# Risk Assessment

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| **Procedure** | Use of Eppendorf NB Innova 44R Incubator Shaker with sticky pad platform |

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| **Name(s) of person performing the work** | Users (Lab manager & Lab Technician & Tenants & Licensee's) | | |
| **Name & position of assessor** | Khwaja Islam & Laboratory & Facilities Manager | **Signature** | |
| **Date of assessment** | 04/08/2022 | **RA Number** | BioE 0046 |

## Outline of procedure / activity:

The Eppendorf Innova 44R incubator refrigerated shaker is large capacity orbital shaker that utilize a triple eccentric counter-balanced drive mechanism. They provide horizontal plane rotary motion in either a 2.54 cm (1-inch) or a 5 cm (2-inch) diameter circular orbit, depending on the model. A Proportional/Integral (PI) microprocessor controller with instantaneous digital feedback controls the speed over the entire speed range. The speed range: 25 to 400rpm with soft start and orbit 25mm.

The Innova 44R provides temperature control from 20°C below ambient (as low as 4°C) to 80°C for culturing a wide variety of organisms in flasks up to 5 L. Naturally, both these ranges depend on relative humidity and other ambient factors, as well as the options installed in the unit. Ambient temperature is measured at one meter from the exterior of the unit.

Erlenmeyer flasks (up to 5 litres in size) as well as a wide variety of tubes and plates can be accommodated refer to operating manual accessories on p. 74 (section 9.12)). These are easily accessed on slide-out platforms.

The Innova 44R may be operated in the following ways:

- **Continuously**: at a set speed and temperature, until user intervention.
- **In a timed mode**: run at a set speed, time and temperature for a period of up to 99.9 hours, after which the shaker automatically shuts off.
- **Via the shaker's programmable controller**: run through multiple temperature and speed changes for an extended period of time.
- **Via computer through an RS-232 interface**.

For safe operation, the Innova 44R shakers are designed with a safety switch that automatically stops the shaker mechanisms when the door is opened.

The Innova 44R is equipped with visual and/or audible alarms that alert the user to the following conditions:

- The end of a timed run
- Deviations from speed set point
- Deviations from temperature set point
- Power failure
- Door open
- Unbalanced load

To accommodate customer needs, a wide variety of platforms can be used with the Innova 44R:

- Universal platforms are the most flexible, providing whole patterns for flask clamps, test tube racks and other accessories.
- Dedicated platforms are supplied with flask clamps attached; they are designed solely and expressly for this purpose.
- Test tube racks, microplate holders, and test tube rack holders are also available (a universal platform is needed for all test tube racks and holders).

User Profile:
The Innova 44R incubator refrigerated incubator shaker only operated by trained lab personal who have carefully read the operating manual and are familiar with the device functions.

Incorrect handling of accessories:
Accessories and spare parts that are not recommended by Eppendorf comprises the safety, function and precision of the device. Eppendorf or BioEscalator cannot be held liable or accept any liability for damage resulting from the use of non-recommended accessories and spares part. Please ask the Laboratory Manager for accessories or spare parts.

- Only use the accessories and original spare parts recommended by Eppendorf.

Small scratches and cracks can cause severe damage to the device and accessories. Liquids may escape.

- Before use, visually check all tubes for any damage.
- Never use damaged tubes.

Refer to operating manual for **Operation** on p. 37. Operation of Incubator shaker:

1. Opening the door:
   Open the door by firmly pressing the bottom of the large curved push bar (located on the right side of the door) to release the latching mechanism. You can now manually move the door up to the open position, or down to the closed position (make sure it latches closed).
2. Starting the shaker:
   To initially start the shaker, close the door and turn the power switch (located on the right hand side of the control panel) to the **ON** position. The display will come on (first showing only New Brunswick Scientific, then briefly displaying the model number, 44R, and the stroke, 1 inch or 2 inch, and then quickly moving into the Display screen), and the audible alarm will sound. To mute it, see Section 7.6.
   When the shaker begins to operate, the **LCD** display will track the speed as it accelerates to the last entered set point. The shaking action may be started or stopped by pressing the Start/Stop button on the front panel.

**Note**: The shaker will not operate if the door is open. This is indicated by the “door open” symbol appearing in the bottom line of the display (see Figure 9 or Table 3).

3. Using the LCD Screens

3.1 Display screen - When you turn the power on, this is the first screen to appear after the company title screen. The default display parameters are temperature (ºC) and shaking speed (RPM).

You can change the displayed parameters. To replace a parameter:

3.2 Using the Control Knob, highlight the parameter that you wish to replace. For this example, we will replace RPM (see Figure 14).

3.3 Click the Control Knob in. RPM will flash.

3.4 Turn the Knob until the desired parameter appears in the highlighted field. For this example, we will select HRS.

3.5 Click the Knob in, to set and save the parameter (see Figure 15).

**NOTE**: If you highlight an item, change it, but do not save your selection, after a few seconds the screen will revert to its previous setting.

**NOTE**: "UV" (UV Germicidal lamp) and "GRO" (photosynthetic growth lamps) will appear in this screen with the word "NONE" if your shaker is not equipped with these optional features.

4 You can also use this screen to verify a set point, even though the values displayed here are actual (current) values. To view a set point:

4.1 Use the Control Knob to highlight the value (in this example, we will view the temperature set point, so we will highlight the current **ºC**, which is **23**).

4.2 Click the Knob in to display the current set point, which will flash.

4.3 At this point you can modify the set point or click the Knob in again to return to the normal display, which will be the actual temperature.

5 **To modify a set point** in this screen:

5.1 Use the Control Knob to highlight the current value (we will continue to use the temperature as our example, so we will select 23).

5.2 Click the Knob in to display the current set point (in this example, **38.5**—see Figure 16), which will flash.

5.3 Turn or spin the Knob to reset the set point (in this example, turn the Knob left to decrease the set point to **37.0**).

**NOTE**: If you turn the Control Knob slowly, one click left or right will change the set point by an increment of one tenth of a degree Celsius (0.1ºC). If you spin the Knob, the value will change by larger increments.

5.4 Click the Knob in to set and save this new set point.

**NOTE**: If you highlight an item, change it, but do not save your selection, after a few seconds the screen will revert to its previous setting.

5.5 The display will automatically return to the actual value.

6 To move out of this screen and into the next:

6.1 Use the Control Knob to highlight **DISP**, then click the Knob in. **DISP** begins to flash.

6.2 Turn the Knob to the right until the next screen, Summary (**SUMM**), appears. If you turn too far and enter another screen, just turn the Knob back to the left to recapture the **SUMM** screen.

6.3 Click the Knob in to select the screen and to work in it.

7 Summary Screen: In this screen (see Figure 17), you can see both the current **ACTUAL** readings and the SET points for shaking speed (**RPM**), chamber temperature (**ºC**), elapsed time in a programmed run (**HRS**) and, if you are using the optional Humidity Monitor (see Section 9.12.10), the percentage of relative humidity **(%RH**).

NOTE: The current day (Su, Mo, Tu, We, Th, Fr or Sa) and time always remains visible in the lower right hand corner.

8 The only elements you can modify in this screen are set points. To change set points in this screen:

8.1 Turn the Knob until the desired set point is highlighted, then click the Knob in. The set point will

begin to flash.

8.2 Turn the Knob to the right to increase the number, or to the left to decrease it. One click left or right will increase the set point by an increment of one (one whole unit or one tenth unit, depending on the parameter). Move the Knob more rapidly (you can spin it) to change the value by larger increments.

8.3 Click the Knob in to set and save the new value.

If you highlight an item, change it, but do not save your selection, after a few seconds the screen will revert to its previous setting.

8.4 Repeat the above steps to change any or all of the other set points.

9 To move out of this screen and into the next:

9.1 Use the Control Knob to highlight **SUMM**, then click the Knob in. **SUMM** begins to flash.

9.2 Turn the Knob to the right until the next screen, Setup (**SET**), appears. If you turn too far and enter another screen, just turn the Knob back to the left to recapture the **SET** screen.

9.3 Click the Knob in to select the screen and to work in it.

10 Set up Screen: Here you can set the day of the week and the time (on a 24-hour clock). This screen also allows you to lock all of your settings from further changes, and to mute or enable the audible alarm. To change the day:

10.1 Turn the knob to highlight the day (Thu in the sample screen above), then click inward once. The day will flash.

10.2 Turn the knob left or right to select the day of choice: Sun, Mon, Tue, Wed, Thu, Fri or Sat.

10.3 Click the knob in to set and save your choice.

**NOTE**: If you highlight an item, change it, but do not save your selection, after a few seconds the screen will revert to its previous setting.

11 To change the time (Hour/Min):

11.1 Turn the knob to highlight the time (**16:19** in the sample screen above), then click inward once. The time will flash.

11.2 Turn the knob left or right to change the time. Left moves backward, right moves forward in time. One click right or left changes by one minute; spin the knob to move more rapidly.

11.3 Click the knob once inward to set and save your choice.

12 To lock the settings:

12.1 Turn the knob to highlight **Lock**, then click inward once. The current status (**Off** in the sample screen above) will flash

12.2 Turn the knob in either direction; the only other choice is **On**. Click once inward to select and save **On**, or continue turning to return to **Off**.

12.3 When you set **Lock** to **On**, a padlock icon (see Section 5.4) will appear at the bottom of the screen. This icon will remain on display through all main display screens until you turn the locking function off.

13 To mute the audible alarm:

13.1 Turn the knob to highlight **Mute**, then click inward once. The current status (**Off** in the sample screen above) will flash.

13.2 Turn the knob in either direction; the only other choice is **On**. Click once inward to select and save **On**, or continue turning to return to **Off**.

13.3 When you set Mute to **On**, the icon will appear at the bottom of the screen. This icon will remain on display through all screens until you turn the muting function off.

Safety Precautions:

- To prevent damage to the striker and its contents, never run the shaker without a platform.
- This equipment is not “explosion-proof” and should never be used with flammable substances or used to grow organisms that produce flammable by-products.
- Before operating the shaker, verify that anyone involved with its operation has been instructed in

both general safety practices for laboratories and specific safety practices for this apparatus.

- It is the responsibility of the user to carry out appropriate decontamination procedures if hazardous material is spilled on or inside the equipment. Before using any cleaning or decontamination method other than those suggested by the manufacturer, users should check with New Brunswick Scientific that the proposed method would not damage the equipment.
- The user is also responsible for following local guidelines for handling hazardous waste and biohazardous materials that may be generated from the use of this equipment.
- If service should be required on a unit that is going to be returned to a New Brunswick facility, it must be completely decontaminated and cleaned prior to its return, and a Returned Material Safety Sheet must be filled out to certify that you have complied. See Section 13, Product Returns.

Using Stick Pad:
The sticky pad is supplied as a 20 X 20 cm (8 x 8 in) mat that can be used to attach flasks, bottles, dishes, and other similar equipment to shaker platforms. The sticky pad can be easily removed and re-positioned simply by peeling it from the surface.

Instructions:

1. Remove the silicone plastic sheet.
2. Remove the sticky pad from plastic mould.
3. Install the sticky pad with upper face in contact with the clean platform.
4. Install flasks onto the inner face of the sticky pad by pressing them firmly into place.
5. Recommended temperature range for the sticky pad is 15°C – 45°C.

Operations:

1. Test the sticky pad with each container you plan to use, under the same conditions (speed, temperature and the same amount of material in the container).
2. The sticky pads has two surfaces, and one is more sticky than the other. Attach the stickier side to the platform, and install the flask on the surface of the less sticky side.
3. Clean up spills as fast as possible. If small amounts of water come in contact with the sticky pad, allow to dry completely before use.
4. To remove flasks from the sticky pad, use a small amount of water around the bottom of the flask, then pat dry with a paper towel after the flask is removed.
5. The sticky pad can be simply cleaned by peeling it off the platform and washing it with a sponge and water or a detergent solution. The full adhesion strength will return after the sticky pad is completely dry.

Notice:

1. Excessive force should not be used when removing flasks from the sticky pad. This may result in material damage.
2. If the sticky pad is used in an incubator shaker for extended periods of time, it may become difficult to remove to remove flasks from the sticky pad. To avoid possible breakage, use the procedure described above to safely remove flasks.

Cautions:

1. At high speeds, the sticky pad is not as safe as flask clamps.
2. The maximum speed to use with sticky pads is 250 rpm for stroke diameters up to 2.0 cm (1 inch) and 200 rpm for diameters up to 5.1 cm (2 inch).
3. Do not use the stick pad in water bath shakers.

## Potential hazards

| Substance or item handled | Associated Hazard (s) | Existing Control Measures | Risk (L/M/H) | Further Action required | Risk (L/M/H) |
|---|---|---|---|---|---|
| Handling of New Brunswick Innova 44R incubator Shaker | Electrical hazard - Electrical shock – danger of death. | Only switch on the device if the device and power cable are undamaged.<br>The lethal voltages inside of the device is not accessible which is contained in housing that is closed and undamaged.<br>Do not remove the housing of the device.<br>Only trained personal are allowed to use the Innova 44R incubator refrigerated shaker. Annual pat testing. Regular visual checks of power cords for fault, fraying or wear and regular electrical safety check. Any faults reported and repaired before use. | L | No further action required if the existing control measures are adhered to. | L |
| Biological samples | Health risk due to contact with biological samples | Must wear PPE (lab coat, safety glasses and gloves).<br>Must have a risk assessment for their work to be carried out using the device including disinfection procedure if there is a spillage inside the device (i.e. Decontamination). | M | No further action required if the existing control measures are adhered to. | M |

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| Substances | Explosion hazard | The device is used in a safe environment, e.g., the open atmosphere of a ventilated lab. Do not use this device to process any explosive or highly reactive substances. Do not use this device to process any substances which can create an explosive atmosphere. The device is not explosion-proof and should never be used with flammable substances or used to grow organisms that produce flammable by-products. | M | No further action required if the existing control measures are adhered to. | M |
| Burns due to hot metal on the device and hot flasks | Burns | Must wear PPE, use heat resistance gloves when handling flasks and platform. | M | No further action required if the existing control measures are adhered to. | M |
| Heavy load | Health risk due to lifting heavy loads i.e. crushing. | Only lift the device with another person or using a suitable aid. Make sure to use a transport aid for transportation over long distances. Use a hydraulic lifting platform to install and uninstall the shaker. Manual handling training received before attempting to move the device. Lifting and transporting the shaker without suitable technical aids can resulting in crushing and other injuries. | M | No further action required if the existing control measures are adhered to. | M |

## Persons potentially at risk:

Only the user or others near by

## Action in event of an accident or emergency:

1. **First Aid Measure**:
   **Burns –** immersing the burn in cool water immediately, removing clothing from the burn area, and keeping the injured area cool for at least five minutes (preferably longer). Any burns to the face or eye or any burns that blister should be seen by a physician.
2. **Fire**: raise the fire alarm and evacuate the area. Use correct fire extinguisher if you have been trained and it is safe to do so.

## Arrangements for monitoring effectiveness of control:

Daily inspection of equipment by lab technician.

Annual preventative maintenance by external contractor (Eppendorf).

Instruction and training given to all operators which is reviewed annually.

Existing operators receive annual refresher training.

Annual pat testing by external contractor.

## **Review of the Risk Assessment**:

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| Date of review | | Name of reviewer | |
| Date of next review | | Signature | |

Have the control measures been effective in controlling the risk?

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| Yes | No |

Have there been any changes in the procedure or in the information available which affect the estimated level of risk from the listed substances

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|---|---|
| Yes | No |

What changes to the control measures are required?

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## Declaration by Tenant/Licensee/Technician:

I confirm that I have read this Risk Assessment and that I understand the hazards and risks involved and will follow all of the safety procedures stated. Where PPE has been identified as a control measure, I will ensure that it is worn.

## Declaration by Laboratory Manager (LM):

I confirm that the tenant/licensee/technician who has signed below is competent to undertake the work. My counter-signature indicates that I am happy for the work to proceed.

| Name (Please print) | Signature | LM Countersignature | Date |
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