TABLET COATING EQUIPMENTS

Tablet Coating Equipment's

Three general types of equipment's are available

1. Standard coating pan

- E.g., Pellegrini pan system
- Immersion sword system
- Immersion tube system

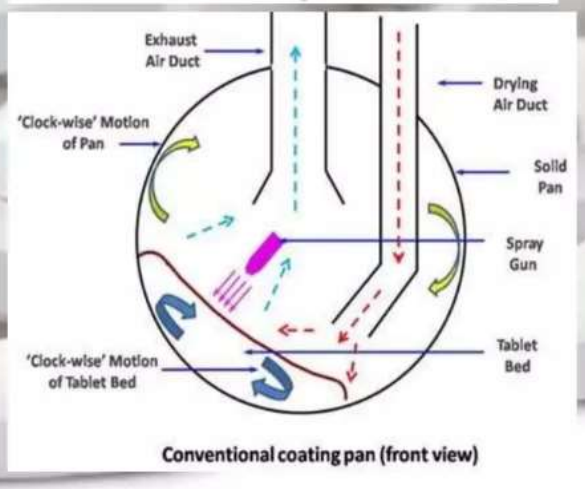
2. Perforated pan system

- E.g., Accela cota system
- Hi coater system
- Glatt coater system
- Dria coated system

3. Fluidized bed coater

1. Standard Coating Pans

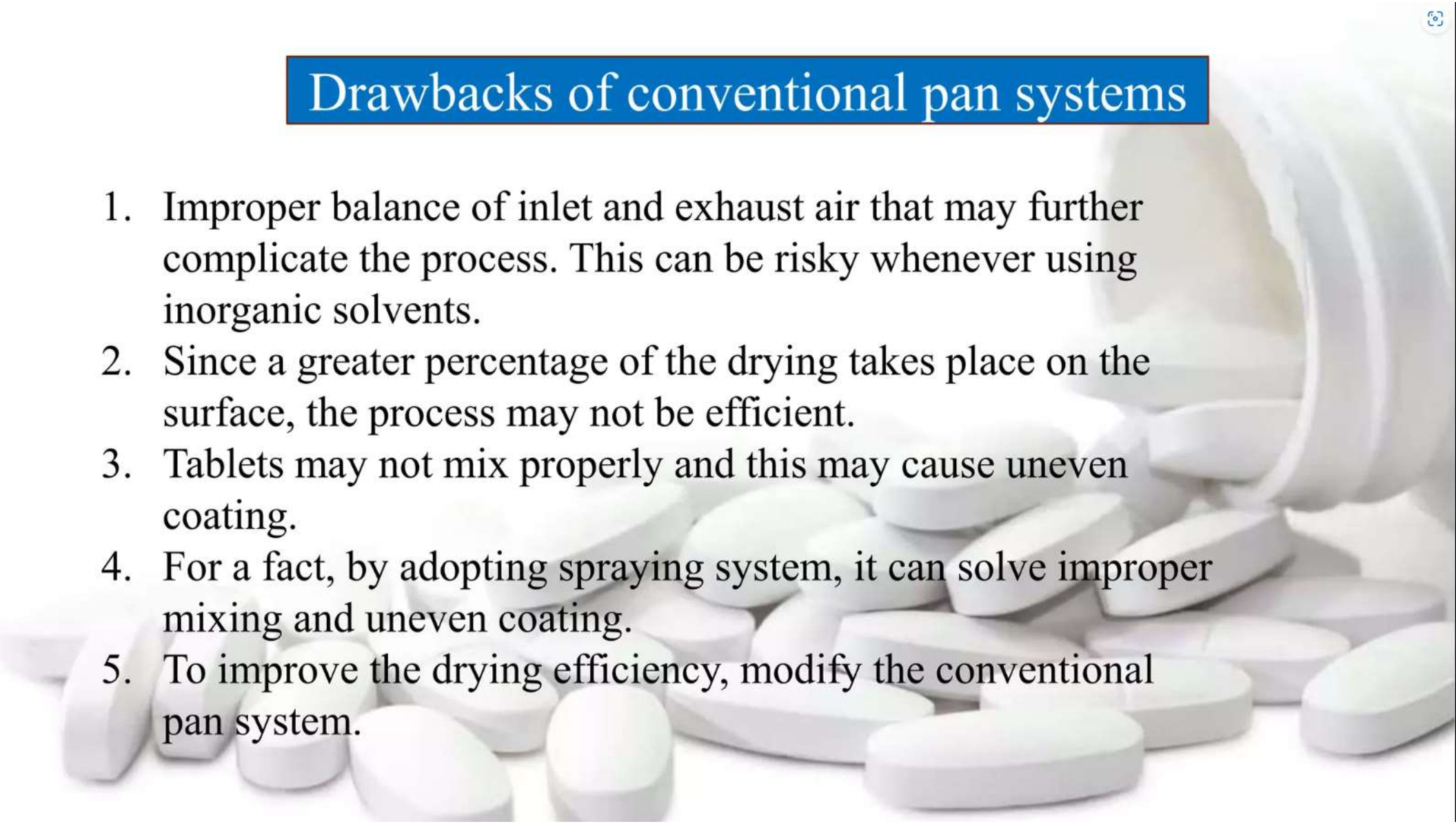
- It is also known as conventional pan system.
- It is a popular accessory in most pharmaceutical industries.
- It consists of a circular metal pan placed angularly and mounted at 40 degree.
- Rotated on its horizontal axis by motor.
- Heated air is directed into the pan on the tablet bed surface.
- Air exhausted by means of ducts.
- Diameter = 8-6o inches /(15-200cm)
- Coating solution are applied to the tablets by ladling or spraying the material on the rotating tablet bed.



Conventional coating pan (front view)

Drawbacks of conventional pan systems

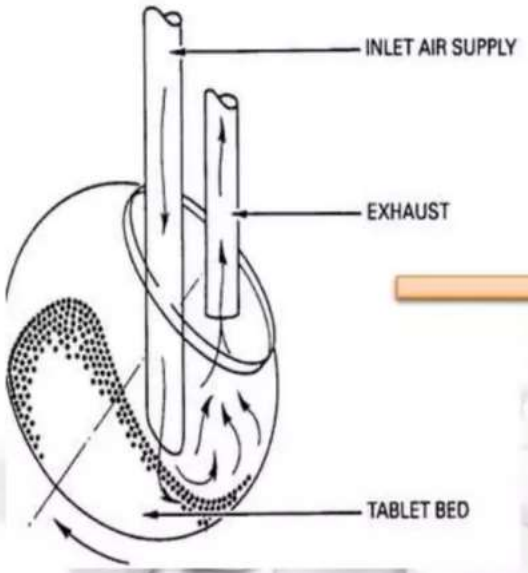
1. Improper balance of inlet and exhaust air that may further complicate the process. This can be risky whenever using inorganic solvents.
2. Since a greater percentage of the drying takes place on the surface, the process may not be efficient.
3. Tablets may not mix properly and this may cause uneven coating.
4. For a fact, by adopting spraying system, it can solve improper mixing and uneven coating.
5. To improve the drying efficiency, modify the conventional pan system.

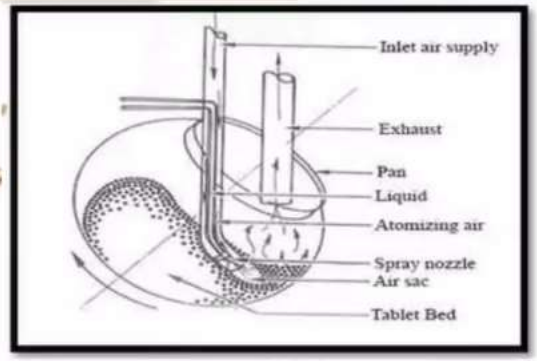


Standard Coating Pan

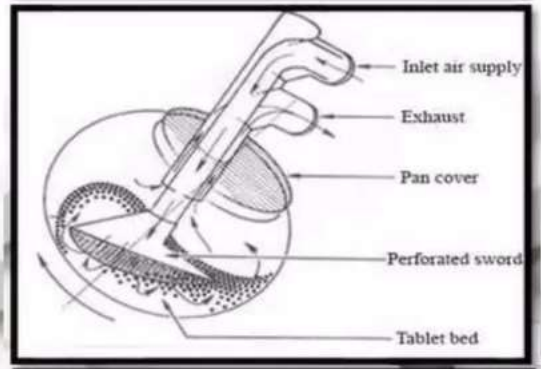
MODIFICATION OF STANDARD COATING PAN

This type of modification can improve drying efficiency.

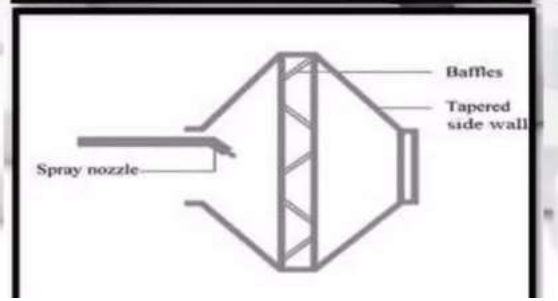




Immersion tube system



Glatt immersion sword system



Pellegrini pan system

1) Pellegrini pan system

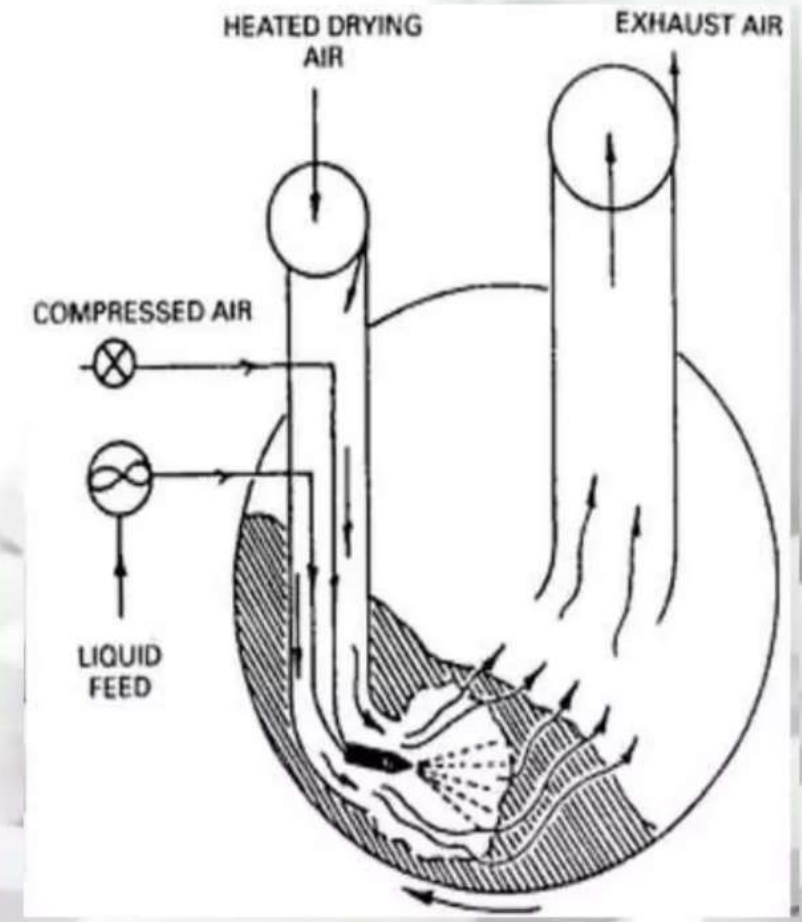
- Rotating on horizontal axis equipped with tapered sidewalls
- Available in the range of 10 – 1000 kg batch.
- Contains baffled pan & diffuser that distributed the drying air uniformly.
- Suitable only for sugar coating process but not for film coating due to limitations in drying capabilities.

2) Immersion – Sword System

- Perforated metal sword device immersed in the tablet bed.
- Drying air is introduced through this device and flows upward from the sword through the tablet bed.
- Coating solution are applied by an atomized spray system directed to the surface of the rotating tablet bed.

3) Immersion – tube system

- Tube immersed in the tablet bed & delivers the heated air consists of long tube with a spray nozzle at its tip.
- Hot air gets delivered through this tube into tablet bed.
- The drying air flows upward & exhausted by a conventional duct.
- Relatively rapid processing times have been reported for both film & sugar coating with this system.
- In immersion tube system the coating solution is applied with the heated air from the immersed tube.

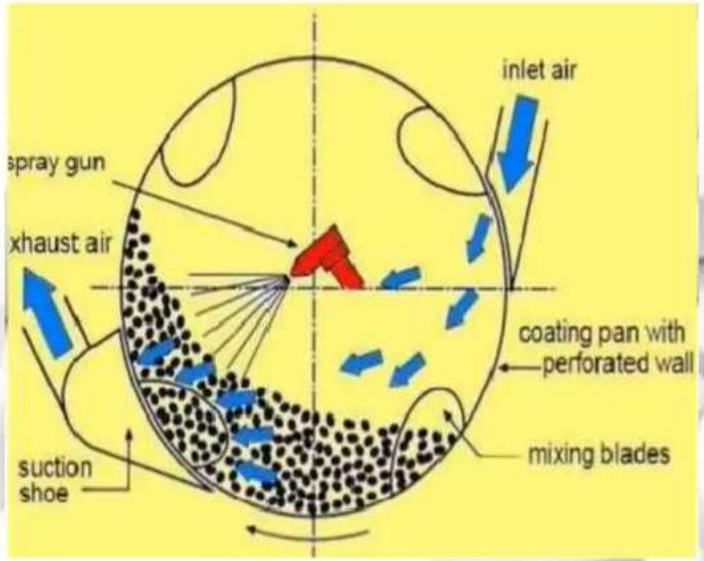


2. Perforated Pan System

- ✓ Perforated coating pan is also popular among pharmaceutical companies.
- ✓ In most cases, this type of tablet coating equipment has either a full or partial perforated drum.
- ✓ Like the standard coating pan, the drum of this tablet coater rotates on a horizontal axis.
- ✓ In this the coating drum is an enclosed housing with various spray nozzles.
- ✓ It is the spray nozzles that atomize the coating solution.
- ✓ However, unlike most conventional pan machines, perforated pan coaters have an efficient drying system.
- ✓ These are high capacity tablet coating machines.

i. ACCELA – COTA SYSTEM

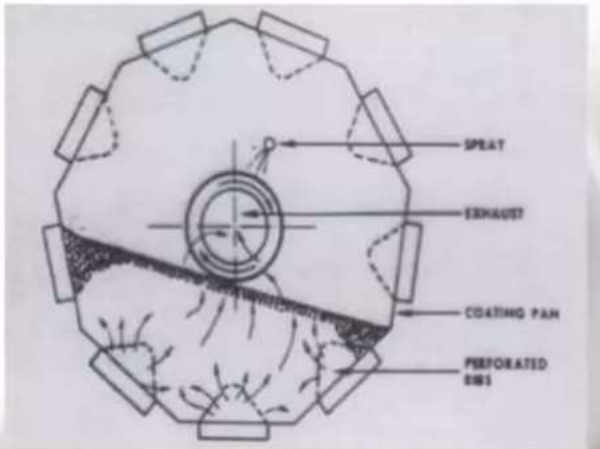
- ✓ There are number of processes that take place within the drum.
- ✓ Baffles/Mixing blades ensure the tablets mix freely within the drum as it rotates.
- ✓ Spray gun atomizes the coating solution and directs it to the tablets.
- ✓ Dry inlet air flows from the upper section of the drum, passing in between the tablets.
- ✓ Pan is fully perforated.
- ✓ This increases the overall efficiency of this type of tablet coating machine.

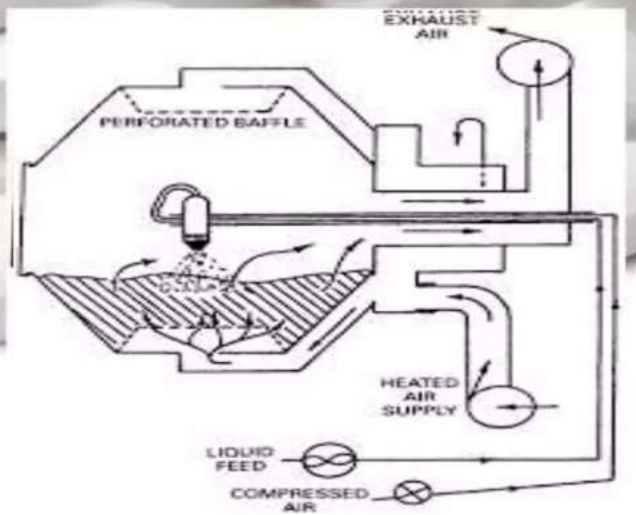


Aceela cota system

ii. DRIA COATER PAN

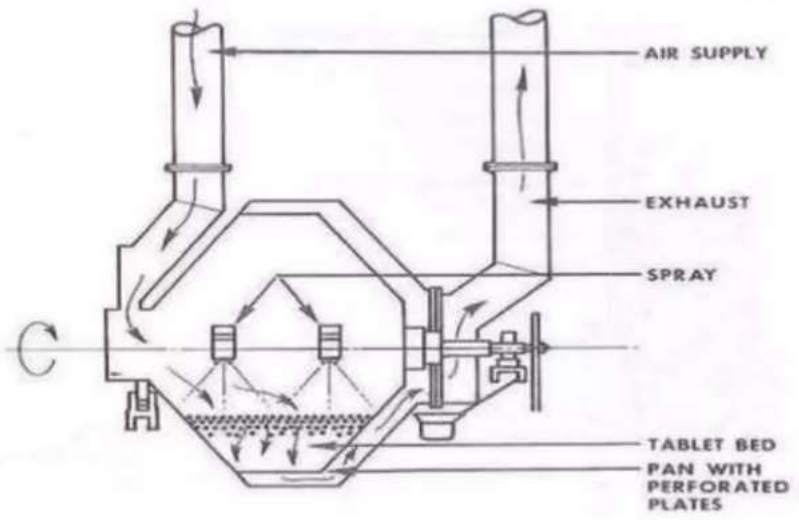
- ✓ A Dria coater pan has hollow perforated ribs, which are locate on the inside periphery tablet coating drum.
- ✓ Therefore, as the drum rotates, the spray nozzle atomizes coating solution and directs it to the tablets from the top section.
- ✓ This is the same scenario like for the accela-cota machines.
- ✓ However, the drying air enters the coating drum from below the tablets and flows upwards, then exits the system through the back of tablet coating pan.
- ✓ Basically, in Dria coater, the drying air fluidizes the tablets.





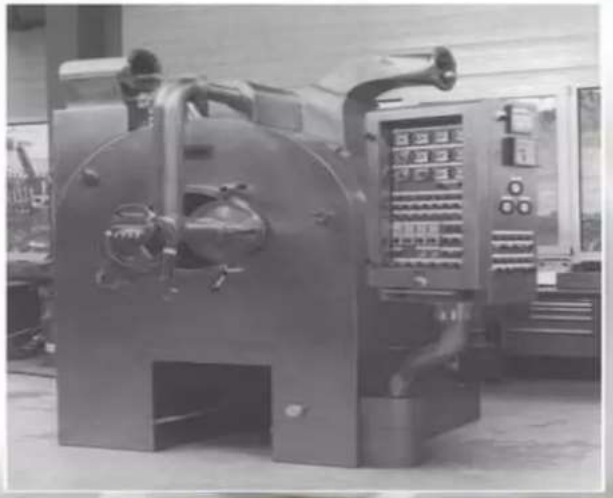
iii. HI-COATER SYSTEM

- ✓ Although the design of Hi-coater systems may be different, the working principle is similar to that of the accela-cota.
- ✓ The machine directs both the coating solution and drying air downwards.
- ✓ The drying air, then leaves the coating system through the perforations below the coating drum.

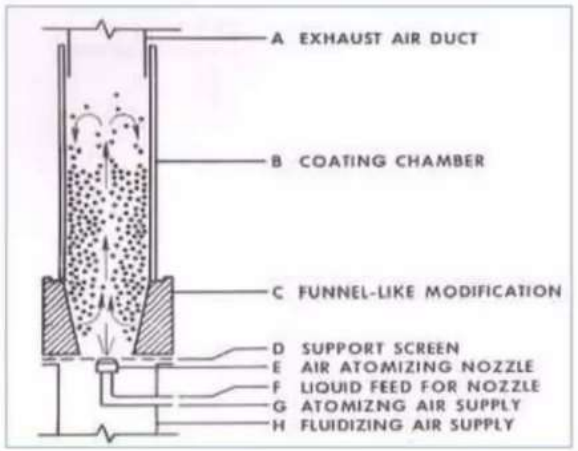


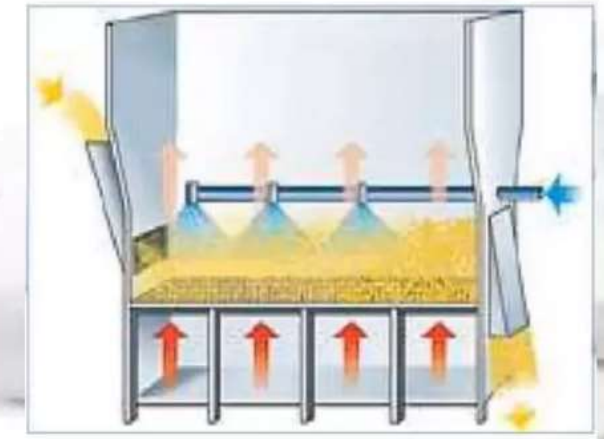
iv. GLATT COATER

- ✓ High spray rates, short processing time.
- ✓ Its design is such that you can direct the drying air from inside the tablet coating drum.
- ✓ Normally, the air passes through the tablet bed and leaves via exhaust duct.
- ✓ Its unique design minimizes turbulence that may occur around the spray nozzle.
- ✓ This ensures an even distribution of the coating solution on the tablets.
- ✓ It's drum has unique geometrical shapes with baffles on the periphery.
- ✓ It is tablet coating machines that ensures consistent and accurate coating.
- ✓ The only difference is how the machine supplies and removes the drying air.
- ✓ Quite expensive.



3. Fluidized Bed Coating



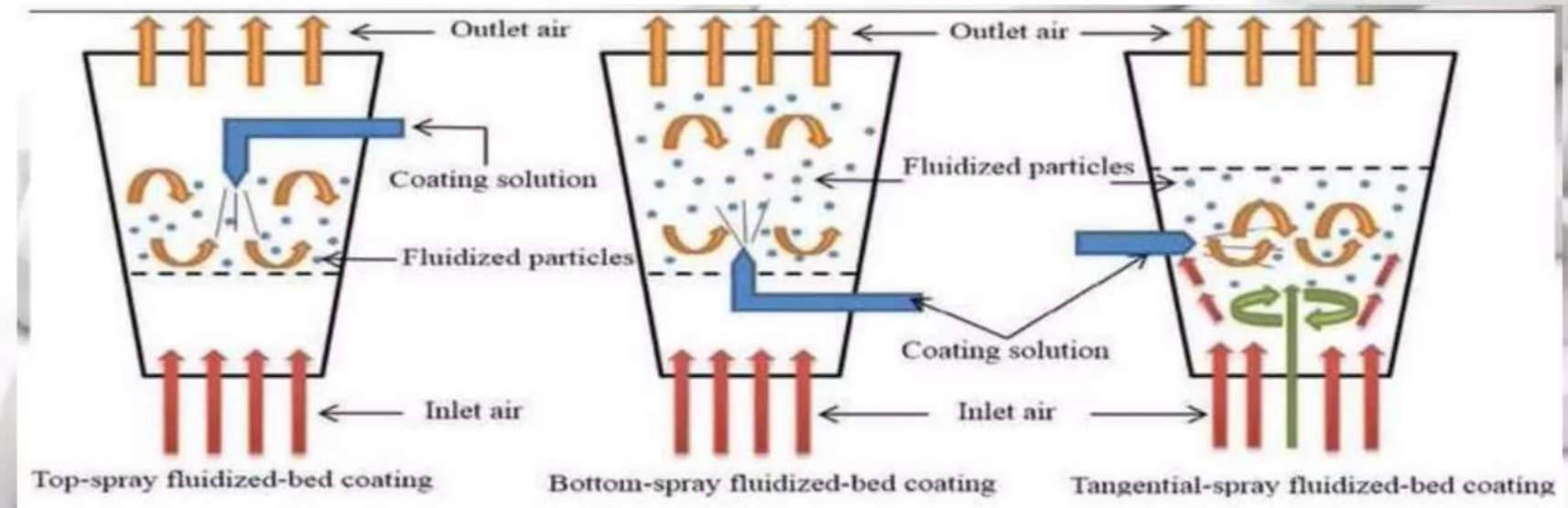


Fluidized Bed Coating Systems

- ✓ The working principle of fluidized bed or air suspension system is basically similar to that of the other spraying systems.
- ✓ It has a vertical cylinder.
- ✓ A column of drying air flows upwards suspending all the tablets. This causes the tablets to move upwards, outwards and the downwards, a process we refer to as fluidization.
- ✓ Spray nozzle atomizes and introduces the coating fluid into a fluidized bed. The nozzle's position.
- ✓ This process will continue until the achieve the right coating on your tablets.
- ✓ Basically we can choose any of the three types of tablet coating machines.
- ✓ The degree of coating fluid atomization in any of there machines will depend on,

i. Type, design and size of the nozzle
ii. Fluid pressure
iii. Orifice size

- ✓ In fluid bed coating, particles are fluidized, coating fluid is sprayed on and dried.
- ✓ 3 types :
    - Top spray coating
    - Bottom spray coating
    - Tangential coating



Different positions of spraying nozzles in fluid bed system