

DIGITAL WE DAYS

2023



DEW POINT DETECTION TO
PROTECT HUMANS AND MACHINES

WÜRTH ELEKTRONIK MORE THAN YOU EXPECT

TODAY'S SPEAKERS



PRESENTATION

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MODERATION

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INFORMATION ABOUT THE WEBINAR

You are muted during the webinar.

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Duration of the presentation 30 Min
Q&A: 10 – 15 Min

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DEW POINT

- **What is dew point?**
 - The dew point is the temperature at which air becomes saturated with moisture, causing water vapor to condense into liquid water or dew.
- **How to calculate the dew point?**

$$T_{dp} = T_n - \left(\frac{100 - R.H}{5} \right)$$

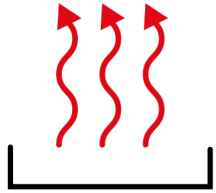
T_{dp} - Dewpoint in degrees Celsius

T_n - Current temperature in degrees Celsius.

R.H - Relative humidity

IMPORTANCE IN HUMAN SAFETY

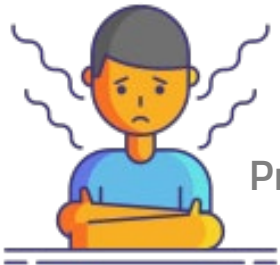
Dew point measurement plays a critical role in ensuring human safety in various scenarios.



Preventing Heat Stress



Enhancing Indoor Air Quality



Preventing Hypothermia



Improving Safety of Outdoor Activities

Image source: www.flaticon.com

IMPORTANCE IN MACHINE PROTECTION

Dew point measurement is not only crucial for human safety but also plays a vital role in safeguarding machines and equipment in various industries.



Preventing Corrosion



Ensuring Electronic
Component Reliability



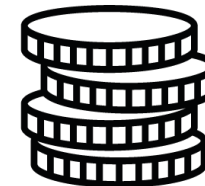
Energy Efficiency



Extending Machinery
Lifespan



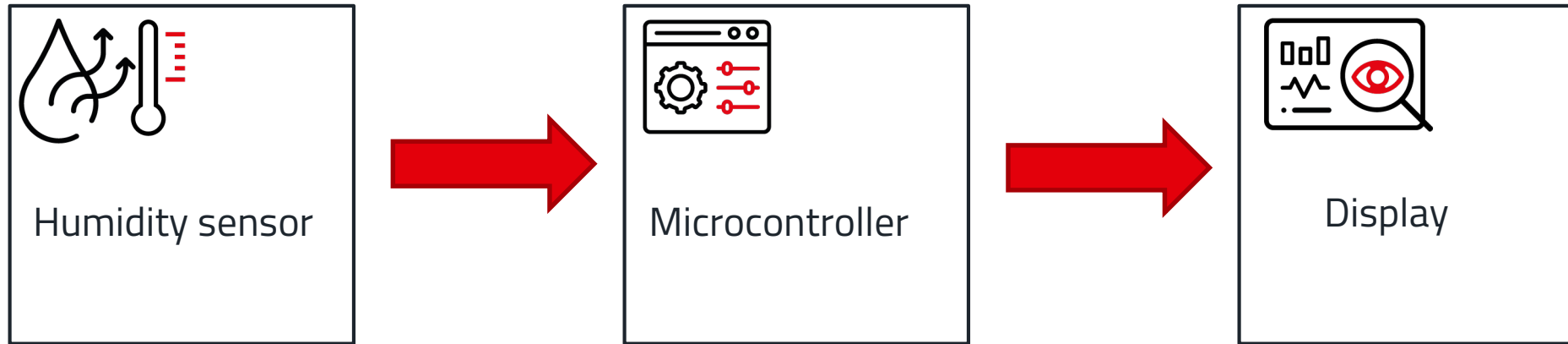
Enhancing Process
Efficiency



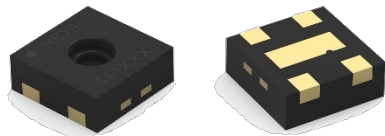
Reducing Maintenance Costs

Image source: www.flaticon.com

REAL-TIME DEW POINT MONITORING



WSEN-HIDS Humidity Sensor with integrated Temperature Sensor



- MEMS-based capacitive sensing principle
- Relative humidity range: 0 to 100%
- Humidity accuracy: $\pm 1.8\%$ rH
- temperature range: $-40\text{ }^{\circ}\text{C}$ to $125\text{ }^{\circ}\text{C}$
- Temperature accuracy: $\pm 0.2\text{ }^{\circ}\text{C}$

BENEFITS OF CONTINUOUS MONITORING

Timely Risk Mitigation

Improved Process Control

Human Safety

Energy Efficiency

Reduced Downtime

Environmental Protection

Scientific Research

Quality Assurance

Remote Monitoring

APPLICATIONS IN HUMAN SAFETY



Image source: www.flaticon.com

APPLICATIONS IN EQUIPMENT PROTECTION



Image source: www.flaticon.com

CASE STUDY: EQUIPMENT PROTECTION

"Corrosion caused by Dew Point and Deliquescent Salts in the Boiler and Flue Gas Cleaning"

- **Background:**
 - Study conducted by Herzog et al. in the field of waste management, specifically related to boiler and flue gas cleaning systems.
- **Problem Statement:**
 - Investigated the impact of dew point and deliquescent salts on corrosion within the equipment.
- **Findings:**
 - The study likely revealed the specific mechanisms and conditions under which dew point and deliquescent salts contribute to corrosion.
 - Insights into the importance of continuous dew point monitoring and control to protect equipment.
- **Significance:**
 - This case study demonstrates the real-world implications of inadequate equipment protection against corrosion.
 - Underlines the need for strategies like continuous dew point monitoring to safeguard industrial equipment.

CASE STUDY: HEALTHCARE SETTING

"A Case Study of Air Quality and a Health Index over a Port, an Urban, and a High-Traffic Location in Rhodes City."

- **Background:**
 - Study conducted by Logothetis et al. on air quality and health indices in different locations within Rhodes City.
- **Problem Statement:**
 - Investigated air quality in locations with potential healthcare relevance.
 - Highlighted the importance of air quality in healthcare environments.
- **Findings:**
 - The study likely examined the relationship between air quality, including dew point, and health indices in different locations.
 - Insights into how dew point affects healthcare environments and patient well-being.
- **Significance:**
 - Demonstrated the relevance of dew point monitoring in healthcare settings.
 - Emphasized the role of dew point in assessing and improving air quality for patients and healthcare providers.

FUTURE DEVELOPMENTS

- **Miniaturization and Portability:**
 - Smaller and more portable
 - Easier integration into various applications.
- **IoT Integration**
- **More precise and cost-effective solutions.**
- **Advanced Sensor Materials:**
 - Research into innovative sensor materials,
 - These materials offer improved sensitivity and accuracy in dew point measurement.
- **Multi-Parameter Sensors:**
 - Measure multiple parameters, such as temperature, humidity and pressure.

CONCLUSION

- **Key Takeaways:**
 - Dew point measurement is crucial for various industries and human safety.
 - It helps prevent moisture-related issues, including corrosion and health concerns.
 - Different detection methods and systems are available to suit various applications.
- **Significance:**
 - Dew point measurement is not just a technical detail; it's a critical factor in maintaining safety, efficiency and product quality.
 - It can save both human lives and significant costs associated with equipment damage.
- **Call to Action:**
 - Encourage industries to adopt dew point monitoring systems to protect their investments and ensure safety.
 - Promote ongoing research and development to improve detection accuracy and reduce costs.

REFERENCE

- Herzog, T.; Müller, W.; Spiegel, W.; Brell, J.; Molitor, D. und Schneider, D. (2012): "Corrosion caused by Dew Point and Deliquescent Salts in the Boiler and Flue Gas Cleaning." In: Thomé-Kozmiensky, K.J. and Thiel, S. (eds.), "Waste management, Volume 3, Recycling and recovery," Neuruppin: TK Verlag, 2012, p. 343–358.
- Logothetis, I.; Antonopoulou, C.; Zisopoulos, G.; Mitsotakis, A.; Grammelis, P. A Case Study of Air Quality and a Health Index over a Port, an Urban and a High-Traffic Location in Rhodes City. *Air* **2023**, 1, 139-158.
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- www.flaticon.com
- www.eldoradoweather.com

Questions

& Answers



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