Mixing of Products in Powder Form: Double Cone Blender

The process of mixing two or more solid products, with or without addition of liquids, can be performed in three different skids depending on their grain size and the manufacturing process. The final product is always a homogeneous mixture of its components.

I INOXPA solution: Double cone blender

This system can mix products in powder or granular form, with equal or different densities, within a short period of time. It allows loading 65% of its total capacity.

The skid consists of a blender body suspended between two supporting frames. It must be surrounded by a guard rail that incorporates a safety system which stops the blender if the rail is opened while the blender is in operation. An alternative system consists in placing the blender in a special room for this purpose.

I Manufacturing process

The product to be mixed is introduced into the blender. This can be accomplished in three different ways:
1. In the case of a suction loading system, the loading port lid is replaced by a bag filter and connected to a vacuum system. On occasions, this filter can be independent, located separate from the skid. The purpose of the filter is to prevent product powder or dust from entering the liquid ring vacuum pump. When the vacuum is applied, the powder is sucked through a pipe that transports it to the interior of the blender introducing it through the top of the unit.
2. A gravity loading system consists of a retractable, sealed sleeve connection which is fitted on the butterfly valve. Before loading the product, the blender is turned 180º so that the loading system is located at the highest point. Next, the retractable sleeve is extended and attached to a hopper, an auger or any other conveying system. The butterfly valve opens and the product is loaded into the blender. Once the loading is complete, the valve closes and the sleeve is retracted.
3. Manual loading of the product. In contrast to the previous options, the manual loading option can generate airborne dust.

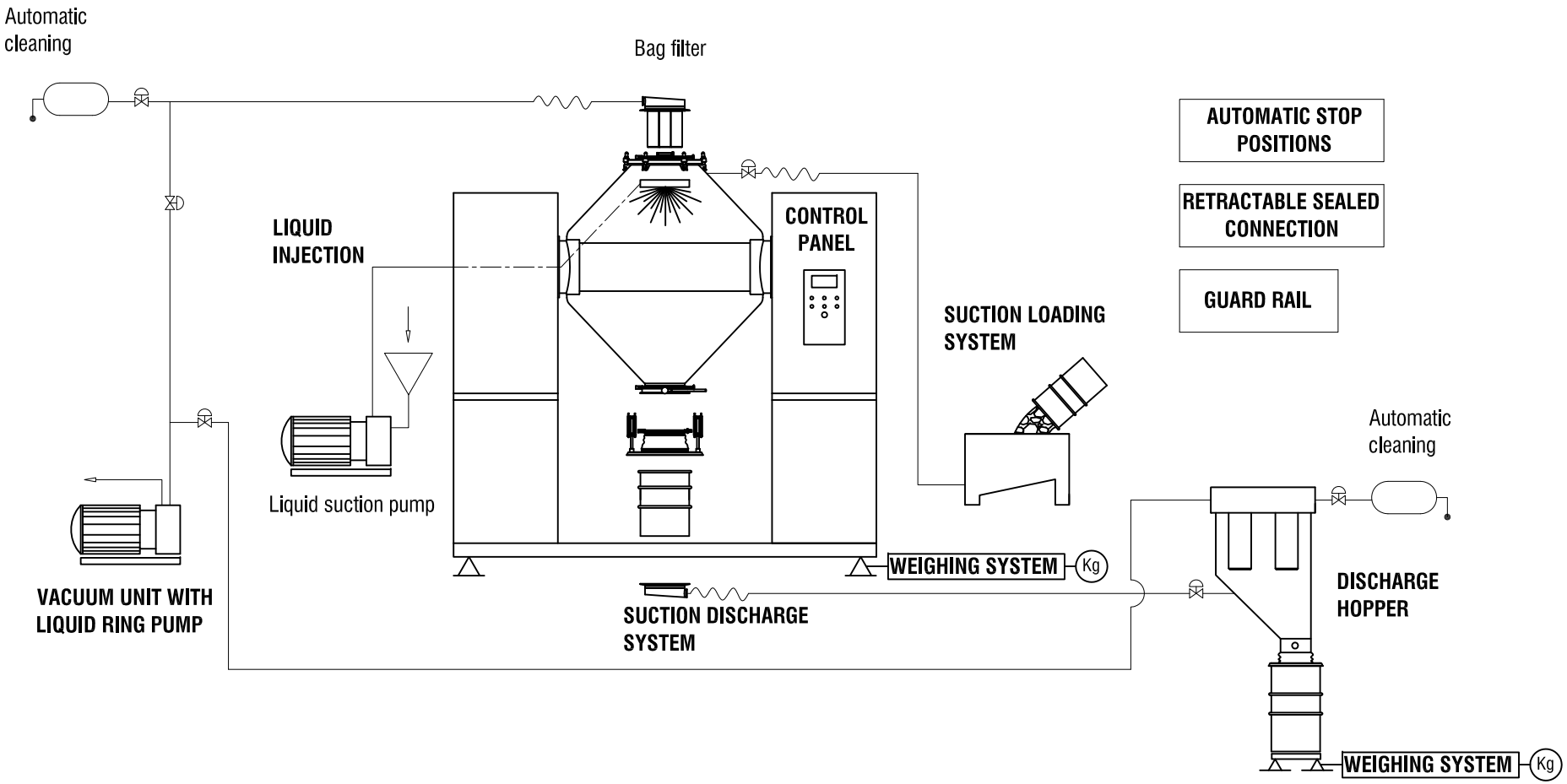
Once loading is complete, the blender begins to turn in order to mix the product. A system for spraying liquids during the process can be incorporated into the interior of the blender, if necessary. It consists of a series of static spray nozzles connected to a pump that transfers the pressurised liquid to the interior of the blender.

When the mixture is homogeneous, it is discharged using one of the following methods:
1. The suction discharge system is equipped with a small hopper located on the butterfly valve, an automatic bag filter with discharge hopper and a vacuum system. The discharge valve is connected to the hopper and this, in turn, is connected to the automatic bag filter with discharge hopper by means of a flexible connection. The filter bags are cleaned automatically at certain intervals by means of a counterflow system. In addition, the hopper incorporates a level monitoring system to discharge the product periodically.
2. Direct discharge into the package or container is possible using a retractable sealed connection on the butterfly valve.
Before discharging the product, the blender is turned to its discharge position so that the discharge system is located at the lowest point. Next, the retractable sleeve is extended and attached to the tank lid. The butterfly valve opens and volumetrically controls the discharge of the product. Once the discharge is complete, the valve closes and the sleeve is retracted.
3. Metered, manually operated gravity discharge.

It is possible to combine the different methods for loading and discharging the product. For example, loading may be performed by suction and discharging by gravity using the retractable connection.

The system can have three automatic stop positions: loading, discharging, and sampling or cleaning. For safety reasons, in order to avoid sudden shocks, before stopping at any one of these positions, the system decreases the speed of the blender during the last turn before it completely stops at the programmed position.

The double cone blender can be cleaned manually or by CIP.
In the case of manual cleaning, a hose is used to clean the skid with pressurised water and, if necessary, with detergent.



Double Cone Blender Skid

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BANYOLES (Girona) Spain

I Double cone blender in granulator/dryer execution

This skid comprises a double cone blender that incorporates a heating chamber, a liquid injection system and a vacuum suction system with an intermediate safety filter located in the interior of the unit.

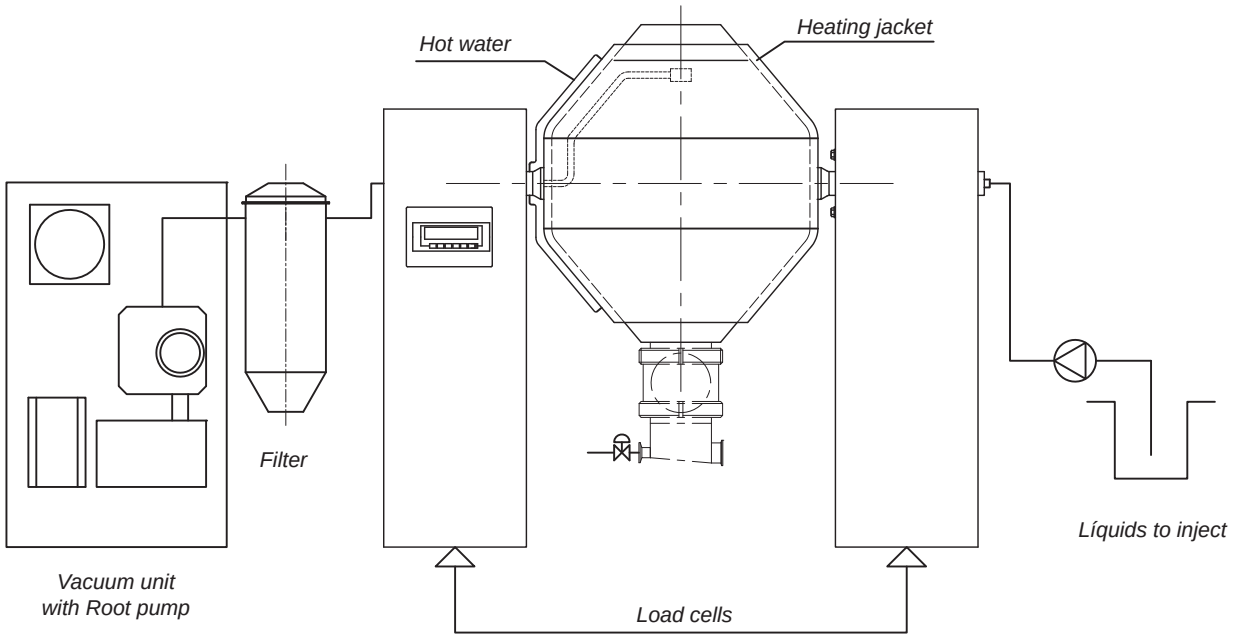
I Manufacturing process

The chamber is filled by recirculating water at a temperature of 30 to 80ºC, depending on the process, to heat the product. The solids are introduced through the loading port using any of the three methods outlined above. The product may contain moisture, usually a maximum of 10%, or be dry, with moisture being added at a later stage through the injection of liquids.

Throughout the drying process, the blender turns at a low speed, rotating the product inside it and allowing it to slide along the inner wall to produce a non-uniform granulate. At the same time, the steam generated in the interior of the blender is extracted by suction using a high flow and high performance vacuum generation system. This vacuum system consists of a high flow Roots type pump and a liquid ring type vacuum system of high suction power with its corresponding safety filter.

The discharge systems are the same as those detailed in the double cone blender, usually feeding directly into a granulation system or a mill in order to obtain a final product of uniform size.

The skid must be surrounded by a guard rail that incorporates a safety system which stops the blender if the rail is opened while the blender is in operation. An alternative system consists in placing the blender in a special room for this purpose.



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