

**Frederick National Laboratory
for Cancer Research**

sponsored by the National Cancer Institute

Vaccine, Immunity and Cancer Directorate
Standard Operating Procedure

SOP Title: Use and Maintenance of Laboratory Convection Incubators

Document ID: 26014

Version

3.0

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Supersedes

2.0

Effective Date: 17Sep21

Written by:

Printed Name:

Title:

Signature/Date:

Approved by:

Printed Name:

Title:

Signature/Date:

QA Approved by:

Printed Name:

Title:

Signature/Date:

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1. PURPOSE

- 1.1 The purpose of this procedure is to describe the proper use and handling of the Convection Incubator.

2. SCOPE

- 2.1 This procedure applies to all Convection Incubators.

3. REFERENCES

- 3.1 Thermo Scientific Heratherm Convection Incubator (Model OMH) User Manual
3.2 Thermo Scientific Heratherm Convection Incubator (Model IMP) User Manual
3.3 10007: Non-Routine Equipment Maintenance
3.4 10009: General Record Review
3.5 15000: Waste Disposal at the Advanced Technology Research Facility

4. RESPONSIBILITIES

- 4.1 The Research Associate, hereafter referred to as Analyst, is responsible for reviewing and following this procedure, and documenting performance of equipment maintenance.
4.2 The Scientific Manager or designee is responsible for training personnel in this procedure and reviewing associated documentation.
4.3 The Quality Assurance Specialist is responsible for quality oversight and approval of this procedure.
4.4 Trained personnel perform equipment maintenance record review per "10009: General Record Review."

5. DEFINITIONS

- 5.1 As Needed Maintenance – maintenance that is performed outside of routine maintenance but is not performed in response to equipment malfunction.
5.2 Non-Routine Maintenance – maintenance that is performed in response to equipment malfunction or failure.

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- 5.3 Routine Maintenance – maintenance that is performed at planned intervals to identify and prevent problems before they result in equipment failure.

6. REAGENTS, MATERIALS, AND EQUIPMENT

- 6.1 Convection Incubator (Thermo Scientific Models OMH and IMP)
- 6.2 Primary Disinfectant (Cavicide, FNLCR Warehouse, Cat # 79300360 or equivalent)
- 6.3 Secondary Disinfectant (Ster-ahol, VWR, Cat # 14003-358 or equivalent)
- 6.4 Thermometer or Probe, National Institute of Standards and Technology (NIST) certified
- 6.5 Wipe, Low-Lint, Wypalls (Warehouse, Cat # 79300335 or equivalent)
- 6.6 Wire Tube Rack, Coated (Sigma, Cat # HS120089 or equivalent)

7. HEALTH AND SAFETY CONSIDERATIONS

- 7.1 Proper safety precautions should be taken while working in a laboratory setting. This includes, but is not limited to, proper protective equipment such as lab coats, safety glasses, closed-toe shoes, and non-latex gloves.
- 7.2 Refer to the respective Safety Data Sheet (SDS) when working with any chemicals.
- 7.3 Refer to “15000: Waste Disposal at the Advanced Technology Research Facility,” “EHS-WM-1: Disposal and Minimization of Chemical Waste,” and “EHS-WM-2: Biological Waste Handling and Disposal” for waste disposal processes.

8. PROCEDURE PRINCIPLES

- 8.1 See Attachment 1 for all Incubator Instrument Panel Display references; D1-D6 and K1-K5.
- 8.2 After completion of settings change, or 30 seconds after any entries have been inputted, the Default Mode on Incubator Instrument Panel Display will turn on showing current Incubator temperature.
- 8.3 Do not load any samples directly on bottom surface of Incubator to prevent those samples from overheating.
- 8.4 Arrange samples uniformly within Incubator and not too close to internal Incubator walls to allow for uniform heating of all samples.

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- 8.5 Wire tube racks may be placed on Incubator shelves to set plates on during incubation to avoid direct stacking of plates while increasing total area available for use.

9. OPERATION

9.1 Switching Incubator ON:

- 9.1.1 In display window on front panel, the readiness indicator icon (D4 on the display area) is illuminated.
- 9.1.2 Press On/Off button for two seconds. An initialization routine will automatically be run after Incubator has been powered up. Once initialization has completed, display will light up and current workspace temperature will appear in temperature display pane (D1).

9.2 Switching Incubator OFF:

Press On/Off button for two seconds. The display window light turns off except for readiness indicator icon (D4 on display area).

Note: If temperature in the workspace is $\geq 50^{\circ}\text{C}$ when switched off, a residual heat temperature readout will remain on in the display.

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9.2.1 If required, unplug the AC power plug to power down Incubator completely.

9.3 Setting the Temperature:

9.3.1 Press MENU (K1 on display area) to activate menu bar, then press LEFT (K2) to select "Temperature" icon and press MENU (K1) to confirm.

9.3.2 In flashing settings pane "Set", press RIGHT (K4) or LEFT (K2) to adjust a new temperature set value, then press MENU (K1) to confirm your settings.

9.3.3 The display returns to its default mode. The actual temperature measured in the workspace (as shown in the temperature display area) starts to change until the workspace temperature reaches the newly adjusted set value.

9.4 Using Temperature Set Value to Speed Up Cool-Down

9.4.1 At the end of drying or heating process, press MENU (K1) to activate menu bar, then press RIGHT (K4) to select "Temperature" icon and press MENU (K1) to confirm.

9.4.2 In flashing settings pane "Set", press LEFT (K2) to lower temperature set value to 50°C, then on to 0°C in one additional step. When display reads 0°C, press MENU (K1) to confirm settings.

9.4.3 The display returns to its default mode. The actual temperature measured in work space, as shown in temperature display area, starts to change until work space temperature reaches newly adjusted set value.

9.5 Turning Boost ON:

Note: Temperature must be set to at least 150°C to use this feature.

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9.5.1 Press MENU (K1) to activate menu bar, then press RIGHT (K4) to select "Boost" icon and press MENU (K1) to confirm.

9.5.2 In selection screen that appears, confirm preselected option ON by pressing the MENU (K1).

9.5.3 The display returns to its default mode. The Boost icon in menu bar is illuminated to indicate that boost mode has been activated. Once preset temperature set value has been reached, boost heater turns off automatically, and Boost icon light turns off.

9.6 Turning Boost OFF:

9.6.1 Press MENU (K1) to activate menu bar, then press RIGHT (K4) to select "Boost" icon and press MENU (K1) to confirm.

9.6.2 In selection screen that appears, confirm preselected option OFF by pressing MENU (K1).

9.6.3 The display returns to its default mode. The Boost icon light in menu bar is turned off to indicate that Boost mode has been turned off.

9.7 Turning the Fan ON:

9.7.1 Press MENU (K1) to activate menu bar, then press RIGHT (K4) or LEFT (K2) to select "Fan" icon and press MENU (K1) to confirm.

9.7.2 The settings dialog appears in Instrument Display pane with current fan speed level flashing.

9.7.3 Keep this setting or press RIGHT (K4) as often as needed to select desired fan level, then press MENU (K1) to confirm.

9.7.4 The Instrument Display will show current fan speed level as a percentage (For example, 20%, 40%, 60%, 80% or 100%). Additionally, the matching number of chevrons will be illuminated in bar graph to the right.

9.7.5 The display returns to its default mode. The Fan icon in menu bar is illuminated to indicate fan is running.

9.8 Adjusting Fan Speed:

9.8.1 Press MENU (K1) to activate menu bar, then press RIGHT (K4) or LEFT (K2) to select "Fan" icon and press MENU (K1) to confirm.

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9.8.2 The settings dialog appears in Instrument Display pane with current fan speed setting flashing.

9.8.3 Change fan speed by pressing RIGHT (K4) or LEFT (K2), then press MENU (K1) to confirm.

9.8.4 The display returns to its default mode. The Fan icon remains illuminated in menu bar.

Note: OMH Series and OMH-S Series Convection Incubators employ forced ventilation, that is, the fan cannot be turned off completely and will run at a variable minimum speed when a certain temperature limit is exceeded. Any attempt to return the fan speed level to 0% will be denied, as indicated by the message "Heater Prot" in the Instrument Display pane.

10. MAINTENANCE

10.1 Weekly Maintenance

10.1.1 Inspect door seal weekly for damage and proper sealing performance when in use.

Note: If seal is not working properly, go to section 10.5 Non-Routine Maintenance for further instructions.

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10.1.2 Check Incubator for cleanliness and remove any debris remaining from prior use.

10.1.3 Document that maintenance performed on “26014-02: Convection Incubator Weekly Maintenance Form.”

10.2 Quarterly Maintenance

10.2.1 The Incubator needs to be cleaned, door seal inspected, and temperature verified quarterly.

10.2.2 Remove all materials from Incubator and follow the instruction in step 8.4 for “Using the Temperature Set Value to Speed Up Cool-Down.”

10.2.3 After cool-down process, turn unit Off.

10.2.4 Spray internal unit with Cavicide and let it sit for at least 3 minutes prior to being wiped with a clean low-lint wipe.

10.2.5 Spray internal unit with Ster-ahol and wipe with a clean low-lint wipe.

10.2.6 Allow unit to stabilize to normal operating temperature.

10.2.7 Place a NIST calibrated probe in the center of unit and record the temperature after one hour on 26014-01 form.

10.2.8 Inspect door seal for any cracks or embrittlement.

10.2.9 Document that maintenance was performed on 26014-01 form.

10.3 Annual Calibration

10.3.1 Facilities, Maintenance, and Engineering (FME) or a contracted vendor calibrate Convection Incubator every year as required, for routine use.

10.3.2 Convection Incubators are assessed for recalibration after repair, damage, or if physical, or electronic changes occur that could impact the operation, range, accuracy, or tolerance of the equipment. This is determined by the Scientific Manager or designee.

10.3.3 Print the Calibration report and file.

10.4 As Needed Maintenance

10.4.1 Spills

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Note: Clean up all spills immediately.

- 10.4.1.1 Remove all materials from Incubator and follow the instruction in step 8.4 for “Using the Temperature Set Value to Speed Up Cool-Down.”
- 10.4.1.2 After cool-down process, turn unit Off.
- 10.4.1.3 Spray internal unit with Cavicide and let it sit for at least 3 minutes prior to being wiped with a clean low-lint wipe.
- 10.4.1.4 Spray internal unit with Ster-ahol and wipe with a clean low-lint wipe.
- 10.4.1.5 Document that As Needed Maintenance was performed on “26014-01: Convection Incubator Maintenance Form.”

10.5 Non-Routine Maintenance

- 10.5.1 In the case that the Convection Incubator is not operating correctly, transition processes being performed to another unit (when applicable), post a sign stating the equipment is out of service and initiate non-routine maintenance documentation per “10007: Non-Routine Equipment Maintenance.”
- 10.5.2 Document the nature of any failures or malfunctions, how and when it was discovered, and the personnel involved on “10007-01: Non-Routine Equipment Maintenance Form.”
- 10.5.3 Initiate a service request and complete the non-routine maintenance process following 10007.

11. SETTINGS

11.1 Heratherm Incubator (Model OMH)

- 11.1.1 Temperature Range: Ambient + 10°C to 330°C

Note: Ambient + 10°C may be achieved when the damper is fully opened.

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11.2 Heratherm Peltier Incubator (Model IMP)

11.2.1 Temperature Range: 5°C to 70°C

11.3 Out of Range Events

11.3.1 If Convection Incubator goes into alarm, acknowledge alarm by emailing the laboratory personnel. If the instrument maintains a temperature out of range for more than 2 hours, then transfer biological contents to another unit. Initiate non-routine maintenance per section 10.3.

12. ATTACHMENTS

12.1 Attachment 1: Convection Incubator Instrument Display

12.2 Attachment 2: 26014-01: Convection Incubator Maintenance Form

12.3 Attachment 3: 26014-02: Convection Incubator Weekly Maintenance Form

13. REVISION HISTORY

Version	Change	Reason
1.0	Create new SOP for the Use and Maintenance of the convection Incubator	Currently no SOP
2.0	1. Transferred procedure and form to new template; forms now separate.	1. Consistency between procedures.
3.0	1. Added weekly maintenance guidance and form 2. Added Non-Routine and As Needed Maintenance 3. Updated Reference Section 4. Minor grammar and language changes 5. Clarified Responsibilities Section	1. Reflect User Manual Guidance 2. Reflect GDP Guidance 3. Reflect new naming scheme 4. Clarity, ease of use 5. Reflect GDP Guidance

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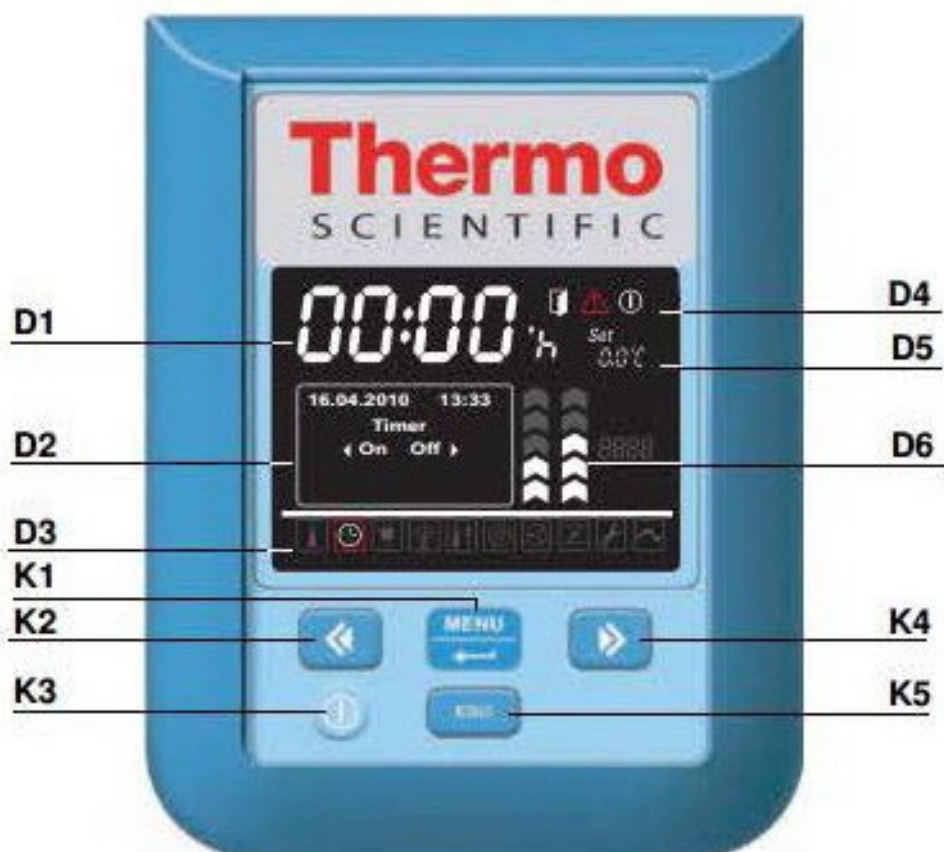
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Attachment 1: Convection Incubator Instrument Display



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Attachment 2: 26014-01 Convection Incubator Maintenance Form

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Equipment ID:		Maintenance Year: (YYYY)	
---------------	--	--------------------------	--

Quarterly Maintenance				
Quarter:	Q1	Q2	Q3	Q4
Primary Disinfectant Lot Number:				
Primary Disinfectant Expiration Date:				
Secondary Disinfectant Lot Number:				
Secondary Disinfectant Expiration Date:				
Door Seal Check (✓)				
Temperature Check:	<div style="display: flex; justify-content: space-between;"> <div> Verified Temperature 20°C _____ <input type="checkbox"/> N/A 37°C _____ <input type="checkbox"/> N/A 56°C _____ <input type="checkbox"/> N/A 70°C _____ <input type="checkbox"/> N/A </div> <div> Verified Temperature 20°C _____ <input type="checkbox"/> N/A 37°C _____ <input type="checkbox"/> N/A 56°C _____ <input type="checkbox"/> N/A 70°C _____ <input type="checkbox"/> N/A </div> <div> Verified Temperature 20°C _____ <input type="checkbox"/> N/A 37°C _____ <input type="checkbox"/> N/A 56°C _____ <input type="checkbox"/> N/A 70°C _____ <input type="checkbox"/> N/A </div> <div> Verified Temperature 20°C _____ <input type="checkbox"/> N/A 37°C _____ <input type="checkbox"/> N/A 56°C _____ <input type="checkbox"/> N/A 70°C _____ <input type="checkbox"/> N/A </div> </div>			
Performed By/Date:				
Reviewed By/Date:				

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As Needed Maintenance: ☐ N/A

Date	Activity Performed	Recorded By/Date	Reviewed By/Date
<input type="checkbox"/> N/A			
<input type="checkbox"/> N/A			
<input type="checkbox"/> N/A			
<input type="checkbox"/> N/A			

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Attachment 3: 26014-02 Convection Incubator Weekly Maintenance Form

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Convection Incubator ID:		Month / Year (MMM YYYY)		
Date	Initials	Door Seal Performance Acceptable?	Clean?	Comments
		<input type="checkbox"/> Yes <input type="checkbox"/> No, refer to 10007	<input type="checkbox"/> Yes <input type="checkbox"/> No, refer to 26014	<input type="checkbox"/> N/A
<input type="checkbox"/> N/A		<input type="checkbox"/> Yes <input type="checkbox"/> No, refer to 10007	<input type="checkbox"/> Yes <input type="checkbox"/> No, refer to 26014	<input type="checkbox"/> N/A
<input type="checkbox"/> N/A		<input type="checkbox"/> Yes <input type="checkbox"/> No, refer to 10007	<input type="checkbox"/> Yes <input type="checkbox"/> No, refer to 26014	<input type="checkbox"/> N/A
<input type="checkbox"/> N/A		<input type="checkbox"/> Yes <input type="checkbox"/> No, refer to 10007	<input type="checkbox"/> Yes <input type="checkbox"/> No, refer to 26014	<input type="checkbox"/> N/A
<input type="checkbox"/> N/A		<input type="checkbox"/> Yes <input type="checkbox"/> No, refer to 10007	<input type="checkbox"/> Yes <input type="checkbox"/> No, refer to 26014	<input type="checkbox"/> N/A
Reviewed by/date:				

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