Paper industry

Facts & figures:
The US and Canada are the world's largest producer of paper and paper products. The next largest are Finland, Japan and Sweden.
The world's annual paper consumption was in 2009 391 million tonnes.
Papemaking was brought to Europe by the Arabs.
Before the final papemaking step of pressing, there is 90% of water in the paper.

Paper in general

The ancestor of the pulp paper making process that is used today is considered to be developed by a Chinese named Tsai-Lun during the early 2nd Century.

Paper and similar products like cardboard are made from cellulose fibre that comes from various sources (wood, rags, grasses). The cellulose fibre is extracted with either chemical or mechanical plumping or a mix of both. After the wet fibres have undergone various treatments it is ready for pressing and drying.

Today's highly sophisticated printing, drawing or packing machines process this thin and sensitive material at an incredible speed. That's why it is essential for a continuous process to adjust these high performance machines to the individual characteristics of the paper type used. Deviation of the paper properties must be avoided at any cost.

Why the need to measure humidity?

Controlling humidity in the paper industry is essential for many factors. An incorrect level of %ERH in the paper will have the following effects on product and process:

Static electrification
From time to time printers experience difficulties due to static electricity phenomena (paper sheets stick together etc.). This happens mostly when both paper and the ambient air are too dry.

Dimensional changes
Vegetable fibres are highly hygroscopic and therefore absorb and desorb humidity resulting in a swelling or shrinking of paper fibres. At approx. 50%ERH, a humidity change of ±10%RH results in a length change of typically 0.1 - 0.2% of the paper. Such a humidity variation would give a 1 to 2mm variation on a 1 x 1m sheet of paper and therefore inaccurate printing results (poor positioning of paper).

Dust
Too dry paper generates dust that will lead to a layer of dust which then affects the printing quality.

Deformation
If too much moisture is exchanged with the surrounding atmosphere through the edges of the stack or roll. This uneven distribution of moisture will eventually lead to rippled paper.

Ink drying time
High values of %ERH as well as low temperature result in long drying times after printing which will slow down the following processes.

Best humidity level
Paper with an humidity level between 50-60%ERH is most suitable to work with. The ambient air should not defer more than ±8-10%RH from that level.
What solution can Rotronic offer?

Rotronic was in 1967 among the first producers of humidity and temperature devices especially designed for the paper industry. The heart of the latest humidity measurement equipment comes with the Rotronic capacitive foil sensor: HygroMer IN-1. An AirChip3000.

Rotronic products:

Humidity and temperature probes:
- **HC2-HS Series**
  - -40...85°C, 0...100%rh, 4mm x 18mm, ±0.8%rh and ±0.1K
- **BFC-UART plate probe**
  - -40...85°C, 0...100%rh, l: 278mm w: 150mm h: 85mm
  - ±0.8%rh and ±0.1K

Transmitter:
- **HF5 series**
  - For interchangeable probes, Various analogue and digital outputs, Display, All psychrometric calculations available...
- **HF8 series**
  - For 2 interchangeable probes, Various analogue and digital outputs, Display, Relais outputs All psychrometric calculations available...

Handheld instrument:
- **HP22**
  - For interchangeable probes, Dew point and other psychrometric calculations, Display
- **S1**
  - Handheld with integrated sword probe designed for paper stacks. 5...99.9%rh, ±1.5%rh and ±0.3K
- **GTS**
  - Handheld with integrated sword probe designed for paper and cardboard stacks. 0...100%rh, ±1.5%rh and ±0.3K

Customer benefits:

Accuracy:
Choosing Rotronic gives you the best accuracy on the market.

Precise humidity measurements enables the printing unit to work always on their maximum possible performance.

Communication:
Networking with Rotronic is an easy affair! With all of the different communication methods, from conventional analogue output signals to RS-485, Wireless or Ethernet RJ45, Rotronic can provide the needed interface to your printing, drawing or packing machine.

Long term stability:
With a long term stability of under 1%rh per year (depending on the environment), Rotronic offers the possibility to “plug & play”: install the device and leave it. We would recommend frequent spot checks in-between calibrations.

Calibration:
In order to calibrate humidity measurement devices, we can offer a factory calibration certificate or even an SCS certificate if this is required. We can also supply a humidity and temperature generator, the HG2-S as well as unsaturated salts for on-site calibration.
Contact us:

Rotronic is represented in more than 40 countries around the world. An up to date list of all our partners is available at www.rotronic-humidity.com/international