



AN EXCHANGE OF TECHNICAL INFORMATION

**Number:** TL006 - 2022

**Subject:** Controlled Atmosphere Initialization (pre-gassing)

**Released:** March 18, 2022

Some commodities do not respire enough for the system to naturally reach optimal conditions for retarding their ripening cycle.

The purpose of this procedure, in alignment with the use of Carrier XtendFRESH™ (Cd43) and EverFRESH™ (Cd71) modified and controlled atmosphere systems, is to create optimal conditions that have been studied and shown to slow the ripening cycle of some of these commodities by the use of pressurized nitrogen (N2) and carbon dioxide (CO2) gas cylinders.

For example, controlled atmosphere conditions for blueberries, as specified by the [Web USDA Agriculture Handbook Number 66](#) (page 240-241, Revision February 2016), are as follows:

- O2 1 - 10%
- CO2 10 - 15%

There are multiple methods to set the initial atmospheric conditions in a container requiring a modified atmosphere.

One method is to utilize the Transicold Disc Assembly (79-04098-03) with charging ports, and is described in the [EverFRESH T-374 operations and service manual](#) in the Container Preparation section.

This TechLINE document describes an alternative method of pressurizing a 40-foot container using either the brass charging port or pressure decay ports on the front of the unit, if the panel (79-04098-03) is not available.

Disc Assembly (79-04098-03)  
with charging port



**Tools / Supplies Required:**

- N2 Supply and regulator capable control at 320 psi
- CO2 Supply and regulator capable control at 180 psi
- Schrader tool

**Instructions:** For the purpose of this document, our cargo final example set points are O2: 5% and CO2: 12%

**Oxygen (O2):**

1. If the unit is equipped with a Vent Position Sensor (VPS):
  - a. Select code select Cd45, VPS position, to view the sensor position.
  - b. Open the manual fresh air vent until the display reads 10 CFM (~17 CMH).
2. If the unit is not equipped with a VPS:
  - a. Open the manual fresh air vent until the indicator points to ~9 CFM (~15 CMH).



**DO NOT INJECT GAS INTO THE CONTAINER UNLESS THE FRESH AIR VENT IS OPENED. DAMAGE TO THE UNIT AND RISK OF PERSONNEL INJURY EXISTS IF A PRESSURE RELIEF PATHWAY IS NOT ESTABLISHED.**

3. Set Cd71 (EverFRESH) or Cd43 (XtendFRESH) to "PUrgE".
4. Connect the hose from the N2 regulator to the 69NT unit equipped gas injection port.



As an alternative option, the pressure decay ports can be used. Select either port. If used, remember that the Schrader valve needs to be removed prior to charging, and then replaced when charging is complete.



5. Start releasing N<sub>2</sub> gas and adjust the regulator pressure to 320 psi.

Attention: If injection pressure is regulated higher than 320 psi, then there is a risk of clearing the unit defrost condensate trap. If this happens, the condensate trap will need to be refilled with water. If the condensate trap has been cleared of water, then a leak exists that will hinder atmosphere control.

6. Bring up Cd44 and monitor the O<sub>2</sub> level by toggling between O<sub>2</sub> and CO<sub>2</sub>.
7. It should take approximately 2.5 hours (2 hours 30 min for 1250 ft<sup>3</sup>) to get O<sub>2</sub> level to ~ 5 ± 0.5%. Refer to Table 1 (next page) for approximate time required for additional set points.
8. Turn off the N<sub>2</sub> at the desired gas concentration and remove the hose from the N<sub>2</sub> regulator.
9. Connect the purging hose to the CO<sub>2</sub> regulator.

### **Carbon Dioxide (CO<sub>2</sub>):**

1. Connect the hose from the CO<sub>2</sub> regulator to the gas injection port.

Note: Increasing the CO<sub>2</sub> pressure beyond 180 psi will run the risk of freezing the regulator. Charging the hose and associated components can get very cold, do not touch with bare skin.

Due to mixing and sensor lag, the CO<sub>2</sub> level will continue to rise for some time after stopping the CO<sub>2</sub> regulator.

2. Bring up Cd44 and monitor the CO<sub>2</sub> level by toggling between O<sub>2</sub> and CO<sub>2</sub>.
3. It is estimated that a CO<sub>2</sub> charge of approximately 30 minutes would bring a container with a free volume (cargo taking up approximately half of the shipping container) of 1250 ft<sup>3</sup> to near 12%.  
After injection, the sensor may read much lower than this for at least a half hour. Refer to Table 2 (next page) for approximate time required for additional set points.
4. Remove the gas injection hose connections and close the manual fresh air vent.
5. Set Cd71 (EverFRESH) or Cd43 (XtendFRESH) to desired set points for the duration of the trip.

Note: AL07 will become inactive once the manual fresh air vent has been closed. There should be no active alarms. Clear the alarm list at this time.

Table 1 - O2 Purge Time Estimates

Time (min)	O2 (%)
0	21
5	20
10	19
16	18
22	17
28	16
35	15
42	14
49	13
57	12
66	11
76	10
86	9
99	8
112	7
128	6
146	5
169	4
199	3

Table 2 - CO2 Charge Time Estimates

Time (min)	CO2 (%)
0	0
3	1
5	2
8	3
10	4
13	5
16	6
18	7
21	8
24	9
26	10
29	11
32	12
35	13
38	14
41	15
43	16
46	17
50	18
53	19
56	20