Sugar muddy juice dewatering

Optimize your process using Alfa Laval decanter centrifuges

Optimized sugar muddy juice dewatering

Save on operating costs
Decanter centrifuges are an attractive alternative to traditional rotary vacuum drum filters (RVDF) for dewatering sugar mud from clarifier bottoms. You achieve a number of major advantages by using a centrifuge system compared to RVDFs:

– The amount of sugar recovered from mud is significantly higher when using decanters. Sugar loss is typically reduced by 50% in this production step.
– Save 1% bagasse on cane and use it for power production since decanters do not require any bagasse as filter aid.
– The process produces less sugar mud cake since it is both dryer and does not contain any bagacillo filter aid. This lowers disposal costs and reduces sugar losses.
– Save 0.5% bagasse on cane in the evaporating stage since no wash water is used in the decanter.
– Power consumption for dewatering is reduced by up to 20%.

Summarizing the savings that can be made, the payback time in changing to an Alfa Laval decanter system is often less than one sugar cane crushing season.

High sugar recovery
Sugar loss in muddy juice dewatering is directly related to how wet the resulting cake is. The dryer the cake, the more sugar is recovered.

A decanter system produces cake with 35% dryness compared to 25–28% for an RVDF. The fraction of sugar lost in the dewatering process is estimated to be 0.03% on cane for a decanter system and typically twice as high for an RVDF.

High capacity and low risk of contamination
Decanters are very compact and offer high performance on a small footprint. This is valuable when expanding plant capacity and space is limited.

The degradation from bacterial contamination is minimized as mixing of bagasse is completely eliminated.

Increased co-generation in Indian sugar mill

Hemarus Industries Ltd operates a sugar mill in Maharashtra, India, with a crushing capacity of 3,500 tons per day. The company also has a 20 MW co-generation power plant on-site.

The plant was commissioned in late 2010 and uses Alfa Laval decanters as the sole separation method for sugar muddy juice.

Mr. J. Venkat Rao, General Manager – Technical at Hemarus explains the reason for choosing decanters:

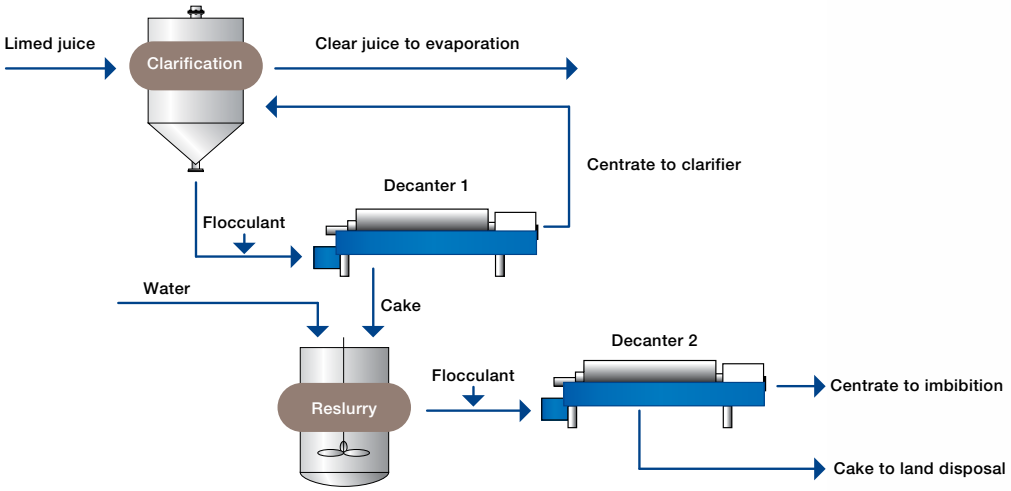
"We studied the decanter technology vis-à-vis RVDF technology and decided to go ahead with the former, primarily because of the savings envisaged in terms of bagasse," he says.

The company calculated that they would be able to generate an extra 1,440 MWh from saved bagasse and sell it to the electric grid for 6.89 million Indian Rupees (approximately $150,000).

Hermarus is in the process of setting up another sugar plant in the near future. The good experiences with Alfa Laval decanters have made choosing equipment easy.

"We have already included Alfa Laval decanters and the option of Wide gap PHEs and condensers for our new project," Mr. J. Venkat Rao concludes.

Process overview



Sugar recovery is maximized by using a system with two decanters. The cake coming out of the first decanter is re-slurried in water in order to wash out the residual sugar. The slurry is then fed to the second decanter.

The overall sugar recovery is higher than 99% and the cake coming out of the second decanter has a dryness of about 35%.

The sugar juice from the first decanter is fed back to the clarifier and the effluent from the second decanter is returned to the process as imbibition water.

To maximize dewatering system performance, a flocculant (polyelectrolyte) is fed to the process stream just before each decanter. Alfa Laval assists in optimizing the selection and dosing of the flocculant. Typically 10 to 15 grams of flocculant are fed per ton of cane. The cost of the flocculant is insignificant compared to the savings accrued.

Typical figures for a decanter system

INLET	
Sugar content:	12%
Suspended solids (lime, mud, bagacillo, etc.):	5–10%
OUTLET	
Sugar content:	0.5–1.5% (significantly better than an RVDF)
Suspended dry solids in cake:	35%
PERFORMANCE OF EACH DECANTER	
Suspended solids recovery:	95%

Designed for the sugar industry

The SugarDec range of decanter centrifuges was designed and built with the specific requirements of the sugar industry in mind.

Drawing on Alfa Laval's long experience in the supply and manufacture of decanter centrifuges to the food and process industries, the SugarDec range offers unrivaled performance and reliability.

Thanks to the well-balanced, straight-forward design, unique control systems and use of robust, abrasion-resistant materials, SugarDecs operate more reliably and more efficiently than any other comparable equipment.

SugarDec decanters give very high cake dryness and sugar juice clarity compared to traditional technologies. The machines are energy efficient with high throughput. This means a lower production cost and higher production capacity.

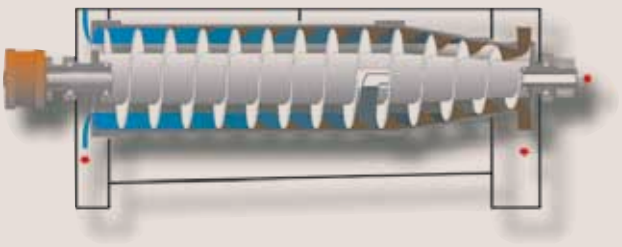
Operating principle
A decanter centrifuge uses centrifugal force to separate suspended solids from the liquid in sugar muddy juice.

The sugar muddy juice is injected into a rotating, cylindrical bowl. The suspended solids have higher density than the liquid, which means the centrifugal force causes them to separate from the liquid and build up on the wall of the bowl.

A screw conveyor in the bowl transports the solids to the conical end of the decanter where they are discharged. At the same time the clarified liquid exits the bowl at the other end.

Continuous, easy operation
Decanters operate continuously in a totally closed system, being leakage and splash free. The system requires no vacuum system and only minor attention from operators. It is easily kept clean as the decanters and piping can be flushed with hot water.

All parts in contact with the slurry are made of stainless steel.



A decanter centrifuge uses the centrifugal force to separate suspended solids from the liquid in sugar muddy juice. The solids are discharged at one end of the decanter and the clarified liquid at the other.

To succeed in the sugar industry, plant owners constantly need to find new ways of optimizing the production process. Reducing operating costs and raising production yield is always on the to-do list.

Alfa Laval has a long experience from sugar processing and offers a wide range of solutions that help boost efficiency and bottom-line results. One example is the many advantages Alfa Laval decanters offer for dewatering muddy juice compared to using traditional rotary vacuum drum filters (RVDF):

– Sugar loss reduced by 50%.
– Significant savings in mud disposal costs.
– More power co-generated as no bagasse is used in the process.
– Up to 20% reduced power consumption.
– Lower steam consumption in the evaporator stage.
– Reduced bacterial contamination.
– Smaller size and lower installation costs.
– Easy operation without need for vacuum.

Alfa Laval in brief

Alfa Laval is a leading global provider of specialized products and engineered solutions.

Our equipment, systems and services are dedicated to helping customers to optimize the performance of their processes. Time and time again.

We help our customers to heat, cool, separate and transport products such as oil, water, chemicals, beverages, foodstuffs, starch and pharmaceuticals.

Our worldwide organization works closely with customers in almost 100 countries to help them stay ahead.

How to contact Alfa Laval

Up-to-date Alfa Laval contact details for all countries are always available on our website at www.alfalaval.com

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