

UP-TO-DATE LOW-TEMPERATURE TECHNIQUE

Современная низкотемпературная техника

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Most people wouldn't know what to do without a refrigerator, as there are few things that can soothe your parched throat the same way a glass of chilled water does.

Although there were techniques that people used in ancient times to get their fill of cold water, they were certainly not as easy as opening a door at home and taking out a bottle of ice-cold water. Even if they could get cold water to drink, they certainly didn't have anything that could make their food stay fresh for days or even weeks on end.

In the refrigeration cycle, there are five basic components: fluid refrigerant; a compressor, which controls the flow of refrigerant; the condenser coils (on the outside of the fridge); the evaporator coils (on the inside of the fridge); and something called an expansion device [1].

Refrigerator working principle

The working principle of a refrigerator (and refrigeration, in general) is very simple: it involves the removal of heat from one region and its deposition to another. When you pass a low-temperature liquid close to objects that you want to cool, heat from those objects is transferred to the liquid, which evaporates and takes away the heat in the process.

You may already know that gases heat up when you compress them and cool down when they are allowed to expand. That's why a bicycle pump feels warm when you use it to pump air inside a tire, while sprayed perfume feels cold.

An aerosol air freshener feels cold to the touch because the gas is allowed to expand suddenly, which brings down its temperature.

The tendency of gases to become hot when compressed and cold when expanded, along with the help of a few nifty devices, helps a refrigerator cool the stuff being kept inside it.

Parts of a refrigerator. A refrigerator consists of a few key components that play a vital role in the refrigeration process:

Expansion valve. Also referred to as the flow control device, an expansion valve controls the flow of the liquid refrigerant (also known as 'coolant') into the evaporator. It's actually a very small device that is sensitive to temperature changes of the refrigerant.

Compressor. The compressor consists of a motor that ‘sucks in’ the refrigerant from the evaporator and compresses it in a cylinder to make a hot, high-pressure gas.

Evaporator. This is the part that actually cools the stuff kept inside a refrigerator. It consists of finned tubes (made of metals with high thermal conductivity to maximize heat transfer) that absorb heat blown through a coil by a fan. The evaporator absorbs heat from the stuff kept inside, and as a result of this heat, the liquid refrigerant turns into vapor.

Condenser. The condenser consists of a coiled set of tubes with external fins and is located at the rear of the refrigerator. It helps in the liquefaction of the gaseous refrigerant by absorbing its heat and subsequently expelling it to the surroundings.

As the heat of the refrigerant is removed, its temperature drops to condensation temperature, and it changes its state from vapor to liquid.

Refrigerant. Also commonly referred to as the coolant, it’s the liquid that keeps the refrigeration cycle going. It’s actually a specially designed chemical that is capable of alternating between being a hot gas and a cool liquid.

In the 20th century, fluorocarbons, especially CFCs, were a common choice as a refrigerant. However, they’re being replaced by more environment-friendly refrigerants, such as ammonia, R-290, R-600A etc.

Refrigerator function

The refrigerant, which is now in a liquid state, passes through the expansion valve and turns into a cool gas due to the sudden drop in pressure.

As the cool refrigerant gas flows through the chiller cabinet, it absorbs the heat from the food items inside the fridge. The refrigerant, which is now a gas, flows into the compressor, which sucks it inside and compresses the molecules together to make it into a hot, high-pressure gas.

Now, this gas transports to the condenser coils (thin radiator pipes) located at the back of the fridge, where the coils help dissipate its heat so that it becomes cool enough to condense and convert back into its liquid phase. Because the heat collected from the food items is given off to the surroundings via the condenser, it feels hot to the touch [2].

After the condenser, the liquid refrigerant travels back to the expansion valve, where it experiences a pressure drop and once again becomes a cool gas. It then absorbs heat from the contents of the fridge and the whole cycle repeats itself.

Литература

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THE ROLE OF ECONOMICS IN THE LIFE OF THE SOCIETY

Роль экономики в жизни общества

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To begin with we can't but mention that the term "economics" has Greek origin and means the science of economics management. The main purpose is to provide the physical life of the society with material base, which is necessary in all other spheres. We can't imagine the evolution of human society without material production.

Some people confuse the term "economy" with "economics". The first means the economic life of the country with its factories, plants, enterprises, roads, stores, etc. The second is a social science which studies the economy.

The economic sphere is the main sphere of life, it defines the way of all processes. The main factors of production are land with all wealth, labor, which depends on population and its education and capital. Economics may be considered from both sides. On the one hand it is a science that studies the production, distribution, and consumption of goods and services. On the other hand economics is a system of social production, a process of creating material goods necessary for human society for its normal existence and development.

Economics plays an important role in our everyday life. It provides us with material conditions of existence such as food, clothes, accommodation and other goods of consuming. Economic sphere of society is connected with production, spreading, exchange and consuming.

There are three basic questions that every manufacturer should answer: what to produce, how to produce it, and who gets what is produced. An economic system is a way of answering these basic questions.

When we speak about economics we can't but mention the term "economic system of the society". It means single sustainable organizationally-designed relatively-independent materially public complex, within which production, spreading, exchange and consumption are carried out.

There are a lot of economics around the world. Each economics has its own peculiarities, although they all have something in common. There are four main types of economic systems: traditional, command, mixed and market.