



**UNITED
TECHNOLOGIES
CARRIER**

Commercial Division
Carrier Corporation

BULLETIN: CA-SB-19-C-64-16

DATE: 1/21/64

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SERVICE BULLETIN

SUBJECT:

PURGING PROCEDURE : THERMAL PURGE

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PURPOSE

To transmit a purging procedure that will minimize refrigerant loss when using the thermal purge, and to caution against "quick purging" practices.

MACHINES AFFECTED

All R-11 and R-113 machines of all voltages.

INFORMATION

- A. General. When air and non-condensable gases are removed from a refrigeration machine, a certain amount of refrigerant vapor is also lost.

With the thermal purge design, the purge pump operates only when air and non-condensables collect in the condensing chamber. The fewer times the purge pump operates, the less the refrigerant loss.

Excessive refrigerant loss can occur when purging down after the machine has been opened. The amount of refrigerant lost is dependent upon the equilibrium of the mixture of air and refrigerant vapor inside the condensing chamber. Basically, the higher the mixture temperature and lower the pressure, the greater the amount of refrigerant in the mixture and, thus, the greater the loss of refrigerant when exhausted to the atmosphere. Conversely, the lower the mixture temperature and higher the pressure, the less the amount of refrigerant in the mixture, thus resulting in the least loss when exhausted. A curve is shown in Fig. 1 for R-11 only, but a similar curve can be applied to R-113.

Note the "Normal Purging Range" in Fig. 1. This is the R-11 temperature and pressure range in the condensing chamber in which the purge pump operates when in the "Normal-Automatic" position. Some refrigerant loss will occur, but it is acceptable if the machine tightness limits the number of purge pump cycles.

- B. Changes. In the past, when the purge pump was used to pump out the system, with refrigerant left in the cooler, the mixture discharged through Valve #4 at zero psig to the atmosphere. Refrigerant loss was excessive at this pressure.

To minimize this loss of refrigerant, a small relief valve, Part No. EB51NP-121, pre-set for 15-20 psig, has been added to the purge condensing chamber, and located as shown in Fig. 2, to raise the pressure in the chamber. The valve chart located on the left side of the console has been changed to reflect the addition of the relief valve.



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On purges not equipped with this relief valve, the condensing chamber pressure can be raised to 15-20 psig by throttling Valve #4 and observing the purge gage. Throttling this valve may appear to slow down the purging time. Actually, the mixture volume discharged will contain a higher percentage of air.

Raise the condensing chamber pressure to 15-18 psig, even if the refrigerant has been removed from the cooler. Some refrigerant (liquid and vapor) will always remain in the cooler and condensing chamber and, in large machines, the amount can be substantial.

PROCEDURE

A. Before Opening the Machine

1. Before breaking the machine vacuum, operate the chilled water pump (with condenser water pump off) to raise the machine pressure. This will allow as little air and moisture as possible to enter the machine.

NOTE: On R-11 machines, raise the machine pressure to atmospheric, if possible. On R-113 machines, raise the machine pressure as high as possible before breaking the machine vacuum.

2. Break the vacuum at the top of the condenser by removing the pipe plug on the condenser shell.
3. When the vacuum is broken, replace the pipe plug.

B. Purging Procedure when the Refrigerant is left in the Cooler

1. Leak test all machine areas which were opened.
2. Set purge valves in the positions shown on the valve chart.
3. Start the purge.

NOTE: On thermal purges not equipped with the pre-set relief valve, throttle the #4 valve to raise the purge pressure to 15-20 psig. As purging progresses, adjust the #4 valve to maintain this pressure. **DO NOT EXCEED 25 PSIG IN THE CONDENSING CHAMBER.**

4. Bring the machine up to speed every 20 minutes during the purging operation, then immediately shut it down. Continue every 20 minutes until the machine can be left on the line without serious surging or overheating the compressor-motor. This enables the air in the system to collect in the condenser which results in more efficient purging and decreased purging time.



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C Purging Procedure when the Refrigerant is removed from the Cooler

1. Leak test all machine areas which were opened.
2. Set purge valves in the positions shown on the valve chart.
3. Start the purge pump and pull about 5 to 8 in. Hg vacuum on the machine.

NOTE: On thermal purges not equipped with a pre-set relief valve, throttle the #4 valve to raise the purge pressure to 15-18 psig. As purging progresses, adjust the #4 valve to maintain this pressure. DO NOT EXCEED 25 PSIG IN THE CONDENSING CHAMBER.

4. When machine pressure reaches 5-8 in. Hg vacuum, charge the refrigerant into the machine while purging. This will insure a flooded tube bundle in the purge condensing chamber.
5. Bring the machine up to speed every 20 minutes during the purging operation, then immediately shut it down. Continue every 20 minutes until the machine can be left on the line without serious surging or overheating the compressor-motor. This enables the air in the system to collect in the condenser, resulting in more efficient purging and decreased purging time.

PURGING PRACTICES TO BE AVOIDED

- A. Do not operate the 19C machine while blowing off air and refrigerant through the plug opening at the top of the condenser. This will result in excessive refrigerant loss, surging, overheating of the compressor-motor, and damage to the O-ring gaskets.
- B. Do not start and stop the 19C machines more than three times per hour to protect the motor and starter components.
- C. Do not operate the purge pump to remove air after opening the machine without first throttling Valve #4 (machines not equipped with a relief valve) and raising the purge pressure as noted in 4.2 and 4.3 to minimize refrigerant loss.
- D. Do not exceed 25 psig when throttling Valve #4; otherwise, leakage will occur past the tube bundle O-ring seals.

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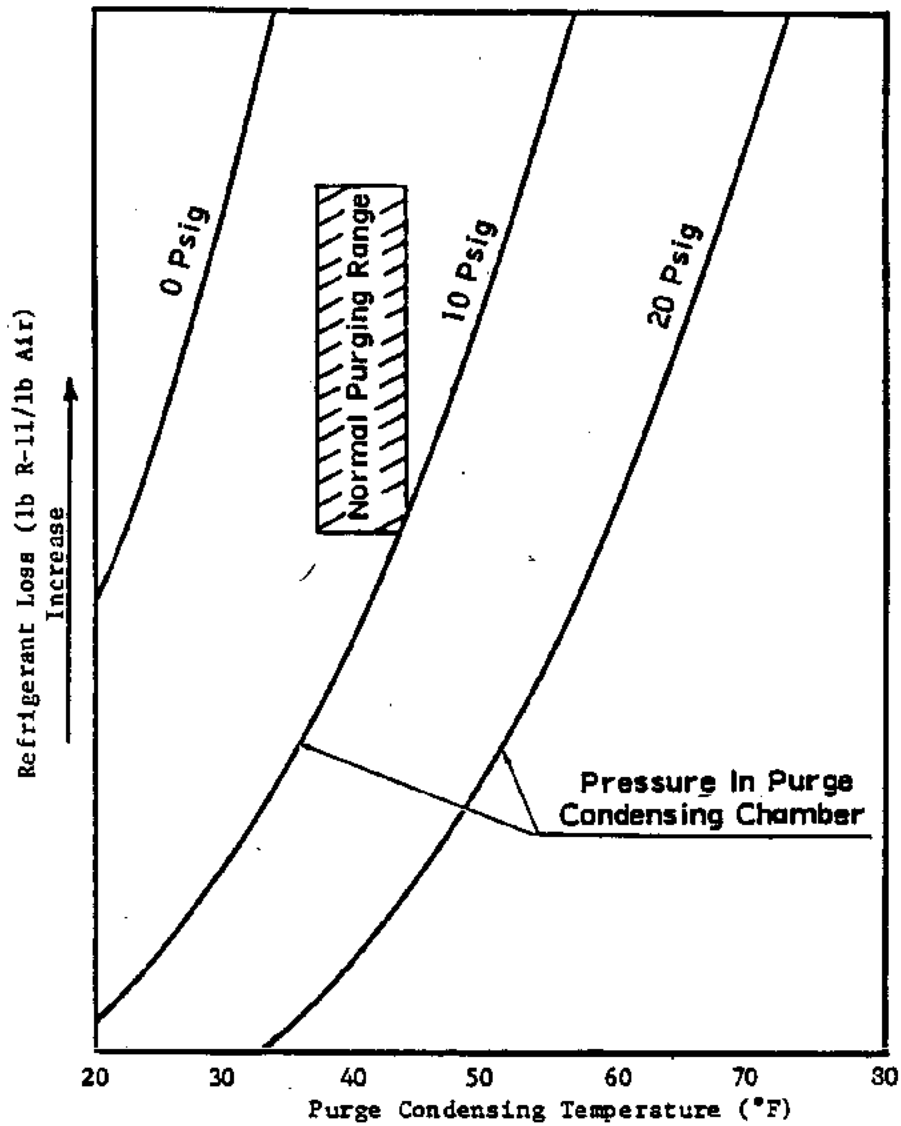


Fig. 1. Refrigerant Loss vs Mixture Pressure and Temperature Curve, R-11



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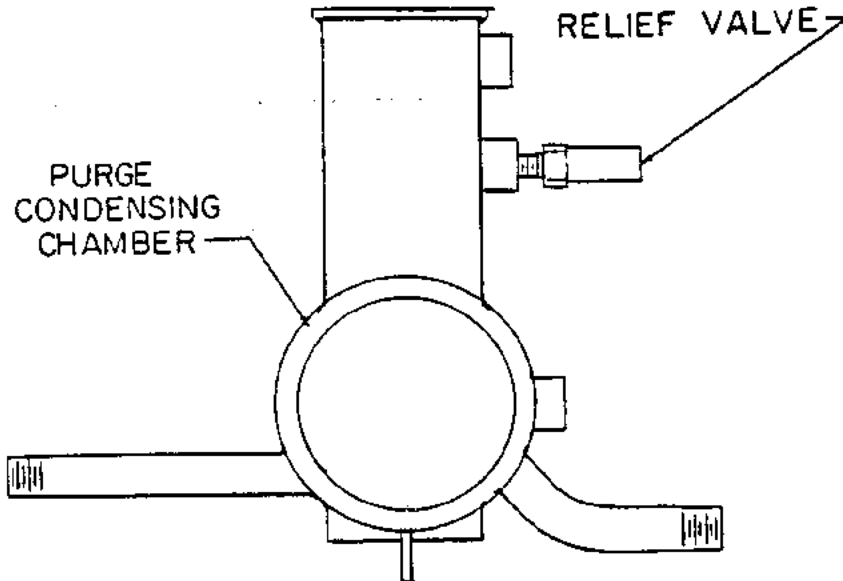


Fig. 2. Location of Purge Relief Valve