



# General Service Bulletin

**CVHE-SB-26**

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Product	Centrifugal Liquid Chillers
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**Literature Changes:**  
CVHE-SB-26 (12/90) -- Original issue of bulletin.

**Subject: CVHE Oil Loss**

**(This is an informational Service Bulletin Only.)**

## **Introduction:**

We have received reports of excessive oil loss some on CVHE units, varying in age and design sequence. The purpose of this service bulletin is to discuss oil loss and available corrective action.

## **Discussion:**

CVHE oil-loss can occur due to a sudden reduction in oil tank pressure. Oil-loss symptoms are most likely to occur during these operating conditions:

- Start up after a long shut down;
- Start up with a warm evaporator;
- Shut down at high load (especially with high condensing pressure), and;
- During load shedding.

These operating conditions normally produce sudden reductions in oil tank pressure that can cause the refrigerant dissolved in the oil to out-gas. If this pressure reduction is rapid enough, the out-gassing is not contained in the oil tank, allowing oil to be carried out through oil tank vent line.

Since the Trane Company has a policy of continuous product improvement, it reserves the right to change specifications and design without notice. The installation and servicing of the equipment referred to in this booklet should be done by qualified, experienced technicians.

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Each CVHE installation is unique. Oil loss and return efficiency will depend upon system conditions and controls being applied. Oil loss may be a very dynamic event that is difficult to isolate and is not apparent during normal operation. Symptoms of oil loss problems are:

- Three or more gallons of oil are added to the unit and the oil level has not stabilized. The optimum operating oil level is visible in the lower half of the bottom oil-sump sight glass. During unit start-up and shutdown, it is normal for the oil level to drop. The oil level should return, however, after a period of sustained operation.

**Note:** Trane OIL-22 is the only oil recommended for use in CVHE units. The proper oil charge for all unit sizes is seven (7) gallons.

- The unit loses oil to the point of tripping on low oil pressure.
- Oil tank pressure is more than 6-7 inches of mercury greater than evaporator pressure.

### **Root Cause:**

The root cause of oil loss is: High oil-tank pressure relative to evaporator pressure. The oil tank is vented to the suction cover behind the first stage guide vanes, which is the lowest pressure area in the unit (at or below evaporator pressure). Oil tank pressure is established by:

- The amount of leakage that occurs through the seals, and;
- The amount of oil tank line-loss in the oil tank vent line.

Oil tank pressure tends to follow evaporator pressure, but may be low at part load and even lower at low-load operation, depending on head conditions.

During start-up and shut down, oil-tank pressure moves closer to evaporator pressure. If oil-tank pressure is too high, the pressure drop causes out-gassing and oil loss through the vent line. Rapid changes in operating conditions can also cause sudden oil-tank pressure drop, with resultant oil loss.

A secondary result of high oil tank pressure is, that the oil reclaim system is not effective. The reclaim system relies on the eductor to pump oil out of the suction cover to the oil tank. If a large pressure differential exists between the suction cover and the oil tank, eductor oil return rate is reduced. At high heads and low loads, the normally high oil-tank pressure makes the eductor's ability to return oil marginal.

### **Units Affected:**

All CVHE units.

### **Corrective Action:**

Since each job tends to be unique, a comprehensive evaluation must be made for that jobsite. The first step is to verify that the unit has a full operating refrigerant charge. Secondly, record an accurate system operating log to determine where the unit is operating (as compared to the design specifications) and to determine the degree of oil loss at those actual conditions. Pay particular attention to evaporator pressure versus low oil-tank pressure (be sure that all gauges are properly calibrated). The greater the pressure differential, the greater the oil-loss potential is, and the more likely the chance that the oil recovery system will not adequately reclaim oil. Once it has been determined that an oil loss condition exists, the following corrective action is available:

1a. Increase the vent line (Figure 1) size to 1-1/8". The line is 7/8" on units manufactured through September of 1990. Cut off the 7/8" line as close as possible to the oil tank and use a 1-1/8" x 7/8" reducing coupling. At the suction cover, cut the line and remove the screw-in fitting. Replace it with a 90-degree elbow (Mueller No. W2164) or straight adaptor (Mueller No. W1164), whichever is appropriate for the job. Both are 1-1/8" solder vs. 3/4" NPT. The bent tube in the old suction cover fitting is not required.

1b. Next, install a new ALCO vent-line solenoid valve (Trane Part No. VAL-3217) at the location shown in Figure 1.

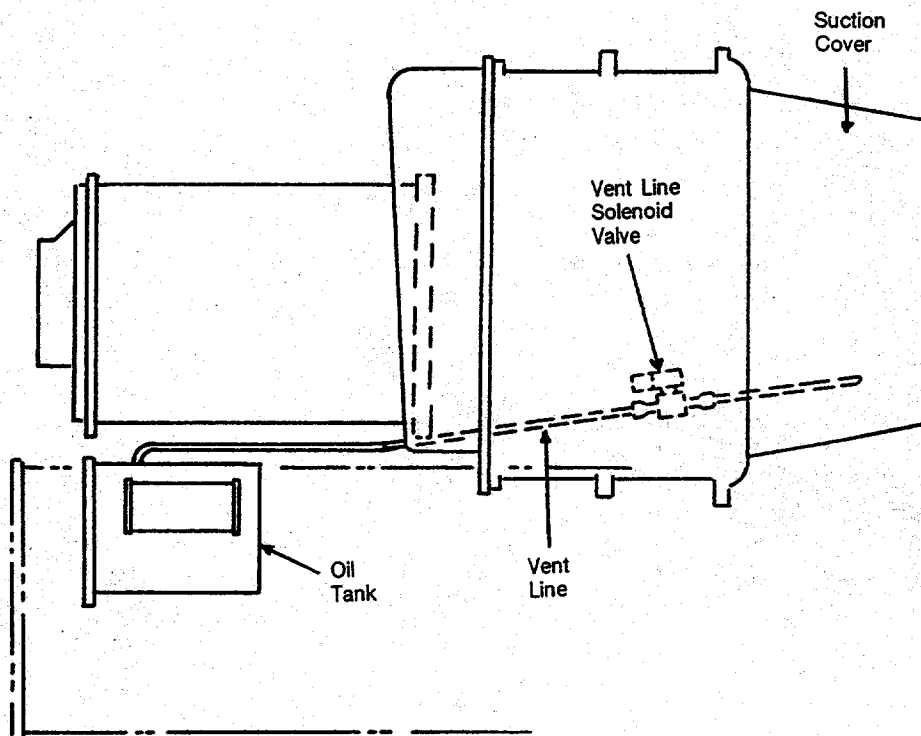
1c. Finally, install a second eductor (Trane Part No. TEE-0077) on the 1/4" valve on the evaporator. Tee a 3/8" line from the condenser supply to the eductor, 1/4" line to the evaporator and 3/8" line to the oil tank.

If the oil loss problem persists after performing these steps, contact the CenTraVac and Absorption Systems Business Unit Technical Service Department in La Crosse, Wisconsin.

### **Special Note:**

When a CVHE teardown is performed for any reason, pay particular attention to the third-stage labyrinth seal clearance, (SEL-0366, SEL-0367.) Total clearance should be .004" to .007". Replace the seal if this clearance exceeds .007".

**Figure 1**  
**CVHE Vent Line and Vent-Line Solenoid**  
**Valve Location**



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## **Parts Information:**

This service bulletin is informational only and does not authorize any parts or labor. The parts listed below are required to complete the procedures described under "Corrective Action":

Obtain the parts listed below locally:

- 1-1/8" Copper Tubing (field supplied);
- (1) 90-Degree Elbow (Mueller No. W2164); or,
- (1) Straight Adaptor (Mueller No. W1164).

Order the parts listed below from La Crosse, "Ship from 31", and specify the following part numbers:

VAL-3217 - ALCO Vent-Line Solenoid Valve;  
TEE-0077 - Oil Eductor.

## **Other Service Bulletins Referencing Oil Loss:**

CVHE-SB-20 - "CVHE Oil Pressure Loss During Startup".

CTV-SB-68 - "CenTraVac Oil Recovery System".