Hydrocyclone Technology for Tapioca Starch and Sago Industry

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A hydrocyclone is a straightforward device with no moving parts. It includes a set of nozzles, usually made of plastic, housed within a watertight steel structure. Hydrocyclones are used in the starch industry mainly for purification and concentration. Its main function is to separate a mixture of solid particles and water into two distinct streams. The majority of solid particles are concentrated in a smaller volume of water and exit through the bottom of the hydrocyclone, known as the underflow. Meanwhile, excess water is discharged from the top of the hydrocyclone, known as the overflow.

How does a hydrocyclone work?

Hydrocyclone is key equipment for producing cassava starch. Cassava starch milk is a mixture of extracted starch particles suspended in a large volume of water. It undergoes pressurization and is then directed into the top section of the nozzles positioned around a central aperture. Within the nozzles, the starch milk follows a circular path, generating significant centrifugal forces. These forces propel the heavier starch particles outward toward the nozzle walls, causing them to descend downwards. Eventually, the starch, now separated from water, exits through an opening at the bottom of the nozzles. On the other hand, lighter particles such as fine starch and dirt are carried along with water through the central opening at the top of the nozzles.

How can hydrocyclones be installed in the starch and sago industry?

During the tapioca starch extraction process, significant amounts of water are utilized for rasping and sieving. This water consumption can be reduced by directing the starch milk, which flows from the screening system, through a hydrocyclone. The starch milk is then collected in a specially designed sump tank before being pumped to the hydrocyclone at the appropriate operating pressure. The concentrated starch milk extracted from the bottom of the hydrocyclone is directed to settling tanks. The surplus water, containing a minor amount of fine starch and dirt, can be recycled back to the raspers. This recycling process helps replace the freshwater typically used for crushing.

Advantages

- Water consumption can be reduced by up to 60 %
- Volume of water can be reduced by up to 60 %
- The volume of settling tanks required is reduced
- Starch will settle quicker
- Quantity of dirt starch collected in settling tanks is reduced
- Less starch will be lost in the overflow from settling tanks

After installing hydrocyclone technology, tailored to match the factory's capacity, regular cleaning ensures seamless and trouble-free operation. The primary installation costs include the hydrocyclone and its support structure, a pump with associated pipework and valves for connecting to the hydrocyclone, and the construction of a sump tank to collect the starch milk. The operating costs will primarily involve running the pump, yet these expenses can be offset by the savings generated from using less fresh water extracted from open or bore wells.

Thus, hydrocyclones offer significant advantages in terms of efficiency, cost-effectiveness, and versatility in various stages of starch production and refinement within the tapioca starch and sago industry.