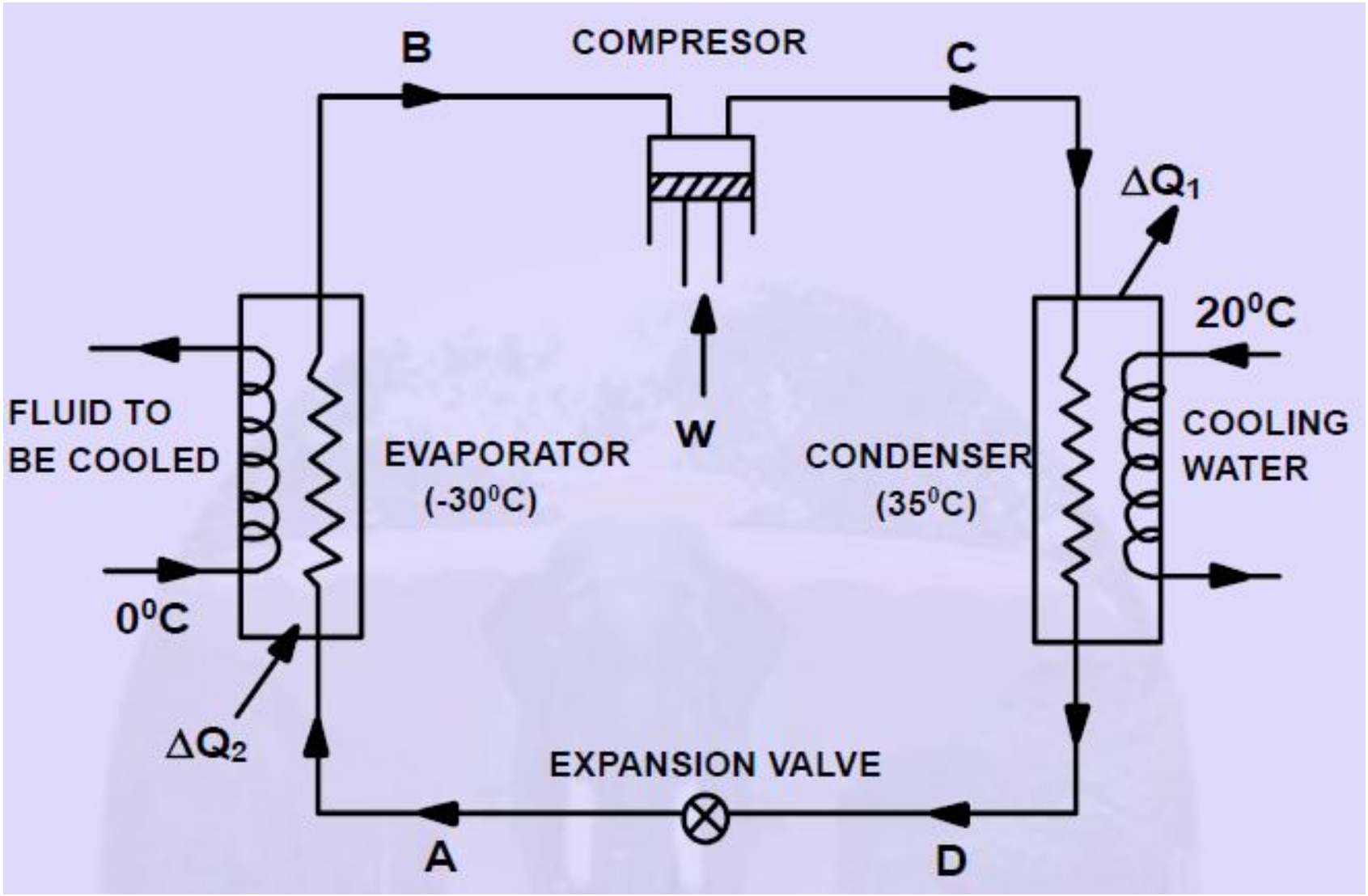
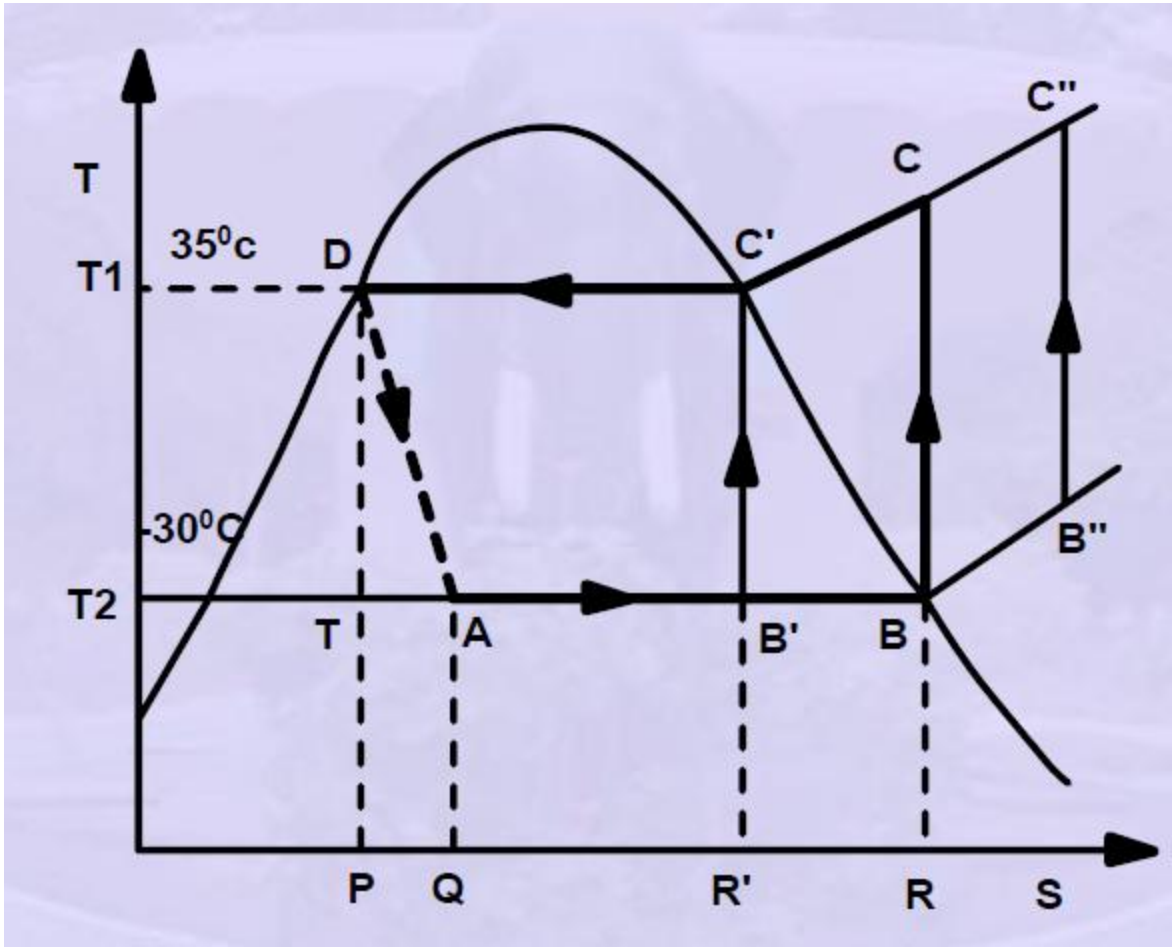
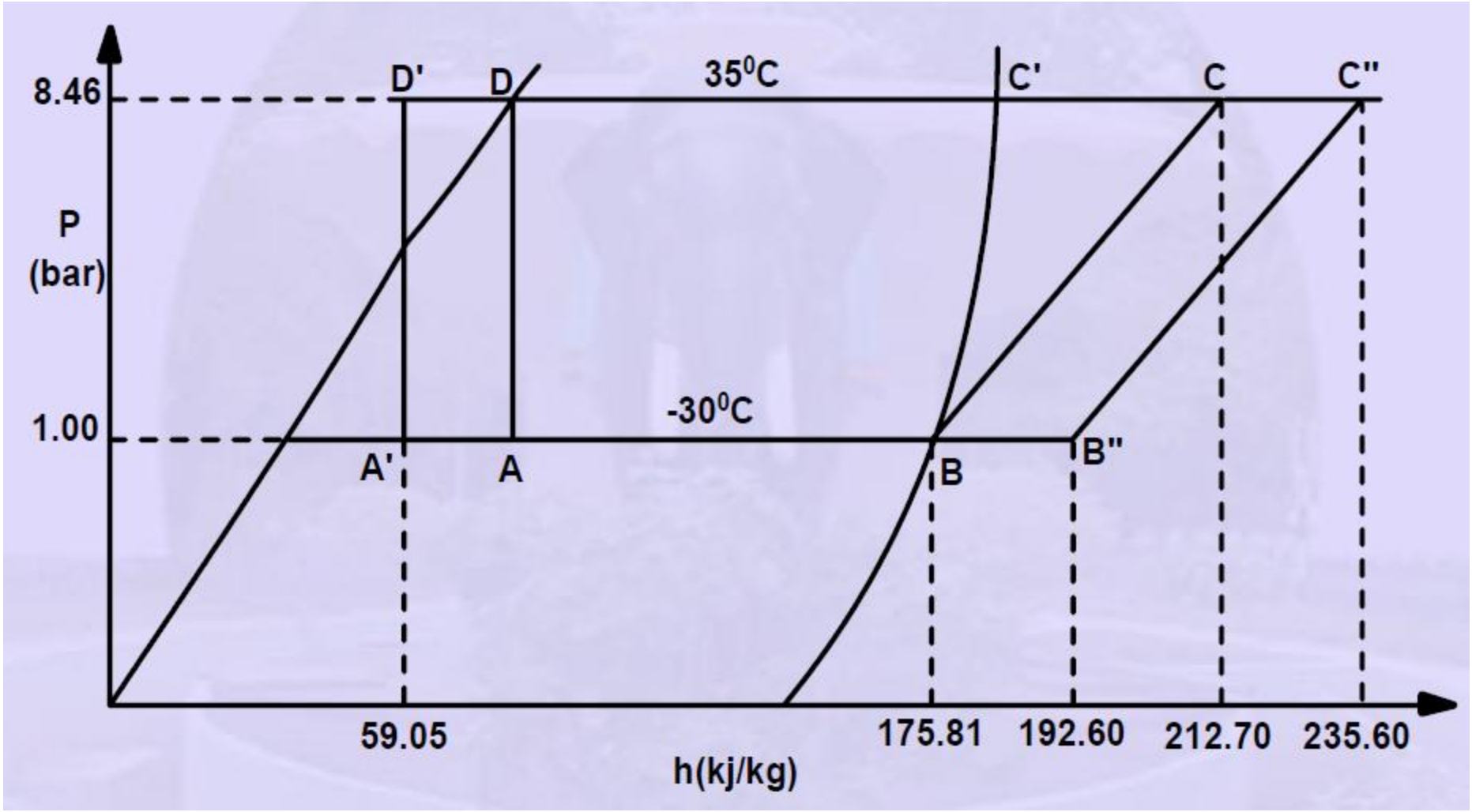
Vapor Compression System



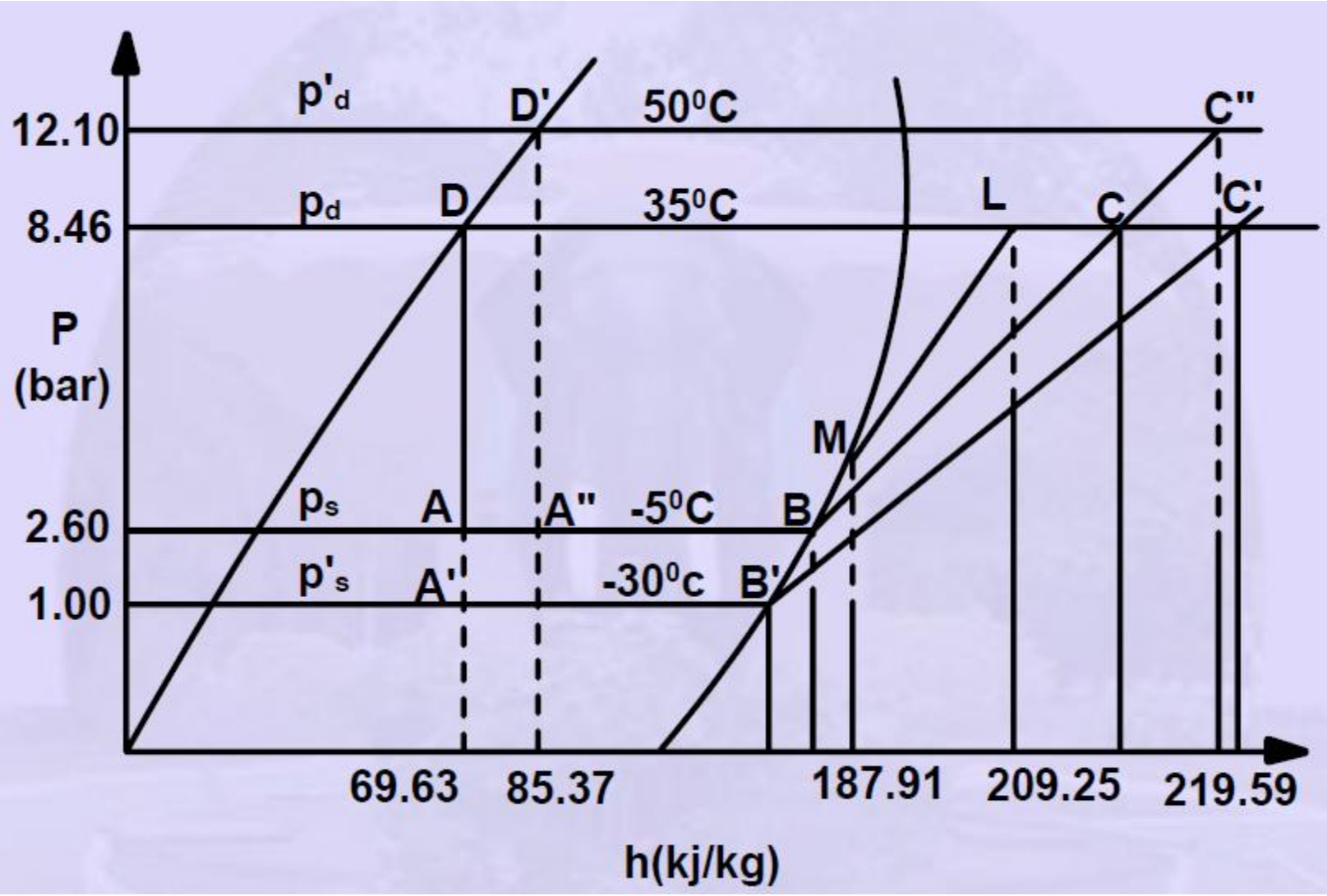
Vapor Compression Systems (T-s diagram)



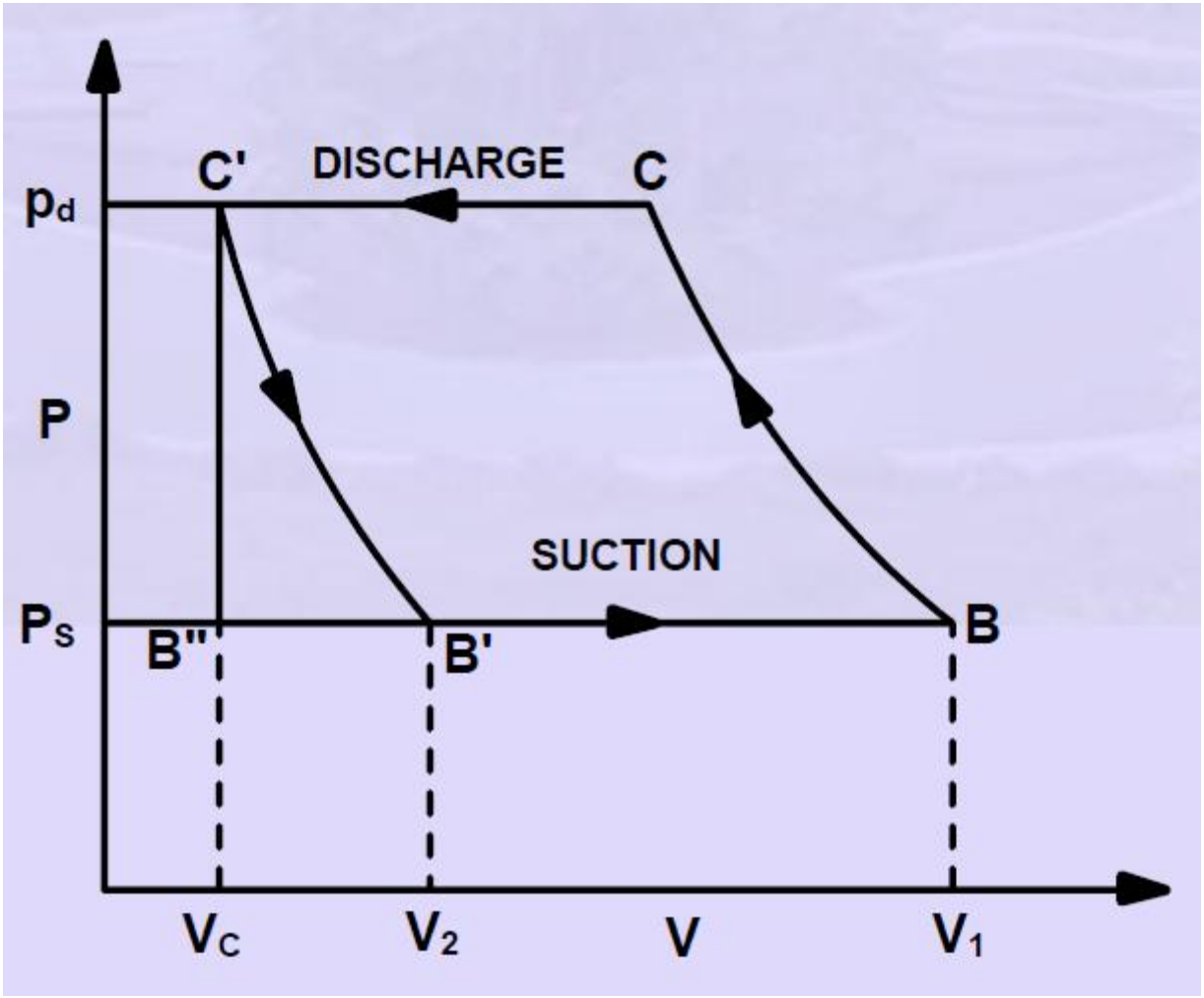
Effects of Subcooling and Superheating



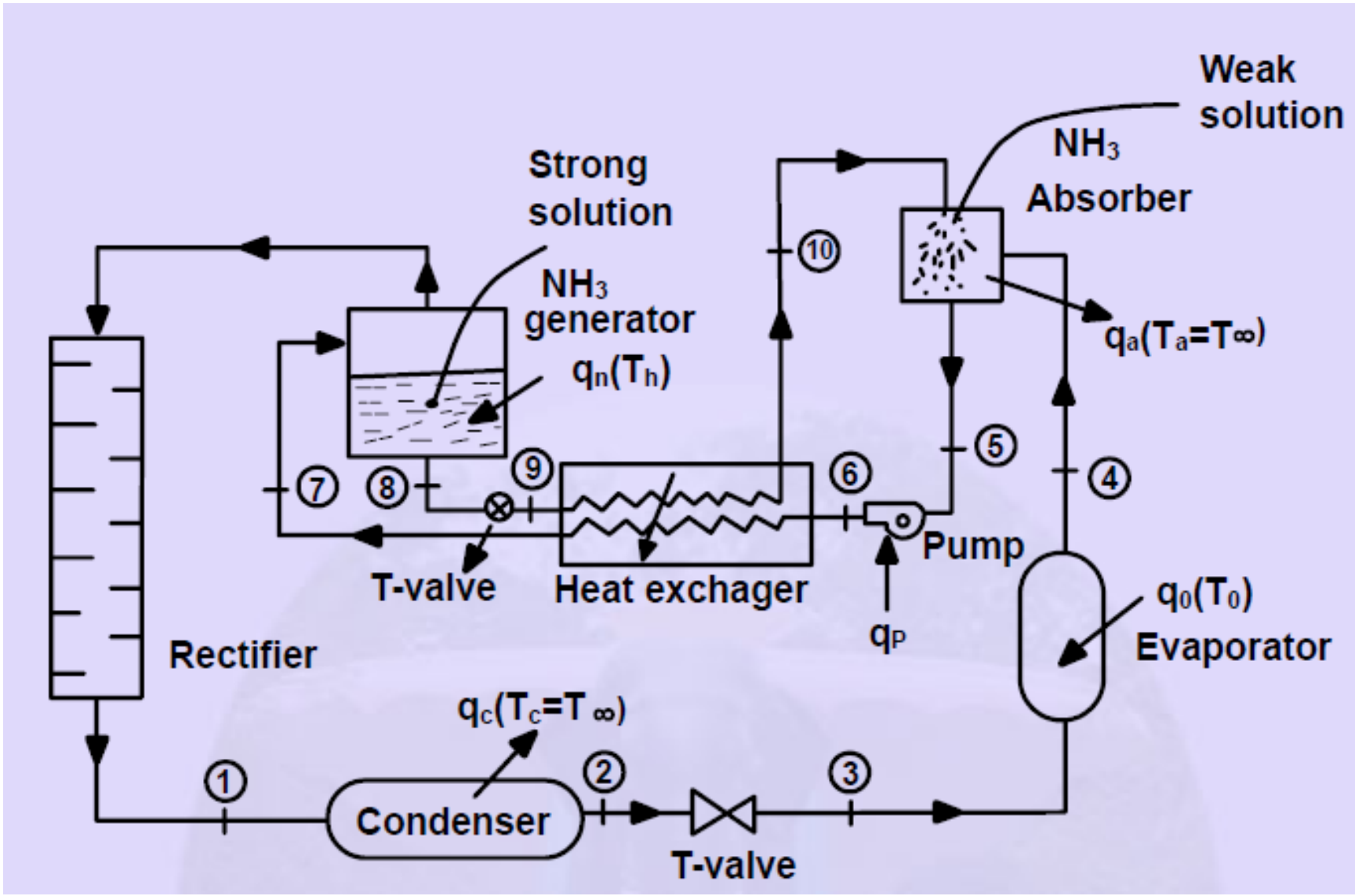
Effects of Suction and Discharge Pressure



Effect of Volumetric Efficiency



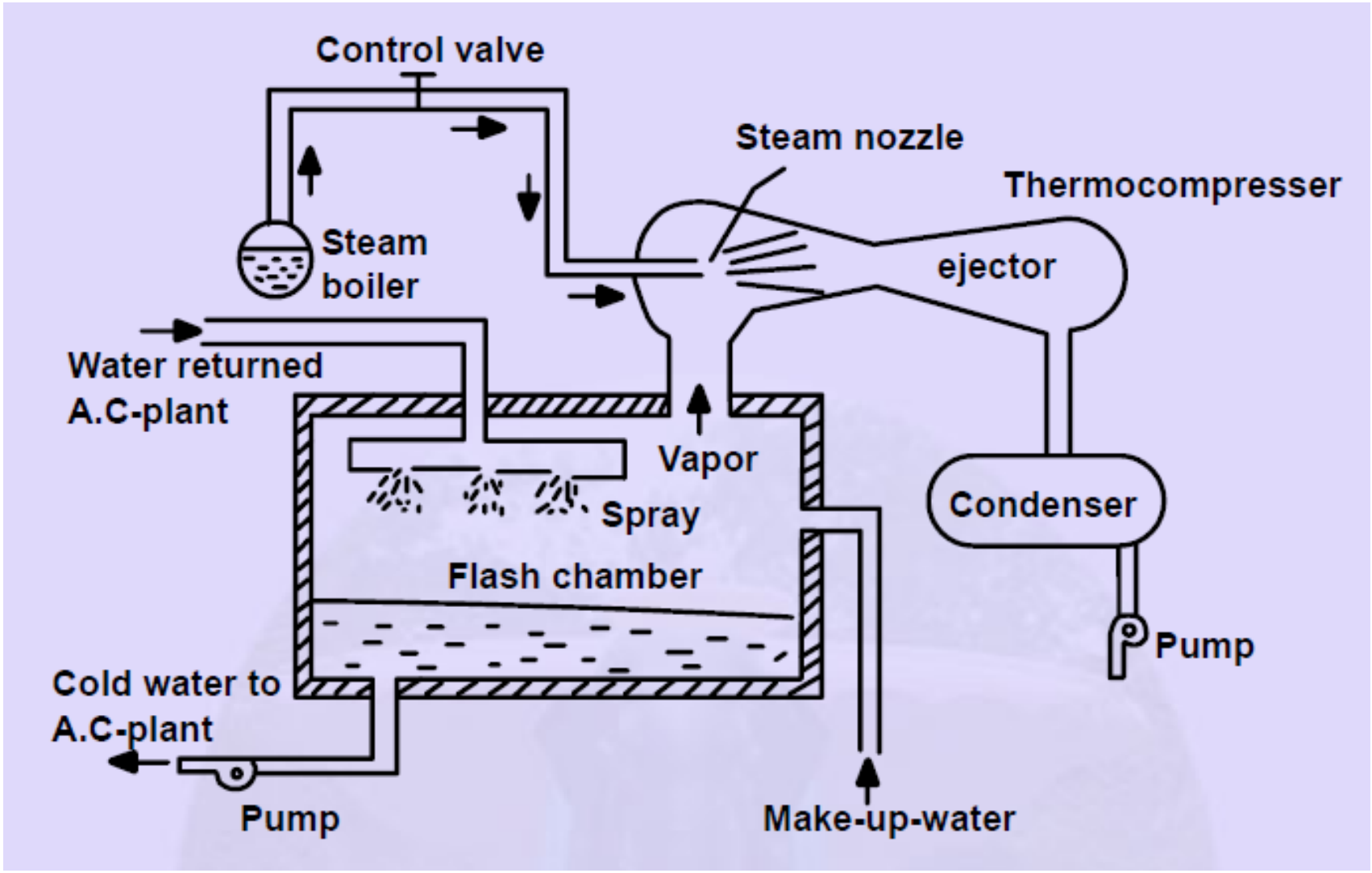
Vapor Absorption Cycle



Comparison between Vapor Compression and Absorption system:

Absorption system	Compression System
a) Uses low grade energy like heat. Therefore, may be worked on exhaust systems from I.C engines, etc.	a) Using high-grade energy like mechanical work.
b) Moving parts are only in the pump, which is a small element of the system. Hence operation is smooth.	b) Moving parts are in the compressor. Therefore, more wear, tear and noise.
c) The system can work on lower evaporator pressures also without affecting the COP.	c) The COP decreases considerably with decrease in evaporator pressure.
d) No effect of reducing the load on performance.	d) Performance is adversely affected at partial loads.
e) Liquid traces of refrigerant present in piping at the exit of evaporator	e) Liquid traces in suction line may damage the compressor.

Steam Jet Refrigeration Cycle



Advantages:

a) *It is flexible in operation; cooling capacity can be easily and quickly changed.*
b) *It has no moving parts as such it is vibration free.*
c) *It can be installed out of doors.*
d) *The weight of the system per ton of refrigerating capacity is less.*
e) *The system is very reliable and maintenance cost is less.*
f) *The system is particularly adapted to the processing of cold water used in rubber mills,, distilleries, paper mills, food processing plants, etc.*
g) *This system is particularly used in air-conditioning installations, because of the complete safety of water as refrigerant and ability to adjust quickly to load variations and no hazard from the leakage of the refrigerant.*

Disadvantages:

a) *The use of direct evaporation to produce chilled water is usually limited as tremendous volume of vapor is to be handled.*
b) *About twice as much heat must be removed in the condenser of steam jet per ton of refrigeration compared with the vapor compression system.*
c) *The system is useful for comfort air-conditioning, but it is not practically feasible for water temperature below 4^0C.*