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## ABSTRACTS

Continuous centrifugals have been a significant asset in sugar factories, providing simple and reliable operation and the ability to handle poor quality fillmass that batch centrifugals had difficulty purging. The one issue that has been problematic with continuous centrifugals is the durability of the screens they use. Rapid wear equates to higher sugar losses and equipment downtime when changing screens in addition to the expense of purchasing extra screens.

Johnson Screens contacted the Bay City factory in 2001 about testing their concept of using wedge-wire screens in continuous centrifugals. We were intrigued with the idea. The thickness of the wedge-wire should enable long screen life, but would they work? Questions to answer were: would the machines stay in balance, would the screens come apart, would they affect throughput, would they affect syrup quality, and ultimately, would they provide long service life?

A 90 micron screen was designed to fit a BMA 1100 centrifugal in 2002 that we would test in High Raw service. We installed the first test screen in the fall of 2003 and set up a weekly test schedule to compare performance against a conventional chrome-plated screen that was in another machine. Even though the screen was significantly heavier, the centrifuge stayed in balance. This first screen was quickly followed with two more screens for expanded comparison. Interestingly, one of these screens had the slots aligned horizontally instead of the normal vertical alignment. The results of our comparison testing are shown below in Table 1. Essentially we concluded that all the screens provided equivalent performance to the conventional screens. Following the campaign, the screens were inspected and there was no detectable wear.

Confident from the success we had on our high raw centrifugals, we had a 40 micron screen built to test in our K2300 low raw centrifugals in 2004. Molasses purity was tracked to determine if there was an effect on sugar loss. The results, as shown in Table 2, demonstrated that we obtained essentially the same molasses purity.

In the subsequent years we added additional screens to gradually replace all the conventional screens as Johnson Screens has continued to refine their design. The first K1100 screen showed minor damage in 2007 after a service life of four campaigns, but has been kept in service still through the present campaign. The other original K1100 screens are also still in service in their sixth campaign. In comparison, the chrome-nickel screens were completely worn out in one campaign. The first K2300 screen was replaced in 2007 for a service life of three campaigns. The second set of K2300 screens are still in service in their fourth campaign. The old screens only lasted about 30 days. These screens have convincingly shown us reliable performance and greater durability than we had ever hoped for when we began this project.

**TABLE 1 K1100 HIGH RAW CENTRIFUGAL JOHNSON SCREEN TEST**

VERTICAL SLOTS		HORIZONTAL		VERTICAL		STD SCREEN		DIFFERENCE	
JOHNSON SCREEN		JOHNSON SCREEN		JOHNSON SCREEN		STD SCREEN		DIFFERENCE	
BRIX	PURITY	BRIX	PURITY	BRIX	PURITY	BRIX	PURITY	BRIX	PURITY
84.6	70.2	84.2	70.7	83.8	70.9	81.5	73.2	3.1	-3.0
83.9	70.8	83.3	70.9	84.4	71.1	81.1	71.3	2.8	-0.5
83.9	71.1	83.9	70.8	83.1	71.0	83.0	71.5	0.9	-0.4
85.9	71.8	85.2	71.8	84.6	72.4	83.6	71.9	2.3	-0.1
81.2	70.2	85.2	70.3	83.7	70.9	85.6	71.8	-4.4	-1.6
83.4	71.2	85.0	71.8	83.6	72.4	84.4	72.3	-1.0	-1.1
82.2	72.1	81.4	72.5	84.0	72.0	82.2	72.6	0.0	-0.5
83.0	72.3	84.5	71.3	81.7	71.4	83.4	72.8	-0.4	-0.5
78.8	70.1	78.7	71.5	78.0	71.8	80.6	70.7	-1.8	-0.6
84.2	67.3	84.7	67.1	84.1	66.1	84.3	66.3	-0.1	1.0
82.0	71.9	83.7	71.4	82.3	72.3	82.7	71.6	-0.7	0.3
84.1	71.1	84.7	70.6	84.8	70.8	83.8	71.1	0.3	0.0
80.0	69.9	79.4	69.6	79.9	69.0	80.4	69.4	-0.4	0.5
78.1	69.7	78.2	70.5	77.7	70.0	78.0	69.1	0.1	0.6
78.0	75.2	78.7	76.1	78.5	75.0	78.7	76.0	-0.7	-0.8
85.4	71.4	84.9	69.3	86.7	71.1	86.0	70.6	-0.6	0.8

Average      82.4      71.0      82.9      71.0      82.6      71.1      82.5      71.4      0.0      -0.4

**TABLE 2 K2300 LOW RAW CENTRIFUGAL JOHNSON SCREEN TEST**

JOHNSON SCREEN		CONVENTIONAL	
BRIX	PURITY	BRIX	PURITY
86.8	63.7	88.5	63.3
89.7	58.8	89.4	58.8
88.6	59.9	87.9	60.1
89.1	58.4	89.0	59.0
89.8	57.8	89.1	57.0
89.5	58.8	88.2	58.8
89.1	57.9	89.3	58.0
89.5	56.8	89.4	57.3
87.4	58.0	91.6	58.4
91.5	59.4	86.6	56.7
88.5	55.7	87.4	57.8
90.7	59.3	90.7	58.6
83.6	59.2	84.9	58.2
88.2	59.4	87.1	59.3
89.0	59.2	89.1	59.9
90.1	59.6	88.2	59.6
89.0	62.1	87.9	62.8
88.3	57.8	89.1	60.4
89.9	57.8	89.3	58.2

Average      88.9      58.9      88.6      59.1