Harrer & Kassen

Brix instrument
in sugar industry

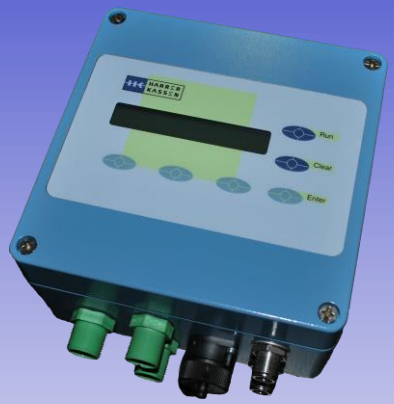
Matched to the engineering processes in different industries, various procedures of measurement are in use in dependence of the technical material transport and the product to be analyzed. The material to be analyzed can be transported in pipes, vessels, silos, tanks or conveyer belts and the product can be solid or liquid. For the quality insurance the products are under measurement to define and monitor concentration, moisture, limit values, flow, organic components and colour.

Harrer & Kassen offers for sugar industry:

- Brix measurement
- Moisture measurement
- Colour measurement - Whiteness

Different types of H&K instruments for sugar industry

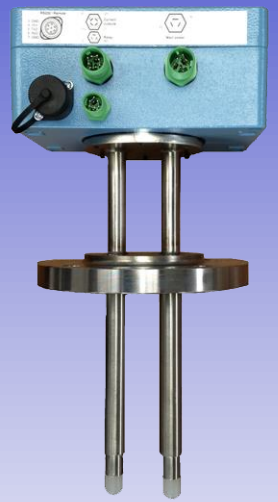
HK2 - M



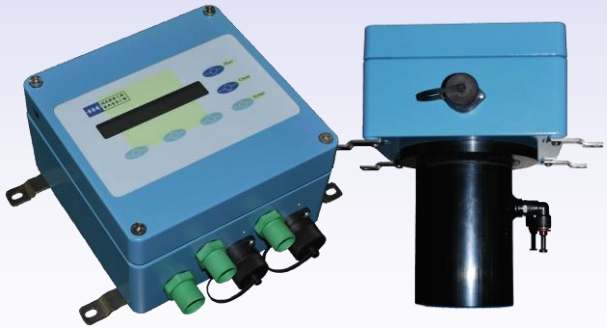
HK6 - F

HK6 - C

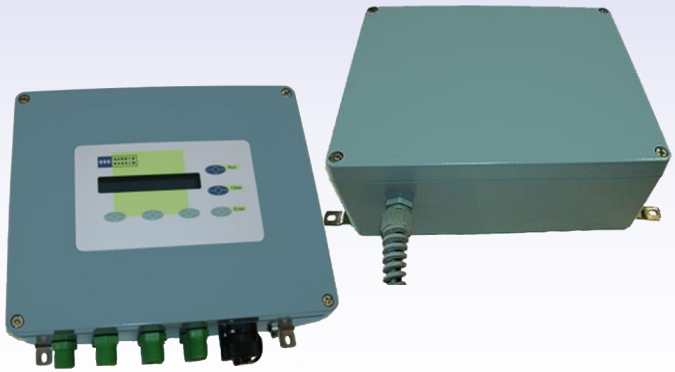
HK6 - CLN



HK8



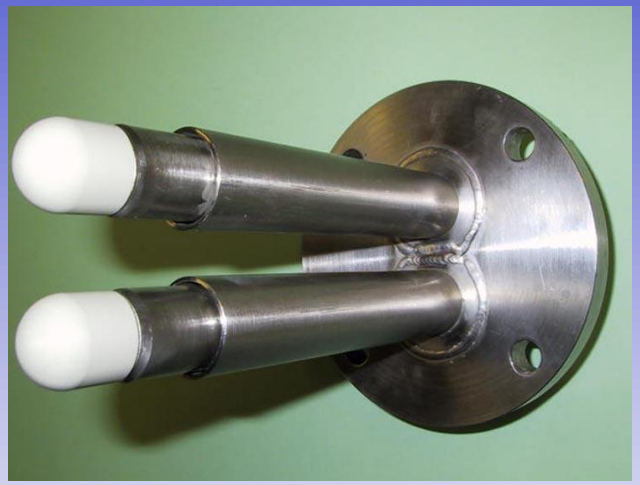
HK7 Colour



Different sensors for H&K instruments

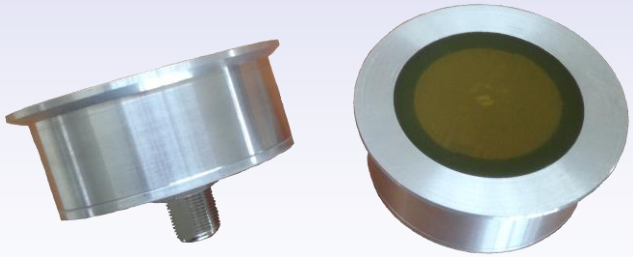
Standard sensor with flange DN65

Sensor with cleaning flange DN85



Small spiral antenna

Big spiral antenna



Calibration

The instrument has to be calibrated with a series of samples ranging over the occurring variation of the total solid content.

The calibration is only valid for the range of the included samples.

The minimum range of the calibration samples should be 2%, better results will be achieved when the samples range is over 5%.

In many cases we can use one point calibration in sugar apllication.

As reference method refractometer, oven drying, microwave oven or Karl Fischer method can be used.

Technical dates

Compact – sensor is part of the unit

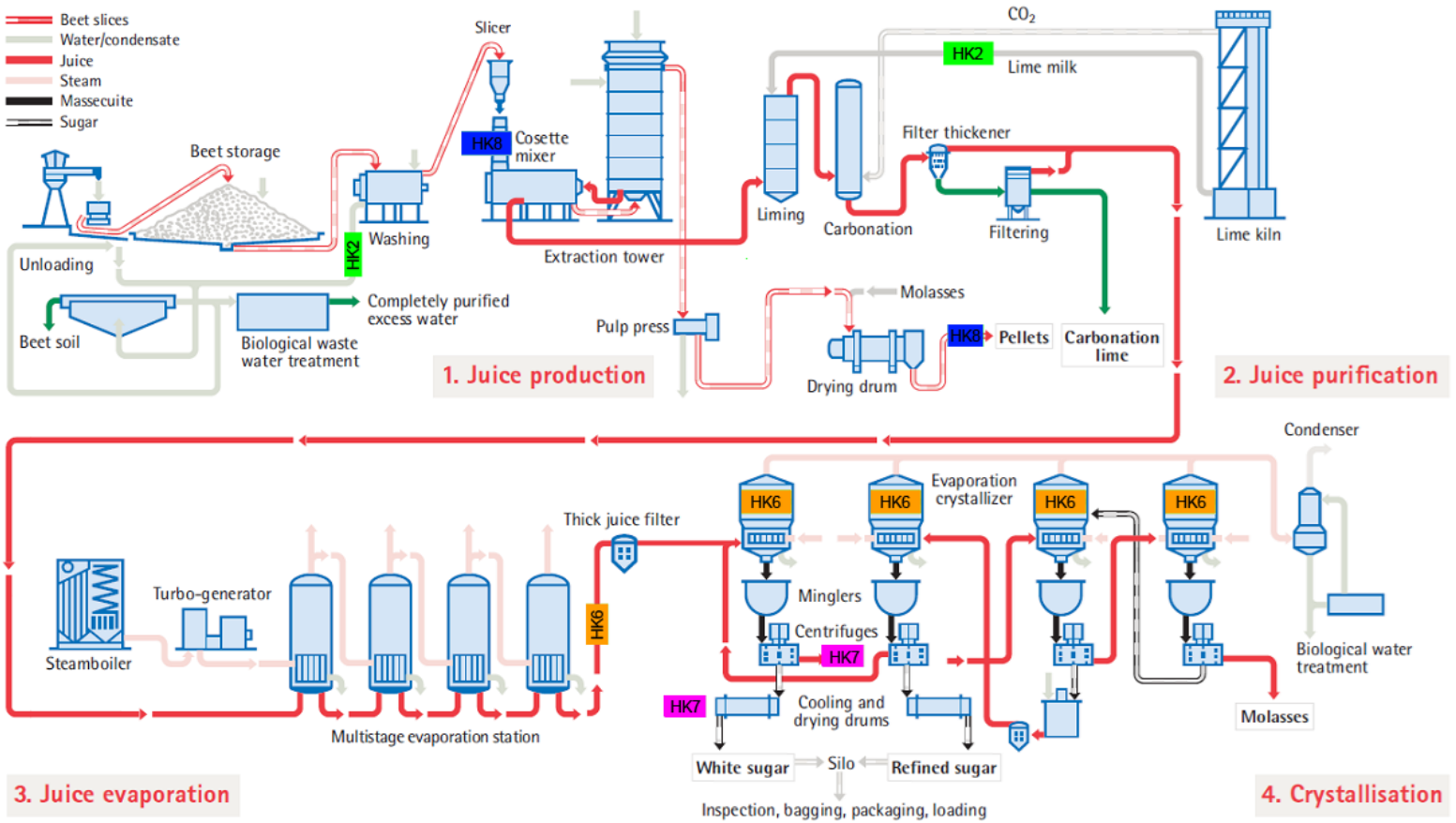
Modular – unit is connect via coaxial cables (max. 2m) to the sensor.

According IP65

Connection to

- PC via RS232 (RS485 optional)
- PLC via current output 0/4 - 20mA

Sugar production diagram

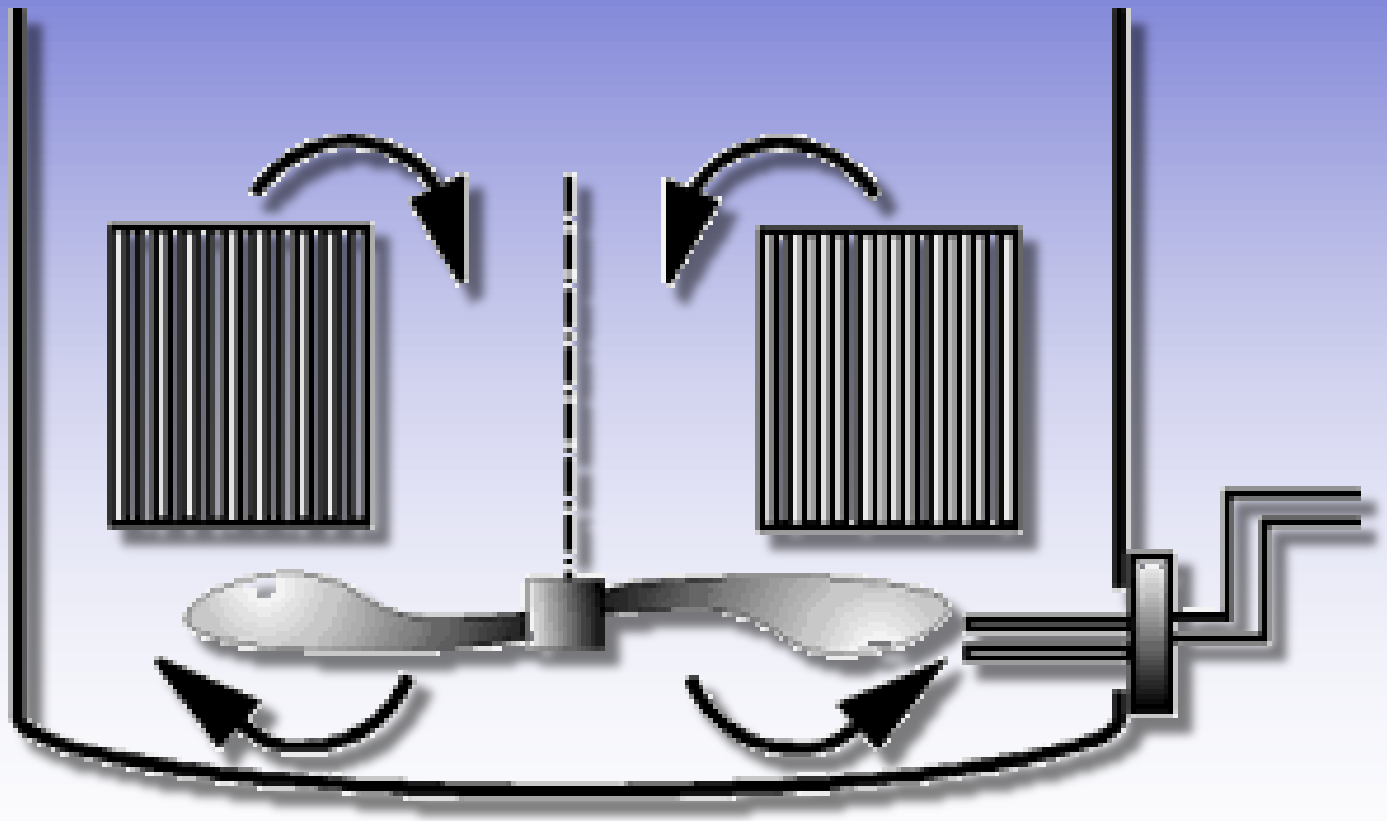


Harrer & Kassen GmbH measurements in the sugar production

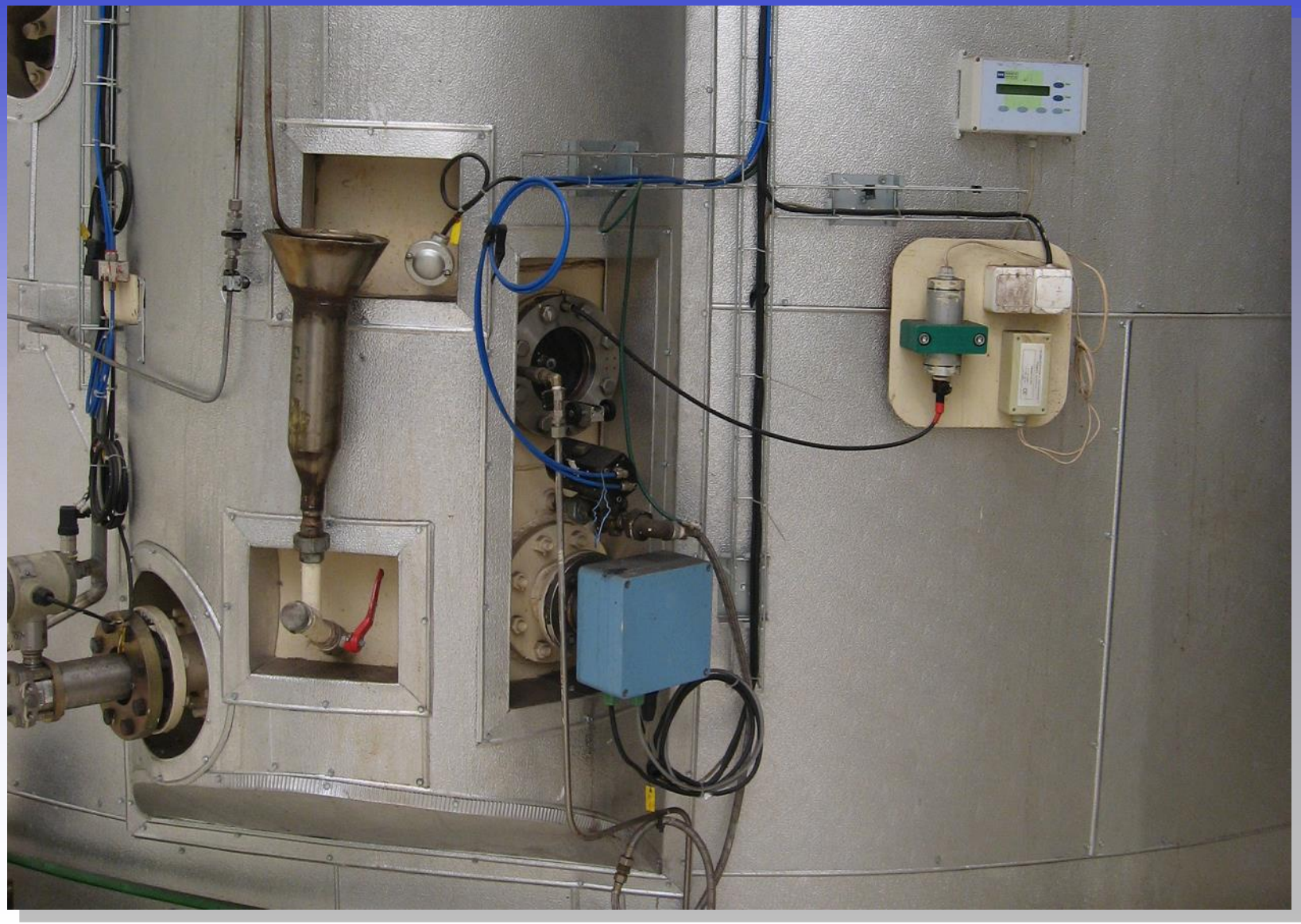
HK2 Microwave measurement | HK6 Microwave measurement | HK7 White index measurement | HK8 NIR-measurement

Base application for on-line Brix measurement directly in cooking pan

A, B or C class, Seed

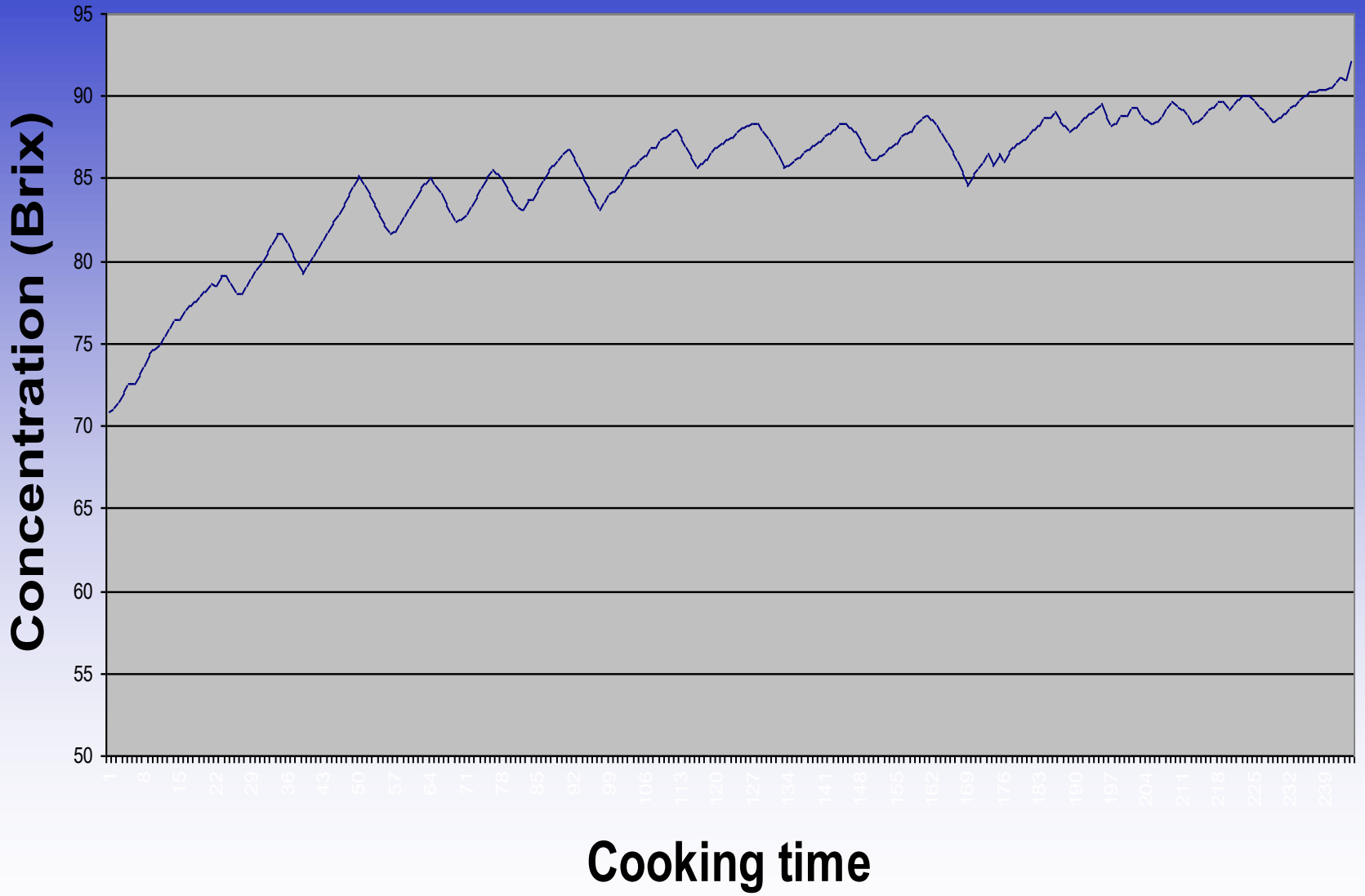


- in the sampling pocket

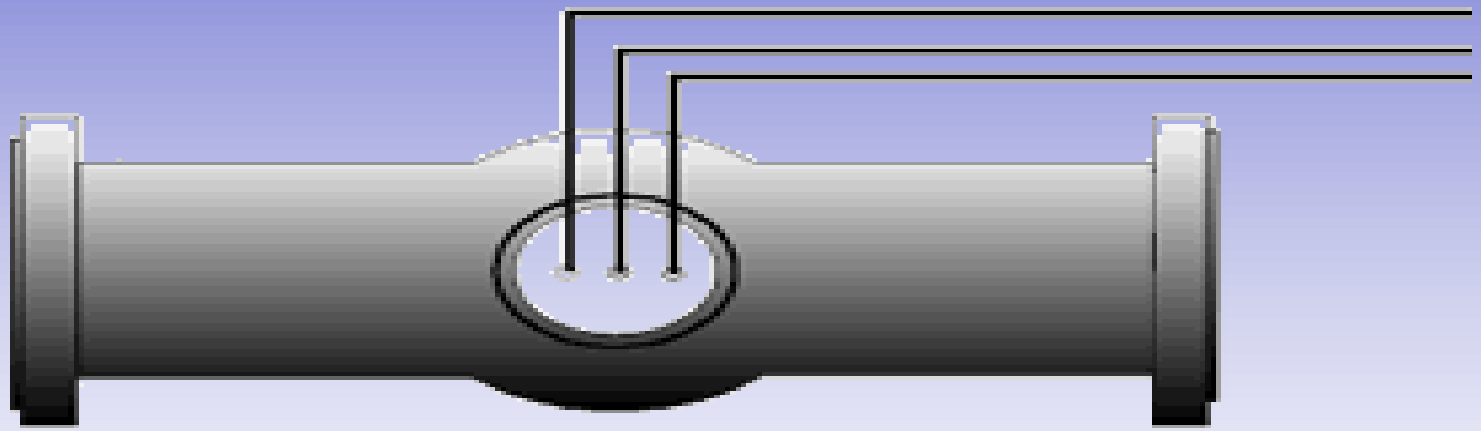


- on the bottom of the pan

Cooking of sugar in the pan



Brix measurement directly in the pipe



Standard liqueur – approx. 74Bx

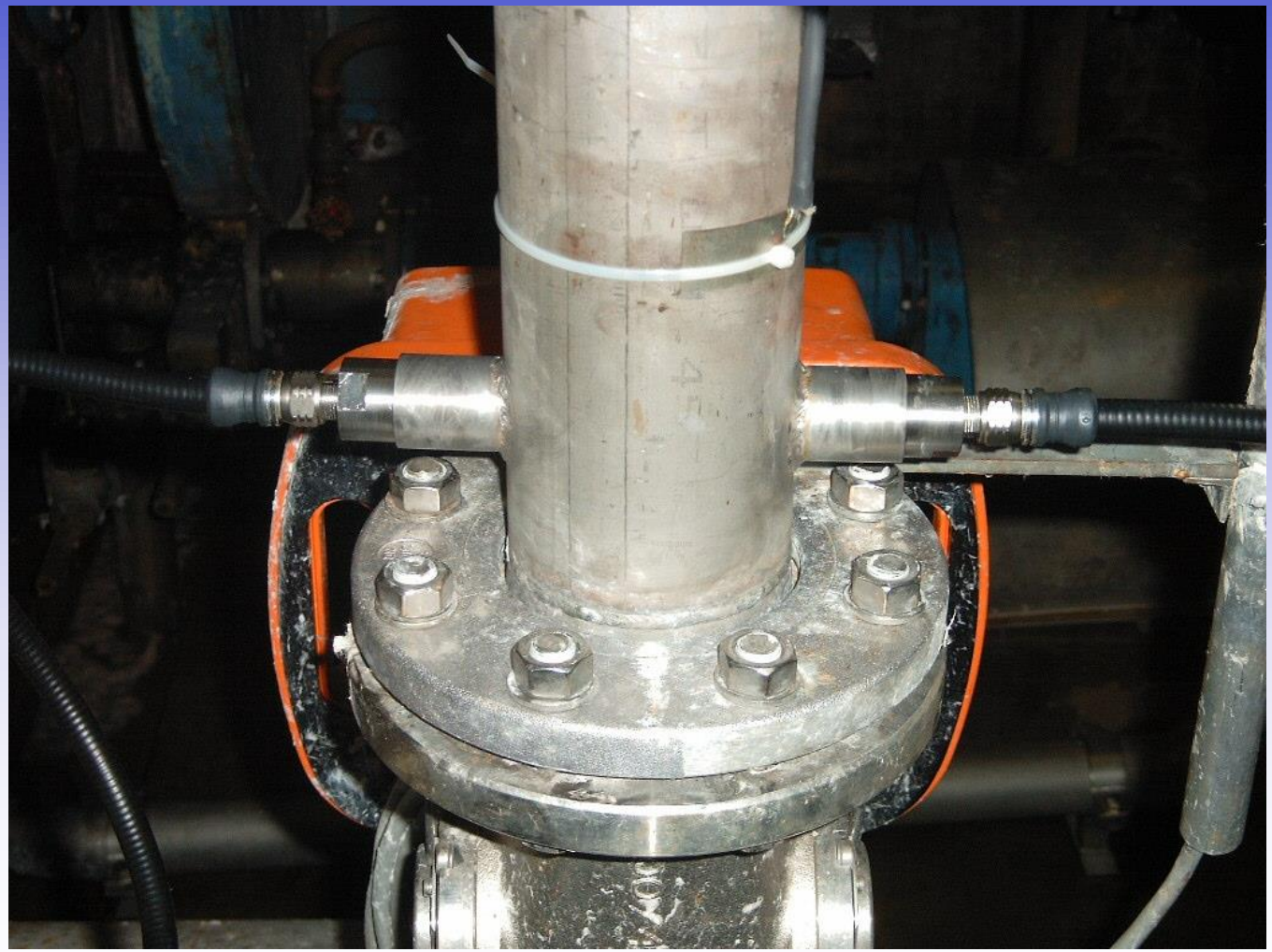
Continuous cooking pan „C“

After evaporization

Dilution molasses with thick juice

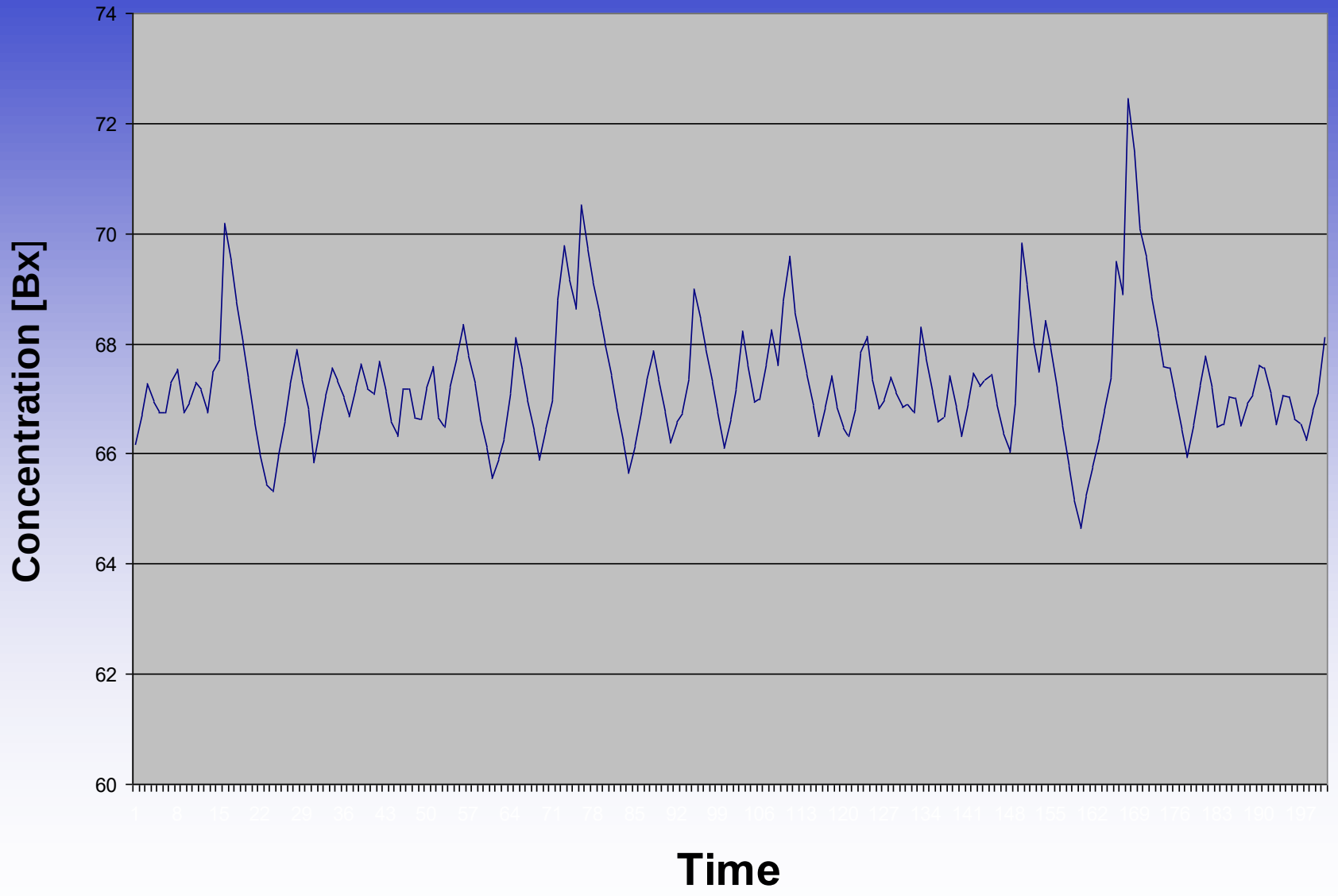
HK2 with cleaning device

Waste water - sludge



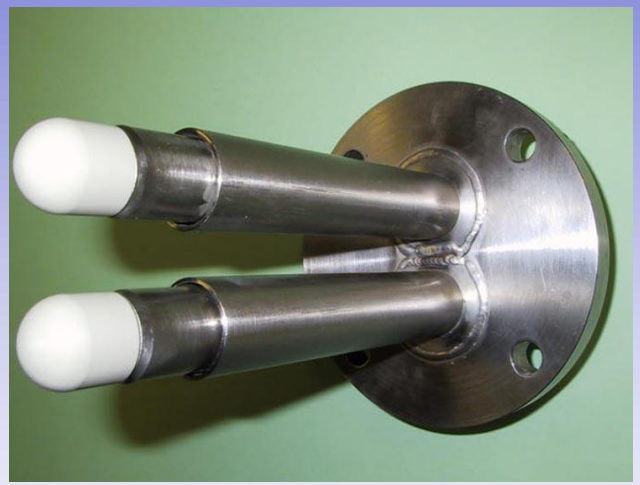
Brix measurement in the vessel

Concentration in the melter



Milk of lime measurement

Standard measurement in the tank before liming
(with cleaning sensor)



In the canal after lime slaking –better but more exacting

Conclusions

The Harrer & Kassen microwave (MW) instrument is an alternative to the actually used instruments based on density and refractometry.

The Harrer & Kassen measurement is not dependent on flow rate between 50 and 5000 L/h

Important influences of temperature variations (> 5° C) on correlations between Ts measurements were observed.

An excellent correlation between Ts and the microwave phase angle change was found. Over a large range this is best as a polynomial relationship though in the 0° to 360° range this can be adequately described by a linear fit.

The MW-Instruments are not influenced by changes in particle size distribution.

The MW-Instruments are best installed in a vertical position to avoid noise from air bubbles.

HK8 NIR
Moisture measurement on a belt

Infrared-Measurement in the NIR-range exclusively for the detection of H_2O (moisture, watercontent, dry solids) in products on conveyor belts.

The system is suitable for products with smooth and planar surfaces as well as for abrasive bulk material.

Online moisture meter HK8

moisture measurement
sugar beets

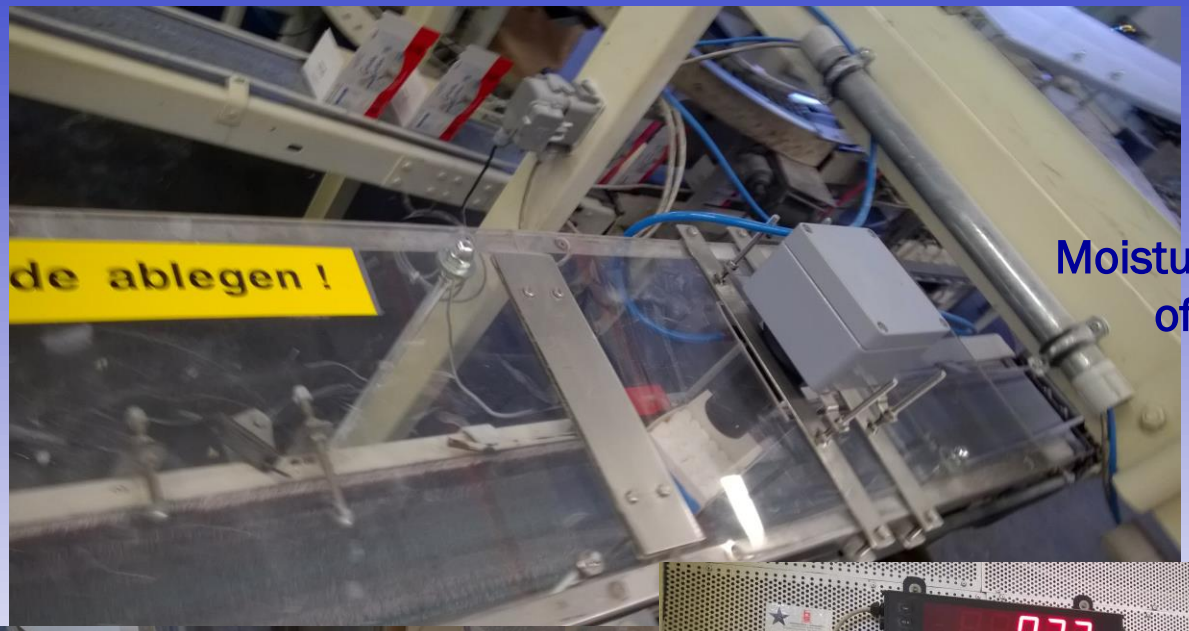
Online moisture meter HK8

moisture measurement
sugar beets

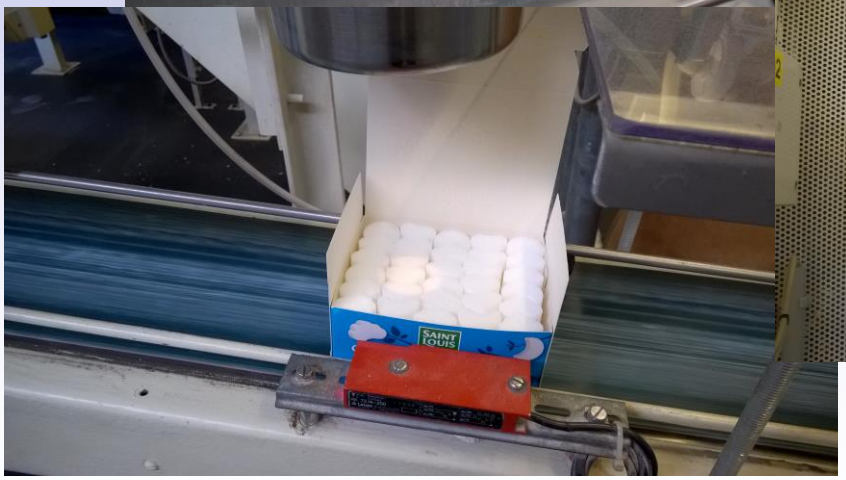
Online moisture meter HK8

moisture measurement pellets

Online moisture meter HK8



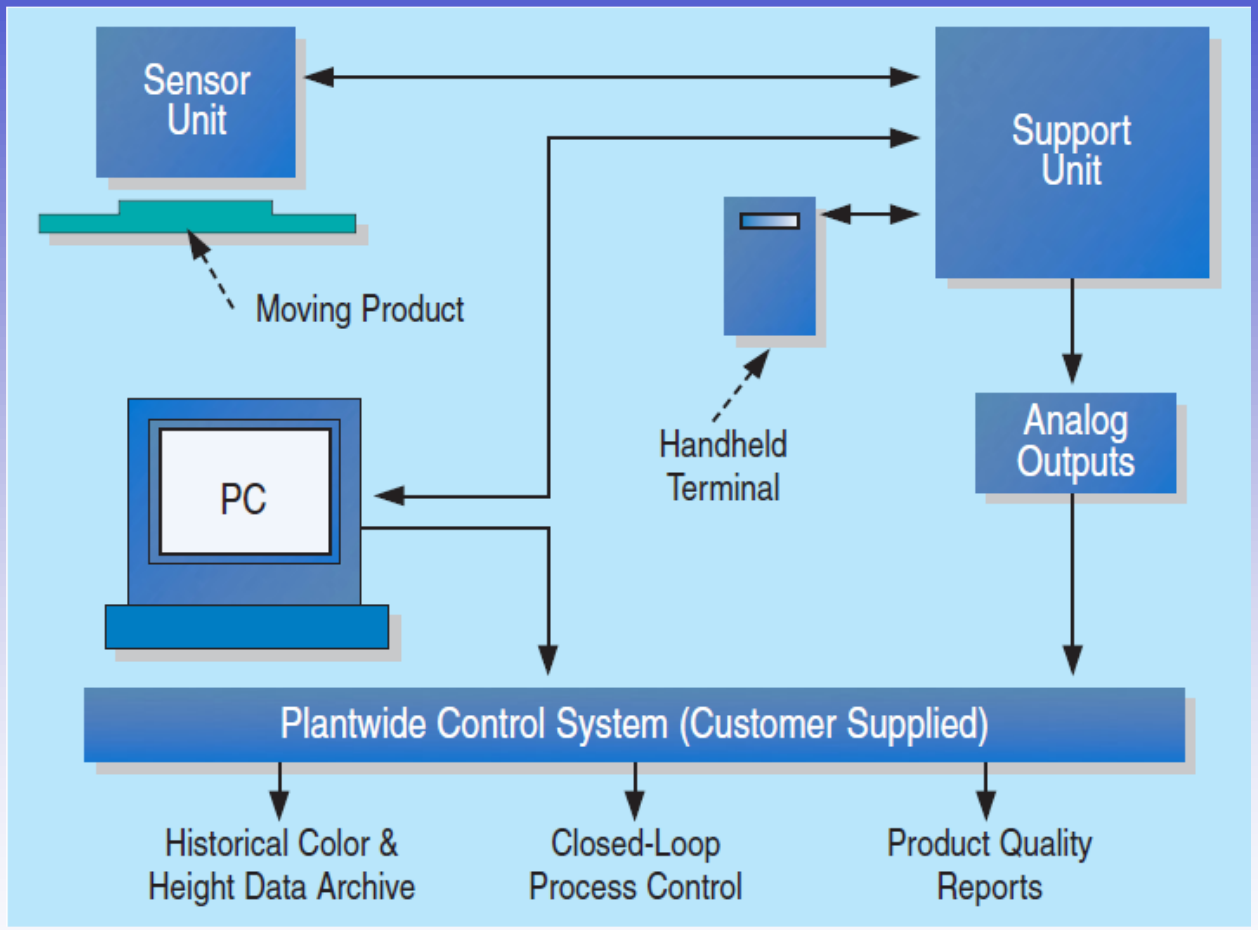
Moisture measurement
of cube sugar



Comparison HK8 versus Filter NIR

Disturbance	HK8	NIR filter system
distance variation	not influenced	influenced
product colour change	not influenced	influenced
lamp ageing	not influenced	influenced
gloss / mirror	influenced	influenced
ambient temperature	not influenced	influenced
ambient light	not Influenced	influenced
dust / vapour	influenced	influenced

Online Color measurement (Whiteness)



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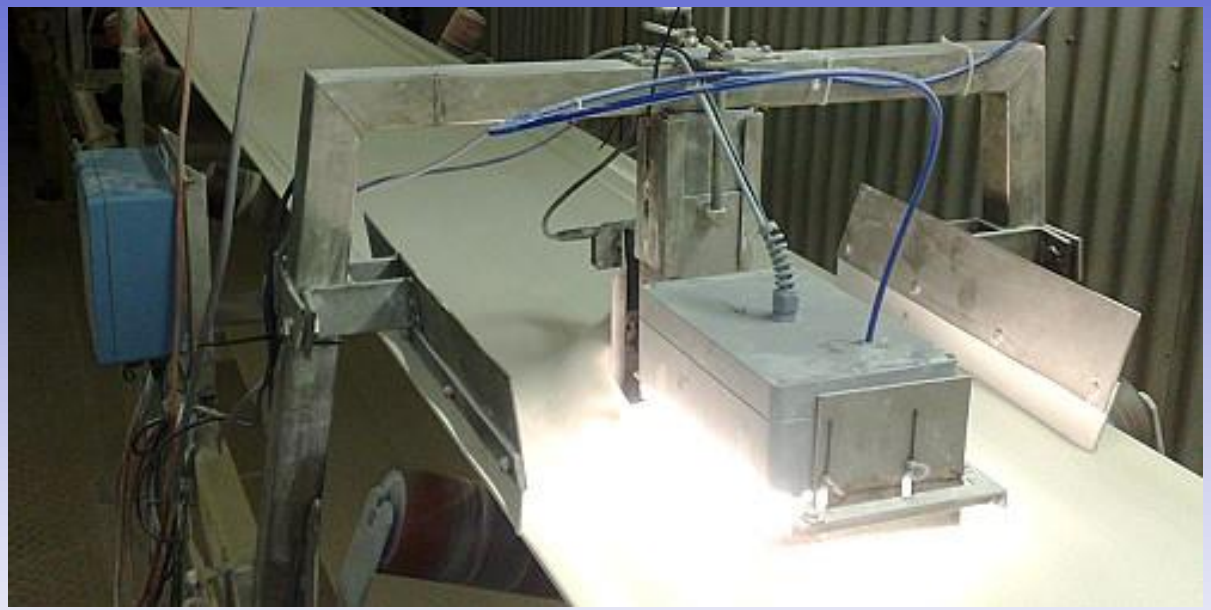

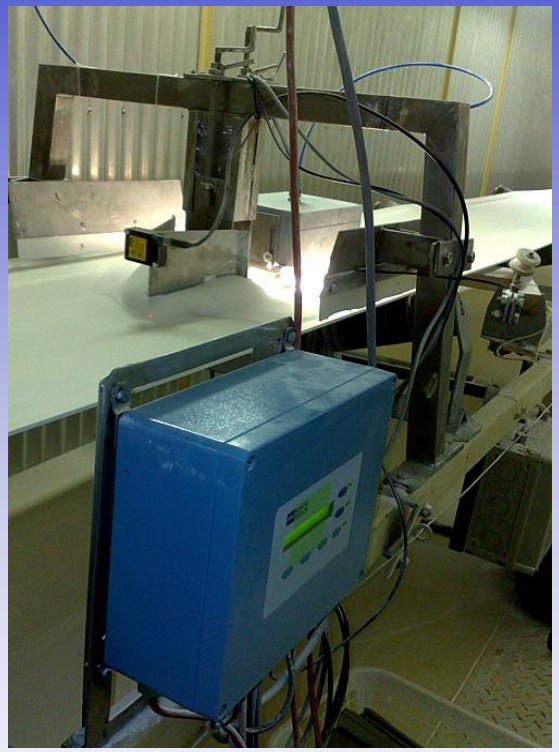

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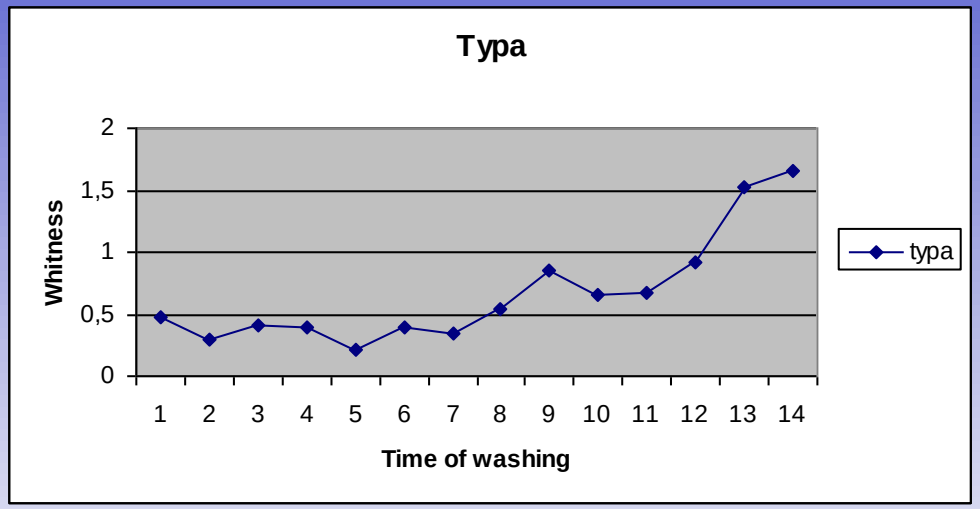

Saving energy
Better quality

Thank you

for your attention !

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