

## Selecting Your Glove Box

Terra's versatile designs let you configure a chamber to your exact process specifications—using standard control modules and standard pricing! This 2-step overview will help you select the right equipment for your application. Begin by selecting a glove box of the appropriate material. [See below for custom modifications.](#)

Whichever modules you select, Terra will deliver a tested, turnkey system that's ready for service!

### Glove Box Configuration Chart

For complete details on each configuration, visit [www.TerraUniversal.com](http://www.TerraUniversal.com):



Glovebox:	Series 100 Plastic	Series 200, 210, 310	Series 300 SS	Series 400 SS	Series 500 Full View	Series 600 Front View
Control Capabilities*						
Low Humidity	•	•	•	•	•	•
High Humidity	•	•	•	•	•	•
Process Gas Mix	•	•	•	•	•	•
Vacuum to 5" WG		•				
Vacuum to 29.9" WG		•		•		
Pass-Through Oven, to 572 F (300° C)			•	•		
Gas Heating, to 300° F (148° C)**			•	•		
Refrigeration, to -40° F (-40° C)**			•	•		
HEPA Filtration	•		•	•	•	•
Static Neutralization	•	•	•	•	•	•

\* With selection of appropriate accessories  
 \*\* Specify double-wall, insulated design for improved efficiency

### Step 1

#### Plastic Glove Boxes (Series 100 and 200)



- Single or Twin (one or two operators)
- Five different polymers (see sidebar on "Glove Box Materials")
- Positive or Negative Pressure Air locks and vacuum antechambers

#### Stainless Steel Glove Boxes (Series 300 - 600)



- Single or Twin (one or two operators)
- Safety glass viewing windows or full-view plastic access panels
- Air locks and vacuum antechambers

## Step 2

**Environmental Control Modules****Customized Performance—Straight from Stock****Humidity Control**

These modules monitor and regulate the process gas to maintain the humidity level you specify. Low-humidity modules achieve desired conditions by regulating the purge gas (nitrogen, argon, or dry air).

- Dual Purge™
- System DewWatch™
- NitroWatch®
- Humex™

**Vacuum Control**

Control modules and pumps are available for a wide range of process pressures, from 5" WG to one atmosphere.

- VacuumChambers
- Turnkey Fitting Kits
- Vacuum Controllers
- Vacuum/Nitrogen Pumps

**Process Gas Generation & Analysis**

Terra provides gas generators, mixers, and monitors to guarantee a reliable processing environment.

- Nitrogen Generator
- Gas Mixer
- Dryex™ Dry Air Generators
- Trace Oxygen Analyzer
- Dry Gas Generator

**Static Control**

Terra engineers will configure the right combination of ionizers and dissipative materials to protect sensitive parts against ESD.

- Ionizing Bar and Blower
- Static-Dissipative PVC
- Ionizing Gun

**Temperature Control**

A wide range of process temperature solutions, from -40° to +300°C. Double-wall, insulated glove boxes ensure stable temperatures. The Process Controller allows multi-cycle process documentation and control.

- Process Gas Heater
- Refrigeration Module
- Process Gas Cooler
- Process/Sequence Controller
- Pass-Through Vacuum Ovens

**Particle and Germ Control**

Terra helps you meet particle requirements as low as Class 1 through laminar flow and HEPA/ULPA filtration technologies. Radius corners and ultra-clean materials (including electropolished stainless steel) contribute to a clean, aseptic processing environment.

- Filtration/Recirculation Modules
- Laminar Flow Filter/Fan Modules

### Custom Glove Boxes

***Our engineers work hand-in-hand with yours to develop cost-effective solutions to unique application challenges.***

Terra Universal is a full-capability manufacturer, with over thirty years of design and fabrication experience in semiconductor, pharmaceutical, and other critical-environment applications.

In most applications, our standardized enclosures and processing modules can be economically configured to meet special process requirements. Terra performs all plastic and metal fabrication, electronics configuration, testing and certification on-site, giving our customers direct contact with every stage of the manufacturing process.

***Call for more information on custom configurations!***

- Custom Sizes
- Process Equipment Enclosures
- Interface Modules
- Process Control Software
- Double-Wall Construction More!

### Glove Box Glossary

Glove boxes have as many names as they do shapes and sizes. This glossary provides background information on Terra's use of the terms commonly used to describe glove box configurations. For additional background, refer to the American Glovebox Society's Guideline for Gloveboxes (1998).

**Barrier**—A physical separation of a material from the ambient environment. Barriers must be evaluated for their effectiveness in specific applications. For example, plastics may form effective, inexpensive particulate barriers, but are permeable to water vapor.

**Enclosure**—A multi-sided barrier that effectively isolates the process environment from the ambient environment. Hoods and open-front chambers are non-isolated enclosures that rely on careful management of air flow to protect either the process or ambient environment. Glove boxes are isolated enclosures.

**Dry Box**—An enclosure that maintains a low-humidity environment, either through use of a dry purge gas (such as nitrogen, argon, or clean, dry air) or a desiccant. Glove boxes are dry boxes with sealed glove ports that allow an operator to manipulate isolated material and equipment. Desiccators are dry boxes without arm ports that are used primarily for storage or drying/degassing.

**Isolation Glove Box**—A glove box that protects materials or processes from the operator and/or the ambient environment. Isolation glove boxes may be configured to prevent specific kinds of exposure (to humidity, particles, static charges, low or high temperature, etc.). Terra glove boxes achieve this isolation through a variety of

**Minienvironment**—This term is broadly used in the same sense as "enclosure." However, it suggests specially configured enclosures that accommodate industry-specific automated process equipment, such as semiconductor probers or package sealers, or that facilitate robotic transfer of specialized containers, such as reticle pods.

**Barrier Isolator (Isolator or Isolation Barrier)**—An enclosure that protects both the process and the ambient environment. These industry-specific terms emphasize the need to maintain an absolute environmental barrier and to facilitate effective cleaning or sterilization, especially in pharmaceutical applications. Barrier isolators typically minimize cracks and crevices, where contaminants can collect, and feature radius seams and corners that are easy to sterilize.

**Air Lock**—A pass-through chamber used for transfer of small objects into and out of a glove box with minimal disruption of the controlled glove box environment. Also called a Transfer Chamber or Antechamber. Specialized air lock ports, such as Bag-In, Bag-Out Ports, further protect the external environment from hazardous vapors or powders inside a Containment Glove Box. Terra air locks feature connections to facilitate purging with an inert process gas. Interlocks are available on an optional basis to minimize cross-contamination.

environmental control modules, including inert-gas controllers that maintain a continuous low-level positive pressure (see overview above).

**Containment Glove Box**—A glove box that protects the operator and ambient environment from materials or processes inside the glove box. In a positive-pressure application, air-tight seals protect the ambient environment from exposure to hazardous or toxic materials, but purged gas may require containment or treatment to prevent contamination. In negative-pressure applications, hazardous powders, vapors or fumes are ducted from the glove box or treated with an appropriate filter (particulate or vapor) to allow safe release.

**Controlled Environment Glove Box**—A glove box (either isolation or containment) that meets precise requirements for humidity, temperature, static safety, particulates, and/or other environmental conditions. Typically, such enclosures operate under a positive pressure of inert process gas or a negative pressure for fume or other contaminant removal.

**Bag-In, Bag-Out Port**—A specialized port on a glove box or air lock that allows materials to be packaged with a barrier material (film or foil) before they are removed from a glove box.



**Process Gas**—A gas used to displace ambient air inside an enclosure.

Generally, engineers base their selection of a process gas (or "purge gas") on its ability to retard chemical reaction, especially oxidation. Nitrogen is the most common process gas because it is inert, nontoxic, noncombustible, and relatively inexpensive. Trace gas mixtures, often including helium, are used in package sealing to allow subsequent leak testing in a vacuum chamber. Oxygen analyzers are used to ensure that oxygen levels in a process chamber remain below acceptable concentrations (often < 1 part per million by volume).

**WC (Water Column)/ WG (Water Gauge)**—a scale used to measure low-level negative pressure (e.g., 1" WG = pressure necessary to raise a column of water in a water gauge 1" =  $9.869 \times 10^{-1}$ " Hg).