

Taconic maintains one of the most innovative and largest maximum barrier rodent facilities in the world. These facilities are called the Isolated Barrier Unit System (IBUS). Based on gnotobiotic technology, the IBUS features the complete separation of each barrier building from the next; at no time is there any cross-contact between colonies in terms of air flow, water, supplies or personnel. The system is designed to prevent accidental microbial cross contamination between colonies. Any pathogen break would be limited to only one Barrier Unit.

Taconic's Isolated Barrier Unit System has been in place since 1980 and has an exceptional track record for preventing microbial contamination. This method of raising and maintaining Murine Pathogen Free (MPF™) laboratory rodents has many advantages over traditional barrier facilities. Taconic is proud of pioneering this innovative facility design. You are invited to contact Taconic to arrange a visit or obtain more detailed information.

The Isolated Barrier Unit



The Isolated Barrier Units (IBU) are singular buildings separated from one another by over fifty feet. Each IBU contains one or three barrier animal colony(ies) approximately 800 square feet in size, a personnel entry area, supply entry area with Transfer Port, and an air handling equipment room. The buildings are of wood frame construction with complete exterior metal covering and six inches of thermal insulation. Ceilings are plaster, coated with epoxy. The walls and floors are finished with Mipolam PVC covering. Wall and floor joints are heat-sealed to form an impervious barrier throughout the animal room. The flooring material continues up each wall for six inches to eliminate sharp corners and to form a tight seal with the wall.

The barrier rooms have positive air pressure greater than the entry area of the building. Each IBU animal room has its own HVAC system with the capability of supplying 100% fresh air and 15-20 air changes per hour. Heat exchangers are used to increase energy efficiency and the air temperature throughout the air handling system is monitored by computer to quickly identify equipment malfunctions.

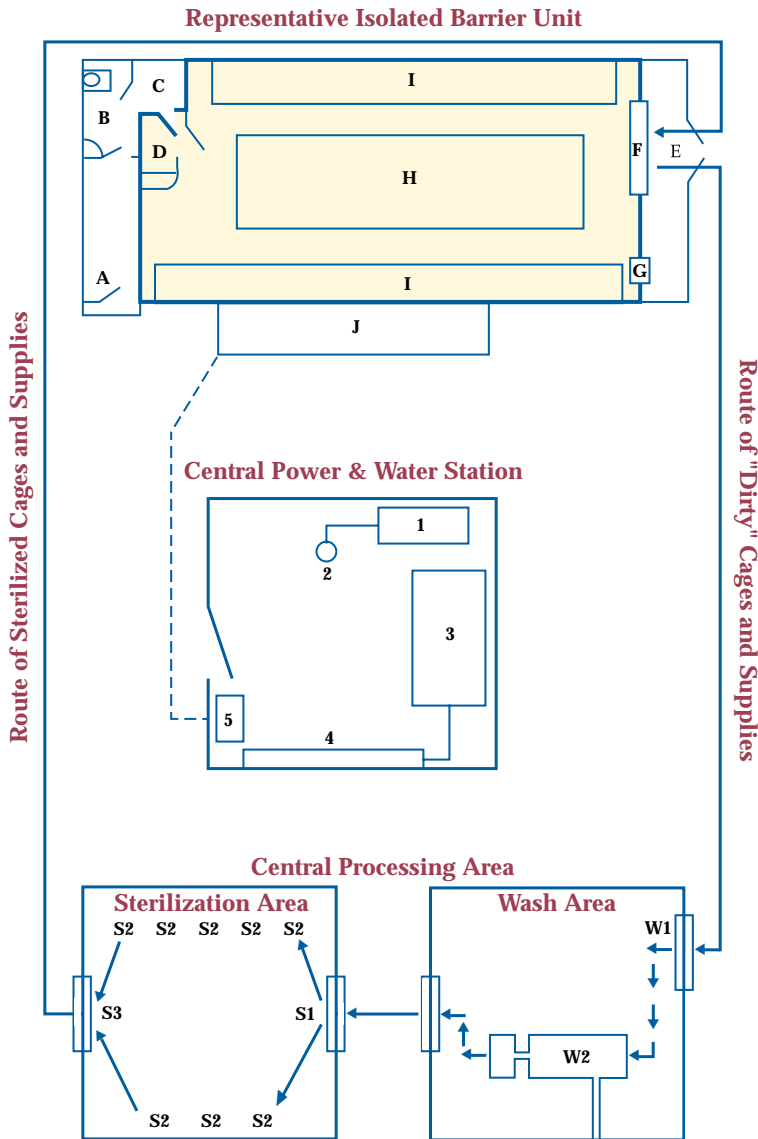
Each room in each IBU is equipped with either HEPA or 95% filtration and is kept at a constant 72°F ± 2°.

In the event of equipment malfunction, an alarm system alerts facility personnel (24-hour coverage plus back-up personnel) and, if necessary, a portable air conditioning unit can be quickly connected to the building's air intake and exhaust ports to temporarily replace the primary unit.

The Barrier Unit animal colony room is sized to be serviced by one to three caretakers working a normal 40-hour week. Personnel are dedicated exclusively to one Barrier Unit. No one may enter a Barrier Unit without undergoing a three to four day quarantine prior to entry. A separate lock system is provided for personnel entry. This system consists of (A) an Initial Entry Lock (disrobing of street clothes, lunch area), (B) Pre-shower Lock (full disrobe) with toilet and sink, (C) Shower (15 minute shower procedure), and (D) Interior Dressing Lock (sterile head-to-toe garments and face mask). Personnel are not permitted to take any materials into the barrier through the shower lock and they must go through full disrobe, shower and sterile garment dress each time they enter the barrier. Also, personnel are restricted from access to other animal areas or congregating with other Taconic personnel during the normal workday.



Taconic's Isolated Barrier Unit System (IBUS™)



KEY: Isolated Barrier Unit

- A Initial Entry Lock
- B Pre-shower Lock
- C Shower
- D Interior Dressing Lock
- E Transfer Container Dock
- F Transfer Container Port
- G Isolator Port
- H Rolling Cage Racks
- I Removable Wall Cage Racks
- J Air Handling Equipment Room

KEY: Central Power & Water Station

- 1 Main Water Storage
- 2 Water Chlorination Unit
- 3 Backup Generator
- 4 Main Electrical Panel
- 5 Computer Monitor for each IBU's Air System

KEY: Central Processing Area

Wash Area

- W1 Used Transfer Container Area
- W2 Cage Cleaner with Automated Bedding Disposal

Sterilization Area

- S1 Transfer Container Receiving Area
- S2 Autoclaves
- S3 Sterilized Transfer Container Pick-up Area

KEY: Structural Features

- Barrier Perimeter
- Door
- Double Door
- Overhead Door
- Transfer Ports

The Transfer Container and Port System

The heart of the IBU System revolves around its unique system of sterilized material supply to each animal colony. Special Transfer Containers and Transfer Ports were engineered and built for this operation which in many ways emulates the supply cylinders and entry ports commonly used to service plastic-film gnotobiotic isolators.

All supplies for the IBU System are sterilized in the Central Processing Building. Supplies that cannot withstand high temperatures are sterilized with either



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The Transfer Container and Port System (continued)

chemical agents or irradiation. Feed, bedding, uniforms and animal caging for the IBU'S are packed in large steel Transfer Containers and then autoclaved (see section on Central Processing Area). The Transfer Containers are approximately 7' x 5' x 3' rectangular stainless steel boxes mounted on adjustable casters. Two sides are covered with filter media and one other side is a steel door with pressure locking handles. When closed, the door's internal gasket makes an air-tight seal against the container frame which eliminates any air passage to the interior of the container except through the filter media. This allows the entire container to be autoclaved after which its supplies will remain sterile until the door is opened.

Forklifts are used to transport the autoclaved Transfer Containers several hundred feet to the receiving dock of a Barrier Unit. Built into each IBU is a Transfer Port designed to receive the Transfer Container; it is ten inches deep and made of stainless steel. On the animal colony side of the Transfer Port are sealed double doors; the outer side of the Transfer Port is

rimmed with a stainless steel "U" channel and rubber gasket specifically sized to receive the outer rim of the Transfer Container. The Transfer Container rim is compressed into the channel's gasket with a series of Destaco clamps. This forms an air lock between the container's door and the animal colony door. This lock area is then sprayed with a disinfectant via two compressed air valves built into the sidewalls of the Transfer Port. When the lock is completely fogged, a waiting period of 15 minutes is used to assure maximum sanitization before the colony room doors are opened and entry made to the Transfer Container. After the caretaker removes the sterile supplies, the container can be loaded with either used supplies (e.g. dirty cages) or animals ready for shipment. The container door is locked along with the internal double doors, and then the container is immediately removed for reprocessing. In addition to this system for the bulk transfer of colony supplies, a smaller transfer port is in each Barrier Unit for hook-up of a germfree isolator or gas sterilization of small items needed in the animal colony.

The Central Processing Area

Several hundred feet removed from the IBU's, two concrete and steel buildings have been constructed to serve as the Central Processing Area (CPA) for all supplies used in the IBU animal colonies.

Soiled cages from the animal colonies are brought to the Wash Building CPA by forklift. The Transfer Containers are opened and the cages are unloaded and stacked for cleaning. The cages are individually picked off the stacks, inverted and scraped to remove the dirty bedding. The bedding drops into a bin and

is automatically removed from the building. The cages are then subject to a high-pressure hot water spray that removes any residual materials.

After cleaning, the cages receive clean bedding and are loaded into the Transfer Container for autoclaving. All caging is dedicated to a single Barrier Unit. Therefore, cleaned cages are always returned to their Barrier Unit of origin.

Once the Transfer Container is loaded with clean, bedded cages, it is closed and a forklift transports it to the Sterilization Area of the CPA. Eight large autoclaves, capable of receiving two Transfer Containers at a time, are used to sterilize IBU supplies. Each Transfer Container load is specifically cycled according to pre-established protocols, and the autoclave loads are individually monitored for sterility. Autoclave checks are done weekly using either Bowie Dick or D.A.R.T. tests; in addition, the vacuum heat and dry cycles for each load are automatically recorded and retained for Quality Control review.



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The Central Power and Water Station

Several separate buildings serve as the central distribution point for electrical and water supply to the IBUs. Back-up electricity is provided by diesel generators that supply the needs of a specific group of IBUs. These generators are operated one day each week to assure stand-by readiness in case of external power failure.

Water is supplied from several drilled wells located at Taconic. Water is fed into a storage tank from which it is pumped into chlorination tanks. Two water lines supply each IBU with water chlorinated

to 10 ppm for animal drinking and 5 ppm for sinks and showers. Each day water from both lines is tested for proper treatment and equipment operation.



Summary Considerations

The Isolated Barrier Unit System is a superior barrier system. Advantages include:

- Erroneous personnel movement is eliminated by dedicating a limited number of technicians to each building.
- Materials and supplies can only enter the animal colony via proper methodology due to the absence of any alternative direct access to the animal colony.
- Personnel contact with other animal colony personnel or service people is minimized, thereby lessening the risk of transfer of pathogens via human vectors.
- “Clean” and “Dirty” corridors are non-existent eliminating the need for sensitive balancing of air pressure between multiple rooms and corridors.
- Sterilized supplies are moved directly from the autoclave to the individual animal colonies. This reduces the risk of supply contamination after autoclaving and eliminates the possibility of supplying multiple colonies with contaminated supplies due to improper autoclaving of one supply load.
- Individual air handling equipment for each IBU precludes the possibility of multiple colony loss due to uncorrected equipment failure.

The Isolated Barrier Unit System makes it possible to raise healthier, higher quality animals because the technology not only limits the risk of exposure of each colony, but also minimizes the possibility of a contaminant spreading to other barrier units.

Taconic designed this system to be able to assure our customers of an uninterrupted supply of high quality Murine Pathogen Free (MPF™) laboratory animals. Please don't hesitate to call Taconic with any questions or to arrange an on-site visit to view the system in operation.



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