TRAINING UPDATE

Lab Location:	SGMC and WAH	**Date Implemented:**	11.28.2017
Department:	BB	**Due Date:**	12.18.2017

DESCRIPTION OF PROCEDURE REVISION

Name of procedures:

Blood Bank Plasma Freezers
Plasma Freezer Temperature Form
Platelet Rotator Quality Control (Helmer iSeries)
Platelet Rotator Temperature Form
Blood Bank Refrigerators (Helmer iSeries)
Refrigerator Temperature Form
Blood Bank Refrigerators (Helmer iSeries with i.C3)

Description of change(s):

1. Added requirement to bleach probe and probe bottle annually for each refrigerator, freezer, and platelet rotator.

2. "Clean Probe Bottle" was added to each form as annual maintenance.

Electronic Document Control System

Quest Diagnostics

Document No.: SGAH.BB45[2]
Title: Blood Bank Plasma Freezers
Owner: LESLIE BARRETT
Status INWORKS
Effective Date: 22-Dec-2017 **Next Review Date:**

Non-Technical SOP

Title	**Blood Bank Plasma Freezers**	
Prepared by	Rowena Vince Cruz	Date: 5/28/2010
Owner	Stephanie Codina	Date: 5/28/2010

Laboratory Approval		
Print Name and Title	**Signature**	**Date**
Refer to the electronic signature page for approval and approval dates.		
Local Issue Date:	Local Effective Date:	

Review:		
Print Name	**Signature**	**Date**

Form rev sep 3/31/00

TABLE OF CONTENTS

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1. PURPOSE

Frozen plasma and cryoprecipitate products are stored at temperatures ≤ -18°C. Blood product storage freezers must be equipped with a system for continuous temperature monitoring and audible alarm. The alarm must activate at a temperature that will allow proper action to be taken before blood products reach unacceptable conditions. The temperature and alarms are frequently checked to ensure an appropriate temperature is maintained.

2. SCOPE

Thermometers and chart recorders are calibrated prior to initial use and annually thereafter. Temperatures of thermometer, recording device and digital display are recorded daily. Temperature alarm system, power failure alarm, door open alarm and no battery alarm are verified quarterly.

3. RESPONSIBILITY

All blood bank staff members must demonstrate competency for the proper temperature requirements to store frozen blood products, performance and documentation of quality control, and action required when the temperature range is exceeded or the freezer alarm sounds.

4. DEFINITIONS

N/A

5. PROCEDURE

A. General Guidelines

Blood bank freezers:

1. Shall only contain blood components. One shelf may be reserved for temporary storage of patient specimens.
2. Shall be equipped with a visual and audible alarm system, and have continuous temperature monitoring device via a chart recorder. Alarm is set to activate at a

temperature that will allow proper action to be taken before components reach unacceptable temperature. The audible alarm sounds within the blood bank where there is 24 hour coverage.

3. Shall be connected to an emergency power source, alarm system has a battery backup.
4. Shall have a calibrated thermometer placed on one of the shelves near the door.
5. Shall have clearly designated areas for:
   a. Plasma separated by ABO groups
   b. Cryoprecipitate

B. Daily Quality Control

Step	Action
1	Verify that the recording chart is positioned at the correct date and time. If not, re-adjust to the correct date and time and document the correction on **both** the front of the recording chart and the Plasma Freezer Temperature Form.
2	Read and record the following temperatures on the "Plasma Freezer Temperature Form." A. Chart recorder read to the nearest whole number (for example, -35) B. Thermometer read to the nearest 0.5 degree (for example, -35.0 or -35.5) C. Digital display read to the nearest 0.1 degree (for example, -35.1 or -35.2)
3	Interpret the freezer's operation. A. S = satisfactory B. U = unsatisfactory. If unsatisfactory, a. Document corrective action on the reverse side of the Plasma Freezer Temperature Form. b. Notify a supervisor if unable to resolve. c. If the temperature is out of range, move the contents of the freezer. Refer to section, "Freezer in Alarm."

C. Weekly Quality Control

Step	Action
1	Weekly QC is performed each Monday.
2	Obtain a new temperature chart. Be sure the new temperature chart is appropriate for the freezer and will record temperatures correctly. A. Stamp the back of the chart with the hospital address stamp. B. Stamp the back of the chart with the "date on" stamp. C. Record "plasma freezer" and the serial number of the freezer on the back of the chart to identify the storage container. D. Record the current date in the "date on" line. E. Initial the back of the chart next to the date.

Step	Action
3	On the chart recorder, press the "C" (chart change) button until the stylus begins to move to the left, then release the button. The LED will flash to indicate the current temperature range value.
4	When the stylus stops moving, remove the chart know by turning it counter-clockwise, then swing it toward the top of the chart recorder.
5	Gently lift the stylus and remove the current temperature chart.
6	Press the new chart onto the chart recorder. Gently lift the stylus and turn the paper so the pen is on the correct day and time line groove.
7	Hold the chart paper to prevent it from turning while re-installing the chart knob. Turn the knob clockwise until snug.
8	Press and hold the "C" (chart change) button until the stylus starts to move to the right, then release the button.
9	Confirm the stylus is marking the correct temperature on the correct day/time. If not, repeat steps 3-9. Do not try to move or adjust the chart while it is on the recorder.
10	Record the following information on the removed chart and forward the chart to a supervisor or designee for review. A. Date removed B. Tech's initials

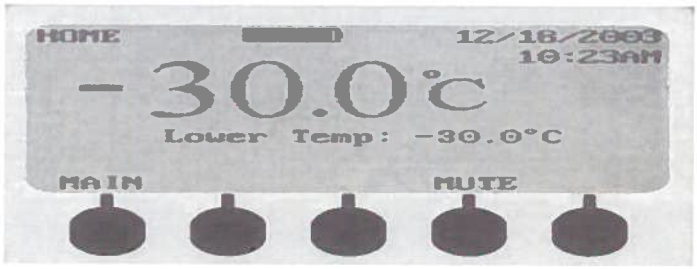
D. Quarterly Quality Control

Step	Action
1	**Calibrate the temperature probes** to ensure the high temperature alarm is activated properly. A. Remove all probes and cap from the bottle. B. Tape a calibrated thermometer to the temperature probe and place both in the probe bottle. Ensure that at least 2 inches of the probe and thermometer are immersed in solution. C. Close the freezer door and allow the temperature to stabilize for at least 10 minutes. D. Read the temperature of the calibrated thermometer to the nearest 0.5°C and record on the QC form. E. If the temperatures agree within 1°C, no further action is needed. If temperatures are more than 1°C apart, continue with step F. F. Enter and save the temperature reading in the freezer configuration. a. On the freezer panel, press the first button to go to the "Main Menu." b. Press the "Down" button until "Edit Configuration" is highlighted then

Form revised 3/31/00

Step	Action
	press "select." c. Press the "Down" button until "Temperature Calibration" is highlighted then press "select." d. Select the "Upper" temperature probe. e. Press the "Down" button until "Temperature" is highlighted. f. Press the "Inc" and "Dec" buttons until the temperature of the calibrated thermometer displays. g. Press the "down" button until "Store Calibration" is highlighted and press "select." h. Press the "home" key to exit. A message will appear stating that the new calibration is memorized. The current temperature value will change to the value you selected. Verify the value. i. Shortly after the change, the current value temperature may change. This is normal. G. Remove the calibrated thermometer from the probe bottle and replace the cap. Ensure the cap fits tightly to minimize evaporation. H. Replace the probes in the bottle ensure they are immersed in solution at least 2 inches. I. Document the temperature probe calibration on the Plasma Freezer Temperature Form. Notify a supervisor or designee immediately if a problem exists.
2	Test the **Power Failure Alarm** to ensure it activates in an appropriate amount of time. A. The power failure alarm is normally set at 3 minutes. B. Change the power failure alarm setting to zero minutes. a. From the main menu, press the "down" button until "Edit Configuration" is highlighted. Press "select." b. Press the "down" button until "Alarm Setpoints" is highlighted and press "select." c. Press the "down" button until "Power Failure Timeout" is highlighted. d. Press the "dec" button until the setting is "0 min." e. Press the "back" button. C. Turn off the power to the freezer. a. Turning off the freezer may affect the chamber temperature. Before testing the alarm, take precautions to protect items in the freezer from extended exposure to adverse temperatures. b. During a power failure, the backup batteries continue to provide power to the monitoring system. D. The power failure alarm should activate immediately. a. An audible alarm will sound. b. The "AC Power Failure" message will appear on the HOME screen. E. Turn the power back on. The power failure alarm should clear. F. Change the power failure alarm setting to 3 minutes. a. From the main menu, press the "down" button until "Edit Configuration" is highlighted. Press "select." Press the "down" button until "Alarm Setpoints" is highlighted and press "select."

Step	Action
	b. Press the "down" button until "Power Failure Timeout" is highlighted. c. Press the "inc" button until the setting is "3 min." d. Press the "back" button. G. Document the alarm failure check on the Plasma Freezer Temperature Form. Notify a supervisor or designee immediately if a problem exists.
3	Test the **door open alarm**. A. Change the door open timer setting to zero minutes. a. From the main menu, press the "down" button until "Edit Configuration" is highlighted. Press "select." b. Press the "down" button until "Alarm Setpoints" is highlighted and press "select." c. Press the "down" button until "Door Ajar Alarm" is highlighted. d. Press the "dec" button until the setting is "0 min." e. Press the "back" button. B. Open the freezer door. C. The alarm should activate immediately. a. An audible alarm will sound. b. The "Door Open" message will appear on the "HOME" screen. D. Close the freezer door. The alarm should clear. E. Return the door open alarm to the 3 minute setpoint. a. From the main menu, press the "down" button until "Edit Configuration" is highlighted. Press "select." b. Press the "down" button until "Alarm Setpoints" is highlighted and press "select." c. Press the "down" button until "Door Ajar Alarm" is highlighted. d. Press the "inc" button until the setting is "3 min." e. Press the "back" button. Document the Door Open Alarm check on the Plasma Freezer Temperature Form. Notify a supervisor or designee immediately if a problem exists.
4	Test the **No Battery Alarm**. A. Remove the battery from the battery holder for the monitoring system. B. The "No Battery" alarm should activate. a. An audible alarm will sound. b. The "No Battery" message will appear on the HOME screen. c. Return the battery to the battery holder and the alarm will clear. C. Document the "No Battery" alarm check on the Plasma Freezer Temperature Form. D. Notify a supervisor or designee immediately if a problem exists.

Step	Action
5	**Clean the condenser grill and external drain fan.** A. Protect the items in the freezer from exposure to adverse temperatures. B. Unplug the freezer to eliminate the potential for electric shock. C. Clean the condenser grill and the drain fan using a soft brush and vacuum cleaner. a. The condenser grill is the finned surface on the rear of the freezer. b. The external drain fan is located on the rear of the freezer, directly above the water evaporation tray. D. Document the cleaning on the Plasma Freezer Temperature Form. E. Notify a supervisor or designee immediately if a problem exists
6	Examine the probe bottles. Clean and refill if necessary.
7	Wipe the interior, exterior, and gasket with a damp cloth and mild soap to clean.
8	Test the **high alarm**.  A. Identify the current setting for the high alarm set point. The alarm should activate at a temperature between ≤-20°C. B. From the "MAIN" screen, use the buttons to navigate to and select the "System Alarm Test & Status" option. C. The "System Alarm Test & Status" screen appears. D. Press the "up" or "down" button until the "Start High Alarm Auto Test" option is highlighted. E. Press the "Enter" button. F. The "Home" screen will appear. Under the reading for the upper temperature probe, a "High Alarm Test in Progress" message will appear. G. View the event log to determine the temperature at which the high temperature alarm activated. This should be at or below -20°C. H. Document the alarm check on the Plasma Freezer Temperature Form. I. Notify a supervisor or designee immediately if a problem exists.

E. Annual Maintenance

Step	Action
1	Clean the probe bottles annually, when they visually appear dirty, and when the temperature alarm sounds repeatedly without an obvious cause. A. Remove the probes from the bottle. B. Remove the bottle from the bracket. C. Dump the probe bottle. Soak the bottle in a 10% bleach solution for 10 minutes then allow the bottle to dry. D. Wipe the probe with a hospital-approved bleach disinfectant wipe or a solution of 10% bleach. E. Refill the bottle with a 1:1 solution of propylene glycol and water. F. Allow the solution to cool before replacing the probes. G. Document "cleaning probe bottles" on the freezer chart to explain why the temperature is out of range as applicable. H. Document cleaning of probe bottles on the maintenance form.

F. Freezer in Alarm

Step	Action
1	If the freezer alarm activate, push the alarm silence button to temporarily stop the audible alarm.
2	Determine whether there is an obvious cause for alarm activation and correct. If corrected, make a note on the temperature chart indicating alarm activation and reason. A. Freezer door ajar B. Outlet power failure / unit unplugged C. Freezer failure

Step	Action
3	If the cause of alarm is not identified or if the problem is not immediately correctable, A. Monitor the internal thermometer temperature of the freezer every **15 minutes** until the alarm stops **or** until all blood products have been removed. Document the temperature on the "Manual Product Storage Temperature" form. B. If the temperature reaches -20°C, all blood products must be relocated to another storage container that will maintain temperatures below -18°C. Blood products can be moved to: a. The Chemistry freezer. However, patient specimens and blood products must be stored on different shelves. b. ARC shipping boxes containing dry ice. c. Transfer to a sister hospital (WAH, SGMC, GEC) d. Contact the blood supplier to attempt to ship products to another hospital. C. Document movement of the blood products on the temperature chart. Include the exact time and tech's initials. D. Place a calibrated thermometer in the temporary storage container with the blood products. E. Monitor the temperature at least every 4 hours. Document the temperature of the temporary storage container on the "Manual Product Storage Temperature" form.
4	A. Notify a supervisor or designee as soon as possible but definitely within 1 business day. B. Notify Quest biomedical engineering if the problem persists or if repairs are needed. C. Notify plant operations if there is a problem with the power supply.
5	When the problem is resolved **and** the freezer temperature returns to the acceptable range, A. Re-activate the alarm B. Return the blood products to the freezer C. Document replacement of blood products on the temperature chart with exact time and initials D. Continue to monitor and document manual temperatures every 4 hours for a minimum of 12 hours.

6. RELATED DOCUMENTS

Form: Manual Product Storage Temperature Form (AG.F51)
Form: Plasma Freezer Temperature Form (AG.F50)
Procedure: Equipment Policy for Transfusion Services
Procedure: Equipment Maintenance and Calibration, Transfusion Services
Procedure: Thermometer Calibration and Installation

Form revised 3/31/00

7. REFERENCES

1. Fung, MK, Grossman, BJ, Hillyer, CD, and Westhoff, CM. 2014. Technical Manual of the AABB, 18th ed. AABB Publishing, Bethesda, Maryland.
2. Standards for Blood Banks and Transfusion Services, 2016. AABB, 30th ed. AABB Publishing, Bethesda, Maryland.
3. Barry of Helmer Inc.,Freezer Operation Manual, Helmer Freezer, 360086-1 Rev H; issued April 2009.
4. Barry of Helmer Inc., Temperature Chart Recorder Operation and Service Manual, 360076-1 Rev H; issued April 2009.
5. Barry of Helmer Inc., Freezer Service Manual 360087-1 Rev K; issued April 2009.

8. REVISION HISTORY

Version	Date	Reason for Revision	Revised By	Approved By
		Supersedes SGAH.B507.002, WAB507.003, SGAH.B508.001, WAB508.002		
000	12.9.2013	Section 5: Removed instructions for manual alarm checks; only perform electronic. Updated formatting. Changed acceptable range for alarm activation from -20-22°C to ≤-20°C. Section 6: forms moved from section 9 Footer: version # leading zero's dropped due to new EDCS in use as of 10/7/13.	SCodina LBarrett	NCacciabeve
1	11.21.17	Header: Added WAH Section 5: Added requirement to clean probe bottles annually. Moved temperature alarms from semi-annual to quarterly to align with other storage equipment. Section 6: Updated related documents.	SCodina	NCacciabeve

9. ADDENDA AND APPENDICES

None

Electronic Document Control System

Document No.: AG.F50[4]
Title: Plasma Freezer Temperature Form
Owner: LESLIE BARRETT
Status INWORKS
Effective Date: 22-Dec-2017 **Next Review Date:**

___ Shady Grove Medical Center
___ Washington Adventist Hospital

Quest Diagnostics

Plasma Freezer Temperature Form

Acceptable Range: - 18 °C or colder
All temp readings agree ≤ 5 °C

Serial Number: _____

Month/Yr _____

Day	CHECK DAILY					Tech
	Verified Temp Chart Recorder Operation	Chart Temp °C	Digital Temp °C	Internal Thermometer Temp °C	Interp S/U	
1						
2						
3						
4						
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S satisfactory **U** Circle Unsatisfactory item/s.Document corrective action on back sheet.

Reviewed By: _____

Quarterly Maintenance

___ Check (√) if quarterly maintenance not due during current month.

Calibrate Digital and Chart Temperature Probes	Digital Probe Temp_____ Chart Probe Temp_____ NIST Therm Temp_____ □ Acceptable □ Unacceptable If unacceptable, document resolution on back. Tech_____ Date_____
Power Failure Alarm	□ Acceptable □ Unacceptable If unacceptable, document resolution on back. Tech_____ Date_____
Door Open Alarm	□ Acceptable □ Unacceptable If unacceptable, document resolution on back. Tech_____ Date_____
No Battery Alarm	□ Acceptable □ Unacceptable If unacceptable, document resolution on back. Tech_____ Date_____
Clean Condenser Grill and Drain Fan	□ Acceptable □ Unacceptable If unacceptable, document resolution on back. Tech_____ Date_____
Wipe Clean Interior, Exterior, and Gasket	□ Acceptable □ Unacceptable If unacceptable, document resolution on back. Tech_____ Date_____
Alarm Test	Activation Temp:_____ (≤-20°C) □ Acceptable □ Unacceptable If unacceptable, document resolution on back. Tech_____ Date_____
Clean Probe Bottles (Annual)	Tech_____ Date_____

Electronic Document Control System

Document No.: SGAH.BB95[2]
Title: Platelet Rotator Quality Control (Helmer iSeries)
Owner: LESLIE BARRETT
Status INWORKS
Effective Date: 22-Dec-2017 **Next Review Date:**

Non-Technical SOP

Title	**Platelet Rotator Quality Control (Helmer iSeries)**
Prepared by	Stephanie Codina Date: 4/8/2011
Owner	Stephanie Codina Date: 4/8/2011

Laboratory Approval		
Print Name and Title	**Signature**	**Date**
Refer to the electronic signature page for approval and approval dates.		
Local Issue Date:	Local Effective Date:	

Review:		
Print Name	**Signature**	**Date**

Form revised 3/31/00

TABLE OF CONTENTS

1. PURPOSE

Platelet products are stored at temperatures between 20-24°C. Platelet storage containers must be equipped with a system for continuous temperature monitoring and audible alarm. The alarm must activate at a temperature that will allow proper action to be taken before blood products reach unacceptable conditions. The temperature and alarms are frequently checked to ensure an appropriate temperature is maintained.

Thermometers and chart recorders are calibrated prior to initial use and annually thereafter. Temperatures of thermometer, recording device and digital display are recorded daily. Temperature alarm system, power failure alarm, door open alarm and no battery alarm are verified quarterly.

2. SCOPE

This procedure applies to all cabinets used to store platelets.

3. RESPONSIBILITY

All blood bank staff members must understand the temperature requirements of platelets and the steps that must be taken when an alarm sounds.

4. DEFINITIONS

Platelet Rotator: The term platelet rotator will be used to describe both the rotator which provides continuous agitation and the incubator which maintains an appropriate temperature range.

5. PROCEDURE

General Guidelines

Platelet Rotators:

1. Shall only contain blood components.

2. Shall be equipped with a visual and audible alarm system, and have continuous temperature monitoring device via a chart recorder. Alarm is set to activate at a temperature that will allow proper action to be taken before components reach unacceptable temperature. The audible alarm sounds within the blood bank where there is 24 hour coverage.
3. Shall be connected to an emergency power source, alarm system has a battery backup.
4. Shall have a calibrated thermometer placed inside the incubator.

Daily Quality Control

Step	Action
1	Verify that the recording chart is positioned at the correct date and time. If not, re-adjust to the correct date and time and document the correction on **both** the front of the recording chart and the "Platelet Rotator Temperature Form."
2	Read and record the following temperatures on the "Platelet Rotator Temperature Form." A. Chart recorder read to the nearest whole number (for example, 22) B. Thermometer read to the nearest 0.5 degree (for example, 22.0 or 22.5) C. Digital display read to the nearest 0.1 degree (for example, 22.3 or 22.4) D. The acceptable range is 20-24°C. E. Ensure all temperatures agree within 2°C.
3	Interpret the platelet rotator's operation. A. S = satisfactory B. U = unsatisfactory. If unsatisfactory, a. Document corrective action on the reverse side of the "Platelet Rotator Temperature Form." b. Notify a supervisor if unable to resolve. c. If the temperature is out of range, move the contents of the platelet rotator. Refer to section, "Platelet Rotator in Alarm."

Weekly Quality Control

Step	Action
1	Weekly QC is performed each Monday.
2	Obtain a new temperature chart. Be sure the new temperature chart is appropriate for the platelet rotator and will record temperatures correctly. A. Stamp the back of the chart with the hospital address stamp. B. Stamp the back of the chart with the "date on" stamp. C. Record "platelet rotator" on the back of the chart to identify the storage container. D. Record the current date in the "date on" line. E. Initial the back of the chart next to the date.

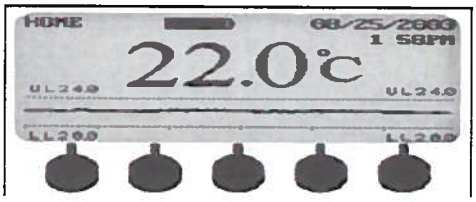
Form revised 3/31/00

Step	Action
3	On the chart recorder, press the "C" (chart change) button until the stylus begins to move to the left, then release the button. The LED will flash to indicate the current temperature range value.
4	When the stylus stops moving, remove the chart know by turning it counter-clockwise, then swing it toward the top of the chart recorder.
5	Gently lift the stylus and remove the current temperature chart.
6	Press the new chart onto the chart recorder. Gently lift the stylus and turn the paper so the pen is on the correct day and time line groove.
7	Hold the chart paper to prevent it from turning while re-installing the chart knob. Turn the knob clockwise until snug.
8	Press and hold the "C" (chart change) button until the stylus starts to move to the right, then release the button.
9	Confirm the stylus is marking the correct temperature on the correct day/time. If not, repeat steps 3-9. Do not try to move or adjust the chart while it is on the recorder.
10	Record the following information on the removed chart and forward the chart to a supervisor or designee for review. A. Date removed B. Tech's initials

Quarterly Quality Control

Step	Action
1	**Calibrate the temperature probe** to ensure the high and low temperature alarms are activated properly. This can be performed simultaneously with the chart calibration (step 2). A. Place a calibrated thermometer inside the platelet rotator cabinet. The thermometer should be placed in the back, right, bottom corner. B. Allow the temperature to stabilize. This may take up to 30 minutes. C. Read the temperature of the calibrated thermometer to the nearest 0.5°C and record on the QC form. D. Compare the reading of the thermometer to that of the digital reading on the thermometer. Record the reading of the digital thermometer on the QC form. Adjust if the temperature difference is greater than 1°C. E. Determine how much to increase or decrease the offset value to make the monitor reading match the calibrated thermometer. For example, if the thermometer reads 23.0 and the digital display reads, 22.5, the offset will increase by 0.5 so both temperatures match.

Step	Action
	F. Enter and save the temperature reading in the platelet rotator configuration. a. On the platelet rotator panel, press the first button to go to the "Main Menu." b. Press the "Down" button until "Edit Configuration" is highlighted then press "select." c. Press the "Down" button until "Temperature Calibration" is highlighted then press "select." d. Select the "Upper" temperature probe. e. Press the "Down" button until "Temperature" is highlighted. f. Press the "Inc" and "Dec" buttons until the temperature of the calibrated thermometer displays. g. Press the "down" button until "Store Calibration" is highlighted and press "select." h. Press the "home" key to exit. A message will appear stating that the new calibration is memorized. The current temperature value will change to the value you selected. Verify the value. i. Shortly after the change, the current value temperature may change. This is normal. G. Remove the calibrated thermometer from the incubator. H. Document the temperature probe calibration on the maintenance form. I. Notify a supervisor or designee immediately if a problem exists.
2	**Calibrate the chart probe** to ensure the temperature being marked matches that read by the chart recorder probe. This can be performed simultaneously with the temperature probe calibration (step 1). A. Place a calibrated thermometer inside the platelet rotator cabinet. The thermometer should be placed in the back, right, bottom corner. B. Allow the temperature to stabilize. This may take up to 30 minutes. C. Read the temperature of the calibrated thermometer to the nearest 0.5°C and record on the Thermometer Calibration Log form. D. Compare the reading of the thermometer to that on the temperature chart recorder. The readings should be within 1°C of each other. E. Change the position of the chart stylus if needed. Press and hold the appropriate arrow button until the stylus has moved to the desired location. a. Press the ◄ button to move the stylus to the left (increase the temperature). b. Press the ► button to move the stylus to right (decrease the temperature)

Step	Action
3	**Test the alarms.** Helmer rotators electronically heat and cool the probe making manual alarm checks unnecessary. Calibrate the temperature probe prior to performing the alarm checks.  A. High Alarm Test a. Identify the current setting for the high alarm set point. The alarm should activate at a temperature of 23.5°C or below. b. From the "MAIN" screen, use the buttons to navigate to and select the "System Alarm Test & Status" option. c. The "System Alarm Test & Status" screen appears. d. Press the "up" or "down" button until the "Start High Alarm Auto Test" option is highlighted. e. Press the "Enter" button. f. The "Home" screen will appear. Under the reading for the upper temperature probe, a "High Alarm Test in Progress" message will appear. g. View the event log to determine the temperature at which the high temperature alarm activated. This should be 23.5°C or lower. h. Document the alarm check on the "Platelet Rotator Temperature Form." i. Notify a supervisor or designee immediately if a problem exists. B. Low Alarm Test a. Identify the current setting for the high alarm set point. The alarm should activate at a temperature of 20.5°C or higher. b. From the "MAIN" screen, use the buttons to navigate to and select the "System Alarm Test & Status" option. c. The "System Alarm Test & Status" screen appears. d. Press the "up" or "down" button until the "Start Low Alarm Auto Test" option is highlighted. e. Press the "Enter" button. f. The "Home" screen will appear. Under the reading for the upper temperature probe, a "Low Alarm Test in Progress" message will appear. g. View the event log to determine the temperature at which the high temperature alarm activated. This should be at 20.5°C or higher. h. Document the alarm check on the "Platelet Rotator Temperature Form." i. Notify a supervisor or designee immediately if a problem exists.

Step	Action
4	Test the **Power Failure Alarm** to ensure it activates in an appropriate amount of time. A. The power failure alarm is normally set at 3 minutes. B. Change the power failure alarm setting to zero minutes. a. From the main menu, press the "down" button until "Edit Configuration" is highlighted. Press "select." b. Press the "down" button until "Alarm Setpoints" is highlighted and press "select." c. Press the "down" button until "Power Failure Timeout" is highlighted. d. Press the "dec" button until the setting is "0 min." e. Press the "back" button. C. Turn off the power to the platelet rotator. During a power failure, the backup batteries continue to provide power to the monitoring system. D. The power failure alarm should activate immediately. a. An audible alarm will sound. b. The "AC Power Failure" message will appear on the HOME screen. E. Turn the power back on. The power failure alarm should clear. F. Change the power failure alarm setting to 3 minutes. a. From the main menu, press the "down" button until "Edit Configuration" is highlighted. Press "select." b. Press the "down" button until "Alarm Setpoints" is highlighted and press "select." c. Press the "down" button until "Power Failure Timeout" is highlighted. d. Press the "inc" button until the setting is "3 min." e. Press the "back" button. G. Document the alarm failure check on the maintenance form. H. Notify a supervisor or designee immediately if a problem exists.
5	Test the **door open alarm**. A. Change the door open timer setting to zero minutes. a. From the main menu, press the "down" button until "Edit Configuration" is highlighted. Press "select." b. Press the "down" button until "Alarm Setpoints" is highlighted and press "select." c. Press the "down" button until "Door Ajar Alarm" is highlighted. d. Press the "dec" button until the setting is "0 min." e. Press the "back" button. B. Open the platelet rotator door. C. The alarm should activate immediately. a. An audible alarm will sound. b. The "Door Open" message will appear on the "HOME" screen. D. Close the platelet rotator door. The alarm should clear.

Step	Action
	E. Return the door open alarm to the 3 minute setpoint. a. From the main menu, press the "down" button until "Edit Configuration" is highlighted. Press "select." b. Press the "down" button until "Alarm Setpoints" is highlighted and press "select." c. Press the "down" button until "Door Ajar Alarm" is highlighted. d. Press the "inc" button until the setting is "3 min." e. Press the "back" button. F. Document the Door Open Alarm check on the maintenance form. G. Notify a supervisor or designee immediately if a problem exists.
6	Test the **No Battery Alarm**. A. Open the door on the top right corner of the rotator. B. Turn the key to the off "o" position. C. The "No Battery" alarm should activate. a. An audible alarm will sound. b. The "No Battery" message will appear on the HOME screen. c. Return the battery to the battery holder and the alarm will clear. D. Return the key to the on "I" position. It may take a few seconds for the display to reset, but the alarm will silence and the "No Battery" message will disappear. E. Document the "No Battery" alarm check on the maintenance form. F. Notify a supervisor or designee immediately if a problem exists. Test the backup battery for the temperature recorder. Check the LED light beside the mounting bracket of the stylus. a. A solid green light indicates the battery is operational. b. A solid red light indicates the battery is low. Replace with a fresh battery. c. A flashing red light indicates the temperature chart is on battery power. Refer to the troubleshooting guide.
7	Test the **Motion Alarm** to ensure that it activates when the rotator stops agitating (with AC power). A. Change the Motion Alarm to zero. a. From the main menu, press the "down" button until "Edit Configuration" is highlighted. Press "select." b. Press the "down" button until "Alarm Setpoints" is highlighted and press "select." c. Press the "down" button until "Agitator Alarm Setpoints" is highlighted then press the "select" button. d. Press the "dec" button until the setting is "0 min." e. Press the "back" button. B. Ensure the motion alarm switch is in the On "I" position. C. Stop agitation by pressing the agitation switch to the Off "o" position. D. The alarm will sound after the delay period elapses.

Step	Action
	E. Clear the alarm by turning the motion alarm switch to the Off "o" position. F. Return the Motion Alarm to 5 minutes. a. From the main menu, press the "down" button until "Edit Configuration" is highlighted. Press "select." b. Press the "down" button until "Alarm Setpoints" is highlighted and press "select." c. Press the "down" button until "Agitator Alarm Setpoints" is highlighted the press the "select" button. d. Press the "inc" button until the setting is "5 min." e. Press the "back" button. G. Document the alarm on the QC form.
8	**Clean the condenser grill and external drain fan.** A. Unplug the platelet rotator to eliminate the potential for electric shock. B. Clean the condenser grill and the drain fan using a soft brush and vacuum cleaner. a. The condenser grill is the finned surface on the rear of the platelet rotator. b. The external drain fan is located on the rear of the platelet rotator, directly above the water evaporation tray. C. Document the cleaning on the maintenance form. D. Notify a supervisor or designee immediately if a problem exists.
9	Clean the **agitator fan**. A. Stop the agitator to stop the agitator fan. B. Clean the fan using a soft brush and vacuum cleaner.

Annual Maintenance

Step	Action
1	Clean the probe bottles annually, when they visually appear dirty, and when the temperature alarm sounds repeatedly without an obvious cause. A. Remove the probes from the bottle. B. Remove the bottle from the bracket. C. Dump the probe bottle. Soak the bottle in a 10% bleach solution for 10 minutes then allow the bottle to dry. D. Wipe the probe with a hospital-approved bleach disinfectant wipe or a solution of 10% bleach. E. Refill the bottle with a 10% solution of glycerol and water. F. Allow the solution to reach temperature before replacing the probes.

As Needed Maintenance

Step	Action
1	Change the batteries on the monitoring system. A. The display contains a visual display of the status of the backup batteries. The battery charge level displays information about the life of the batteries. B. Notify the biomedical engineering contractor when batteries need to be changed.

Platelet Rotator in Alarm

Step	Action
1	If the platelet rotator alarm activates, push the alarm silence button to temporarily stop the audible alarm.
2	Determine whether there is an obvious cause for alarm activation and correct. If corrected, make a note on the temperature chart indicating alarm activation and reason. A. Platelet rotator door ajar B. Outlet power failure / unit unplugged C. Platelet rotator failure
3	If the cause of alarm is not identified or if the problem is not immediately correctable, A. Monitor the internal thermometer temperature of the platelet rotator every **15 minutes** until the alarm stops **or** until all platelet products have been removed. Document the temperature on the "Manual Product Storage Temperature" form. B. If the temperature reaches goes below 20°C or above 24°C, all blood products must be relocated to another storage container that will maintain temperatures between 20-24°C. Blood products can be moved to one of the following. Note: Platelets can be without agitation for a maximum of 24 hours. a. ARC platelet shipping boxes. b. Transfer to a sister hospital (WAH or SGAH) c. Contact the blood supplier to attempt to ship products to another hospital. C. Document movement of the blood products on the temperature chart. Include the exact time and tech's initials. D. Place a calibrated thermometer in the temporary storage container with the blood products. E. Monitor the temperature at least every 4 hours. Document the temperature of the temporary storage container on the "Manual Product Storage Temperature" form.

Step	Action
4	A. Notify a supervisor or designee as soon as possible but definitely within 1 business day. B. Notify Quest biomedical engineering if the problem persists or if repairs are needed. C. Notify plant operations if there is a problem with the power supply.
5	When the problem is resolved **and** the platelet rotator temperature returns to the acceptable range, A. Re-activate the alarm B. Return the platelets to the platelet rotator. C. Document replacement of blood products on the temperature chart with exact time and initials. D. Continue to monitor and document manual temperatures every 4 hours for a minimum of 12 hours.

6. RELATED DOCUMENTS

Form: Platelet Rotator Temperature Form (AG.F96)
Form: Blood Bank Manual Product Storage Temperature Form (AG.F51)
SOP: Equipment Policy for Transfusion Services
SOP: Equipment Maintenance and Calibration, Transfusion Services
SOP: Thermometer Verification and Installation

7. REFERENCES

1. Fung, MK, Grossman, BJ, Hillyer, CD, and Westhoff, CM. 2014. Technical Manual of the AABB, 18th ed. AABB Publishing, Bethesda, Maryland.
2. Standards for Blood Banks and Transfusion Services, 2016. AABB, 30th ed. AABB Publishing, Bethesda, Maryland.
3. Helmer Flatbed Platelet Agitator Operation Manual, Version 360092-1/J, Helmer, Inc. Noble, IN.
4. Helmer Platelet Incubator Operation Manual, Version 360093-1/J, Helmer, Inc. Noble, IN.

8. REVISION HISTORY

Version	Date	Reason for Revision	Revised By	Approved By
		Supersedes WAH-SGAH B518.003		
000	4.25.12	Section 5: 3 references to freezer were changed to platelet rotator.	SCodina	NCacciabeve
001	11.21.17	Header: Added WAH Section 5: Added annual maintenance Section 6: Updated procedures Section 7: Updated references Footer: Version # leading zero's dropped due to new EDCS in use as of 10/7/13	SCodina	NCacciabeve

9. ADDENDA AND APPENDICES

N/A

Electronic Document Control System

Document No.: AG.F96[4]
Title: Platelet Rotator Temperature Form
Owner: LESLIE BARRETT
Status INWORKS
Effective Date: 22-Dec-2017 **Next Review Date:**

__ Shady Grove Medical Center
___ Washington Adventist Hospital

QuestDiagnostics

Platelet Rotator Temperature Form

Acceptable Range: 20-24°C
All temp readings agree ≤ 2 °C

S/N _____ Month/Yr _____

Day	CHECK DAILY					Tech
	Verified Temp Chart Recorder Operation	Chart Temp °C	Digital Temp °C	Internal Thermometer Temp °C	Interp S/U	
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
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21						
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24						
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26						
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28						
29						
30						
31						

S satisfactory **U** unsatisfactory
Circle unsatisfactory item/s.Document corrective action on back sheet.

Reviewed By: _____

Quarterly Maintenance

___ Check (√) if quarterly maintenance not due during current month.

Calibrate Digital and Chart Recorder Probes
Digital Temp:_____ °C
Temperature Chart Temp:_____ oC
NIST Temp:_____°C
□ Acceptable □ Unacceptable
If unacceptable, document resolution on back.
Tech_____ Date_____

Alarm Test
High Activation Temp:_____ (≤23.5°C)
Low Activation Temp:_____ (≥20.5°C)
□ Acceptable □ Unacceptable
If unacceptable, document resolution on back.
Tech_____ Date_____

Power Failure Alarm
□ Acceptable □ Unacceptable
If unacceptable, document resolution on back.
Tech_____ Date_____

Door Open Alarm
□ Acceptable □ Unacceptable
If unacceptable, document resolution on back.
Tech_____ Date_____

No Battery Alarm / Battery Test
□ Acceptable □ Unacceptable
If unacceptable, document resolution on back.
Tech_____ Date_____

Clean Condenser Grill and Drain / Agitator Fans
□ Acceptable □ Unacceptable
If unacceptable, document resolution on back.
Tech_____ Date_____

Wipe Clean Interior, Exterior, and Gasket
□ Acceptable □ Unacceptable
If unacceptable, document resolution on back.
Tech_____ Date_____

Motion Alarm
□ Acceptable □ Unacceptable
If unacceptable, document resolution on back.
Tech_____ Date_____

Clean Probe Bottle (Annual)
Tech_____ Date_____

Electronic Document Control System

Quest Diagnostics

Document No.: SGAH.BB91[2]
Title: Blood Bank Refrigerators (Helmer iSeries)
Owner: LESLIE BARRETT
Status INWORKS
Effective Date: 22-Dec-2017 **Next Review Date:**

Non-Technical SOP

Title	**Blood Bank Refrigerators (Helmer iSeries)**
Prepared by	Stephanie Codina Date: 9/19/2011
Owner	Stephanie Codina Date: 9/19/2011

Laboratory Approval		
Print Name and Title	**Signature**	**Date**
Refer to the electronic signature page for approval and approval dates.		
Local Issue Date:	Local Effective Date:	

Review:		
Print Name	**Signature**	**Date**

Form revised 3/31/00

TABLE OF CONTENTS

1. PURPOSE

Red blood cells, whole blood, and thawed plasma products are stored at temperatures between 1-6°C. Reagents are stored at temperatures within the temperature range specified by the manufacturer. Blood product refrigerators must be equipped with a system for continuous temperature monitoring and an audible alarm. The alarm must activate at a temperature that will allow proper action to be taken before blood products reach unacceptable conditions. The temperature and alarms are frequently checked to ensure an appropriate temperature is maintained.

2. SCOPE

This procedure applies to all Helmer iSeries refrigerators in the blood bank.

3. RESPONSIBILITY

All blood bank staff members must understand appropriate refrigerator temperatures, refrigerator maintenance, and the steps that must be taken when a refrigerator is out of the appropriate temperature range.

4. DEFINITIONS

N/A

5. PROCEDURE

General Guidelines

Blood bank refrigerators:

1. Shall only contain blood products, reagents, and patient specimens. If the refrigerator contains reagents, the temperature and alarms will be adjusted to meet the manufacturer's storage recommendations (refrigerator range will be 2-6°C and the alarms will sound at 2.5°C and 5.5°C).
2. Shall be equipped with a fan for circulating air to ensure proper temperature is maintained throughout the refrigerator.
3. Shall be equipped with a visual and audible alarm system, and have continuous temperature monitoring device via a chart recorder. Alarm is set to activate at a temperature that will allow proper action to be taken before components reach

unacceptable temperature. The audible alarm sounds within the blood bank where there is 24 hour coverage.

4. Shall be connected to an emergency power source, alarm system has a battery backup.
5. Shall have a calibrated thermometer placed on upper and lower shelves near the door.
6. Shall have clearly designated areas for:
    a. Unprocessed blood products
    b. Uncrossmatched blood products separated by blood group and Rh type
    c. Crossmatched blood products separated by the last name of the patient to whom they are crossmatched
    d. Rejected, outdated, and quarantined blood products
    e. Directed donor and autologous blood products

Daily Quality Control

Step	Action
1	Review the recording chart. A. Verify that the recording chart is positioned at the correct date and time. If not, re-adjust to the correct date and time and document the correction on **both** the front of the recording chart and the "Blood Bank Refrigerator Temperature Form." B. Ensure the temperature has been within the acceptable temperature range for the previous 24 hours.
2	Read and record the following temperatures on the "Blood Bank Refrigerator Temperature Form." The acceptable temperature range is 2-6°C. A. Chart recorder read to the nearest whole number (for example, 2 or 3) B. Thermometer read to the nearest 0.5 degree (for example, 2.5 or 3.0) C. Digital display read to the nearest 0.1 degree (for example, 2.6 or 2.7)
3	Visually inspect the appearance of blood products in inventory. A. Examine blood products for hemolysis, clots, change in color or unusual color, comparison of segments with bag. B. Quarantine any unacceptable blood products in inventory. C. Record findings on the QC form.
4	Interpret the refrigerator's operation. A. S = satisfactory B. U = unsatisfactory. If unsatisfactory, a. Document corrective action on the reverse side of the "Blood Bank Refrigerator Temperature Form." b. Notify a supervisor if unable to resolve. c. If the temperature is out of range, move the contents of the refrigerator. Refer to section, "Blood Bank Refrigerator in Alarm."

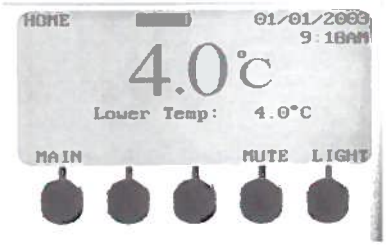
Form revised 3/31/00

Weekly Quality Control

Step	Action
1	Weekly QC is performed each Monday.
2	Obtain a new temperature chart. Be sure the new temperature chart is appropriate for the refrigerator and will record temperatures correctly. A. Stamp the back of the chart with the hospital address stamp. B. Stamp the back of the chart with the "date on" stamp. C. Record the refrigerator identification on the back of the chart to identify the storage container. D. Record the current date in the "date on" line. E. Initial the back of the chart next to the date.
3	On the chart recorder, press the "C" (chart change) button until the stylus begins to move to the left, then release the button. The LED will flash to indicate the current temperature range value.
4	When the stylus stops moving, remove the chart knob by turning it counter-clockwise, then swing it toward the top of the chart recorder.
5	Gently lift the stylus and remove the current temperature chart.
6	Press the new chart onto the chart recorder. Gently lift the stylus and turn the paper so the pen is on the correct day and time line groove.
7	Hold the chart paper to prevent it from turning while re-installing the chart knob. Turn the knob clockwise until snug.
8	Press and hold the "C" (chart change) button until the stylus starts to move to the right, then release the button.
9	Confirm the stylus is marking the correct temperature on the correct day/time. If not, repeat steps 3-9. Do not try to move or adjust the chart while it is on the recorder.
10	Record the following information on the removed chart and forward the chart to a supervisor or designee for review. A. Date removed B. Tech's initials

Quarterly Quality Control

Step	Action
1	**Calibrate the temperature probes** to ensure accuracy. Note: The chart and upper temperature probes are located at the top of the refrigerator. The lower temperature probe is located at the bottom, left-hand side of the refrigerator. A. Place a calibrated thermometer inside the refrigerator probe bottle along with the temperature probe(s). B. Allow the temperature to stabilize. . C. Read the temperature of the calibrated thermometer to the nearest 0.5°C and record on the QC form. D. Compare the reading of the thermometer to that of the digital reading on the refrigerator display. Record the reading of the digital display on the QC form. E. If the temperatures are ≥1°C different, determine how much to increase or decrease the offset value to make the monitor reading match the calibrated thermometer. For example, if the thermometer reads 3.0 and the digital display reads, 4.5, the offset will decrease by 1.5 so both temperatures match. F. Enter and save the temperature reading in the refrigerator configuration. a. On the refrigerator panel, press the first button to go to the "Main Menu." b. Press the "Down" button until "Edit Configuration" is highlighted then press "select." c. Press the "Down" button until "Temperature Calibration" is highlighted then press "select." d. Select the "Upper" temperature probe. e. Press the "Down" button until "Temperature" is highlighted. f. Press the "Inc" and "Dec" buttons until the temperature of the calibrated thermometer displays. g. Press the "down" button until "Store Calibration" is highlighted and press "select." h. Press the "home" key to exit. A message will appear stating that the new calibration is memorized. The current temperature value will change to the value you selected. Verify the value. i. Shortly after the change, the current value temperature may change. This is normal. G. Remove the calibrated thermometer from the refrigerator. H. Document the temperature probe calibration on the maintenance form. I. Notify a supervisor or designee immediately if a problem exists.

Step	Action
2	**Calibrate the temperature chart.** A. Place a calibrated thermometer inside the refrigerator probe bottle along with the temperature probe. B. Allow the temperature to stabilize. . C. Read the temperature of the calibrated thermometer to the nearest 0.5°C and record on the QC form. D. Compare the reading of the thermometer to that of the temperature chart. The chart and calibrated thermometer should agree within 1°C. E. Adjust the chart temperature as needed. a. Touch the left arrow "◀" to increase the temperature recorded on the chart. b. Touch the right arrow "▶" to decrease the temperature recorded on the chart.
3	**Test the alarms.** Helmer refrigerators electronically heat and cool the probe making manual alarm checks unnecessary. Calibrate the temperature probe prior to performing the alarm checks.  A. Low Alarm Test a. Identify the current setting for the high alarm set point. The alarm should activate at a temperature of 2.5°C or higher. b. From the "MAIN" screen, use the buttons to navigate to and select the "System Alarm Test & Status" option. c. The "System Alarm Test & Status" screen appears. d. Press the "up" or "down" button until the "Start Low Alarm Auto Test" option is highlighted. e. Press the "Enter" button. f. The "Home" screen will appear. Under the reading for the upper temperature probe, a "Low Alarm Test in Progress" message will appear. g. View the event log to determine the temperature at which the high temperature alarm activated. This should be 2.5°C or higher. h. Document the alarm check on the "Refrigerator Temperature Form." i. Notify a supervisor or designee immediately if a problem exists.

Form revised 3/31/00

Step	Action
3 Cont	B. High Alarm Test a. Identify the current setting for the high alarm set point. The alarm should activate at a temperature of 5.5°C or lower. b. From the "MAIN" screen, use the buttons to navigate to and select the "System Alarm Test & Status" option. c. The "System Alarm Test & Status" screen appears. d. Press the "up" or "down" button until the "Start High Alarm Auto Test" option is highlighted. e. Press the "Enter" button. f. The "Home" screen will appear. Under the reading for the upper temperature probe, a "High Alarm Test in Progress" message will appear. g. View the event log to determine the temperature at which the high temperature alarm activated. This should be 5.5°C or lower. h. Document the alarm check on the "Refrigerator Temperature Form." i. Notify a supervisor or designee immediately if a problem exists.
4	Test the **Power Failure Alarm** to ensure it activates in an appropriate amount of time. A. The power failure alarm is normally set at 3 minutes. B. Change the power failure alarm setting to zero minutes. a. From the main menu, press the "down" button until "Edit Configuration" is highlighted. Press "select." b. Press the "down" button until "Alarm Setpoints" is highlighted and press "select." c. Press the "down" button until "Power Failure Timeout" is highlighted. d. Press the "dec" button until the setting is "0 min." e. Press the "back" button. C. Turn off the power to the refrigerator. During a power failure, the backup batteries continue to provide power to the monitoring system. D. The power failure alarm should activate immediately. a. An audible alarm will sound. b. The "AC Power Failure" message will appear on the HOME screen. E. Turn the power back on. The power failure alarm should clear. F. Change the power failure alarm setting to 3 minutes. a. From the main menu, press the "down" button until "Edit Configuration" is highlighted. Press "select." b. Press the "down" button until "Alarm Setpoints" is highlighted and press "select." c. Press the "down" button until "Power Failure Timeout" is highlighted. d. Press the "inc" button until the setting is "3 min." e. Press the "back" button. G. Document the alarm failure check on the maintenance form. H. Notify a supervisor or designee immediately if a problem exists.

Step	Action
5	Test the **door open alarm**. A. Change the door open timer setting to zero minutes. a. From the main menu, press the "down" button until "Edit Configuration" is highlighted. Press "select." b. Press the "down" button until "Alarm Setpoints" is highlighted and press "select." c. Press the "down" button until "Door Ajar Alarm" is highlighted. d. Press the "dec" button until the setting is "0 min." e. Press the "back" button. B. Open the refrigerator door. C. The alarm should activate immediately. a. An audible alarm will sound. b. The "Door Open" message will appear on the "HOME" screen. D. Close the refrigerator door. The alarm should clear. E. Return the door open alarm to the 3 minute setpoint. a. From the main menu, press the "down" button until "Edit Configuration" is highlighted. Press "select." b. Press the "down" button until "Alarm Setpoints" is highlighted and press "select." c. Press the "down" button until "Door Ajar Alarm" is highlighted. d. Press the "inc" button until the setting is "3 min." e. Press the "back" button. F. Document the Door Open Alarm check on the maintenance form. G. Notify a supervisor or designee immediately if a problem exists.
6	Check for the **"No Battery" alarm** message. A. On the "Home" screen, check if either the "Low Battery" or "No Battery" alarm is flashing. Change the batteries if either message is present. a. Avoid reusing batteries that may have some charge remaining. Install all fresh batteries. b. For iC^3 models, the biomedical engineering department will have to replace the battery. B. Test the battery backup. a. Disconnect the refrigerator from AC power. The display should continue to display information. Replace the batteries if the display is blank then repeat this test. b. Reconnect the refrigerator to AC power. C. Document the "No Battery" alarm check on the maintenance form. D. Notify a supervisor or designee immediately if a problem exists.
7	**Check batteries** for the monitoring system. (This is the 9V battery located next to the temperature chart). A. Determine if the battery needs to be changed. a. Inspect the battery. A red light will flash if the battery is low on charge. b. Replace the battery if the light is flashing.

Step	Action
7 Cont	B. Test the alarm. a. Disconnect the battery from the connection. The red light will flash to show low battery charge. b. Reconnect the battery to the connection. The red light will stop flashing. c. Notify a supervisor if the alarm is not functioning as expected. C. Document the battery check on the refrigerator temperature form.
8	**Clean the condenser grill and external drain fan.** A. Protect the items in the freezer from exposure to adverse temperatures. B. Unplug the refrigerator to eliminate the potential for electric shock. C. Clean the condenser grill and the drain fan using a soft brush and vacuum cleaner. a. The condenser grill is the finned surface on the rear of the refrigerator. b. The external drain fan is located on the rear of the freezer, directly above the water evaporation tray. D. Document the cleaning on the maintenance form. E. Notify a supervisor or designee immediately if a problem exists.
9	Examine the probe bottles. Clean and refill if necessary. The probe bottles are filled with 10% glycerol.
10	Wipe the interior, exterior, and gasket with a damp cloth and mild soap to clean.

Annual Maintenance

Step	Action
1	Clean the probe bottles annually, when they visually appear dirty, and when the temperature alarm sounds repeatedly without an obvious cause. A. Remove the probes from the bottle. B. Remove the bottle from the bracket. C. Dump the probe bottle. Soak the bottle in a 10% bleach solution for 10 minutes then allow the bottle to dry. D. Wipe the probe with a hospital-approved bleach disinfectant wipe or a solution of 10% bleach. E. Refill the bottle with a 10% solution of glycerol and water. F. Allow the solution to cool before replacing the probes. G. Document "cleaning probe bottles" on the refrigerator chart to explain why the temperature is out of range as applicable. H. Document cleaning of probe bottles on the maintenance form.

As Needed Maintenance

Step	Action
1	Contact the Biomedical Engineering Department to replace burned out light bulbs in the refrigerator.

Refrigerator in Alarm

Step	Action
1	If the refrigerator alarm activates, push the alarm silence button to temporarily stop the audible alarm.
2	Determine whether there is an obvious cause for alarm activation and correct. If corrected, make a note on the temperature chart indicating alarm activation and reason. A. Refrigerator door ajar B. Outlet power failure / unit unplugged C. Refrigerator failure D. The probe solution is empty or low
3	If the cause of alarm is not identified or if the problem is not immediately correctable, A. Monitor the internal thermometer temperature of the refrigerator every **15 minutes** until the alarm stops **or** until all blood products have been removed. Document the temperature on the "Manual Product Storage Temperature" form. B. If the temperature reaches a low of 1.5°C or high of 5.5°C, all blood products must be relocated to another storage container that will maintain temperatures between 2-6°C. Reagents must be moved when the low temperature reaches 2.5°C. Blood products can be moved to: a. Another blood product refrigerator. Be sure to temporarily label the shelves so incorrect blood products are not inadvertently issued. b. ARC shipping boxes containing wet ice. Refer to procedure, "Shipping Boxes Packing and Quality Control." Be sure to label the boxes with the contents. c. A refrigerator in core lab, if available. However, blood products should not be stored with patient specimens or reagents. d. Transfer to a sister hospital (WAH, SGAH, GEC) e. Contact the blood supplier to attempt to ship products to another hospital. C. Document movement of the blood products on the temperature chart. Include the exact time and tech's initials. D. Place a calibrated thermometer in the temporary storage container with the blood products. E. Monitor the temperature at least every 4 hours. Document the temperature of the temporary storage container on the "Manual Product Storage Temperature" form.

Step	Action
4	A. Notify a supervisor or designee as soon as possible but definitely within 1 business day. B. Notify Quest biomedical engineering if the problem persists or if repairs are needed. C. Notify plant operations if there is a problem with the power supply.
5	When the problem is resolved **and** the refrigerator temperature returns to the acceptable range, A. Re-activate the alarm B. Return the blood products to the refrigerator C. Document replacement of blood products on the temperature chart with exact time and initials D. Continue to monitor and document manual temperatures every 4 hours for a minimum of 12 hours.

6. RELATED DOCUMENTS

Blood Bank Refrigerator Temperature Form (AG.F90)
Blood Bank Manual Product Storage Temperature Form (AG.F51)
Procedure: Equipment Policy for Transfusion Services
Procedure: Equipment Maintenance and Calibration, Transfusion Services
Procedure: Thermometer Verification and Installation

7. REFERENCES

1. Fung, MK, Grossman, BJ, Hillyer, CD, and Westhoff, CM. 2014. Technical Manual of the AABB, 18th ed. AABB Publishing, Bethesda, Maryland.
2. Standards for Blood Banks and Transfusion Services, 2016. AABB, 30th ed. AABB Publishing, Bethesda, Maryland.
3. Barry of Helmer Inc., Temperature Chart Recorder Operation and Service Manual,360076-1 Rev H; issued April 2009
4. Helmer Refrigerator Operation Manual, i.Series and Horizon Series, 360127-1/A.

8. REVISION HISTORY

Version	Date	Reason for Revision	Revised By	Approved By
000	10.8.12	Section 5: Updated instructions for reading the recording chart, Clarified wording of instructions for calibrating probes and temperature charts for clarity and performing battery checks, Removed instructions for changing light bulb and added instructions to call BioMed.	SCodina	NCacciabeve
001	11/21/17	Header: Added WAH Section 5: Added annual maintenance to bleach probe bottles Footer: Version # leading zero's dropped	SCodina	NCacciabeve

9. ADDENDA AND APPENDICES

N/A

Electronic Document Control System

Document No.: AG.F90[4]
Title: Refrigerator Temperature Form, Blood Bank
Owner: LESLIE BARRETT
Status INWORKS
Effective Date: 22-Dec-2017 **Next Review Date:**

Quest Diagnostics™

Shady Grove Medical Center
Washington Adventist Hospital

Refrigerator Temperature Form

Acceptable Range: 2-6 °C
All temp readings agree ≤ 2 °C

Serial Number: _____ Month/Yr _____

Day	CHECK DAILY							Tech
	Verified Temp Chart Recorder Operation	Chart Temp °C	Digital Temp °C	Internal Therm Temp Upper °C	Internal Therm Temp Lower °C	Visual Inspection of Blood Products S/U	Interp S/U	
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
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31								

S Satisfactory **U** Unsatisfactory–Circle unsatisfactory item/s. Document corrective action on back of sheet.

Reviewed By: _____

Quarterly Maintenance

___ Check (√) if quarterly maintenance not due during current month.

Calibrate Upper Digital and Chart Recorder Probes
Digital (Upper) Temp:_____ °C
Temperature Chart Temp:_____ oC
NIST Temp:_____°C
□ Acceptable □ Unacceptable
If unacceptable, document resolution on back. Tech_____ Date_____

Alarm Test
High Activation Temp:_____ (≤5.5°C)
Low Activation Temp:_____ (≥2.5°C)
□ Acceptable □ Unacceptable
If unacceptable, document resolution on back.
Tech_____ Date_____

Power Failure Alarm
□ Acceptable □ Unacceptable
If unacceptable, document resolution on back.
Tech_____ Date_____

Door Open Alarm
□ Acceptable □ Unacceptable
If unacceptable, document resolution on back.
Tech_____ Date_____

No Battery Alarm / Battery Test
□ Acceptable □ Unacceptable
If unacceptable, document resolution on back.
Tech_____ Date_____

Clean Condenser Grill and Drain Fan
□ Acceptable □ Unacceptable
If unacceptable, document resolution on back.
Tech_____ Date_____

Wipe Clean Interior, Exterior, and Gasket
□ Acceptable □ Unacceptable
If unacceptable, document resolution on back.
Tech_____ Date_____

Battery Check
□ Performed Tech_____ Date_____

Clean Probe Bottles
□ Performed Tech_____ Date_____

Electronic Document Control System

Document No.: SGAH.BB141[2]
Title: Blood Bank Refrigerators (Helmer iSeries with i.C3)
Owner: LESLIE BARRETT
Status INWORKS
Effective Date: 22-Dec-2017 **Next Review Date:**

Non-Technical SOP

Title	**Blood Bank Refrigerators (Helmer iSeries with i.C^3)**
Prepared by	Stephanie Codina Date: 10.8.2012
Owner	Stephanie Codina Date: 10.8.2012

Laboratory Approval		
Print Name and Title	**Signature**	**Date**
Refer to the electronic signature page for approval and approval dates.		
Local Issue Date:	Local Effective Date:	

Review:		
Print Name	**Signature**	**Date**

TABLE OF CONTENTS

1. PURPOSE

Red blood cells, whole blood, and thawed plasma products are stored at temperatures between 1-6°C. Reagents are stored at temperatures within the temperature range specified by the manufacturer. Blood product refrigerators must be equipped with a system for continuous temperature monitoring and an audible alarm. The alarm must activate at a temperature that will allow proper action to be taken before blood products reach unacceptable conditions. The temperature and alarms are frequently checked to ensure an appropriate temperature is maintained.

2. SCOPE

This procedure applies to all Helmer iSeries refrigerators with i.C^3 in the blood bank.

3. RESPONSIBILITY

All blood bank staff members must understand appropriate refrigerator temperatures, refrigerator maintenance, and the steps that must be taken when a refrigerator is out of the appropriate temperature range.

4. DEFINITIONS

i.C^3 – An intuitive user interface and icon-driven touchscreen.

5. PROCEDURE

General Guidelines

Blood bank refrigerators:

1. Shall only contain blood products, reagents, and patient specimens. If the refrigerator contains reagents, the temperature and alarms will be adjusted to meet the manufacturer's storage recommendations (refrigerator range will be 2-6°C and the alarms will sound at 2.5°C and 5.5°C).
2. Shall be equipped with a fan for circulating air to ensure proper temperature is maintained throughout the refrigerator.
3. Shall be equipped with a visual and audible alarm system, and have continuous temperature monitoring device via a chart recorder. Alarm is set to activate at a temperature that will allow proper action to be taken before components reach unacceptable temperature. The audible alarm sounds within the blood bank where there is 24 hour coverage.
4. Shall be connected to an emergency power source, alarm system has a battery backup.
5. Shall have a calibrated thermometer placed on upper and lower shelves near the door.
6. Shall have clearly designated areas for:
   a. Unprocessed blood products
   b. Uncrossmatched blood products separated by blood group and Rh type
   c. Crossmatched blood products separated by the last name of the patient to whom they are crossmatched
   d. Rejected, outdated, and quarantined blood products
   e. Directed donor and autologous blood products

Daily Quality Control

Step	Action
1	Review the recording chart. A. Verify that the recording chart is positioned at the correct date and time. If not, re-adjust to the correct date and time and document the correction on **both** the front of the recording chart and the "Blood Bank Refrigerator Temperature Form." B. Ensure the temperature has been within the acceptable temperature range for the previous 24 hours.
2	Read and record the following temperatures on the "Blood Bank Refrigerator Temperature Form." The acceptable temperature range is 2-6°C. A. Chart recorder read to the nearest whole number (for example, 2 or 3) B. Thermometer read to the nearest 0.5 degree (for example, 2.5 or 3.0) C. Digital display read to the nearest 0.1 degree (for example, 2.6 or 2.7)
3	Visually inspect the appearance of blood products in inventory. A. Examine blood products for hemolysis, clots, change in color or unusual color, comparison of segments with bag. B. Quarantine any unacceptable blood products in inventory. C. Record findings on the QC form.

Step	Action
4	Interpret the refrigerator's operation. A. S = satisfactory B. U = unsatisfactory. If unsatisfactory, a. Document corrective action on the reverse side of the "Blood Bank Refrigerator Temperature Form." b. Notify a supervisor if unable to resolve. c. If the temperature is out of range, move the contents of the refrigerator. Refer to section, "Blood Bank Refrigerator in Alarm."

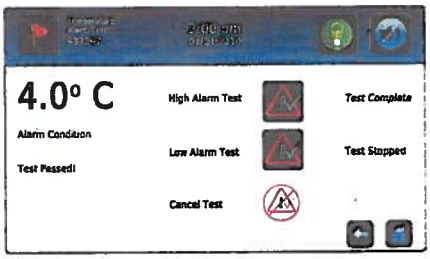
Weekly Quality Control

Step	Action
1	Weekly QC is performed each Monday.
2	Obtain a new temperature chart. Be sure the new temperature chart is appropriate for the refrigerator and will record temperatures correctly. A. Stamp the back of the chart with the hospital address stamp. B. Stamp the back of the chart with the "date on" stamp. C. Record the refrigerator identification on the back of the chart to identify the storage container. D. Record the current date in the "date on" line. E. Initial the back of the chart next to the date.
3	On the chart recorder, press the "C" (chart change) button until the stylus begins to move to the left, then release the button. The LED will flash to indicate the current temperature range value.
4	When the stylus stops moving, remove the chart knob by turning it counter-clockwise, then swing it toward the top of the chart recorder.
5	Gently lift the stylus and remove the current temperature chart.
6	Press the new chart onto the chart recorder. Gently lift the stylus and turn the paper so the pen is on the correct day and time line groove.
7	Hold the chart paper to prevent it from turning while re-installing the chart knob. Turn the knob clockwise until snug.
8	Press and hold the "C" (chart change) button until the stylus starts to move to the right, then release the button.
9	Confirm the stylus is marking the correct temperature on the correct day/time. If not, repeat steps 3-9. Do not try to move or adjust the chart while it is on the recorder.

Step	Action
10	Record the following information on the removed chart and forward the chart to a supervisor or designee for review. A. Date removed B. Tech's initials

Quarterly Quality Control

Step	Action
1	**Calibrate the temperature probes** to ensure accuracy. Note: The chart and upper temperature probes are located at the top of the refrigerator. The lower temperature probe is located at the bottom, left-hand side of the refrigerator. A. Place a calibrated thermometer inside the refrigerator probe bottle along with the temperature probe(s). B. Allow the temperature to stabilize. . C. Read the temperature of the calibrated thermometer to the nearest 0.5°C and record on the QC form. D. Compare the reading of the thermometer to that of the digital reading on the refrigerator display. Record the reading of the digital display on the QC form. E. If the temperatures are ≥1°C different, determine how much to increase or decrease the offset value to make the monitor reading match the calibrated thermometer. For example, if the thermometer reads 3.0 and the digital display reads, 4.5, the offset will decrease by 1.5 so both temperatures match. F. Enter and save the temperature reading in the refrigerator configuration. a. Touch the i.C3 APPs button  b. Touch the settings button  c. Touch "Temperature Calibration" d. Touch the "+" plus or "-" minus buttons to increase or decrease the value to match the measured value. G. Remove the calibrated thermometer from the refrigerator. H. Document the temperature probe calibration on the maintenance form. I. Notify a supervisor or designee immediately if a problem exists.

Step	Action
2	**Calibrate the temperature chart.** A. Place a calibrated thermometer inside the refrigerator probe bottle along with the temperature probe. B. Allow the temperature to stabilize. . C. Read the temperature of the calibrated thermometer to the nearest 0.5°C and record on the QC form. D. Compare the reading of the thermometer to that of the temperature chart. The chart and calibrated thermometer should agree within 1°C. E. Adjust the chart temperature as needed. a. Touch the left arrow "◀" to increase the temperature recorded on the chart. b. Touch the right arrow "▶" to decrease the temperature recorded on the chart.
3	**Test the alarms.** Helmer refrigerators electronically heat and cool the probe making manual alarm checks unnecessary. Calibrate the temperature probe prior to performing the alarm checks.  A. Low Alarm Test a. Identify the current setting for the low alarm setpoint. b. Touch the i.C3 APPs button  c. Touch "Temperature Alarm Test." d. The alarm screen shown above will display. e. Touch the "Low Alarm Test" button to start the low alarm test. The button will begin to flash and the message, "Peltier Test Probe Cooling" message will appear. f. Watch the temperature at which the probe triggers the alarm to sound. This should be at 2.5°C or above. g. Document the alarm check on the "Refrigerator Temperature Form." h. Notify a supervisor or designee immediately if a problem exists

Step	Action
3 Cont	B. High Alarm Test a. Identify the current setting for the high alarm setpoint. b. Touch the i.C3 APPs button  c. Touch "Temperature Alarm Test." d. The alarm screen shown above will display. e. Touch the "High Alarm Test" button to start the high alarm test. The button will begin to flash and the message, "Peltier Test Probe Warming" message will appear. f. Watch the temperature at which the probe triggers the alarm to sound. This should be at 5.5°C or below. g. Document the alarm check on the "Refrigerator Temperature Form." h. Notify a supervisor or designee immediately if a problem exists
4	Test the **Power Failure Alarm** to ensure it activates in an appropriate amount of time. A. The power failure alarm is normally set at 3 minutes. B. Change the power failure alarm setting to zero minutes. a. Touch the i.C3 APPs button  b. Touch the settings button  c. Touch "Alarm Settings." Note, you will have to scroll down to see this option. Scroll by rubbing your finger up and down the side of the screen. d. Touch the "-" minus button to decrease the value to zero. C. Turn off the power to the refrigerator. During a power failure, the backup batteries continue to provide power to the monitoring system. D. The power failure alarm should activate immediately. a. An audible alarm will sound. b. The "Power Failure" message will appear on the screen. E. Turn the power back on. The power failure alarm should clear F. Change the power failure alarm setting to 3 minutes. a. Touch the i.C3 APPs button  b. Touch the settings button  c. Touch "Alarm Settings." Note, you will have to scroll down to see this option. Scroll by rubbing your finger up and down the side of the screen. d. Touch the "+" plus button to increase the value to three. G. Document the alarm failure check on the maintenance form. H. Notify a supervisor or designee immediately if a problem exists.

Step	Action
5	Test the **door open alarm**. A. The door open alarm is normally set at 3 minutes. B. Change the door open alarm setting to zero minutes. a. Touch the i.C3 APPs button  b. Touch the settings button  i.C³ Settings c. Touch "Alarm Settings." Note, you will have to scroll down to see this option. Scroll by rubbing your finger up and down the side of the screen. d. Touch the "-" minus button to decrease the value to zero. C. Open the refrigerator door. D. The door open alarm should activate immediately. a. An audible alarm will sound. b. The "Door Open" message will appear on the screen. E. Close the door. The door open alarm should clear F. Change the door open alarm setting to 3 minutes. a. Touch the i.C3 APPs button  b. Touch the settings button  i.C³ Settings c. Touch "Alarm Settings." Note, you will have to scroll down to see this option. Scroll by rubbing your finger up and down the side of the screen. d. Touch the "+" plus button to increase the value to three. G. Document the Door Open Alarm check on the maintenance form. H. Notify a supervisor or designee immediately if a problem exists.
6	Check for the **"No Battery" alarm** message. A. On the "Home" screen, check if either the "Low Battery" or "No Battery" alarm is flashing. Change the batteries if either message is present. a. Avoid reusing batteries that may have some charge remaining. Install all fresh batteries. b. For iC^3 models, the biomedical engineering department will have to replace the battery. B. Test the battery backup. a. Disconnect the refrigerator from AC power. The display should continue to display information. Replace the batteries if the display is blank then repeat this test. b. Reconnect the refrigerator to AC power. C. Document the "No Battery" alarm check on the maintenance form. D. Notify a supervisor or designee immediately if a problem exists.

Step	Action
7	**Check batteries** for the monitoring system. (This is the 9V battery located next to the temperature chart). A. Determine if the battery needs to be changed. a. Inspect the battery. A red light will flash if the battery is low on charge. b. Replace the battery if the light is flashing. B. Test the alarm. a. Disconnect the battery from the connection. The red light will flash to show low battery charge. b. Reconnect the battery to the connection. The red light will stop flashing. c. Notify a supervisor if the alarm is not functioning as expected. C. Document the battery check on the refrigerator temperature form.
8	**Clean the condenser grill and external drain fan.** A. Protect the items in the refrigerator from exposure to adverse temperatures. B. Unplug the refrigerator to eliminate the potential for electric shock. C. Clean the condenser grill and the drain fan using a soft brush and vacuum cleaner. a. The condenser grill is the finned surface on the rear of the refrigerator. b. The external drain fan is located on the rear of the refrigerator, directly above the water evaporation tray. D. Document the cleaning on the maintenance form. E. Notify a supervisor or designee immediately if a problem exists.
9	Examine the probe bottles. Clean and refill if necessary. The probe bottles are filled with 10% glycerol.
10	Wipe the interior, exterior, and gasket with a damp cloth and mild soap to clean.

Annual Maintenance

Step	Action
1	Clean the probe bottles annually, when they visually appear dirty, and when the temperature alarm sounds repeatedly without an obvious cause. A. Remove the probes from the bottle. B. Remove the bottle from the bracket. C. Dump the probe bottle. Soak the bottle in a 10% bleach solution for 10 minutes then allow the bottle to dry. D. Wipe the probe with a hospital-approved bleach disinfectant wipe or a solution of 10% bleach. E. Refill the bottle with a 10% solution of glycerol and water. F. Allow the solution to cool before replacing the probes.

Step	Action
1 Cont	G. Document "cleaning probe bottles" on the refrigerator chart to explain why the temperature is out of range as applicable. H. Document cleaning of probe bottles on the maintenance form.

As Needed Maintenance

Step	Action
1	Notify the Biomedical Engineering department to replace burned out light bulbs in the refrigerator.

Refrigerator in Alarm

Step	Action
1	If the refrigerator alarm activates, push the alarm silence button to temporarily stop the audible alarm.
2	Determine whether there is an obvious cause for alarm activation and correct. If corrected, make a note on the temperature chart indicating alarm activation and reason. A. Refrigerator door ajar B. Outlet power failure / unit unplugged C. Refrigerator failure D. The probe solution is empty or low
3	If the cause of alarm is not identified or if the problem is not immediately correctable, A. Monitor the internal thermometer temperature of the refrigerator every **15 minutes** until the alarm stops **or** until all blood products have been removed. Document the temperature on the "Manual Product Storage Temperature" form. B. If the temperature reaches a low of 1.5°C or high of 5.5°C, all blood products must be relocated to another storage container that will maintain temperatures between 2-6°C. Reagents must be moved when the low temperature reaches 2.5°C. Blood products can be moved to: a. Another blood product refrigerator. Be sure to temporarily label the shelves so incorrect blood products are not inadvertently issued. b. ARC shipping boxes containing wet ice. Refer to procedure, "Shipping Boxes Packing and Quality Control." Be sure to label the boxes with the contents. c. A refrigerator in core lab, if available. However, blood products should not be stored with patient specimens or reagents. d. Transfer to a sister hospital (WAH, SGMC, GEC)

Form revised 3/31/00

Step	Action
	e. Contact the blood supplier to attempt to ship products to another hospital. C. Document movement of the blood products on the temperature chart. Include the exact time and tech's initials. D. Place a calibrated thermometer in the temporary storage container with the blood products. E. Monitor the temperature at least every 4 hours. Document the temperature of the temporary storage container on the "Manual Product Storage Temperature" form.
4	A. Notify a supervisor or designee as soon as possible but definitely within 1 business day. B. Notify Quest biomedical engineering if the problem persists or if repairs are needed. C. Notify plant operations if there is a problem with the power supply.
5	When the problem is resolved **and** the refrigerator temperature returns to the acceptable range, A. Re-activate the alarm B. Return the blood products to the refrigerator C. Document replacement of blood products on the temperature chart with exact time and initials D. Continue to monitor and document manual temperatures every 4 hours for a minimum of 12 hours.

6. RELATED DOCUMENTS

Blood Bank Refrigerator Temperature Form (AG.F90)
Blood Bank Manual Product Storage Temperature Form (AG.F51)
Procedure: Equipment Maintenance and Calibration, Transfusion Services
Procedure: Equipment Policy for Transfusion Services
Procedure: Thermometer Verification and Installation

7. REFERENCES

1. Fung, MK, Grossman, BJ, Hillyer, CD, and Westhoff, CM. 2014. Technical Manual of the AABB, 18th ed. AABB Publishing, Bethesda, Maryland.
2. Standards for Blood Banks and Transfusion Services, 2016. AABB, 30th ed. AABB Publishing, Bethesda, Maryland.
3. Helmer i.C3 User Guide, 360129-1/C.
4. Helmer Refrigerator Operation Manual, i.Series and Horizon Series, 360127-1/A.

8. REVISION HISTORY

Version	Date	Reason for Revision	Revised By	Approved By
000	4.7.17	Section 5: Fixed errors in steps 3E and 5E. Section 7: Updated references. Footer: Version # leading zero's dropped due to new EDCS in use as of 10/7/13.	SCodina	NCacciabeve
1	11/21/17	Section 5: Added annual maintenance requirement; Section 6: Updated documents Section 7: Updated references	SCodina	NCacciabeve

9. ADDENDA AND APPENDICES

N/A

Electronic Document Control System

Quest Diagnostics

Document No.: AG.F90[4]
Title: Refrigerator Temperature Form, Blood Bank
Owner: LESLIE BARRETT
Status INWORKS
Effective Date: 22-Dec-2017 **Next Review Date:**

Quest Diagnostics

Shady Grove Medical Center
Washington Adventist Hospital

Refrigerator Temperature Form

Acceptable Range: 2-6 °C
All temp readings agree ≤ 2 °C

Serial Number: _____ Month/Yr _____

Day	CHECK DAILY							Tech
	Verified Temp Chart Recorder Operation	Chart Temp °C	Digital Temp °C	Internal Therm Temp Upper °C	Internal Therm Temp Lower °C	Visual Inspection of Blood Products S/U	Interp S/U	
1								
2								
3								
4								
5								
6								
7								
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30								
31								

S Satisfactory **U** Unsatisfactory--Circle unsatisfactory item/s. Document corrective action on back of sheet.

Reviewed By: _____

Quarterly Maintenance

___ Check (√) if quarterly maintenance not due during current month.

Calibrate Upper Digital and Chart Recorder Probes	Digital (Upper) Temp:_____ °C Temperature Chart Temp:_____ oC NIST Temp:_____ °C □ Acceptable □ Unacceptable If unacceptable, document resolution on back. Tech_____ Date_____
Alarm Test	High Activation Temp:_____ (≤5.5°C) Low Activation Temp:_____ (≥2.5°C) □ Acceptable □ Unacceptable If unacceptable, document resolution on back. Tech_____ Date_____
Power Failure Alarm	□ Acceptable □ Unacceptable If unacceptable, document resolution on back. Tech_____ Date_____
Door Open Alarm	□ Acceptable □ Unacceptable If unacceptable, document resolution on back. Tech_____ Date_____
No Battery Alarm / Battery Test	□ Acceptable □ Unacceptable If unacceptable, document resolution on back. Tech_____ Date_____
Clean Condenser Grill and Drain Fan	□ Acceptable □ Unacceptable If unacceptable, document resolution on back. Tech_____ Date_____
Wipe Clean Interior, Exterior, and Gasket	□ Acceptable □ Unacceptable If unacceptable, document resolution on back. Tech_____ Date_____
Battery Check	□ Performed Tech_____ Date_____
Clean Probe Bottles	□ Performed Tech_____ Date_____