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Safety Notice

A thorough familiarity with all operating guidelines is essential to safe operation of the product. Failure to observe safety precautions could result in poor performance, damage to the system or other property, or serious bodily injury or death. The following symbols are intended to call your attention to two levels of hazard involved in operation.



CAUTION

Cautions are used when failure to observe instructions could result in significant damage to equipment.



WARNING

Warnings are used when failure to observe instructions or precautions could result in injury or death.

The information presented here is subject to change without notice.

1.0 Description

All of Terra's vacuum chambers include two metering valves installed on the chamber. One valve can be used to apply vacuum from a pump while the other valve can be used to backfill the chamber with nitrogen or other process gas. A vacuum gauge reads the pressure levels inside the chamber within a range of 0 – 30"Hg.

Acrylic Vacuum Chambers

Acrylic vacuum chambers are available in seven different sizes, with both cubic and cylindrical designs. All models are fabricated of transparent 1"-thick acrylic (except for #5235-08, which uses 1/2" acrylic). Chrome-plated latches and stainless steel hinges are durable and resist corrosion.

Acrylic models feature O-rings inlaid in a precision CNC-routed channel to ensure a uniform seal along the entire perimeter of the chamber opening.

Aluminum Vacuum Chambers

Powder-coated aluminum vacuum chambers offer better chemical resistance than acrylic chambers, particularly when using disinfectants, such as isopropyl alcohol, or sporicidal agents.

Metallic walls also minimize the amount of moisture within the vacuum chamber. Acrylic walls absorb moisture from the air which is then drawn out of the walls when vacuum is applied, leading to a loss of vacuum over time. Several vacuum cycles may be needed to remove all the residual moisture.

If feed-throughs for wiring or electrodes are needed, aluminum is easier to machine and modify for these applications. Acrylic is more prone to cracking, which may develop into leaks over time.



Figure 1. Acrylic vacuum chamber



Stainless Steel Vacuum Chambers

Stainless steel vacuum chambers feature double-wall construction and the smoothest interior surfaces, making these chambers both very durable and easy to clean. Stainless steel stands up well to corrosives and other harsh chemicals, making it useful for a wider range of chemical processing and curing operations.

The 8" by 8" window offers a view of the materials inside and is made of heat-resistant safety glass. Handles are installed on the sides of the chamber for easy transport. The silicone gasket ensures a tight seal and provides excellent chemical resistance.

2.0 Set-Up

2.1 Unpacking

Terra's Vacuum Chambers are shipped fully assembled. Uncrate the vacuum chamber, checking to make sure that there is no visible damage incurred during shipment. If damage is found, contact the freight company to file a damage claim immediately.

2.2 Applying Vacuum to the Chamber

- 1) Make sure that both metering valves are fully closed.
- 2) Connect ¼" vacuum line from the vacuum pump to one of the metering valves on the vacuum chamber and open that valve.
- 3) Turn on the vacuum pump. The vacuum gauge should indicate falling pressure inside the vacuum chamber.
- 4) Once the desired vacuum level is reached, close the metering valve that is connected to the pump.
- 5) Turn off the vacuum pump.



Never turn off the vacuum pump while the vacuum valve is open! Contaminants – including oil, if the pump is oil lubricated – will be drawn into the chamber. Always close the metering valve before turning the pump on or off.

Additional Instructions For Acrylic Vacuum Chambers

Because acrylic is hygroscopic and can hold a small amount of moisture, applying vacuum to an acrylic chamber will draw moisture out of the walls of the chamber and cause a loss of vacuum pressure. If you require sustained vacuum over a long period of time, you may wish to leave the vacuum pump running with the vacuum valve open.

Alternatively, after applying vacuum for the first time:

- 1) Close the vacuum valve and wait approximately three hours for the vacuum level to stabilize.
- 2) When the vacuum level stops falling, turn the vacuum pump back on and reopen the valve.
- 3) After reapplying vacuum, the acrylic chamber will maintain the desired vacuum level over a much longer period (see chart below).

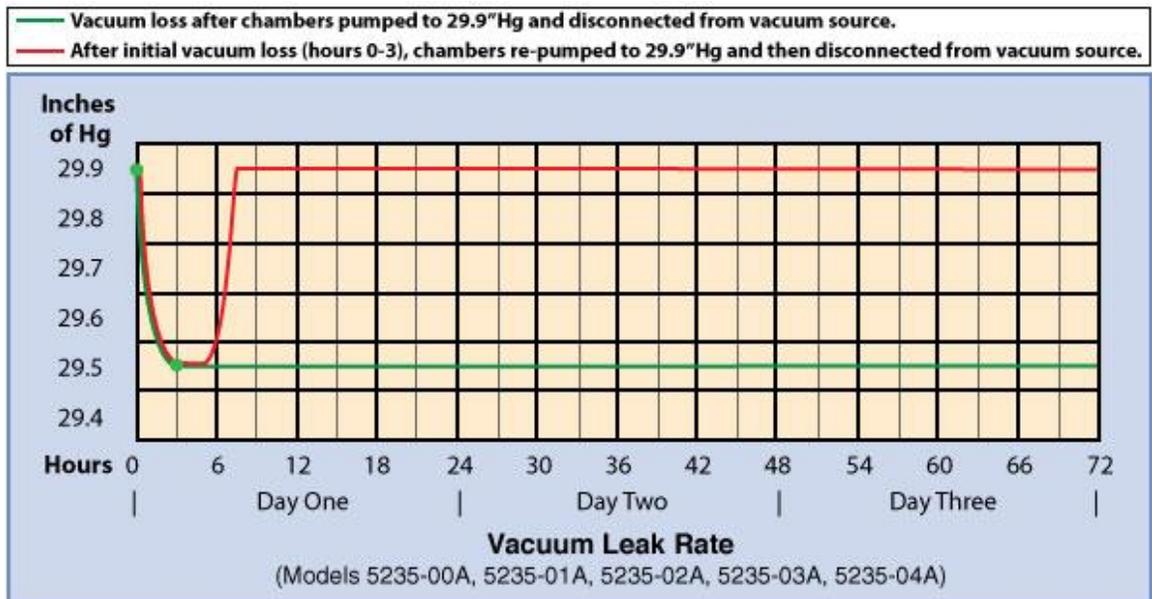


Figure 2. Tested leak-rate of an acrylic vacuum chamber showing the improved performance with reapplication of vacuum pump

2.3 Reducing Vacuum (Bleeding the Chamber)

- 1) Make sure the valve used to apply vacuum is closed.
- 2) If nitrogen or other process gas will be used to fill the chamber, connect the gas source to the second metering valve using 1/4" tubing.
- 3) Turn on the gas source.
- 4) While monitoring the vacuum gauge, slowly open the second valve to allow air (or process gas) to enter the chamber.
- 5) When the desired vacuum level is reached, close the valve.
- 6) Shut off the gas source and disconnect the tubing.

3.0 Maintenance

Terra's vacuum chambers require minimal maintenance other than periodic cleaning.

Acrylic Vacuum Chambers



Do not clean acrylic with alcohol or other abrasive cleaning agents.

Acrylic may be cleaned with clean, lukewarm water with or without a mild, non-abrasive detergent and a dry, clean non-abrasive wipe. Use only light pressure when cleaning. If the outside surface is exceptionally dirty or gritty, lightly swab the surface with a



saturated cloth and allow the surfactants to drain away. Avoid rubbing dirt or grit into the surface. Turn the cloth often and replace with a clean cloth frequently. Dry the surface by blotting gently with a clean, dry cloth.

Aluminum or Stainless Steel Vacuum Chambers

	Bleach will cause pitting on stainless steel surfaces.
CAUTION	

Aluminum and stainless steel may be cleaned with isopropyl alcohol and the same cleaning techniques as an acrylic chamber (see above). For heavy duty cleaning agents or decontamination protocols, check chemical compatibility with the silicone gasket and other materials before use.

4.0 Specifications

Acrylic Vacuum Chambers	
Dimensions	See original order form
Seal Type	Nitrile rubber O-ring (EPDM rubber on 3305-80)
Metering Valve	Nickel-plated, 1/4" tube connector
Vacuum Gauge	0 – 30"Hg
Wall Construction	1"-thick acrylic 1/2"-thick acrylic for 5235-08
Latch	Stainless steel, non-locking
Max Vacuum	29.9 inches Hg

Aluminum Vacuum Chambers	
Dimensions	See original order form
Seal Type	Nitrile rubber O-ring
Metering Valve	Nickel-plated, 1/4" tube connector
Vacuum Gauge	0 – 30"Hg
Wall Construction	1/2"-thick aluminum, powder-coated 1"-thick aluminum for 1590-series part numbers
Latch	Stainless steel, non-locking
Viewing Window	1"-thick acrylic
Max Vacuum	29.9 inches Hg

Stainless Steel Vacuum Chambers	
Dimensions	See original order form
Seal Type	Silicone, heat-resistant
Metering Valve	Nickel-plated, 1/4" tube connector
Vacuum Gauge	0 – 30"Hg
Wall Construction	304-grade stainless steel, double-wall
Latch	Electropolished stainless steel LiftLatch, non-locking
Viewing Window	1/2"-thick tempered safety glass
Max Vacuum	29.9 inches Hg



5.0 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. 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. 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.

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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.

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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."

*Thank you for ordering from
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