

•Lugversorging

•Verkoeling



•Air-conditioning

•Refrigeration

## **PRINCIPLES OF REFRIGERATION**

By definition cooling is the removal of heat from a specific area (the inside of your fridge), and the disposal of that heat in another area (the outside of your fridge).

No matter how cold it is, there is still heat available (just a lot less!) So-called heatpump air-conditioners that perform heating as well, uses this principle to extract heat from the very cold outside of your home, and “disposing” of it inside your room.

Heat always moves from a warmer to a cooler place. Those warm summer hands holding an ice cold beer, is actually warming up the beer. The cold beer is not making your hands cold.

Temperature is not the same as heat. Temperature is the measurement of heat.

A liquid under high pressure boils at a higher temperature than the same liquid at a lower pressure, which would boil at a much lower temperature.

Any moisture, no matter how little, becomes the enemy of refrigeration, the minute it finds its way into the cooling circuit.

## **FRIDGES / FREEZERS / COLD ROOMS**

Your refrigeration equipment works by using a closed-loop system. This simply means that, in this hermetically sealed system, the refrigerants should stay in side – hopefully forever.

Except of course, when things go wrong. A somehow reckless attempt to defrost a fridge with a sharp object could create a puncture hole through which refrigerant leaks out, and your once wonderful fridge becomes a problem fridge.

It is practice nowadays for fridge manufacturers to build fridges with a controlled leak, just so that you can buy a new one every couple of years. They have realised that they will not become rich by producing fridges that lasts “too long”.

In the next schematic diagram I am introducing you to a very basic closed-loop cooling cycle.

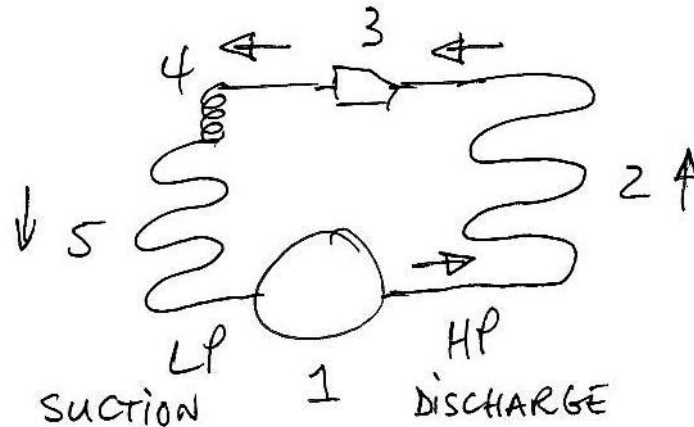
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Components:

1. Compressor. (the heart of the fridge / freezer). It receives (by suction) the low pressure gas from the Evaporator (see 5 below), compressing it and releasing it as a high pressure, hot gas on the discharge side (approx 75 Degrees Celsius) (Hot due to the addition of the mechanical friction heat energy of the compressor)
2. Condensor. It cools the high-pressure hot gas from the compressor in three stages, turning it into a high-pressure, cooler liquid. The stages are de-superheating, cooling and sub-cooling.
3. Filter drier removes moisture and impurities from the high-pressure, sub-cooled liquid.
4. Metering device. This normally takes the form of a thin capillary tube on fridges and freezers. This very thin tube (typically  $\pm 0.7\text{mm}$  internal dia) ensures that the liquid is under a very high pressure.
5. Evaporator. The liquid, under extremely high temperature due to the thin capillary tube, now expands rapidly into the evaporator, and the huge pressure drop (thin vessel into thick vessel, as well as the suction effect of the compressor, causes it to boil rapidly. This boiling action is taking place at temperatures way below zero degree Celsius, and heat is thus moving from the inside of the fridge, into the evaporator and are thus removed.

LP = Low Pressure (Suction side)

HP= High Pressure (Discharge side)

Arrows indicate direction of refrigerant flow

This process repeats itself *ad infinitum*, until something goes wrong. At the stage where it goes wrong, you need only one number and dial it immediately, 079 868 7954.

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