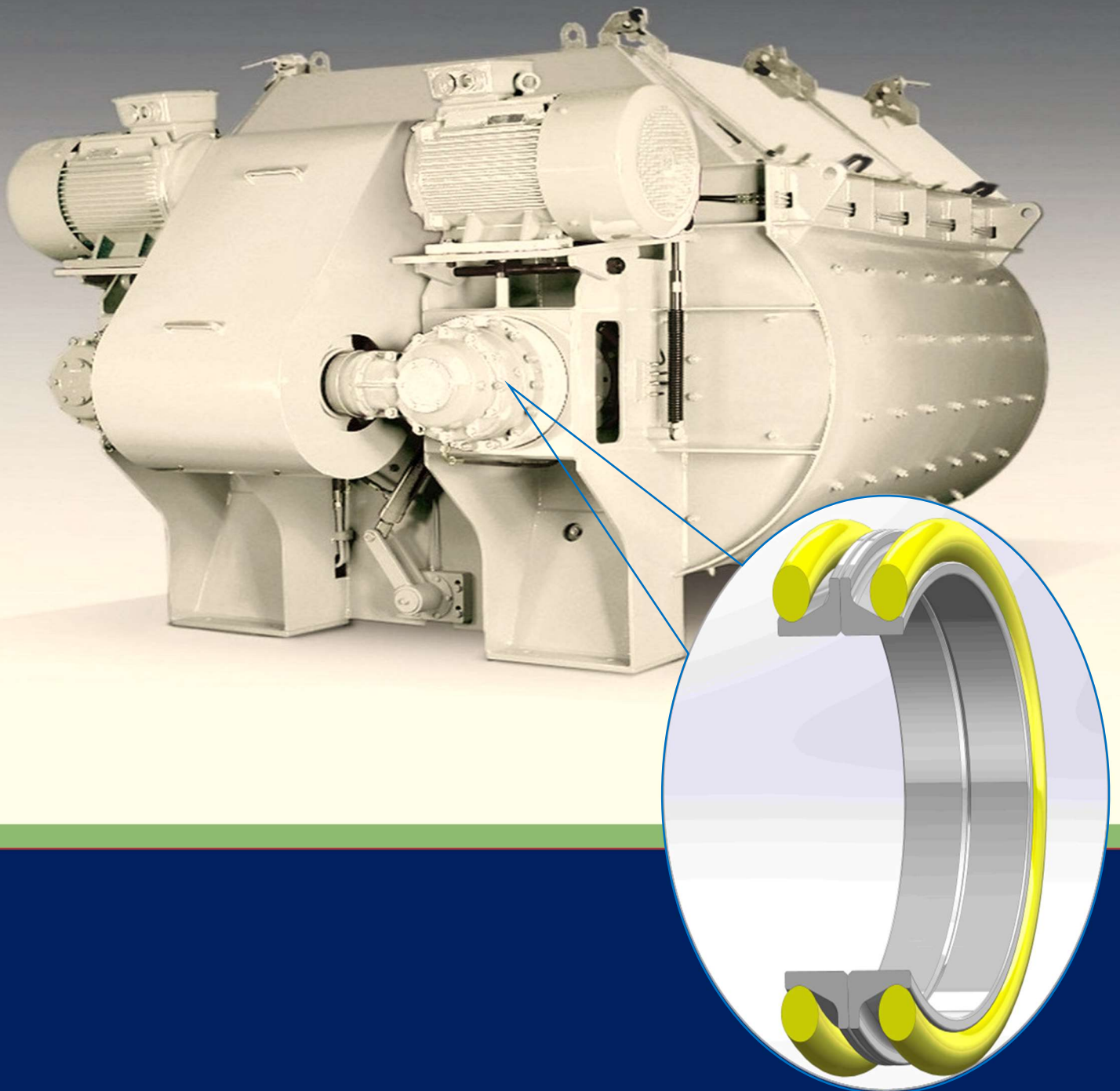


MECHANICAL FACE SEALS TWIN SHAFT BATCHING PLANTS



HEAVY DUTY FACE SEALS DESIGNED FOR CHALLENGING APPLICATIONS

1. Batching Plants and Its Significance –

A Concrete plant, also known as batch plant or batching plant, is a device that combines various ingredients to form Concrete. Some of these inputs include sand, water, aggregate (rock, gravel etc.), fly ash, potash, and cement.

Most Common used concrete batching plants are –

1. Single Shaft Batching Plant
2. Twin Shaft Batching Plant
3. Planetary Batching Plant

2. Twin Shaft Batching Plant -

A Twin shaft batching plant ensure an even mixture of concrete and Large output with high Quality. It consists of Mixer with counter rotating shafts that are geometrically arranged so that they follow the pattern of an interrupted spiral .This motions the materials to be mixed in a screw like pattern both along the mixing shafts and on each shafts in opposite direction .

Mixing blades are positioned on both the shafts in a counter direction in such a way that they can transport the mix on the opposite shaft. This way, the materials are constantly rotating around the mixing through. At the same time, the material rotating process also takes place in an inward turning spiral. This results in an intensive three-dimensional movement of material.

The principal advantage of Twin shaft mixing technology is the Larger mixing Technology, rapid discharge and mobility as it can be moved from one place and installed again.



Mixing Blades inside Twin Shaft batching plant

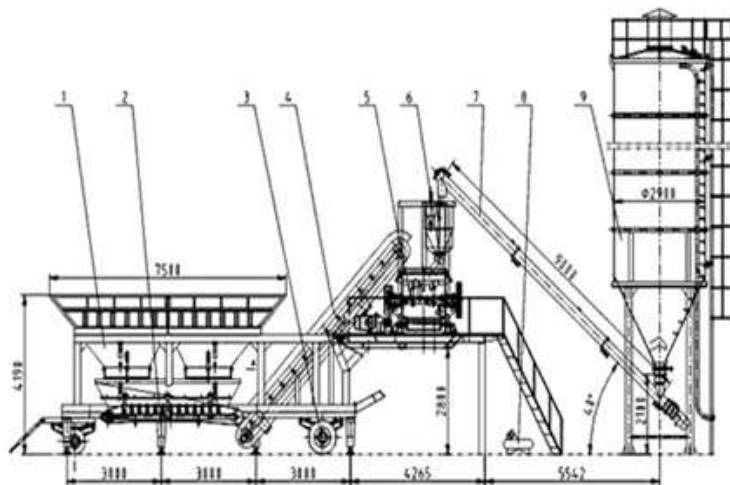


Counter Direction Movement of the blades

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The Concrete batching plants with its parts and accessories combines and produces high-quality concrete. The Different components of plant involves –

- **Aggregate Feeders** – With the help of bins located, materials like aggregate, sand etc. is been fed with the help of bins that holds the different size of aggregates/sand for different compartment.
- **Cement Weighing Hopper** – Hold large volume of cement that comes in bulk. The cement bags are been placed on the top of the hopper and once the cement bags torn, they fall into the hopper.
- **Aggregate Weigh Hopper** – Used to weigh the aggregates one by one and transfer them for further processing. With the help of pneumatic cylinders, the aggregates are been discharged.
- **Twin – Shaft Mixer** – It is one of the main components of the concrete batching plant. All the ingredients are been mixed with the help of twin shaft mixer. Ensures the concrete is thoroughly mixed getting the uniform appearance and all the ingredients are equally distributed.
- **Control Panel** – The working of the batching plant is controlled by the control panel. It assists with the fast and accurate measurements of the ingredients that help to produce high-quality concrete. Latest machines also help to save and print mix material recipes.
- **Admixtures** – Liquid form, having three different types tanked separately.
- **Water** – Water is controlled with the help of meter system depending upon the volume required for mixing



1. Batcher
2. Hydraulic Support Legs
3. Wheel System
4. Groove Type Belt
5. Twin Shaft Batching Plant
6. Weighing System
7. Screw Conveyor

The processing of the concrete batching starts by aggregate feeding into individual bins. As set in the control panel aggregates weigh individually as per the design. After weighing the aggregates, it is been further transformed into the mixing unit. There are weigh hoppers for cement, additive and water present above the mixing unit that aims at transferring the content to the mixing unit. By means of weigh conveyor, cement is been transformed and water is also been pumped. The concrete is been made in the twin shaft mixer where are all the ingredients are mixed uniformly. The timer is been set for mixing of the ingredients by the help of control panel and the time elapses mixing process stops and the truck is been loaded by the concrete.

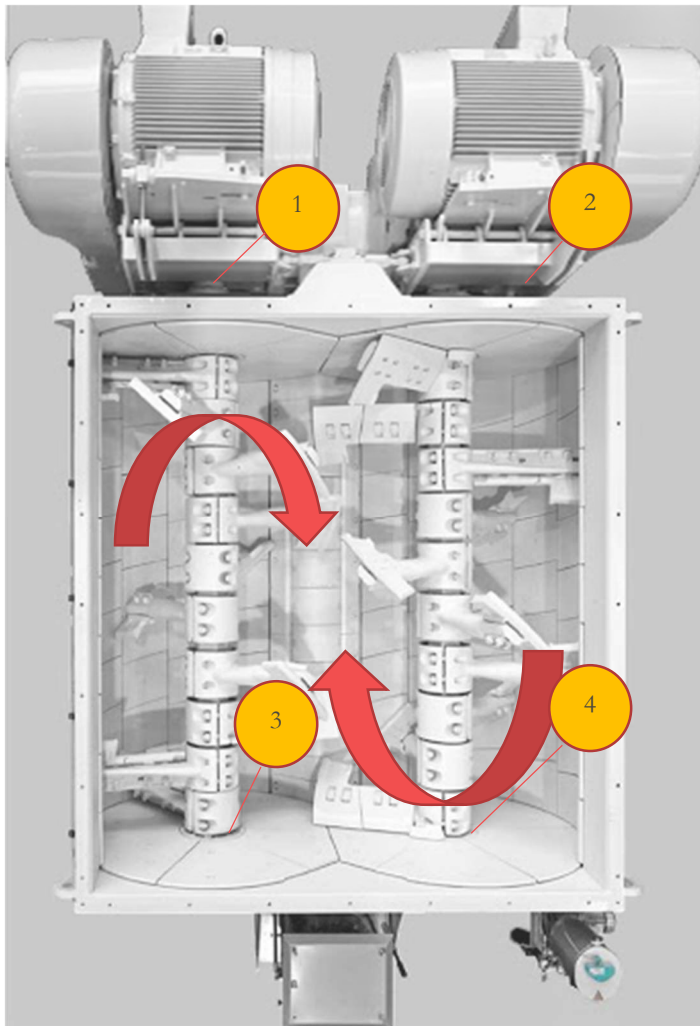
4.Application Challenges in Twin Shaft Batching Plant

Twin Shaft mixer is one of the most challenging application as to provide maximum output with minimum downtime. Since the complete machine is operating in rigorous challenging environment of concrete, mud and slurry, one of the most critical area of operation is the **shaft sealing** of the **bearing housing**.

In Each mixer, the arms are actuated by the shaft with horizontal axis along the tanks. **Seal assembly** installed on the attachment holes located on two opposite tank walls with the bearing housings located just outside the external edges of the mixing tank .The **bearing housings** are protected by seal assemblies installed on the attachment holes located on the two opposite tank walls to prevent to fluid or dry mass to leak out of the tank .

The mixture leakage will flow outside the tank along the rotating shaft reaching the bearing housing assembly and may cause –

- **Seal Failure** – Concrete slurry may stick on the bearing housing joint seals and cause oil seal failure.
- **Bearing Damage** – Due to concrete penetrating and creating friction.
- **Shaft Damage** – Bearing and Seal failure may Seize the shaft and cause down time.



The Power is transmitted to bearing housing from the reduction gear driven by drive motors. There are 04 bearing housings in a twin shaft mixture. Two on the drive side indicated by **01 & 02** in the picture and other two on the Non drive side indicate by **03 & 04**. Bearing housings are placed on the outlet of the holes where the shaft is aligned .

Shafts are rotating counterclockwise to each other to get the homogenous mixture in the tank.

HEAVY DUTY FACE SEALS DESIGNED FOR CHALLENGING APPLICATIONS

3. SAP Parts™ Solutions for Twin Shaft Batching Plants –

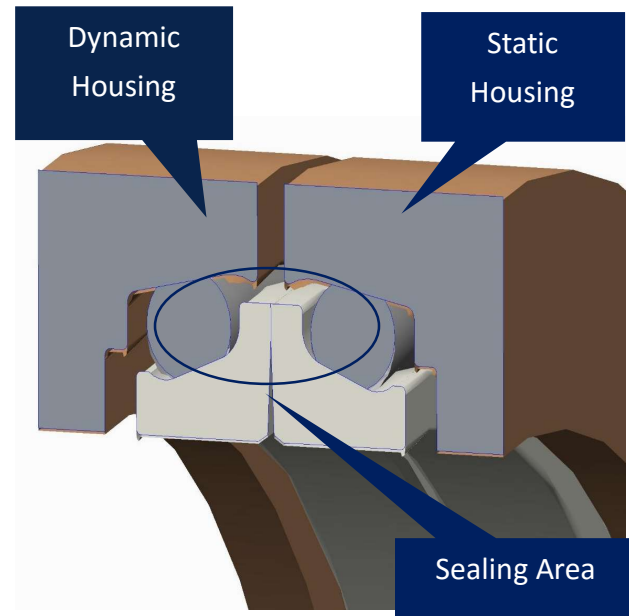
One of the major challenges with the Twin Shaft Batching plants is the sealing arrangement of the bearing housing assembly as it has to be protected from the internal concrete mixture and the external dirt and dust and to ensure smooth running in the hostile conditions .

SAP Parts™ is been manufacturing **Mechanical Face Seals** for Agriculture, Construction, Mining and Industrial applications since 2009. SAP parts with its expertise has already proven their Mechanical face seals in challenging applications like **Twin Shaft Batching Plants**.

4. SAP Parts™ Seals Working Principle –

Mechanical Face Seal consists of Two Metal rings and two O-rings .

- One pair of Metal seal and O-ring is mounted in the static cavity and the other pair of metal ring and O-ring are mounted on the dynamic cavity.
- There is a relative motion between the metal faces which acts as primary sealing at the metal to metal contact area.
- O-rings are used as secondary sealing Elements providing static sealing on housing and uniform axial pressure on metal rings transmits torque to the metal faces.
- The seal tapered surfaces allow lubrication to the precision lapped metal faces via centrifugal action.



5. Advantages SAP Parts™ Mechanical Face Seals -

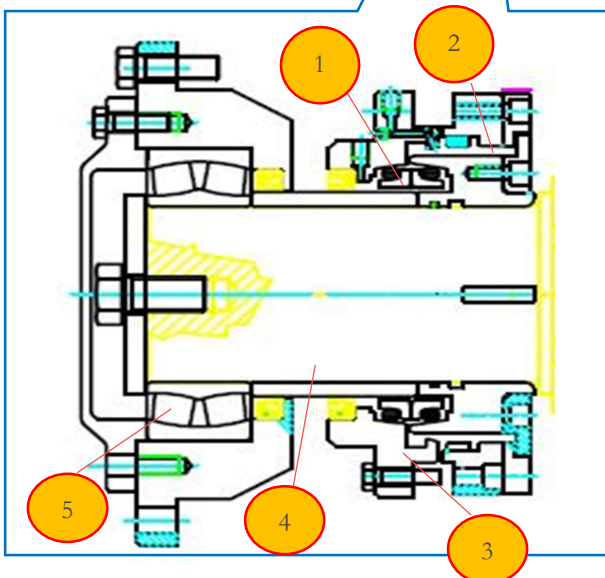
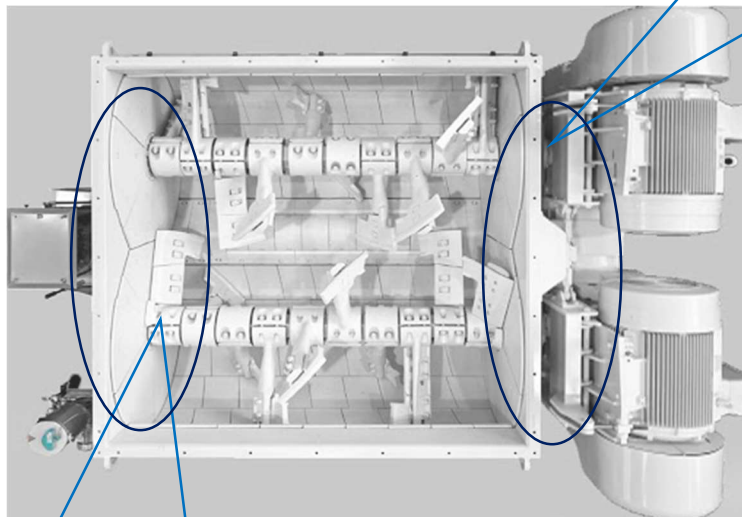
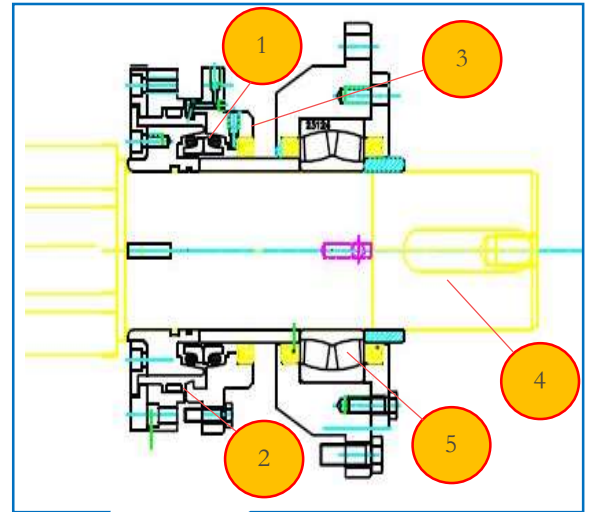
- Mechanical Face seals have higher performance than the conventional seals in high pressure and aggressive environments.
- Higher sealing life than the conventional seals, once assembled we do not have to remove or replace.
- Resistant to contamination and retention to external media due to special design to fit application and precision lapped surfaces.
- Tested and validated simulating actual working condition at SAP seal Technology center

5.SAP Parts™ Innovative Sealing Solution –

Drive Side Shaft Bearing Housing –

The Drive side bearing housing arrangement is assembled next to the planetary gears outside the mixing tank .01 indicates the Mechanical Face seals arrangement. One half of the Mechanical Face seal is mounted in the Stationary housing 02, whereas the other half of the Mechanical Face seal is mounted on the Rotating housing 03.

There is a Labyrinth arrangement provided for the Mechanical Face Seal Assembly, to protect the Shaft 04 and bearing 05 from heavy concrete slurry and mixture.



Non-Drive Side Shaft Bearing Housing –

The Drive side bearing housing arrangement is assembled on the other side of the mixing tank where the other end of the shaft is aligned outside the mixing tank .01 indicates the Mechanical Face seals arrangement. One half of the Mechanical Face seal is mounted in the Stationary housing 02, whereas the other half of the Mechanical Face seal is mounted on the Rotating housing 03.

There is a Labyrinth arrangement provided for the Mechanical Face Seal Assembly, to protect the Shaft 04 and bearing 05 from heavy concrete slurry and mixture.