

# ColourQ



**Neltec**  
REAL-TIME COLOUR

## Colour measurement for batch and continuous centrifugals



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## Colour measurement for sugar delivered by batch centrifugals



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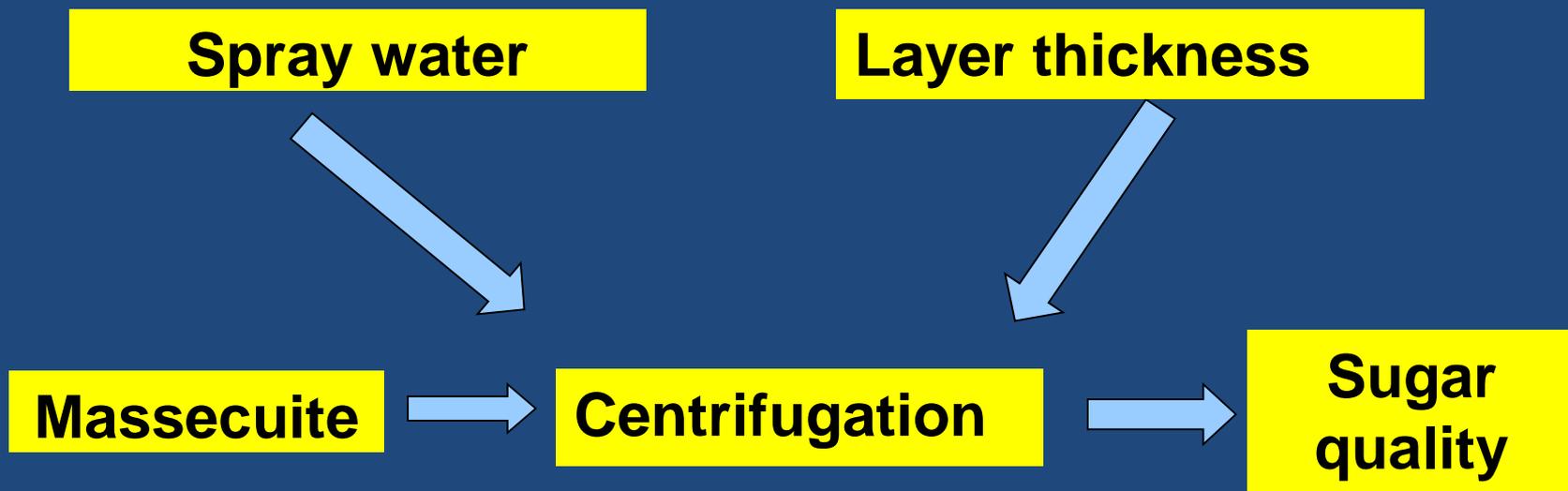
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**Batch centrifugals are usually used  
for sugar delivered to the customer**





Which factors do have an influence on the efficiency of discontinuous centrifugals?





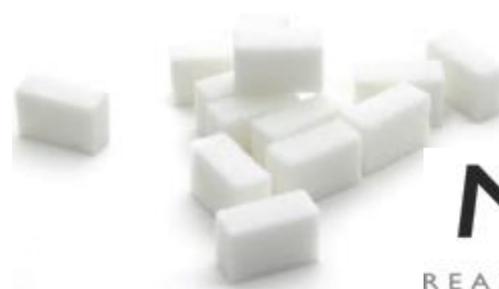
Which factors of massequite quality have an impact on the centrifugal work ?

**Crystal size**

**Crystal size distribution**

**Crystal content**





Particle numbers and surface areas of crystal aggregates as functions of the mean diameter  $d'$  and the uniformity coefficient  $n$

*P. van der Poel et. al., ( 1998)*  
Sugar Technology

$d'$ mm	$n$	$d_{05}-d_{95}$ mm	Particle number per 1kg	Surface area m <sup>2</sup> /kg
<b>1.5</b>	<b>3.5</b>	<b>2.05-0.64</b>	<b><math>1.87 * 10^6</math></b>	<b>3.56</b>
	2.5	2.37-0.46	$7.92 * 10^6$	4.18
1	3.5	1.37-0.43	$6.30 * 10^6$	5.33
	2.5	1.55-0.31	$3.18 * 10^7$	6.27
<b>0.75</b>	<b>3.5</b>	<b>1.03-0.32</b>	<b><math>1.49 * 10^7</math></b>	<b>7.12</b>
	2.5	1.16-0.23	$7.25 * 10^7$	8.35
0.5	3	0.72-0.19	$1.04 * 10^8$	11.35
<b>0.4</b>	<b>3</b>	<b>0.58-0.15</b>	<b><math>1.93 * 10^8</math></b>	<b>14.21</b>
0.3	3	0.43-0.11	$4.28 * 10^8$	19.01
0.2	3	0.29-0.07	$1.63 * 10^9$	28.36



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## Neltec ColourQ 2100



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The Neltec ColourQ  
measures  
colour in solution  
in accordance to  
ICUMSA standards



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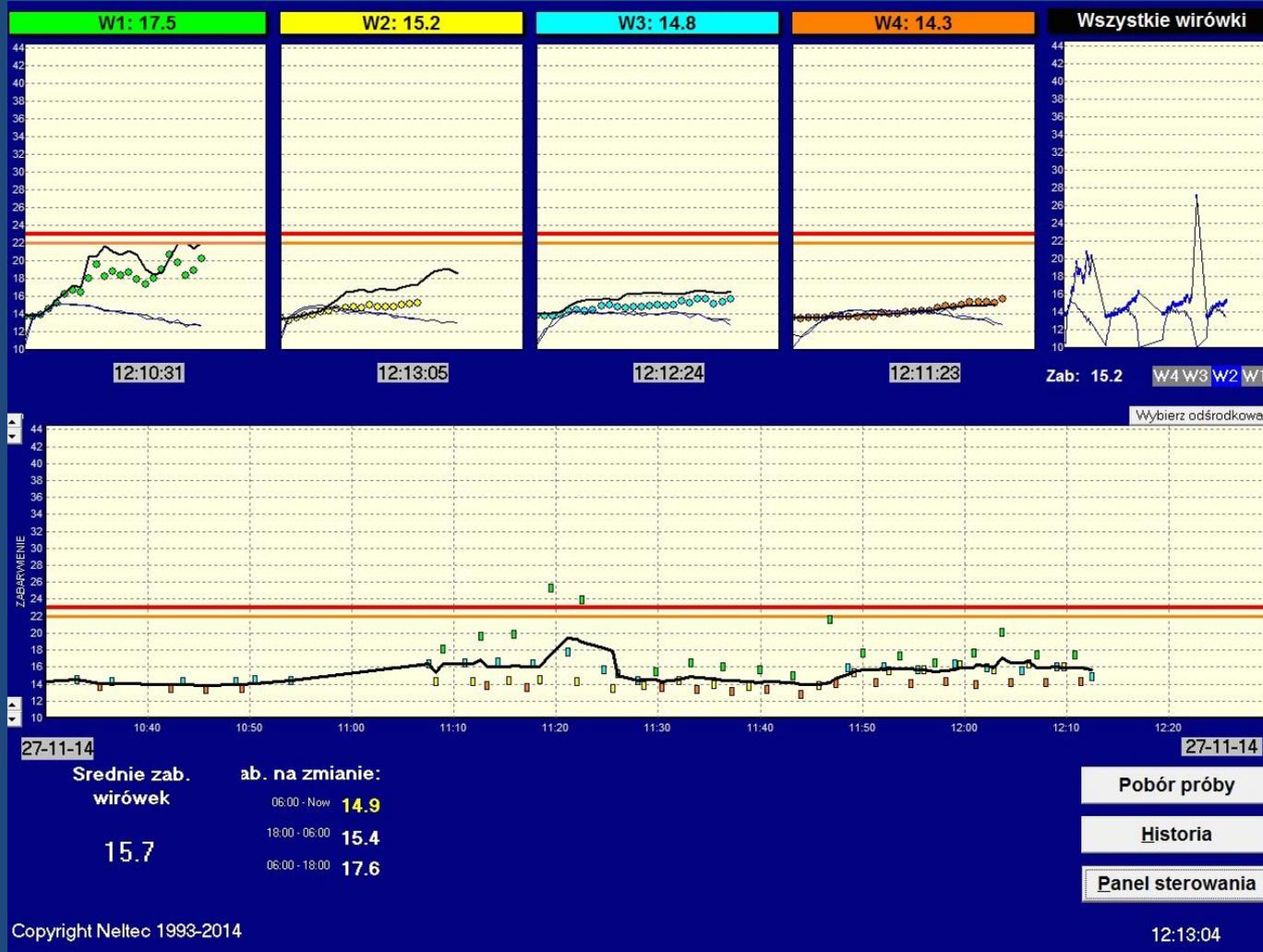
The  
instrument  
is best to  
be installed  
behind the  
centrifugals

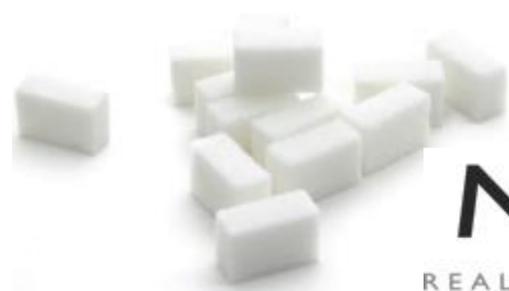


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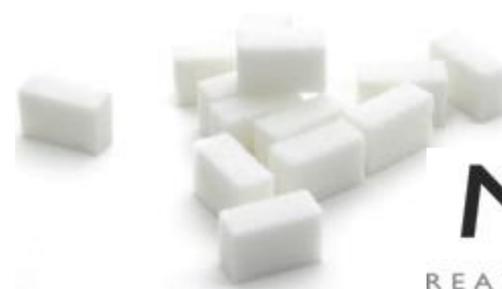




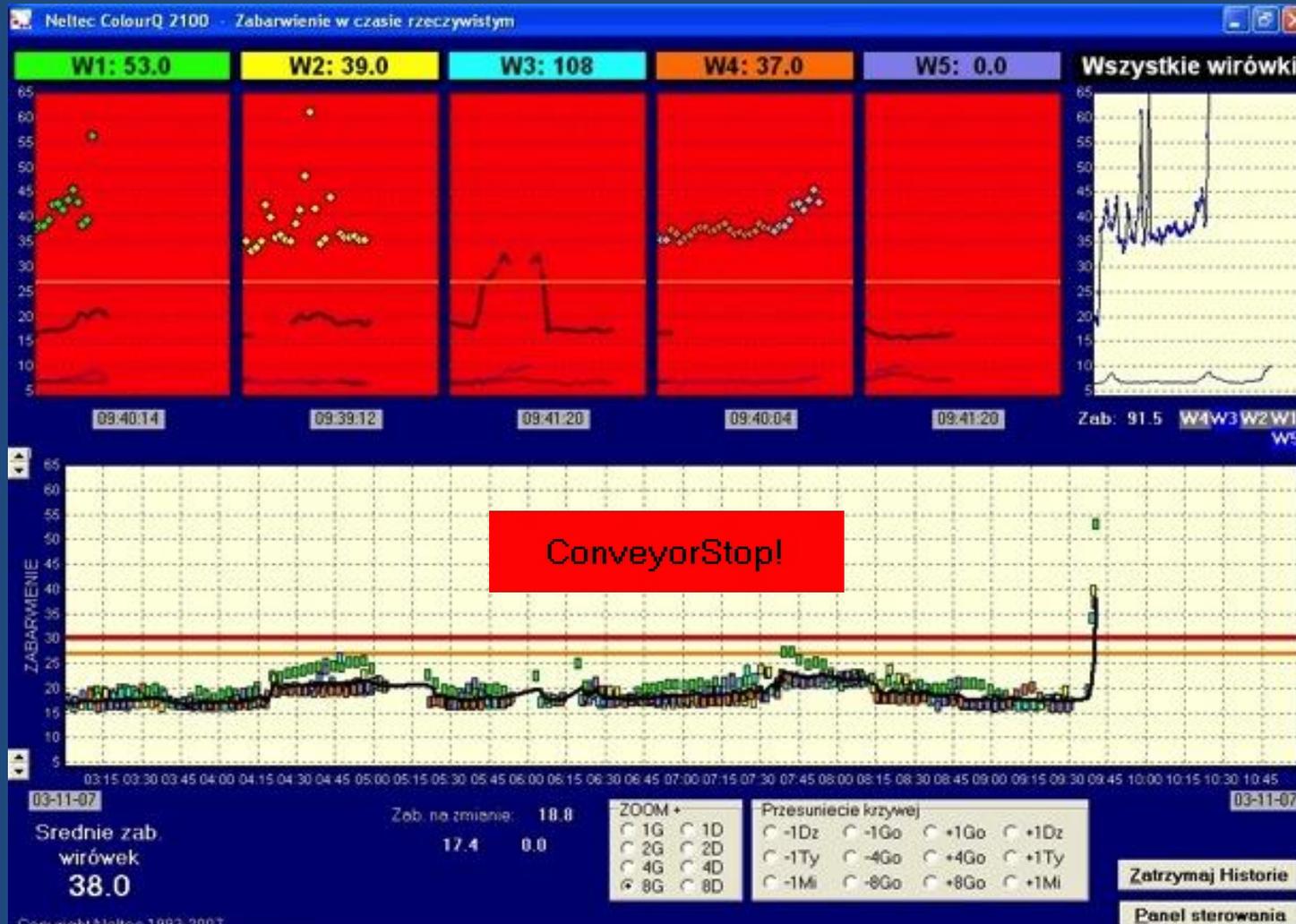
## Different pans deliver different sugar quality



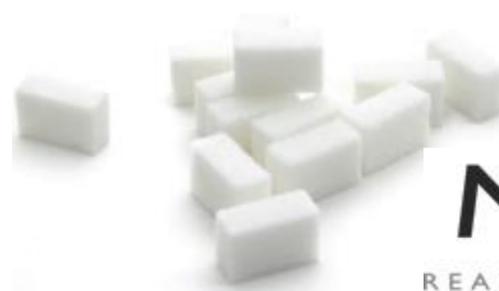
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## Neltec ColourQ Accepted accuracy by ICUMSA

The accuracy of the Neltec ColourQ  
has been accepted by ICUMSA  
as INDIRECT Method for ICUMSA Solution Colour  
at the meeting in Ribeirão Preto, SP, Brazil, in September,  
2014

as the *first* and *only* instrument.

Details will be in the proceedings.

Final approval is waiting for the method/guidelines to be  
finished. This work is in progress for presentation at  
ICUMSA 2016





## Average Absolute Difference (IU) - ICUMSA test

	<u>Indep. Lab – ColourQ</u>		<u>Fact. Lab – ColourQ</u>		Fact. Lab – <u>Indep. Lab</u>	
	N° Test samples	Abs. Diff.	N° Test samples	Abs. Diff.	N° Test samples	Abs. Diff.
<b>Factory I</b>	57	<b>1.5</b>	57	<b>0.8</b>	57	<b>1.3</b>
	69	<b>1.3</b>	71	<b>1.4</b>	70	<b>1.0</b>
<b>Factory II</b>	41	<b>1.5</b>	47	<b>1.2</b>	41	<b>4.6</b>



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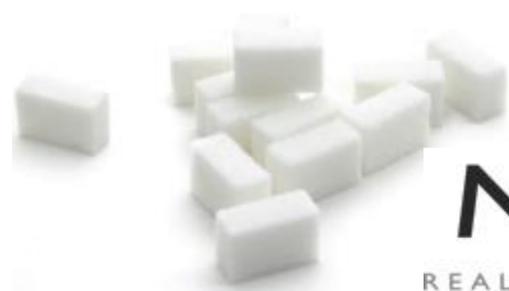


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## Neltec ColourQ 1600



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The instrument has 5 digital outputs, indicating deviations from slight (Level 1) to serious (Level 5)

06-01	21:26	Level 5
07-01	04:28	Level 4
08-01	08:47	Level 3
08-01	10:02	Level 3
08-01	10:34	Level 3
08-01	11:22	Level 3
10-01	03:05	Level 3
10-01	04:04	Level 3
10-01	04:10	Level 5
10-01	04:12	Level 3
10-01	04:17	Level 5
10-01	04:18	Level 3
10-01	07:17	Level 4



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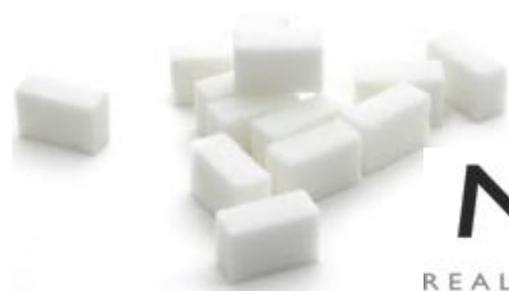


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## Colour measurement for sugar delivered by continuous centrifugals



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B sugar, used for dilution into liquor is normally processed on continuous centrifugals

The water addition on the B centrifugals decides on how much colour is returned to the A pans, and how much sugar is sent towards molasses

The water addition on the B centrifugals depends highly on the massecuite quality





The task of the C centrifugals is to keep the molasses purity as low as possible

Due to the high viscosity of the massecuite water and steam are used to improve the separation abilities of the massecuite.

In C centrifugals the sugar quality is not the main goal. The main goal is the separation of crystals and mother liquor, keeping the molasses losses as low as possible.



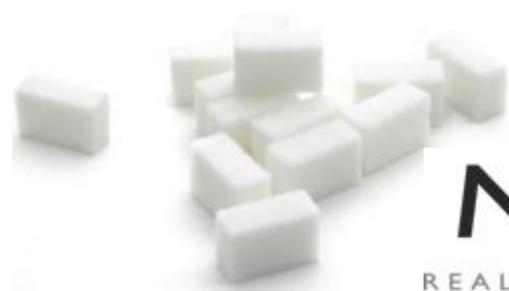
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**Which factors do have an influence  
on the efficiency of continuous centrifugals?**





## Factors influencing the work in continuous centrifugals

Viscosity

Crystal content

Crystal size

Crystal size distribution

Water addition

Steam addition

Masseccuite temperature

Feed rate

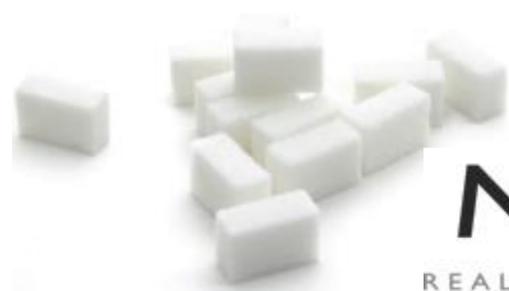
Due to the various influencing parameters, the molasses losses can not be controlled. Optimization can only be approached by trial and error.

Continuous centrifugals need continuous attention by the operator

Payne (1992)



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**Quality control for sugar delivered  
by continuous centrifugals**



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The extent to which the water and steam mix with the mother liquor to reduce the viscosity and the extent to which the water and steam washes the molasses film off the crystal is unknown

(Peter Rein, Cane Sugar Handbook 2007)



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## Typical centrifugal control for continuous centrifugals



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## Centrifugal control for continuous centrifugals By using the Neltec ColourQ 1700



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TChart

