

Eddy Jet 2W

Instructions for Use

Spiral Plater



Doc. 50008011-08

Fecha de revisión: June 2023



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INDICATION OF THE INTRODUCED MODIFICATIONS

If it's the first time that you use Eddy Jet 2W, please read the entire document carefully.

If it's not the first time that you use Eddy Jet 2W and you use it before, in the table below you can read the indication of the introduced modifications

Revision	Description of change
08	Update section 5.3.6
	Update section 5.6.2

1. INTRODUCTION

Thank you for choosing the Eddy Jet 2W. We are confident that this instrument will become an integral part of your laboratory.

Before using the Eddy Jet 2W, it is essential that you read these instructions for use manual carefully. Following the instructions and safety information will ensure safe operation and maintain the system in a safe condition.

1.1. Intended use of the Eddy Jet 2W

The Eddy Jet 2W is a spiral plater that meets all the requirements that may be necessary for a modern microbiology laboratory.

The Eddy Jet 2W performs reliably and accurately different types of spiral and lawn inoculations avoiding cross-contamination, thanks to its disposable micro-syringes.

With its new and improved programming capability and its bigger and more responsive screen, the everyday work will be done easily.

Take a look at *Spiral Plating with Eddy Jet 2W*, *Types of Spiral Distributions*, and *Colony Counting to learn more about Spiral Plating* to better understand what the Eddy Jet 2W can do for you.

1.2. General Information

1.2.1. Scope of delivery

The delivery includes the following items:



- a. Eddy Jet 2W main unit.
- b. Pack of 1000 disposable micro-syringes (Cat.90001780).
- c. Pack of 1000 disposable sample beakers (Cat.90001790).
- d. Holder for micro-syringes (Cat.900011275).
- e. Holder for beakers box (Cat.90001949).
- f. Holder for 10 beakers (Cat.90001974).
- g. 5mm disk for height adjustment (Cat.90001904).
- h. Power cord (Cat.90004017, Cat.90004018, Cat.90004019, Cat.90004026, or Cat.90004027).
- i. Spiral counting grids (Cat.9000625).

- j. Table of volume (µl) for different spiral spreadings (Cat.50008028).
- k. Start point adjustment pattern (Cat.90001935).
- l. Instructions for use (Cat.50008011).
- m. Plate holder device for 100 mm Petri dishes (already installed) (Cat.90001710).
- n. Waste container for used micro-syringes (already installed) (Cat.900011156).
- o. USB Flash Memory (Cat.90004453)

1.2.2. Technical assistance

At IUL SA we pride ourselves on the quality and availability of our technical support. Our Technical Service Department is staffed by experienced technicians with extensive practical and theoretical expertise in the use of IUL SA products. If you have any questions or experience any difficulties regarding the Eddy Jet 2W or IUL SA products in general, do not hesitate to contact us.

IUL SA customers are a major source of information regarding advanced or specialized uses of our products. This information is helpful to other customers as well as to the researchers at IUL SA. We encourage you to contact us if you have any suggestions about product performance or new applications and techniques.

For technical assistance, contact the IUL SA Technical Service Department (support@iul-inst.com), or local distributors.

1.2.3. Policy Statement

It is the policy of IUL SA to improve products as new techniques and components become available. IUL SA reserves the right to change the specifications of products at any time.

In our effort to produce useful and appropriate documentation, we appreciate your comments on this user manual. Please contact IUL SA Technical Service with any feedback.

1.2.4. Requirements for Eddy Jet 2W users

Table 1 covers the general level of competence for the use and servicing of the Eddy Jet 2W.

Task	Personnel	Training and experience
Routine use	Laboratory technicians or equivalent	Training in techniques for laboratory instrument operation
Servicing	IUL SA Service Specialists only	Trained, certified, and authorized by IUL SA

2. SAFETY INFORMATION

Before using the Eddy Jet 2W, it is essential that you read this user manual carefully. Following the instructions and safety information in this user manual will ensure safe operation and maintain the system in a safe condition.

The following types of safety information appear throughout the Eddy Jet 2W *Instructions for Use*.

WARNING 	The term WARNING is used to inform you about situations that could result in personal injury to you or other persons. Details about these circumstances are given in a box like this one.
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CAUTION 	The term WARNING is used to inform you about situations that could result in damage to the instrument or other equipment. Details about these circumstances are given in a box like this one.
---	---

The advice given in this manual is intended to supplement, not supersede, the normal safety requirements prevailing in the user's country.

2.1. Proper use

WARNING/ CAUTION 	Risk of personal injury and material damage Improper use of the Eddy Jet 2W instrument may cause personal injury or damage to the instrument. The instrument must only be operated by qualified personnel.
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CAUTION 	Lifting instructions Stand facing towards the bench with one foot slightly in front of the other. Test the weight by lifting slightly at one edge. Grasp load at opposite diagonals. Move the load towards the body. Transfer the load to another bench or trolley if over a long distance. Remember to flex the knees not the back when lifting and lowering. Do not lift and twist as this could result in a back injury.
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CAUTION 	Carrying instructions Remove obstructions from the route. For a long lift, plan to rest the load midway on a table or bench to change the grip. Turn the body by moving the back foot and then the front foot until pointing in direction of travel – do not twist your body. Keep the load close to the waist. The load should be kept close to the body for as long as possible while lifting. Keep the heaviest side of the load next to the body. Adopt a stable position and make sure your feet are apart, with one leg slightly forward to maintain balance.
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CAUTION 	Damage to the instrument Avoid spilling water or chemicals onto the Eddy Jet 2W instrument. Damage caused by water or chemical spillage will void your warranty.
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In case of emergency, switch off the Eddy Jet 2W at the power switch and unplug the power cord from the power outlet.

2.2. Electrical Safety

If the operation of the Eddy Jet 2W is interrupted in any way (e.g., due to interruption of the power supply or a mechanical error), first switch off the instrument using the power switch, then disconnect the electrical cord from the power outlet. Contact IUL SA Technical Service after such an incident.

WARNING 	Electrical hazard Any interruption of the protective conductor (earth/ground lead) inside or outside the instrument or disconnection of the protective conductor terminal is likely to make the instrument unsafe. This must be checked after service or maintenance. Intentional interruption is prohibited. Lethal voltages inside the instrument When the instrument is connected to line power, its terminals may be live. Opening covers or removing parts is likely to expose live parts. This WARNING applies to routine users as well as to technical service users.
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To ensure satisfactory and safe operation of the Eddy Jet 2W:

- The line power cord must be connected to a line power outlet that has a protective conductor (earth/ground).

- No other power cords than the specified in *Ordering Codes* must be used. In case of replacement, this must be ordered to IUL SA
- The instrument must not be operated with the cover removed.
- If liquid has spilled on the instrument, switch it off, disconnect it from the power outlet, and proceed to remove using a lightly moistened dry cloth or an antistatic cloth.
- If you suspect any instrument damage, contact IUL SA Technical Services.

If the Eddy Jet 2W becomes electrically unsafe, prevent other personnel from operating it, and contact IUL SA Technical Service.

The instrument may be electrically unsafe if:

- The instrument or the power cord appears to be damaged.
- The instrument has been stored under unfavorable conditions for a prolonged period.
- A different mains power cord is used other than the one provided by IUL

WARNING 	Risk of electric shock In case of replacement of the mains power cord, these must be replaced <u>only</u> with the power cords listed in <i>Ordering Codes</i> and provided by IUL.
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2.3. Environment

Operating conditions

WARNING 	Explosive atmosphere The Eddy Jet 2W is not designed for use in an explosive atmosphere.
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WARNING 	Risk of overheating Slits and openings that ensure the ventilation of the Eddy Jet 2W must not be covered.
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2.4. Biological safety

Use safe laboratory procedures as outlined in publications such as *Biosafety in Microbiological and Biomedical Laboratories*, HHS:

<http://www.cdc.gov/od/ohs/biosfty/biosfty.htm>

WARNING 	Samples containing infectious agents Some samples used with the Eddy Jet 2W may contain infectious agents. Handle such samples by the required safety regulations. The responsible person(s) (e.g., laboratory manager) must take the necessary precautions to ensure that the workplace is safe and that the instrument operators are suitably trained and not exposed to hazardous levels of infectious agents, as defined in the applicable Safety Data Sheets (SDSs) or OSHA ¹ ACGIH ² or COSHH ³ documents. Venting of fumes and disposal of wastes must be following all national, state, and local health and safety regulations and laws.
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2.5. Chemicals

WARNING 	Hazardous chemicals Some chemicals used with the Eddy Jet 2W may be hazardous. Always wear safety glasses, gloves, and a lab coat. The responsible person(s) (e.g., laboratory manager) must take the necessary precautions to ensure that the workplace is safe and that the instrument operators are suitably trained and not exposed to hazardous levels of toxic substances (chemical or biological), as defined in the applicable Safety Data Sheets (SDSs) or OSHA¹, ACGIH² or COSHH³ documents. Venting of fumes and disposal of wastes must be following all national, state, and local health and safety regulations and laws.
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2.6. Maintenance safety

CAUTION 	Damage to the instrument Do not use spray bottles containing alcohol or disinfectant to clean the surface of the Eddy Jet 2W instrument or its parts. Spray bottles should be used only to clean items that have been removed from the instrument.
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¹ OSHA: Occupational Safety and Health Administration (United States of America).

² ACGIH: American Conference of Government Industrial Hygienists (United States of America).

³ COSHH: Control of Substances Hazardous to Health (United Kingdom).

WARNING 	Risk of electric shock Do not open the panels on the instruments. Risk of personal injury and material damage Only perform maintenance that is specifically described in these Instructions for Use.
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2.7. Waste disposal

Used consumables, such as sample micro-syringes or beakers, may contain hazardous chemicals or infectious agents. Such waste must be collected and disposed of properly following local safety regulations.

All cartons from micro-syringe and beakers boxes waste must be collected and disposed of properly following local environmental regulations.

For disposal of waste electrical and electronic equipment (WEEE) see *Technical Data*.

2.8. Symbols on the Eddy Jet 2W instrument

Symbol	Location	Description
	Type plate on the back of the instrument	Waste Electrical and Electronic Equipment (WEEE), see <i>Waste Electrical and Electronic Equipment (WEEE)</i> .
	Type plate on the back of the instrument	CE Mark, Declaration of Conformity, see <i>EC Declaration of Conformity</i> .

3. GENERAL DESCRIPTION

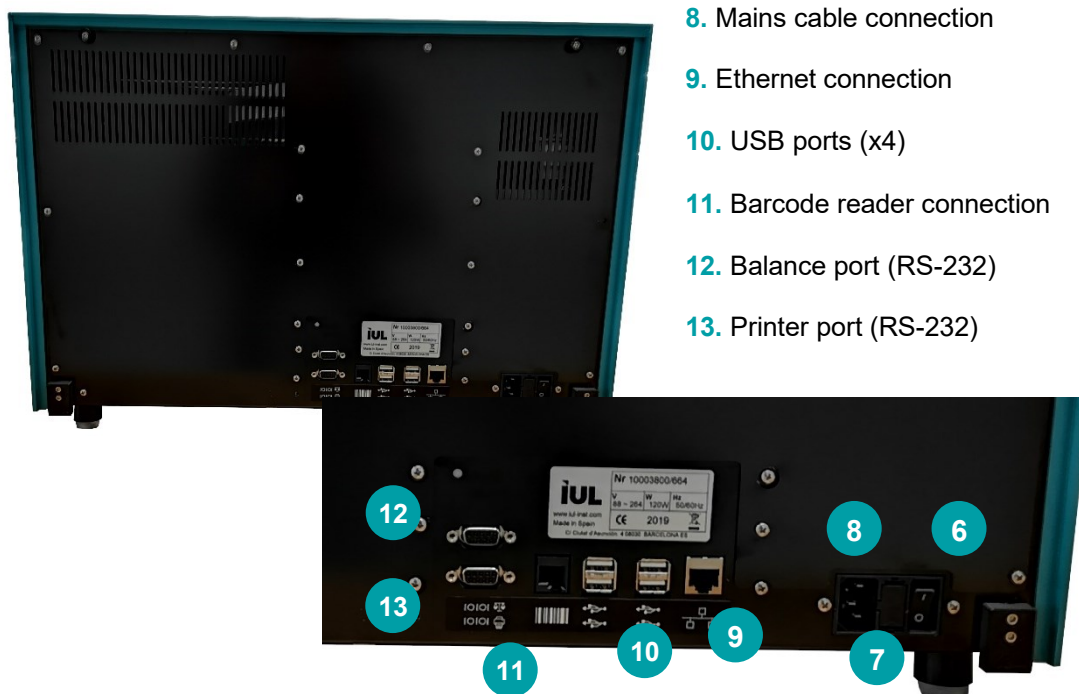
3.1. Instrument Overview

FRONT VIEW :



- 1. Touchscreen
- 2. Micro-syringe pack slot
- 3. Sample beaker
- 4. Plate holder
- 5. Waste container for used micro-syringes

REAR VIEW



- 6. Main switch
- 7. Fuse
- 8. Mains cable connection
- 9. Ethernet connection
- 10. USB ports (x4)
- 11. Barcode reader connection
- 12. Balance port (RS-232)
- 13. Printer port (RS-232)

3.2. Accessories of the Instrument

3.2.1. Waste container

Can be disassembled and autoclaved.

3.2.2. Plate holder device

Can be disassembled and cleaned using a brush with hot water and soap.

3.2.3. Holders

Holder for micro-syringes pack box → can be autoclaved.

Holder for beakers box → can be autoclaved.

Holder for 10 beakers → can be autoclaved.

3.2.4. Plastic bottle with Aniline Blue (optional accessory)

Could be used to test the spiral trace. It should be diluted with this recipe:

- 25g Aniline blue powder (from Cat.90004928)
- 500ml water

NOTE: Homogenize until completely dissolved.

3.2.5. Power Cord

The instrument is equipped with a power cable with a plug suitable for the destination country. See *Ordering Codes* for details.

WARNING 	Risk of electric shock In case of replacement or a loosening of the mains power cord, this must be replaced <u>only</u> with one of the power cords listed in <i>Ordering Codes</i> , delivered by IUL, SA
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4. INSTALLATION

4.1. Unpack the instrument



The packaging of the Eddy Jet 2W can be stored for reuse.

4.2. Site requirements

Place the Eddy Jet 2W instrument on a level, stable surface, ideally a firmly secured bench top, near an earthed/grounded electrical outlet. Allow at least 10 cm (4 in) of clearance on all sides of the unit for proper ventilation. While operating, make sure that the instrument does not touch other objects. Locate it away from vibration-sensitive instruments, such as an analytical balance.

WARNING



Disconnecting devices accessibility

Do not place the Eddy Jet 2W in a position that is difficult to operate the Power Switch and/or the Power Cord.

4.3. Power cord connection

The socket for connecting the power cable is on the back of the Eddy Jet 2W instrument.

- Connect the supplied power cord to the socket on the instrument.
- Plug the instrument into the electrical outlet.
- Switch the instrument ON.
- While the main screen loads, a splash image will appear onscreen.
- Once the main screen has loaded, any of the operating parameters may be changed.

When the Eddy Jet 2W is not in use for a long period of time, we recommend disconnecting the power cable.

5. OPERATING PROCEDURES

5.1. Preparation

Before switching on the instrument:

- Accommodate the instrument within its operating temperature range.

5.2. Main Screen Overview

The main screen displays some of the settings of the spread to be performed, allows to change and save settings, manage recipes (programs) and call other applications.



Main Window:

	The plate icon stands next to the number of plates for the current recipe and the selected plate's size.
	The smaller spiral plate icon stands on each plate tab.
	The bigger spiral plate icon stands next to the spiral distribution of the selected spread.
	The purging micro-syringe icon stands next to the number of purge cycles.
	The icon of the selected feeding mode appears colored. Could be automatic feeding (sample beaker icon) or manual feeding (test tube icon).
	The icon of the selected identification mode appears colored. Could be automatic identification (AUTO label icon) or manual identification (ID label icon).

Lateral panel:

	Press this 'document with a plus symbol' button to create a new recipe.
	Press this 'folder' button to open the recipe folder.
	Press this 'save' button to save changes to the current recipe.
	Press this 'save as' button to save and rename the current recipe.
	Press this 'green play' button to run the current recipe.

Upper toolbar:

	Press this button to switch layout orientation. The lateral panel will change from left side to right side or from right side to left side.
	Press this 'green X/Y axis' button to verify the spiral initial point. See chapter 5.6.1 for more information.
	Press this 'blue pipette' button to start the volume verification procedure. See 5.6.2 for more information.
	Press this 'purple gear' button to enter to Tools menu. See chapter 5.7 for more information.
	Press this button to enable help view and be able to request the button's function information.

5.3. Programming Spreads

5.3.1. Spread Settings Overview

Programming the spreads operation involves defining several parameters:

Recipe name: To be able to store and reuse, a name must be assigned to each recipe to identify the operation.

Number of spreads: It is possible to add several spreads to be performed with a single micro-syringe (it is understood that using the same sample).

Plate diameter: Depending on the kind of plate selected (100mm or 150mm), the device will display appropriate recipes, and appropriate spiral distributions will be available.

Spread name: Each spread has a different name that can be edited. By default are named Plate1, Plate2...

Spiral distribution: Eddy Jet 2W has 37 different spiral distribution modes (25 for 100 mm dishes and 12 for 150 mm dishes). Eddy Jet 2W includes 4 SLOW motion methods, that allow working with irregular surface plates. Volumes poured across each spiral vary for each mode (see *Appendix D: Volume (ml) Table: 90 – 100 mm Petri Dishes* and *Appendix E: Volume (µl) Table: 150 mm Petri Dishes* Volume (µl) Table: 150 mm Petri Dishes). See also *Appendix A: Spiral Plating with Eddy Jet 2W* and *Appendix B: Types of Spiral Distributions* for more detailed information on each type of distribution.

Air purge cycles: In order to remove air bubbles that might be taken in when sample liquid is driven into a micro-syringe, purge cycles are implemented. IUL SA recommends setting 2 purge cycles for normal aqueous samples. However, if at any point considerable bubbles are detected inside micro-syringes, this parameter should be increased.

Feeding mode: Samples can be fed automatically (placing sample beakers in the beaker trough) or manually (the operator will hold the sample container while a micro-syringe intakes the sample).

Identification mode: Two ID modes exist: automatic identification and manual identification. Manual identification will give increasing numbers to each of the plates that are processed. When manual identification is activated sample and plate ID numbers should be introduced by the operator.

5.3.2. Default Spread Settings

Number of spreads:	1
Kind of plate:	100mm
Spiral distribution:	00-E_Mode_50ul
Air purge cycles:	2
Feeding mode:	Cups
Identification mode:	Automatic
Number of plates:	1

5.3.3. Creating a New Recipe

To edit a new recipe the 'document with a plus symbol' button must be pressed (see red circle).

Push the current name (see yellow square) or the 'save as' button (see green circle) to edit the recipe name.



5.3.4. Programming Several Spreads with the Same Syringe



Push the plus symbol (see blue circle) to add a new spread to the current recipe.

Each spread of the current recipe has a tab with its plate name (yellow circles). To check or adjust the operating parameters the proper tab must be selected. Then all features of this spread will be displayed in the main window.

5.3.5. Selecting the Spiral Distribution of Displayed Spread

Push the little triangle next to the spiral distribution name (see red circle) to display the list of available distributions. Then it is possible to select any of these distributions. A different spiral distribution can be selected for each spread.



5.3.6. Setting Purge Cycles



The 'red minus symbol' button or 'green plus symbol' button (see green circle) should be pressed to adjust the number of purge cycles. Purges will be performed before taking the amount of sample for the spiral.

Note: It is highly recommended to perform a minimum of one purge cycle for the initial inoculation of the recipe.

5.3.7. Setting Feeding Mode

Default settings will always include automatic sample feeding and the 'sample beaker icon' (see blue circle) will be colored.

To select manual feeding press the 'test tube icon' (see yellow circle) and check that it is colored.



5.3.8. Setting Identification Mode



Inoculated plates and samples are numbered by default with an automatic increase. In this case, the 'AUTO label icon' (see green circle) will be colored.

Whenever operators need to enter plate and sample ID numbers (using the touch screen, barcode reader, or keyboard), manual identification needs to be activated. To enable it,

the 'ID label icon' (see red circle) must be pressed and become colored.

5.3.9. Saving Current Recipe

Push the 'save' button (see green circle) to save recipe settings with the current recipe name.

Push the 'save as' button (see blue circle) to edit the current recipe name and save it in the recipes folder.



5.3.10. Recalling a Saved Recipe



To open the saved recipe list push the 'folder' button (see yellow circle).

The recipe list will appear on the left side of the screen. If there are more than 7 recipes stored it is possible to scroll down.

Push on the desired recipe and it will be charged to the main screen.

To close the recipe list without selecting a recipe, push on the right side of the screen.

5.4. Executing a Spread

5.4.1. Sample Preparation

Unless using liquid samples, a previous dilution and homogenization process shall be performed. Once the sample has been adequately homogenized (and diluted additionally if necessary), it can be plated by Eddy Jet 2W. It is important to bear in mind that large particles in suspension must be avoided as they could obstruct the micro-syringe's tip. When using a paddle homogenizer such as the Masticator, a simple solution to avoid this problem is to use homogenizer bags with a filter (Cat.900014501).

5.4.2. Choosing an Agar Petri Plate

It is very important to use agar plates that match the following requirements:

- Uniform depth of the agar layer throughout the Petri plate.
- A smooth surface lacking any irregularities such as waves or air bubbles.
- Homogenous hydration of the agar's surface, meaning there shall be no dried-out regions.

5.4.3. Making a Spiral Inoculation

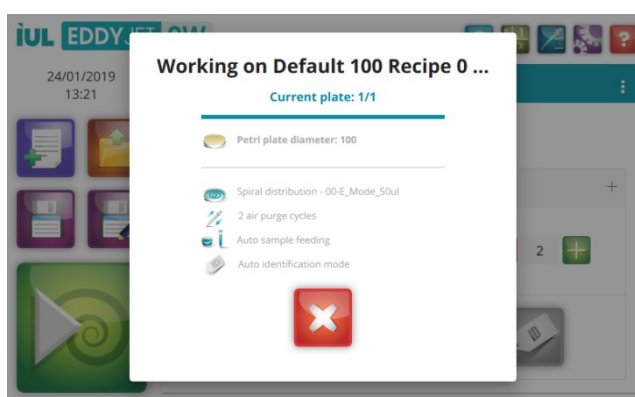
Note: it's important to remember to visit the “Programming Spreads” section in this manual if settings are to be changed from the default configuration.

Before running the instrument:

- Ensure that the waste container is placed in the left lateral of the instrument.
- Place a micro-syringe pack (from Cat.90001780) on the right-side hole.
- Place the proper disk for height adjustment in the turn plate.
- Place a petri dish with agar media onto the disc of the turn plate.
- Place a beaker (from Cat.90001790) containing the liquid sample, on its holder (if working with automatic feeding).

Press the ‘green play’ button to start the operation.

A pop-up window will appear with the number of plates of the current recipe, information on current spread, and a cross button to stop the operation.



When manual identification is enabled, pop-up windows will appear before taking the sample. After the edition, press the ‘OK’ button to continue the process. Sample and plates ID will be requested. See the next chapter for more information.

When the manual feeding is enabled, the device will stop after catching the syringe and will request the operator to sink by hand the syringe tip into the liquid sample of the test tube. Press the ‘OK’ button to start taking the sample. When the syringe filling process ends, a pop-up window appears and the operator should press the ‘OK’ button to continue with the operation.

When more than one spread is programmed, the instrument will stop between spreads and request the operator to change the petri dish. Press the ‘OK’ button to start the next spread process.

5.4.4. Manual Identification

When manual identification is activated, the instrument will request ID for samples and plates. There are different ways to insert these data:

- Reading a barcode using our barcode reader (Cat.90005701) that must be connected to the instrument.
- Pressing the ID field of the pop-up window and using the virtual keyboard that will appear on the screen.

- Pressing the ID field of the pop-up window and using an external USB keyboard connected to the instrument.

To install external devices see the “Connecting Peripherals” section for more information.

5.4.5. Loading Micro-syringes Pack

The instrument will automatically ask operators to introduce a micro-syringe pack (from Cat.90001780) whenever the start button is pressed and there is no pack placed. A pop-up window will appear until a micro-syringe pack is properly placed.

The instrument will continue the operation just after detecting the pack.

5.4.6. Unloading Micro-syringes Pack

When the micro-syringe pack is empty, the instrument will extract the pack to allow the operator to remove it.

Operators can also force the extraction of a pack at any time. See “Micro-syringe Pack Extraction” for more information.

5.5. Connecting Peripherals

The following peripherals can be connected in the rear end of Eddy Jet 2W:

- Barcode Reader (Cat.90005701)
- Printer (must be configured)
- Balance (must be configured)
- USB keyboard
- USB Memory (for firmware updating or extracting logs)

The Instrument Overview section should be reviewed to locate all of the sockets in the instrument’s rear end.

WARNING 	No peripherals must be plugged into Eddy Jet 2W when it’s turned on.
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5.5.1. Connecting a Barcode Reader

In order to use a barcode reader, it must be simply plugged into its specific plug in the device’s rear end (see the Instrument Overview section to locate it). It’s important to keep in mind that the only barcode readers that will work with IUL, SA devices are IUL, SA barcode readers (Cat.90005701).

5.5.2. Connecting a Printer or a Balance

Note: Printers must be always plugged into the lower RS-232 socket, and balances in the upper RS-232 socket.

To configure the communication parameters for printer or balance first access to Tools menu by pressing on the 'purple gear' button (see yellow circle).



In the first window of the Tools menu, there is the “RS-232 port connections” button (see red circle) that must be pressed to open the ports configuration window.

To change communication parameters the virtual switch of the right-upper corner of the window must be set to 'ON'.

To check the communication between devices there are specific buttons. For the printer, push on “PRINT TEST TICKET” and the printer should start printing a test ticket. For balances, push on “CHECK WEIGHT” and the reading of the balance should appear next to this test button.

5.5.3. Connecting a USB Device

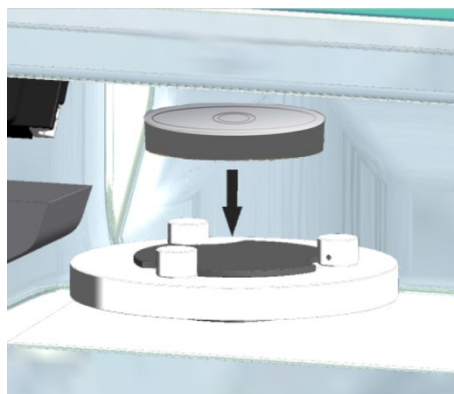
The USB devices can be connected to the four USB ports located in the device's rear end (see the Instrument Overview section to locate them).

5.6. Verifications

5.6.1. Verification Protocol for Spiral Initial Point

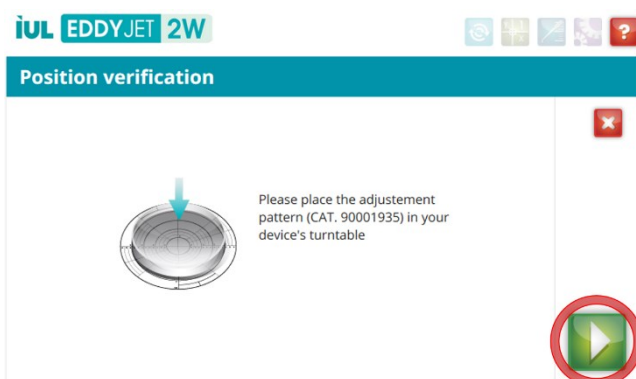
This procedure verifies Eddy Jet 2W positions micro-syringes accurately while performing a spiral. It is important to perform a position verification periodically. The adjustment pattern (Cat.90001935) is required for this verification; it is included in the instrument package.

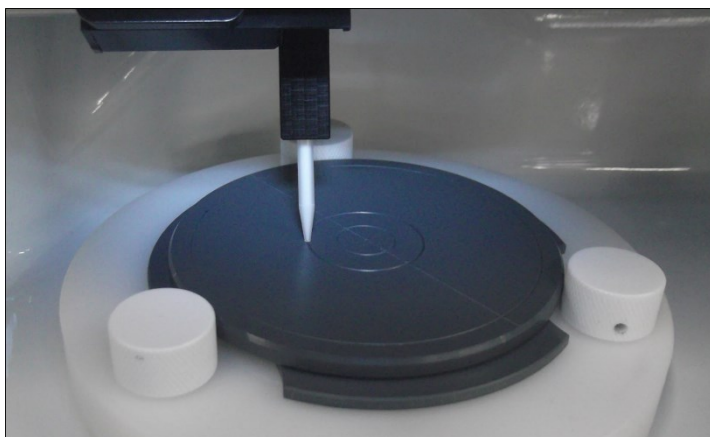
To perform this verification the adjustment pattern (Cat.90001935) must be placed onto the 3mm disk for height adjustment in the instrument's turntable.



To access the position verification screen, the 'green X/Y axis' button (see yellow circle) must be pressed.

To start the verification operation, the green 'Play' button (see red circle) must be pressed.





The device will then proceed to load a micro-syringe and perform the position verification test. Once the micro-syringe comes to a halt, its tip must fall directly over the bigger central circle as shown in the picture.

Push the 'OK' button of the pop-up window to end the verification.

5.6.2. Verification Protocol for Volume

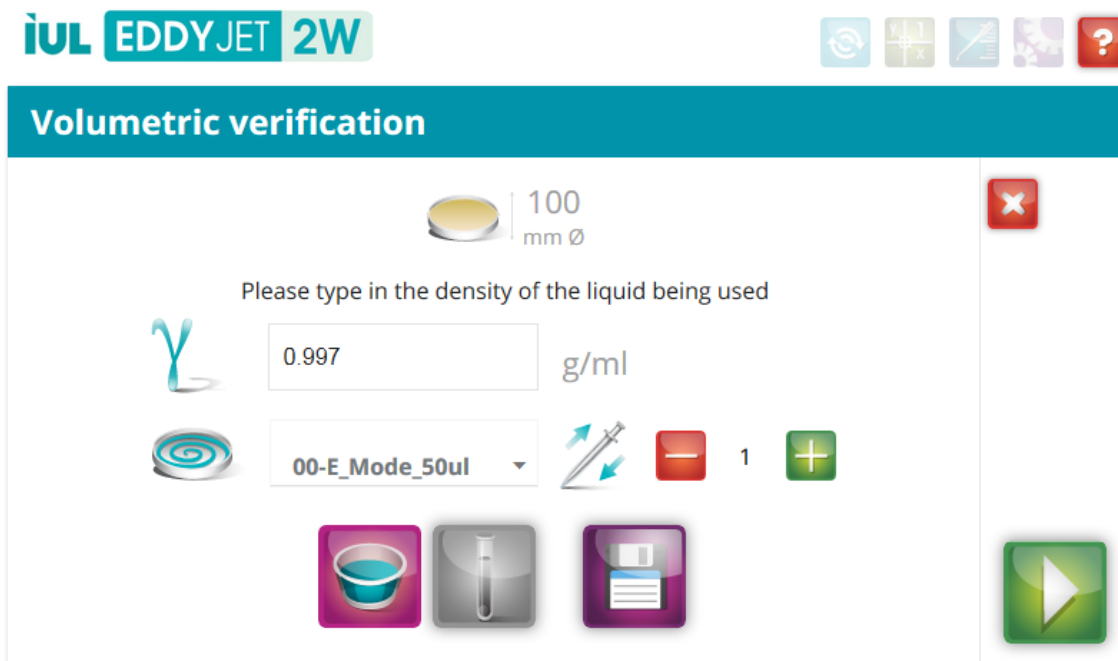
Volume verifications check the precision of volumes dispensed by Eddy Jet 2W during plating. It should be performed with a precision balance (0.0001 resolution) and a printer which should be all plugged into Eddy Jet 2W before verification takes place. The "Connecting Peripherals" section in this manual must be reviewed to see how peripherals are connected. Otherwise, verification can be performed without connecting any of these. Distilled water can be fed automatically or manually during verification, the user is advised to select whichever option is regularly used.

Note: By default, the verification procedure is set to perform in a room with 25°C using distilled water.



To start the volume verification process, the 'blue pipette' button (see green circle) must be pressed.

In the first screen of volume verification, it is possible to set the density of the liquid, the spiral mode, the number of purges, and the feeding mode. It is also shown the current plate size of the instrument.



iUL EDDYJET 2W

Volumetric verification

100 mm Ø

Please type in the density of the liquid being used

0.997 g/ml

00-E_Mode_50ul

1

Beaker icon, Test tube icon, Document icon, Play button

By default, the liquid density is set to 0.997 g/ml, which is for distilled water with a temperature of **25°C**. If you perform this verification under a different temperature or a different liquid this value must be edited. To do so, push on its field and a numeric keyboard will appear on the screen. Keep in mind that both verification liquid and the instrument must be accommodated to room temperature before starting volume verification.

Here are distilled water densities for some temperatures at 1 atmosphere:

15°C → 0.9991 g/ml

20°C → 0.9982 g/ml

25°C → 0.9970 g/ml

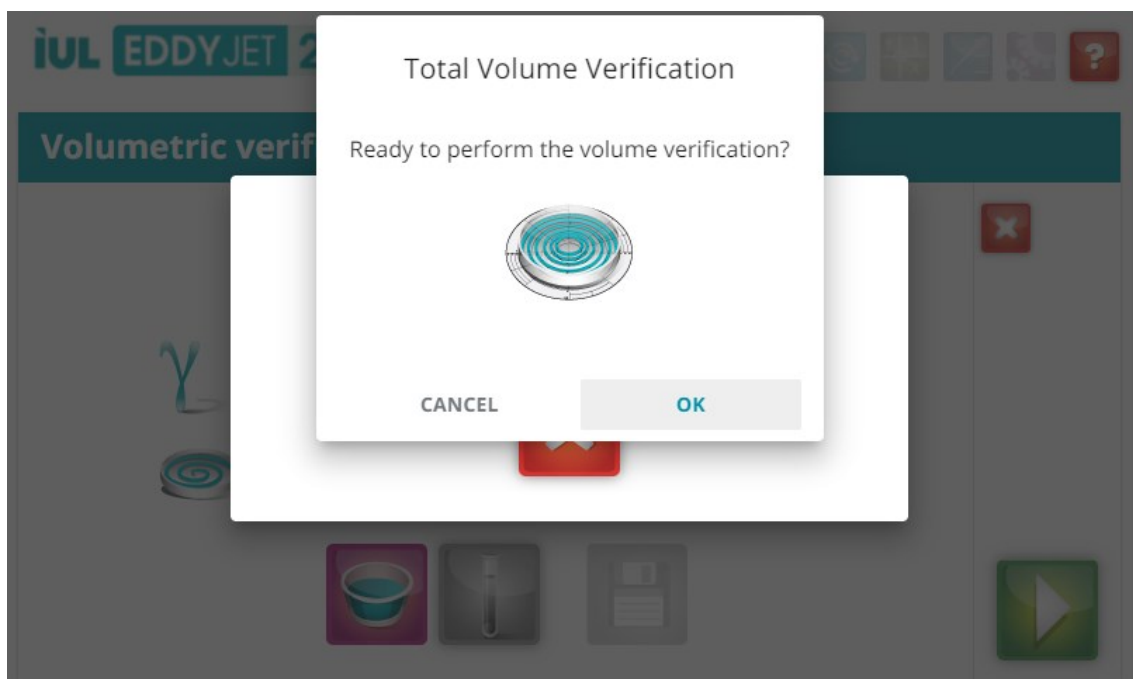
30°C → 0.9956 g/ml

35°C → 0.9940 g/ml

After adjusting all settings, it is possible to save the configuration for the next verification using the 'save' button.

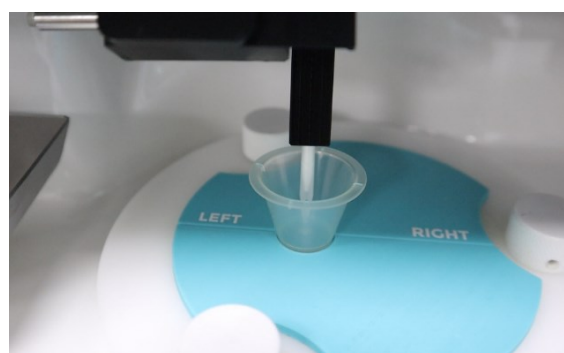
In case of automatic feeding, place a beaker with the verification liquid into its holder. Press the green play button to proceed with volume verification.

The device will take a new micro-syringe and a pop-up window will request to perform the volume verification of the selected spiral mode. Press the 'OK' button to proceed.



The instrument will take the verification liquid, then a new pop-up window will suggest placing an empty beaker on the balance and setting the tare. Then, take this empty beaker and place it on the plate holder. Make sure that the disk for height adjustment (Cat. 90001903) is placed in such a way that the marked line is parallel to the equipment and place the beaker in the marked area. To dispense the total volume of the selected spiral spread in the beaker, press the 'OK' button.

Note: Ensure that the balance is calibrated.



After dispensing, the syringe will return to the sample position. Take the beaker from the plate holder and place it on the balance. A pop-up window will request to weigh the sample. Wait until the weight is stable and press the 'OK' button to finish the verification.

The device will eject the syringe and print the verification report. Close the report window with the 'red cross' button.

5.6.3. What to Do if Incorrect Results are Obtained

Check the following tips and perform the procedure several times to be confident about it.

- Ensure that the temperature room is stable and within device operation ranges.
- Ensure that the balance is installed onto a leveled and stable surface, and it is free of vibrations and air flows.
- Ensure that the verification liquid density is correct.
- Avoid wasting time between steps of the verification procedure.

If obtained results still suggest that the instrument is not working properly, contact IUL SA authorized workshops.

5.7. Tools menu

WARNING 	Many features included in the Tools menu should only be used when instructed by an authorized technician.
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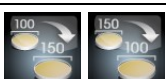
Tools pages are accessed by pressing the 'purple gear' wheel button located at the upper toolbar (see yellow circle).



5.7.1. Tools Menu Overview

To shift between different Tools windows, push and drag the screen.

First Window :

	Press this 'pack removal' button to extract the micro-syringe pack. See chapter 5.7.2 for more information.
	Press this button to edit the communication parameters for the printer or balance. See chapter 5.5.2 for more information.
	Press this 'purple clock and calendar' button to set the date and time. See chapter 5.7.4 for more information.
	Press this 'earth on yellow' button to set the language. See chapter 5.7.5 for more information.
	Press this button to change the active plate size. See chapter 5.7.6 for more information.
	Press this 'purple factory' button to restore factory settings. See chapter 5.7.7 for more information.
	Press this 'documents to USB' button to extract log files to a USB memory stick. See chapter 5.7.8 for more information.

Second Window :

	Press this 'home' button to force home position movements. See chapter 5.7.9 for more information.
	Press this 'green X/Y axis n°1' button to adjust the sample position. See chapter 5.7.10 for more information.
	Press this 'green X/Y axis n°2' button to adjust the spiral initial position. See chapter 5.7.11 for more information.
	Press this 'green X/Y axis n°3' button to adjust the ejection position. See chapter 5.7.12 for more information.
	Press this 'question mark' button to see software versions information. See chapter 5.7.13 for more information.

5.7.2. Micro-syringe Pack Extraction

To force the micro-syringe pack extraction, enter the Tools menu and press the 'pack removal' button. It will be directly moved outside.

A pop-up window will appear noting that the syringe pack is out. Then it is possible to close the window with the 'OK' button or reset the syringe feeder mechanism by pressing the 'RETRY' button.

WARNING 	Ejected packs that for some reason contain spare micro-syringes can't be reintroduced into the plater, thus the operator is advised to throw these away.
---	---

5.7.3. RS-232 Serial Ports

See the “Connecting a Printer or a Balance” section in this document for explanations about these ports configurations.

5.7.4. Setting Date and Time

Once in the first window of the Tools menu, the ‘purple clock and calendar’ button must be pressed.

Push on the date and a virtual calendar will appear to select the date.

Push on the time and a virtual clock will appear to select the hour and minutes.

Push on the current time zone and a list will appear to select a time zone.

5.7.5. Setting the Interface Language

Once in the first window of the Tools menu, the ‘earth on yellow’ button must be pressed.

Push on the current language and a list will appear to select one.

5.7.6. Changing Plate Size

From 100mm plates to 150mm plates :

Note: acquiring IUL SA 150 mm Petri dish turntable (Cat.90001715) is necessary to perform this operation.

To access the Tools menu, the ‘purple gear’ button (see yellow circle) must be pressed.

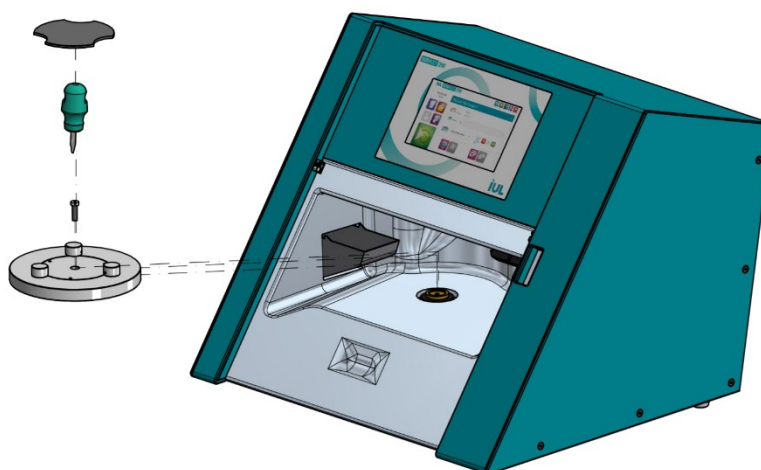


To change the plates being used to perform spiral spreads from 100 mm plates to 150 mm plates, the “Switch plate size” button (blue circle) must be pressed.

A pop-up window will confirm the new setting.



The turntable platform should be switched using the small screwdriver that comes with the 150 mm turntable. The dark grey platform layer must be removed before unscrewing the platform that is to be changed. Installing the new platform is as simple as screwing it and placing the grey platform on it.



From 150mm plates to 100mm plates :

Access the Tools menu with the ‘purple gear’ button and push on the “Switch plate size” button to swift the setting of the plate.

A pop-up window will confirm the new setting.

The turntable platform should be switched using the small screwdriver that comes with the 150 mm turntable. The dark grey platform layer must be removed before unscrewing the platform that is to be changed. Installing the new platform is as simple as screwing it and placing the grey platform on it.

5.7.7. Restore Factory Defaults

Note: Do not use this function without a technician’s advice.

Once in the first window of the Tools menu, the ‘purple factory’ button must be pressed.

The ‘purple factory’ button allows restoring factory default settings. There are two kinds of resetting, soft or hard.

5.7.8. Copy Log files to a USB Memory

Once in the first window of the Tools menu, the 'documents to USB' button must be pressed.

The 'documents to USB' button must be pressed when the record is to be kept of the device's operations and errors. This will provide very useful information to the technical service. This process requires simply connecting a USB memory to one of the two USB ports (see chapter Instrument Overview to locate these) and pressing the 'Documents to USB' button.

5.7.9. Home Position Movements

Note: Do not use this function without a technician's advice.

Once in the second window of the Tools menu, the 'home' button must be pressed.

Home movements of several mechanisms will be performed. Specifically in the order: arm, plunger, small carriage, and big carriage.

5.7.10. Adjusting Sample Position

Once in the second window of the Tools menu, the 'green X/Y axis n°1' button must be pressed.

The instrument will take a micro-syringe and move it to the current sample position. The adjustment window will be displayed.

Use left and right arrows to change the position value. Use the 'updating' button to refresh the position and check the new adjustment. Press the 'OK' button to save the new value and return to the Tools menu.

5.7.11. Adjusting Spiral Initial Point Position

Once in the second window of the Tools menu, the 'green X/Y axis n°2' button must be pressed.

The instrument will take a micro-syringe and move to the current spiral initial point position. The adjustment window will be displayed.

Use left and right arrows to change the position value. Use the 'updating' button to refresh the position and check the new adjustment. Press the 'OK' button to save the new value and return to the Tools menu.

5.7.12. Adjusting Ejection Position

Once in the second window of the Tools menu, the 'green X/Y axis n°3' button must be pressed.

The instrument will take a micro-syringe and move to the current ejection position. The adjustment window will be displayed.

Use left and right arrows to change the position value. Use the 'updating' button to refresh the position and check the new adjustment. Press the 'OK' button to save the new value and return to the Tools menu.

5.7.13. Checking Software Versions

Once in the second window of the Tools menu, the 'question mark' button must be pressed.

The software version of different parts will be displayed.

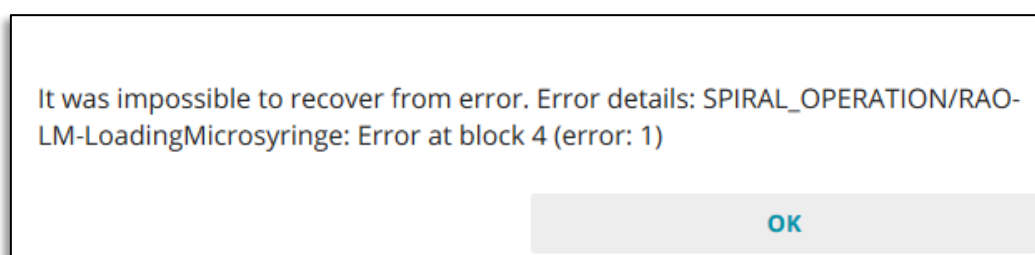
6. TROUBLESHOOTING

6.1. Poorly Drawn Spiral

If the spiral paint is not accurate, ensure that agar plates have a proper surface (see “Choosing an Agar Petri Plate” for more information). In some cases, it is possible to work with irregular agar surfaces using the slow version of a spiral mode. Modes with a slow version will include an extra ‘S’ in their name. Check Appendix D: Volume (ml) Table: 90 – 100 mm Petri Dishes to find out which modes have a slow version.

6.2. Error Messages

A message dialog box will appear whenever an error is detected:



Share this information with technical service together with Log files (see “Copy Log files to a USB Memory” section to get the Log files from the instrument).

7. MAINTENANCE

7.1. Cleaning procedure

To keep a high-performance level, cleaning Eddy Jet 2W will be necessary. Disconnect the Eddy Jet 2W from the power supply for cleaning. Use a lightly moistened cloth or an antistatic cloth. The device's outside can be cleaned using a water-soap moistened cloth. The device's transparent cover and the white interior surface can be cleaned with an alcohol-soaked cloth for disinfection. The micro-syringe waste container can be autoclaved. Do not use cleaning agents or abrasive solvent products.

CAUTION 	Damage to the instrument Do not use spray bottles containing alcohol or disinfectant to clean the surfaces of the Eddy Jet 2W instrument or its parts. Spray bottles should be used only to clean items that have been removed from the instrument.
---	---

7.2. Replacing the main fuse

To replace the main fuse, follow this procedure:

The power switch, the mains plug, and the fuse holder can be found on the backside of the unit.

The fuse holder contains a functional fuse engaged into a metallic socket) and an additional spare fuse.

If the spare fuse is not available make sure you have a new fuse with identical characteristics (see *Technical Data*).

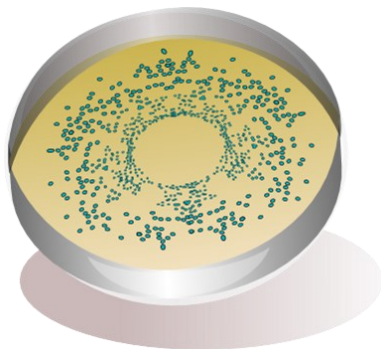
1. Unplug the power cord from the Eddy Jet 2W unit
2. Remove the fuse box with the help of a screwdriver



3. Replace the fuse and fit the fuse box back into its housing

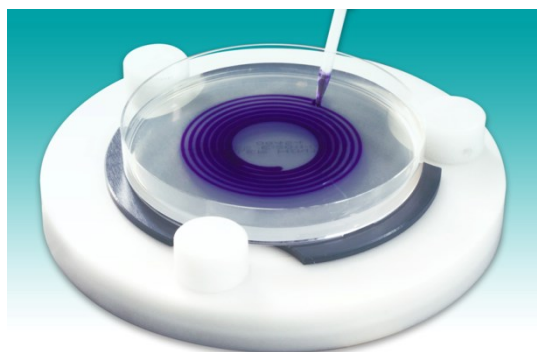
APPENDIX A: SPIRAL PLATING WITH EDDY JET 2W

Introduction to Spiral Plating



Spiral plating is a widely accepted microbiological surface plating technique that was created in the 1970s to reduce the number of agar plates used in surface spreads. Initially, this technique was implemented to test dairy samples¹, however, over the years it has gained a very broad application range and has become one of the most extended techniques when performing viable bacterial/fungal counts. Spiral plating has been awarded full approval by organizations like the AOAC², the ISO³, and the FDA⁴.

Spiral platers rotate an agar plate while pouring decreasing amounts of liquid sample onto its surface describing an Archimedean spiral. After incubating the plates, colonies appear distributed along the spiral's track with a radial decrease in concentration. In this fashion, a single 90 mm Petri plate contains across its surface the equivalent to a threefold decimal dilution concentration range.



The core feature of Eddy Jet 2W is the use of high-precision disposable micro-syringes. Micro-syringes have a capacity of 110 μ l and deliver extremely precise volumes of sample to agar surfaces. The angle at which a micro-syringe's tip contacts the agar's surface ensures constant liquid deposition. Despite this process' complexity, Eddy Jet 2W is a very user-friendly device. Self-explanatory icons guide the user through the device's software.



A specific counting grid always implemented to enumerate colonies. Counting always starts in the outermost sectors of the plate and moves inward (see the "Colony Counting" section for a detailed explanation). This method enables elucidating a sample's bacterial and fungal concentration.

Main Applications of Spiral Plating

Spiral plating's main application, as previously described, is that of performing surface spreads for viable microorganism enumeration where a single spread can have a detection range between 2×10^2 and 4×10^5 CFU/ml. This application is mainly used to assess bacterial concentrations during and after the manufacturing or processing of food, drinks, pharmaceuticals, and cosmetics. It is also widely implemented during challenge testing (also known as preservative efficacy testing). This method has also been applied to test environmental water samples⁵. Agricultural and environmental industries implement spiral platers in bio-pesticide challenges, frost prevention, and leaf studies.

Rare Applications of Spiral Plating

Spiral plating can be used for purposes different from CFU enumeration such as spiral MIC tests (Spiral Gradient Test) and mutagenicity assays (Spiral Salmonella Mutagenicity Assay).

Kill curves and susceptibility testing can be performed with the Spiral Gradient Test (SGT). This test evaluates an antibiotic's susceptibility by plating an antibiotic in a decreasing concentration (as spiral plates usually do with sample bacteria). Bacteria strains to be tested are then radially inoculated in the plate. Thus, the point at which the antibiotic inhibits growth can be detected. A specific antibiotic concentration can be associated with it and this enables elucidating a clear-cut MIC with a software designed for this purpose⁶.

The Spiral Salmonella Mutagenicity Assay evaluates the potential mutagenicity of a substance. This test adapts the Ames test to spiral plating. As in the Spiral Gradient Test, the spiral plater is used to dispense decreasing amounts of sample across the agar plate's surface generating a concentration gradient. Mutation induction rates are evaluated by quantifying the amount of prototrophic revertants (His⁺) from an inoculated strain of Histidine auxotrophic (His⁻) bacteria. Revertant His⁺ levels that lie above basal reversion levels account for mutated bacteria^{7,8}. A specific software must be also used for this test⁷.

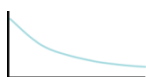
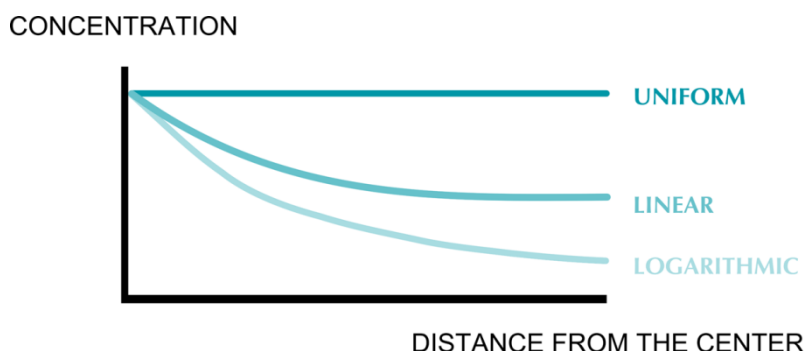
Bibliography

1. C.B. Donnelly, G.E. Gilchrist, J.T. Peeler and J.E. Campbell, Spiral plate method for examination of raw and Pasteurized Milk, *Ap. And Env. Micr.* 1 (1976) 21-27.
2. AOAC Method 977.27
3. ISO 7218: 2007, Microbiology of food and animal feeding stuffs. General Requirements and Guidance for Microbiological Examinations.
4. L. Maturin and J.T. Peeler, Bacteriological Analytical Manual Chapter 3. Aerobic Plate Count. FDA (2001).
5. Wada M., Statistical study of the optimal conditions of the spiral method for counting bacterial numbers in river water. *Nihon Eiseigaku Zasshi*.4 (1992) 798-810.
6. J.H. Paton, H.A. Holt and M.J. Bywater, Measurement of MIC's of Antibacterial Agents by Spiral Gradient Endpoint Compared With Conventional Dilution Method. *Int. J. Clin. Chemother.* 3(1990) 31-38.
7. N.L. Couse and J.W. King, Use of the Spiral Plater With the Salmonella for Chemical Mutagens, *Environ. Mutagen.* 2 (1980) 307-308.
8. S L.D. Claxton and V.S. Houk, Methods for the spiral Salmonella assay including specialized applications, *Mutat. Res.* 488 (2001) 241-257.

APPENDIX B: TYPES OF SPIRAL DISTRIBUTIONS

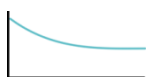
Eddy Jet 2W can perform 25 spiral distributions (37 distributions, if counting those for 150 mm plates). Each type corresponds to a different pattern in liquid sample spreading across the spiral. Several types of distributions exist logarithmic, linear, and uniform. As previously explained, the purpose of spiral plating is to create areas with different sample concentrations in a single plate. This is achieved by pouring different volumes of the sample across the spiral. Note that the latter isn't true for uniform distributions where sample concentrations stay constant across the spiral. Variations in total volume, partial volumes, and rotation speed as well as in plate size all account for each of the 37 spiral distributions that are available.

Note: distributions are also referred to as (deposition) modes and (types of) spiral distributions.



Logarithmic Distributions

In logarithmic modes, volumes poured across each section in the spiral decrease logarithmically providing a dramatic decrease in sample concentration along the different sections of the spiral. Logarithmic modes are by far the most widely used in spiral plating to perform viable bacterial/fungal counts.



Linear and Proportional Distributions

Linear/Proportional distributions create hyperbolic concentration gradients that are more moderate than those in exponential modes. During a linear distribution, the flow of dispensed samples into agar plates doesn't vary, meanwhile, as the stylus heads towards the outer parts of the spiral, the area over which the sample is being dispensed increases generating a hyperbolic concentration gradient.



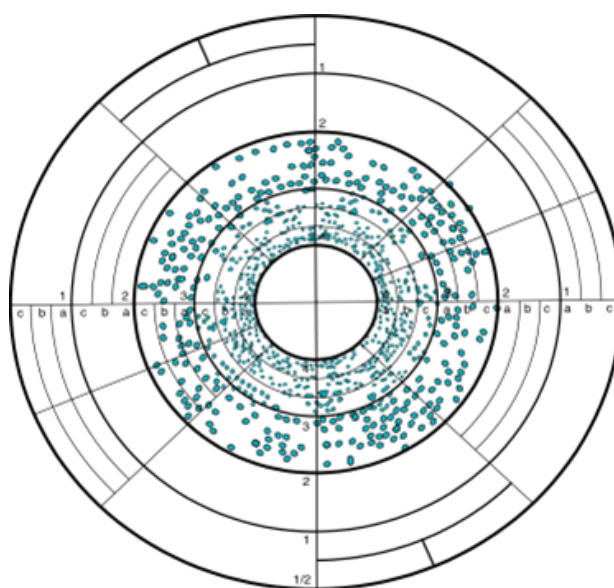
Uniform Distributions

In uniform modes, the volume of liquid poured in different segments of the spiral doesn't vary at all, sample concentrations remain constant regardless of their position in the spiral. This distribution is designed to perform the deposition of tested microorganisms in the Salmonella mutagenicity spiral assay. This assay is a variant of the AMES test, see the "Introduction to Spiral Plating" section for a description of this assay.

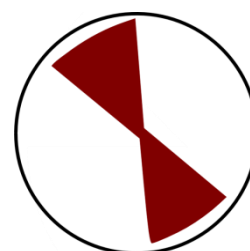
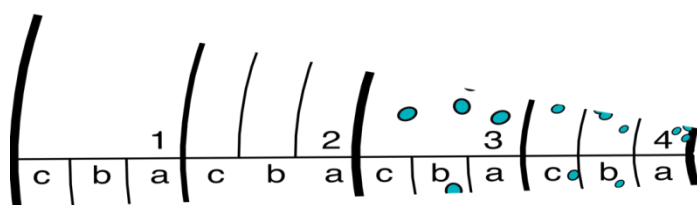
APPENDIX C: COLONY COUNTING

Counting colonies in a spiral plate requires the use of a specific counting grid (which comes along with Eddy Jet 2W). IUL SA strongly recommends the usage of the manual (DOT; Cat.90008700) or automatic colony counters (SphereFlash®; Cat.90007000) to perform spiral colony counting. The use of the latter can genuinely streamline a lab's workflow by avoiding the time-consuming procedure described in this section of the manual.

WARNING 	Use exclusively spiral counting grids provided by IUL SA for Eddy Jet 2W. If ever needed, normal colony counting (which requires counting all colonies) must be used to count Uniform spreads.
---	---



When enumerating manually, a simple process must be followed: colonies are to be counted only in a 1/8 sector of the counting grid (the counting grid already contains marked 1/8 sectors). The counting grid is divided into 4 concentric sections (1, 2, 3, and 4) that have been further divided into three rings (1c, 1b, 1a...). Ring sections 1 and 2 only will be used whenever 150 mm plates are being read.



The following formula must be used to calculate CFU concentrations:

$$C = (N' + N'') / (V / 4)$$

C = CFU concentration = CFU ml⁻¹

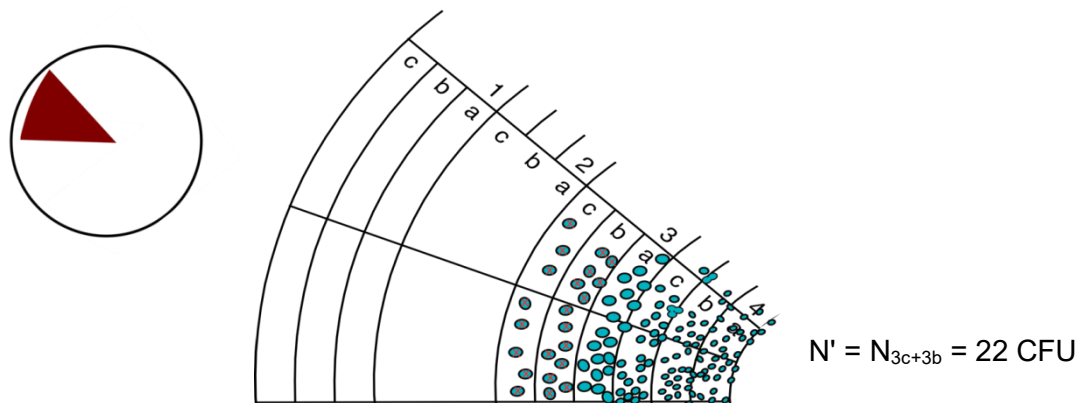
N' = CFU count in the first 1/8 ring sector = CFU

N'' = CFU count in the opposite 1/8 ring sector = CFU

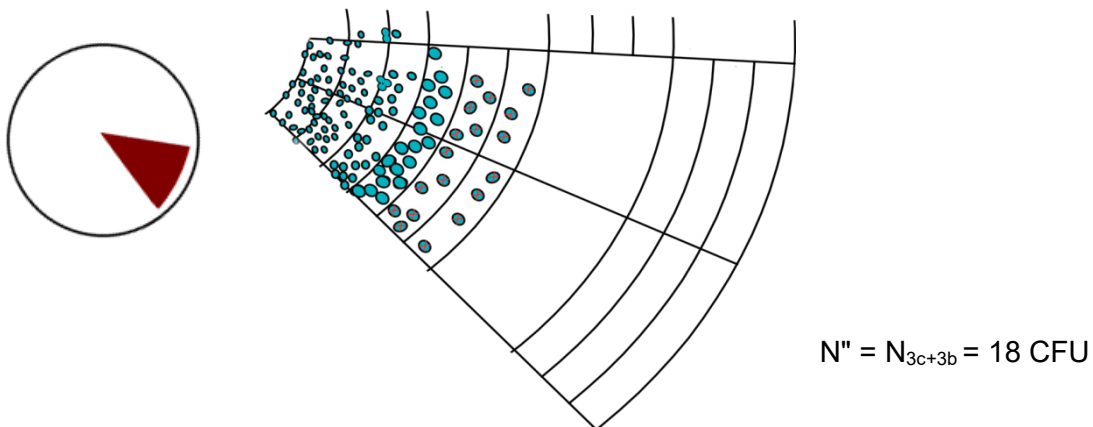
Counting is performed as follows:

Counting shall be restricted to the 3 and 4 ring sections of the counting grid for 100 mm Petri plates and to 1, 2, 3, and 4 ring sectors in 150 mm plates. Any colonies that appear outside of these boundaries are to be ignored. Counting takes place in 1/8 sectors of the counting grid's rings, it must start at the outermost ring of the grid and proceed inwards. When a ring is reached where a count of 20 colonies is met, counting can be resumed until the rest of the colonies in this same ring sector are counted, it must then stop. Next, colonies that are present in the same rings of the opposed sector must be counted (see example below).

Note: an E-Mode 50 μ l distribution was supposedly used to inoculate the plate being counted in the following example.



The first count reaches (and surpasses) 20 CFU in the 3b ring sector and it, therefore, stops here. Thus all colonies in the 3c and 3b ring sectors are counted, adding up to 22 colonies. Then, the opposite end of the grid is counted in the same fashion:



The second count in the 3c and 3b sectors reaches 18.

Next, the sample volume poured in the counted rings (V) must be figured out. The total volume of the counted rings appears in Appendix D: Volume (ml) Table: 90 – 100 mm Petri Dishes and Appendix E: Volume (µl) Table: 150 mm Petri Dishes. It's vital to choose the volume table that accounts for 100 mm Petri plates. In this case, the E-Mode 50 µl volumes for sections 3c and 3b (V_{3c+3b}) must be found.

$$V = V_{3c+3b} = 6.44 \mu\text{l} \cdot 10^{-3} \text{ ml}/\mu\text{l} = 6.44 \cdot 10^{-3} \text{ ml}$$

Last, the variables are ready to be introduced into the formula.

$$C = (N' + N'') / (V_{3c+3b} / 4)$$

$$C = (22 \text{ CFU} + 18 \text{ CFU}) / (6.44 \cdot 10^{-3} \text{ ml} / 4)$$

$$\underline{C = 2.4845 \cdot 10^4 \text{ CFU/ml}}$$

Otherwise: figure out CFU/ml in one second...

Automatic Spiral Colony Counter

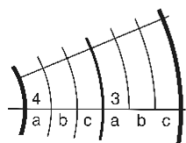


SphereFlash®

Cat.90007000

APPENDIX D: VOLUME (ML) TABLE: 90 – 100 MM PETRI DISHES

90 - 100 mm

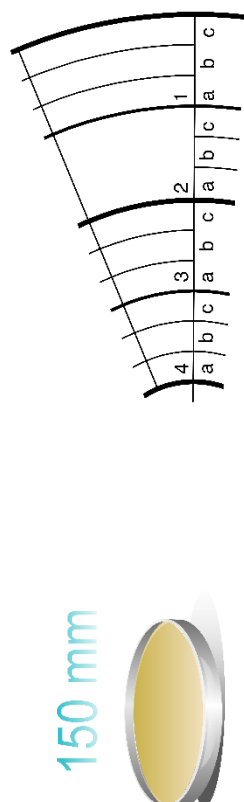


	3c	3c+3b	3c+3b+3a	3+4c	3+4c+4b	TOTAL
E-Mode 50 µl	2,56	6,44	12,08	20,36	32,32	50
C-Mode 40 µl	1,52	3,96	7,68	13,36	22	37,3
C-Mode 100 µl	4,56	11,52	21,52	35,92	56,8	92,2
D-Mode 49,2 µl	2,16	5,48	10,56	18,28	30	49,2
D-Mode 50 µl	3	7	13,2	22	34	50
Log Mode 50 µl (S)	2,16	5,48	10,56	18,28	30	49,2
Log Mode 100 µl	4,32	10,8	21,12	36,4	60	98,4
Log Mode 200 µl	8,64	21,6	42,24	72,8	120	196,8
Linear Mode 18µl	3	6	9	12	15	18
Linear Mode 50µl (S)	8,33	16,67	25	33,33	41,67	50
Linear Mode 100µl (S)	16,67	33,34	50	66,67	83,34	100
Linear Mode 200µl	33,33	66,67	100	133,33	166,67	200
Exp. 3000 Mode 50µl (S)	1,16	4,72	10,08	18,28	30,12	50
Prop. 3000 Mode 20µl	3,33	6,66	10	13,33	16,67	20
Lawn 3000 Mode 20µl (+)	4,38	8,23	11,56	14,37	16,66	20
Unif. 3000 Mode 20µl	4,73	8,91	12,52	15,58	18,09	20,04
C-Mode Fast 40 µl	1,52	3,96	7,68	13,36	22	37,3
Log Mode 300 µl	12,96	32,4	63,36	109,2	180	295,2
Log Mode 400 µl	17,28	43,2	84,48	145,6	240	393,6
Linear Mode 300µl	50	100	150	200	250	300
Linear Mode 400µl	66,67	133,33	200	266,67	333,33	400

(S) This spiral mode has also a slow version to work with irregular agar surfaces.

(+) Lawn is not considered a colony counting method and it does not meet the assigned area 4a.

APPENDIX E: VOLUME (ML) TABLE: 150 MM PETRI DISHES



	1c	1c+1b	1c+1b +1a	1+2c	1+2c +2b	1+2c +2b+2a	1+2+3c	1+2 +3c+3b	1+2+3c +3b+3a	1+2+3 +4c	1+2+3 +4c+4b	TOTAL
C-Mode 40 µl	0,05	0,15	0,38	0,75	1,33	2,28	3,8	6,24	10,14	16,44	26,04	39,6
C-Mode 100 µl	0,08	0,32	1,05	2,18	3,93	6,68	11,08	17,88	28,43	44,33	67,53	99,2
Exp. 3000 54.30µl	0,15	0,4	0,8	1,46	2,54	4,23	6,66	10,18	15,25	22,57	33,23	54,3
Slow 3000 54.30µl	0,15	0,4	0,8	1,46	2,54	4,23	6,66	10,18	15,25	22,57	33,23	54,3
Unif. 3000 63.45µl	8,52	16,45	23,79	30,55	36,72	42,30	47,29	51,70	55,52	58,75	61,39	63,45
Prop. 3000 43.09µl	3,59	7,18	10,77	14,36	17,95	21,54	25,13	28,72	32,31	35,9	39,49	43,09
Lawn 3000 55.78µl	3,48	14,46	20,92	26,86	32,28	37,19	41,58	45,45	48,81	51,65	53,97	55,78
Linear Mode 50µl	4,17	8,33	12,5	16,67	20,83	25	29,17	33,33	37,5	41,67	45,83	50
Linear Mode 100µl	8,33	16,67	25	33,33	41,67	50	58,33	66,67	75	83,33	91,67	100
Linear Mode 200µl	16,66	33,34	50	66,66	83,34	100	116,66	133,34	150	166,66	183,34	200
Linear Mode 300µl	25	50	75	100	125	150	175	200	225	250	275	300
Linear Mode 400µl	33,33	66,67	100	133,33	166,67	200	233,33	266,67	300	333,33	366,67	400

APPENDIX F: ORDERING CODES

Consumables

Product	Contents	Cat. #
Pack of 1000 disposable micro-syringes	1 unit	90001780
Pack of 1000 disposable beakers	1 unit	90001790

Spare Parts

Product	Contents	Cat. #
Holder for micro-syringes	1 unit	900011275
Holder for beakers box	1 unit	90001949
Holder for 10 beakers	1 unit	90001974
5mm disk for height adjustment	1 unit	90001904
Power cord Schuko	1 unit	90004017
Power cord (Japan & USA)	1 unit	90004018
Power cord (UK)	1 unit	90004019
Power cord (Argentina)	1 unit	90004026
Power cord (Australia/China)	1 unit	90004027
Spiral counting grids	2 grids	9000625
Table of volume (µl) for different spiral spreadings	1 unit	50008028
Start point adjustment pattern	1 unit	90001935

Product	Contents	Cat. #
Plate holder device for 100mm dishes	1 unit	90001710
Waste container for used micro-syringes	1 unit	900011156

Optional Accessories

The following accessories can be purchased separately. State the order number (Cat.#) when ordering the accessory.

Product	Contents	Cat. #
Plate holder device for 150mm dishes	1 unit	90001715
Plastic bottle of 25 gr of Aniline Blue	1 unit	90004928
Bar-Code Reader MMJ7	1 unit	90005701
Top supplement Eddy Jet 2	1 unit	900011588
Ticket Dot Matrix Printer	1 unit	90003069

APPENDIX G: TECHNICAL DATA

IUL SA reserves the right to change specifications at any time.

Specifications

Spiral modes	25 spiral modes (37 including 150 mm modes)
Minimum step volume	< 10 nl
Maximum pipetted volume	100 µl
Syringe material	Polypropylene
Plunger material	Polyethylene H.D.
Volume validation	Total volume of each method
Touch screen	7"
External balance connection	Serial RS-232 DB-9
Printer connection	Serial RS-232 DB-9
Barcode reader connection	IUL SA Barcode Reader Connection
USB sockets	4 host ports
Spiral motion control	3 Microcontroller-regulated stepper motors

Operating Conditions

Power range	88 ~ 264 V
Frequency range	50 ~ 60 Hz
Fuse	6 A
Maximum power	120 W
Overvoltage category	II
Air temperature	18 ~ 35 °C
Relative humidity	10 ~ 75 % (non-condensing)
Altitude	Up to 2000 meters (6500ft.)
Place of operation	For indoor use only
Pollution level	2

Transportation conditions

Air temperature	5°C ~ 40°C (41°F ~ 104°F) In manufacturer's packaging
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Relative humidity	Maximum 75 % (non-condensing)
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Storage conditions

Air temperature	5°C ~ 40°C (41°F ~ 104°F) In manufacturer's packaging
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Relative humidity	Maximum 75 % (non-condensing)
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Dimensions and Weight

Dimensions (WxHxD)	51.5 x 42 x 50 cm / 20.3 x 16.5 x 19.7 in
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Weight	20 Kg / 44 lb
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APPENDIX H: WARRANTY

The Eddy Jet 2W instrument has a 12-month warranty period which starts when the instrument is purchased to IUL, SA.

The warranty is void when misuse of the equipment can be proved. Damage or manufacturing faults caused by impacts, chemical or corrosive products, liquids, dampness, or other external factors, such as radiation, fire, or inadequate transport are not included.

In addition, the warranty will not apply if the equipment has been handled, repaired, or modified by not qualified or specifically designated personnel.

As part of this warranty, all shipping costs to the selected technical service are the responsibility of the Buyer.

APPENDIX I: WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE)

This section provides information about disposal of waste electrical and electronic equipment by users.

The crossed-out wheeled bin symbol (see below) indicates that this product must not be disposed of with other waste; it must be taken to an approved treatment facility or a designated collection point for recycling, according to local laws and regulations.

The separate collection and recycling of waste electronic equipment at the time of disposal helps to conserve natural resources and ensures that the product is recycled in a manner that protects human health and the environment.



APPENDIX J: EC DECLARATION OF CONFORMITY

Manufacturer Name:

IUL SA



Manufacturer Address:

Carrer de la Ciutat d'Asunción, 4 08030 Barcelona Spain

Declares that the product Name:

Eddy Jet 2W

Catalog Number:

Cat.90003800

Conforms the Council Directives:

- Directive [2014/30/EU](#) of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast).
- Directive [2014/35/EU](#) of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits (recast).
- Directive [2011/65/EU](#) of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (recast).

Standards which Conformity is Declared:

- [EN 61326-1:2013](#) Electrical equipment for measurement, control and laboratory use - EMC requirements -- Part 1: General requirements (IEC 61326-1:2012)
- [EN 61010-1:2010](#) Safety requirements for electrical equipment for measurement, control, and laboratory use -- Part 1: General requirements.
- [EN 50581:2012](#) Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

Barcelona, November the 26th 2018



A handwritten signature in blue ink, appearing to read 'Daniel Blanch'.

Daniel Blanch / Director of Electronic Engineering

APPENDIX K: CHINA ROHS STATEMENT

The following information has been made available to comply with SJ/T11364-2006 Marking for Control of Pollution Caused by Electronic Information Products as required by China's Management Methods for the Control of Pollution from Electronic Products.

Part Name - 部件名称	Toxic or hazardous Substances and Element - 有毒或有害的物质成分					
	Lead (Pb) 铅	Mercury (Hg) 汞	Cadmium (Cd) 镉	Hexavalent Chromium (Cr6+) 六价铬	Polybrominated biphenyls (PBB) 多溴联苯	Polybrominated diphenyl ethers (PBDE) 多溴联苯醚
Plastics - 塑料						
Enclosure / Plastics parts - 外壳/塑料部件	O	O	O	O	O	O
Mechanical units - 机械部分						
Chassis / Moving parts - 底盘/可动部分	O	O	O	O	O	O
Electrical Units - 电器部分						
PCB's a. components / Sensors - 印刷电路板部分/传感器	O	O	O	O	O	O
Power Supply – 电源	O	O	O	O	O	O
Cables - 电缆						
Connecting cables – 连接电缆	O	O	O	O	O	O
Compressor -压缩机						
Compressor - 压缩机	X	O	X	O	O	O
PTC, e-PTC- 继电器	X	O	O	O	O	O
Relay- 继电器	O	O	O	O	O	O
Motors - 电机						
Motors / Pumps / Fans - 电机/泵/风扇	O	O	O	O	O	O
O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11364-2006. O : 代表用于此部件的所有同类型的包含该种有毒或者有害物质的材料均在 SJ/T11364-2006 的规定界限以下 X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part may be above the limit requirement in SJ/T11364-2006. (EU RoHS2 Exemption). X : 代表用于此部件的至少一种此类型的包含该种有毒或者有害物质的材料可能在 SJ/T11364-2006 的规定界限以上 (属于欧盟 RoHS2 豁免项)						

The Environment-Friendly Using Period for the Eddy Jet 2W is:



APPENDIX L: FCC STATEMENT

FCC Declaration of Conformity

Responsible party:

IUL SA
C/ Ciutat d'Asunción, 4
08030 Barcelona
Spain



This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the device. Where shielded interface cables have been provided with the product or specified additional components or accessories elsewhere defined to be used with the installation of the product, they must be used in order to ensure compliance with FCC regulations.

Notes

