
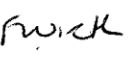


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	<b>STANDARD OPERATING PROCEDURE</b>	
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## 1. Scope

This Standard Operating Procedure (SOP) applies to the staff and students using the Jouan® BE 117R Water Distiller in the laboratories of the Pharmacy Department, University of Malta.

## 2. Objective

To describe the procedure for installation, operation, maintenance and troubleshooting of the Jouan® BE 117R Water Distiller.

## 3. Definitions

- 3.1. Boiling Chamber:** The lower part of the distiller in which tap water is allowed to heat and subsequently vapourise to enter the condenser.
- 3.2. Condenser:** The upper part of the distiller which allows the vapourised water to re-cool and change back into its liquid state to be collected.
- 3.3. Jack Socket:** Used to supply the heating elements when these are connected.
- 3.4. Water Distillation:** The process by which water is purified by means of vapourisation and condensation cycles.

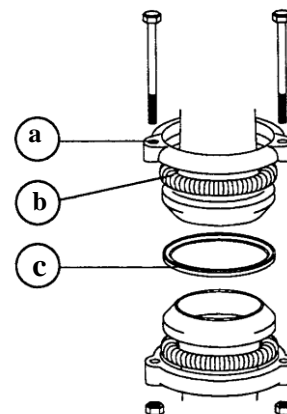
## 4. Responsibility


- 4.1.** The members of the Department of Pharmacy (staff and students) are responsible for following this SOP.
- 4.2.** The designated Laboratory Officer or Laboratory Assistant is responsible for ensuring that this SOP is followed.

## 5. Procedure

### 5.1. Installation

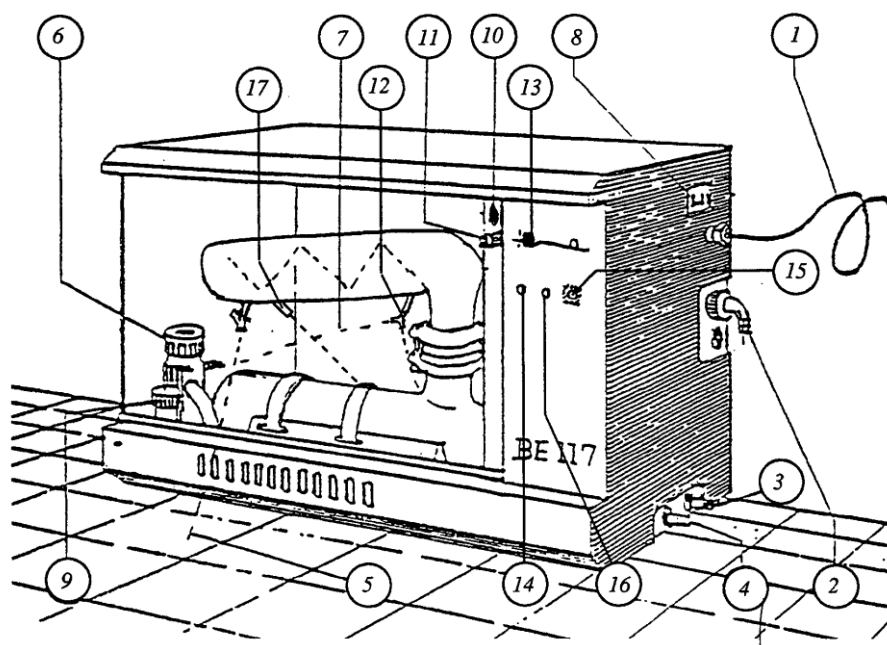
#### 5.1.1. Diagram of Condenser Installation



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- 5.1.2. Place the tension rings [b] onto the necks of the condenser and boiling chamber.
- 5.1.3. Follow the tension rings with the collars [a].
- 5.1.4. Position the condenser on top of the boiling chamber.
- 5.1.5. Place the seal [c] in between with the rim facing downwards.
- 5.1.6. Tighten the structure by using 3 appropriate bolts.

#### 5.1.7. Diagram of Operational Components



- |                              |                              |
|------------------------------|------------------------------|
| 1. Mains cord                | 2. Water supply              |
| 3. Alternative boiler drain  | 4. Boiler drain              |
| 5. Distilled water collector | 6. Constant level system     |
| 7. Boiler feeding tube       | 8. Mains switch              |
| 9. Boiler drain tap          | 10. Socket for level control |
| 11. JACK socket              | 12. Boiler water supply      |
| 13. Distillation switch      | 14. Overheat alarm light     |
| 15. Low flow alarm light     | 16. Fuse                     |
| 17. Condenser feeding tube   |                              |

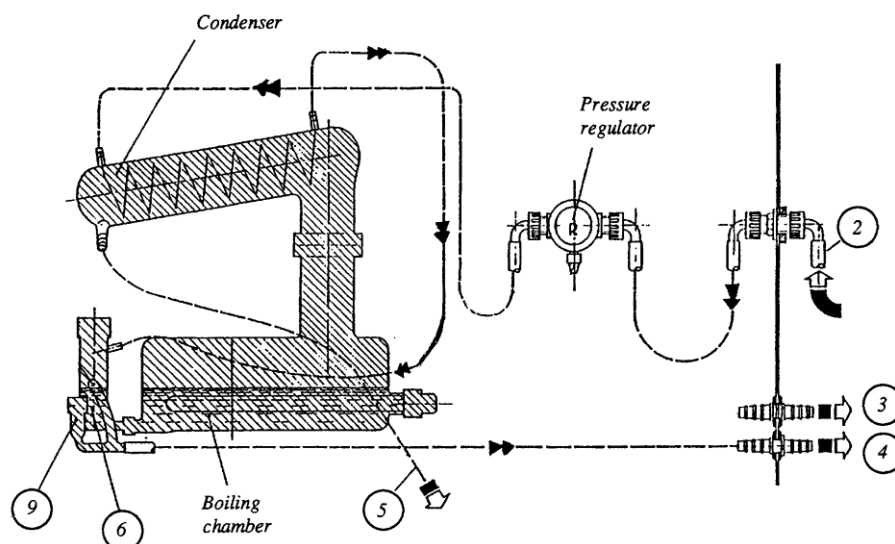
- 5.1.8. Connect the condenser feeding tube and the boiler feeding tube to their hose connections at positions [17] and [12] respectively on the condenser.
- 5.1.9. Connect electrical cable at position [1].

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- 5.1.10. Connect electrical cable to the mains supply.
- 5.1.11. Connect the water supply line inlet to the hose nozzle at position [2].
- 5.1.12. Connect cooling boiler drain to hose nozzle at position [4].
- 5.1.13. Connect a suitable rubber pipe for distilled water collection at position [5].

## 5.2. Operation

### 5.2.1. Diagram of Water Flow Line



- 5.2.2. Check that the boiler drain cock [9] is fully closed.
- 5.2.3. Check that the level tube [6] is tightened.
- 5.2.4. Check that the JACK socket [11] is plugged in.
- 5.2.5. Turn on mains water.
- 5.2.6. Check that there are no water leakages in hydraulic system.
- 5.2.7. Switch on distiller by pressing the mains switch [8].
- 5.2.8. Check that the boiler has an operative water level which may not be so when exceeding water flows out from the overflow [4].
- 5.2.9. Push distillation switch [13] to the 'ON' position.
- 5.2.10. Wait until pilot lamp lights up and heating resistors in the boiler turn red.
- 5.2.11. Check that a little excess water is always overflowing during both boiling and distillation-collection phases to prevent the boiler from draining.

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### 5.3. Maintenance


**5.3.1.** Wash boiler and level tube periodically whenever scales or residues appear on their walls.

**5.3.2.** Whenever washing is to be performed:

- 5.3.2.1.** Switch off mains supply [8].
- 5.3.2.2.** Turn off water inlet.
- 5.3.2.3.** Remove the left side panel.
- 5.3.2.4.** Remove the plastic cap from the level tube [6].
- 5.3.2.5.** Half drain boiler by means of the suitable drain cock [9].
- 5.3.2.6.** Introduce at least 250ml of concentrated hydrochloric acid into the level tube.
- 5.3.2.7.** Leave this in situ for some minutes.
- 5.3.2.8.** Open the water inlet cock again.
- 5.3.2.9.** Turn on both the mains and the distillation switch.
- 5.3.2.10.** Wait until water content in the boiling chamber boils.
- 5.3.2.11.** Switch off mains switch.
- 5.3.2.12.** Allow to cool for some minutes.
- 5.3.2.13.** Turn off water supply.
- 5.3.2.14.** Drain the boiler completely [9].
- 5.3.2.15.** Close level tube with stopcock.
- 5.3.2.16.** Turn on water supply to allow rinsing.
- 5.3.2.17.** Throw away the first distillate batch since this may still contain traces of the acid.

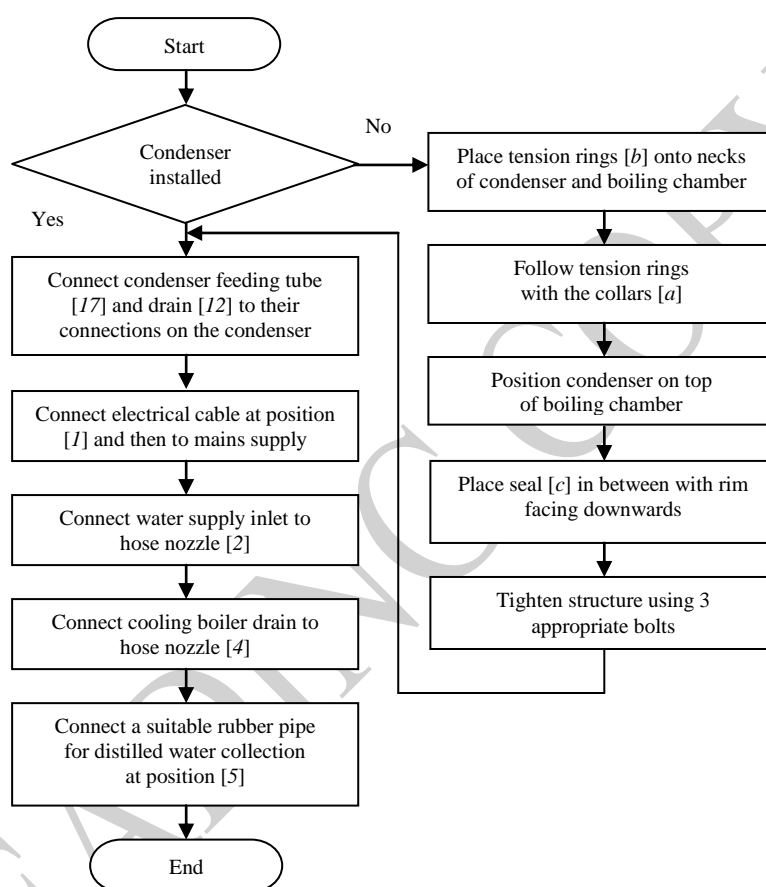
### 5.4. Troubleshooting


Fault	Possible Cause/s
<i>Overheat Alarm lights up</i>	Boiler overheating or electricity disconnection
<i>Low Flow Alarm lights up</i>	Temporary failures such as pressure leakage in cooling circuit (heating resistor is automatically switched off)

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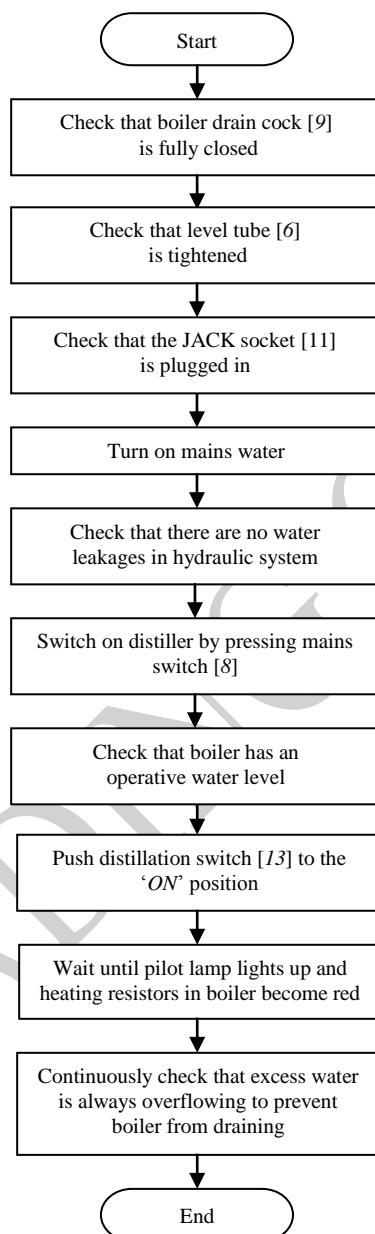
## 5.5. Flow Charts


### 5.5.1. Installation



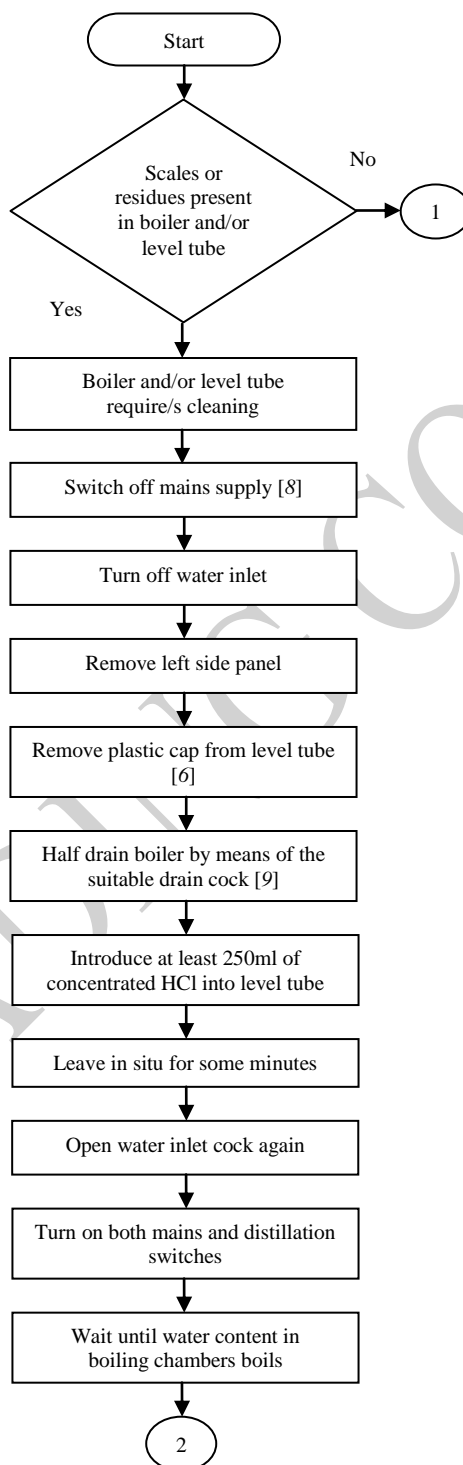
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### 5.5.2. Operation




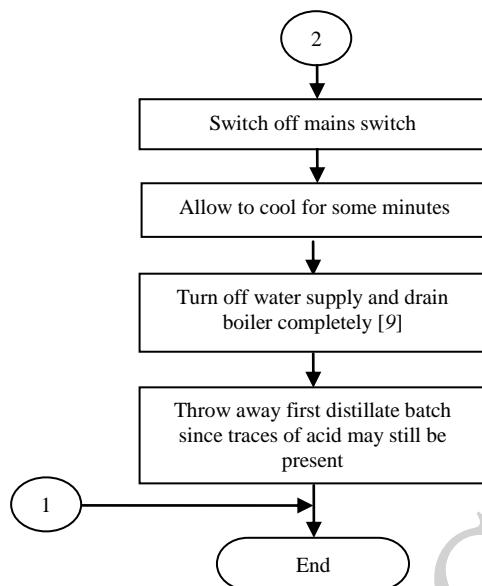
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### 5.5.3. Maintenance





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## 6. Precautions

**6.1.** Before starting up the distiller, always check that:

- 6.1.1.** Boiler drain cock [9] is fully closed
- 6.1.2.** Level tube [6] is tightened
- 6.1.3.** JACK socket [11] is plugged in
- 6.1.4.** Boiler has an operative water level

**6.2.** During both the boiling phase and distillation-collection phase, check that a little excess water is overflowing in order to prevent the boiler from draining.

**6.3.** When the overheat alarm lights up, always try to identify the actual cause/s for the boiler overheating before trying to use the distiller again.

**6.4.** Perform regular cleaning measures to maintain the distiller in efficient working order.

## 7. References

Jouan. Ovens and Incubators (EU/EB) User's Manual. Saint Herblain: Jouan; 1989.

## 8. Appendices

N/A

## 9. Revision History

Version Number	Amendments/ Reasons for change
01	Initial Release