REAL-TIME COLOUR

NEWS FROM NELTEC

No. 1-2001

Robust System in a Difficult Environment

Due to strict customer requirements a ColourQ system has been placed in a very harsh environment and has again shown its robustness

At the British Sugar factory in York the sugar is handled and conveyed according to very strict procedures, to guarantee the safety of employees and the quality of the product. All conveying is done in completely closed conveyors and special permission is required to even enter the conveying area. Because of these rules it was impossible merely to cut a hole in the conveyor's cover to take measurements. The instrument had to be placed inside the conveyor's shield.

During each discharge moist sugar crystals whirl in the air - contaminating any unprotected surface

The Environment

From the centrifugals the sugar falls onto a hopper/shaker conveyor. One of the uses of the ColourQ is to monitor the performance of each individual centrifugal, so it needed to be placed as close to the centrifugals as possible above this conveyor. The temperature within the shield is around 50°C/112°F, plus or minus a few degrees. The humidity is close to 100%RH, and each charge brings a new load of hot vapour. During each discharge moist sugar crystals whirl in the air - contaminating any unprotected surface.

Precautions Taken

To remedy this problem the electronics were upgraded to withstand an ambient temperature of at least 55°C/121°F. Small heating elements were placed in the illuminator and the detector to keep the optic systems a few degrees above the ambient temperature. This prevents condensation on their surfaces. Condensation is not a problem on the rest of the system as it is waterproof. The instrument was placed as high as possible – approx. one meter above the sugar. Finally, the instrument was tilted to turn the optics away from sugar crystals flying from the centrifugals.

Stable Function

These precautions have been sufficient to deliver accurate and reliable performance. The system has now worked through a long juice run and a long beet campaign without any problems. The optics have not required cleaning on a daily basis.

It was originally estimated that the system would give a significant financial return. However, its success has led to its use being extended to more applications than originally envisaged and so the rate of return is now higher

Benefits from the System

The factory in York produces sugar in different qualities, which are stored in different silos. The ColourQ helps determine to which silo the sugar is sent. It was originally estimated that the system would give a significant financial return. However, its success has led to its use being extended to more applications than originally envisaged and so the rate of return is now higher. Furthermore, this estimate does not include the value and peace of mind provided by always knowing precisely what is going on in the centrifugals.
You may direct questions to
Mr. G. Parkin,
email: gparkin@britishsugar.co.uk,
or to Neltec.

New Display presents Valuable Information

Neltec has designed a new display. Monitoring and optimising the centrifugals' performance is now very easy for the operators.

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Aarberg is Satisfied with the ColourQ

The sugar factory in Aarberg, Switzerland, has used the ColourQ for several years. The operators "don't want to miss the Neltec".

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New Display Presents Valuable Information

At the annual meeting of the Sugar Industry Technologists in New Orleans in May 2000 Neltec introduced a new version of software for the ColourQ. This software was first installed at the British Sugar factory in York in July 2000. It now runs in many factories.

From talks with operators using ColourQ systems Neltec has learnt that, apart from the primary purpose of measuring the colour of the sugar, the ColourQ systems are widely used for monitoring and optimising centrifugals' performance. To facilitate this task Neltec has designed a new display to show a **colour profile** of every charge leaving the centrifugals.

Colour Profile of a Charge

The unique mechanism of the ColourQ allows many measurements to be presented from each charge. When these measurements are plotted on a graph, they show a **colour profile** of the charge from the first to the last sugar leaving the centrifugal. See figs. 1 to 3 below.

Typical Colour Profiles

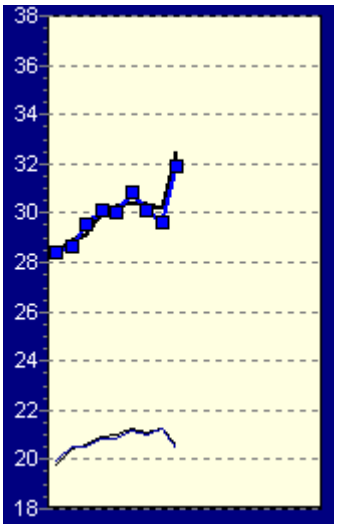

Fig. 1

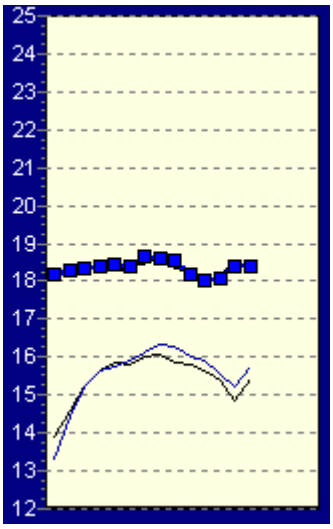

Fig. 2

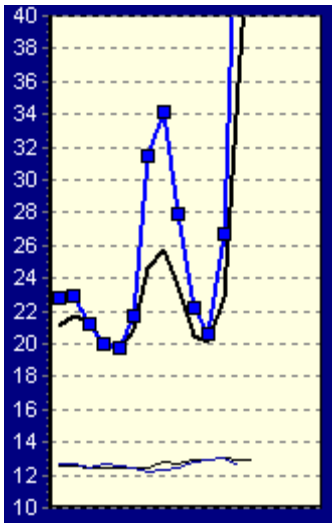

Fig. 3

Wash Water Efficiency

Wash water sprayed on the wall of sugar in a centrifugal basket becomes more and more saturated on its way through the sugar. As the saturation increases the water loses its ability to dissolve the syrup on the surface of the crystals.

At low levels of wash water the surface syrup is dissolved only on the innermost layer of crystals. The colour of the sugar increases from the inner layer to the outer layer, and even more in the upper and lower corners of the basket, where the washing is less efficient.

Colour Profile with Medium Wash Water

See fig. 1.In this case the first sugar encountered by the plough has low colour. Soon the colour increases and ends with a peak.

Colour Profile with Little Wash Water

Here the profile has the same shape as in fig. 1, but with much larger variation from the beginning to the end of the charge.The peak at the end can have colour 20 to 30 ICU higher than the first sugar.

Colour Profile with Excess Wash Water

See fig. 2. In this case all the syrup is removed and the profile is a flat curve. The sugar has low colour - but at a cost, since a high percentage of the crystalline sugar has been dissolved.

Colour Profile with High Peaks

See fig. 3. This is a sure sign that the centrifugal is not working correctly. The spraying system may not be distributing the wash water properly, or the free flow of syrup from the basket may be blocked.

Many other types of error may occur, all of which can be detected by examining the colour profile and comparing it with profiles from the other centrifugals.

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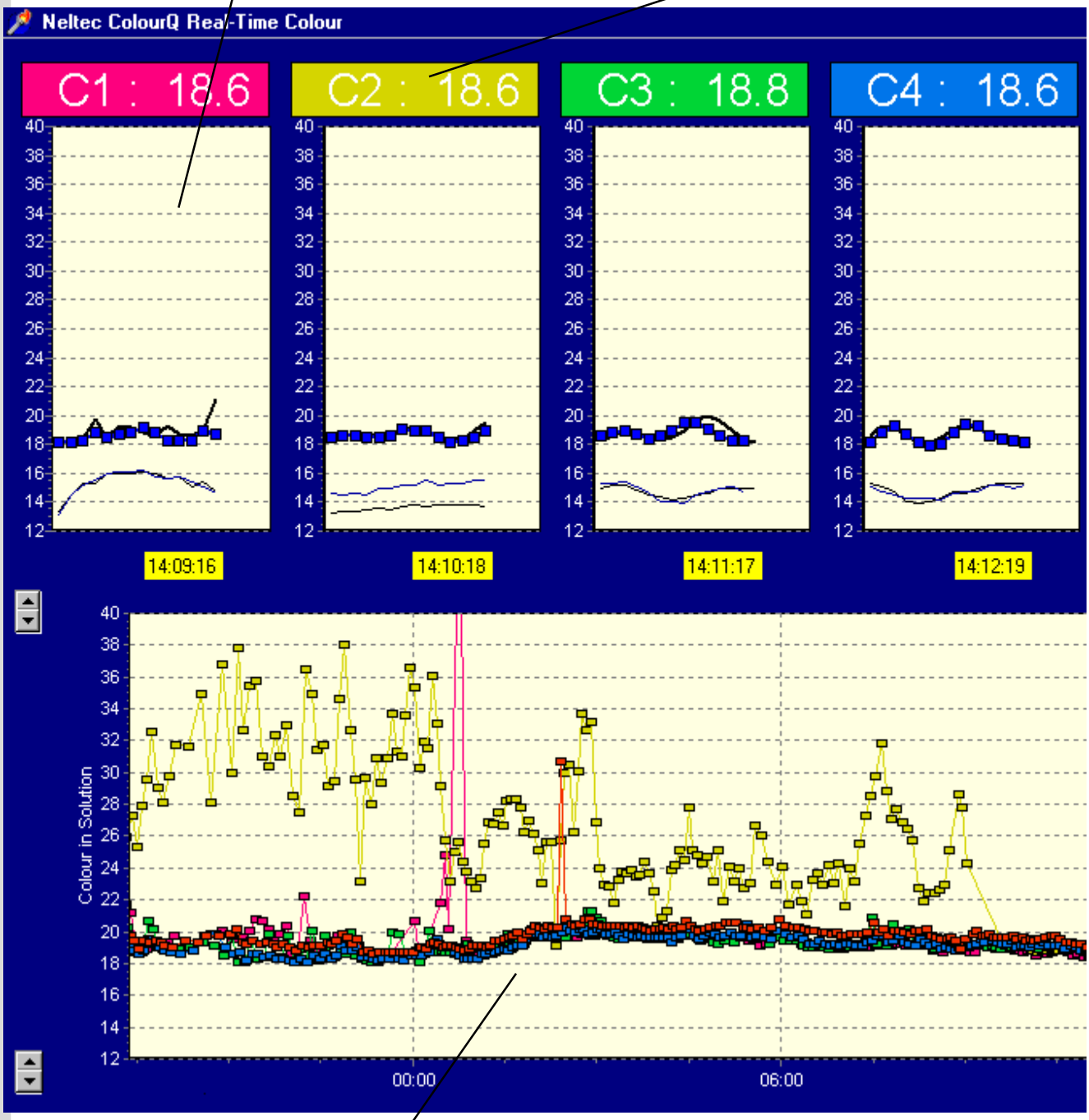
This window shows the colour profile of the most recent charge from centrifugal no. 1. The colour profile is the curve marked with blue squares. Behind this curve is a black curve showing the average colour profile of the two previous charges. By comparing these two curves, it is easy to see if a problem is accelerating. The thin lines below show the height of the sugar on the conveyor from the beginning to the end of the charge.
All centrifugals run with excess wash water. You could reduce the washing by several seconds with hardly any colour increase.

This window shows the average sugar colour of the most recent charge from centrifugal no. 2. The yellow background colour is used to indicate charges from centrifugal 2 in the large window below.
In this case all the centrifugals deliver the same sugar colour.



Each point in this window represents one charge. Centrifugal 2 (yellow marks) has been malfunctioning until 2 hours before the end of the curve.

If you don't detect such errors – but instead increase the washing to keep the colour low – you melt many percent of the good sugar.

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Aarberg is Satisfied with the ColourQ

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Aarberg, 16.11.2000

Neltec-Colour Measurement

Dear Mr. Nielsen

This year is our third campaign with a Neltec-Color-Measurement on wet sugar after centrifugals and we are very satisfied with this measurement. People don't want to miss the Neltec for adjusting the centrifugals, and I think this is a good sign of acceptance of this measurement.

Especially at the 1999 campaign we have had a higher variation of thick juice quality but by using the color-measurement we could adjust the washing water to the centrifugal always to the minimum.

Now the new software is installed for having a better view on every single centrifugal. And the production manager was really surprised when the staff started to optimize the centrifugals by themselves just by watching the single batch-curves. They don't want to have any centrifugal that is worse than the others.

So the new software has started a process of selfeducation of the staff. Now the people know more about the performance of a single centrifugal and have a good instrument for optimizing the filling with massecuite, the amount of washing water and the adjustment of the nozzles.

To say it in short: we are completely satisfied with our Neltec and the service, too!

Kind regards

Zuckerfabriken
Aarberg und Frauenfeld AG

Copy to Mr. M. Hornecker

Neltec2

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