panel System.

\*\* NOTE TO SPECIFIER \*\* Application: Nanofabrication, pharmaceutical Filling, and Optics. Delete if not required. Delete cleanroom design options not required.

* + - 1. Air Cleanliness Rating: ISO 5 (Class 100):
         1. Maximum Particle Concentration per cu m; .1µm|.2µm|.3µm|.5µm|1µm|5µm:

1,00,000|*23,700*|10,000|3,520|832|d, e, f.

* + - * 1. Average Airflow Velocity: 40 to 80 fpm (0.203 to 0.406 mps).
        2. Air Changes per Hour: 240 to 480.
        3. Ceiling Coverage: 35 to 70 percent.
        4. Cleanroom Design: Hardwall.
        5. Cleanroom Design: Softwall.
        6. Cleanroom Design: BioSafe® Wall Panel System.
        7. Cleanroom Design: BioSafe Steel.

\*\* NOTE TO SPECIFIER \*\* Application: Aerospace. Delete if not required. Delete cleanroom design option not required.

* + - 1. Air Cleanliness Rating: ISO 4 (Class 10).
         1. Maximum Particle Concentration per cu m; .1µm|.2µm|.3µm|.5µm|1µm|5µm:

10,000|*2,370*|1,020|352|83|d.

* + - * 1. Average Airflow Velocity: 50 to 90 fpm (0.254 to 0.457 mps).
        2. Air Changes per Hour: 300 to 540.
        3. Ceiling Coverage: 50 to 90 percent.
        4. Cleanroom Design: BioSafe® Wall Panel System.
        5. Cleanroom Design: BioSafe Steel.

\*\* NOTE TO SPECIFIER \*\* Application: Semiconductor, and Microelectronics. Delete cleanroom design option not required.

* + - 1. Air Cleanliness Rating: ISO 3 (Class 1):
         1. Maximum Particle Concentration per cu m; .1µm|.2µm|.3µm|.5µm|1µm|5µm:

1,000|*237*|102|35|d|e.

* + - * 1. Average Airflow Velocity: 60 to 90 fpm (0.305 to 0.457 mps).
        2. Air Changes per Hour: 360 to 540.
        3. Ceiling Coverage: 60 to 100 percent.
        4. Cleanroom Design: BioSafe® Wall Panel System.
        5. Cleanroom Design: BioSafe Steel.

\*\* NOTE TO SPECIFIER \*\* Delete Article not required.

* 1. BIOSAFE® MODULAR CLEANROOMS WITH WALL PANEL SYSTEM
     1. Basis of Design: BioSafe® Modular Cleanrooms with Wall Panel System as manufactured by Terra Universal. Fully integrated turnkey UL-listed cleanroom including wall panels, framing, and filtration. Solutions are not limited by overhead clearance, size, shape, or pathways within the site.

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + 1. Model: 6606-07. Dimensdions (WxDxH): 8 x 8 x 8 ft (2.438 x 2.438 x 2.438 m).
       1. Certified ISO Grade Design: ISO 5.
       2. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
    2. Mod++el: 6606-08. Dimensdions (WxDxH): 10 x 10 x 8 ft (3.048 x 3.048 x 2.438 m).
       1. Certified ISO Grade Design: ISO 5.
       2. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
    3. Model: 6606-09. Dimensdions (WxDxH): 12 x 12 x 8 ft (3.658 x 3.658 x 2.438 m).
       1. Certified ISO Grade Design: ISO 5.
       2. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
    4. Model: 6606-00. Dimensdions (WxDxH): \_\_ x \_\_ x \_\_ ft (\_\_ x \_\_ x \_\_ m).
       1. Certified ISO Grade Design: ISO 5.
       2. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
    5. Standards Compliance: ISO-14644, cGMP, GLP, ASTM and IEST requirements.
       1. cULus Listed, USA and Canada.
       2. FM approved.
    6. Product Characteristics:
       1. Design: Compliant with ISO-14644, GLP, ASTM, IEST, and CGMP grades A, B, C, and D requirements.
       2. Not limited by overhead clearance, size, shape, or pathways within the site.
       3. Operating Temperature: 140 degrees F (60 degrees C).
       4. Non-flammable.
       5. Resistant to corrosion, moisture, solvents, and disinfectants.
       6. Corner Pieces: Pre-formed and joint-free. No surface flashing or capping.
       7. Airtight Seamless Transitions: Between ceiling, walls, and floors.
       8. Monolithic, Flush Smooth Finish: There are to be no cracks or crevices where microbes may colonize.
       9. A level and flush interface between the walls and the finished floor.
          1. Panels are installed onto an adjustable height, recessed channel base.
    7. Wall Panels: Modular Pre-Fabricated.
       1. Adhere to ISO 14644-1 standard for ISO Class 5 and below environments.
          1. Panels Size (WxH): 4 x 8 ft (1.219 X 2.438 m). Panel Thickness: 2 inches (51 mm) nominal.
          2. Core Material: Aluminum honeycomb.

\*\* NOTE TO SPECIFIER \*\* The uPVC laminate finish ensures a fully flush surface that is robust, easy to clean, and resists common disinfectants, acids, and corrosives.

* + - * 1. Shell Material: uPVC-laminated galvanized steel. 26 ga.
        2. Sealed joints with cold welded seams.
        3. Panel Plenum Space: Houses utility and filling lines. Users to have convenient access to gas, vacuum and water connections, duplex outlets, control panels, and phone jacks.
      1. Cleanroom Windows:
         1. Standards Compliance: ISO 14644-1 and cGMP standards.
         2. Glazing: 0.5 inch thick tempered glass pane.
         3. Mounting: Flush to cleanroom wall.

Clamping design eliminates drilling and hardware.

* + - * 1. Window Type: Double-pane.
        2. BioSafe uPVC and stainless steel-framed systems. Eliminates crevices where microbes colonize.

\*\* NOTE TO SPECIFIER \*\* The following paragraphs are optional. Delete options not required.

* + - * 1. Fire-rated.
        2. Smart-glass.
      1. Modular Walkable Ceiling Systems: Accommodate easy access to equipment installed above the cleanroom and streamlined maintenance operations, such as HEPA filters change-outs.
         1. Maintains a flush, seamless surface for easy wipe-down or spray-down.

\*\* NOTE TO SPECIFIER \*\* Delete support system option not required.

* + - * 1. Support System: Self-Supported. Affix directly to facility flooring with minimal hardware.
        2. Support System: Suspended Turnbuckle Hanger Assembly: Eliminates need for a t-grid structure.
        3. Prefabricated Panels: Seamless wall-to-ceiling integrations.

Standards Compliance: cGMP, GLP, ISO 14664-1 and ASTM standards.

Cutouts: For HEPA-filtered fan units, lighting, sprinkler heads, video cameras, fire alarms, electrical drop, and gas penetrations.

* + - * 1. Panels Size (WxH): 4 x 8 ft (1.219 X 2.438 m).

Panel Thickness: 2 inches (51 mm) nominal.

Core Material: Aluminum honeycomb.

\*\* NOTE TO SPECIFIER \*\* The uPVC laminate finish ensures a fully flush surface that is robust, easy to clean, and resists common disinfectants, acids and corrosives. .

Shell Material: uPVC-laminated galvanized steel. 26 ga.

* + - 1. Cleanroom Lighting: LED panels.
         1. Standards Compliance: UL-listed, ISO-rated.
         2. LED Lights: For heat reduction and longer life spans.

\*\* NOTE TO SPECIFIER \*\* The remaining items are optional. Delete options not required.

* + - * 1. Color: White.
        2. Color: Amber.
        3. Color: Red.
        4. Color: Blue.
        5. Emergency Lights: LED, Battery-powered.
        6. Germicidal UV Lighting: For GMP and biologics applications.
        7. Teardrop: For ISO class 4 and 5 environments.
        8. Strip Lighting: For ISO class 4 and 5 environments.
      1. Cleanroom Doors: Pre-hung designs.
         1. Standards Compliance: cGMP, GLP, ASTM and ISO standards.

\*\* NOTE TO SPECIFIER \*\* Delete operation and door type options not required.

* + - * 1. Operation: Manual.
        2. Operation: Automatic.
        3. Door Type: Sliding.
        4. Door Type: Swing-out left.
        5. Door Type: Swing-out right.
        6. Door Type: Bi-parting.
        7. Door Type: Roll-up doors.
        8. Mounting: Flush to the cleanroom wall.
        9. Door Size: As determined from Manufacturer’s standard offerings.

\*\* NOTE TO SPECIFIER \*\* The remaining paragraphs are optional. Delete options not required.

* + - * 1. Fire-rated.
        2. Highspeed operation.
        3. Interlocking systems for GMP spaces.
        4. Hermetically-sealed for BSL-rated areas.
        5. Door Windows: Full length.
        6. Door Windows: Partial windows.
      1. Pass-Through Chambers: Rounded corners and autoclave-safe doors.

\*\* NOTE TO SPECIFIER \*\* Delete mounting options not required.

* + - * 1. Wall-mount. Install flush to the cleanroom wall.
        2. Floor-mount. Install flush to the cleanroom wall.
        3. Interlocks to prevent cross-room contamination.
        4. Seam System: Eliminate crevices where microbes colonize.

\*\* NOTE TO SPECIFIER \*\* The following paragraphs are optional. Delete options not required.

* + - * 1. HEPA Filtration.
        2. Refrigeration.
        3. UV Sterilization.
        4. Automatic, hands-free doors.
        5. Key Card Readers.
        6. Biometric Scanners.
      1. Filter Fan Units: Replaceable systems.
         1. Standards Compliance: UL-listed. ISO-rated. CE marked.

\*\* NOTE TO SPECIFIER \*\* Delete motor, unit and filter options not required.

* + - * 1. Unit Type: Room-side.
        2. Unit Type: Topside.
        3. Motor Type: Energy saving EC.
        4. Motor Type: AC motors.
        5. Filter Type: HEPA.
        6. Filter Type: ULPA.

\*\* NOTE TO SPECIFIER \*\* Delete paragraph if not required or delete configurations not required.

* + - 1. Specialty Configurations:
         1. Battery powered.
         2. Integrated LED light.
         3. Integrated ionizer.
         4. Explosion-proof (Class 1/ Division 1).
         5. Reverse flow.
         6. Laminar flow terminal diffusers.
         7. Low profile and narrow footprint designs.
         8. GMP-compliant stainless steel models.

\*\* NOTE TO SPECIFIER \*\* Delete audible alarm option if not required.

* + - 1. Audible Alarm: For filter replacement.
      2. UL-Listed Cleanroom Control System:
         1. Powers complete network of FFUs, lights, duplex outlets.
         2. Scalable, plug-and-play system completely eliminates hard wiring.
         3. Streamlines room permitting, compliance and certification.
         4. Optimizes cleanroom relocation, maintenance, and filter replacement.
         5. Supports rapid cleanroom installation for time-sensitive projects.
         6. Significant cost savings compared to standard, hard-wired systems.
  1. BIOSAFE® WALL PANEL SYSTEMS
     1. Wall Panel System: BioSafe as manufactured by Terral Universal. Prefabricated and demountable wall panels.
        1. Design Compliance: ISO-14644, cGMP, GLP, ASTM and IEST requirements.
        2. Solutions are not limited by overhead clearance, size, shape, or pathways within the site.
        3. Constructed from durable, GMP-rated materials resistant to scratches, corrosion, and common disinfectants such as Spor-Klenz, quaternary and phenolic cleaners.
        4. Cleanroom Leveling Mechanism compensates for small variations in floor level to eliminate need for unsightly floor shims.
     2. Wall System Model: 6606-50.
        1. Panel Material: uPVC laminated steel exterior.
        2. Core Material: Aluminum honeycomb.
        3. UL: N.
        4. Fire Rating: None.

\*\* NOTE TO SPECIFIER \*\* Delete ISO cerification options not required. ISO 5 is standard.

* + - 1. Certified ISO Grade Design: ISO 5.
      2. Certified ISO Grade Design: ISO 6.
      3. Certified ISO Grade Design: ISO 7.
      4. Certified ISO Grade Design: ISO 8.
    1. Wall System Model: 6606-52.
       1. Panel Material: uPVC laminated steel exterior.
       2. Core Material: EPS rigid foam.
       3. UL: N.
       4. Fire Rating: None.

\*\* NOTE TO SPECIFIER \*\* Delete ISO cerification options not required. ISO 5 is standard.

* + - 1. Certified ISO Grade Design: ISO 5.
      2. Certified ISO Grade Design: ISO 6.
      3. Certified ISO Grade Design: ISO 7.
      4. Certified ISO Grade Design: ISO 8.
    1. Wall System Model: 6606-53.
       1. Panel Material: 304 stainless steel.
       2. Core Material: Aluminum honeycomb.
       3. UL: N.
       4. Fire Rating: None.

\*\* NOTE TO SPECIFIER \*\* Delete ISO cerification options not required. ISO 5 is standard.

* + - 1. Certified ISO Grade Design: ISO 5.
      2. Certified ISO Grade Design: ISO 6.
      3. Certified ISO Grade Design: ISO 7.
      4. Certified ISO Grade Design: ISO 8.
    1. Wall System Model: 6606-54.
       1. Panel Material: 304 stainless steel.
       2. Core Material: EPS rigid foam.
       3. UL: N.
       4. Fire Rating: None.

\*\* NOTE TO SPECIFIER \*\* Delete ISO cerification options not required. ISO 5 is standard.

* + - 1. Certified ISO Grade Design: ISO 5.
      2. Certified ISO Grade Design: ISO 6.
      3. Certified ISO Grade Design: ISO 7.
      4. Certified ISO Grade Design: ISO 8.

\*\* NOTE TO SPECIFIER \*\* Delete wall panel systems options not required.

* + 1. Wall Panel System Options:
       1. Cleanroom Windows:
          1. Standards Compliance: ISO 14644-1 and cGMP standards.
          2. Glazing: 0.5 inch thick tempered glass pane.
          3. Mounting: Flush to cleanroom wall.

Clamping design eliminates drilling and hardware.

* + - * 1. Window Type: Double-pane.
        2. BioSafe uPVC and stainless steel-framed systems. Eliminates crevices where microbes colonize.
      1. Modular Walkable Ceiling Systems: Accommodate easy access to equipment installed above the cleanroom and streamlined maintenance operations, such as HEPA filters change-outs.
         1. Maintains a flush, seamless surface for easy wipe-down or spray-down.

\*\* NOTE TO SPECIFIER \*\* Delete support system option not required.

* + - * 1. Support System: Self-Supported. Affix directly to facility flooring with minimal hardware.
        2. Support System: Suspended Turnbuckle Hanger Assembly: Eliminates need for a t-grid structure.
        3. Prefabricated Ceiling Panels: Seamless wall-to-ceiling integrations.

Standards Compliance: cGMP, GLP, ISO 14664-1 and ASTM standards.

Cutouts: For HEPA-filtered fan units, lighting, sprinkler heads, video cameras, fire alarms, electrical drop, and gas penetrations.

* + - * 1. Panels Size (WxH): 4 x 8 ft (1.219 X 2.438 m).

Panel Thickness: 2 inches (51 mm) nominal.

Core Material: Aluminum honeycomb

\*\* NOTE TO SPECIFIER \*\* The uPVC laminate finish ensures a fully flush surface that is robust, easy to clean, and resists common disinfectants, acids and corrosives. .

Shell Material: uPVC-laminated galvanized steel. 26 ga.

* + - 1. Cleanroom Doors: Pre-hung designs.
         1. Standards Compliance: cGMP, GLP, ASTM and ISO standards.

\*\* NOTE TO SPECIFIER \*\* Delete operation and door type options not required.

* + - * 1. Operation: Manual.
        2. Operation: Automatic.
        3. Door Type: Sliding.
        4. Door Type: Swing-out left.
        5. Door Type: Swing-out right.
        6. Door Type: Bi-parting.
        7. Door Type: Roll-up doors.
        8. Mounting: Flush to the cleanroom wall.
        9. Door Size: As determined from Manufacturer’s standard offerings.

\*\* NOTE TO SPECIFIER \*\* The remaining paragraphs are optional. Delete options not required.

* + - * 1. Highspeed operation.
        2. Interlocking systems for GMP spaces.
        3. Hermetically-sealed for BSL-rated areas.
        4. Door Windows: Full length.
        5. Door Windows: Partial windows.
      1. Pass-Through Chambers: Rounded corners and autoclave-safe doors.

\*\* NOTE TO SPECIFIER \*\* Delete mounting options not required.

* + - * 1. Wall-mount. Install flush to the cleanroom wall.
        2. Floor-mount. Install flush to the cleanroom wall.
        3. Interlocks to prevent cross-room contamination.
        4. Seam System: Eliminate crevices where microbes colonize.

\*\* NOTE TO SPECIFIER \*\* The following paragraphs are optional. Delete options not required.

* + - * 1. HEPA Filtration.
        2. Refrigeration.
        3. UV Sterilization.
        4. Automatic, hands-free doors.
        5. Key Card Readers.
        6. Biometric Scanners.
  1. CUSTOM HARDWALL MODULAR CLEANROOMS
     1. Free-Standing Clean Rooms.
        1. Electrical Components: UL listed.
           1. UL Listing Declaration available for cleanroom electrical system.
           2. Control Panels: Stainless steel.

Separate power switches for lights, blowers, FFUs, included on control panel, along with pressure gauges.

\*\* NOTE TO SPECIFIER \*\* The following items are optional. Delete if not required.

Automated Fan Control System: Simplifies pressure balancing; logs cleanroom pressure, temperature, and humidity for complete environmental validation.

Seismic Analysis: Part Number 6600-98.

* + - 1. Modular Construction: Accommodates custom floor plans and equipment interfaces.
         1. Components are factory-assembled and tested before shipping.
         2. All-steel frames and ceiling grids. No external bracing.

Assembles with standard tools.

Frame: Interlocking 2 inch (51 mm) square powder-coated or stainless steel.

Ceiling Grid: 3 x 1.5 inch (76 x 38 mm) T-shaped joists, arranged to form 2 x 4 ft (0.610 x 1.219 m) ceiling bays.

* + - * 1. Standard Height: 7 ft (2.134 m). measured from filter face to floor; 8 ft 3 inches (2.515 m) with fan/filter unit. Fits beneath a standard 9 ft (2.743 m) ceiling. Other heights available.

Allow an additional 11 inches (279 mm) between the top of the FFUs and the ceiling or other overhead obstruction; a total of 24 inches (610 mm) between the cleanroom filter face and the surrounding facility ceiling.

\*\* NOTE TO SPECIFIER \*\* Delete mounting option not required.

* + - * 1. Wall Panel Mounting: Interior Flush Mount.
        2. Wall Panel Mounting: Center. Mount.
      1. Fan/Filter Units (FFU): HEPA or ULPA meeting ISO 5 (Class 100) cleanliness requirements.
      2. Power Distribution Modules (PDMs): 3 or 4 pin quick-connect fittings for addition of FFUs or light panels as needs require.
      3. LED Light Panels or T-Bar Mounted Strips: For cool, energy-efficient illumination.
         1. Accommodate any ceiling grid configuration.
      4. Panel Materials:

\*\* NOTE TO SPECIFIER \*\* Acrylic is damaged by alcohol and many other cleaning agents. Use only water and mild detergent. Acrylic also generates surface charges that attract and aggregate particles, leading to unpredictable contamination release; select Static-Dissipative PVC for critical static and cleanliness requirements. Delete materials options not required.

* + - * 1. Acrylic: Lightweight. High clarity/ Not for use with alcohol or other strong cleaning agents.

\*\* NOTE TO SPECIFIER \*\* Delete color options not required.

Color: Clear.

Color: Amber.

Color: Black.

* + - * 1. Static-dissipative PVC: Prevents static charges which attract and cause particles to cling to the wall surface; dissipative layers are molecularly embedded for longer useful life (Surface resistivity: 10^7 ohms/sq ft).
        2. Polycarbonate: Resists many common acids, solvents, and cleaning solutions; high tensile strength and shatter-resistant.
        3. Polypropylene: Provides superior resistance to acids and other harsh chemicals; opaque white for privacy.
        4. Tempered Glass: Combines visual clarity with broad chemical resistance and non-porous surfaces for easy sterilization.

\*\* NOTE TO SPECIFIER \*\* Delete model options not required. Then delete grade design options not required.

* + 1. Model: 6600-63B-SS.
       1. Dimensdions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
       2. Dimensions: As designated on the Drawings.
       3. Certified ISO Grade Design: ISO 5.
       4. Certified ISO Grade Design: ISO 6.
       5. Certified ISO Grade Design: ISO 7.
       6. Certified ISO Grade Design: ISO 8.
       7. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
       8. Frame Material: 304 stainless steel.
       9. Panel Material: Clear acrylic.
       10. Wall Type: Interior flush mount.
    2. Model: 6600-64A-SS.
       1. Dimensdions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
       2. Dimensions: As designated on the Drawings.
       3. Certified ISO Grade Design: ISO 5.
       4. Certified ISO Grade Design: ISO 6.
       5. Certified ISO Grade Design: ISO 7.
       6. Certified ISO Grade Design: ISO 8.
       7. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
       8. Frame Material: 304 stainless steel.
       9. Panel Material: Polycarbonate.
       10. Wall Type: Center mount.
    3. Model: 6600-64B-SS.
       1. Dimensdions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
       2. Dimensions: As designated on the Drawings.
       3. Certified ISO Grade Design: ISO 5.
       4. Certified ISO Grade Design: ISO 6.
       5. Certified ISO Grade Design: ISO 7.
       6. Certified ISO Grade Design: ISO 8.
       7. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
       8. Frame Material: 304 stainless steel.
       9. Panel Material: Polycarbonate.
       10. Wall Type: Interior flush mount.
    4. Model: 6600-69A-SS.
       1. Dimensdions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
       2. Dimensions: As designated on the Drawings.
       3. Certified ISO Grade Design: ISO 5.
       4. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
       5. Frame Material: 304 stainless steel.
       6. Panel Material: Tempered glass.
       7. Wall Type: Center mount.
    5. Model: 6600-69B-SS.
       1. Dimensdions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
       2. Dimensions: As designated on the Drawings.
       3. Certified ISO Grade Design: ISO 5.
       4. Certified ISO Grade Design: ISO 6.
       5. Certified ISO Grade Design: ISO 7.
       6. Certified ISO Grade Design: ISO 8.
       7. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
       8. Frame Material: 304 stainless steel.
       9. Panel Material: Tempered glass.
       10. Wall Type: Interior flush mount.
    6. Model: 6600-68A-SS.
       1. Dimensdions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
       2. Dimensions: As designated on the Drawings.
       3. Certified ISO Grade Design: ISO 5.
       4. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
       5. Frame Material: 304 stainless steel.
       6. Panel Material: Polypropylene.
       7. Wall Type: Center mount.
    7. Model: 6600-68B-SS.
       1. Dimensdions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
       2. Dimensions: As designated on the Drawings.
       3. Certified ISO Grade Design: ISO 5.
       4. Certified ISO Grade Design: ISO 6.
       5. Certified ISO Grade Design: ISO 7.
       6. Certified ISO Grade Design: ISO 8.
       7. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
       8. Frame Material: 304 stainless steel.
       9. Panel Material: Polypropylene.
       10. Wall Type: Interior flush mount.
    8. Model: 6600-73A-SS.
       1. Dimensdions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
       2. Dimensions: As designated on the Drawings.
       3. Certified ISO Grade Design: ISO 5.
       4. Certified ISO Grade Design: ISO 6.
       5. Certified ISO Grade Design: ISO 7.
       6. Certified ISO Grade Design: ISO 8.
       7. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
       8. Frame Material: 304 stainless steel.
       9. Panel Material: Static-Dissipative PVC.
       10. Wall Type: Center mount.
    9. Model: 6600-73B-SS.
       1. Dimensdions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
       2. Dimensions: As designated on the Drawings.
       3. Certified ISO Grade Design: ISO 5.
       4. Certified ISO Grade Design: ISO 6.
       5. Certified ISO Grade Design: ISO 7.
       6. Certified ISO Grade Design: ISO 8.
       7. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
       8. Frame Material: 304 stainless steel.
       9. Panel Material: Static-Dissipative PVC.
       10. Wall Type: Interior flush mount.
    10. Model: 6600-73A-4910.
        1. Dimensdions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
        2. Dimensions: As designated on the Drawings.
        3. Certified ISO Grade Design: ISO 5.
        4. Certified ISO Grade Design: ISO 6.
        5. Certified ISO Grade Design: ISO 7.
        6. Certified ISO Grade Design: ISO 8.
        7. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
        8. Frame Material: Power-coated teel.
        9. Panel Material: CDPVC.
        10. Wall Type: Interior flush mount.
    11. Model: 6600-73-4910.
        1. Dimensdions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
        2. Dimensions: As designated on the Drawings.
        3. Certified ISO Grade Design: ISO 5.
        4. Certified ISO Grade Design: ISO 6.
        5. Certified ISO Grade Design: ISO 7.
        6. Certified ISO Grade Design: ISO 8.
        7. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
        8. Frame Material: Power-coated steel.
        9. Panel Material: CDPVC.
        10. Wall Type: Center mount.
    12. Model: 6600-63A.
        1. Dimensdions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
        2. Dimensions: As designated on the Drawings.
        3. Certified ISO Grade Design: ISO 5.
        4. Certified ISO Grade Design: ISO 6.
        5. Certified ISO Grade Design: ISO 7.
        6. Certified ISO Grade Design: ISO 8.
        7. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
        8. Frame Material: Power-coated stainless steel.
        9. Panel Material: Clear Acrylic.
        10. Wall Type: Center mount.
    13. Model: 6600-63B.
        1. Dimensdions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
        2. Dimensions: As designated on the Drawings.
        3. Certified ISO Grade Design: ISO 5.
        4. Certified ISO Grade Design: ISO 6.
        5. Certified ISO Grade Design: ISO 7.
        6. Certified ISO Grade Design: ISO 8.
        7. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
        8. Frame Material: Power-coated steel.
        9. Panel Material: Clear Acrylic.
        10. Wall Type: Interior flush mount.
    14. Model: 6600-64A.
        1. Dimensdions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
        2. Dimensions: As designated on the Drawings.
        3. Certified ISO Grade Design: ISO 5.
        4. Certified ISO Grade Design: ISO 6.
        5. Certified ISO Grade Design: ISO 7.
        6. Certified ISO Grade Design: ISO 8.
        7. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
        8. Frame Material: Power-coated steel.
        9. Panel Material: Polycarbonate.
        10. Wall Type: Center mount.
    15. Model: 6600-64B.
        1. Dimensdions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
        2. Dimensions: As designated on the Drawings.
        3. Certified ISO Grade Design: ISO 5.
        4. Certified ISO Grade Design: ISO 6.
        5. Certified ISO Grade Design: ISO 7.
        6. Certified ISO Grade Design: ISO 8.
        7. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
        8. Frame Material: Power-coated steel.
        9. Panel Material: Polycarbonate.
        10. Wall Type: Interior flush mount.
    16. Model: 6600-69A.
        1. Dimensdions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
        2. Dimensions: As designated on the Drawings.
        3. Certified ISO Grade Design: ISO 5.
        4. Certified ISO Grade Design: ISO 6.
        5. Certified ISO Grade Design: ISO 7.
        6. Certified ISO Grade Design: ISO 8.
        7. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
        8. Frame Material: Power-coated steel.
        9. Panel Material: Tempered glass.
        10. Wall Type: Center mount.
    17. Model: 6600-69B.
        1. Dimensdions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
        2. Dimensions: As designated on the Drawings.
        3. Certified ISO Grade Design: ISO 5.
        4. Certified ISO Grade Design: ISO 6.
        5. Certified ISO Grade Design: ISO 7.
        6. Certified ISO Grade Design: ISO 8.
        7. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
        8. Frame Material: Power-coated steel.
        9. Panel Material: Tempered glass.
        10. Wall Type: Interior flush mount.
    18. Model: 6600-68A-4910.
        1. Dimensdions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
        2. Dimensions: As designated on the Drawings.
        3. Certified ISO Grade Design: ISO 5.
        4. Certified ISO Grade Design: ISO 6.
        5. Certified ISO Grade Design: ISO 7.
        6. Certified ISO Grade Design: ISO 8.
        7. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
        8. Frame Material: Power-coated steel.
        9. Panel Material: White Polypropylene.
        10. Wall Type: Interior flush mount.
    19. Model: 6600-68-4910.
        1. Dimensdions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
        2. Dimensions: As designated on the Drawings.
        3. Certified ISO Grade Design: ISO 5,
        4. Certified ISO Grade Design: ISO 6.
        5. Certified ISO Grade Design: ISO 7.
        6. Certified ISO Grade Design: ISO 8.
        7. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
        8. Frame Material: Power-coated steel.
        9. Panel Material: White Polypropylene.
        10. Wall Type: Center mount.
    20. Model: 6600-68A.
        1. Dimensdions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
        2. Dimensions: As designated on the Drawings.
        3. Certified ISO Grade Design: ISO 5.
        4. Certified ISO Grade Design: ISO 6.
        5. Certified ISO Grade Design: ISO 7.
        6. Certified ISO Grade Design: ISO 8.
        7. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
        8. Frame Material: Power-coated steel.
        9. Panel Material: Polypropylene.
        10. Wall Type: Center mount.
    21. Model: 6600-68B.
        1. Dimensdions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
        2. Dimensions: As designated on the Drawings.
        3. Certified ISO Grade Design: ISO 5.
        4. Certified ISO Grade Design: ISO 6.
        5. Certified ISO Grade Design: ISO 7.
        6. Certified ISO Grade Design: ISO 8.
        7. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
        8. Frame Material: Power-coated steel.
        9. Panel Material: Polypropylene.
        10. Wall Type: Interior flush mount.
    22. Model: 6600-73A.
        1. Dimensdions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
        2. Dimensions: As designated on the Drawings.
        3. Certified ISO Grade Design: ISO 5.
        4. Certified ISO Grade Design: ISO 6.
        5. Certified ISO Grade Design: ISO 7.
        6. Certified ISO Grade Design: ISO 8.
        7. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
        8. Frame Material: Power-coated steel.
        9. Panel Material: Static Dissipative PVC.
        10. Wall Type: Center mount.
    23. Model: 6600-73B.
        1. Dimensdions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
        2. Dimensions: As designated on the Drawings.
        3. Certified ISO Grade Design: ISO 5.
        4. Certified ISO Grade Design: ISO 6.
        5. Certified ISO Grade Design: ISO 7.
        6. Certified ISO Grade Design: ISO 8.
        7. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
        8. Frame Material: Power-coated steel.
        9. Panel Material: Static Dissipative PVC.
        10. Wall Type: Interior flush mount.
    24. Standard Features:
        1. Status Indicator:
           1. When FFUs are Operational: Indicator lights are on.
           2. When FFUs are Not Operational: Indicator lights flash.
        2. Fan Filter Unit: As specified in Section 23 41 33 - Cleanroom Filtration.

\*\* NOTE TO SPECIFIER \*\* Delete filtration type option not required.

* + - * 1. Filtration Type: HEPA.
        2. Filtration Type: ULPA.
      1. LED Panels:
      2. Control Panel: Includes temperature, pressure and relative humidity gauges and other selected instruments.
      3. Door Design: As specified in Section 08 34 00 - Cleanroom Doors

\*\* NOTE TO SPECIFIER \*\* Delete door options not required.

* + - * 1. Material: Stainless steel.
        2. Material: Aluminum.
        3. Type: Swinging.
        4. Type: Sliding.
        5. Operation: Manual.
        6. Operation: Electronic.
      1. Steel Supports

\*\* NOTE TO SPECIFIER \*\* The remaining items are optional. Delete options not required.

The following comprises the most common options. The Manufacturer has a huge catalog of accessories and optional equipment available to meet your unique requirements

* + - 1. Night Service setting.
      2. Pass-Through Chambers. As specified in Section 13 20 00 - Clean Room Pass-Through Chambers.
      3. Air Conditioning.
      4. Air locks.
      5. Antechambers.
      6. Vacuum.
      7. Airflow and pressure gauges.
      8. Seismic codes.
      9. DI water and gas utilities.

\*\* NOTE TO SPECIFIER \*\* Delete accessories options not required.

* + 1. Accessories:
       1. BioSafe Hygienic Stainless Steel Crash Rails: Continuous-seam welds for a smooth finish.
       2. Lighthouse Handheld Airborne Particle Counters: For accurate readings of cleanrooms and critical environments. ISO 7: 6 Channels.
          1. Model: 1510-59.

Detection Range: 0.2 - 2.0 micrometer.

Counting Efficiency:

50 percent at 0.2 micrometer.

100 percent at greater than 0.3 micrometer.

* + - * 1. Model: 1510-62.

Detection Range: 0.3 - 10 micrometer.

Counting Efficiency:

50 percent at 0.3 micrometer.

100 percent at greater than 0.45 micrometer.

* + - * 1. Model: 1510-60.

Detection Range: 0.3 - 25 micrometer.

Counting Efficiency:

50 percent at 0.3 micrometer.

100 percent at greater than 0.45 micrometer.

* + - * 1. Model: 1510-61.

Detection Range: 0.5- 25.0 micrometer.

Counting Efficiency:

50 percent at 0.5 micrometer.

100 percent at greater than 0.75 micrometer.

* + - 1. Germicidal UV-C Lamp: Sanitizes labs and cleanrooms. Installs on a ceiling grid for line-of-sight room disinfection. Safety occupancy sensor prevents personnel exposure.
      2. WhisperFlow Cleanroom Fan Filter Units: Internal baffling and aluminum diffuser provide quiet operation along with uniform air speed for ISO-compliant laminar flow.
      3. Wall-Mounted Benches: Mounts to cleanroom’s frame uprights. Can be used as an adjustable bench, shelf, or countertop.
      4. HEPA Fan Filter Unit with Integrated LED Light and Ionizer: Provides HEPA filtered air and neutralization of static charges. Eliminates hard-to-clean, exposed light fixture and ion bar. Includes internal baffling plate and diffuser panel.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required, or delete model not required, then dimensions and grade design options not required.

* 1. CUSTOM SOFTWALL MODULAR CLEANROOMS
     1. Model: 6600-61.
        1. Dimensions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
        2. Dimensions: As designated on the Drawings.
        3. Certified ISO Grade Design: ISO 6.
        4. Certified ISO Grade Design: ISO 7.
        5. Certified ISO Grade Design: ISO 8.
        6. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
        7. Frame Material: 304 stainless steel.
     2. Model: 6600-60.
        1. Dimensions (WxDxH): \_\_\_ X \_\_\_ X \_\_\_ ft (\_\_\_ X \_\_\_ X \_\_\_ m).
        2. Dimensions: As designated on the Drawings.
        3. Certified ISO Grade Design: ISO 6.
        4. Certified ISO Grade Design: ISO 7.
        5. Certified ISO Grade Design: ISO 8.
        6. ISO Air Cleanliness Rating: \_\_\_\_\_\_\_\_.
        7. Frame Material: Powder-coated steel.
     3. Product Details
        1. Electrical Components: UL listed.
        2. ISO-classified enclosed space for clean manufacturing under HEPA-filtered airflow.
        3. Fully free-standing.
        4. Components are factory-assembled and tested before shipping.
        5. Frame: Interlocking 2.5 inch (63.5 mm) steel frame with corner gussets for rigidity.
           1. Ceiling grid supports fan/filter units and LED light panels.
           2. Configure ceiling grid with lights and fan/filters to meet ISO 5 - 8 particle requirements.
           3. Unused Ceiling Bays: Polypropylene panels.
        6. Softwall Panels: Heavy-duty, blur-free 40-mil static-dissipative vinyl for tear resistance.
           1. Where two panels meet, the panels are to overlap by 2 inches (51 mm).
           2. Panel Seams: Can be fastened closed.

\*\* NOTE TO SPECIFIER \*\* Delete fastening system option not required.

Fastening System: Dual-Lock, magnetic closures.

Fastening System: Attachment clips.

* + - 1. Strip Shields: 60 mil dissipative vinyl, come standard in 8 inch (203 mm) widths, with 2 inch (51 mm) overlap to form a convenient entryway.
      2. Strip Shields: 40 mil thick polyurethane, 12 inches (305 mm) wide,
      3. Airflow: Exhausts through the gap along the bottom of the vinyl curtains; cannot hold pressure.
      4. Status Indicator Lights: Glow solid to indicate FFUs are operational; flash when FFUs are off.
      5. HEPA Fan/Filter units: 2 x 4 ft (0.610 x 1.219 m). Ceiling-mounted. Up to 805 cfm of micro-filtered air; 99.99 percent efficient at 0.3 micron particles.
         1. Fan Unit Motors: Rated for 5 years of continuous 24/7 operation if HEPA filters are consistently replaced.

\*\* NOTE TO SPECIFIER \*\* The following is optional. Delete if not required.

* + - * 1. Audible and visual filter replacement alarm system.
      1. LED Light Panels: 2 x 4 ft (0.610 x 1.219 m). 4500 lumens of cool, energy-efficient illumination.

\*\* NOTE TO SPECIFIER \*\* Strip lights are optional. Delete if not required.

* + - 1. Strip Lights: Mount to T-bar between fan/filter units.
      2. Standard Control Panel: Separate switches for FFUs and lights.
      3. Standard Height: 7 ft (2.134 m), measured from filter face to floor; suitable for installation under standard 9 ft (2.743 m) ceilings. Other heights are available.
         1. Allow 11 inches (279 mm) or more of overhead clearance between the top of the FFUs and the ceiling for sufficient airflow.

\*\* NOTE TO SPECIFIER \*\* The remaining items are optional. Delete options not required.

* + - 1. Heavy-Duty Cleanroom Grade Locking Casters: Allows repositioning of unit.
         1. Stainless steel swivel casters with non-shedding polyurethane wheels.
      2. Night Service Mode: Operates FFUs at reduced speed for 25 percent energy usage reduction.
      3. Vacuum.
      4. DI water and gas utilities.

\*\* NOTE TO SPECIFIER \*\* Delete accessories not required.

* + 1. Accessories:
       1. Lighthouse Handheld Airborne Particle Counters: For accurate readings of cleanrooms and critical environments. ISO 7: 6 Channels.
          1. Model: 1510-59.

Detection Range: 0.2 - 2.0 micrometer.

Counting Efficiency:

50 percent at 0.2 micrometer.

100 percent at greater than 0.3 micrometer.

* + - * 1. Model: 1510-62.

Detection Range: 0.3 - 10 micrometer.

Counting Efficiency:

50 percent at 0.3 micrometer.

100 percent at greater than 0.45 micrometer.

* + - * 1. Model: 1510-60.

Detection Range: 0.3 - 25 micrometer.

Counting Efficiency:

50 percent at 0.3 micrometer.

100 percent at greater than 0.45 micrometer.

* + - * 1. Model: 1510-61.

Detection Range: 0.5 - 25.0 micrometer.

Counting Efficiency:

50 percent at 0.5 micrometer.

100 percent at greater than 0.75 micrometer.

* + - 1. Germicidal UV-C Lamp: Sanitizes labs and cleanrooms. Installs on a ceiling grid for line-of-sight room disinfection. Safety occupancy sensor prevents personnel exposure.
      2. WhisperFlow Cleanroom Fan Filter Units: Internal baffling and aluminum diffuser provide quiet operation along with uniform air speed for ISO-compliant laminar flow.
      3. HEPA Fan Filter Unit with Integrated LED Light and Ionizer: Provides HEPA filtered air and neutralization of static charges. Eliminates hard-to-clean, exposed light fixture and ion bar. Includes internal baffling plate and diffuser panel.

1. EXECUTION.
   1. EXAMINATION
      1. Do not begin installation until the substrates have been properly constructed and prepared.
      2. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.
   2. PREPARATION
      1. Clean surfaces thoroughly prior to installation.
      2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
   3. INSTALLATION
      1. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.
   4. FIELD QUALITY CONTROL
      1. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

\*\* NOTE TO SPECIFIER \*\* Include if manufacturer provides field quality control with onsite personnel for instruction or supervision of product installation, application, erection, or construction. Delete if not required.

* + 1. Manufacturer’s Services: Coordinate manufacturer’s services in accordance with appropriate sections in Division 01.
  1. CLEANING AND PROTECTION
     1. Clean products in accordance with the manufacturers recommendations.
     2. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION