

How Absorption Refrigeration Works

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By [Editor](#)

Back in the early days of RVing, ice was used to cool food and beverages much as it was in homes, before the advent of modern refrigeration. Mechanical refrigeration systems using compressors are noisy and require a lot of electrical energy, but provide fast cool down. This method has been almost universally adopted for household and commercial use, including refrigerators, freezers, and air conditioners.

Essentially, what refrigeration systems do is provide cooling effect by moving heat from where it's not wanted, to where it doesn't bother anything. This is the case for both mechanical and absorption-type refrigerators. Absorption cooling was invented by a French scientist in 1858, using water and sulphuric acid as the heat transfer medium. In 1922 Swedish scientists improved the technology with a three-fluid mix.

Related video: [Why an RV Refrigerator is Best](#)

For the RV market, the decade of the 1960s saw the gradual introduction of so-called absorption refrigeration systems, which somewhat magically chilled food and even made ice from heat! These units are quiet, have no moving mechanical parts, and require less energy, although they don't cool as quickly as systems with compressors. The company AB Electrolux sold RV refrigerators under the Dometic brand and in 2001, Dometic became a separate company and now makes the majority of RV refrigerators.

Differences Between Compressor and Absorption Refrigeration

Both compressor-type and absorption refrigerators employ a refrigerant gas that has a very low boiling point temperature. In either type, when the refrigerant boils as it is exposed to heat, it carries heat away with it and then condenses. This change of state between a gas and a liquid provides the cooling effect.

The main difference between how absorption refrigeration works versus a compressor-type is how the refrigerant is converted from a gas back into a liquid, which allows the cycle to repeat. Absorption refrigerators change the gas into a liquid by employing only heat, with no moving parts other than the refrigerant gas, which goes around in a circle of tubes.

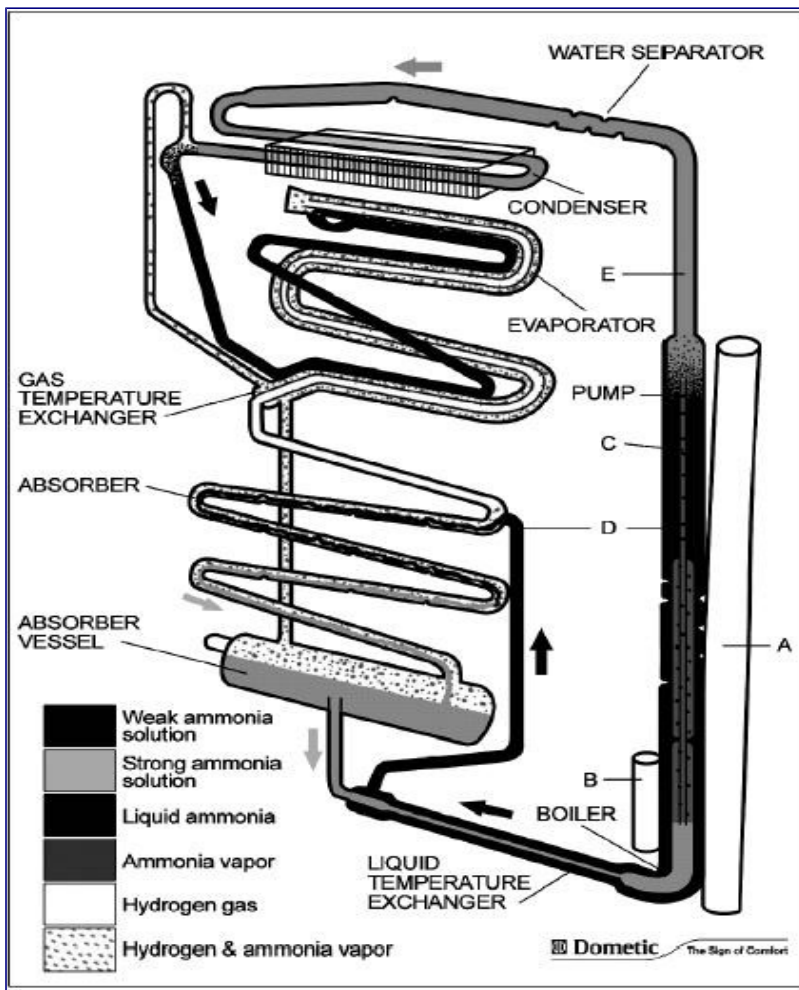


Photo credit: Dometic

The absorption cooling cycle consists of three phases: Liquid refrigerant evaporates in a low pressure vessel, picking up heat from the interior of the refrigerator. Due to the low pressure, heat required for evaporation is low. Next, the now-gaseous refrigerant is absorbed by a special salt solution. Then the refrigerant-saturated liquid is heated, causing the refrigerant gas to evaporate out. This hot refrigerant gas passes through a heat exchanger, transferring its heat to the outside ambient-temperature air. This heat loss causes the gas to condense back into a liquid, which then supplies the evaporation phase, as the cycle starts over and continues to do this as long as it has heat applied to the burner or heating coil.

RV absorption refrigerator coils are typically heated by either LP-gas burner or 120-volts AC and some may also use 12 volts DC electricity for heating, with the control circuit always powered by 12 volts DC from the coach battery. The circuit boards draw a slight current even when in storage, which along with other parasitic draws, can run batteries down. Therefore, during extended storage a battery maintenance charger should be used, or during shorter storage the batteries should be disconnected to prevent deep discharge which is harmful to batteries.

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RV refrigerators perform better when there is sufficient airflow over the heat exchanger coils, especially in hot weather. Some refrigerators come from the factory with small air circulation fans behind the units to aid air circulation. If yours doesn't have one, they can be purchased at RV supply stores. If your coach is plugged in to shore power most of the time, a fan that is powered by 12 volts from the battery may be fine. If you dry camp a lot (off the grid) a fan powered by a small solar panel may be best.

Tips to Improve Cooling Performance

RV refrigerator doors shouldn't be left open for long; plan what you are going to do and move quickly to keep them cold inside. Other ways to improve cooling performance are to park so the sunlight does not shine directly on the side of the coach where the refrigerator is located. Also, before going on a trip, put ice in the refrigerator to speed up the cooldown process when it is started up. Check that the door gasket is sealing properly by slipping a piece of paper between gasket lips and then close the door on it. Try to drag the paper around the perimeter of the door; lack of drag will indicate places where the gasket is not sealing well.

Related video: [Simple Tips for Keeping RV Refrigerators Efficient](#)

Leveling is one of the requirements for proper operation of absorption refrigerators. Proper leveling must be maintained to provide the correct refrigerant flow. Without proper leveling, refrigerant within the cooling unit will collect and stagnate at certain areas. Without proper refrigerant flow, the cooling process will stop. To ensure proper leveling, the vehicle needs to be leveled so it is comfortable to live in. (No noticeable sloping of floor or walls.)

Final Thoughts

Looking to the future, it's quite possible that solid-state electronic devices may be introduced to provide the cooling in RV refrigerators. But modern absorption refrigerators work well when used properly and will likely handle your cooling needs for years to come.

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