

Processing Low Raw (Grade) and High Raw Massecuite in a Continuous Centrifugal

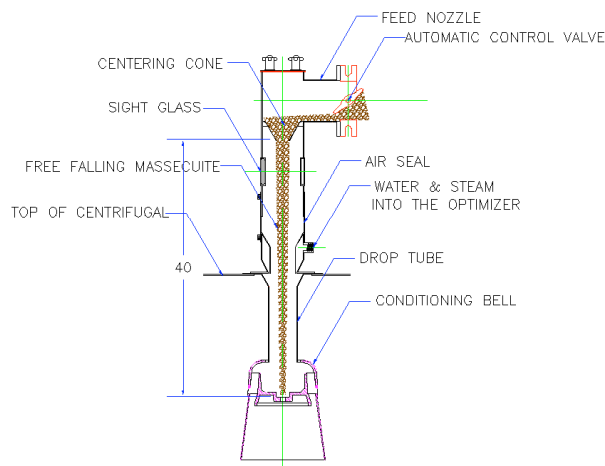
I am always amazed at how many sugar factories let their centrifugal station get in poor operating condition and still expect good results.

The speed is the first thing you need to check. A number of tests will be required to make sure you are running at the optimum purging speed. The manufacture will set the speed close for low raw (grade) 2600Gs, this is at the top of the basket. A high raw centrifugal is set at 1500Gs to 1700Gs, the basket discharge point. A lower RPM will give a higher over all capacity to the continuous centrifugal. The tests are very important on high raw centrifugals. Before running tests, check with the manufacture as to what the maximum safe centrifugal speed should be.

The feeding system drawing below is a tried and true feeding system, which will work on any centrifugal.

In many sugar factories people will change their feeding systems for one reason or another. This is not a good idea because the machine will perform badly and could become dangerous. I would advise getting a qualified professional help before making changes. The requirements to get the tried and true feeding system pictured above are as follows:

1. You need a sealed feed tube so ambient air will not cool down the massecuite.
2. A single stream of massecuite that is free falling about one meter will accelerate to the right speed to produce a smaller rope of massecuite, which will cause the massecuite to spread out in the conditioning bell.
3. The system must have a way to center the feed rope, this can be done with a centering cone.
4. You need a way to see the massecuite falling into the

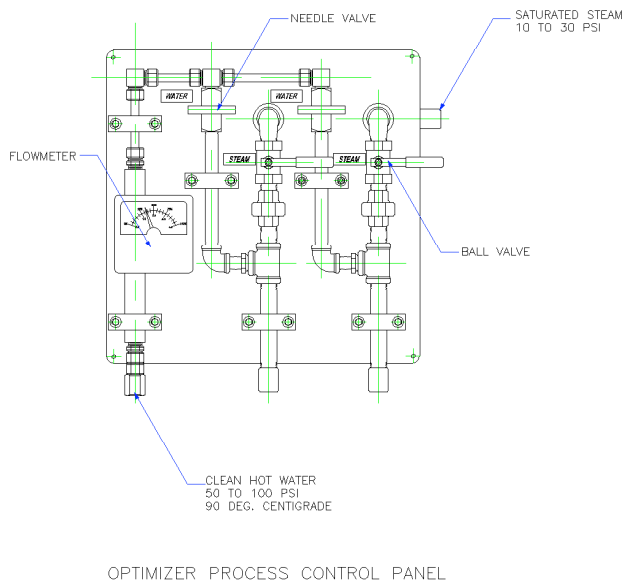


CENTRIFUGAL FEEDING SYSTEM

centrifugal while keeping the feed system sealed. A sight glass is the best way to do this job. Some manufactures will provide an open space so you can see the massecuite going into the centrifugal. This is not recommended because the feed system is not sealed and allows air to cool down the process.

5. It is recommended that an automatic control system be used, there are many good process controllers on the market today. By using an automatic control system the continuous centrifugal capacity will be higher, the over purging condition will be avoided, and the molasses purity will be minimized.

6. You need a good massecuite heating system. The Optimizer can provide more than the required amount of heat to the massecuite. It is very safe, sets on top of the centrifugal and cannot fall into the centrifugal, avoiding the potential for a great deal of damage. The massecuite heater can be controlled by a process control panel. You can add a temperature controller to check the temperature



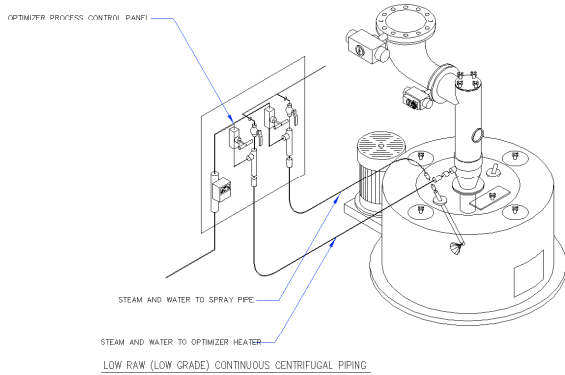
of the incoming massecuite and the exiting molasses to control the heat from the optimizer.

7. Good housekeeping keeps foreign objects out of the massecuite, keeping the conditioning bell clean. This will help keep vibration down, the screens uniformly covered, and a safer operation. On one occasion I was called to visit a sugar mill with a terrible problem; the whole centrifugal station was shaking. With a stroboscope light I

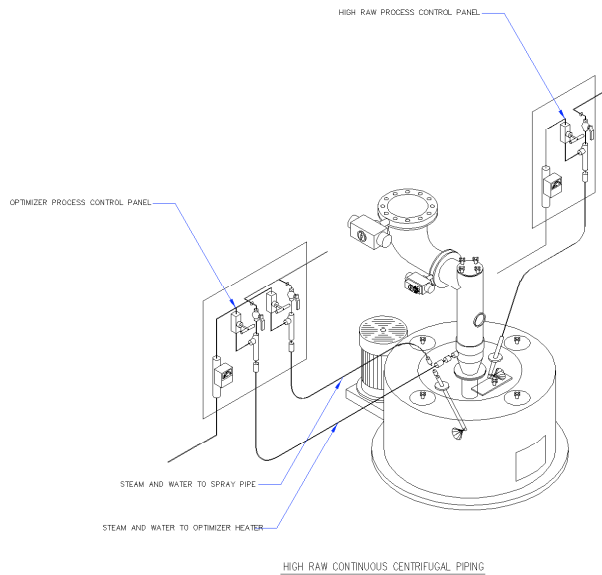
continued on page 28

continued from page 26

could see bad streaking of the sugar on the baskets. We stopped the centrifugals, one by one, finding short pieces of cane in the conditioning bell. We traced the cane back to the crystallizer operator, who had a real taste for cane,



he had a whole box of cane to eat, while he sat there on his box of cane pulling out one piece of cane at a time to



eat he was peeling off and throwing the outer parts of the cane into the crystallizer. The factory manager was ready to throw the operator into the crystallizer.

For the benefit of all: the control panel needs to be easy to understand, maintain, and easy to track hoses to their destination. The fewer the valves and gauges the better the panel will work. The drawing below shows a simply control panel.

The low raw (low grade) and high raw continuous centrifugals both need an optimizer process control panel. However, the use of the panel is not the same for low raw

and high raw massecuite. But the requirements are the same. The requirements are as follows:

1. A constant supply of water, at a constant pressure. The pressure can be 50 to 100 PSI, but must maintained at a constant pressure. Many times I have seen the water supply connected to the batch centrifugal supply; this is not a good idea. When the batch centrifugal goes into its wash cycle the continuous centrifugal will loose water pressure, upsetting the purging of sugar, creating high color and causing the use of to much water, which will raise the molasses purity.

2. Hot clean water at a minimum temperature of 90° centigrade. If the water is not clean you will have problems with the flowmeter and eductor on the optimizer process panel.

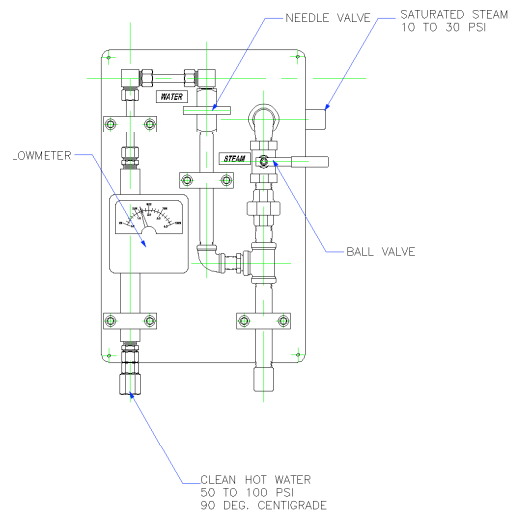
3. Saturated steam, 10 to 30 PSI, at 89 to 121 degrees centigrade, at a constant pressure.

4. A heavy structure under the centrifugal station to minimize vibration. High vibration will reduce the accuracy and shorten the life of the flowmeters.

The high raw you wash the sugar on the screens; and the low raw (low Grade) requires little or no sugar washing, but requires the massecuite to be diluted for good purging. The high raw continuous centrifugal needs an additional process panel to control its upper spray nozzle. The picture below shows the High Raw Process Panel.

The next two drawings show you how the low raw (low grade)centrifugal piping arrangement is different from the high raw continuous centrifugals.

In most cases, when processing low raw (low grade) massecuite in the continuous centrifugal you want to



HIGH RAW PROCESS CONTROL PANEL

dilute and heat the feed, to add steam and hot water to the massecuite in the optimizer. Do not put water on the free falling massecuite rope, water on the outside of the feed

rope will make the massecuite very slick and it will not spread out uniformly in the conditioning bell and basket. Avoid washing the sugar on the basket, however if necessary place a spray nozzle below the color line or as low as possible. When the sugar leaves the basket and hits the sugar curb you would like to see the sugar build up to a mound and brake off in rolls the size of your arm. The color of the sugar should be a golden tan, you do not want to see very dark brown or near white sugar; nor do you want to see the sugar running down the side of the curb like magma or not sticking to the wall at all.

When processing high raw massecuite in a continuous centrifugal you should avoid diluting the feed. By adding steam into the optimizer without adding water will help heat the massecuite without diluting the feed. As the syrup is leaving the crystal you should clean the syrup from the surface. High raw massecuite must be washed on the basket with the first nozzle about 100 millimeters above the color line. If it is difficult to obtain the low color with a small amount of water, it is preferred to add a second wash nozzle 200 millimeters from the top of the basket

rather than using a large amount of water at the first nozzle. A large amount of wash water at the first nozzle will make low brix syrup, while a tiny amount of wash water at the second nozzle will make very low color sugar. The color of the sugar should be a creamy white, rather dry, and falling off the sugar curb easily.

When making changes to the centrifugal I like to catch a sugar sample in a pile on top of the centrifugal, make a change, collect a new sugar sample in pile on top of the centrifugal next to the first pile and compare the samples to each other to see if the changes I have made have made the planned corrections. In the long run, a properly designed and maintained centrifugal station that are regularly tested to keep the centrifugals running at their peak performance will actually reduce operating cost, increase yields, and improve the profitability of the factory.

SJ

Ted D. Milner founded Sugar Technical Solutions, a consulting and design company for the sugar industry. He can be reached at his email: milner_88@msn.com

continued from page 27

- Una construcción pesada de soporte de la centrifugas para minimizar altas vibraciones que reducirán la precisión exacta de los medidores de flujo.

Las mazas de crudo de alto grado requieren lavado de la maza en las mallas y las mazas de crudo de bajo grado requieren muy poca o nada de agua de lavado, pero requiere una buena dilución para una mejor purga. Las centrifugas continuas para mazas de crudo de alto grado requieren un panel de control de proceso para las boquillas (sprays) superiores.

En la mayoría de los casos las mazas de crudo de bajo grado las centrifugas continuas requiere de dilución y temperatura en las mazas, agregar vapor y agua caliente a la maza en el optimizador. No ponga agua en el flujo de lamaza, ya que esta se volverá resbaladiza y no se distribuirá uniformemente en la campana acondicionadora y en la canasta misma. Evite lavar el azúcar en la canasta, sin embargo es necesario poner un a boquilla (spray) debajo de la línea de color o los mas bajo posible. Cuando el azular sale de la canasta y en lanzada al cuerpo curvado de la centrifuga es preferible ver que el azúcar forma unos terrones que se desintegren en rollos del tamaño del brazo. El color del azúcar debe de ser color oro, debe de evitarse el color de café oscuro, tampoco ver azúcar muy blanca, siempre es preferible que azular fluya hacia abajo en el lado de la curva como su fuera magma y que no se pegue del todo a la pared.

Cuando se esta procesando en una centrifuga continua mazas de crudo de alto grado debe de evitarse diluciones en la alimentación. Agregando vapor en el optimizador sin que se agregue agua ayudara a calentar la maza sin diluir

en la alimentación. Cuando el cristal esta dejando a la miel, se debe de limpiar la miel en su superficie. Mazas de de crudo de alto grado deben de ser lavadas en la canasta con la primera boquilla (spray) aproximadamente a 100 milímetros encima de la línea de color. Es difícil obtener un bajo color con una pequeña cantidad de agua, es preferible agregar una segunda boquilla (spray) a 200 milímetros de la parte superior de la canasta, en vez de usar una cantidad grande de agua en la primera boquilla (spray). Una cantidad excesiva de agua en la primera boquilla (spray) hace una miel de bajo brix, mientras que un poco de agua en la segunda boquilla (spray) hará azúcar de bajo color. El color del azúcar deber de ser color crema-blanco, un poco seca, y saliendo fácilmente de la curva.

Cuando se hagan cambios en la centrifuga siempre es bueno tomar una muestra del azúcar antes del cambio, después del cambio s toma otra muestra para compararla con la muestra que se tomo antes del cambio, comparando las dos azucares nos dará una idea si el cambio ha valido la pena.

Como rutina de largo plazo, un apropiado diseño de centrifugas, un mantenimiento preventivo permanente y pruebas con regular frecuencia se tendrán las centrifugas en condiciones optimas, esto reducirá costos de operación, aumentaran los rendimientos y mejorara la rentabilidad de la fabrica.

SJ

Translated by Luis E. Rivas, consultant for the sugar industry. Baton Rouge, LA Email: lrivase@aol.com.