

Operating Procedures

BT80



TrendiTech Inc.

Burnaby, British Columbia, Canada

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Part 1: Getting Started

1.1 What is the purpose of this document?

- BT80 showcases the BioTrim capabilities for processing small batches of fruit and vegetables into freeze-dried powders.
- The BT80 Operating Procedures identifies all the equipment, processes, and documents needed to successfully operate the BT80.

1.2 What health and safety equipment do I need?

1.2.1 Personal Protective Equipment

In accordance with Trendi's Health and Safety Plan and as required by the Province of British Columbia, occupants of the BT80 **must wear**

- Coveralls
- Hairnet
- Facemask
- Nitrile gloves
- Protective shoes

1.2.2 Sanitation equipment

In accordance with Trendi's Health and Safety Plan and as required by the Province of British Columbia), the BT80 **must include**

- Mop buckets
- Dustpan
- Floor squeegees
- Floor scrubbing machine
- Wet mop-head
- Brooms
- Vacuum
- Poles and handles

1.2.3 What is the Health and Safety Plan for BT80?

Please refer to [Cleaning and Sanitizing Procedure for Tools and Equipment Use for Cleaning and Sanitizing](#) for the most up-to-date guidelines.

1.3 Where do I find the forms I need for recording information?

1.3.1 Batch Notes

Google Docs [Batch Notes for BT80 \(BT001\)](#)
PDF Version [Batch Notes for BT80 \(BT001\)](#)

1.3.2 Impact Report

Google Docs [Impact Report for BT80 \(BT002\)](#)
PDF Version [Impact Report for BT80 \(BT002\)](#)

1.4 What are BT80's main components?

1.4.1 Overview of BT80 rooms

Figure 1 - BT80 rooms and functions



Room 1 - Receive, wash, and sanitize raw product.

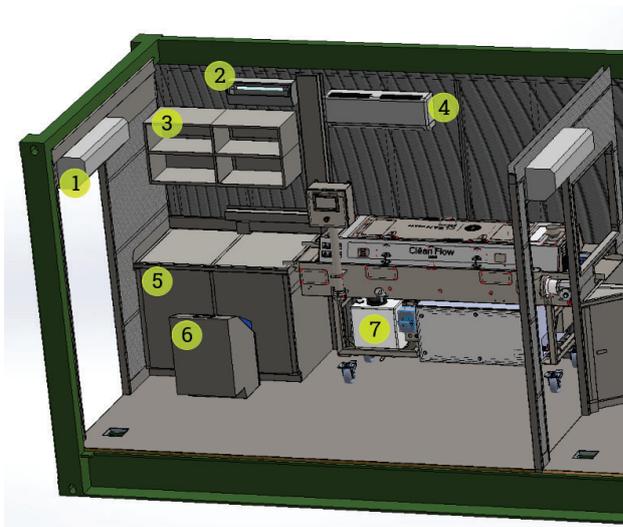
Room 2 - Trim, chop, puree, and place product on trays.

Room 3 - Insert and remove trays from the freeze drier, break product into small parts, package product in vacuum-sealed bags, and store.

Room 4 - Utilities

1.4.2 Room 1 detail

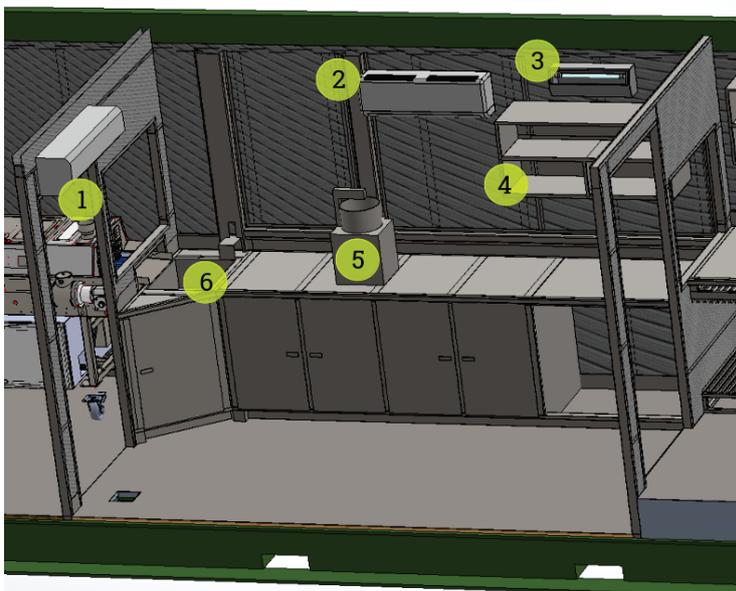
Figure 2 - BT80 Room 1 detail



- 01 – Air Curtain
- 02 – Light Trap
- 03 – Wall-mounted storage
- 04 – Air Conditioning
- 05 – Storage
- 06 – Hand Sanitation
- 07 – CleanFlo Mini

1.4.3 Room 2 detail

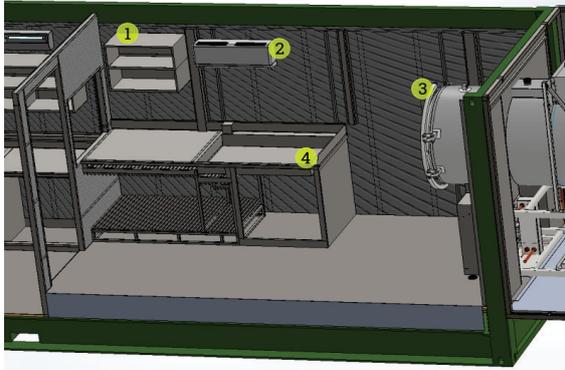
Figure 3 - BT80 Room 2 detail



- 01 – Air Curtain Trimming / chopping / pureeing / drying sink
- 02 – Air Conditioning Storage space
- 03 – Insect Trap Faucet
- 04 – Storage
- 05 – Food processor to dice/puree
- 06 – Sink for distribution of material on trays / washing trays

1.4.4 Room 3 detail

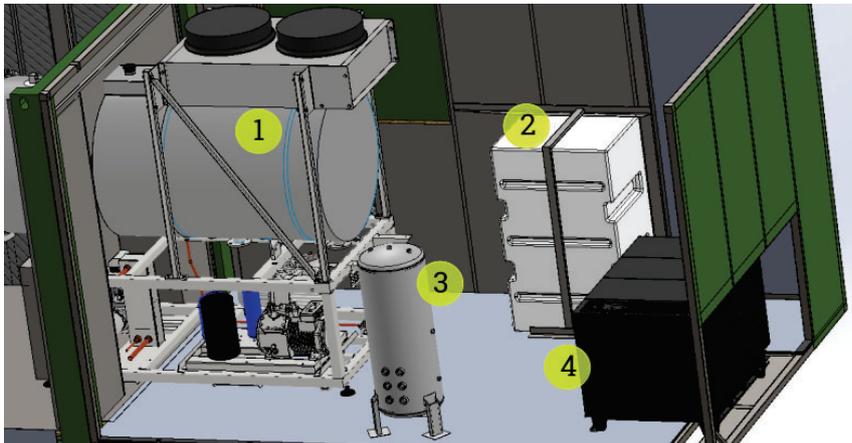
Figure 4 - BT80 Room 3 detail



- 01 – Storage Area
- 02 - Air Conditioner
- 03 – Freeze Dryer
- 04 – Sink with integrated chute to place dry material into bags after freeze dryer process
- 05 – (Not Shown) Vacuum Packing Machine

1.4.5 Room 4 detail

Figure 5 - BT80 Room 4 detail



- 01 – Freeze Dryer assembly
- 02 – Clean water tank
- 03 – Water heater
- 04 – Generator
- (items not shown):
- 05 – Air Compressor
- 06 – Electrical Panel

1.5 How do I prepare the BT80?

1.5.1 Start-up safety check and set-up procedure

Steps to preparing a parked BT80	
1	Check the trailer level and adjust it until the trailer is balanced.
2	Open the main door.
3	Unlock and position the main staircase.
4	Open the utilities room door.
5	Unlock and position the Utilities room's staircase.
6	Open the Power Generator and AC windows.
7	Walk through the unit, checking and restoring in place any equipment that shifted during transit.
8	Untie all equipment that was secured or tied down before transiting the unit.
9	Remove any items placed in inner room corridors during transport.

1.5.2 Turning on the BT80

Steps to powering the BT80	
1	Complete the start-up safety-check and ensure that all equipment is safe.
2	Connect to an external power source.
3	Turn on the power generator or the external power source.
4	Wait until the air pressure stabilizes in 6bar or more then check the air compressor for leaks.
5	Walk inside the unit and check if all lights are working.
6	Turn on the air conditioner and air curtains.

7	Plug in all internal equipment and run a quick test if necessary (two robot coupe machines, vacuum packaging machine, etc.).
8	Turn on the Clean Flow Mini and check it to make sure it is working.
9	Turn on the Freeze Dryer and check it to make sure it is working.
10	Ensure all equipment is working properly.

1.5.3 Preparing the rooms

Prior to starting any processes in the BT80, in each room, you must verify that the:

- Surfaces are clean (by wiping, sweeping, and mopping as required).
 - Doors
 - Walls
 - Countertops
 - Floor benches
 - Floor
 - Lights
 - Scales
 - Rubbish Bin
- Cleaning supplies are available and at full capacity.
 - Gloves
 - Paper towels
 - Hand wash
 - Hand sanitizer
 - Surface sanitizer
 - Wipes
- Equipment is free from damage and sanitized.
 - Benches
 - Work areas
 - Utensils
 - Machines
 - Prepared Food Trays
 - Freeze Drier Trays
- Equipment is prepared.
 - Calibrate scales against test weight.
 - Fit the rubbish bin with a new liner bag.
 - Place freeze drier trays on the tray rack.



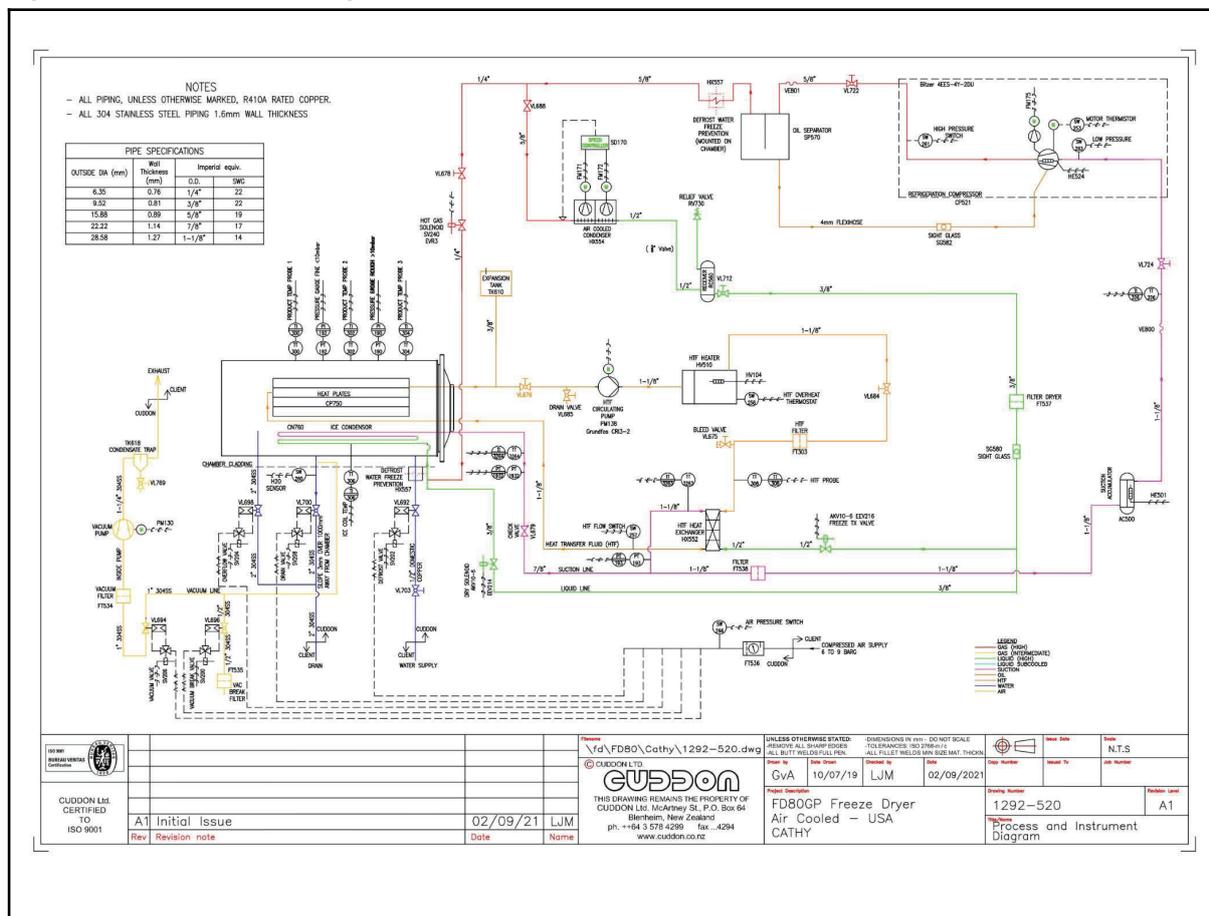
Record your activity in the [BT80 Batch Notes](#) and the [BT80 Impact Report](#).

1.5.4 Preparing the freeze drier

Prior to operating the freeze drier, you must conduct a thorough check of all the main components and verify that:

- Compressed air is connected.
- Isolation valves are open.
- Vacuum pump oil is clean.
- Vacuum pump oil is levelled.
- Heating fluid in the expansion tank is levelled.
- Freeze drier door seal is intact.
- Chamber is clean and free from ice and water.

Figure 6 - BT80 freeze-drier diagram



Steps to preparing the freeze drier after component check is complete.

1

Turn on the freeze drier and log onto the system.

2

Confirm that the correct recipe has been selected.

3	Select appropriate function: a) Standby if no trays in the chamber. b) Freeze if the chamber has trays ready for freezing.
4	 Record your activity in the BT80 Batch Notes .

1.5.5 Preparing the produce

Steps to preparing the produce.	
1	Sort the washed produce, discarding any rotten or damaged items.
2	Prepare the washed produce. <ul style="list-style-type: none"> <input type="checkbox"/> Core <input type="checkbox"/> Remove stones or pips <input type="checkbox"/> Peel <input type="checkbox"/> Other as needed for specific produce
3	Determine how produce will be freeze-dried and assembled. <ul style="list-style-type: none"> <input type="checkbox"/> Whole <input type="checkbox"/> Wedges <input type="checkbox"/> Slices <input type="checkbox"/> Pulped <input type="checkbox"/> Grated <input type="checkbox"/> Other as needed for specific produce
4	Weigh prepared produce into tray-sized quantities.
5	Place the prepared produce into the loading bucket.

1.5.6 Loading the trays and starting the freeze-drier

Steps to loading the trays.	
1	Tip produce onto a tray from the filled loading bucket.
2	Level produce evenly on the tray to ensure no high or low spots.
3	Place each loaded tray onto a shelf into the freeze drier and push to the rear.
4	Repeat steps 1-3 until all trays have been filled, levelled, and placed into the freeze-drier.
5	Distribute the product temperature probes evenly into the selected trays. Ensure that <ul style="list-style-type: none"> a) 1 probe is on the top tray. b) 1 probe is on the middle tray. c) 1 probe is on the bottom tray. d) Probe is placed on the last tray entering the chamber. e) Probe is positioned closer to the freezer door.

6	Close the chamber door and secure the latches.
7	Confirm that the correct recipe has been selected.
8	Select the “Freeze” function. This starts the freeze-drying process.
9	 Record your activity in the BT80 Batch Notes.

Part 2: Freeze-drying the produce

2.1 What are the steps to freeze-drying produce?

After [loading the trays and starting the freeze function](#), follow the freeze-drying cycles in the following order:

1. [Freeze](#)
2. [Dry](#)
3. [Vacuum Break](#)
4. [Defrost Part 1](#)
5. [Product Removal](#)
6. [Defrost Part 2](#)

Cycle	Pre and post cycle checklist	Peri cycle checklist
1	<input type="checkbox"/> Product temperature is between -18 to -20 degrees Celsius for at least 1 hour. <input type="checkbox"/> Freezing takes approximately 3 hours from starting the freeze function. <i>Note: this may be faster depending on the type of produce and whether it has been pre-frozen.</i>	<input type="checkbox"/> Clean and sanitize any used equipment and machines. <input type="checkbox"/> Clean and sanitize rooms. <input type="checkbox"/> Return equipment to the original area.
2.1.1 Freeze		



Cycle	Pre and post cycle checklist	Peri cycle checklist
2	<input type="checkbox"/> All 3 product temperature probes must have a reading -20 degrees or colder for at least 1 hour.	<input type="checkbox"/> Clean and sanitize any used equipment and machines.

Cycle	Pre and post cycle checklist	Peri cycle checklist
2.1.2 Dry	<input type="checkbox"/> Vacuum pump is warm from running the freeze cycle. <input type="checkbox"/> Correct 'recipe' has been selected. <i>Note: once the 'Dry' function is selected, the recipe cannot be changed for this cycle.</i> <input type="checkbox"/> Operating pressure in the chamber is lowered. <i>Note: This takes approximately 30 minutes.</i> <input type="checkbox"/> Drying takes approximately 24 hours. <i>Note: the 'Dry' time can vary depending on the recipe selected and product.</i> <input type="checkbox"/> Set Value temperature has been maintained for 2 hours. <i>Note: if the temperature probes have not come up to the Set Value, the product may not be fully dried.</i> <input type="checkbox"/> Oil level in the vacuum pump and on the ballast valve setting is adequate.	<input type="checkbox"/> Prepare rooms and equipment for unloading produce. <input type="checkbox"/> Process any already freeze-dried produce into powders. <input type="checkbox"/> Prepare the next batch of trays for freeze-drying. <input type="checkbox"/> Ensure that all equipment required for unloading and processing is in place and ready to go.
 Record your activity in the BT80 Batch Notes .		



Cycle	Pre and post cycle checklist	Peri cycle checklist
3	<input type="checkbox"/> Release the chamber door. <input type="checkbox"/> Select the Vac Break function. <input type="checkbox"/> Open the door. <i>Note: there will be a delay of 7 to 10 minutes while the chamber pressure rises to equal the outside pressure before you will be able to open the</i>	<input type="checkbox"/> Ensure that all the equipment required for unloading and processing is in place and ready to go. <i>Note: any delays could result in the dried product rehydrating moisture from the surrounding</i>
2.1.3 Vacuum Break		

Cycle	Pre and post cycle checklist	Peri cycle checklist
	<p><i>chamber door.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Remove the three temperature probes from the product and hang them up out of the way. <input type="checkbox"/> Remove all of the trays from the chamber and place them into the tray trolley. 	<p><i>atmosphere.</i></p>



4	<ul style="list-style-type: none"> <input type="checkbox"/> Ensure that no product has fallen in the chamber, on shelving, or is stuck to the top of the shelving. <input type="checkbox"/> Monitor the ice build-up on the ice coil. <input type="checkbox"/> Ensure that the 'dam' (defrost baffle) is in place and the seal is seated correctly. Readjust if misaligned. <input type="checkbox"/> Ensure that the temperature probes are inside the chamber. <input type="checkbox"/> Select the 'Defrost' function. <input type="checkbox"/> Confirm that water is entering the chamber. <input type="checkbox"/> Close the chamber door. <p><i>Note: depending on the water pressure, this could take between 10 to 15 minutes to fill the chamber. The chamber door may be open to monitor the water level.</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> While the trays are being unloaded, monitor the water level to make sure that the ice coil is submerged. <input type="checkbox"/> Keep water in the chamber during this cycle - do not drain. <p><i>Note: the overflow valve at the back of the chamber will automatically drain the water once it reaches just above the ice coil. Manually stopping the water results in water conservation but also lengthens the defrost process.</i></p>
2.1.4 Defrost Part 1		



Cycle	Pre and post cycle checklist
5	<ul style="list-style-type: none"> <input type="checkbox"/> Unload all product from the trays. <input type="checkbox"/> Monitor the water level inside the chamber.

Cycle	Pre and post cycle checklist	Peri cycle checklist
<p style="text-align: center;">2.1.5 Product Removal</p>	<p><input type="checkbox"/> Scoop, scrape, peel, or lift product off the trays and place it into the vacuum pack bags.</p> <p><input type="checkbox"/> Return the unloaded trays to the tray trolley.</p> <p><input type="checkbox"/> Vacuum pack bags.</p> <p><i>Note: depending on the temperature of the product, the bags can either be vacuum packed as they are filled or once all of the bags are full.</i></p> <p><input type="checkbox"/> Label, store, or box full and vacuum-packed bags. See 2.7 How do I label the freeze-dried produce?</p>	



6	<p><input type="checkbox"/> Select the 'Drain' function to remove water from the chamber.</p>	
<p style="text-align: center;">2.1.6 Defrost Part 2</p>	<p><input type="checkbox"/> When all water is removed, open the chamber door and confirm that there is no ice remaining on the ice coil. If there is, flush with hot water until removed.</p> <p><i>Note: if ice is left on the ice coil it will affect freeze drier efficiency for the next cycle.</i></p> <p><input type="checkbox"/> Operate in 'Standby' mode for 30 minutes as a cool-down period.</p> <p><input type="checkbox"/> Check the shelving and chamber for any remaining product.</p> <p><input type="checkbox"/> Remove and clean any shelving then reload into the chamber.</p> <p><input type="checkbox"/> Determine whether to keep the freeze drier on (for reloading or maintenance) or turn it off (if all cycles are complete).</p>	
<p> Record your activity in the BT80 Batch Notes. Log the run hours from the settings page.</p>		

2.7 How do I label the freeze-dried produce?

2.7.1 Information required on label

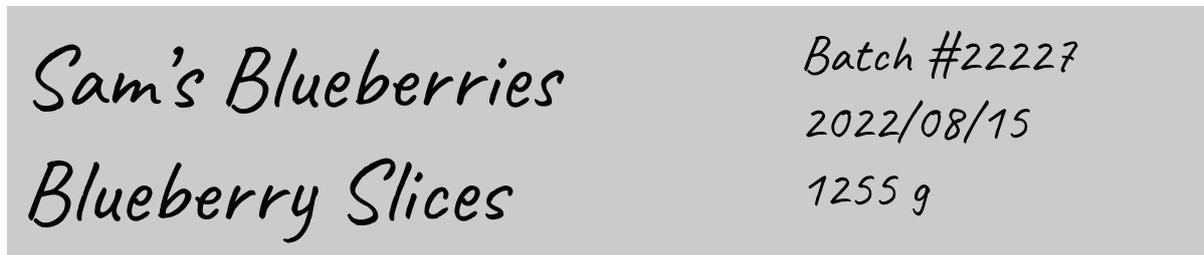
Use the appropriate label template for each product and package. Unless otherwise requested, the label should indicate

- Location or farm name (e.g. Sam's Blueberries.)
- Product details (e.g. Blueberry Slices.)
- Batch number (e.g. #22227)
- Date (e.g. 15/08/22 or 2022/08/15)

- Weight (e.g. 1255 g)

2.7.2 Sample of label format

Figure 7 - Label format sample



Part 3: Stopping

3.1 What happens after all the produce is processed?

Once all cycles and processes are complete, you must clean and inspect all the equipment.

3.1.1 Cleaning the equipment and rooms

After all the product has been processed and all cycles are complete, ensure that

- Surfaces are clean (by wiping, sweeping, and mopping as required).
 - Doors
 - Walls
 - Countertops
 - Floor benches
 - Floor
 - Lights
 - Scales
 - Rubbish bin
 - Freezer drier walls
 - Freeze drier shelving
- Supplies are intact (by cleaning, replenishing, and replacing as required).
 - Vacuum packer filter
 - Vacuum pack bags
 - Trays
 - Paper towel
 - Sanitizer
- Rubbish and used PPE and is removed.
 - Rubbish bin liner bags
 - Hair nets
 - Gloves
 - Aprons

3.1.2 Inspecting the equipment

After all the product has been processed and all cycles are complete, examine the equipment to ensure that it is prepared for the next cycle.

- Equipment is functioning properly.
 - Trays have no faults or defects.
 - Scales are fully charged and calibrated against the test weight.
- Fluid levels are sufficient.
 - Vacuum pump oil (See [4.3.1 Freeze drier](#))
 - Freeze drier coolant

1.5.2 Turning off the BT80



Do not turn the BT80 off during a freeze or dry cycle, only when all processes are complete.

Steps to turning off the BT80 and final safety check	
1	Turn off the <ul style="list-style-type: none"> <input type="checkbox"/> Freeze dryer <input type="checkbox"/> Clean Flow Mini <input type="checkbox"/> All internal equipment - air conditioner and air curtains
2	Unplug internal equipment: two robot coupe machines; vacuum packaging machine, etc
3	Turn off the Power Generator or alternate external power source.
4	Close and lock the <ul style="list-style-type: none"> <input type="checkbox"/> AC window <input type="checkbox"/> Generator windows <input type="checkbox"/> Side doors (if they are open)
5	Check the fuel level using a flashlight and add more fuel if it is low.
6	Check the wastewater tank and drain if it is more than 2/3 full.
7	Walk around the unit, closing and locking all external storage spaces.
8	Remove the utility rooms staircase and in the transit position, locking it in place with the pin.

9	Close and lock the utility rooms outside door.
10	Walk around the unit and do a final check up for closed windows, doors, etc.
11	Remove the main door staircase and place in the transit position.
12	Close and lock the main door.

Part 4: Monitoring the BT80 unit

4.1 What do I need to monitor?

Conduct regular checks (before, during, and after cycles) of all equipment for

- Cleanliness
- Sanitization
- Faults, defects, or damage
- Sufficient fluid

4.2 How often do I check the equipment?

Equipment checks take place regularly before, during, and after cycles.

4.2.1 Before starting a cycle

Inspect all equipment to ensure

- Equipment is free from damage and sanitized.
 - Benches
 - Work areas
 - Utensils
 - Machines
 - Prepared food trays
 - Freeze drier trays
- Equipment is prepared.
 - Calibrate scales against test weight.
 - Fit the rubbish bin with a new liner bag.
 - Place freeze drier trays on the tray rack.
 - Ice coil is free from ice before a new batch is started.

4.2.2 When cycle is operating

While produce is in the freeze drier

- Monitor equipment condition.
 - Trays are free from damage.
 - Water level is stopped before it reaches the top of the ice coil.
- Monitor fluid levels.
 - Vacuum pump oil
 - Freeze drier coolant

4.2.3 After all cycles are complete

After each cycle is complete and when all produce has been processed

- Assess equipment for damage, faults, or defects.
- Remove compromised equipment for repair or replacement.

4.3 Which equipment requires regular maintenance?

4.3.1 Freeze drier

- At every 100 run hours
 - Vacuum pump oil must be changed.
 - Counter is reset.

4.3.2 Trays

- Before, during, and after cycles
 - Remove any trays with faults or defects.
 - Replace faulty or defective trays with functioning ones.

Part 5: Getting technical support

5.1 Who do I contact for technical support?

5.1.1 Cuddon

- **Toll Free Numbers:** Canada/USA: 1 877 617 9635 or +64 3 578 4299 (Direct to NZ)
- **Office Hours:** Monday to Friday from 0800 – 1630 NZDT.
- **Technical Support Email:** service@cuddonfrezedry.com

5.1.2 Clean Flow

- **Contact:** Denise VanderVeen - Director, Education & Training
- **Phone:** +1 289-438-4233, Ext. 2104
- **Email:** dvanderveen@cleanworkscorp.com

5.1.3 Trendi Tech Team

- TBD

Part 6: Appendix

5.1 [Batch Notes for BT80 \(BT001\)](#)

5.2 [Impact Report for BT80 \(BT002\)](#)

5.3 Table of Figures

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