EQUINLAB
Equipos para la Industria y Laboratorio

novasina
The Art of Precision Measurement

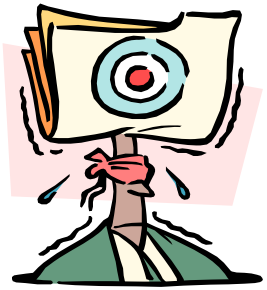
RH and T measurement around the world !

AGENDA

- Objectives
- Air transmitter applications around the world
- Why is the accuracy of RH and T so important in industrial processes?
- References and market experiences

M. Hänsli

Objectives



- Information transfer between Novasina and its partners for special applications
- More theoretical information about accuracy and process control
- Discuss new sales arguments for the high precision HygroDat 100 measurement system for process controls

Air transmitter systems:
„Part - market segments“

NEW

Service and Handheld
ms-1, *Hygro*Mate

HVAC plants
Humidity and temperature transmitter
TR 102, HygroDat 05 / 10 / 20

NEW

Process control
Humidity and temperature transmitter
HygroDat 100 E/C, TR 200

NEW

Quality monitoring
Data logger
***Hygro*Guard 10 / 20**

Service and Handheld
ms-1, *Hygro*Mate

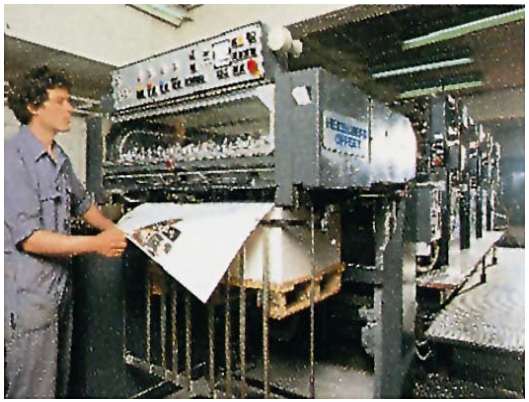
Applications for „Handheld“

- HVAC service/start-up engineers (air conditioning plants)
- Quality engineers for climate controls in any industrial processes
- Temporary humidity/temperature control in warehouses, archives, museums, food- or paper processing, pharmaceutical- and chemical industry
- Climate control for drying and painting processes as well in the wood- and textile industry
- Dew point measurement for container shipping, in new buildings etc.
- Climate control in private buildings, basements as well as in wine cellars.

Service and Handheld
ms-1, *Hygro*Mate

Special Applications :

Quality check in the paper industry, periodical controlling of climate parameters in storages.
(Germany)



Start-up engineers for bigger climatic installations in the textile industry. Final process control.
(worldwide)

Humidity calibration laboratories. Ms-1 as master measurement instrument for testing the whole equipment.
(UK, USA, Canada)

HVAC plants
Humidity and temperature transmitter
TR 102, HygroDat 05 / 10 / 20

Typical applications

- Permanent hum/temp. control in bigger HVAC plants in duct or room areas of business buildings
- Air conditioning control in :

Food processing
Paper industry
Chemical
Biological
Clean rooms
Pharmaceutical
Microelectronics
Healthcare
High fogging
Measurement rooms
IT / Telecom
Green houses
Museums
Archives
Theaters / Music halls
Drying processes

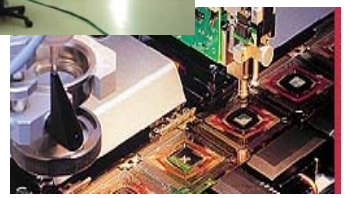
- Hum/Temp. observation in quality measurement rooms for the metal industry or research centres
- Climatic chamber controls

HVAC plants
Humidity and temperature transmitter
TR 102, HygroDat 05 / 10 / 20

Special applications

Clean room control in aerospace and microelectronic industries

(control and monitoring)



OEM applications

e.g. build in a Condair humidifier „MK-05“ or single room control at Siemens Japan (TR 102)

Car- and aircraft painting industry.

(Attention: critical application due to the chemical resistance of meas.cells)

Special development of a silicon free sensor !!

Process control
Humidity and temperature transmitter
HygroDat 100 E/C, TR 200

Typical applications

- High precision climate measurement for sensitive processes in specific industries :

Gas turbine control
- **High fogging**
- **Efficiency control**

Cotton spinnings/knitting or weaving mills

Pharmaceutical processes

Microbiological processes

Coating industries
- **Film industry**
- **Glowing / composit**

Healthcare, hospital

Wind tunnels for research and development

Optical precision measurement in microelectonics

- NEW - High temperature drying processes up to +120° in chemical, pharmaceutical-,food-industry

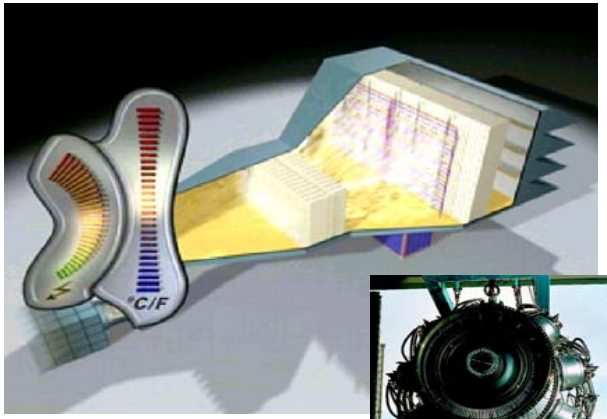
- Hum measurement down to –40°C in cooling chambers (e.g. food industry)

Special applications

Process control
Humidity and temperature transmitter
HygroDat 100 E/C, TR 200

Clean room application in the pharmaceutical industry for monitoring and controlling the air intake and room parameters
(control and monitoring)

Air intake measurement in front of gas/oil turbines (power plants)
to optimize an „high/over fogging“ system.
-> improve the efficiency



Measurement in wind tunnels for research:
- snow making maschine
- Formula 1 aerodynamic

Quality monitoring
Data logger
***Hygro*Guard 10 / 20**

Typical applications

- Long term climate data acquisition (logging) in limited temperature ranges (-20...50°C)
- Operational areas :

Paper-, Film-, Archeological archives

IT server room monitoring

Museums

Backup quality control

Storages
- food
- pharma / chemical
- healthcare

Living rooms

Telecom, mobile phone nodes / antenna

Single room observing

Research and development

Healthcare

Hospitals

Music halls

Microelectronics PCB production

- An important instrument for quality control engineers in different industries as well as for the comfort field.

Special applications

Quality monitoring
Data logger
***Hygro*Guard 10 / 20**

Monitoring network for an international Swiss Bank over Ethernet/Intranet

Monitoring & data acquisition

Long term monitoring of humidity and temp. in many rooms as well as in archives, museums, restaurants etc.

Stand alone monitoring & long term data acquisition

Long term monitoring of humidity and temp. on overseas shipping or other transportation (road shipping, air shipping etc.)

Stand alone long term data acquisition

Why is the accuracy of rH and T so important in many industrial processes ?

- ✓ The „**humidity sensor**“ of a **human** is very efficient but only our body needs this information! *(transpiration control)*
- ✓ Many industrial process are on highly sophisticated. For a good, constant quality, it is necessary to control the climatic environment surrounding such processes!
- ✓ In over 90% of such processes the products need the best climatic conditions!
- ✓ The climatic parameter like T / rH / P / water content / dew point are related.
- ✓ The Hx-diagram is a useful tool to understand the most important climatic interactions.

Cost savings, if you measure precisely rH and temperature

- ✓ You can save costs over the whole plant life time for service and maintenance.
- ✓ Cost savings also for pure water *(humidification),* electricity and oil/gas *(heating/cooling)*
- ✓ Some production steps can be simplified and accelerated
- ✓ The efficiency of the production can be increased *(depending on the industry sector)*

Examples :

Power production

Textils plants

Paper industry

Coating

Public buildings

Painting

Composite

The measurement of rH :

(For visualisation and control)

- ✓ It is very difficult to measure precisely the relative humidity in rooms !
- ✓ You have to understand the influence of many factors *(environment)* !

- **Dimensions** of the room
- The **air flow** in, around and out of the room
- The „**heating/cooling**“ sources in the room
- The **isolation** and **decoupling** of the room
- The weight of the **equipment** inside the room
- The stable **point climate** which the process requires
- The **in/out take** frequency of production lots
- The influence of **human beings** in the room

Example : „Cleanroom application“

particel

Temp.

rH

differential pressure

Atmospheric pressure

„But we only need an „easy“ temperature control in a room“ !

If a customer needs to control an air temperature in a special room he needs to control the relative humidity as well, otherwise his measurement results won‘t be optimal !

- **Water** in the air is a an important **energy source**!
- The **adiabatic process** of **evaporation** is difficult to control at any time
- The **evaporation** process is not only in the air itself, but it will be on any **surface** of the room as well as in **filters** and **ducts**.
- If you work with very **dry air** *(„to low relative humidity“)* you might become **electrostatic** problems

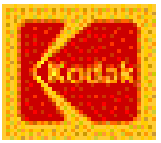
„What is inportant too, for a good rH measurement system“ !

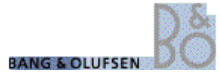
- We know that all electronic rH measurement systems have a drift over a certain period of time (depends on the applications).
- Thus it is important, that you can easily manage the periodical test and adjustment procedures.
- The accuracy of an measurement sensor is an inportant part of the total accuracy of the hole HVAC plant. A roule in the control engingeering say‘s that you need to measure min. 4 time better a parameter then you will control the plant! (if you design a HVAC plant withhin +/-2 %RH you need to measure the rH at +/-0.5 % rH)
- The hysteresis of an humidity measurement system is a very inportant parameter too. It will be some time more inportant then a good accuracy too.

How you can optimize the accuracy on a measurement system !

- An effective **filter protection** system for the rH cell itself *(life time of the cell)*
- **Self test** directly on the instruments when required
- Easy to handle check equipment like **SC Checks** applicable in any environment
- A simple exchangeable **sensor** interface for quick replacement if the drift is too high
- **Self diagnostic** tools integrated in the system
- Clear structured and **modularised** measurement system for a quick and efficient failure handling
- A clear and explanatory **documentation** *(operation manual)*

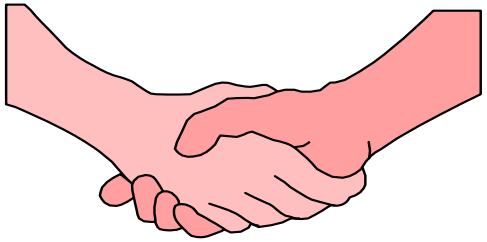
References





novasina
The Art of Precision Measurement

Your specialist for precise humidity and temperature measurement in AIR ENVIRONMENTS



! Thank you for your attention !