

New sugar melting plant improves sugar-end operation

A new BMA sugar melting plant was commissioned in the Dinteloord sugar factory, Netherlands, in 2012 for the start of the thick juice campaign. B and C sugar are used together with thick juice to produce about 400 t/h of liquor with the highest possible dry substance content. Under the preceding basic concept, two melting tanks, each with a capacity of 60 m³, were to be installed in succession, thus offering a cost-effective solution regarding both process engineering and energy efficiency benefits.

After first consultation meetings, the available options regarding processes, equipment, installation, and investment volumes were examined in the form of a basic concept. For an expansion of the sugar melting plant with downstream liquor filtration, the central issue was to achieve optimum melting and filtration results in terms of process reliability, availability of melting volume, the necessary heat exchanger areas for heating the liquor, and a suitable filtration method. One of the primary objectives was to find a solution in which only thick juice is used for melting the B and C sugar, in order to reduce the steam consumption for downstream evapo-crystallisation as much as possible.

The concept was implemented with two BMA melters, each 12.5 m long and 2.5 m wide, and each subdivided into five chambers. A sturdy stirrer in the first chamber provides for intensive mixing of the sugar and the thick juice, and another eight stirrers in the other chambers keep the sugar/thick-juice mixture in motion, so all the sugar is eventually melted. There is no stirrer in the last chamber, which is used as a buffer for level control with the liquor pump. If necessary, the addition of small amounts of thin juice (during the beet campaign) or condensate (when thick juice from the thick juice storage tanks is used) is possible so as not to exceed the dry substance content of 78 % that has been defined as a maximum for the liquor. The temperature in the melting tanks is adjusted with plate heat exchangers for thick juice and recirculated liquor.

Regarding the detailed design of the melting tanks and the additional peripheral equipment, various options were discussed with BMA and implemented according to requirements. Since the tanks had to be installed in an existing building, which has a very narrow column spacing, the melting tanks were shipped in four segments each. On site, these were taken to their final place of installation and then welded together to form two leak-proof troughs.



*New sugar melting
plant at the Dinteloord
sugar factory*



*Stirrers for the first
chambers*

A performance run confirmed the design that had been selected for the melting plant in the basic concept. Not only were the defined parameters reached in a continuous and stable process. The reaction of the equipment to typical incidents at the sugar end could also be tested. Finished white sugar that suddenly enters the melting system because of a disturbance in the sugar flow would, for instance, considerably disrupt the normal production process. To simulate such a situation, an additional 10 t of sugar were fed into the first chamber of the melting system within a period of seven minutes. The fluctuations in the temperature and dry substance content of the liquor that were thus triggered did not lead to any critical conditions for the stirrers in the melting system or the liquor pumps; neither did it affect downstream liquor filtration.

After the first few days of the campaign, the customer was already full of praise about the smooth sugar-end operation as a whole, which

he attributed to the new melting and filtration equipment. In terms of energy efficiency, the new melting plant has clearly exceeded the expectations placed on it.

Dr Andreas Lehnberger

- Expert assistance with design and equipment selection
- Several planning steps for a high level of process reliability
- Efficient plant performance in line with specified parameters
- System reliability even in cases of typical malfunctions
- BMA equipment providing for optimised energy consumption