



SNS COLLEGE OF TECHNOLOGY

**An Autonomous Institution
Coimbatore - 35**

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DEPARTMENT OF FOOD TECHNOLOGY

19FTT101 Fundamentals of Food Processing

I – YEAR II SEMESTER

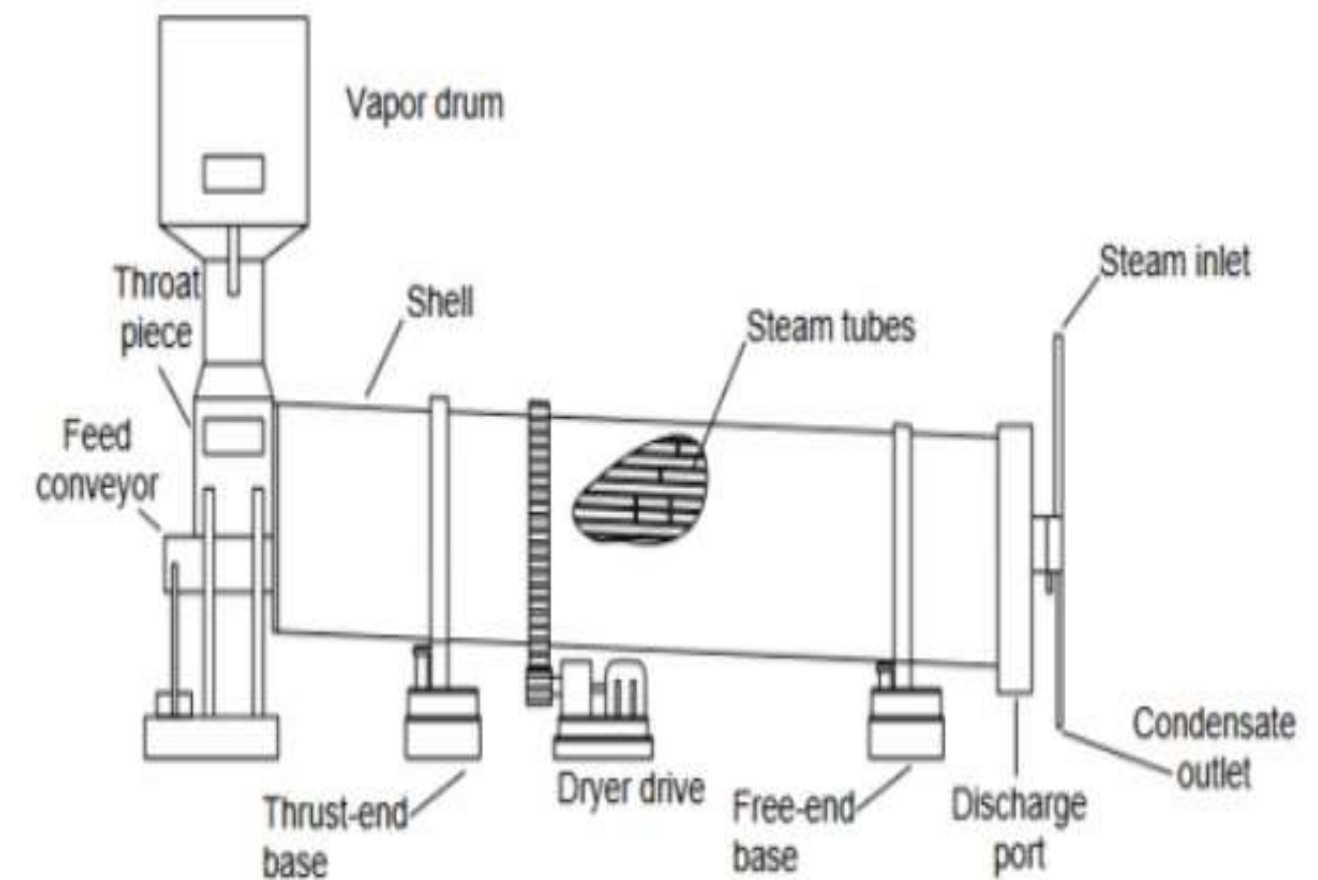
UNIT III TYPES DRYERS

TOPIC – Rotary Dryer & Vacuum Dryer.



Introduction

- Rotary dryers are one of the most common types of industrial dryer, utilised for large quantities of material with particles of size 10 mm or larger.
- Rotary dryer - cylindrical shell - steel plates - inclined (10 to 50) horizontal to assist the transportation of the wet material fed for the processing.
- Shell is typically 0.3-5 m in diameter.
- 5-90 m in length and rotating at 1-5.
- Wet material is fed into the upper end of dryer and the material travels through it by virtue of rotation and slope of the shell and dried product is picked as the lower end.
- The feed rate, speed of rotation of shell, the volume of heated air or gases, and their temperature are so regulated such that by the time material reaches to discharge point of rotary dryer it's accurately dried.

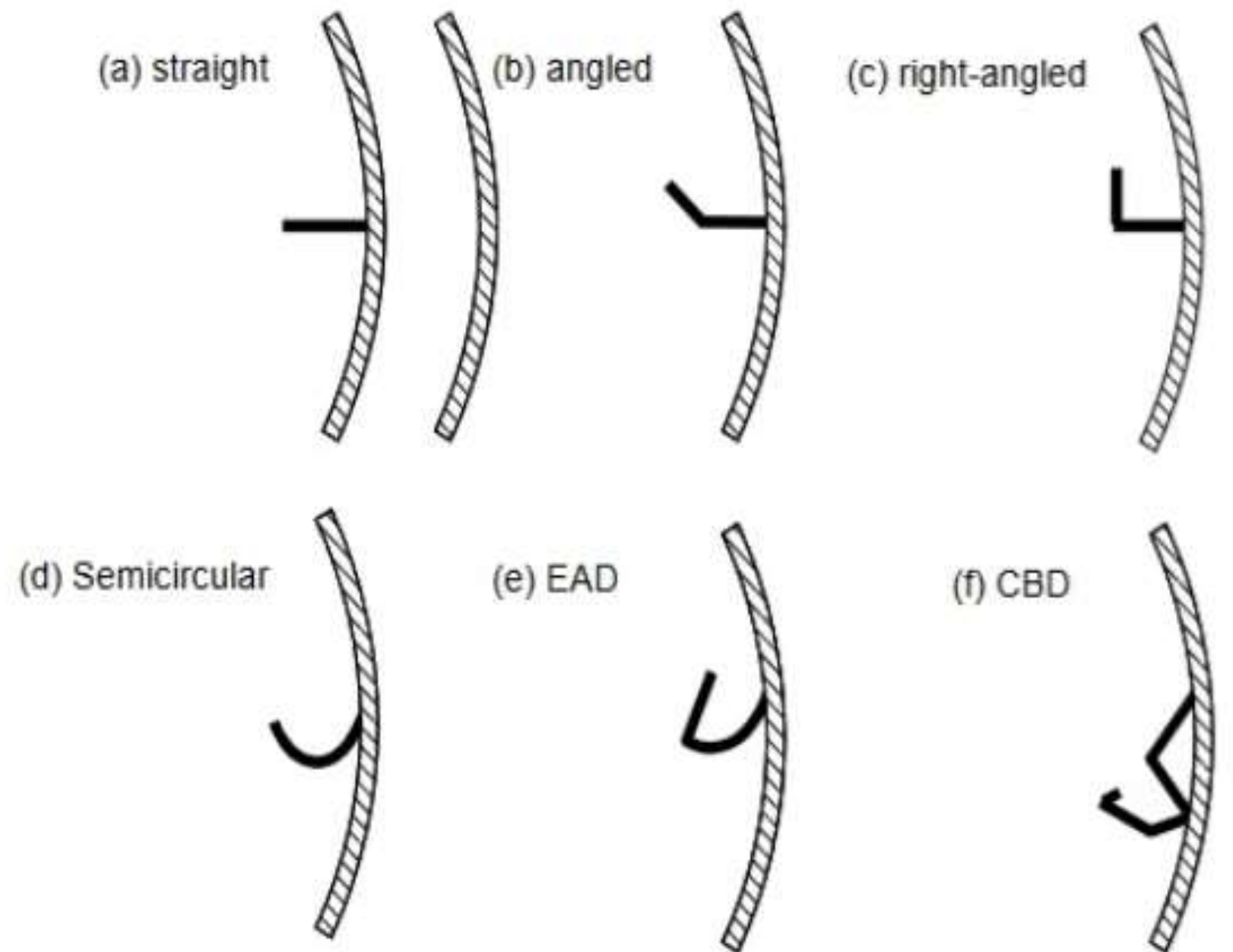




Components



- Rotary dryer performs due role in complete drying process, 1) as a conveyor, carrying/ moving material from feed end to discharge end 2) as heating/ drying device. Movement of material within the dryer is influenced by the lifting, cascade action, sliding and bouncing.



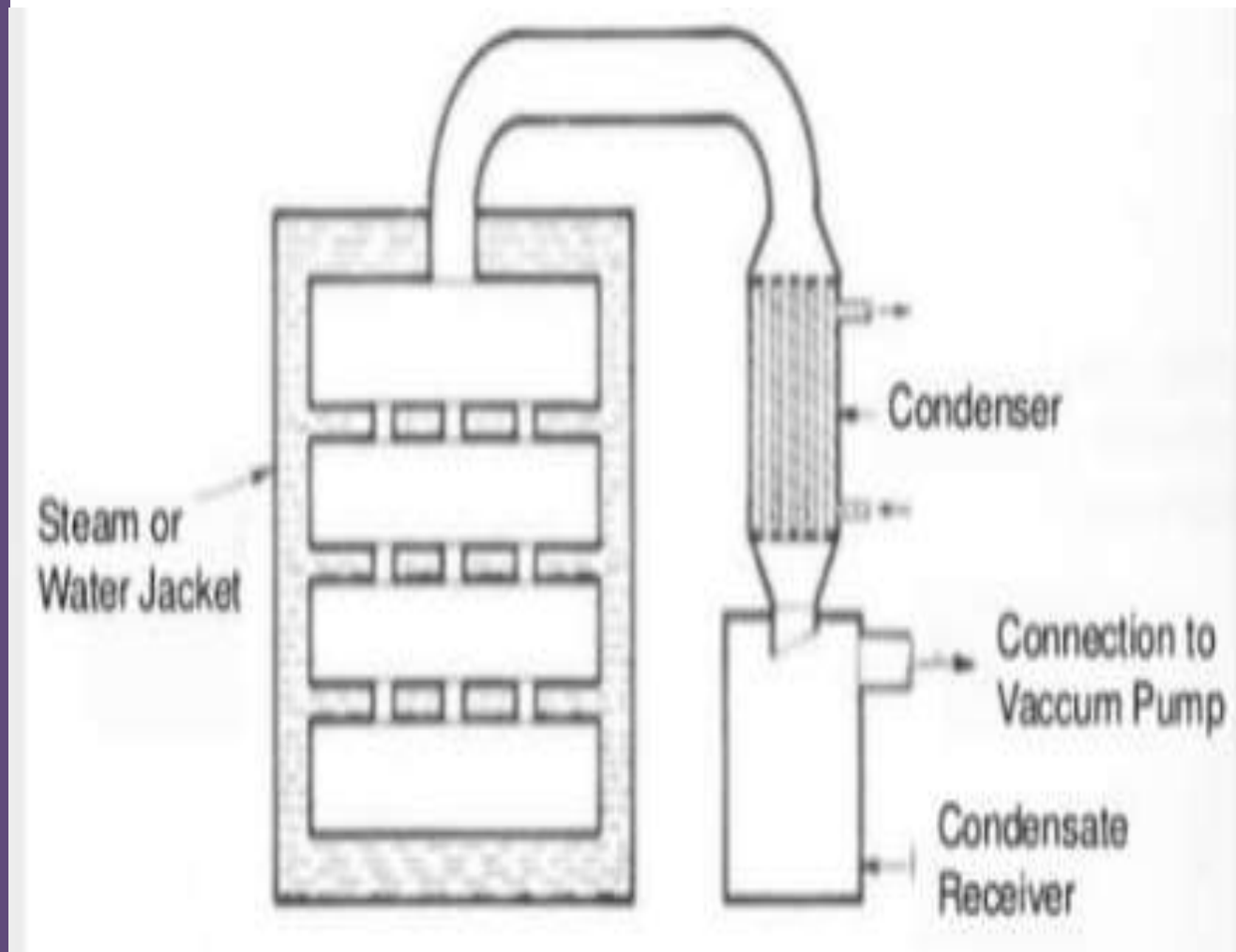


Vacuum Dryer



Principle

- Vacuum drying is generally used for the drying of substances which are hygroscopic and heat sensitive, and is based on the principle of creating a vacuum to decrease the chamber pressure below the vapor pressure of the water, causing it to boil.
- Hence, water evaporates faster, and the rate of drying increases.



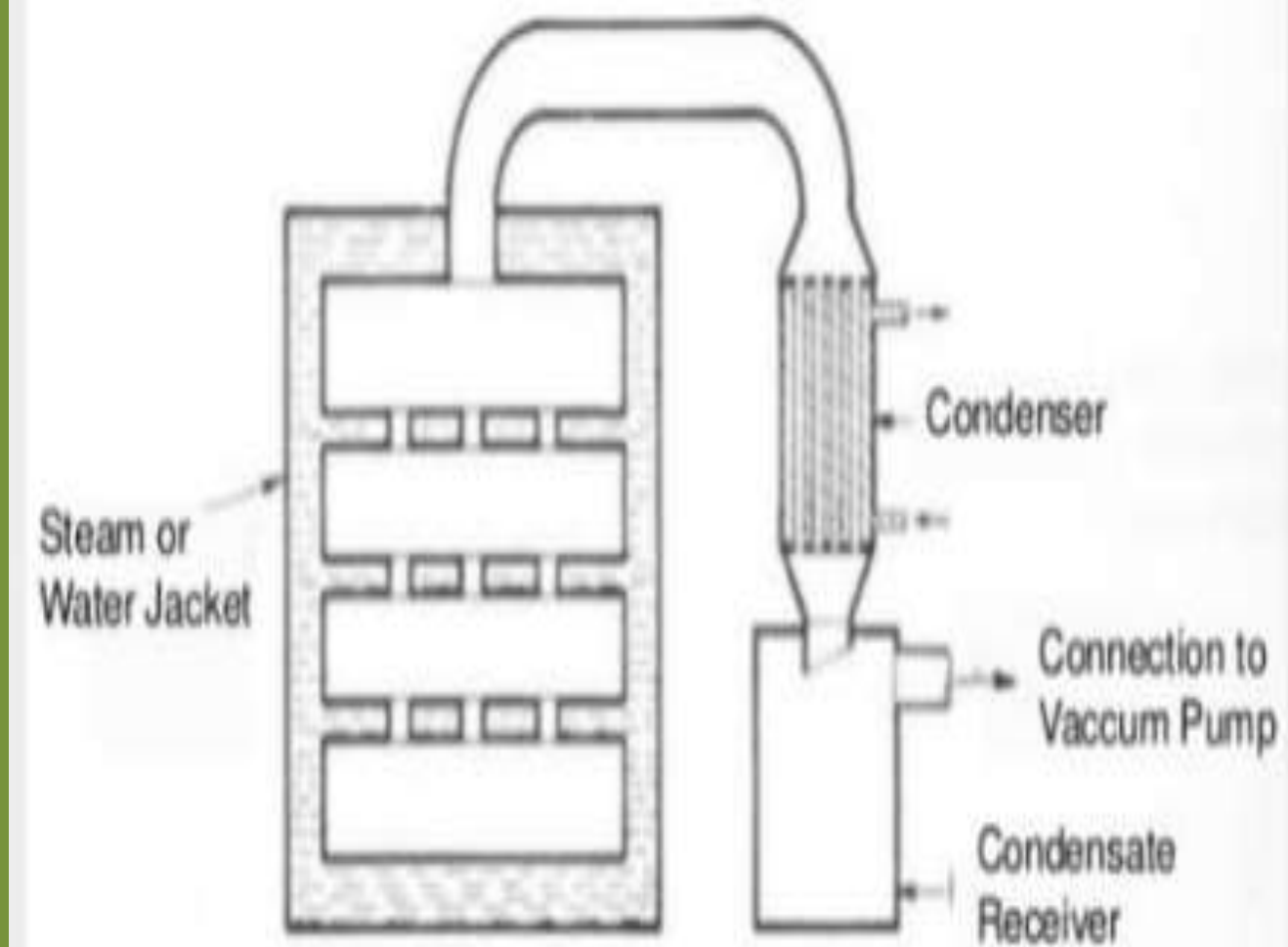


Vacuum Dryer



Construction:

- The oven is divided into hollow trays which increases the surface area for heat conduction.
- The oven door is locked airtight and is connected to a vacuum pump to reduce the pressure.
- The materials to be dried are kept on the trays inside the vacuum dryer and pressure is reduced by means of vacuum pump.
- These shelves provide a larger surface area (about 45 to 50 meter square) for conduction of heat.
- Over the shelves, metal trays are placed for keeping the material.
- The oven door can be locked tightly to give an airtight seal.
- The oven is connected to a vacuum pump by placing a condenser in between.

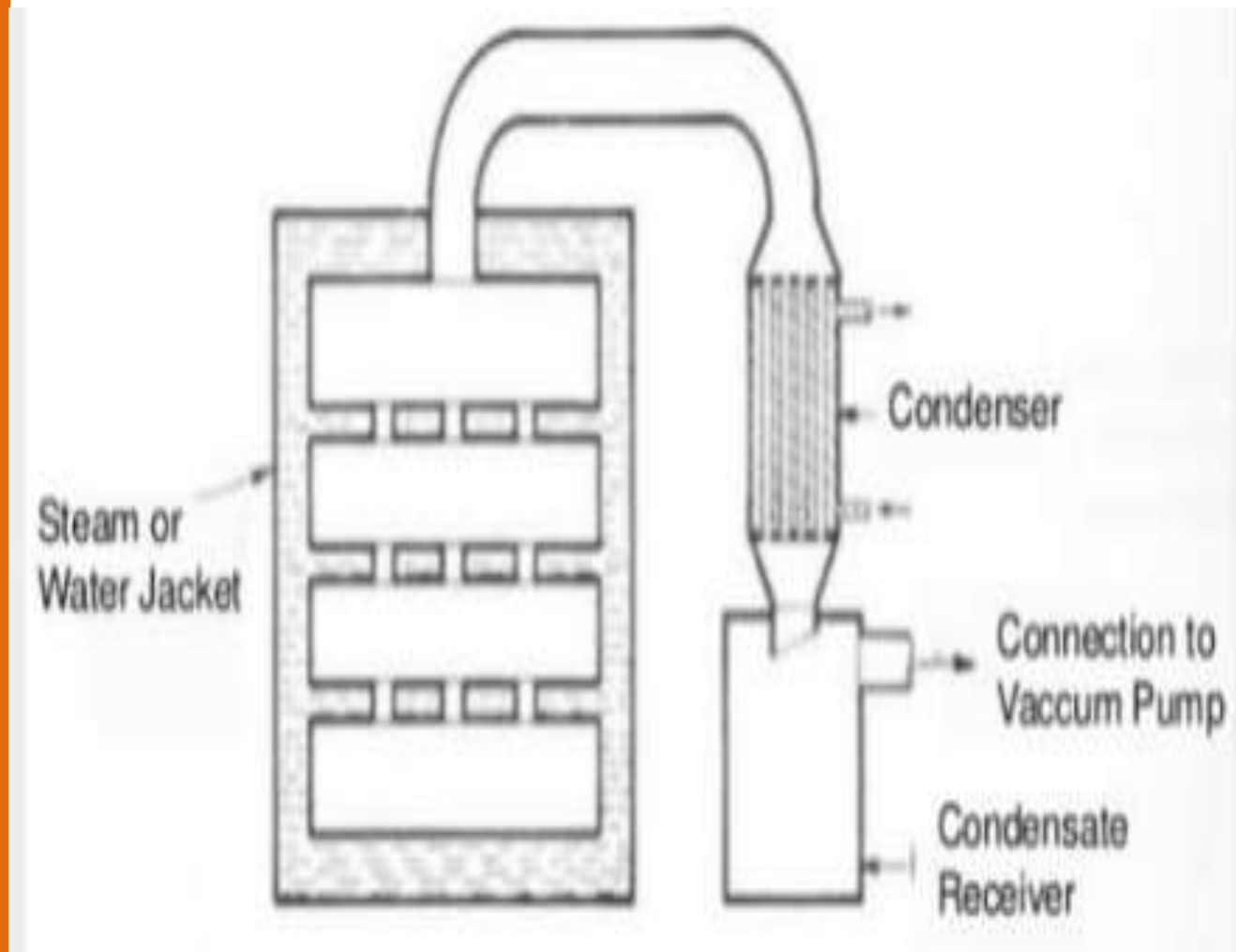




Vacuum Dryer



- **Working**
- The trays that are present in the dryer are used to dry the material that is placed in the shelves and the pressure is reduced to 30 to 60 Kps by vacuum pump.
- The door closes firmly and steam passes through the jacket space and the shelves.
- So the heat transfer is carried out by the conduction mechanism.
- When evaporated under vacuum, the water is evaporated from the material at 25 - 30°C.
- The vapor goes to the condenser.
- After drying, the vacuum line is disconnected.
- Then the materials are collected from the tray.





Vacuum Dryer



Advantages:

- Material handling is easy.
- Hollow shelves which are electrically heated can be used.
- It provides a large surface area. So the heat can be easily transferred through the body of the dryer and the last drying action takes place.
- Hot water can be supplied through the dryer, which help in drying process at the desired temperature

Disadvantages:

- Batch type process.
- Low efficiency.
- More expensive.
- Labour cost is too high.
- High maintenance.
- Danger of overheating due to the vacuum.



THANK YOU