

## Refrigerator and Freezer Operation and Maintenance

### 1. Scope:

This document provides a procedure for the operation and maintenance of refrigerators and freezers used in the Regulatory Analysis (RA) program.

### 2. Outline of Procedures:

- 3.1 Refrigerator and Freezer Temperature Ranges
- 3.2 Storage Considerations
- 3.3 Routine Maintenance
- 3.4 Refrigerator and Freezer Temperature Monitoring
- 3.5 Response to Mechanical Failure
- 3.6 Response to Temperature Out of Range
- 3.7 Troubleshooting

### 3. Specific Procedures:

#### 3.1. Refrigerator and Freezer Temperature Ranges

Below are general guidelines. Each device has the acceptable range posted on it according to its purpose and type.

- Refrigerators shall be maintained between 0°C and 10°C.
- General purpose freezers shall be maintained between -25°C and -5°C.
- Temperatures are monitored and recorded each workday
- Notify the Supervisor or designee if an appliance is out of range.

#### 3.2. Storage Considerations

- Flammable materials shall only be stored in appliances rated for such.
- Standards and samples shall not be stored in the same appliance.
- Refer to the specific method for standard and sample temperature storage requirements.
- Check the manufacturer's recommended storage temperature for analytical standards.
- Liquid feed and fertilizer samples prone to spoilage or fermentation shall be stored in a refrigerator between 0°C and 10°C or in a freezer between -25°C and 0°C.
- Do not overload appliance

#### 3.3. Routine Maintenance

- Clean up spills inside the appliance using mild soapy water.
- Keep the heat exchange coils clean and do not block the flow of air to the coils.
- Do not leave the door open for extended periods.

- Defrost appliance whenever significant ice build-up is observed. Do not use sharp objects to dislodge ice when defrosting the appliances. After defrosting, wipe down the interior of the appliance and door gasket to remove dirt particles and moisture.
- Record all maintenance in a logbook or on the temperature monitoring sheet.

#### 3.4. Refrigerator and Freezer Temperature Monitoring

Temperature monitoring devices shall have ISO 17025 accredited calibration, be traceable to NIST standards, and be verified annually according to BP-15 with acceptance criteria of  $\pm 2^{\circ}$  C. Any device failing verification shall be repaired or replaced.

- The current temperature shall be recorded every workday on a temperature log sheet. This includes recorder's initials and any pertinent comments.
- If a temperature is not recorded for a day, the maximum and minimum temperature readings on the thermometer will be recorded for the missed day, making note of the date of the entry. The current temperature is still recorded for the current date.
- The temperature recording devices shall be reset to start a new period of temperature recording.
- File completed temperature record sheets in appropriate binder.

#### 3.5. Response to a Mechanical Failure

Any appliance that has a mechanical failure shall be removed from service and marked "Out of Service" and the supervisor or designee shall be notified.

- The condition (e.g., cool to touch, still frozen) of the contents stored in the appliance shall be recorded in the device's logbook or on the temperature log.
- The contents of the failed appliance shall be moved to another appliance set at the proper temperature.
- Check the power cord and circuit breaker to the appliance. Plug the appliance in or reset circuit breaker if needed.
- Refer to manufacturer's manual for additional troubleshooting.
- Have the appliance repaired by an approved service technician or replace the appliance with a comparable unit.
- Verify that the appliance is able to maintain the proper temperature prior to placing it back into service.

#### 3.6. Response to Temperature Out of Range

- If the device is out of range by less than  $2^{\circ}$  C for a refrigerator or  $5^{\circ}$  C for a freezer, record the time and temperature. Post a "Temperature monitoring in progress, DO NOT OPEN" sign on the door and monitor the temperature for 1-2 hours.
- After 1-2 hours, record the time and temperature. If the device is in range, no further action is required.
- If the device is still not in range, perform the troubleshooting steps in 3.7.

### 3.7. Troubleshooting

When the steps listed in 3.6 fail to bring the device back into range, one or more of the following troubleshooting steps shall be performed and recorded on the temperature log. These steps should also be taken as preventative measures whenever the appliance approaches the outer limits of its acceptable range.

- Adjust the appliance's thermostat.
- Check proper operation of temperature recording device. Reposition thermometer probe. Replace battery or check operation with a known good probe. Replace device if necessary.
- Transfer contents to another appliance set at the proper temperature then defrost the unit and clean dust from heat exchange coils.
- Once these steps have been taken, monitor the temperature of the appliance over several hours or until the temperature has stabilized.
- After the appliance has stabilized and is in its acceptable range, reset the temperature-recording device and record any adjustments or actions taken on the appliance's temperature log.
- If items have been removed from the appliance, they can be returned.
- If the appliance does not meet the control requirements by simple maintenance, report the failure to the section supervisor or designee. Remove the appliance from service and post an "Out of Service" sign on it. Have the appliance repaired by an approved service technician or replace the appliance with a comparable unit.

## 4. References:

Refrigerator and freezer Instruction manuals

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