Installation Guide

Explosion Proof Softwall Cleanroom

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Your Comprehensive Equipment Source

- Particle Filtration
- Laminar Flow Control
- Ultra-Pure Water

- Temperature Control
- Biohazard Containment
- Sterilization

- Static Control
- Chemical Vapor Removal
- Anti-Microbial Treatments

- Vibration Isolation
- Ergonomics
- Process Gas Generation

- Humidification/Dehumidification
- Vacuum Control
- Exhaust Fume Ventilation
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IMPORTANT SAFETY NOTICE

Terra Universal cleanrooms are not designed to support more weight than the blower modules and lighting fixtures originally installed. Ceiling grid beams are not load-bearing and will not support personnel or other additional loads. Placing added weight on the ceiling grid may result in serious damage to the cleanroom and its occupants.

Safety notices supplied by Terra Universal must be affixed prominently on each side of the cleanroom grid.

1.0 Description

Terra Universal’s Explosion-Proof Softwall Modular Cleanrooms provide an economical, versatile solution to clean manufacturing requirements in many industries. Portable, expandable, and easy to assemble/disassemble, this system features ceiling HEPA fan filter units that direct a continuous flow of particle-free air through the enclosure. It is completely free standing and requires no external bracing.

Modular Frame and Ceiling Grid

This system consists of a steel support frame, ceiling mounted filtration and illumination system, flexible side panels and a variety of other access options.

The softwall cleanroom support frame is fabricated of interlocking 2.5” powder-coated square steel or stainless steel uprights, cross sections, and ceiling members.

Ceiling members are connected to steel T-bars, forming the ceiling bays that support filters and lights. Corner reinforcement gussets ensure a rigid structure. Optional heavy-duty casters allow easy repositioning after installation. Standard height is seven feet measured from filter face to floor (8’ 3” overall), allowing installation below a standard nine foot ceiling. Custom ceiling heights up to ten feet are available. System includes a control panel for operation of fan filter units, lights, and other selected options.
Explosion-Proof Fan/Filter Units

Terra’s Explosion-Proof WhisperFlow™ Fan/Filter Unit is UL-listed for safe operation in Class I or Class II, Division 1 as specified by the National Electrical Code (NEC).

The non-sparking, ¼ HP direct-drive motor is mounted in a cast-iron, explosion-proof housing and powers the 700 CFM-rated impeller blower (rated at 90 FPM with filter load). A HEPA (high efficiency particulate air) filter installed inside the housing is rated 99.99% efficient at 0.3um particles. The filtration medium consists of micro porous polyurethane mini-pleats held in place by strong, rigid plastic separators that keep the medium from nesting. This design channels airflow with optimal efficiency to reduce resistance. The filter is sealed into the sturdy powder-coated steel frame with a fire-retardant, non-outgassing adhesive. On an optional basis, an ULPA (ultra-low penetration air) filter, rated 99.9995% efficient at 0.12um particles, may be substituted for the HEPA filter. Power to the Fan Filter Units is controlled by a master ON/OFF switch located on the cleanroom control panel. All 120VAC units and 220VAC, 60Hz units are UL listed. CE-marked models are available for 220VAC, 50Hz operations.

For more information, refer to the Explosion-Proof Fan/Filter Unit Quick-Start Operating Guide: Doc. 1800-99

Model: Explosion-Proof RSR WhisperFlow Fan/Filter Unit

Recommended Fan Filter Configurations (based on ceiling height of 8 feet or less)

<table>
<thead>
<tr>
<th>Nominal Dimensions</th>
<th>No. of Ceiling Bays</th>
<th>No. of Filter Modules to meet Fed Std 209 Class Standards</th>
<th>1</th>
<th>10</th>
<th>100</th>
<th>1,000</th>
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Recommended Fan Filter Configurations (8 ft. ceiling height)

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<tr>
<th>Nominal Dimensions</th>
<th>No. of Ceiling Bays</th>
<th>No. of Filter Modules to meet Fed Std 209 Class Standards</th>
<th>1</th>
<th>10</th>
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Explosion-Proof RSR WhisperFlow Fan/Filter Unit: Airflow and Electrical Specifications (120V)

<table>
<thead>
<tr>
<th>Model</th>
<th>Nominal Dimensions*</th>
<th>Avg. CFM (m³/h)</th>
<th>Airflow ft./min (m/s)</th>
<th>Run Amps (Watts) @ 60Hz</th>
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<tr>
<td>2 x 4</td>
<td>23.72 x 47.63 x 19.86 (603 x 1210 x 504)</td>
<td>717 (1218)</td>
<td>102 (0.51)</td>
<td>6.8A (816W)</td>
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<td>2 x 3</td>
<td>23.72 x 35.63 x 19.86 (603 x 905 x 504)</td>
<td>602 (1023)</td>
<td>116 (0.59)</td>
<td>6.8A (816W)</td>
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<tr>
<td>2 x 2</td>
<td>23.72 x 23.63 x 19.86 (603 x 600 x 504)</td>
<td>558 (948)</td>
<td>166 (0.84)</td>
<td>6.8A (816W)</td>
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* With pre-filter installed.
Explosion-Proof LED Light Module

Each Explosion-Proof LED light fixture is externally mounted to ensure effective illumination of the work area without interfering with the controlled air stream. Units are UL-listed for Class I, Divisions 1 & 2, Groups C & D areas. Each module produces 3,600 lumens and is controlled by a master switch mounted on the main Cleanroom Control Panel. The housing is designed to dissipate heat, increasing the efficiency and lifespan of the LEDs.

Cat. # 3800-46
Power Requirements
USA: 120VAC, 50/60Hz, 40W
International: 277VAC, 50/60Hz, 40W

Blank Ceiling Panels

All remaining ceiling grids are covered with blank panels, which can be removed to allow installation of additional fan filter units or illuminator modules. Panels are made of white polypropylene, acrylic or steel depending on customer selection. All ceiling modules rest against the ceiling grid frame to form a tight seal along the perimeters.

Softwall Panels & Strip Shields

Softwall panels are fabricated of heavy-duty, blur-free 40 mil vinyl or polyurethane—double the industry standard—ensuring enhanced tear resistance and eliminating the need for unsightly sewn sash weights. Strip shields, made of 60-mil material, come standard in 8” widths, with 2” overlap, for easy entrance or exiting. Polyurethane shields are 12” wide and 40 mil thick.

Panels and strips are available in three materials, in either clear or frosted appearance.

- Cleanroom-Grade Vinyl is fire retardant and low outgassing
- Static-Dissipative Vinyl is manufactured with permanent built in static inhibitors that unlike topical treatments, will not wear off.
- Non-outgassing panels are made from inherently static-dissipative polyurethane that provides permanent, humidity-independent ESD protection for sensitive manufacturing conditions. Polyurethane contains no plasticizer, making it virtually non-outgassing.

Note: Softwall panels are notched to ensure a snug fit at all corners. In standard installations, panels are supplied in lengths of four feet. Where two panels meet, the panels overlap by 6”. To prevent personnel from parting panels at these seams, order optional panel seaming, Dual-Lock Velcro, magnetic closures or attachment clips below.

<table>
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<tr>
<th>Panel Options</th>
<th>Cat. #</th>
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<tbody>
<tr>
<td>Dual – Lock Velcro Strips</td>
<td>6704-05</td>
</tr>
<tr>
<td>Flexible Magnet Strip Self-Closures</td>
<td>6704-06</td>
</tr>
<tr>
<td>Snap – Tite™ Clips</td>
<td>6704-07</td>
</tr>
<tr>
<td>Curtain Seaming</td>
<td>6600-65</td>
</tr>
</tbody>
</table>
Casters

Stainless steel swivel casters feature non-shedding polyurethane wheels. Capacity: 300 lbs. each. Order one per vertical post. Casters raise the frame 7.125". If casters are ordered, the frame will be made shorter to keep the floor to filter face dimension to specification. Order one per vertical post.

Cat. # 6704-08

Caution: Casters are intended to allow movement only on smooth floors and require that personnel support each cleanroom upright during motion.

2.0 Unpacking & Installation

Unpack all system components and check for damaged. Any damage should be reported to the shipping company immediately.

Site Preparation

A. Site preparation requirements should be observed for any installation performed by Terra Universal technicians.

B. Customer facility area where the cleanroom is to be installed must afford a minimum clearance of one foot (including fixtures ducts and pipes) on all sides and at least two feet clearance between FFU inlet and ceiling.

C. Customers must provide permanent electrical connection from supply panel to Terra Cleanroom electrical junction boxes (one power line per junction box) in conformance with local electrical code, as well as any vacuum, air, H2O, sprinkler, or nitrogen connections required for the cleanroom.

D. Customers must give advance notice of dates and times for Terra personnel to perform the installation. Short notice may result in higher fees for travel and accommodations.

E. Customers are to provide utilities, installation power and removal of any packing material.

F. Because installation requires unpacking and assembling components, customers are to ensure an adequate staging area for parts and equipment adjacent to the assembly area, clear and ready for work.

G. Customers are to inform Terra Universal in advance of any requirements for security, escorts, special training, badges, work hours, parking areas or special identification and how to obtain all such required permissions and related items.

Required Installation Equipment

A. Handling cleanroom shipping crates, which generally measure over 300" long and weigh well over 1,000 pounds, requires at least one forklift. If crates must be moved through narrow aisles or entrances, two forklifts or pallet jacks are recommended, one to support each end.

B. Unloading crates from the truck is much easier if you have a truck-high loading dock. Without such a dock, you will need at least one forklift and a support to brace one end while the forklift is positioned beneath the center of each crate. Several men are required to unload individual components from the crates.

C. You'll need heavy rubber hammers, good portable drills/screwdrivers, measure tapes (to make sure everything's square) and six to ten 11" locking C-Clamps used to hold beams in place as you insert fasteners. Another tool that will be needed is an 8" – 12" shaft extension for the screwdriver bits (to drive screws in narrow gaps between parts).
Component List / Drawings

The list includes the basic cleanroom components. Quantities vary based on the specifications of each particular unit.

Frame Members and Supports
Ceiling “T” Joists numerically labeled to facilitate installation (see installation note below)
Trim Strips and Grip Track
Explosion-Proof Control Switches
Explosion-Proof Power Distribution Module(s)
Explosion-Proof LED lighting
Explosion-Proof Fan/filter units
Explosion-Proof Junction boxes and wiring conduit

Component Description

<table>
<thead>
<tr>
<th>PICTURE</th>
<th>USED FOR</th>
<th>DESCRIPTION</th>
</tr>
</thead>
</table>
| ![Frame](frame.png) | Frame | Black 3/8” X ½ Allen Screw  
Socket Set Cone Point |
| ![Bar Support](bar_support.png) | Bar Support, Gussets (Corner Supports), Joists, Trim Strips, Grip Track | Screw SS # 12 X ¾” HEX Self Drilling |
| ![Bit for Joist](bit_for_joist.png) | Bit for Joist | Drill Bit, 5/16” Magnetic |
| ![Used for Black 3 / 8 Allen Screw](used_for_black.png) | Used for Black 3 / 8 Allen Screw | Allen Hex Key |
| ![Ceiling Panels (1-Sided)](ceiling_panels_1-sided.png) | Ceiling Panels (1-Sided) | Clip 1-Arm Ceiling |
| ![Ceiling Panels (2-Sided)](ceiling_panels_2-sided.png) | Ceiling Panels (2-Sided) | Clip 2-Arm Ceiling |
Frame Components

- Support Bar
- Center Post
- Middle Connector
- Corner Post
- Joist
- Joist Divider
- Gusset
- Grip - Track
Installing the Support Frame:

**Installation Note:** Before beginning installation of the support frame, familiarize yourself with the placement of the frame members and ceiling “T” joists by referring to the custom drawings attached to this manual.

**IMPORTANT SAFETY NOTICE**

Terra Universal Cleanrooms are not designed to support more weight than the blower modules and lighting fixtures originally installed. In particular, the ceiling grid beams are not load bearing and will not support personnel or other additional loads. Placing added weight on the ceiling grid may result in serious damage to the cleanroom and its occupants.

Safety notices supplied by Terra Universal must be affixed at appropriate places on each side of the cleanroom grid.

All frame members, ceiling members, and trim strips are labeled prior to shipping to show the order of assembly. Refer to the custom drawings attached to this manual for further explanation.

Before you start assembly, it is mandatory that the floor is level to assure the completed room will fit properly and be rectangular. Failure to level the floor may result in the inability to complete the assembly of the room or the insertion of the blowers, lights or ceiling. Be sure to also check vertical alignment using a level before assembly.

A. Beginning with the upright frame member labeled with a “1”, assemble the frame following the order shown in the attached drawings. Insert each horizontal frame member into the appropriate opening of the corresponding upright frame support. As you position each horizontal member, fasten it loosely in place with a 3/8” set screw (screw holes are located on the inside of the upright support). Do not tighten these screws until you have all horizontal supports correctly in position. (See Figure 1).

B. When the frame members have been completely attached, square the structure to ensure that the ceiling modules will slide easily into place. To do this, measure the two diagonals (corner-to-corner distances). If they are not equal, adjust the frame (by pushing on the appropriate corner) until they are.
C. Once the frame is standing, add corner supports (gussets) by using SS # 12 X ¾" Hex Self Drilling "Sheet Metal" Screws (See Figure 2). The corner supports will provide stabilization to the frame as you install the joists and joist dividers.

D. Refer to the attached custom drawings for a diagram of the ceiling grid and order of assembly. Before beginning the ceiling grid installation, make sure that you identify the ceiling perimeter members; these joists will be pre-drilled along their entire lengths for fastening to the cleanroom uprights. Across the ceiling, the long "T" joists will be separated by shorter "T" joists that slide into place to form the ceiling bays (See Figure 3).
F. Position the ceiling "T" joists on top of the support frame according to their labels and following the order indicated in the attached drawings. Loosely fasten the end of each joist in position with two (2) SS # 12 X ¾" Hex Self Drilling "Sheet Metal" Screws (do not fully tighten until all joist dividers have been installed).

G. Starting with the perimeter joists, position the shorter, slide-in "T" joist dividers in between the long "T" joists and secure them in place with the black Divider Clips (See Figure 3). Begin with the perimeter joists.

H. Install the Support Bars underneath the joist dividers using SS # 12 X ¾" Hex Self Drilling "Sheet Metal" Screws (See Figure 5), fully tightening the screws to square the structure. See attached drawings for locations.

I. Recheck the frame to ensure that the structure is square (see step B above). Then tighten all set screws.
Seismic Anchoring

Because most Softwall Cleanroom models have custom configurations, the number of screws required for seismic anchoring will vary based on the size of the cleanroom. Each post on the frame has a foot with four pre-drilled holes. Be sure to adhere to local seismic codes when anchoring the cleanroom. Terra recommends drilling 6” deep and placing a 3/8” Kwik Bolt TZ (not included) anchor for a minimum embedment of 3-5/8” in each of the foot’s holes. This is an example, but local seismic codes may vary.

**EXAMPLE DIAGRAM**

- **Front View**
  - Center Post
  - External Beam
  - Corner Post

- **Side View**
  - External Beam
  - Corner Post

**NOTE:**
SPECIAL INSPECTION IS REQUIRE PER ICC ESR-1917

- 4x 3/8” Kwik Bolt - TZ
- 3-5/8” Min. Emb. Supplied by Others
- 6” Deep

**Center Post**
- 4x 3/8” Kwik Bolt - TZ
- 3-5/8” Min. Emb. Supplied by Others
- 4 ½”

**Anchoring Detail**
- Top View
- 7”
Installing the Ceiling Components:

A. Refer to the attached drawings to determine the approximate PDM installation locations and place a polypropylene ceiling panel in those ceiling bays prior to installing the PDM Support Bracket(s).

B. Install the PDM Support Bracket(s) by fastening both sides of the bracket to the predrilled “T” joists. (See Figure 6).

C. Attach the PDM to the Support Bracket using the PDM mounting tabs and supplied bolts (See Figure 7).

D. Install the fan filter units by carefully lowering each into the appropriate opening in the ceiling support frame (refer to the attached drawings for FFU locations). Each module should fit snugly against the ceiling grid frame to form a tight seal. No fasteners are necessary to hold these modules in place.

E. Prior to installing the explosion-proof LED light modules, place one of the opaque lighting panels in each of the narrow ceiling bays designated for lighting (refer to the attached drawings for light module locations). The edges of the joists and dividers act as a frame to support the panel.

F. Each light module arrives preassembled in a specialized bracket. Lower each light module into the narrow ceiling bay and the sides of the bracket will hook onto the top of the joists, suspending the light module slightly above the panel (See Figure 8). No fasteners are necessary to hold these modules in place.

G. If vertical conduit bracing was included with your cleanroom, attach these conduit braces to the joists and dividers by matching up the predrilled holes. Typically, these braces are located along any long stretches of conduit, particularly in larger cleanrooms.
Installing the Wiring Conduit:

A. The wiring conduit is shipped preassembled and uses quick-disconnect fittings to simplify installation. Each section of conduit has a label that matches an identically labeled connection point on either a PDM or a junction box (See Figures 9 and 10). Refer to the attached electrical drawings for an overview of the conduit layout.

B. Each ceiling component is internally hard-wired at the factory and the rest of the wire is coiled up on the outside of the component. Before connecting each section of conduit, feed the wiring all the way through the conduit, towards the junction box connection (See Figure 11). All final wiring connections will be made within the junction boxes.

C. Starting with the PDM(s), match the labels on the conduit to the labeled connections on the PDM and hand-tighten the quick-disconnect fittings. Remember to feed the wire through each section of conduit as it is installed.

D. After all of the PDM conduit has been attached, use the labels to determine the correct placement of each junction box. Match the conduit labels to the connections on the junction box, feed the PDM wiring into the junction box, and hand-tighten the quick-disconnect fitting.
Note: If more than one PDM is used for the cleanroom, one section of conduit will connect to the next PDM.

E. Once all of the junction boxes are in position, install the conduit for each Fan/filter unit and LED light module following the same steps outlined above for the PDM conduit. Starting from the ceiling component: match the conduit labels to the junction box connection labels, feed the wire through the conduit to the junction box, and hand-tighten the quick-disconnect fittings.

Connecting the Wiring in the Junction Boxes:

A. Each component’s wiring will be labeled to match a group of wires coming from the PDM. Connect the color-coded wires using wire nuts (See Figure 12).

B. Once all of the wires have been connected, screw the lid back onto the junction box.

C. Before sealing the potted fittings, test the wiring system by connecting the cleanroom to a power supply and turning on both power switches.

D. Verify that all components in the system are receiving power and are functioning properly before sealing the potted fittings.

Sealing the Potted Fittings:

A. Potted fittings are preinstalled throughout the conduit framework to provide an additional barrier against potential ignition from within the conduit. Each of the fittings must be completely filled with an expanding cement-mixture, which will effectively seal off each section of conduit from the rest of the system. This functions as a form of secondary containment if any portion of the conduit has been breached.

B. Follow the instructions in the provided kits to mix the cement, preparing enough cement mixture to fill one fitting at a time.

C. For the horizontal potted fittings, unscrew the cap on the large inlet and completely fill the fitting with the cement mixture (See Figure 13). Replace the cap after filling.
D. For the vertical potted fittings, unscrew the cap on the smaller, angled inlet and fill as much of the fitting as possible with the cement mixture (See Figure 14). Replace the cap after filling.

E. Refer to the cement kit instructions for the recommended curing time.

Installing the Ceiling Panels

A. To install the remaining ceiling panels, remove the protective plastic from each panel and drop it in place. Secure down with Terra-provided Cleanroom Ceiling Clips. Use the 1-Arm Clip for joists with only one adjacent ceiling panel and use the 2-Arm Clip for joists with two adjacent ceiling panels (See Figures 15 through 18).

Installing Trim Strips & Grip-Track

A. Begin by positioning the four (4) corner trim pieces (TUI Logo) on the corner posts so that all holes are aligned. Fasten the corner of the TUI logo trim with two (2) SS # 12 X ¾” Hex Self Drilling “Sheet Metal” Screws (See Figure 19).
B. Install the remaining trim strips by sliding the end of each piece underneath the corner trim. Align the predrilled holes in the corner trim, trim strip, and frame. Apply C-clamps to the corner trim and trim strips to hold them in place while installing the Grip-Track.

C. Slide the Grip-Track underneath the trim strips from left to right. Push each Grip-Track section up underneath the trim strip until the predrilled holes align and fasten everything together using SS #12 X ¾” Hex Self Drilling Screws.

D. Tighten all fasteners.

**Installing the Strip Panels:**

A. Open the Grip-Track cover to expose hanging track. Position hanging bead of the curtain or strip shield on the track. Snap the cover closed.
3.0 Operation and Maintenance

The Explosion-Proof Softwall Cleanroom is controlled by two sealed, explosion-proof ON/OFF switches located on one of the corner uprights. Modular cleanrooms typically require minimal maintenance. The filters provide effective operation for years under typical operating conditions. In fact, filter efficiency increases as the filter captures more and more particles. The filter does not require replacement until the backpressure it generates increases to the point that the system can no longer provide an adequate airflow velocity to maintain required particle counts. To monitor this condition, periodic testing with a particle counter and air velocity meter is recommended.

Cleanroom Maintenance

Wipes

Wipes are used more frequently than any other cleaning product or tool. Selection of wipes should be based on intended usage. When selecting wipes you should consider things such as particle-shedding properties, chemical residue of the wiper content, static properties, absorbency and size. When using wipes, wipe in one direction from top-to-bottom or left-to-right. Use only slight overlapping strokes. Remove surface spots with commercial cleaner and woven polyester wipes.

WARNING: Always check chemical compatibility before cleaning plastic surfaces. Although vinyl and polyurethane withstand exposure to a wide range of common cleaning agents, repeated exposure to strong chemicals can cause damage.

Vacuums

There are a variety of different Vacuums available for your cleanroom. Selection of a vacuum will depend heavily on the application and the type of cleanroom you have. With all different types of sizes and filtration systems, select the one you feel would best suit the cleaning needs of your room. Refer to the Parts & Accessories section. For more information log on to our website at Terrauniversal.com

Mini-Environment Cleaning Kits

The ITW Texwipe Mini Environment Cleaning Kits are ideal for cleaning corners and difficult-to-reach locations inside the cleanroom. The kits include a cleaning tool (18" and 24" handles, 1 polyester foam pad, and 6 mop covers), one production bag of dry and pre-wetted wipers and an informational brochure with instructions on how to clean your equipment.

Designed to facilitate cleaning, the mop head has a low, flat profile with rounded corners and is autoclaveable. The swivel joint allows the user to reach inaccessible areas and replaceable foam pad ensures that the mop cover conforms to the surfaces that are being cleaned. The polyester knit fabrics used for the wipers and mop covers will not contaminate isolator surfaces when used in cleaning and disinfection operations.
4.0 Warranty

**Products Manufactured by Terra:** Terra Universal, Inc., warrants products that it manufactures to be free from defects for a period of 12 months for parts and 90 days for labor, commencing from the date of shipment. This limited warranty covers parts and labor, but not transportation and insurance charges. Terra’s sole responsibility is to repair or replace, at its option, any part of the product that proves defective or malfunctioning during this time limit. In some cases, components incorporated in Terra Universal products are covered by additional warranties from component manufacturers; obtain specific information from Terra sales representatives. Repairs may be completed by 3rd party service agents approved by Terra Universal. Terra Universal reserves the rights to limit this warranty based on a service agent’s travel, working hours, the site’s entry restrictions and unobstructed access to serviceable components of the product. This warranty is void if the equipment is abused or modified by the customer, is operated outside Terra’s operating instructions or specifications, or is used in any application other than that for which it is specified. This warranty does not include routine maintenance or service procedures, breakage of quartz baths after 60 days, shipping damage, nor damage from misuse, intentional or unintentional abuse, neglect, natural disasters, or acts of God.

**Products Manufactured by Others:** Terra Universal, Inc., warrants that, to the best of its ability, Terra’s representations of products that are manufactured by others reflect the manufacturer’s representations, subject to change without notice. Sole warranty for these products is the original manufacturer’s warranty that is passed forward to the purchaser and constitutes the customer’s sole remedy for these products. Detailed warranties for distributed products are available through Terra sales representatives.

**Freight Shortage or Damage:** Upon receipt of any equipment from Terra Universal, Inc., customer shall immediately unpack and inspect for damage or shortage. The customer shall not accept a damaged package or a short shipment until the carrier makes a "damage or shortage" notation on both the carrier’s and customer’s copy of the freight bill or delivery receipt. Service title passes when the shipment is loaded, so customer is responsible for filing and collecting a freight claim. Any replacement products must be ordered and paid for separately. For Terra's "Policy and Procedures for Returning Goods," see Terra's Internet site: www.TerraUniversal.com.

Generally, customers can improve the chance of collecting on a freight claim by following these procedures: 1) formally requesting that the carrier inspect the shipment immediately upon suspecting damage or shortage to verify condition; 2) notifying the carrier upon discovery of concealed damage and requesting an inspection within 15 days of receipt, both in person or phone and following up via mail; 3) keeping the shipment as intact as possible, including retaining original packaging materials and keeping the product as close to the original receiving location as possible; 4) holding salvage for disposition by the carrier.

**All Claims:** Terra Universal expressly disclaims all other warranties, expressed or implied or implied by statute, including the warranties of merchantability or fitness for intended use. Terra Universal is not responsible for consequential or incidental damages arising out of the purchase or use of the products supplied by Terra Universal. Terra Universal is not liable for damage to facilities, other equipment, products, property or personnel of others, or of their agents, suppliers, or affiliated parties, which is caused or alleged to have been caused by products supplied by Terra Universal. In any event or series of events, Terra Universal's total liability for any and all damages whatsoever is limited to the lesser of the actual damages or the original invoice cost of the items alleged to have caused the damage. The customer’s sole and exclusive remedy for any cause of action whatsoever is repair or replacement of the non-conforming products or refund of the actual purchase price, at the sole option of Terra Universal. All claims must be made in writing within 90 days of the date the product was shipped. Any claims not made within this time limit shall be deemed waived by the customer. Terra Universal is not responsible for any additional costs of repair caused by poor packaging or in-shipment damage during return.

**Warranty Returns:** All warranty returns must be authorized in advance by Terra Universal and approved under an RMA. Unless approved in advance for good reason, all returns must be in original condition, including all manuals, and must be packaged in original packaging materials. All returned goods are to be shipped to Terra Universal, freight prepaid at customer’s expense. See Terra’s “Policy and Procedure for Returned Goods.”

**Terra Universal Warranty Policy:** [https://www.terrauniversal.com/warranty/](https://www.terrauniversal.com/warranty/)

*Thank you for ordering from Terra Universal!*
5.0 Spare Parts & Accessories

For replacement parts and accessories for your cleanroom order at TerraUniversal.com or Call 714-578-6000

Filter Replacement

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
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<tbody>
<tr>
<td>HEPA</td>
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<td>6601-27</td>
</tr>
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<td></td>
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<td></td>
<td>2 X 4</td>
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<td>ULPA</td>
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Cleanroom and Laboratory Wipers

<table>
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<tr>
<th>Type</th>
<th>Size</th>
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<tbody>
<tr>
<td>Cotton Wiper</td>
<td>9” x 9”</td>
<td>150/bag</td>
<td>5605-07</td>
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<tr>
<td>Cotton Wiper</td>
<td>12” x 12”</td>
<td>75/bag</td>
<td>5605-02</td>
</tr>
</tbody>
</table>

White twill-patterned wiper, made of 100% long-staple cotton is tightly woven for strength and durability, while also clean and absorbent. Fabric is bias-cut and cross section of 120x60 threads per square inch. The woven twill pattern makes this wiper ideal for cleaning, polishing and burnishing magnetic disk media surfaces. Ideal in high heat applications and absorbing aqueous and organic solvent spills. Suitable for Class 1000 and higher cleanrooms.

Laundered Polyester Wipers

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<tr>
<th>Size</th>
<th>Standard 209E</th>
<th>Qty</th>
<th>TUI Part #</th>
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<tr>
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<tr>
<td>12” x 12”</td>
<td>Class 10</td>
<td>75/bag</td>
<td>5605-08</td>
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</tbody>
</table>

Laundered wipers are ideal for critical environments where ultra-low particle/fiber generation and absorbent capacity is important. Soft yet durable construction cleans surfaces without scratching.
**Caster**

<table>
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<tr>
<th>Type</th>
<th>TUI Part #</th>
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<tbody>
<tr>
<td>6&quot; Locking Caster</td>
<td>6704-08</td>
</tr>
</tbody>
</table>

These 6" locking stainless steel swivel casters feature non-shedding polyurethane wheels. Capacity: 300 lbs. each. Order one per vertical post. Casters raise the frame 7.125". If casters are ordered, the frame will be made shorter to keep the floor to filter face dimension to specification.

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**MicroVac Portable Cleanroom Vacuum Cleaner**

<table>
<thead>
<tr>
<th>Type</th>
<th>TUI Part #</th>
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<tbody>
<tr>
<td>110 Vac/60Hz</td>
<td>5100-00</td>
</tr>
<tr>
<td>220 Vac/50Hz</td>
<td>5100-00-220</td>
</tr>
</tbody>
</table>

The MicroVac™ is a portable vacuum cleaner suitable for use in cleanroom environments. It incorporates a four-stage filter system to remove particles and dust from the air before returning the air to the workplace. The small size, light weight, and flexible attachments of this cleaner make it ideal for cleaning tight corners and delicate equipment that a larger cleaner just can’t reach!

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**HEPA-Filtered Vacuum Cleaner**

<table>
<thead>
<tr>
<th>Type</th>
<th>TUI Part #</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 Vac/60Hz</td>
<td>1001-00</td>
</tr>
</tbody>
</table>

This HEPA-Filtered Vacuum Cleaner combines the power and capacity for heavy-duty operation with a lightweight, compact design that makes it as convenient as it is effective. The unit’s HEPA (High Efficiency Particulate Air) filter removes 99.999% of all particles 0.3µm or larger, exceeding federal standards and accepted HEPA filtration levels.

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**ULPA Filtration Vacuum Cleaner**

<table>
<thead>
<tr>
<th>Type</th>
<th>TUI Part #</th>
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<td>1764-00</td>
</tr>
<tr>
<td>220 Vac/50Hz</td>
<td>1764-00-220</td>
</tr>
</tbody>
</table>

This Cleanroom Vacuum Cleaner is used for cleaning the workplace or picking up spills of hazardous dust and particles. Its unique four-stage filter system removes particles 0.12 microns in size at 99.9995% efficiency, before returning the air to the workplace.