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# Review on Water Cooler cum Air Conditioner

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**Abstract:**

This undertaking "WATER COOLER CUM AIR CONDITIONER machine" makes the take a look at of the development of a water cooling system using a everyday air conditioner. The main purpose behind developing this tool is to develop a multifunctional unit which could provide bloodless water at the side of everyday air con cycle. The refrigerant is used as the medium which absorbs and eliminates warmth from the distance to be cooled and in the end rejects that heat elsewhere. This warmness of the refrigerant is used to chill the water, which can be then used for consuming functions. The air cycle is the traditional vapor compression cycle.

**Introduction:**

Any substance capable of soaking up warmness from any other required substance can be used as refrigerant i.E. Ice, water, air or brine. A mechanical refrigerant is a refrigerant so that you can take in the warmth from the supply and deplete the same to the sink or inside the shape of latent heat. The physical properties will permit them to copy constantly a liquid to gasoline and gasoline to liquid transformation. Air become used as a refrigerant in many refrigerant machine in olden days thinking about as most secure refrigerant. Ammonia, carbon dioxide and sulphur dioxide were used for home and commercial purposes .

The refrigerants are classified in to two organizations:

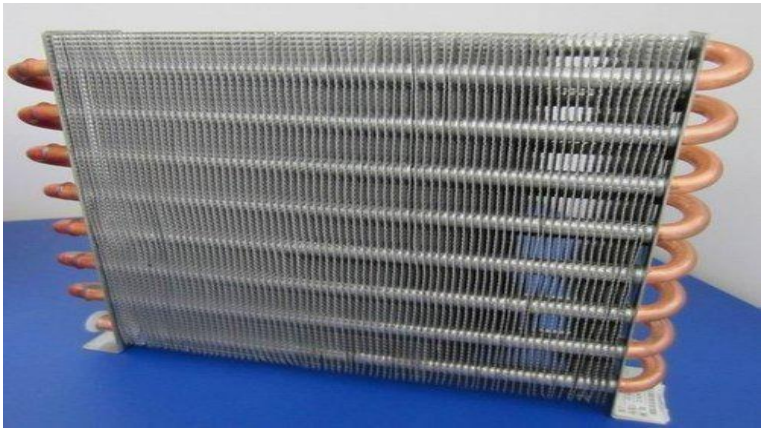
1. Primary refrigerants
2. Secondary refrigerants

Primary refrigerants directly take the element in the refrigerants gadget where secondary refrigerants are first cooled with the help of the primary refrigerants and are similarly used for cooling purpose.

**COMPRESSOR:**

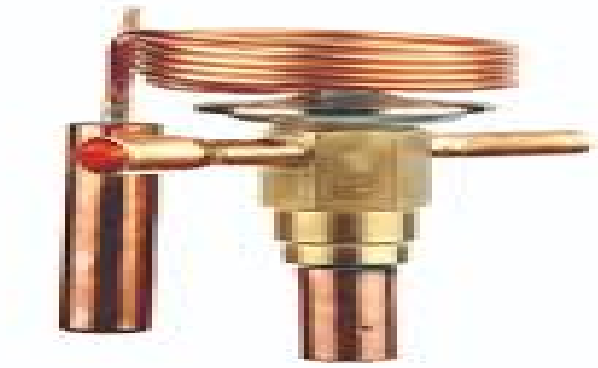
- It's miles the maximum important part of any vapour compression refrigeration gadget and generally costliest.
- It gets rid of low temperature and coffee-strain refrigerant vapours from the cooling coil through the suction line.
- It compresses those refrigerant vapours with the aid of growing the strain and temperature resulting in an growth of boiling factor of the refrigerant,
- It discharges the refrigerant vapours of excessive temperature and stress to condenser via discharge line
- Working Pressure (minimum) 9 Kg. / Sq. Cm.
- No. of stages One (or more)
- Motor Power 200 KW (or more)
- Operating Voltage 3 Phase, 415 V

**Condenser**



- Air condenser used in the residential and small offices applications

**EXPANSION VALVE:**



The basic functions of a selection device used in refrigeration structures are……

- Reduce strain from condenser strain to evaporator pressure.
- The manipulate functions which may additionally contain the supply of liquid to the evaporator at the rate at which it's far evaporated. This determines the performance with which evaporator floor is applied.
- It controls the mass drift fee of refrigerant consistent with the burden on the evaporator.
- Decrease the stress and temperature of flowing refrigerant
- In this process we use the Thermostatic expansion valves.

**EVAPORATOR:**

- The evaporator is a heat transfer machine, and is that part of a refrigeration cycle wherein liquid refrigerant is evaporated for the cause of getting rid of heat from the refrigerated area or product.
- Chargeable for absorbing warmth into the refrigeration gadget
- The evaporator is maintained at a temperature that is decrease than the medium being cooled
- The ability of any evaporator or cooling coil is the charge at which warmness will skip via the evaporator partitions from the refrigerated area to the vaporizing liquid
- Removes both latent and practical heat from the air within the refrigerated box
- Latent heat is inside the shape of moisture.
- Realistic warmness reduces air and product temperature.
- Power supply 230 V, AC, 50 Hz
- Temperature accuracy ± 2°C
- Condenser support Yes

**WATERTANK:**

A water tank in a refrigerator is used to provide cold water. A few things to do not forget whilst buying a water tank encompass:

- Fabric: Water tanks can be made from materials like stainless steel and polyurethane.
- Dimensions: make certain the tank's dimensions match the to be had area.
- Difficult water: in case you stay in an area with difficult water, the tank and heating element cloth have to be taken into consideration. Hard water incorporates high stages of calcium and magnesium, that may purpose scaling.
- The size of the water tank is 10 liters.
- It is non-corrosive.
- Two taps are connected

**Outdoor unit**

- Nominal Capacity: 1 ton
- Electricity in put: 230V/50Hz/Single Phase
- Outdoor unit: Less than 55 dB
- Compressor: rotary type
- Body surface finish: powder coated/high quality paint finish
- Air filtering unit: Activated carbon cartridge, dust proof and anti-bacteria filter


**MOTOR:**

Rated power 3hp

Supply voltage 230volts

Rated speed 900 rpm

Rated frequency 45 Hz

Household fridges typically use a single-segment induction motor to strength the compressor. This motor is brushless, capacitor start/induction run, and "squirrel cage type".

The compressor is the "heart" of a fridge. It circulates refrigerant throughout the machine, adds strain to the nice and cozy a part of the circuit, and makes the refrigerant warm. The evaporator-fan motor powers the fan

that circulates bloodless air inside the fridge. Evaporator fan failure stops the refrigerator from cooling while the freezer nevertheless works.

**WORKING:**

- There may be a sequence of operations in the Experiment the refrigerant we used in this Test is F-22 it also referred to as as R-22 the Chemical formulation is two.
- This refrigerant compressed inside the centrifugal Compressor where the friction is less since there's No sliding elements in it. There is no vibrations in These sorts of compressor. It compresses the Refrigerant, to growth the pressure of the Refrigerant which makes the refrigerant to skip all Over the gadget.
- The F-22 refrigerant is compressed more than the Ultimate refrigerants. The process is based on Vapour compression refrigeration cycle. The Refrigerant is compressed in compressor after which Moves into condenser where the warmth is absorbed, Then, from the condenser it actions into enlargement Valve where the refrigerant is going to expand.
- The section of the refrigerant changes in this Technique from vapour state to liquid country. From the Growth valve it enters to evaporator and section Exchange takes place from liquid state to vapour nation. Than the refrigerant is surrounded.

- The copper tube is surrounded to water tank Thru which the refrigerant passes. It makes use of The 25% of the refrigerant to cool the water and The final 75% of the refrigerant impact Utilized by the air conditioner wherein the Refrigerant passes thru the cooling coil.

- The motor fan is placed again of the coiling coil Which blows the air and offers cooling impact. Then the refrigerant is going in to the outdoor unit. This cycle maintains on persevering with and it makes 50 Cycles in step with minute.

**CONCULUSION:**

- Through using a water cooler and air cooler as a room cooler you may shop 80% of the power ate up via a 1.Five ton wall AC. Except, this test can be utilized in cooling rooms, offices and halls and also cools water becomes a universally everyday option in India too.
- Depending on specific situations, this run parallel to, compete with or maybe update air con device. While that takes place the fee of water cooling and aircon devices will come down dramatically.

- On the basis of this test i have found that a water cooler that cools ten liters of water down to 8C in an hour can be a perfect room cooler to bring the temperature of room air through 18C for a room of about 12 sq. Ft.
- The sag is that for the prevailing a water cooler of that capability may want to cost a packet, approximately Rs.12,000 and its air con attachment every other Rs.20,000. In a specially made design the blended unit should now not fee greater than Rs.18,000. Due to the fact its walking fee in phrases of energy used is most effective 10% of the wall AC, the common place guy would decide on it any day.

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