



**INTEGRATED BIOREPOSITORY OF H3AFRICA UGANDA**

**MAKERERE UNIVERSITY  
COLLEGE OF HEALTH SCIENCES**

**STANDARD OPERATING PROCEDURE**

TITLE: **TEMPERATURE LIMITS AND ALARM RESPONSE**

PAGE 1 of 7

SOP #: **IBRH<sub>3</sub>AU-SOP-EQT-001.1**

Effective Date: **09/01/2014**

Next Rev: **DEC 2015**

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**VALIDATION AND RETIREMENT**

	NAME	DATE
Validated by:		
Retired by:		

**ACKNOWLEDGEMENT OF READING AND UNDERSTANDING**

**I have received and understood the training on this SOP. If I have not understood the training I have asked the trainer to retrain me to ensure that I completely understand all the requirements.**

	NAME	SIGNATURE	DATE
1.			
2.			
3.			
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### 1 INTRODUCTION

The IBRH3AU requires that all biospecimen received and processed must be stored properly such as to maintain biospecimen integrity.

### 2 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to ensure biospecimen are kept at the optimal storage temperature and describes how to respond if the temperature falls outside optimal ranges.

### 3 SCOPE

This SOP applies to all IBRH3AU laboratory personnel.

### 4 EQUIPMENT

#### 4.1 Personal Protective Equipment (PPE)

- 5.1 Lab coat
- 5.2 Protective eye wear
- 5.3 Gloves

#### 4.2 General Lab Equipment

- 5.1 Dry ice
- 5.2 Cooler box
- 5.3 Response to Freezer Alarm SOP
- 5.4 Temperature Monitor and Alarm Manual

### 5 PROCEDURES

#### 5.1 Typical storage temperatures are:

- 5.1.1 Ambient/Room temperature: **10<sup>0</sup>c to 30<sup>0</sup>c**

This is a temperature typically used for post collection processing and is intended to remain warm enough to allow for general chemical reactions, but cool enough not to denature physiological proteins (Some proteins denature at high body temperature).



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### **5.1.2 Refrigerated Temperature: 2<sup>0</sup>c to 8<sup>0</sup>c**

This is a temperature typically used for processed specimens that shall not be frozen (freezing creates ice crystals that penetrate cell membranes), but cool enough to significantly reduce bacterial growth.

### **5.1.3 Frozen Temperature: -20<sup>0</sup>c**

This is a temperature typically used for domestic freezing, as most food products freeze and remain edible for several months. As cooled air holds less moisture (moisture content is cut in half per 10<sup>0</sup>C reduction) dry specimens remain dryer at cold temperatures.

### **5.1.4 Ultra Low Freezing Temperature: <-70<sup>0</sup>C**

This is a temperature typically used for clinical specimens as they may have a depressed freezing point to below -20<sup>0</sup>C (As freezing occurs water is crystallized out of the sample resulting in serious changes in ion concentration and pH). It is paramount to the integrity of clinical specimens that they are stored at temperatures well below -20<sup>0</sup>C.

### **5.1.5 Liquid Nitrogen Temperature: <-130<sup>0</sup>C**

This is a temperature typically used for storage of cells (As diffusion across cell membranes stops and water in solutions stabilizes as an amorphous solid at -130<sup>0</sup>C). Prolonged storage of cells at temperatures above this temperature will result in loss of viability of the cells. Below -130<sup>0</sup>C, even the most temperature sensitive cells can remain viable for long periods of time.

## **5.2 Alarm set points/temperatures**

### **5.2.1 Ambient/Room Temperature: 10<sup>0</sup>C to 30<sup>0</sup>C**

Emergency response should be completed before the ambient temperature reaches 30<sup>0</sup>C. Set alarms at 25<sup>0</sup>C and 15<sup>0</sup>C.

### **5.2.2 Refrigerated Temperature: 2<sup>0</sup>C to 8<sup>0</sup>C**

Emergency response must be completed before freezing and avoiding high temperatures. In regular refrigerators set alarms at 1<sup>0</sup>C and 10<sup>0</sup>C.

### **5.2.3 Frozen temperature -20<sup>0</sup>C**

In regular freezers set alarms at -25<sup>0</sup>C and -10<sup>0</sup>C.

### **5.2.4 Ultra low freezing temperature: <-70<sup>0</sup>C**

Emergency response must be completed before reaching -55<sup>0</sup>C. Set ULT freezers alarms at -90<sup>0</sup>C and -65<sup>0</sup>C.



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#### **5.2.5 Liquid nitrogen temperature: <-130<sup>o</sup>c**

Emergency response must be completed before reaching -130°C. In regular LN2 freezer tanks set alarms at Liquid Nitrogen level of 2 inches and set -140°C.

#### **5.2.6 Completion and follow up:**

This SOP is completed when alarm/alarms are attended to, assessment made whether specimens need to be moved or not, and specimens successfully moved into a functional freezer if need be.

## **6 ATTACHMENTS**

- 6.1 Freezer and Refrigerator maintenance logs; IBRH3AU-FORM- 010, 011 and 013
- 6.2 Liquid Nitrogen maintenance log; Attachment 1



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### 7 REVISION HISTORY

Revision No	Effective Date	Description of Changes Made from Preceding Revision	Approved by/ Date

### ANNEX 1: DOCUMENTATION OF SUGGESTED CHANGES TO THIS SOP

CLAUSE	SUGGESTION	BY	DATE



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**Attachment 1**

**NAME OF TANK:** LS 6000

Date	Level	Comment	Initial of technician

**NITROGEN TANK REFILL LOG**

Date	Level before refill	Level after refill	comment	Initial of tech

**Notes:** Liquid nitrogen level equivalents (LS series)

Model (LS series)	Liquid Nitrogen Level Equivalents	
	Inches	centimeters
LS 750	1.0 in.=2.6 litres	1cm=1.0 litres
LS 3000, LS 4500, LS 6000	1.0in.=6.6 litres	1cm=2.6 litres

Measurements are done on Monday and Thursday

1. Minimum operating limit.....
2. Technician in charge....
3. Emergency contacts.....