Humidity indicators

Identification

Key words: Humidity, indicator, water, water activity, moisture, quality, intelligent packaging
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How does it work?

Primary objective: Humidity indicators can monitor moisture of air at the selected environment without a source of energy.

Working principle: Humidity Indicators (HIs) Package indicators of MA help to provide visual proof of the relative humidity level within a given environment (packaging application, refrigerator application etc.). If the indicator indicates high levels of humidity, users know to check their packaging environment and inspect their products for possible damage. HIs are small paper cards which have mostly 1 – 6 moisture sensitive pots. They change reversibly and constantly indicate relative humidity by color changing (e.g. from Blue (dry) to Pink (humid), from brown to green or from blue to purple). The base chemical is mostly cobalt chloride, copper chloride or newly CoCl2-SiO2 and methylene blue and urea [1, 2, 3]. Other type of humidity indicator is based on a photopolymer recorded hologram. As the Relative Humidity changes, the hologram swells or shrinks and the apparent colour of the reconstructed image changes [4]. Range of moisture monitoring depends on the producer (e.g. 30 -50%, 10 – 60% etc.) These reversible humidity indicator cards work much like a thermometer, fluctuating to indicate the current relative humidity level. They do not need a source of energy. There exists also Non-reversible Humidity Indicator Cards. They are designed for applications which require monitoring the maximum humidity attained when exposed for a period of 24 hours or more.

Relative humidity indicators can also be used in conjunction with Moisture absorbers. They provide an indication of when the absorber is saturated and requires replacement or recharging.

Images

Additional effects

Important process parameters: moisture content, relative humidity, temperature

Important product parameters: moisture content

What can it be used for?

Products: all packed food products with a head space
Operations: Packaging, storage
Solutions for short comings: Humidity indicators can monitor moisture content at low cost.
What can it NOT be used for?

**Products**
- liquid product

**Operations**
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**Other limitations**
- Indicators can’t be in contact with a metal.
- Some type of absorbers cannot be used directly at food packaging (calcium chloride base).

**Risks or hazards**
- You cannot see whether a certain moisture content has been reached during storage. Only the actual value can be seen.

Implementation

**Maturity**
- Widely used in industry

**Modularity/Implementation**
- It can be implemented to the production line (part of packaging) probably as new appliance. It depends also on existing state and type of packaging machine.

**Consumer aspects**
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**Legal aspects**
- EU Regulation EC NO 1935/2004 and the COMMISSION REGULATION (EC) No 450/2009 of 29 May 2009 on active and intelligent materials and articles intended to come into contact with food

**Environmental aspects**
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Facilities that might be interesting for you

Further Information

**Institutes**
- University College Cork - PCE

**Companies**
- Brownell, DRIERITE, Sealed Air Corp.

**References**


