

TROUBLESHOOTING COOLING UNIT

 **Dometic**

**REFRIGERATOR
BULLETIN R81/9A
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A. PROPER DIAGNOSIS

Cooling units are sometimes diagnosed as being defective when the actual problem is something else. Cooling units are expensive to replace, so it is important to make the correct diagnosis. By using the proper test procedures, you can eliminate all other possibilities before condemning the cooling unit.

If there is a cooling performance problem and the cooling unit is a possible suspect, use the following step-by-step procedure before replacing it.

1. Preliminary Checks

- a. Check for an ammonia smell around the cooling unit and inside the refrigerator. This could indicate a possible cooling solution leak. Check for deposits of yellow or green residue on the tubing which will sometimes form around the area of a leak.

Note: A yellow deposit in the area of the fill valve could be due to splashing of cooling solution during manufacture, and would not indicate a leak.

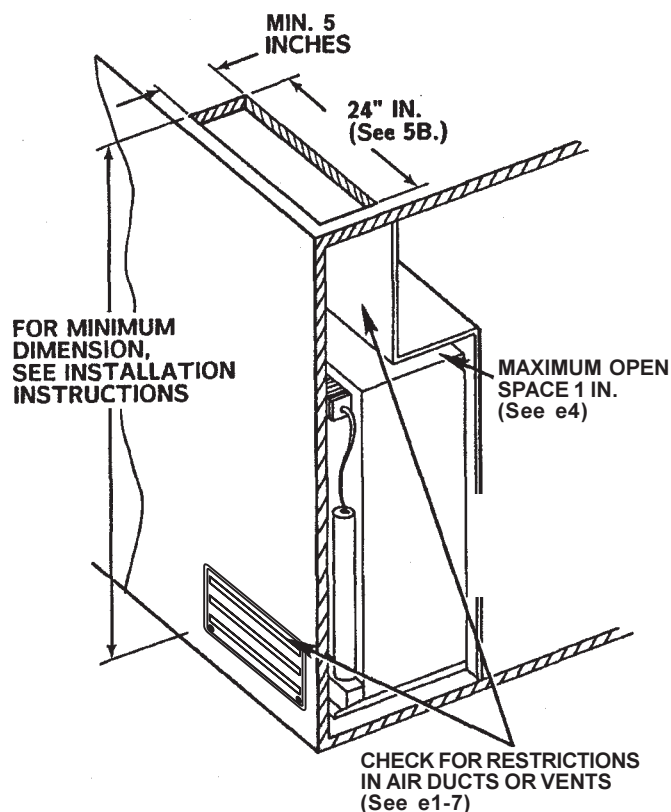
- b. Determine if the refrigerator cools properly on one heat source but not another by testing it in the alternate modes. Also, ask the customer if he gets satisfactory cooling results from one energy source than another. If this is true, it indicates the problem is NOT in the cooling unit.
- c. Make sure the refrigerator is level. In an absorption system, ammonia is liquefied in the finned condenser coil at the top rear of the refrigerator. The liquid ammonia then flows into the evaporator (inside the freezer section) and is exposed to a circulating flow of hydrogen gas, which causes the ammonia to evaporate, creating a cold condition in the freezer.

The tubing in the evaporator section is specifically sloped to provide a continuous movement of liquid ammonia, flowing downward by gravity through this section. If the refrigerator is operated when it is not level and the vehicle is not moving, liquid ammonia will accumulate in sections of the evaporator tubing. This will slow the circulation of hydrogen and ammonia gas, or in severe cases, completely block it, resulting in a loss of cooling. Any time the vehicle is parked for several hours with the refrigerator operating, the vehicle should

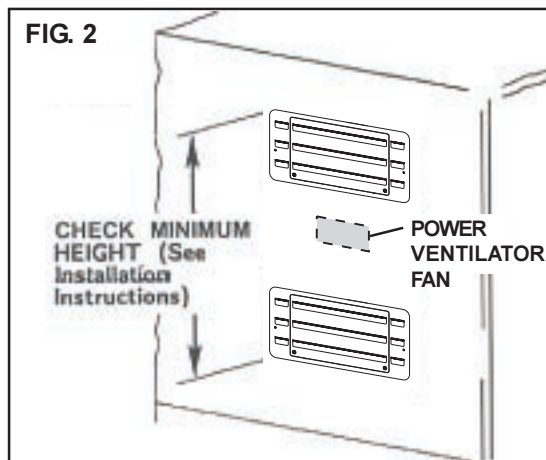
be leveled to prevent this loss of cooling. The vehicle needs to be leveled only so it is comfortable to live in (no noticeable sloping of floor or walls).

When the vehicle is moving, the leveling is not critical, as the rolling and pitching movement of the vehicle will pass to either side of level, keeping the liquid ammonia from accumulating in the evaporator tubing.

- d. Carefully check door gaskets for proper seal. A leaking gasket can allow enough warm air inside the refrigerator to overcome most of the cooling being produced. For a simple method to check gaskets, close the door and reopen the door. If the door gaskets are good, the door will offer resistance when it is reopened immediately after closing due to a slight vacuum.
- e. Check the venting system to insure that ample air flow is provided at the back of the refrigerator. See Installation & Operating Instructions for the model of refrigerator and Vent Installation Instructions.
 1. Check for and remove any restrictions in the vents, such as filters installed by the customer, bird nests in the roof vent, or smashed louvers in the wall vents. See FIG. 1.



2. Make sure the correct roof vent has been installed. Dometic refrigerators use a 5" x 24" roof opening. To check this, measure the actual opening in the roof - DO NOT measure the roof vent itself. See FIG. 1. Also, make sure the distance from the bottom of the refrigerator to the roof vent is at least the minimum dimension given in the Installation Instructions for each model. See FIG. 1.
3. Some models may be installed with two side wall vents instead of a roof vent, plus an optional power ventilator fan. For this type of installation, make sure the top of the upper vent is the correct distance above the refrigerator. Double door models require the power ventilator fan as part of the installation. Single door models with vents at the minimum height also require the power ventilator fan. See FIG. 2. The minimum dimension for this measurement is listed in the Installation & Operating Instructions for the model of refrigerator and Vent Installation Instructions



4. Check the open space above the refrigerator. If this space is 1 inch or more it must be blocked off to prevent hot air from being trapped above the refrigerator. See FIG. 1.

If venting is suspected as a problem, run the performance test described below with the refrigerator installed, then run the same test with the refrigerator removed. If there is a definite improvement in performance, a venting problem is indicated. Also see Section 2. PERFORMANCE TEST.

5. Operate the refrigerator with AC power applied directly to heating element for 10-12 hours (overnight).
6. If the temperature in the food compartment is higher than the acceptable limit, the cooling unit is probably defective. If you are still in question as to the performance of the cooling unit, please contact our Technical Service Department at: 219-463-4858. See the next paragraph before changing the cooling unit.
7. The importance of adequate air flow across the cooling unit cannot be emphasized too much. A minor restriction in the venting system will not create a problem on cooler days - the available air flow will still provide adequate cooling due to the lower temperature. However, on a hot day (90° or more) the cooling unit and the cooling process will slow down or stop.

2. PERFORMANCE TEST

- A. First perform all the preliminary checks described previously.
- B. Remove all food from the refrigerator and place all controls in the OFF position.
- C. Place an accurate thermometer in an ice cube tray, half filled with water, and place the tray in the center of the lower food storage compartment.

Note: If a remote reading thermometer is used (allowing temperature readings without opening the door) the tray of water is not required.

- D. Make sure the AC heating element is the correct wattage for the model being tested., and that the resistance reading is correct. (See "Checking Resistance of a Heating Element" below). Connect 120 volt AC power directly to the heating element leads (make sure the leads are not connected to the refrigerator circuit), then check the voltage at the element with a volt meter. Reading must show at least 115 volts.

! WARNING

Disconnect 115 volt AC power and the 12 volt DC positive (+) terminal at the supply source. Failure to follow these instructions could create a shock hazard causing death or severe personal injury.

- E. If the previously mentioned test was performed in air temperatures above 90° and the temperature in the refrigerator is above the acceptable ranges, it may indicate a restricted air flow. To make sure there is no problem with the venting system, repeat the performance test with the refrigerator removed from its installed location and placed on the floor, or in your service shop. If the second test indicated satisfactory performance, re-check the venting and installation.

3. CHECKING RESISTANCE OF A HEATING ELEMENT

A simple test to check a heating element is to measure the resistance through the element with an ohmmeter. The correct resistance, in ohms, can be calculated if the wattage and voltage ratings are known. (These ratings are stamped on all Dometic heating elements.)

Use this formula:

Volts / (Watts/Volts) = Ohms

Example:

Heating element rated 135 Watts at 110 Volts.

$110/(135/110)$ or, $110/1.23 = 89.4$ ohms

The ohm reading should be within 10% of this figure, or between 80.46 and 98.34 ohms. Use the lowest setting on the ohmmeter which will give an accurate reading.

When testing a 12 volt heating element, a very accurate ohmmeter must be used because of the very low readings that will be found. For example, a 200 watt element will have a reading of .72 ohms (less than 1 ohm).

4. OTHER CAUSES FOR LOSS OF COOLING

If the previously mentioned performance test shows that the refrigerator is working satisfactorily, and the customer still experiences loss of cooling, the following items need to be considered:

A. Make sure the customer is using the refrigerator properly. The cooling rate of the absorption refrigerator is usually much slower than the refrigerator the customer has in his home, so the customer should be advised to follow the instructions for proper use in his Owner's Manual.

1. Start the refrigerator the day before it is to be filled with food.
 2. When the refrigerator is being filled when preparing for a trip, the food should be pre-cooled, and frozen foods should be pre-frozen before placing them in the refrigerator. Ice making should be avoided until the refrigerator has cooled the lower compartment to the desired temperature.
 3. Air circulation within the food compartment is important for proper cooling. DO NOT place paper on the shelves or over fill the compartment with large cartons, etc.
 4. Do not put hot food in the refrigerator. Allow it to cool in room air first.
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