

Document No. OP-007

Version: 1 Effective Date: July 22, 2022

1 PURPOSE

To outline the steps taken to operate the FD80.

2 SCOPE

This procedure applies to the freeze dryer (FD80) in the BT80.

RESPONSIBILITES

Head of Product Innovation, Food Scientist and Food Safety Specialist or its designate

. Revising the work instruction.

Department Manager, Supervisor or its designate

. Ensure that personnel follow this work instruction.

DEFINITIONS

BT80

Mobile Biotrim Unit

FD80

Freeze Dryer with a capacity to freeze dry 80kg of wet product in 24hrs



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5 EQUIPMENT AND MATERIALS

- 5.1 FD80
- 5.2 Trays

PROCEDURE

6

6.1 Prestart Actions

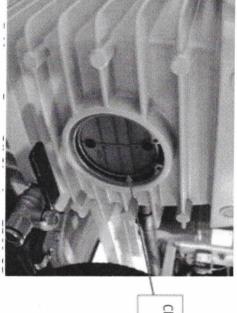
- 6.1.1 Before starting the machine, take the following actions:
- 6.1.1.1 Check that the power has been on for at least 3 hours to give the sump heater time to warm up the
- the start up. 6.1.1.2 If the mains power has been turned off for an extended period, call a Refrigeration Engineer to supervise
- 6.1.1.3 Check the compressed air is connected and that all isolation valves are open
- glass. 6.1.1.4 Check the oil level on the vacuum pump via the sight glass. Also check the quality of the oil in the sight
- 6.1.1.5 Check oil level in the sight glass on every run



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Check level in oil sight glass.

Figure I Vacuum Pump Oil Check on FD80

6.2 Starting the Machine

- .1 Check that the machine is clean inside and out and clear of any free water.
- 2.2 Ensure the door seal is clean. Figure 8: Door Seal and Weir on FD80 GP
- 6.2.3 Freeze Mode Freeze Mode should be used to cool the heat plates to the correct temperature before drying. It can also be used to freeze in place.
- 6.2.4 Select FREEZE on the HMI touchscreen.
- 2.5 Allow temperature of the shelves to reach -20°C.
- 6.2.6 If freezing product in place, ensure the chamber door is firmly and evenly closed.



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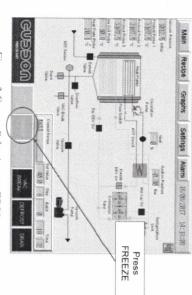


Figure 2 Freeze Selection on FD80

- 6.2.7 Prepare the product for loading and place on the trays and load all the trays into the chamber.
- 6.2.9 Close the chamber door and secure the latches. Place Product Temperature Probes in product for product temperature reference.
- **6.3** Dry Mode
- 6.3.1 Dry Mode is used to remove the ice from the product under a strong vacuum.
- 6.4 While still in Freeze Mode:
- 6.4.1 Load product, place product probes in product, and ensure door is securely latched.



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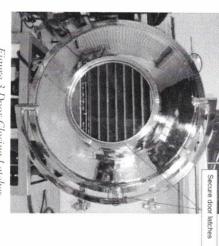


Figure 3 Door Closing Latches

6.5 Select the required recipe (press Recipe on the main screen)

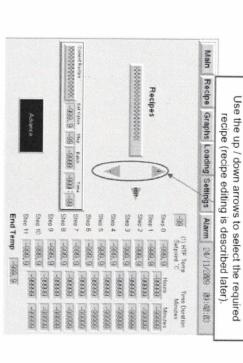


Figure 4 Recipe Set-up on FD80



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- 6.6 Make sure vacuum pump is warm from the freeze cycle
- The control system will start the vacuum pump automatically in freeze mode to achieve this. Make sure the dryer has been running in freeze for at least 25 minutes
- **6.8** Use the up / down arrows to select the required recipe
- 6.9 Select DRY on the HMI touch-screen (press Main to display main screen)

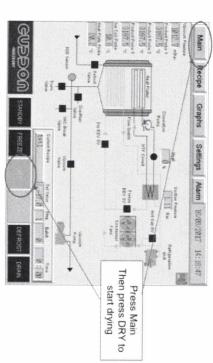


Figure 5 Dry Set Up on FD80

- 6.10 Check that the vacuum has locked onto the door by loosening the door latches
- 6.11 Fill out log sheet with date, weight, time, etc. During The Drying Run It is strongly recommended that the DATE and BATCH NUMBER along with PRODUCT CONDITIONS are recorded manually on the log sheet.
- 6.12 The control system automatically creates a trend of the run and logs a batch file at the end of the run.
- 6.13 Press "GRAPHS" at any time during the run to see the trend
- **6.14** It should take about 30 minutes to bring the chamber down to working pressure.
- 6.15 Press Main Then press DRY to start drying.



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6.16 Freeze Override

- 6.16.1 Freeze Override is a product and machine protection mode that will start automatically if the chamber vacuum rises above Dry Mode HTF Vac Setpoint High Vacuum (Set point 124) for longer than the timer (default 20min), or if the heat plates drop below their minimum temperature for more than 5 minutes.
- 6.16.2The timer will start counting any time the vacuum rises above 3mbar after the initial pull down.
- shelf temperature will drop to the Freeze Setpoint to re-freeze the product. If the dryer goes into Freeze Override, the Freeze Override button will appear on the screen and be GREEN, and the

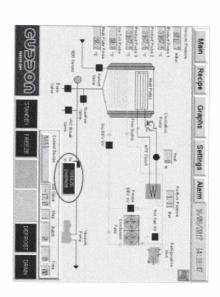


Figure 6 Freeze Override on FD80

- 6.16.4 Once in Freeze Override, make a decision to either Vacuum Break and unload the product, or continue with Drying.
- 6.16.5 Select VAC BREAK to unload the product. Select DRY to put the dryer back into Dry Mode
- 6.16.6 If Dry is selected, the recipe will restart from the beginning of the recipe
- 6.16.7 The 'Advance' button on the Recipe page can be used to bring it back to where it was before Freeze Override started.

6.17 Completion of Drying



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- 6.17.1 At the end of the cycle, there are three indicators that can be used to predict if the product is dry without breaking the vacuum:
- 6.17.1.1 All three Product Probes are at the same temperature as the Heat Plates.
- 6.17.1.2 The Ice Coil probe is at a very low temperature.
- 6.17.1.3 The Vacuum Pressure is very low.
- occurred, the Dry cycle should be continued 6.17.1.4 All three indicators must be present to be confident that the product is really dry. If any of the three has not
- **6.18** When ready to open the Dryer:
- 6.18.1 Release the door latches.
- 6.18.2 Press VAC BREAK on the HMI touchscreen.

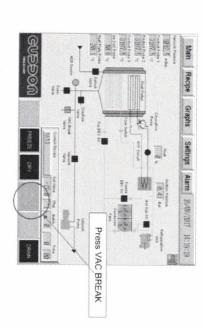


Figure 7 Vacuum Break on FD80

- 6.18.3 Allow vacuum to release then unload product.
- 6.18.4 Data logging stops automatically
- The vacuum is released once the pressure reaches around 1013 mBar and is not rising anymore.
- 6.18.6 The door should open freely if the vacuum has been sufficiently released.



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- 6.18.7 If the door does not open freely, wait a few minutes before trying to open the door again.
- 6.18.8 Unplug the temperature probes.
- 6.18.9 Make sure that the PT100 probes and cables are not damaged.
- 6.18.10 Probes should be removed by the plug only, do not pull on the wire.
- 6.18.11 It is important to have storage for the product to ensure the dry product does not have the opportunity to absorb moisture from the atmosphere.

REFERENCES

Not applicable

8 REVISION HISTORY

		SOP Version
	Jul 22, 2022	Effective Date
	NEW	Summary of Changes
	Precious Chigumo	Revised By