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Work Instruction

Title: TC Infrared Thermometer		**WI Number** SFOWI-0049 **Revision:** 8
Department: Immunohematology **Area:** 2425 Geary Blvd SFO Hospital Lab	***Document is in the Final Approval Process. 2 - approvals are required***	
Type of Document: Work Instruction		**Review Period -** 340 **Days**

PURPOSE

Handheld Infrared Thermometers are fast, accurate and convenient—ideal for remote monitoring. The noncontact feature allows temperature measurements to be taken without touching the product being tested. This is not only important for the safety of the worker but also limits potential product contamination. The response time (detection to display) of an IR thermometer is typically about one-half second. A handheld IR thermometer can only measure the surface temperature of an object and not the internal temperature.

The Noncontact laser infrared thermometer will be used to read the temperature of Packed Red Blood Cells (RBC) and thawed plasma returned to the Transfusion Service within 30 minutes from inpatient nursing units and Emergency Department.

The Infrared Thermometer will not be used when blood product temperature is monitored by affixed temperature indicator. The acceptable temperature for a unit of Red Blood Cell or thawed plasma is less than 10°C.

SCOPE

Transfusion Service Staff

REAGENTS

Not Applicable

EQUIPMENT

A. Infrared Thermometer
B. NIST traceable thermometer.

SPECIMEN

A. Expired unit of RBC or 33% Glycerol bag for calibration studies
B. Returned RBC with no temperature indicator
C. Returned Thawed plasma

CONTROLS

A. **Calibrate Infrared Thermometer Annually**

1. **Complete BF0030 Calibration of Infrared Thermometer form:**
   a. Record the serial number and calibration expiration date of the NIST thermometer
   b. Record the serial number of the Infrared Thermometer (IR) to be tested.
   c. Document the room temperature.
2. **Use an expired unit of RBC or 33% Glycerol bag:**
   a. Remove aliquot labels on the back of the unit to expose the surface of the unit bag.
   b. Insert the NIST thermometer into the bag and seal with Parafilm.
   c. Place the unit with the NIST thermometer back in the refrigerator for 30 minutes to equilibrate the temperature.
3. **Compare temperature of NIST and IR thermometers:**
   a. Remove the unit from the refrigerator and place in a blood container.
   b. Keep the sensor at the distance of approximately 8 inches from the surface of the RBC.
   c. Press the Trigger.
   d. Record the MAX reading displayed on the IR thermometer and the NIST thermometer reading.
   e. Mix the content of the blood bag.
   f. Repeat temperature reading every 5 minutes. Continue taking readings until the NIST thermometer reaches 10 $^{\circ}$C.
4. **Result analysis:**
   a. The acceptable reading is IR thermometer +/- 2 $^{\circ}$C compared to NIST thermometer reading.
   b. If calibration results are acceptable, complete a new calibration sticker and affix it to the IR.

PROCEDURES

A. **Using the Infrared Thermometer**

1. Check the time unit(s) was dispensed. If it was more than 30 minutes, the temperature would be over 10^{0}C and unacceptable for return to inventory.
2. Read the temperature of the returned unit immediately.
3. Aim the laser beam at the target with a distance of about **8** inches.
4. Press the Trigger to display the surface temperature.
5. Record the temperature reading in the LIS for RBC and thawed plasma.

B. **Result Analysis**

1. The NIST thermometer will measure the core temperature, the IR thermometer will measure the surface temperature of the blood bag. The two temperatures will not be the same.
2. When compared to the NIST reading of the core temperature, the Infrared Thermometer will demonstrate a higher temperature each time a reading is taken.
3. The acceptable temperature for the return of a blood product will be based on the surface temperature readout by the Infrared Thermometer. Because the surface temperature is higher than the core temperature, RBC units are acceptable for reissue if the IR thermometer reads less than 10 ^{0}C.

C. **Maintain by Cleaning Sensor Lens As Needed**

1. Clean sensor lens with a soft cloth or cotton swab moistened with water.
2. Allow the lens to fully dry before using.
3. Do not submerge any part of the IR.

D. **Limitations**

1. IR thermometers only measure surface temperature and do not measure through glass, liquids or other transparent surfaces.
2. They also may require adjustments depending upon the surface being measured especially if it is a highly reflective surface.
3. IR thermometers can be temporarily affected by frost, moisture, dust, fog, smoke, other particles in the air, rapid changes in ambient temperature and proximity to a radio frequency with an electromagnetic field strength of three volts per meter or greater.
4. Temperature measurement may be inaccurate when IR is low battery.

PROCEDURE NOTES

A. USE EXTREME CAUTION WHEN OPERATING THE LASER. When IR thermometer is in use, do not look directly into the laser beam. Permanent eye damage may result. NEVER POINT THE DEVICE TOWARD ANYONE 'S EYES.

B. The IR Thermometer is always set to read Celsius.

C. The accuracy of the handheld IR thermometer is primarily determined by the distance-to-spot ratio (D/S Ratio). The FLUKE IR 59 MAX has a D/S ratio of 8:1, which means that at a distance of 8 inches, the thermometer will measure an area of 1 inch.

D. The default Emissivity is 0.95.

E. Battery Replacement

1. The FLUKE IR 59 MAX uses one AA IEC LR06 battery.
2. Change battery when low battery indicator displays to prevent inaccurate measurements.

F. Recommended 'Recipe' for simulated blood products from Williams Laboratories:

Blood Product	% Glycerol (by weight in water)	Volume of water per 1 liter of mix	Volume of Glycerol per 1 liter of mix*
Plasma	10%	900mL	80mL
Whole Blood	22%	780mL	176mL
RBCs	33%	670mL	264mL

* The density of Glycerol is 1.25 g/mL.

REFERENCE(S)

A. User Manual, FLUKE Infrared Thermometer 59 MAX, Fluke Corporation, P.O. Box 9090, Everett, WA 98206-9090.

B. AABB Standards for Blood Banks and Transfusion Services, current edition, Bethesda, MD.

C. AABB Technical Manual, current edition.

Associated Documents:

External Documents

Associated Documents:

SFOFCD-0282 -- BF0030 Calibration of Infrared Thermometer
SFOWI-0111 -- TS-Dispensing Blood and Blood Components

Click to Open an Associated Document

Documents Generated:

Document Revision History:

Revision: 8	**Date Created:** 09/12/2005 **Date of Last Revision:** 06/14/2018	**Last Approval Date:** 09/06/2017

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Reason for Change:

Revision:	Sec/Para Changed	Change Made:	Date
1	N/A	Initial Issue of Document	4/17/11
2	Procedure	Updated version number	4/22/11
3	Approver	Change Lab Director	6/1/11
4	Approver Whole document	New Lab Director. Changed from recording temperature on Return Log to documenting in the computer system.	2/12/13
5	Approver	New BB Medical Director.	11/18/13
6	Approver	New CLIA Director.	8/23/16
7	Whole document	Revised due to change in model of the Infrared Thermometer.	8/29/17
8	Purpose Specimen A., Controls A.2, Procedure Note F.	Replaced Safe-T-Vue 10 with temperature indicator. Added 33% Glycerol bag for calibration studies.	5/18/18

Notification List:

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Document History Section