

Modern process technology for the Mini Cassia sugar factory, USA

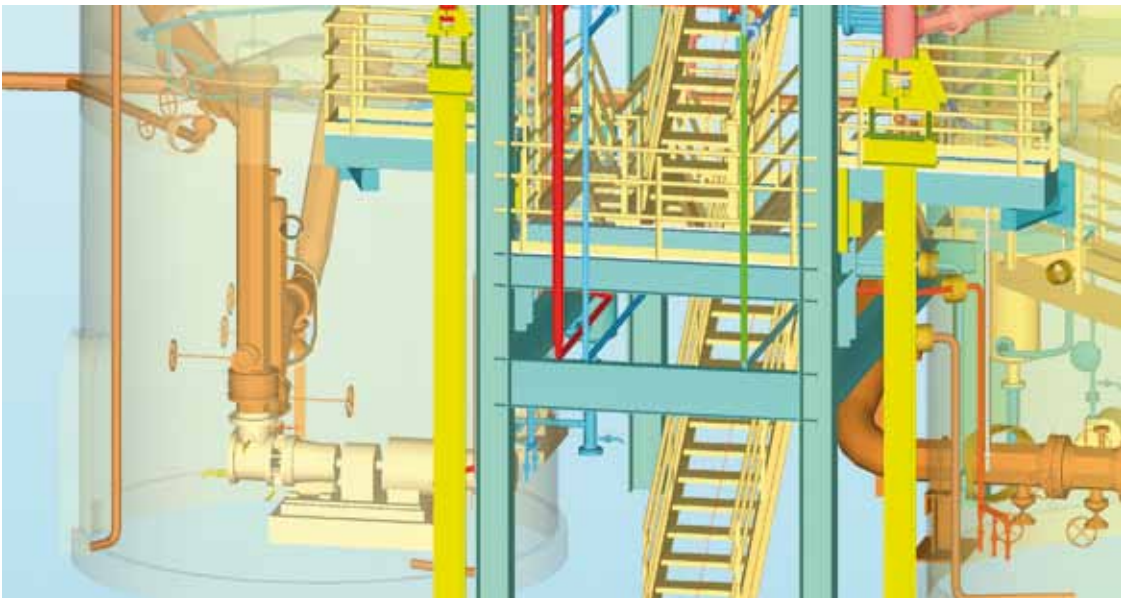


The modernisation and energy reduction programme that the Amalgamated Sugar Company has launched for its Mini Cassia sugar factory in Idaho has been taken one step further. BMA is proud to play a key role in this project as an expert partner and will supply the following equipment: a continuous vacuum pan (VKT), 5.2 m diameter with four chambers for raw sugar, plus F500 and F1000 massecuite pumps; a continuous vacuum pan (VKT), 4.4 m diameter with four chambers for low-raw massecuite, plus F150 and F500 massecuite pumps; two vertical cooling crystallisers (OVC), 5.2 m diameter x 27.5 m, plus two F500 massecuite pumps and a molasses/massecuite mingler. BMA will also provide engineering services as well as supervision of assembly and plant commissioning. Since there are different manufacturing sites, fabrication will have to be carefully coordinated. A large portion of the equipment will come from BMA's workshop in Germany, another portion will be manufactured by Brewer Steel in Colorado, a wholly owned subsidiary of the BMA Group. Local Idaho-based manufacturers will take care of equipment pre-assembly in their workshops and later of assembly on site.

Both VKTs consist 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 to the top chamber, and the feed solution to all chambers, so that the crystal content increases from chamber to chamber. In the last chamber of the low-raw VKT, an optimum non-sugar/water ratio is adjusted for the downstream OVC. The calandrias are controlled individually, which allows for very stable continuous operation. The advantages resulting for the overall process are consistent vapour bleeding, tapping of the feed solution, vapour discharge, and massecuite production. Since it is possible to use heating steam of a lower energy level when changing from a system with batch pans to one operating with a continuous VKT, the factory can save a considerable amount of energy.

Cooling crystallisation is the last step in mother liquor desugarisation and thus of particular importance, because non-optimised apparatus and poor process control directly entail molasses losses. Thanks to steadily improved and modern technology, the continuously operated OVC meets the necessary requirements. Two factors determine the volume that has to be provided and therefore the size of the OVC: the required throughput and the necessary retention time. In view of the high throughput in Mini Cassia, two OVCs had to be connected in series to be able to achieve the desired low massecuite temperature. The cool-



ing systems of the two OVCs consist of cooling coils with a countercurrent flow of cooling water. The entire system is suspended from lifting tubes and oscillates by approximately 1 m in vertical direction by means of hydraulic cylinders that are mounted on 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 premature cooling tube encrustation. The symmetrical arrangement and the uniform motion ensure a very narrow massecuite retention time spectrum and thus lead to excellent yields. The sturdy but simple design allows cooling highly viscous massecuites down to 40 °C.

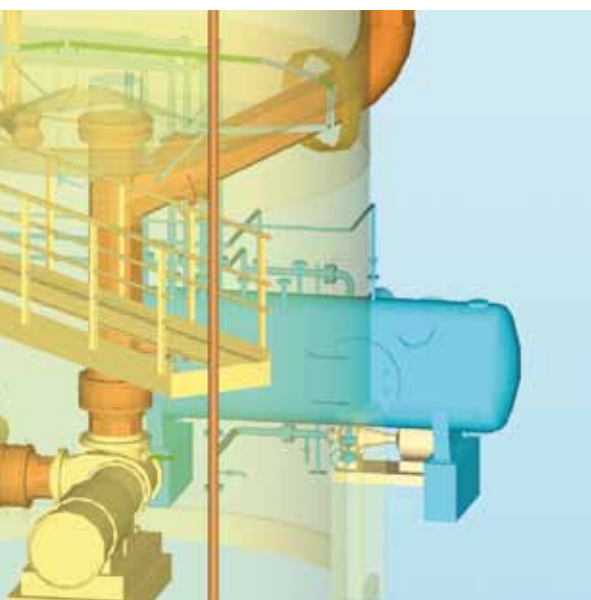
Like almost all VKTs and OVCs, the units for Mini Cassia will be installed outside the sugar house. Examples from different climatic zones clearly show that it is not necessary to provide a building. VKTs and OVCs are in operation at ambient temperatures between -30 °C and +50 °C to the fullest satisfaction of customers around the globe. At Mini Cassia, the two VKTs and the two OVCs will be connected by one central staircase and arranged to form a square. The staircase, which has to provide convenient access to the different VKT and OVC levels for inspection and maintenance, is always adapted to local conditions. The layout and connection of the piping with

the factory are also always adapted to the specific conditions in a factory; this applies particularly to the piping for the VKT.

Another advantage of outdoor installation is that assembly can take place independently of the running campaign. Only the last short pipe connections will be made with some minor interference during the running operation. This considerably reduces time pressure, and such on-the-fly commissioning helps create stable operating conditions before a new process step is installed.

Commissioning is scheduled for the 2011/2012 campaign. By choosing BMA as a partner again, Amalgamated Sugar has decided in favour of engineering competence and excellent process know-how. These, in addition to equipment supplies, are factors that contribute to a successful partnership.

Hans Schmidt



*Support section with
BMA massecuite
pumps*