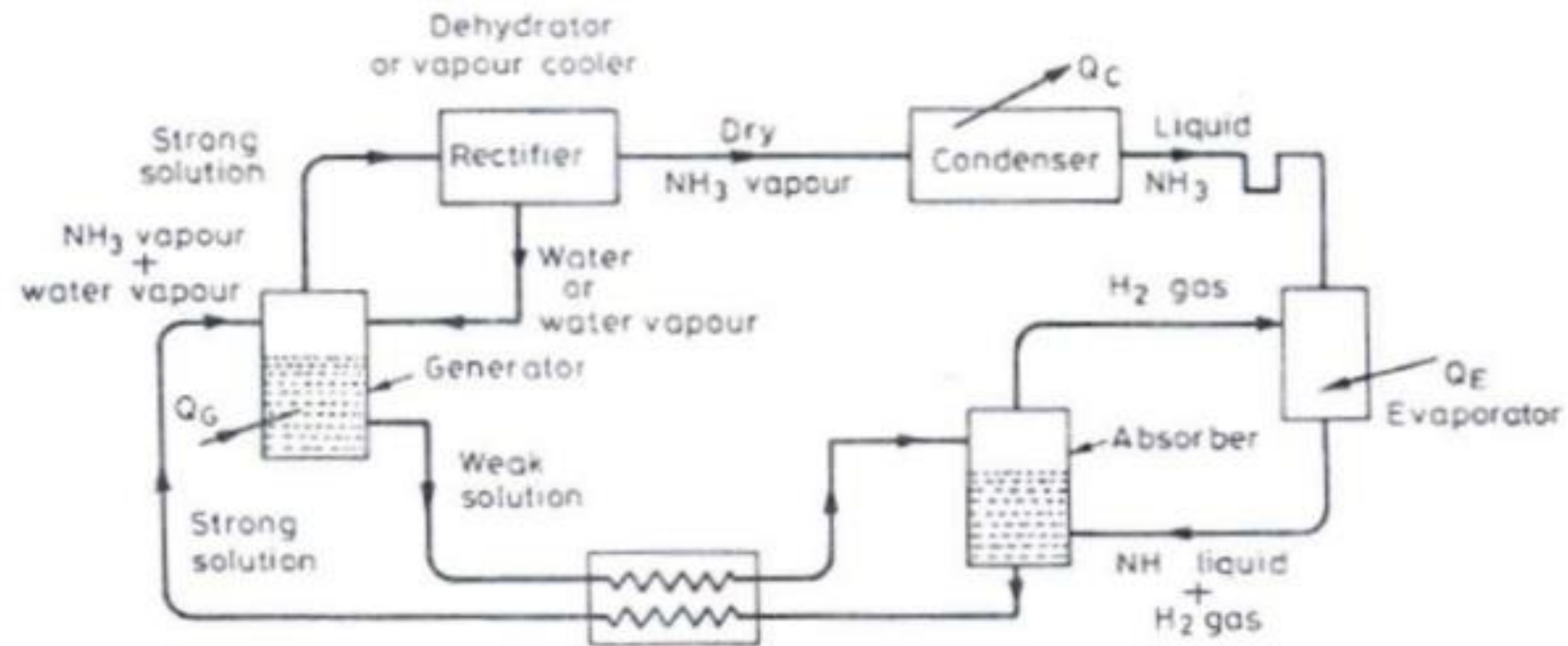


Title : Vapor Absorption Refrigeration System

Date: 28/03/2020

Name of Faculty: Mr. Samik Bhatt & Mr. Hiren Mahida

Lecture No : 31 (6th Sem. ME)



P_c = Condenser pressure = NH_3 pressure

P_e = Evaporator pressure = Partial pressure of H_2 gas + Partial pressure of NH_3

Strong solution → contains as much NH_3 as possible

Weak solution → contains considerably less NH_3 .

Advantage of Three-Fluid

- Silent operation
- Cost effective
- Balanced pressure
- No need of valve
- No lubrication problem
- Less maintenance

Introduction:

- The compressor is replaced by an absorber, a pump, a generator and a pressure reducing valve.
- In this system, the vapour refrigerant from the evaporator is drawn into an absorber where it is absorbed by the weak solution of the refrigerant forming a strong solution.
- This strong solution is pumped to the generator where it is heated by some external sources.
- During the heating process, the vapour refrigerant is driven off by the solution and enters into the condenser where it is liquefied. The liquid refrigerant then flows into the evaporator and thus the cycle is completed.

Comparison of VAR and VCR

Compression systems	Absorption systems
Work operated	Heat operated
High COP	Low COP (currently maximum ≈ 1.4)
Performance (COP and capacity) very sensitive to evaporator temperatures	Performance not very sensitive to evaporator temperatures
System COP reduces considerably at part loads	COP does not reduce significantly with load
Liquid at the exit of evaporator may damage compressor	Presence of liquid at evaporator exit is not a serious problem
Performance is sensitive to evaporator superheat	Evaporator superheat is not very important
Many moving parts	Very few moving parts
Regular maintenance required	Very low maintenance required
Higher noise and vibration	Less noise and vibration
Small systems are compact and large systems are bulky	Small systems are bulky and large systems are compact
Economical when electricity is available	Economical where low-cost fuels or waste heat is available

Questions

- Explain the working of Water ammonia vapor absorption Refrigerator System.
- Explain the advantages of Three Fluid Refrigeration.
- Give the comparison of VARS with VCRS.