

# **Double cone blender, twin shell blender, ribbon blender**

MIXING: Theory and  
Equipment

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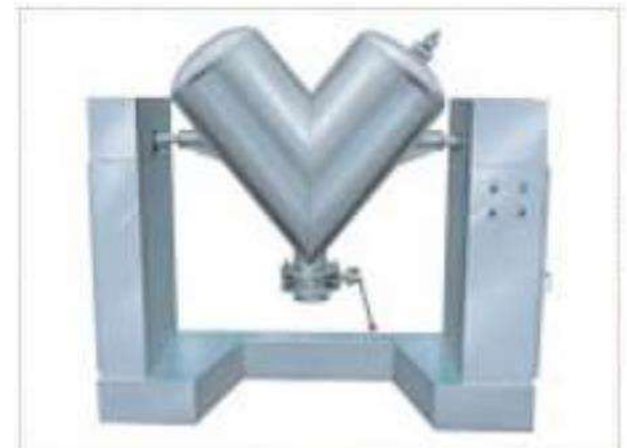
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# Twin shell blender or V cone blender(Diffusive mixing)

- It is V shaped and made up of stainless steel or transparent plastic.
- Material is loaded through shell hatches and emptying is normally done through an apex port.
- The material is loaded approximately 50-60% of the total volume.
- Small models – 20 kg , rotate at 35rpm
- Large models – 1 tonne, rotate at 15rpm
- As the blender rotates , the material undergoes tumbling motion.
- When V is inverted, the material splits into two portions. This process of dividing and recombining continuously yields ordered mixing by mechanical means.



# Double cone blender

- It consists of double cone on rotating shaft.
- It is usually used for small amount of powders.
- It is efficient for mixing powders of different densities.
- Material is loaded and emptying is done through the same port.
- The rate of rotation should be optimum depending upon the size, shape of the tumbler and nature of the material to be mixed.
- The rate of rotation commonly ranges from 30-100rpm.
- Mixing occurs due to tumbling motion.



**Double cone  
blender**

## Advantages of V cone blender and double cone blenders:

- If fragile granules are to be blended, twin shell blender is suitable because of minimum attrition.
- They handle large capacities.
- Easy to clean , load, and unload.
- This equipment requires minimum maintenance.

## Disadvantages of V cone blender and double cone blenders:

- Twin shell blender needs high headspace for installation.
- It is not suitable for fine particulate system or ingredients of large differences in the particle size distribution, because not enough shear is applied.
- If powders are free flowing, serial dilution is required for the addition of low dose active ingredients.

# Ribbon blender

## Principle:

Mechanism of mixing is shear. Shear is transferred by moving blades. High shear rates are effective in breaking lumps and aggregates. Convective mixing also occurs as the powder bed is lifted and allowed to cascade to the bottom of the container. An equilibrium state of mixing can be achieved.



## Construction:

- Consists of horizontal cylindrical trough usually open at the top. It is fitted with two helical blades, which are mounted on the same shaft through the long axis of the trough.
- Blades have both right and left hand twists.
- Blades are connected to fixed speed drive.
- It can be loaded by top loading and emptying is done through bottom port.

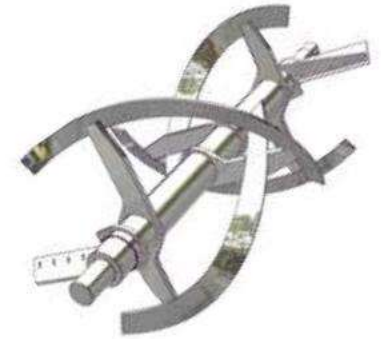
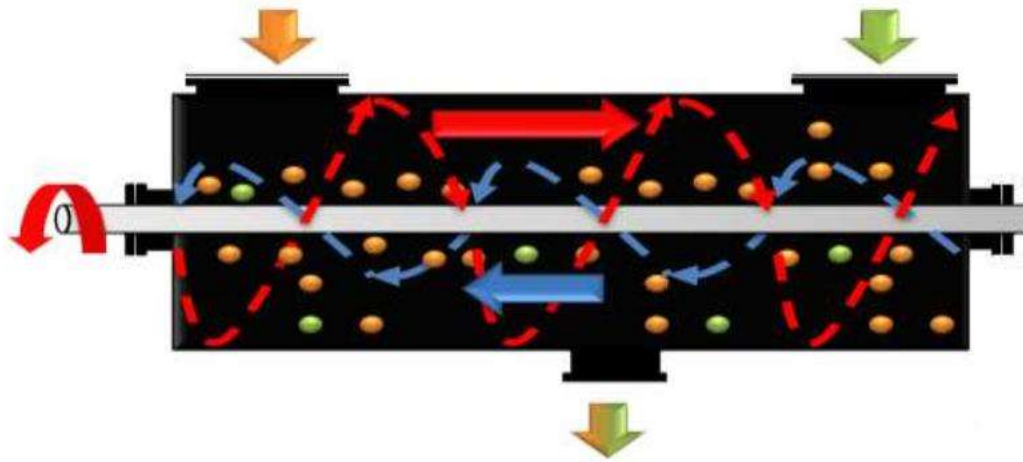


# Working

- Trough the fixed speed drive, ribbons are allowed to rotate.
- One blade moves the solids slowly in one direction and other moves them quickly in opposite direction.
- Different powders are introduced from the top of the trough.
- The body is covered because considerable dust may be evolved during dry blending and granulating medium may evaporate during wet granulation.
- The agitator blade rotates, lifts and distributes the material in an irregular manner.
- Convective and shear mixing occurs as well as some fine-scale diffusive mixing occurs.
- The counteracting blades set up high shear and are effective in breaking up lumps or aggregates.
- Helical blades move the powders from one end to another.
- The final stage of mix represents an equilibrium state.
- The blend is discharged through discharge spout or by inverting the ribbon blender.



## Working:



## Uses:

- Used for mixing of finely divided solids, wet solid mass, and plastic solids.
- Uniform size and density materials can be easily mixed.
- Used for solid – solid and liquid – solid mixing.

## Advantages of ribbon blender:

- High shear can be applied using perforated baffles, which bring about rubbing and breaking of aggregates.
- Headroom requirement is less.

## Disadvantages of ribbon blender:

- It is a poor mixer, because movement of particles is two dimensional.
- Shearing action is less than in planetary mixer.
- Dead spots are observed in the mixer, though they are minimum.
- It has fixed speed drive.





Thank You