



AN EXCHANGE OF TECHNICAL INFORMATION  
**VOLUME 10 NUMBER 1** ABOUT CARRIER TRANSICOLD CONTAINER PRODUCTS **1<sup>st</sup>/2<sup>nd</sup> Qtr 2005**

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### General - Safety First

Today's container port facilities are a marvel of modern engineering. Vehicles of every size, shape and description are all working in conjunction to move containers to and from the ship as efficiently and quickly as possible. They also can be very dangerous places for visitors. Seeing the dangers, recognizing them and being seen by truck drivers, stacker drivers and crane operators is key to your personal safety.

Although you should always consult your applicable local standards, the U.S. standards exist for high

visibility clothing. The **American National Standard for High-Visibility Safety Apparel** (ANSI-ISEA 107-1999) focuses on the many workers that regularly face hazards of low visibility while on the job. ANSI-ISEA standard 107-199 sets forth the following calluses of garments based on the wearer's activities and working environment.

Class 1 – Worn where speeds do not exceed 25 mph and the environment is less complex.

Class 2 – Worn in environments where traffic is moving in excess of 25 mph and inclement weather conditions require greater visibility.

Class 3 – Worn in environments where traffic is moving in excess of 55 mph.

On evaluation of these classes, Carrier Transicold recommends that, as a minimum, everyone conducting business in a port facility wear a Class 2, Lime/Silver Safety Vest (see picture).



A safety vest that is lime green offers greater visibility in complex backgrounds than an orange vest, while silver reflective tape is the best choice for enhanced night-time visibility.

Besides wearing the vest, it is also important to follow some general basic safety rules when entering the port.

- Walk in marked walkways only.
- Make sure crane and stacker driver can see you and that you can see them.

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**Please circulate this newsletter to all of your support personnel**

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## Feature Article

### CA Safety

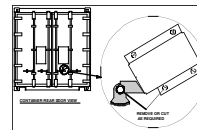
When operating refrigeration equipment there are always certain precautions that should be followed in regards to personal safety, whether it's working on the electrical or the mechanical systems, safety is a major concern. These concerns are even higher when working with equipment that alters the environment inside the container, such as in the case of controlled atmosphere. Conditions present inside the container are often below the survival threshold of human life. Carrier Transicold has several safety devices and procedures in place to prevent accidental entry into the unit. It is extremely important that these procedures are followed to prevent injury or death.

### Safety Considerations

Normal atmosphere, which is colorless, odorless and tasteless, contains 79% nitrogen and 21% oxygen. This oxygen content is vital to supporting life. Controlled atmosphere refrigeration equipment (CA) systems have the capability of reducing the amount of oxygen content in the container. This low-oxygen condition is virtually undetectable without proper monitoring equipment, under these conditions a potentially hazardous situation exists. One or two breaths in a low-oxygen environment will cause unconsciousness within 10 seconds and death within a few minutes. Before entering containers which are equipped with CA systems, the oxygen content must be increased to normal (21%) by ventilation.

Containers using the Carrier Transicold Everfresh option are equipped with warning labels indicating the possibility of unsafe conditions within the container.

These labels are located on the front of the unit near the evaporator access panels, the evaporator motor mounting bracket, and on the rear doors of the container.



In addition, a hazard label is applied to the poly sheet curtain, which is used to help prevent air leakage out the rear doors of the container.

All containers using the CA option are also equipped with a Door Interlock system, which is on rear doors of the container to prevent access of personnel when low-oxygen levels are present.

### Effects of Breathing Oxygen Deficient Atmospheres

As blood passes through the lungs it gives up carbon dioxide and accepts oxygen, which is required to sustain human life. When the human body is deprived of oxygen, the oxygen contained within the bloodstream quickly diminishes; the brain is quickly depleted of oxygen resulting in swift unconsciousness. Symptoms or warnings to these conditions are generally absent.

Within 5 seconds of breathing oxygen deficient atmosphere, there is a rapid drop of oxygen in the blood. As the oxygen concentration is progressively lowered, the physiological effects are:

- |                    |                        |
|--------------------|------------------------|
| • Giddiness        | • Mental confusion     |
| • Loss of judgment | • Loss of coordination |
| • Weakness         | • Nausea               |
| • Fainting         | • Death                |

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## Feature Article - CA Safety (cont)

OXYGEN CONTENT OF AIR	SIGNS/SYMPTOMS OF A PERSON AT REST
15% - 19%	Decreased ability to work strenuously. May impair coordination and may induce early symptoms in persons with coronary, pulmonary or circulatory problems.
12% - 14%	Respiration deeper, increased pulse rate and impaired coordination, perception and judgment.
10% - 12%	Further increase in rate and depth of respiration, further increase in pulse rate, performance failure, giddiness, poor judgment, and blue lips.
8% - 10%	Mental failure, nausea, vomiting, fainting, unconsciousness, ashen face, blue face.
6% - 8%	8 minutes, 100% fatal; 6 minutes, 50% fatal; 4–5 minutes, recovery with treatment for all exposures.
4%	Coma in 40 seconds, convulsions, respiration ceases, death.

### Human Response to Oxygen Deficient Atmospheres

As the oxygen concentration level decreases, the human body reacts. This chart shows the effects that correspond to these decreased levels on a person at rest. These effects would be rapidly accelerated on an individual performing any activity.

### Controlled Atmosphere (CA) Safe Container Entry

Entry into a CA equipped container must be performed by a (minimum) two-person team. The operator will be the person performing the required procedures and that person is to be supervised by someone who is familiar with the required procedures. The person supervising entry must ensure that all venting procedures outlined in service manual T305 section 10 have been performed and all waiting periods have expired. The following steps must be adhered to:

1. Both persons are to read and understand the preceding Safety Considerations and all hazard labels on the unit.
2. The supervising person is responsible for keeping all persons away from open doors and access panels until the venting procedure is completed.

3. Avoid opening doors of a low-oxygen level container while at a loading platform. Never open doors if rain or refrigeration barriers are near the door. Low-oxygen content gas will exit the container and can asphyxiate nearby personnel who are working an adjacent container or are in the warehouse. Instead, follow the venting procedure before backing up to the loading platform.
4. Avoid venting in a confined space.
5. **Before** opening the evaporator access panel(s) the container must first be ventilated per the operation and service manual, as a hazardous low-oxygen atmosphere exists within the evaporator section. Then the access panel(s) must be open for 10 minutes before working inside the evaporator section.
6. The supervising person will declare it safe to enter the container. Prior to entry, the supervisor or a **second** person must be present. Every time the doors or panels are to be opened, the supervising person must ensure the venting procedures are performed and the waiting times have expired prior to declaring the container safe to enter and allowing any person to enter. **Every time.**

□ M. Rogers

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## TechTip

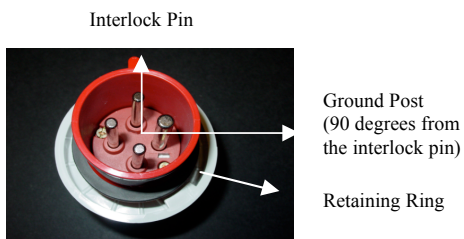
### Power Plug Check

Every technician plugs and unplugs units daily without much thought to what might happen. Power plugs are certified by design and the thinking goes that there is nothing further that has to be done. This is not true; the plug should be checked thoroughly prior to installation. So how should you inspect the plug to ensure safety?

Following are recommended guidelines for inspection of plugs in the field.

#### Visually Inspect the Plug

1. Physical damage, if the plug is cracked or damaged in any way it should be replaced.
2. If there are any signs of water or dirt in the pin area of the plug or signs of water draining from the internals of the plug, it must be dried and cleaned prior to use. Assure plug is correctly assembled.
3. Inspect all four pins for signs of excessive arcing, replace if there are any signs of burning or pitting on the pins.
4. If the retaining ring is cracked, broken or missing, the plug should be replaced.
5. Check the interlock pin. The interlock pin is safety related with regard to alignment and receptacle operation. Below is the layout of the internals of the interlock pin in relation to the ground pin.



- a. If the interlock pin is in the wrong position, the plug must be replaced.
- b. If the plug has no interlock pin it must be replaced.
- c. If the plug has an adaptor ring with the interlock pin on it the plug should be replaced.

### Electrically Check the Plug and Cable

All the following checks should be carried out using a 500v insulation resistance tester.

1. Connect the ground wire from the insulation tester to a fixed ground point on the unit.
2. Check the insulation resistance to:
  - a. The Ground pin on the plug. It should read 0Mohms, indicating that the ground wire in the power cable is connected to the ground pin and the ground wire is continuous through the power cable.
  - b. Three Phase pins on the plug – All readings should read 100Mohms or higher.
3. Check the insulation resistance between the three phase pins
  - a. Pin 1 to Pin 2
  - b. Pin 1 to Pin 3
  - c. Pin 2 to Pin 3
  - d. All readings should be 100Mohms or higher, indicating electrical insulation between the 3 phases.

Once these checks and any repairs found necessary have been completed, the unit can be connected.

1. Ensure the power switch is off on the circuit panel and the unit On / Off switch is in the off position.
2. Insert the power plug completely into the socket.
3. Lock the plug into place with the retaining ring.
4. Remove hands from any cable or plug and turn away from the switch panel.
5. Turn the power switch on.

When wrapping up cable it is recommended that the plug be placed on the inside of cable loops with the pins faced in the downward direction.

□ D. Whyte

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Continued from page 1

- Don't step out from between containers or trailers into the roadway without first checking both ways for oncoming traffic.
- Notify the yard traffic supervisor to ensure that no containers in the stack you are working in are slated to move in the time you anticipate to complete the job.
- Never work between container stacks without being sure there are no stackers or trucks working in the area.
- Before entering a stack to service units, notify the stacker driver that you will be in the area so they are aware of your presence.

**Note, safety rules vary from port to port. Observe all posted safety rules for the port in which you are working. In addition to the recommended safety vest, the port may require hard hats, gloves and hearing protection. Be prepared before you get to the port.**

□ G. Busse

## General

### Scroll Compressor Sight Glass

The scroll compressor sight glass and O-ring have been added to the scroll units' recommended stocking list, which was posted in the 2nd quarter 2002 edition of TECHLINE.



Part Name	Part Number
Sight Glass w/O-Ring	18-10128-50
O-Ring	18-10128-51

If replacement is required, the sight glass will need to torque to 44 N-m (33-ft-lbs) using either a 35 mm or 1 3/8 inch socket.

□ Z. Asprovski

## TechTip

### Calibration Procedure for the Lower Vent Position Sensor (LVPS)

1. Check the alarm list to make sure there is no AL50.
2. If there is an active AL50, power cycle to clear it. If the alarm remains active, then further troubleshooting is required before the calibration procedure can be carried out.

3. With the unit in the Off position, remove the slide assembly.
4. Disconnect the harness plug and connect the test leads from the multi-meter to terminal 1 and 2 in the sensor. Set multi-meter to 200k ohms.
5. Turn the shaft fully clockwise. Reading should be 100k ohms +/- 3%.
6. Turn shaft fully counter clockwise. Reading should be 0 ohms +/- 3%.
7. Turn shaft clockwise until 6.4k ohms shows on the meter.
8. Leave the meter attached to the sensor and re-install slide assembly in the fully closed position. Reading should remain at 6.4k ohms. (**Make sure the gear teeth are fully aligned**).
9. Disconnect multimeter and re-connect harness and turn unit On.
10. Select Code 45, press and hold the Enter Key for 5 seconds.
11. After the key has been pressed for 5 seconds "CAL" will be displayed.
12. Press the "Alt Mode" key and hold for 5 seconds.
13. After Calibration is complete, code 45 will display 0 CMH/CFM.
14. Check the alarm list for an active AL50. If there is no active AL50, the calibration was successful.
15. If there is an AL50, the sensor was out of calibration range (5.0k ohm to 10.0k ohm) when the calibration was attempted. Repeat the calibration attempt by going back to step 4.
16. If there is still an AL50, the sensor is out of the calibration range. Replace the sensor.

Note: A simple pigtail can be made to assist in connecting the test leads from the multi-meter to the sensor using CTD terminal P/N 22-01613-15, heatshrinks and alligator clips.



□ G. Barkowski



**TechTip****Software Release Update**

The latest software release versions for the 69NT units are:

Scroll (ML2i/ML3) - 5317  
 Recip (ML2i /ML3) - 5131  
 Recip (ML2) – 1207  
 ML2 DataCorder – 2104  
 Controlled Atmosphere – 3109  
 DataLine - 1.5  
 DataBank - 0509.ML3

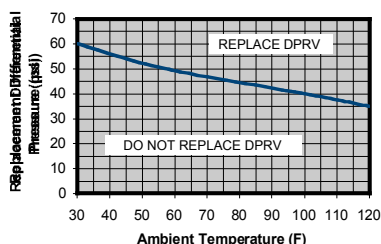
All of these can be downloaded from Transcendental within the Carrier Transicold Website except for DataLine. DataLine can be upgraded from Carrier Transicold Website at <http://www.container.carrier.com/> as long as you own an original copy.

**TechTip****Discharge Pressure Regulation Valve (DPRV) Test Procedure**

The DPRV valve is designed to maintain a minimal level of pressure 32.7 kg /cm<sup>2</sup> (72 psig) at the compressor head. The following procedure can be used to perform a functional check.

1. Install a high pressure gauge at the discharge service valve.
2. Install another high pressure gauge at the liquid line service valve.
3. Run unit with -18°C (0°F) set point.
4. After 5 minutes read both gauges and subtract the liquid line pressure from the discharge pressure. This is the actual differential pressure.

Using the ambient temperature and the chart below determine the replacement differential pressure.



[www.container.carrier.com](http://www.container.carrier.com)

**Note:** This test should **not** be run below -1.1°C (30° F) or above 48.9°C (120°F). If the actual differential pressure is close to the replacement differential pressure it is recommended that the readings be taken several times at 2 minutes intervals.

If valve is found to be leaking at the cap a temporary seal can be installed using a replacement cap that comes with an o-ring (40-50024-00).

**TechFACT****2005 School Schedule**

Listed below is the planned schedule for Container training courses offered in 2005. Refer to the 2005 *Worldwide Customer Training* brochure (62-03198 rev. AL) for the course descriptions, enrollment details and fees. This information is also available on the Internet at <http://www.container.carrier.com> and click on the Training tab.

Upcoming Container Training Schools

May-05	Course Title	Location
2 - 4	3-Day Container Product Update	Marseille, France
9 - 13	1-Week Container	Rotterdam, The Netherlands
9 - 13	1-Week Container	St. Petersburg, Russia
17 - 19	3-Day Container Product Update	Halifax, Nova Scotia
Jun-05		
6 - 10	1-Week Container	Ho Chi Minh City, Vietnam
7 - 8	2-Day Controlled Atmosphere	Mombasa, Kenya
9 - 10	2-Day Cont./Genset Product Familiar	Oakland, CA
13 - 17	1-Week Container	Pusan, Korea
16 - 17	2-Day Cont./Genset Product Familiar	Genoa, Italy
20 - 24	1-Week Container	Guatemala
Aug-05		
8/31 - 9/2	3-Day Container Product Update	Christchurch, NZ
Sep-05		
5 - 7	3-Day Container Product Update	Melbourne, Australia
19 - 23	1-Week Container	Tacoma, WA
Oct-05		
14 - 16	1-Week Container	Cape Town, South Africa
17 - 21	1-Week Container	Xiamen, China
24 - 26	3-Day Container Product Update	Kaohsiung, Taiwan
Nov-05		
7 - 11	1-Week Container	Oakland, CA
14 - 18	1-Week Container	Valparaiso, Chile
14 - 16	3-Day Container Product Update	Oakland, CA
11/30 - 12/02	3-Day Container Product Update	Miami, FL
Dec-05		
5 - 9	1-Week Container	Costa Rica

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