

## **Unique new measurement technology for vaporized H<sub>2</sub>O<sub>2</sub>**

*Sanna Lehtinen, product manager (M.Sc in Eng., M.Sc in Econ.) at Vaisala Oyj,  
Vantaa, Finland;*

### **Key objectives**

1. Vaisala's new 3-in-1 HPP272 probe for H<sub>2</sub>O<sub>2</sub> vapor (ppm), temperature and humidity measurement
2. Outline a novel method for measuring vaporized hydrogen peroxide and humidity (New PEROXCAP® technology)
3. Describes the differences between relative humidity (RH) and relative saturation (RS) measurement values

### **Summary of the content**

Vaporized hydrogen peroxide is used extensively in the bio-decontamination and sterilization of rooms, facilities, and equipment in the pharmaceutical industry and healthcare. For example, isolators, treatment rooms in hospitals, ambulances, or even aircraft can be cleansed with vaporized hydrogen peroxide. The use of vaporized hydrogen peroxide is growing in popularity, as it destroys even the most resistant microorganisms, like bacterial spores, mycobacteria, and viruses at room temperature and low concentrations. It has no toxic by-products and leaves no residues.

Vaisala has released unique HPP272 probe for bio-decontamination processes. The probe uses the new PEROXCAP sensor, developed by Vaisala, in the measurement of vaporized hydrogen peroxide. PEROXCAP sensor is based on a new capacitive thin-film polymer sensor technology. PEROXCAP measurement uses two composite HUMICAP sensors, one with a catalytic layer and one without. The catalytic layer catalyzes H<sub>2</sub>O<sub>2</sub> from the vapor mixture. Therefore, the HUMICAP sensor with this layer only senses water vapor, providing a measurement of partial water pressure, i.e. relative humidity (RH). The sensor without the catalytic layer senses both hydrogen peroxide vapor and water vapor in the air mixture. The difference between the readings from these two sensors indicates the vapor concentration of H<sub>2</sub>O<sub>2</sub>

One HPP probe can measure not only the hydrogen peroxide content (ppm) of bio-decontamination but also temperature, relative humidity (RH, only water vapor), and relative saturation (RS, whole gas mixture). Water and hydrogen peroxide have a very similar molecular structure, and they both affect the humidity of the air in which they are present. HPP272 measurement makes a difference between the humidity caused by both H<sub>2</sub>O<sub>2</sub> vapor and water vapor, and the humidity caused only by water vapor:

- Relative saturation is a parameter that indicates the humidity of the air caused by both H<sub>2</sub>O<sub>2</sub> vapor and water vapor. When relative saturation reaches 100 %RS, the vapor mixture starts to condense.
- Relative humidity is a parameter that indicates the humidity of the air caused only by water vapor.

Thanks to the repeatability of this new probe, the verification of the bio-decontamination process is reliable cycle after cycle. The extremely stable HPP272 probe require calibration only once a year. Moreover, the heating function of the sensor ensures water cannot condense on the sensor, so the measurement data stays reliable even in extremely high humidities.

### **Presenter's biography**

Sanna Lehtinen is a Product Manager at Vaisala. She has worked as an electronics designer and with life science product management in leading international high tech companies for 20 years. At Vaisala, Sanna ensures product quality and road mapping, gathers industry insight, develops leading products for demanding customer needs as well as produces relevant customer-facing material. Sanna holds a M.Sc. in Biomedical Engineering from Tampere University of Technology and M.Sc. in Economics from Helsinki School of Economics.