|  |  |  |
| --- | --- | --- |
|  | **LABORATORY DEPARTMENT****POLICY AND PROCEDURES** | **Department: BLOOD BANK** |
| **Number:** **788.0-Blbk-gu-rev02/15** |

|  |
| --- |
| **ALARM CHECKS AND MAINTENANCE** |

**POLICY**

1. The alarm on each blood component storage unit is checked quarterly to ensure that it functions properly and activate at the correct temperatures.
2. The Jewett refrigerator and freezer systems have a push button to check that the electrical circuits are intact and that the alarm rings. These electrical circuit checks are performed monthly and recorded.
3. Alarms are set to activate at a temperature that will allow proper action to be taken before the blood or components reach an undesirable temperature.
4. If alarms activate, or total power is interrupted, emergency procedures must be in place to preserve the blood supply.
5. Blood Bank freezers and refrigerators are on back up power supply, which is routinely tested by Plant Operations. Refer to Environment of Care Policy 15.703 “Emergency Power Management.”
6. Alarm checks and maintenance are documented on the Blood Bank Maintenance Worksheet. The Blood Bank Maintenance Worksheet is reviewed after each month by the Laboratory Director or designee.

**REAGENTS AND EQUIPMENT**

1. For weekly check of “door ajar” alarms, and motion alarm function on platelet agitator:

None

1. For monthly electrical circuit checks:

None, except the built-in surveillance module on each unit

1. For quarterly alarm checks:

Cup or glass

Pan for water and ice

Teaspoon

Ice slush or chips

Table salt

Tap water

Thermometer that has been checked against approved standard

Antifreeze

16mm plastic tube – for platelet incubator

1. Blood Bank Maintenance Worksheet

**PROCEDURE**

1. **Weekly Maintenance**
2. **For weekly check of “door ajar” alarms on BB1 and BB8:**

Open each door. After the door has been open for approximately 5 minutes, an alarm will **sound,** indicating the door has been left open**.** In the case of **BB5**, an audible alarm does not sound, but an icon above the door will light.Document the results of the alarm test (Y – yes, the alarm sounded, N – no, the alarm did not sound), as well as the date and the initials of the person performing the test.

1. **For weekly check of motion alarm function** on the platelet agitator (BB4 only):

Stop the agitator by turning it off, making sure the motion alarm is on. The alarm should sound shortly thereafter. Document the results of the alarm test (Y – yes, the alarm sounded, N – no, the alarm did not sound), as well as the date and the initials of the person performing the test.

1. **For monthly check of electrical circuits**
2. Jewett equipment (BB1):
	* 1. The high alarm is activated by depressing and releasing the High Alarm Touch Pad Switch. The temperature rises until the module reaches the High Activation Temperature (+5.5°C for BB1).
		2. The low alarm is activated by depressing and releasing the Low Alarm Touch Pad Switch. The temperature falls until the module reaches the Low Activation Temperature (+1.5°C for BB1). The temperature display returns to normal operating temperature once the alarm point is achieved. (There is no low alarm activation for the freezer unit.)
3. Jewett (BB5) – Activate the alarm test by pressing ▲and ● simultaneously and holding for about five seconds. The test automatically advances through all steps and stops. The main display and the thermometer show the warm alarm temperature. The alarm sounds and the alarm icon flashes.
4. Helmer equipment (BB8)
	1. To access the circuit alarms, press the “Main” button on the Helmer screen. If the “Main” button is not visible, press one of the gray buttons at the bottom of the screen and the word “Main” will appear as an option.
	2. Scroll down and select “System Alarm Test and Status”.
	3. Activate the high alarm by selecting “Start High Alarm Auto Test”. The temperature rises until the module reaches the High Activation Temperature (+5.5°C for BB8).
	4. Activate the low alarm by selecting “Start Low Alarm Auto Test”. The temperature falls until the module reaches the Low Activation Temperature (+1.5°C for BB8). The temperature display returns to normal operating temperature once the alarm point is achieved.
5. Document the results of the alarm test on the maintenance worksheet (Y – yes, the alarm sounded, N – no, the alarm did not sound).
6. Record the date and initials of the person performing the test.
7. **For quarterly check of accuracy of the High and Low Alarm Activation:**
8. **Low Alarm Activation Check**

**Refrigerator (1.5°C)**

* 1. Fill an 8 ounce glass half full of chilled water (4°C).
	2. Crush ice to 1/8 in. particles in a separate container.
	3. Remove the sensor from the upper solution bottle, tape it to the test thermometer, and into the glass.
	4. Slowly add crushed ice at the proper rate to provide a temperature drop of 0.5°C/minute (approximately 1 teaspoon every 15-25 seconds).
	5. Stir the test thermometer/monitor sensor constantly in a circular motion, keeping the ends in the lower liquid, not the upper ice slurry.
	6. Document the results of the alarm test on the maintenance worksheet (Y – yes, the alarm sounded, N – no, the insert them both alarm did not sound).
	7. Log both the reading from the test thermometer and the displayed temperature at the time the alarm sounded.

**Platelet Agitator (20.5°C)**

1. Fill the plastic 16 mm tube with water at least 19.5°C or cooler.
2. Place the tube in the holding bracket and slide it up to submerse the end of the probe in the water.
3. The alarm indicator light on the temperature controller will illuminate as the reading passes the alarm point, and the audible alarm will sound.
4. Document the results of the alarm test on the maintenance worksheet (Y – yes, the alarm sounded, N – no, the alarm did not sound).
5. Document the temperature at which the alarm sounded.
6. Remove the plastic tube and empty the water. Do not leave the tube in a position that covers the sensor.
7. **High Alarm Activation Check** (5.5°C for BB1 and BB8; -25° for BB5; 23.5°C for BB4 and BB10, -60˚C for S1)

**Refrigerator (BB1 and BB8):** Slowly add warm water to the ice slurry at the proper rate to provide a temperature rise of 0.5°C/min.

**Freezer (BB5):** Slowly add water to a container of pre-cooled antifreeze solution (-30°C) at the proper rate to provide a temperature rise of 0.5°C/min.

1. Constantly stir the test thermometer/monitor sensor as in Step 5 above.
2. Place the tube in the holding bracket and slide it up to submerse the end of the probe in the water.
3. The alarm indicator light in the temperature controller will illuminate as the reading passes the alarm set point, and the audible alarm will sound.
4. Document the results of the alarm test on the maintenance worksheet (Y – yes, the alarm sounded, N – no, the alarm did not sound).
5. Document the temperature at which the alarm sounded.
6. Record the date and initials of the person performing the test.

**Platelet Agitator (BB4 and BB10): 23.5°C**

1. Fill the plastic 16 mm tube with water at least 24.5°C or warmer.
2. Place the tube in the holding bracket and slide it up to submerse the end of the probe in the water.
3. The alarm indicator light on the temperature controller will illuminate as the reading passes the alarm point, and the audible alarm will sound.
4. Document the results of the alarm test on the maintenance worksheet (Y – yes, the alarm sounded, N – no, the alarm did not sound).
5. Document the temperature at which the alarm sounded.
6. Remove the plastic tube and empty the water. Do not leave the tube in a position that covers the sensor.

**Surgery Freezer (S1): High Alarm Activation Check (-60˚C)**

1. Press and hold the Alarm Test pad. The digital temperature display indicates rising temperature.
2. When the temperature reaches the warm alarm value, the alarm sounds.
3. Document the results of the alarm test on the maintenance worksheet (Y – yes, the alarm sounded, N – no, the alarm did not sound).
4. Document the display temperature at which the alarm sounded.

**Plasma Thawer: High Alarm Activation Check (36.5°C)**

* 1. Adjust the digital Plasma Thawer temperature setting to 37.0°C. (See Helmer Plasma Thawer.
	2. The alarm will sound when the temperature of the plasma thawer reaches 36.5°C.
	3. When the alarm sounds, document the digital and thermometer temperature readings on the Blood Bank Maintenance worksheet.
	4. Document “Y” under “Alarm Sound, Y/N” on the Blood Bank Maintenance worksheet.
	5. If the alarm does not sound or does not sound at the proper temperature, document “N” under “Alarm Sound Y/N” on the worksheet and notify VVMC Biomed.
1. Record the date and initials of the person performing the alarm tests.
2. **MTS Dispenser Volume Check**
3. The volume dispensed by the MTS dispenser should be checked by dispensing 10 times into a clean, dry 10mL graduated cylinder and recording the delivered volume on the maintenance worksheet. Acceptable ranges are:
	1. Model MTS 9610 (0.5mL): 4.75-5.25mL
	2. Model MTS 9612 (1.0mL): 9.50-10.50mL
4. If the volume delivered is not in the acceptable range, take the dispenser out of use until acceptable results are obtained. Contact the manufacturer or VVMC Biomed for assistance in repairing the dispenser.
5. Observe dispenser tubing for signs of wear and replace as needed.
6. Record the date and initials of the person performing the test.

**INTERPRETATION**

* + 1. If equipment alarm activation temperatures coincide with the set alarm temperatures, the testing is complete.
		2. If the results do not agree or the alarms do not activate at the set temperatures, retest to eliminate Tech error.
		3. If the temperature is allowed to rise or fall too rapidly, the change may be too rapid for the monitor to accurately record it.
		4. If results are still not as expected, contact Plant Operations, VVMC Biomed or the manufacturer of the equipment for further troubleshooting assistance.
		5. Record corrective action taken on the “Laboratory Equipment Unscheduled Maintenance/Repair” form.
		6. If alarm testing shows any equipment to be unreliable, the products need to be moved to a storage device that is reliable immediately. See the “***Temporary Storage of Blood Components***” section in the “***Inventory Management***” procedure.

**REFERENCES**

1. American Association of Blood Banks, 17th Edition (2011). *Technical Manual*. Bethesda, Maryland: AABB.
2. American Association of Blood Banks, *Standards for Blood Banks and Transfusion Services*, 28th Edition (2012). Bethesda, Maryland.
3. Owner’s manuals: Helmer Platelet Rotator/Incubator.
4. Jewett Refrigeration Company, 1992. Temperature Surveillance Module, *Installation, Operation and Service Manual*.
5. Ortho Diagnostic Systems, Inc., 1996. *ID-Micro Typing System Implementation Guide*.
6. Jewett. 305391H01 Rev. C. (2006) *Chest and Upright Freezers; Installation and Operation Manual.* USA
7. Helmer Inc., 2008. i. Series and Horizon Series Refrigerator Documentation. P/N 460001-1/B (disc).
8. Installation and Operation Manual; Thermo Scientific Jewett Laboratory Freezers
9. Helmer Inc., 2011. QuickThaw, *Plasma Thawing System Operation Manual*.

|  |  |  |
| --- | --- | --- |
| **Prepared by/Title/Date:**Angela Schoch, MT(ASCP) 12/03**Approved by/Title/Date:** Signature on File in Lab |  | **Dates Reviewed/Revised:**12/97 11/07 03/1311/99 07/08 12/1412/03 10/0812/05 07/0908/06 09/11 |