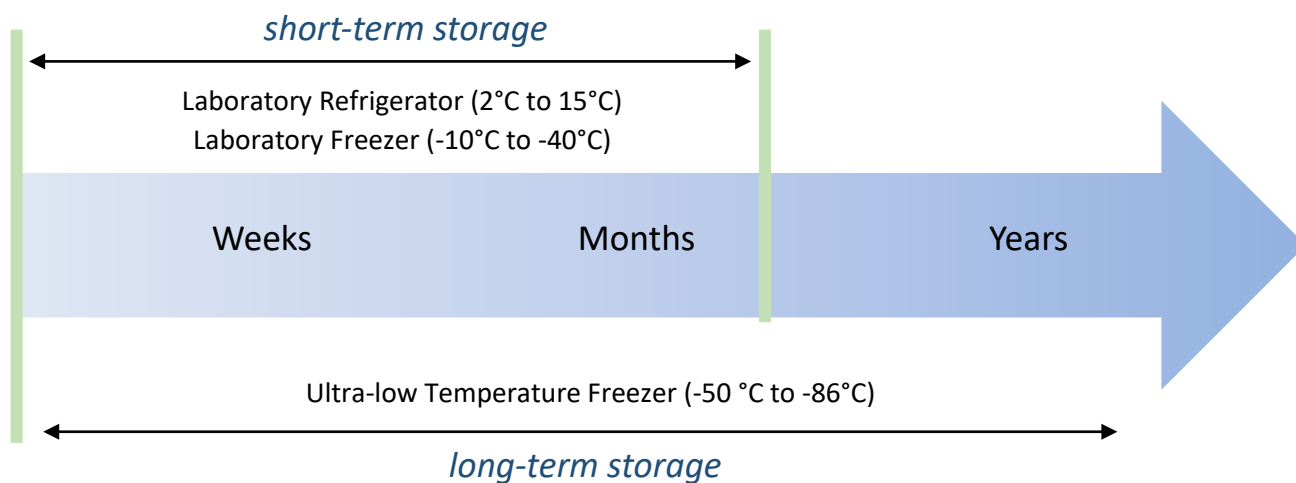


## Product Introduction

Cold storage equipment is essential in a researcher’s life work. Different types of samples must be stored using appropriate techniques and storage temperatures to properly serve the needs of the research community. Once proper storage requirements are not met, these precious samples may be put at risk and eventually lead to sample spoilage and wastage. Hence, it is important to carefully choose the cold storage that can assure optimal product protection.

## Application

Preservation and protection of essential and irreplaceable temperature-sensitive products are critical factors in ensuring reliable results. Short-term storage, a matter of months, can be done in a Laboratory Refrigerator (2°C to 15°C) or Laboratory Freezer (-10°C to -40°C). Long term storage should be done in an Ultra-low Temperature Freezer (-50°C to -86°C).



## Preventive Maintenance

Preventive maintenance is a schedule of planned service measures aimed to prevent unexpected downtimes and failures through routine maintenance and early detection of problems. It is a regular check-up for your Cold Storage equipment to stay at the ideal condition and carry out its primary purposes such as protection and preservation of valuable samples, pharmaceuticals, biologics, and other temperature-sensitive products for life science research, diagnostics, and various industries. Esco provides world-class customer support and services in compliance with international standards to keep your equipment working in excellent form.

**Routine Maintenance Checklist**



Laboratory Refrigerators and Freezers				
No.	Description of Task to Perform	Maintenance to be carried out every		
		Month	6 months	Year
1	Condenser cleaning	✓		
2	Cleaning of exterior and interior surfaces		✓	
3	Alarm checks			✓
4	Actual internal temperature check			✓
5	Power supply check			✓
6	Door seal check			✓
7	Battery replacement			✓
8	Validation			✓



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Ultra-low Temperature Freezers							
No.	Description of Task to Perform	Maintenance to be carried out every					
		As needed	Week	Month	Quarter	6 months	Year
1	General cleaning	✓					
2	Defrost and cleaning	✓					
3	Battery replacement	✓					
4	Vacuum relief port cleaning		✓				
5	Back-up battery checking			✓			
6	Air filter cleaning				✓		
7	Door gasket cleaning					✓	
8	Condenser cleaning					✓	
9	Validation						✓

## Cleaning Procedure

### General Cleaning

Routine cleaning of the equipment should be carried out. The appliance is thoroughly cleaned in our factory before delivery. It is recommended to clean the interior of the unit before use. Before any cleaning operation, make sure that the appliance power cord is disconnected. The surfaces can be cleaned by wiping down with clean water and a mild detergent using a sponge.



### Condenser Cleaning

Cleaning the condenser is one of the most important tasks to make sure the unit operates properly and efficiently. A clogged condenser often results in poor performance and a rise in power consumption. To clean the condenser, use a household type of vacuum cleaner to vacuum the fins or a dry brush. Make sure you can clearly see through the fins after the vacuum operation is completed. The condenser should be cleaned once every 6 months – or less if the area is dusty.



### Air Filter Cleaning\*

The air filters are the first line of defense against dust and dirt that might be pulled into the condenser. To clean the air filter, open the front condenser doors at the bottom, there are two air filters installed. Remove the condenser air filter and wash it in water. Dry it out and place it back in the air filter holders. It should be inspected and washed once in every 3 months. Replace the filter if it is too dirty or worn out.



Door Gasket Cleaning\*

The door gasket is an important part to maintain and seal the unit to achieve proper temperature. Over time, the gasket can get deformed or damaged if not properly kept clean from ice.

To clean off the ice and frost accumulating on the gasket, use a dull plastic scraper to wipe off ice and frost accumulation that sticks to the ice surface. Wipe off the water from the gasket before closing the door. The door gasket should be cleaned at least monthly. More frequent cleaning may be required if dirt or excessive frost build-up prevents the door from closing properly.



Vacuum Relief Port Cleaning\*

Use a soft cloth; remove any frost build-up from the vacuum relief port, at the back of the main door. Cleaning of vacuum relief port should be done regularly, depending on how often and how long the door is opened.



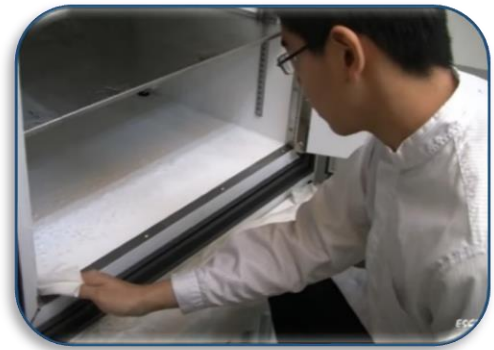
Battery Checking (if applicable)

Locate the battery and check its voltage output using a digital voltmeter. If the voltage goes below 12 volts, replace the battery.



## Defrosting the Chamber\*

To clean up the frost, move all products to another unit that operates at the same temperature as the Esco unit temporarily. Turn off the power on the Esco unit, open the doors to let the unit warm up. Place some towels around the floor of the unit to absorb any melted frost that might run out. Once the unit is thawed, wipe off the water with a towel. Use a mixture of warm water and light detergent to clean the interior and exterior of the unit carefully; do not let water drip into the refrigeration and electrical compartments.



*\*Applicable only to ULT Freezer*

## **Validation**

### Internal Temperature Checking

It is recommended to check every 2 years if the temperature inside the compartment is consistent with that shown on the display. To this end, you will need a calibrated tool (RTD or thermocouple). This is applicable only to HP series units.

### Maintenance/Service Log

It is good practice (and in some cases regulatory requirement) to maintain a log of all maintenance work carried out on your freezer.



Checking of the Alarm Function (if applicable)



Checking the Electrical Panel



Calibration



Temperature Mapping

Note: To guarantee optimal performance of the unit, follow indications given by the manufacturer and arrange the preventive maintenance through a qualified technician.