New low-raw product station for the sugar factory at Nampa, USA

Nampa

sugar factory

The Amalgamated Sugar Company located at Nampa, Idaho started another step towards factory modernisation. This phase includes the conversion of the low-raw product station by providing the following BMA equipment: a continuous vacuum pan (VKT), a vertical cooling crystalliser (OVCC), continuous K3300 centrifugals, a molasses/magma mingler, and several massecuite pumps. With the continuous operation of the VKT and an increased aftercrystallisation capacity, a constantly lower C-magma temperature can be achieved in the future, which will result in an increased yield and a reduced molasses loss.

The VKT consists of four crystallisation chambers that are arranged one above the other and equipped with a separate stirrer each. The massecuite flows from one chamber to the other under its own gravity. The crystal seed is added in the top chamber, and the feed solution in all chambers. The crystal content increases from chamber to chamber and can be adjusted in the last chamber to an optimum nonsugar/water ratio for the downstream OVCC. The calandrias are controlled individually, which allows for a very stable continuous operation. The advantages resulting for the overall process are consistent vapour bleeding, consistent tapping of the feed solution, consistent vapour discharge, and consistent massecuite production.

Cooling crystallisation is the last step of mother liquor desugarisation and thus of particular importance, since non-optimised apparatus and poor process control directly entail molasses losses. Thanks to steadily improved and modern technology, the continuously operated OVCC meets the necessary requirements. The OVCC size and thus the volume determine the residence time. The cooling system consists of several block-type cooling elements that are equipped with tubes and operated in countercurrent. The entire system is suspended from lifting tubes and oscillates by approximately 1m in vertical direction by means of hydraulic cylinders attached to the cover. This uniform relative motion between massecuite and cooling tubes ensures a very good heat transfer. At the same time, a high self-cleaning effect is obtained, preventing incrustations of the cooling tubes. The symmetrical arrangement and the uniform motion ensure a very close massecuite residence time spectrum and thus lead to excellent yields. The sturdy but simple design allows cooling highly viscous massecuites down to 40 °C.

Another advantage of using VKT and OVCC is the fact that the project can be implemented independently of the running campaign. Thanks to the vertical arrangement and the resulting low space requirements as well as the solid design, both machines can be assembled outdoors in front of the factory building without affecting the campaign. The last short tube connections can be made during a short interruption of the running operation. This reduces time pressure, and such on-the-fly commissioning helps creating stable operating conditions before a new process step is installed.

Hans Schmidt

Benefits

- Process know-how from BMA
- Minimal massecuite temperatures
- Maximum yield
- High processing rate with only 1 crystalliser

Assembly of

a crystalliser