



TRANE®

Installation/ Operation Maintenance

Refrigerant Handling Guidelines

*A Guide for the Service Technician's
Conservation and Safe Handling of Low-
Pressure Refrigerants in Trane Chillers*

Includes Cylinder Shipping Return Instructions



Models CVHE, CVHF, CDHF, CVHG, CDHG

X39641061010

CTV-SVX05A-EN



Introduction

Reference

Regulations regarding waste handling are constantly changing. To ensure that your office and personnel are in compliance with the latest federal, state and local regulations, contact your local waste management office for the proper procedures on handling, disposal, transporting and storage of oil, oil filters and filter dryer cores.

Although this guide was prepared for the safe handling of low-pressure refrigerants, i.e. CFC-11, CFC-113 and HCFC-123, many of the same procedures may be applied for the safe handling of all refrigerants. Because these are updated guidelines, procedures for the service technician's conservation and safe handling of low-pressure refrigerants in Trane chillers will differ from guidelines previously published.

Many items listed in this guide are suggested by specific reference and vendor information. Refer to "Reference Materials" on the back cover. At appropriate times throughout this guide, you will be referred back to this introduction with regard to regulations for the handling and disposal of waste materials.

Warnings and Cautions

Notice that warnings and cautions appear at appropriate intervals throughout this bulletin. Warnings are provided to alert installing contractors to potential hazards that could result in personal injury or death, while cautions are designed to alert personnel to conditions that could result in equipment damage.

Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

NOTICE: Warnings and Cautions appear at appropriate sections throughout this literature. Read these carefully.

⚠ WARNING: Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION: Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

CAUTION: Indicates a situation that may result in equipment or property-damage only accidents.



Jobsite Requirements

⚠ Warning!

Qualified Technicians Only!

All service work must be performed by a qualified, experienced technician. There are various electrical, mechanical and chemical hazards that may be encountered in servicing equipment of this type. Specific warning and cautionary statements are provided in the appropriate Trane service literature, which must be referred to prior to servicing equipment.

Read Appropriate Service Literature

Refer to the following service literature prior to servicing equipment.

Installation	Operation and Maintenance	Supplemental Material
CVHE-SVN01*-EN General Information CVHE-SVN02*-EN Water Piping CVHE-SVN03*-EN Electrical Information CDHF-SVN01*-EN Duplex Installation	CVHE-SVU01*-EN O & M CenTraVac CDHF-SVU01*-EN O & M Duplex	TECH-PRA010-EN Refrigerant Safety CTV-SB-19 CTV-SB-97

Inspect Equipment Room

Comply with the local safety codes that are applicable to your geographical area; refer to ASHRAE Standard 15-2004 if local codes are not yet updated to accommodate the alternative refrigerant. Trane recommends that all equipment rooms meet ASHRAE Standard 15-2004 requirements as a minimum. All commonly used low-pressure and high-pressure refrigerants are included in ASHRAE Standard 15.

In addition to standard code practices of the past, ASHRAE Standard 15-2004 defines four additional key areas that should be followed for all refrigerants. A Personal Breathing Apparatus is no longer required by ASHRAE Standard 15, but may be required by local codes.

Refrigerant detector. Sensors that are capable of monitoring the appropriate refrigerant concentration levels are required for all refrigerants.

Mechanical Ventilation. Use mechanical ventilation sized as directed in ASHRAE Standard 15-2004 (typically not required for penthouse and lean-to applications). Check ASHRAE Standard 15-2004 and local codes for details.

Alarms. Use an alarm activated at, or below, the TLV-TWA or equivalent.

Note: For R11 and R123 there is no TLV-TWA, so the AEL is used as the equivalent, see [Table 1, "Allowable Personal Exposure Levels for R-123 and R-11," on page 4.](#)

The alarm shall annunciate visual and audible alarms inside the refrigerating machinery room and outside each entrance to the refrigerating machinery room.

Jobsite Requirements

The alarms required in this section shall be of the manual reset type with the reset located inside the refrigerating machinery room.

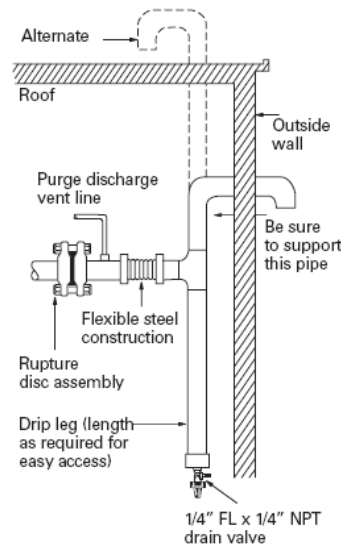
Alarms set at other levels (such as IDLH) and automatic reset alarms are permitted in addition to those required by this section. The meaning of each alarm shall be clearly marked by signage near the annunciators.

Table 1. Allowable Personal Exposure Levels for R-123 and R-11

Exposure Level	Source	R-123	R-11
WEEL ⁽ⁱ⁾	AIHA ⁽ⁱⁱ⁾	50 ppm ⁽ⁱⁱⁱ⁾	Not Established
Ceiling ^(iv)	OSHA ^(v)	Not Established	1,000 ppm
AEL ^(vi)	DuPont ^(vii)	50 ppm	1,000 ppm
EEL ^(viii)	DuPont ^(vi)	1,000 ppm	Not Established

- (i) PEL = permissible exposure limit. OSHA time-weighted average limit. Employee's average airborne exposure in any eight-hour work shift of a 40-hour work week, which shall not be exceeded.
- (ii) Ceiling = employee's exposure level, which shall not be exceeded for any time period.
- (iii) AEL = acceptable exposure level. Employee's average airborne exposure in any eight-hour work shift of a 40-hour work week, which shall not be exceeded.
- (iv) EEL = emergency exposure level. Maximum exposure-level ceiling during emergency situations, such as a spill or accidental chemical release. Exposure duration shall not exceed one hour. Escape is feasible without suffering any escape-impairing or irreversible effects on employee health.
- (v) AIHA = American Industrial Hygiene Association.
- (vi) OSHA = Occupational Safety and Health Administration.
- (vii) DuPont = DuPont chemicals.
- (viii) ppm = parts per million.

Purge Venting.



Pipe the relief device and purge outdoors using refrigerant-compatible materials, and refer to Installation Manual CVHE-SVN02*-EN. A drip-leg with a shutoff valve should be provided on the vent piping. Check for liquid accumulation in the drip leg at regular maintenance intervals.



Checking for Machine Integrity

Check refrigerant detector

Check the refrigerant detector for current levels in the equipment room. If high concentrations exceeding the applicable exposure limit are indicated, activate ventilation per ASHRAE Standard 15-2004 to ensure an adequate supply of fresh air.

Self-contained breathing apparatus

Check for the availability of self-contained breathing apparatus (SCBA) and any other personal safety equipment. Check local codes, as requirements vary for providing SCBAs in the equipment room. Make sure devices are calibrated, tested and properly maintained.

Review jobsite records

Use jobsite records to identify:

1. Recent monitoring levels of refrigerant in the equipment room.
2. Monitoring equipment calibration intervals versus the manufacturers recommendations (generally monthly).
3. Operational history of the chiller.

New Units

- Check to make sure there is a positive pressure holding charge. (New units ship with a 5 psig dry nitrogen holding charge at nominal 72 °F.)
- If the machine is flat, perform positive pressure leak test.
- For field-assembled units, a leak test is mandatory.
- Begin the evacuation process. Perform standing leak rise test before charging the unit.
- If leak testing is required, use dry nitrogen to 8 psig and check with soap and water, or other solutions. If a trace gas becomes absolutely necessary to identify a leak, a small quantity of R-22 and dry nitrogen should be used. Refrigerant and air mixture should not be used due to potentially combustible nature.

Existing Units

- Check operating logs and purge history for indications of excessive leaks. Small and large leaks can be identified by comparing the purge run minutes per day to [Figure 1](#).
- If leaks are noted, perform leak-testing procedure as outlined in "[Routine Maintenance](#)" on [page 15](#), before adding any refrigerant to the chiller.

Typical purge operation

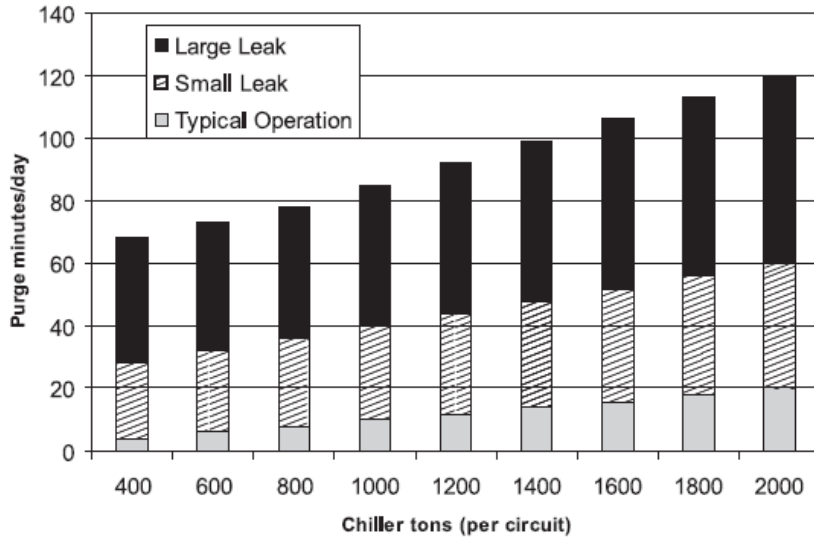


Figure 1 was created using the following formula, which allows the annual refrigerant leakage rate to be calculated based on the daily purge pump out time and the unit refrigerant charge. This formula is:

$$\% \text{ annual leakage rate} = \frac{[(X \text{ min/day}) * (0.00001 \text{ lb R-123/min}) / (Y \text{ lbs})] * 100}{1}$$

where

X = minutes/day of purge pump out operation

Y = initial refrigerant charge

Figure 1. Typical Purge Operation



Charging the Chiller With Refrigerant

Preparing To Charge

1. Drain water from evaporator or circulate water while breaking vacuum. This is the most important step of all. Do this after leak testing the water side of the system or put a drain hose on when checking vacuum rise test. Breaking vacuum is not necessary if the evaporator has been properly drained. If water is present in the tubes, break machine vacuum with refrigerant vapor, or circulate water, to avoid damage to tubes.

Note: *Do not use dry nitrogen to pressurize cylinders for pushing refrigerant into the unit, as was common practice in the past. Nitrogen requires purging, which will result in unnecessary release of refrigerant.*

2. Use recovery/recycle unit or vacuum pump to evacuate hoses; discharge outdoors.
3. Always use refrigerant-compatible hoses or copper tubing with self sealing connections or shut-off valves.

Transfer the refrigerant using one of the following procedures, listed in preferred recommended order of use:

- An approved Trane low-pressure refrigerant recovery/recycle unit.
- The available pressure differential.
- Gravity.
- A mechanical gear pump with compatible seals, or a magnetically driven pump.

Types of Refrigerant Containers

Trane-released refrigerant SUVA-123 is shipped in returnable cylinders to the lower 48 United States. Drums are used in all other shipments. The cylinders have either 50- pound or 200-pound capacity. Service offices are expected to return cylinders after the chiller has been charged. The return procedure is listed on [page 11](#).

Trane worked with its refrigerant supplier, DuPont, to develop a returnable SUVA 123 cylinder to replace refrigerant drums. Numerous field complaints associated with drum leakage and disposal issues drove this project. Also, drums could not be subjected to a deep vacuum without collapsing. These issues were resolved with refrigerant cylinders.

DuPont Refrigerant Cylinders

A drawing of a refrigerant cylinder is shown below. The 50-pound cylinder is actually a 100-pound cylinder charged with 50-pounds of SUVA 123. Both cylinders have the same outside diameter but have different heights.

Figure 2. Refrigerant cylinder

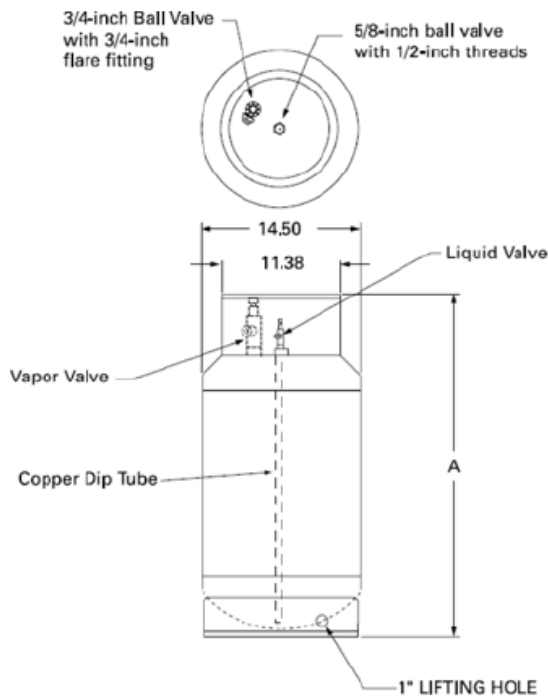


Table 2. Refrigerant cylinder height and weight

Ext	Charge	Dimension A	Tare Weight
01	50-pounds	22.5 inches	40-pounds
02	200-pounds	37.8 inches	61-pounds

Two ball valves are attached to the top of the cylinders to allow product unloading. The flare fitting on the vapor valve can be removed which allows any 3/4-inch male pipe fitting to be used if the provided 5/8-inch flare fitting is not suitable. Do not remove the valves for any reason. The recommended procedure for removing refrigerant is the push-pull method through the use of the dip tube. If it becomes necessary to invert a cylinder, a one-inch hole is provided in the foot ring to allow a lifting hook to be used for hoisting the cylinder for gravity method unloading.

Note: A T handle service tool (TOL01251) has been developed to permit operating the ball valve stems through the collar openings. The cost of the service tool is around \$25.00.

⚠ WARNING

Hazardous Pressures!

If a heat source is required to raise the tank pressure during removal of refrigerant from cylinders, use only warm water or heat blankets to raise the tank temperature. Do not exceed a temperature of 150°F. Do not, under any circumstances, apply direct flame to any portion of the cylinder. Failure to follow these safety precautions could result in a violent explosion, which could result in death or serious injury.

CAUTION

Do Not Remove Valves!

Do not remove ball valves when removing refrigerant from cylinders. Failure to follow this precaution could cause rust and corrosion resulting in contamination to equipment.



Charging the Chiller With Refrigerant

Charging from cylinders

A charging procedure known to give fast unloading times (four to six minutes per 200-pound cylinder) is outlined below.

1. Using a set up for push-pull unloading, run a 1/2" to 3/4" hose from the liquid valve to the unit evaporator-charging valve. Run a similar sized hose from the vapor valve to the exhaust connection of a vacuum pump. Run a hose from the intake side of the vacuum pump to the 3/4-inch ball valve located under the chiller suction elbow.
2. For the first cylinder only, open the evaporator ball valve and then the cylinder liquid valve located in the center on the top. After a few minutes, open the suction elbow valve and start the pump. Open the vapor valve. As there is initially no refrigerant vapor in the chiller, you can't pull vapor pressure from the unit.
3. When empty, stop the pump, close the vapor valve and then the liquid valve. Close off the valve on the line to the evaporator. Disconnect hoses from cylinder, replace all valve caps and hook up the next cylinder.

Note: *Do not close liquid valve first and let the vacuum pump build pressure inside the cylinder!*

4. Be sure to empty each cylinder charge completely into the chiller.

Note: *Unloading of each cylinder using the push-pull method will get progressively faster, whereas with the gravity method, it gets slower.*

5. Close valves completely and install caps. Do not remove hoses before closing the valves.
6. These cylinders do not require an initial deposit but must be returned to DuPont after unloading. If La Crosse finds that an office is not making an effort to return cylinders, a one-time charge of \$150.00 per cylinder will be assessed to the Service Company. Some loss of cylinders due to theft or contractor negligence is expected. Service companies will not be held liable for occasional losses of cylinders, provided the number is small. Return the cylinders promptly after unloading the refrigerant. Required forms and paperwork required to return the cylinders are available on the Trane website.

Note: *Cylinders whose charge is temperature stabilized below 83°F should not have positive pressure. If there is positive pressure despite a stabilized temperature below 83°F, residual pressure can be relieved by slowly cracking the valve open. Report each incident to La Crosse Technical Service.*

Charging from drums

SUVA-123 is shipped in drums to Hawaii, Alaska, and all international locations.

When charging from drums, use a fitting designed for use with the 3/4-inch center drum bung of 2-inch bung, [Figure 3](#).

1. Tap HCFC-123 drum.
 - a. Unscrew bung from drum.
 - b. Dig out the cork seal but do not push the seal out.
 - c. Screw special 3/4-inch nipple with a 3/4-inch self-sealing male coupling into drum (Trane EBS Part Number 0172-0016-01). The special 3/4-inch nipple, [Figure 3](#), will push out the metal seal and will keep the seal from plugging the feed.
2. To connect the drum, a hose with a 3/4-inch female coupling is required (Trane EBS Part Number 0172-0017-01).
3. Weigh in the proper charge. The push-pull method is described in the previous section.
4. Seal all empty containers tightly with the original bung and store properly. If indoor storage of resealed drums is anticipated, such storage should be done in a monitored area. If storage is outdoors, follow the local storage code or ordinance (see Introduction).

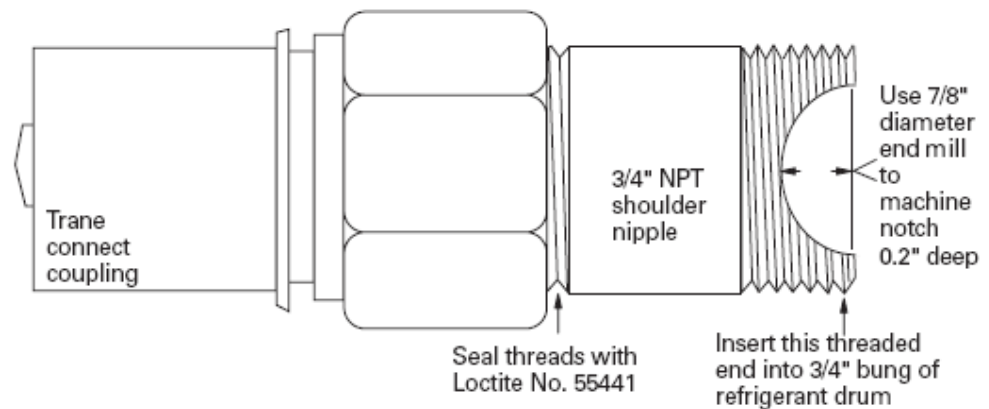


Figure 3. Charge Fitting For Drums



Container Return Shipping Procedure

Use the following procedure for returning empty or defective containers, or extra (not recovered) product.

1. **For returning extra product - contact your DuPont Sales or Customer Service Representative for approval and disposition.** All product returns are subject to DuPont approval and will be based on DuPont's ability to resell the product.
2. **Complete the Return Authorization (RA) form**, provided at the end of this document. Extra copies of the RA form are available from the Trane website: https://www.trane.com/Commercial/Equipment/PDF/16/ReturnAuthForm_Trane_6_06.pdf
3. **Contact DuPont Transportation (TONA)** at (800) 554-8662 to arrange shipment. DuPont TONA will inform you of the RA number, carrier, and Dupont return location. Normally this is the site that originally shipped product to you. Write the RA number you are given on the RA form and Bill of Lading for the carrier.
4. **Complete the Bill of Lading form**, indicating correct quantities, weight, DOT description, and RA number. For your convenience, a copy of this form is provided at the end of this document. It is also available on the Trane website: https://www.trane.com/Commercial/Equipment/PDF/16/BillOfLading_Trane_Empty_Cylinder_6_06.pdf
5. When returning defective or full containers, identify each container with a "Returned for Inspection" tag. This tag must be filled out completely and must cross-reference the RA number and customer purchase order number.
6. **Ship to DuPont. Provide the carrier with a Bill of Lading and attach the RA form (packing list) to the shipment.**
7. **Fax a copy of the RA form to DuPont's return location and to La Crosse Technical Service (608-787-3024) for proper crediting of returned cylinders.**

Acceptable Empty Containers

Any DuPont Suva 123 returnable container will be accepted.

Note: *The DOT requires valves to be protected for shipping on all cylinders, including returned empties. Contact your customer service representative for details.*

If a container shows visible damage, the full cost of the container will be charged. Examples of damage for which you will be charged include:

- Use of a flame on cylinders, as evidenced by burn marks through the paint.
- Dents 4" in length or greater
- Gouges in the metal to a depth of 3/8" or greater
- Severe rusting (more than 50% of the cylinder).



Container Return Shipping Procedure

Acceptable Full Containers

Full containers will be accepted if the following criteria are met:

- The container is full and the protective shrink-wrap is intact on the valve.
- The container does not show visible damage

If the shrink-wrap is removed, return the product through the recovered refrigerant program. Contact your DuPont sales or customer service representative for details.

Credits for full product returns

- Credit amount will be based on the customer's last purchase price of product.
- A 30% restocking fee will be assessed based on the current list price of product unless DuPont overshipped.

Credits for returned empty cylinders

Empty cylinders returned to DuPont will be accepted for credit if:

1. The container is less than two years old. To determine the date of a cylinder, look at the small (112" x 314") sticker. As an example, a sticker that shows 120L8A or 120/8A is decoded as:
120 = 120th day of the year
8 = Year, 1998
L or A = Filler's I.D.
2. The container does not show visible damage.
3. The container is lightweight or empty, and the protective shrink-wrap is intact on the valve.
 - If the shrink-wrap is removed but the customer has determined that the container is defective, the defect will be verified by a DuPont site inspection, see next section.

Credits for returned defective containers

Container Contents		Shrink-Wrap Intact		Defect confirmed ⁽¹⁾		Credit charges ⁽²⁾
Partially Empty	Full	Yes	No	Yes	No	
X		X		X		Full
X		X		X		Full
X		X			X	No credit
	X		X	X		Full
	X		X		X	Full less 30% handling fee

(1) Common defects include broken valves, leaks at valve stems, rupture disc failure, and empty or lightweight containers with shrink-wrap intact.

(2) Individual cases will be reviewed with Sales/Marketing for final disposition

- Credit amount will be based on the current list price of product.
- If container is full and no defect is found, a 30% handling fee will be assessed based on the current list price of product.



Container Return Shipping Procedure

- All defective containers reported and returned by customer will be inspected to determine appropriate disposition as shown in the table below.
- For situations where defect cannot be readily identified upon receipt, credit will be issued up front; if defect is later found, offsetting debit will be applied

Palletizing Containers Properly

1. Verify that the cylinders (valves, plugs, reliefs, etc.) are secure and not leaking.
2. Identify all containers and pallets with RA tags that include RA number and customer purchase order number.
3. Return freight collect. DuPont TONA will tell you which DuPont location to ship to. Normally, this is the site that originally shipped the cylinders to you.
4. All shipments must be properly blocked and braced.

Empty cylinder returns

Empty cylinders should be palletized vertically on a standard 4-way pallet (preferably on the same pallet(s) as received) and secured for shipment using adequate banding materials. Bands should be at two or three locations vertically (6-12" below the top shoulder, 6-12" above the base, and the center) to ensure the load does not separate during transport.

Defective containers

Consolidate **defective containers** with other returned product for shipping.

Empty containers should be returned on the same pallet(s) as received and properly secured to the pallet to provide a safe return to DuPont. Use banding to secure cylinders to pallet(s).

Options for **banding material** include:

1. Steel banding that uses the 3/4" wide by 0.023" thick banding with 3/4" clips. Kits that have the bander, crimper, seals, and banding are about \$275.00 each.
2. Poly strapping. A kit costs about \$90.00 including the tensioner, cutter, buckles, and 1,000' plastic banding.

Steel banding and poly strapping kits can be ordered through any local supply house for shipping materials.

Preparing the Bill-of-Lading

DuPont provides a bill-of-lading (BOL) form for return shipments on their website. For your convenience, we have included one on page 20. All items on this form should be filled out by the shipper except those specifically indicated to be filled out by the carrier. The BOL form must contain the following information:

- Proper shipping name
- Name of carrier
- Date



Container Return Shipping Procedure

- Company name and address of shipper
- Signature of shipping company's representative
- Shipping destination
- Number and types of containers
- Freight prepaid or collect
- Gross product weight, in pounds (includes the weight of the containers, except for tank trucks)
- DOT "Nonflammable Gas" placards are not required for shipments of SUVA 123 in any container size since this material is not regulated by the DOT.
- Driver's signature

Authorized Return Sites

The following site accept empty or defective containers and returned product. Use state lookup to determine the authorized return site for your location, then use the appropriate address at left, below, for either Louisville Packaging or Franke Filling. For general questions contact the CTV Technical Service department in La Crosse at 608-787-3943 or e-mail TechService@trane.com.

Addresses	Louisville Packaging (Kentucky)		Franke Filling (Texas)
DuPont Fluoroproducts	Alabama	Missouri	Arizona
c/o Louisville Packaging	Alaska	Montana	Louisiana
7745 National Turnpike, Unit 190	Arkansas	Nebraska	New Mexico
Louisville, KY 40214	California	Nevada	Mississippi
Fax: 502-363-8013	Colorado	New Hampshire	Texas
	Connecticut	New Jersey	
DuPont Fluoroproducts	Delaware	New York	
c/o Franke Filling, Inc.	District of Columbia	North Carolina	
5960 Tension Drive	Florida	Ohio	
Fort Worth, TX 76112	Georgia	Oklahoma	
Fax: 817-457-8527	Hawaii	Oregon	
	Idaho	Pennsylvania	
	Illinois	Rhode Island	
	Indiana	South Carolina	
	Iowa	South Dakota	
	Kansas	Tennessee	
	Kentucky	Utah	
	Maine	Vermont	
	Maryland	Virginia	
	Massachusetts	Washington	
	Michigan	West Virginia	
	Minnesota	Wisconsin	
	Mississippi	Wyoming	
	North Dakota		

Routine Maintenance

Leak Testing

1. Raise machine pressure with a controlled hot water or electric resistance system to a maximum of 8 psig. Do not use nitrogen. (Nitrogen purging increases refrigerant emission.)
Use a soap and water solution or other leak-detection device that may be appropriate.
2. Identify, document and repair all leaks as soon as possible or as may be required by appropriate regulations. (Note: For repair of leaks, see Major Service, [page 18](#).)

Oil System

An oil analysis program is strongly recommended as opposed to automatic annual oil changes. This eliminates an unnecessary waste of valuable natural resources and unnecessary refrigerant emissions.

Oil sampling

Use oil-sampling containers provided by the testing lab and follow the published procedures outlined in the current version of CTV-SB-19.

1. A refrigerant angle valve is provided on all new CenTraVac® chillers to allow an oil sample to be taken. This valve, located just upstream of the oil filter, provides non-filtered oil for analysis. Do not use the oil drain valve located on the bottom of the oil tank to take a sample. On older machines, where a sampling valve is not present, one should be installed before the oil filter. Make sure the valve seat material is compatible with refrigerant being used, [Figure 4](#).
2. Seal the container tightly and submit it for analysis.

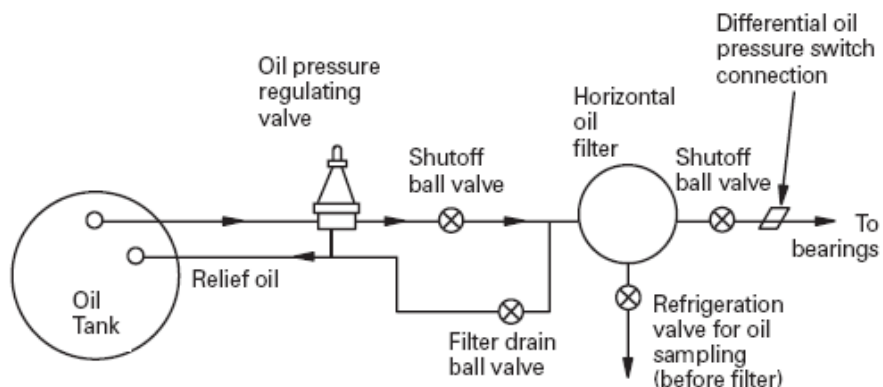


Figure 4. Oil System Schematic For CenTraVac Chillers

Oil filter change

To minimize oil loss and refrigerant vapor release, all new CenTraVac chillers ship with an oil system that allows isolation of the oil filter to allow quick filter changes. Beginning in late 1996, a redesigned oil tank head assembly incorporates a single rotary isolation valve and filter assembly along with the oil pressure regulator. Trane Service Bulletin CTV-SB-97 contains details of the new design.

For older units without isolation valves, install refrigerant ball valves and relocate the oil filter (spin-on type only) to the horizontal position, [Figure 4 on page 15](#). Trane Service Bulletin CTV-SB-19D has more details about this change.

1. Turn CenTraVac chiller off.
2. Run oil pump for two to three minutes to assure that the oil filter is warmed to oil sump temperature.

Note: *Chiller must be off to change an oil filter unless the optional dual oil filter system is installed. See Trane Service Bulletin CTV-SB-97 for discussion on the dual oil filter option.*

3. Turn the oil pump motor off.
4. Close shutoff valves before and after filter and open filter drain valve. Drain time can be reduced by momentarily opening the oil-sampling valve. (On units with the single-rotary valve, place the valve in the drain position.)
5. Allow time for the filter to drain (approximately 15 minutes).
6. Close the drain valve. (On units with the single rotary valve, move the valve to the change filter position.)
7. Remove the oil filter and properly dispose of filter and filter drier cores in a resealable container as shown at left. Install the new filter as quickly as possible.
8. Open the shutoff valves before and after the filter. (On units with the single rotary valve, move the valve to the "run " position.)
9. The chiller is now ready for operation.
10. If transporting used oil filters in an enclosed vehicle, make sure they remain in a properly sealed container.
11. Dispose of used oil filter per applicable code (see introduction).





Routine Maintenance

Oil change

Once it is determined through oil analysis that the oil must be changed, proceed accordingly:

1. An evacuated tank, capable of handling the pressures involved, should be used to remove oil from the chiller oil tank. If a tank is not available, a magnetically-driven pump with an airtight sealable container can be used.
2. Some refrigerant will be dissolved in the oil. The refrigerant can be recovered and returned to the chiller with an appropriate deep vacuum recovery unit and heating and agitating the oil container.
3. Dispose of waste oil by following the applicable local, state and federal regulations.

Changing EarthWise™ purge filter/dryer

Refer to EarthWise Purge Operation Maintenance manual PRGD-SVU01_-EN for proper handling procedures.

Major Service

If you are opening a machine for major service purposes, such as compressor overhaul, regasketing, refrigerant conversion, replacing tubes, etc., use Trane recovery/recycle equipment capable of evacuation/recovery of at least 2,000 microns, normally overnight. Break vacuum and pressurize unit to 5 psig with nitrogen. Re-evacuate to 1,000 microns and break vacuum with nitrogen again. Turn on all available ventilation to its highest speed. Proceed to open unit and perform service.

⚠ Warning! **Asphyxiation Danger!**

All fluorocarbon refrigerant vapors are three to five times heavier than air. Should a major spill occur, leaking vapors will collect and concentrate in confined spaces or in low spots displacing the air and posing a potential health risk due to asphyxiation, [Figure 5](#).

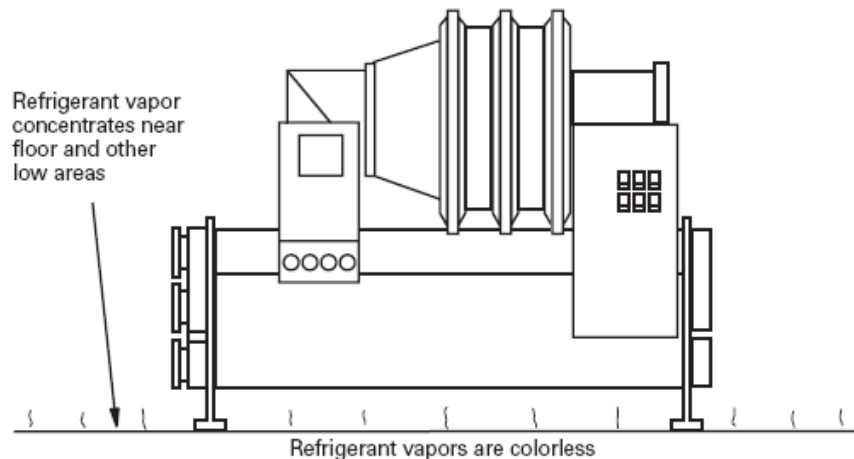


Figure 5. Pooling Location For Escaped Refrigerant

⚠ Warning! **Protective Equipment Required!**

Service personnel must be familiar with material and procedures, and have proper equipment available to safely handle all refrigerants.

1. If the job does not meet ASHRAE Standard 15-2004 requirements, any time a Trane serviceman is on the jobsite the office is to provide the necessary equipment on a temporary basis. For example, if a room does not have a refrigerant monitor, provide one on a temporary basis. If the room does not have mechanical ventilation, provide portable fans.
2. Be familiar with, and understand, MSDSs for all refrigerants or other chemicals you will be handling.
3. Wear safety glasses with side shields. If splash potential exists, use chemical splash goggles.



Major Service

4. Wear butyl gloves wherever hand contact may occur.
5. Familiarize yourself with the area monitoring equipment in the equipment room.
6. Have available a half mask organic vapor respirator for use in the event of a small liquid spill or vapor release when concentrations may reach 30 ppm or greater for no more than 30 minutes in an eight-hour work shift. If concentrations may reach 100 ppm or greater for 30 minutes, a higher level of respiratory protection is required, i.e. a full-face respirator or self-contained breathing apparatus. When the machine is first opened, concentrations may have excursions in excess of 50 ppm. Experience has shown that as long as recommended recovery/recycling practices are followed, these excursions are experienced only for extremely short duration (less than one minute).
7. Ensure the availability of a self-contained breathing apparatus (SCBA) in or near the equipment room.
8. All contaminated materials must be in sealed containers for storage or transport (see Introduction).
9. If the equipment room is not equipped with mechanical ventilation, doors should be opened and portable fans positioned to exhaust any vapors outdoors.



Key Steps for Returning Suva® 123 Refrigerant Containers & Materials

Empties At-A-Glance Procedure	Defective Containers At-A-Glance Procedure	Product At-A-Glance Procedure	Recovered Refrigerants At-A-Glance Procedure
<ol style="list-style-type: none"> 1. Complete Return Authorization (RA) form—include RA#. 2. Call (800) 554-8662 to arrange shipment and get RA number. 3. Complete BOL form—include RA # 4. Tag each pallet, ton or ½ ton. Include RA #. 5. Ship to DuPont. Attach copy of RA form to shipment (packing list) and give one to Carrier with copy of BOL. 6. Fax RA form to: 1. DuPont site (below) 2. Trane-La Crosse (608-787-3024) 	<ol style="list-style-type: none"> 1. Complete Return Authorization (RA) form—include RA #. 2. Call (800) 554-8662 to arrange shipment and get RA number. 3. Complete BOL form.—include RA # 4. Tag each container. Include RA #. 5. Ship to DuPont. Attach copy of RA form to shipment (packing list) and give one to Carrier with copy of BOL. 6. Fax RA form to: 1. DuPont site (below) 2. Trane-La Crosse (608-787-3024) 	<ol style="list-style-type: none"> 1. Call DuPont Sales or Customer Service Representative for approval. 2. Complete RA form—include RA # 3. Call (800) 554-8662 to arrange shipment and get RA # 4. Complete BOL form—include RA # 5. Tag each container. Include RA #. 6. Ship to DuPont. Attach copy of RA form to shipment (packing list). And give one to Carrier with copy of BOL. 7. Fax RA form to: 1. DuPont site (below) 2. Trane-La Crosse (608-787-3024) 	<ol style="list-style-type: none"> 1. Call (800) 554-8662 to arrange shipment and get RA number. 2. Complete BOL form—include RA # 3. Affix Used Refrig label to each container. And Tag with Refrig i.d. tag (Include RA #) 4. Ship to Hudson Technologies. Attach copy of RA form to shipment (packing list). Provide carrier with copy of BOL. 5. Fax copy of BOL to 1. Hudson (217-373-1432) 2. Trane-La Crosse (608-787-3024)

Empty Cylinder Returns

- Palletize vertically for a maximum of nine (9) Suva® 123 cylinders per pallet. Double-band* the cylinders.

*Contact your DuPont Customer Service Representative for details on container banding options.

Defective Containers and Other Returned Product

- Consolidate and ship with return containers. Tag defective cylinders.

RA number must be NOTED on all forms and tags

Authorized Return Sites

DuPont Fluoroproducts c/o Louisville Packaging 7745 National Turnpike, Unit 190 Louisville, KY 40214 Fax: 502-363-8013	
DuPont Fluoroproducts c/o Franke Filling, Inc. 5960 Tension Drive Fort Worth, TX 76112 Fax: 817-457-8527	



DuPont Fluoroproducts

RA No.: _____

**FOR CYLINDERS RETURNED FROM TRANE
STRAIGHT BILL OF LADING SHORT FORM-ORIGINAL - NOT NEGOTIABLE**

ATTACH TOGETHER WITH COMPLETED RETURN AUTHORIZATION FORM

CARRIER/SHIPPER RECEIVED, subject to the classifications and lawfully tariffs in effect on the date of the issue of this shipping order:

Check Carrier: HMES – USF Holland RDWY– Roadway Other – _____

Trane Sales Order #

FREIGHT PREPAID THIRD PARTY. Send Freight Invoices to:
 DuPont c/o CASS Information Systems
 P.O. Box 17606
 St. Louis, MO 63178-7606

Subject to Section 7 conditions of the bill of lading. If this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
 The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.
 Per _____
 (Signature of Consignor)

If charges are to be prepaid, write or stamp here, "To be Prepaid".

EMERGENCY CONTACT:
 For a chemical emergency (spill, leak, exposure, fire or accident)
 contact DuPont - day or night - by calling:
 in USA CHEMTREC (800) 424-9300 (toll free),
 in area code (703), call 527-3887,
 outside USA, call local operator & request collect call to USA at 703- 527-3887,
 in Europe, call DUCHEM HELP at (local international access code) + 44-2871-861313.

Date:

FROM (COMPANY): _____

ADDRESS: _____

CONSIGNEE TO: (Mail or street address of consignee-For purposes of notification only)

E.I. du Pont de Nemours and Company

c/o FluoroChemicals

STREET _____

CITY _____ STATE _____ ZIP _____

No. of Cylinders	Description for Empty Cylinders	Gross Wt. (lbs.)
	Not Regulated by DOT Previously contained Suva® 123 (2,2-Dichloro-1,1,1-trifluoroethane)	

No. of Cylinders	Description for Defective DuPont Cylinders or Full of Product	Gross Wt. (lbs.)
	Not Regulated by DOT Suva® 123 (2,2-Dichloro-1,1,1-trifluoroethane)	

TOTAL GROSS WEIGHT (lbs.): _____

Shipper's Name _____

Date _____

Driver's Name _____

Date _____



DuPont Fluoroproducts

Key Steps for Returning:

CALL 800-554-8662 TO ARRANGE SHIPMENT AND TO RECEIVE A RETURN AUTHORIZATION NUMBER

NOTE: Empty containers should be returned on the same pallet(s) as received and properly secured to the pallet to provide a safe return to DuPont. Use banding to secure cylinders to pallet(s).

RA number and Trane sales order number must be noted on all forms and tags.

Authorized Return Sites:

Ship cylinders from Arizona, Louisiana, Mississippi, New Mexico, and Texas to :

DuPont Fluoroproducts
c/o Franke Filling, Inc.
5960 Tension Drive
Fort Worth, TX 76112

All others to:

DuPont Fluoroproducts
c/o Louisville Packaging
7745 National Turnpike, Unit 190
Louisville, KY 40214

Reference Materials

DuPont HCFC-123 MSDS

DuPont "HCFC-123 Properties, Uses, Storage, and Handling"

Trane Service Bulletin CTV-SB-97

Trane Service Bulletin CTV-SB-82E

BSR/ASHRAE Standard 15-2004

Code of Federal Regulations, Title 29, Part 1910



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For more information, contact your local Trane office or e-mail us at comfort@trane.com

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Available	Through e-Library

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