

VACUUM REFRIGERATION SYSTEM FOR DOMESTIC APPLIANCE

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ABSTRACT

Our purpose of introducing this product to implementation of this idea to the market or develop secondary option instead of AC. To use this system at residential or commercial level not as Air conditioning system but as cooling system. From the researches we have found that in future the demand of Air conditioning will increase because of pollutants. But in our system the treatment of air quality can't be done. So, to make a system advanced cost will also increase. And from the researches in future industries will try to provide a cooling effect with less cost and greater benefits electricity bills.

KEY WORDS

Refrigeration, Vacuum Gauge, Vacuum Pump, Vacuum Refrigeration

1. INTRODUCTION

This project is based on principle of steam jet refrigeration cycle. Vacuum is generated in our arrangement inside insulated vacuum chamber by use of a vacuum pump. Water in the insulated vacuum chamber will be cooled because it's saturation temperature will decrease and its heat will be utilized in phase transformation now, this chilled

water will be passed to evaporator which is located in the conditioned space. The warm water from evaporator is again sent to the storage tank. Day by day temperature of our surrounding is increasing, summer season is getting longer and so demand of refrigeration and air conditioning system is going to high level. Vapor compression refrigeration system is refrigeration system available in market today. Price of Air conditioners working on vapor compression refrigeration system starts from around 25000 rupees. Every person in our country cannot afford these costly air conditioners so we developed a new refrigeration system called vacuum refrigeration system. Vacuum refrigeration system for domestic application is project carried out for developing a new and affordable method of refrigeration for domestic application purpose. Principle used in this system is quite similar to principle of steam jet refrigeration system. This method of refrigeration is completely innovative and is designed for our Indian market.

2. DESIGN CONSIDER

VRDA system is an idea to establish an easier way of providing refrigeration and comfort in future.

So, as mentioned above to execute the idea many aspects, economic and design considerations should be involved.

Some general requirements of any system are:

Strength and load carrying capacity of the system.
Safety of the system and safety to the worker.
Easy to develop and manufacture.
Easy to locate system and easy to use.
System should be economical and beneficial to compare others.

Size and specification.

As we discussed above to make the system easier and compatible. we must have to take care of these things. So, it would be easy to implementation of the idea.

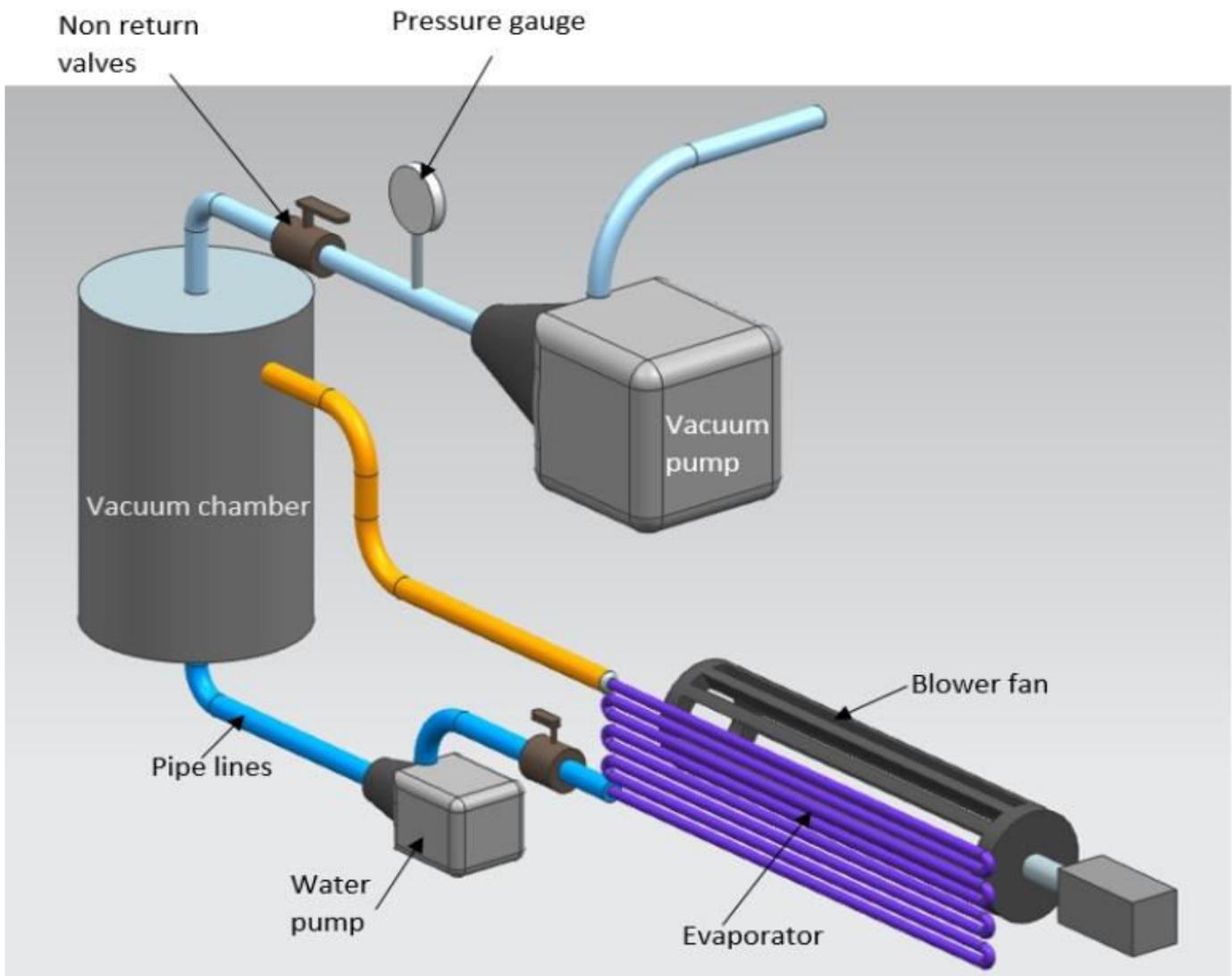


Figure 2.1 Vacuum Refrigeration System

3. WORKING

- ✧ As vacuum pump is started its start to suck the air from the insulated vacuum chamber and creating low pressure in insulated vacuum chamber.
- ✧ vacuum in the insulated vacuum chamber is brought down up to 0.01 bar and so, saturation temperature of the chamber reaches down approximate at 6 °C.
- ✧ vacuum is controlled inside the insulated vacuum chamber with help of the regulation valve.
- ✧ As the saturation temperature of the water is at around 6°C the water is start boiling inside the insulated vacuum chamber at the 6°C temperature because the temperature of the water is around at 25°C so now its emit its heat to the insulated vacuum chamber environment.
- ✧ As water emits heat to the insulated vacuum chamber environment the temperature of the water is brought down to the near 6°C and water gets cold.
- ✧ Cold water of insulated vacuum chamber is circulated to evaporator via water pump.
- ✧ Surrounding confined space has temperature of 30°C so that due to temperate difference of the water and surrounding heat transfer will take place.
- ✧ Now the water is at low temperature and the surrounding is at the high temperature so the heat transfer will take place from surrounding to the water.
- ✧ The water is circulated in the evaporator coil so there will be some loss because of evaporator coil.
- ✧ At the end due to different losses the temperature of the water will rise up to certain level.
- ✧ Now that water is circulated through whole evaporation system.
- ✧ Now air is passes over the evaporating coil so now that air cool down due to evaporating cooling.
- ✧ Now that cool air will go and will mix with through surrounding air.

- ✧ Now surrounding air is at high temperature comparatively cool air from the evaporator.
- ✧ Because of the temperate difference the heat transfer will take place to the surrounding air to the evaporator cool air.
- ✧ Hence heat transfer will take place surrounding air will give its heat energy to the evaporation cool air.
- ✧ As surrounding air will give its heat energy to the evaporation cool air surrounding air will cool down and evaporation air will heat up and this process will give relative cooling.
- ✧ Blower fan circulates the air over evaporator coil so that forced convection takes place more heat transfer occurs and more eat transfer rate means more rapidly cooling and more human comfort.
- ✧ After the all process water will exit from the evaporator outlet and discharge to the insulated vacuum chamber again.

4. COOLING CAPACITY OF THE UNIT:

The cooling capacity of unit depends on a variety of factors:

- ✧ The average size of house or space where it will be used.
- ✧ Number of rooms in house.
- ✧ Amount of people in house.
- ✧ How many windows and doors are there and how many time it opens and closes in a day.
- ✧ If the house is very large then more cooling power is required. Air conditioning units are measured in British thermal units which is the amount of heat and also be measured in tons.

5. CONCLUSION

A vacuum refrigeration system is developing and designed with the considerations of room eat load, vacuum pump power and pumping speed. Vacuum cooling is the new concept and it is emerging now. So the system of refrigeration with vacuum is widespread and familiar in the near future.

6. REFERANCE

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