

NEWS FROM NELTEC

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Refinery Gets Fast Pay-back

Elimination of unnecessary remelting in centrifugals gives short payback

The refinery of Saint Louis Sucre in Marseille, France, has installed a ColourQ 800 on a conveyor carrying second-strike sugar. The measurements are used to trim the wash time in the centrifugals, when the sugar has low colour. In this way the refinery avoids melting good sugar. This use alone of the instrument has led to a very short payback for the instrument. On top of this the instrument helps in optimising the centrifugals, and detects any anomalies in the process immediately.

Ask for Copy of the Publication

A detailed description of the experiences in the refinery was given at the 1999 S.I.T. annual meeting, and published in the International Sugar Journal, Dec. 1999. Ask Neltec for a copy.

Positive Operator Attitude

During the first months of operation the operators were very sceptical about the instrument, because earlier they had tried another instrument with less than satisfactory reliability. This attitude has changed and the instrument is now considered indispensable for the process control.

Presentation at the S.I.T. Conference in Lisbon, May 1999

Centrifugal Washing Optimisation by Real-Time Colour Measurement

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ABSTRACT

Removal of colour is the main purpose of the refining process in sugar factories and refineries. However, colour measurements from the laboratory are not available until the sugar has reached the silo, so control of the process is based on historical values and statistical process control instead of current product status.

Automatic real-time colour measurement with the in-line ColourQ 800 colorimeter by Neltec Denmark has been tested on wet sugar from second-strike centrifugals and compared with laboratory measurements. The test has focused on the accuracy of the methods and on the influence of real-time measurements on process control. A special investigation was made to reduce the loss of sugar due to superfluous washing in the centrifugals.

The instrument showed a high level of accuracy.

Loss of sugar due to unnecessary melting of good sugar in the centrifugals was reduced by at least 250 tonnes per year, leading to a very favourable payback on the investment.

Installation on Brown Sugar

In the last quarter of 1999 a ColourQ 800 was tested on brown sugar at the Eridania Béghin-Say refinery in Nantes, France.

The speciality sugar from this line is sold as cubes or granulated sugar. The refinery is very satisfied with the instrument's performance. More results will be published during the first half of 2000.

REFINERY IN NANTES

The instrument is placed one meter above the conveyor. The orange sensor detects sugar on the belt and stops the colour measurement when the belt is empty.



Ochsenfurt Installs Fourth ColourQ

The SÜDZUCKER factory installs the fourth ColourQ 800 instrument in 1999.

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10 Years ColourQ Experience

The Danisco factory in Assens, Denmark says: "The Neltec colorimeters are an important part of our instrumentation".

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Still Better Accuracy – Guaranteed

The ColourQ 800 measures sugar colour in real-time. Improved technique means that Neltec delivers measurements with smaller and smaller error.

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Easy Centrifugal Optimisation

A New Feature of the ColourQ Allows Continuous Comparison of Centrifugal Performance.

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Barilla Installs Sixth ColourQ

Biscuits are measured in the oven. ColourQ gives automatic and error-free check.

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ColourQ 800 doesn't add to Laboratory Uncertainty

Studies on both cane and beet sugar give this result.

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Two Different Qualities Measured in One Screw

One instrument measures two qualities separately.

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10 Years ColourQ Experience

Three colorimeters are important instrumentation at the Danisco factory in Assens, Denmark

The Danisco factory in Assens, Denmark was the first to install ColourQ systems. In 1989, 1990, and 1991 three systems were installed (on second strike, first strike, and dry sugar, respectively). In 1999 the factory installed new batch centrifugals, each with 1750 kg capacity. The colorimeters on wet sugar have been moved to the new screw conveyors and upgraded to the latest version with the centrifugal optimisation tool (see more about this in the article on the next page).

More Uniform Product

Engineer Per Nielsen has more than ten years experience with the colorimeters. He has this to say about his experiences:

„The Neltec colorimeters are an important part of the instrumentation in the sugarhouse. They simplify process control and ensure a more uniform product. The risk of conveying sugar with too high colour to the silo has been eliminated. High colour sugar can no longer slip through between two laboratory colour determinations.“

Colorimeter as Switch

„In the next campaign the instrument on dry sugar will be used as a switch. Sugar with colour higher than a fixed limit will automatically be sent to a separate, small silo. In this way we will avoid remelting sugar that can be sold for special applications.“

“The risk of conveying sugar with too high colour to the silo has been eliminated”



In the photo you see the two ColourQ instruments at the left and right side. Two screws convey the sugar to a third, starting underneath where the photo was taken. In the lower right corner is the slit through which the instrument measures the sugar just before it falls into the third screw. The screen behind the instruments is installed to prevent access to the screws and the sugar.

Faster and More Precise Intervention

„We find it essential that the colorimeters detect increased colour from a centrifugal immediately. This means the risk of producing high-colour sugar for extended periods of time has been eliminated. When adjusting the process the operators get immediate feedback on their actions, leading to a better understanding of the process.“

better process control, we have succeeded in reducing the limit with several ICU – without any noteworthy increases in production costs.“

High Colour Avoided on Difficult Second-Strike

„During the 1999 campaign the beet have had a very good quality. In the first strike much sugar has been crystallised. Naturally, this has

“The operators have got a better understanding of the process”

given higher colour than usual in the second strike. The second-strike colorimeter has helped us control the process and avoid too high colour.“

Ochsenfurt Installs Fourth ColourQ

For several years the SÜDZUCKER factory in Ochsenfurt, Germany, has been using measurements from ColourQ instruments in process control and for monitoring sugar quality. In 1995 and 1996 three ColourQ systems were installed: one on dry sugar and two on wet sugar lines. For the 1999 campaign a new line was commissioned and equipped with a fourth ColourQ.

Easy Centrifugal Optimisation

REAL-TIME COLOUR

New Feature of Colorimeter Allows Continuous Comparison of Centrifugal Performance

A new development by Neltec has made centrifugal optimisation very easy. You can now read the average colour quality from each batch centrifugal on the system's monitor. The colour values are shown as averages for the preceding 10 to 15 minutes to eliminate the influence of small fluctuations and variations within a charge.

Read Colour from each Centrifugal

In the upper part of the photograph from the system's monitor you see the colour measured, displayed over the last 30 minutes. A black curve indicates measurements from the bottom of the conveyor – no sugar is conveyed. In the middle left of the screen you see the colour codes for the centrifugals: Number 2 is yellow; number 3 is green, etc. The short horizontal lines to the right of the colour codes indicate delivery of a charge from the centrifugal with the corresponding

colour code. Below the short lines you find the average colour from each centrifugal.

See the Influence from Parameter Changes

With these averages it is easy to check if one centrifugal delivers sugar with higher colour than the others.

It is also possible to change the parameters for one centrifugal to evaluate changes in spinning time, filling, washing, screen cleaning, etc. Such optimisation would be impossible with manual sampling and colour determination, because of the very large number of samples required.



ColourQ 800 doesn't add to Laboratory Uncertainty

Two recent studies have compared the ColourQ 800 with laboratory colour measurements. One study was made on cane sugar in a refinery and the other on beet sugar. Both studies concluded that the ColourQ does not add any significant error to that of the laboratory measurements. The studies were published in 1999 at the S.I.T. and C.I.T.S. conferences, respectively.

Ask Neltec for copies, if you want to know more details.

Two Different Qualities Measured in One Screw

A ColourQ 800 instrument was installed for the 1999 campaign in the Nordzucker factory in Munzel. Here two different qualities are centrifuged and sent through one screw conveyor. One ColourQ instrument checks both qualities and displays the colour for each quality separately. The centrifugal station is unmanned, but due to the instrument any error conditions leading to higher colour are detected and corrected immediately.

Still Better Accuracy – Guaranteed

ICUMSA Colour in Solution Measured by Reflection and in Real-Time

The internationally accepted method for determining sugar colour is the ICUMSA method for measuring colour in solution. This method requires a relatively large amount of labour and time for each sample measured. The inevitable time-delay is in conflict with process control requirements.

The ColourQ 800 measures sugar colour in real-time. The accuracy can be measured by comparing the results from the instrument with laboratory measurements. The Standard Error of Prediction (SEP) is calculated as shown below:

$$SEP = \sqrt{\left[\frac{\sum_{i=1}^N (LabColourValue - NeltecColourValue)^2}{N} \right]}$$

**From the year 2000 the guaranteed accuracy is
SEP < 2.0 ICUMSA units
for measuring dry white sugar on a belt conveyor**

For hopper and screw conveyors - and for wet sugar – the guaranteed SEP is higher due to the higher inherent sampling errors.

Improved technique

Due to continuous improvements in the measurement techniques and the calibration procedures, Neltec is able to deliver measurements with smaller and smaller error.

SEP Includes Laboratory Error

The SEP measurement of accuracy includes errors from sampling and errors in the laboratory colour determination, so the error from the ColourQ 800 cannot be smaller than the laboratory error.

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Barilla Installs Sixth ColourQ



Outside Italy, Barilla is perhaps better known for pasta, but in Italy itself Barilla also supplies a strong brand for biscuits under the name “Molino Blanco”. Several years ago Barilla wanted to supplement its careful manual monitoring of baking quality with automated, human error-free scrutiny of some of the more critical products.

Several makes of instrument were tested at a baking line, and after the test the first ColourQ was permanently installed. By the end of 1999 six instruments had been installed. In the photograph you see the instrument mounted on a linear unit to check and compare the biscuits across the wide conveyor in the oven.