IM SERIES

CHINO Works America Inc.
Instrumentation, Control and Systems

APP-037

Human Food Products





Application notes

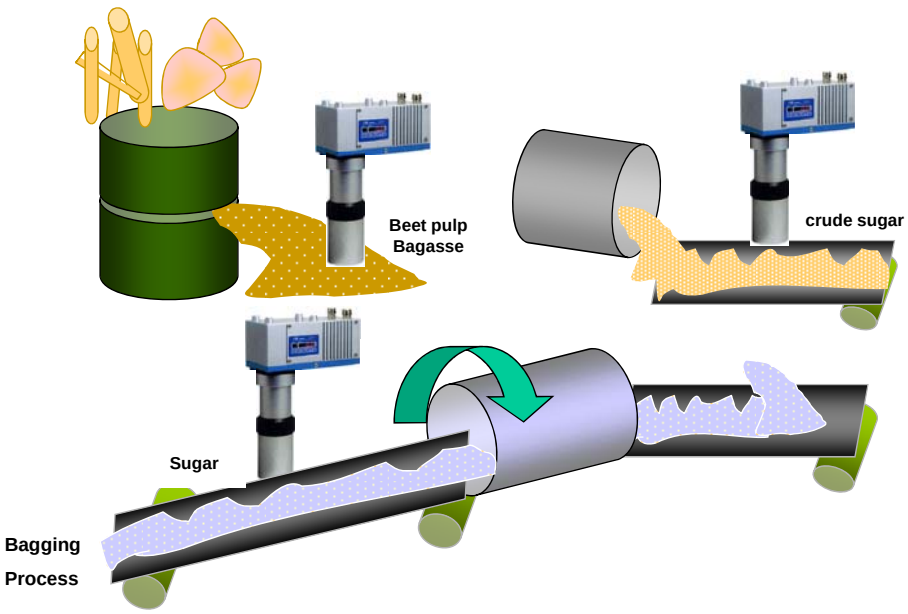
Moisture measurement / Sugar production

The sugar industry processes sugar cane and sugar beet to manufacture edible sugar. Typical processes are as follows;

1. Washing/Preparation/Extraction
   Sugar cane: Milling with water, extracting raw juice -> purification
   Sugar beet: Diffusing with hot water, extracting raw juice -> purification.
2. Purification -> Refinery
   Crystallized sugar after purification is called "raw sugar". Raw sugar is then dried and may be further refined before bagging for shipment.

CHINO's IM Series online system can measure moisture to maintain product consistency as well as energy efficiency at the following parts of the sugar manufacturing process.

A. Moisture measurement of "Bagasse" - fiber residue of the canes.
   10% - 40% (Accuracy: +/- 0.5%) Bagasse is mainly used as a biofuel, renewable resource in the pulp, paper products and building materials.
B. Moisture measurement of "used cossettes" - sliced beets used for diffusion. 30% - 70% (Accuracy: +/- 0.5%)
   Used cossettes are dried and sold as animal feed
C. Moisture control of raw sugar and during refinery
   IM Series is equipped w/ 4-20mA Analog output which can be easily incorporated with existing process control systems.



Moisture measurement / Sugar production APP-037

Products / Location	Parameter	Range
Bagasse	Moisture	10 to 40%
Used Cossettes (beet pulp)	Moisture	30 to 70%
Raw sugar	Moisture	0 to 2%
Refined sugar	Moisture	0 to 2%

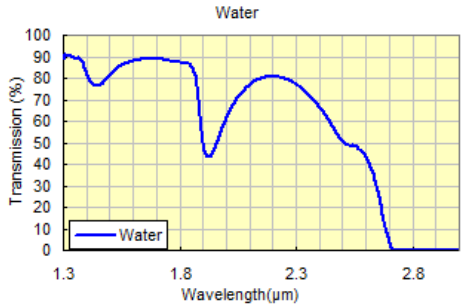
Recommended model / Item

A. Moisture over 50% - High moisture unit and associated accessories
Model: IRMA1200S, IR-WEA, IR-WEB
B. Up to 50% - General moisture unit and associated accessories
Model: IRMA1100S, IR-WEA, IR-WEB

Installation

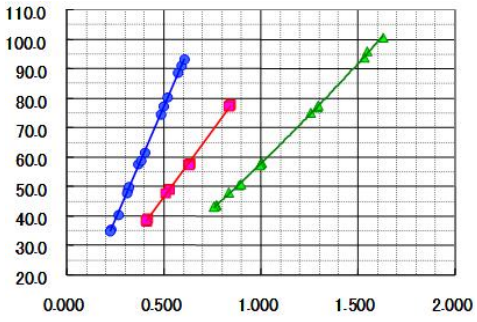
Mount IRMA to make the light beam falls onto the target perpendicularly. If dust or fine particle is presence, implement air purging with filtered instrument air. It is recommended to choose locations where the distance between the unit's lens and the target is stable. Use plow as necessary to level the height of the product that goes under the IRMA. It may require to use different calibration curve depending on products.

Absorption characteristic



Moisture(water) has a unique infrared absorption spectrum regions. Water absorbs at wavelength of 1.43, 1.94, and 3 micrometers.

Calibration curve



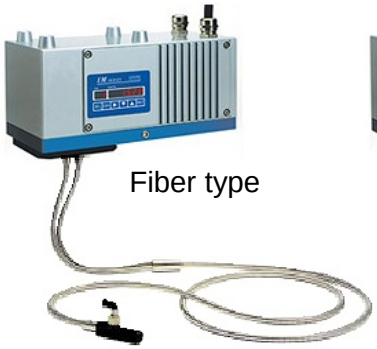
Calibration curve is a correlation between moisture determined by customer's reference instrument and IR absorption measured by IRMA.

[Basic sample test for moisture]

1. Prepare samples with various moisture content
2. Show each sample to IRMA and record absorption level
3. As conducting step-2, determine moisture level with your reference instrument
4. Put all data points on a X/Y graph and see if there's a correlation

Note: Reference instrument may vary depending on the method (by volume or weight).


Mirror type


Fiber type


Liquid cell type


Setting & Display unit

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