



SNS COLLEGE OF TECHNOLOGY

**An Autonomous Institution
Coimbatore - 35**

Accredited by NBA – AICTE and Accredited by NACC – UGC with 'A+ Grade
Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai.

DEPARTMENT OF FOOD TECHNOLOGY

19FTT101 Fundamentals of Food Processing

I – YEAR II SEMESTER

UNIT III TYPES DRYERS

TOPIC – Heat Pump Dryer

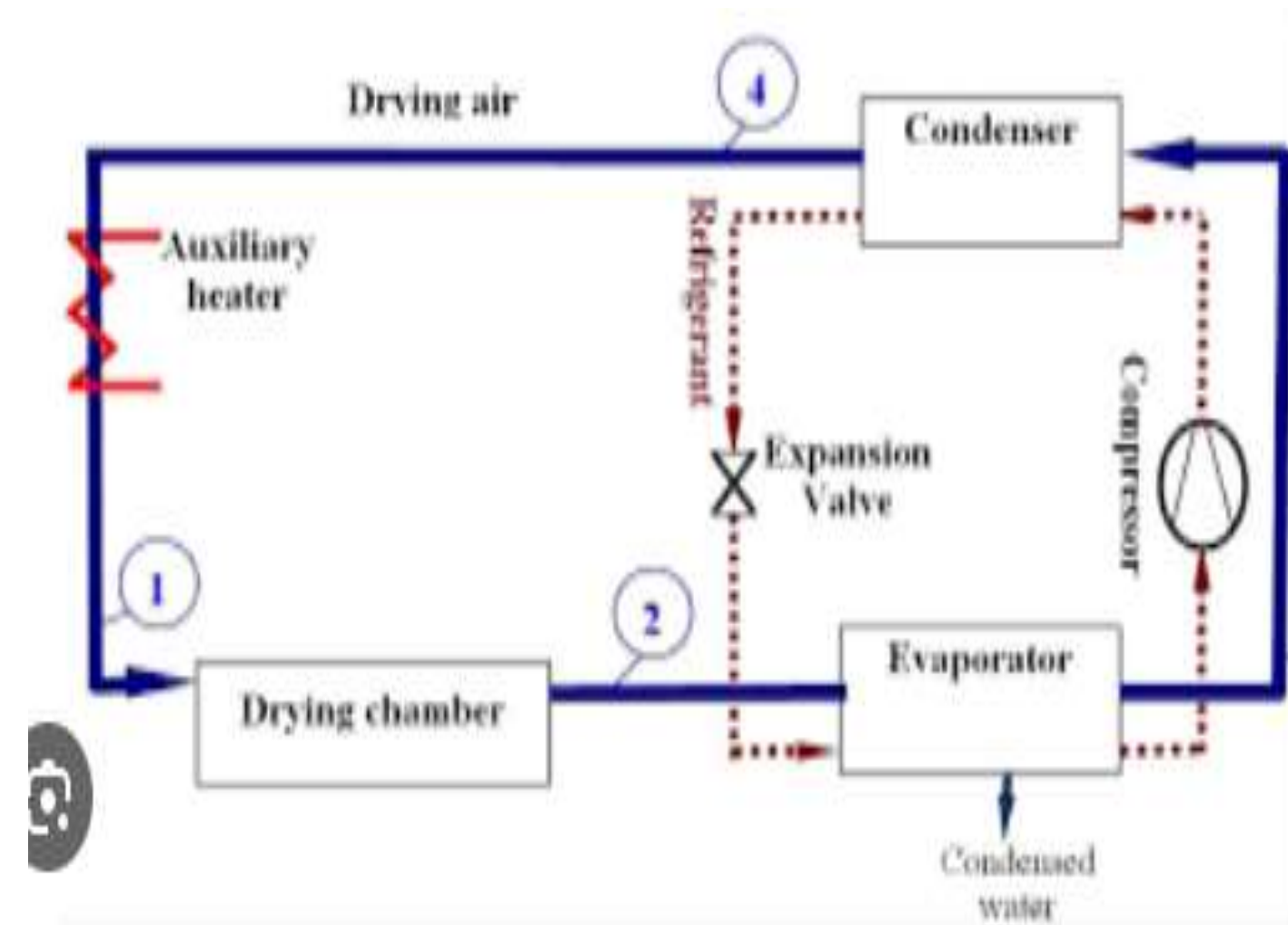


Heat Pump Dryer

- Heat pump drying technology is based on the thermodynamic principle of the refrigeration cycle. The technology uses a heat pump to transfer heat from the surrounding air to the drying material.

Heat pump system consists of four main components:

- **The Compressor,**
- **Condenser,**
- **Evaporator, and**
- **Expansion valve.**

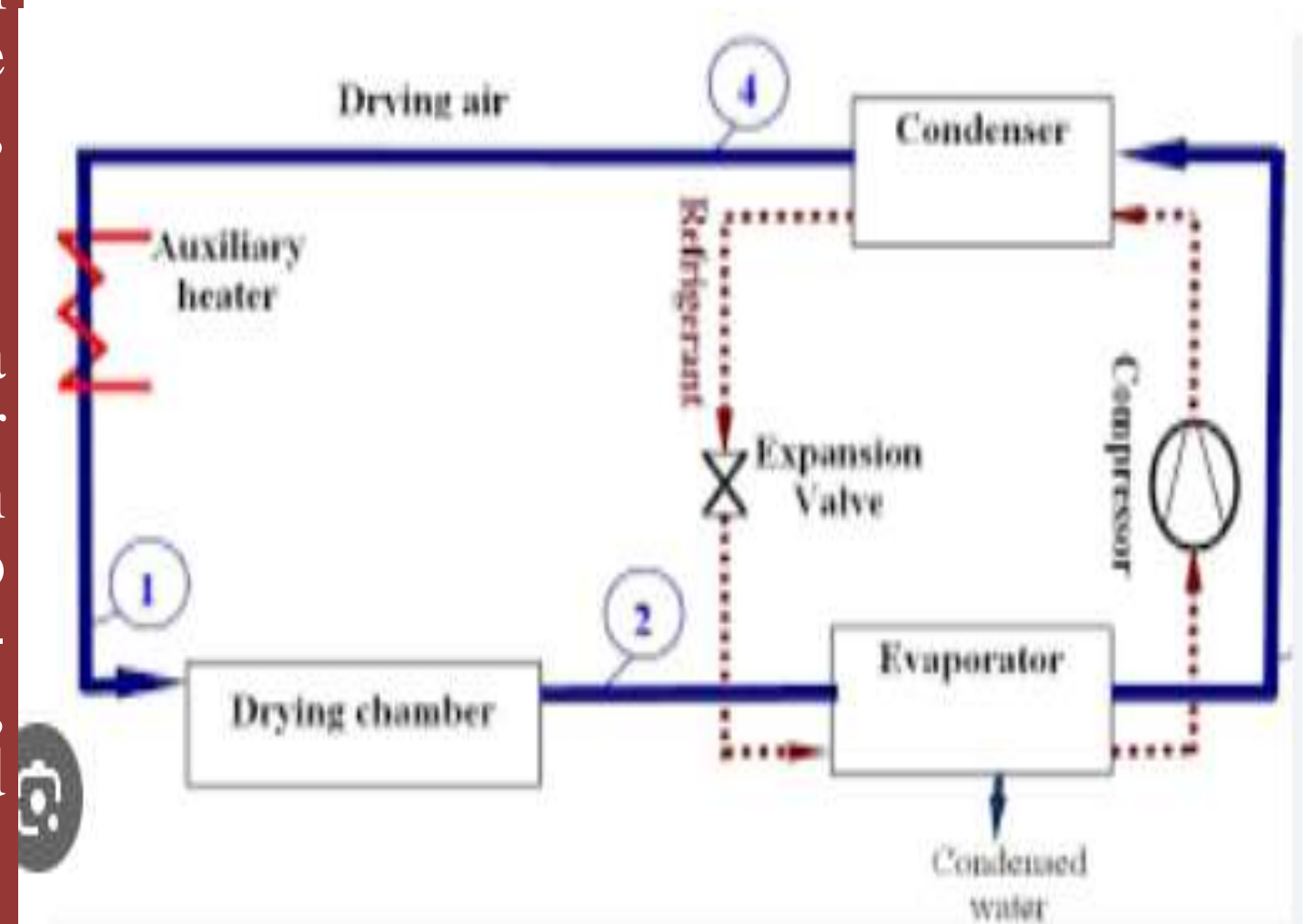




Heat Pump Dryer



- Air is drawn into the heat pump system using a fan, and it passes through an evaporator where it absorbs heat from the drying material. The compressor then compresses the low-pressure, low-temperature gas from the evaporator, causing its temperature and pressure to increase.
- The hot, high-pressure gas is then passed through a condenser, where it releases its heat to the surrounding air or water. The high-pressure gas is then passed through an expansion valve, where its pressure is reduced, causing it to cool down and turn into a low-pressure gas. The low-pressure gas is then passed through the evaporator again, where it absorbs more heat from the drying material, and the cycle repeats.





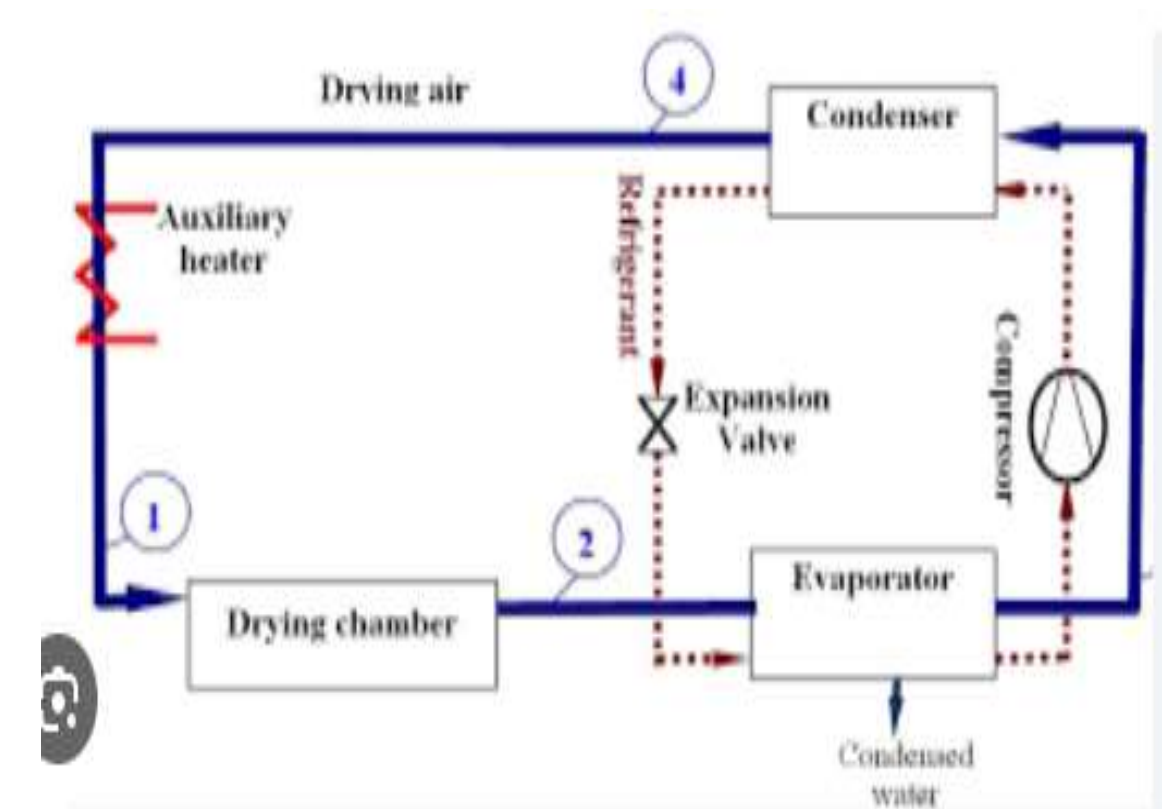
Heat Pump Dryer



- **Types of Heat Pumps**

Two main types:

- ❖ air-to-air heat pumps and
- ❖ air-to-water heat pumps.
- Air-to-air heat pumps are the most commonly used heat pumps in heat pump drying technology. They use air as both the heat source and heat sink, with the heat being transferred between the drying material and the surrounding air. Air-to-air heat pumps are suitable for drying materials with low moisture content, such as grains and seeds.
- Air-to-water heat pumps, on the other hand, use water as the heat sink instead of air. The heat from the drying material is transferred to the water, which is then circulated to a cooling tower or a heat exchanger to dissipate the heat. Air-to-water heat pumps are suitable for drying materials with high moisture content, such as fruits and vegetables.





Heat Pump Dryer





Heat Pump Dryer



Working:

<https://youtu.be/IWqNmOLHwt0>



THANK YOU