11/2025 • We reserve the right to make technical changes.

Digital sensors for humidity, temperature, dew point FHAD 46-Cx for measuring the equilibrium moisture content in building materials

Measuring the equilibrium moisture content

A material's equilibrium moisture content is that level of relative humidity prevailing in the ambient atmosphere at which the material neither gains nor loses moisture. All construction materials may - to a greater or lesser degree - attract water vapor from or emit water vapor to the ambient air. They are hygroscopic; i.e. they attempt to establish an equilibrium in terms of moisture content with respect to the ambient air. The construction material and the ambient air, depending on their respective temperatures, establish an interactive balance between the adsorption of and the emission of water vapor from / to one another. Each material thus has, depending on temperature and on atmospheric humidity, a certain moisture content level (measured in water as a percentage of overall weight).

In the state of equilibrium the relationship between the water content and the equilibrium humidity of a material can be displayed graphically as a curve, the so called moisture sorption isotherm. The sorption isotherm for the material in question indicates per atmospheric humidity value the corresponding water content value at a given constant temperature. If the composition or quality of the material changes then its sorption behavior - and thus its sorption isotherm - also changes. Given the great complexity of sorption processes these isotherms cannot be determined by calculation; they have to be recorded experimentally.

Digital sensors for humidity, temperature, air pressure FHAD 46-C0, uncovered sensor element, with ALMEMO® D6 plug.



FHAD 46-C0
Uncovered sensor element: Smallest design, short response time

Digital sensor for temperature, atmospheric humidity, and atmospheric pressure FHAD 46-C2 Version in plastic, with slotted sensor cap with ALMEMO® D6 plug



FHAD 46-C2
Sensor element enclosed in slotted sensor cover,
compact design, short response time

Measurement of Moisture in Materials

Dielectric Measurement of Moisture in Materials

The measurement of the moisture in materials is performed indirectly via the determination of the dielectric constant. This is performed by using a capacity measurement via a high-frequency electrical field, which penetrates the material without disturbances.

Advantage:
- simple and fast measuring technology
- non-destructive contact measurement
- long term use is possible

Disadvantage:
- limited accuracy

Measurement of the Moisture in Materials according to the Principle of Conductivity

The measurement of the moisture in materials is performed indirectly via the determination of the electrical resistance, which depends on the moisture content of the material.

Advantage:
- simple and fast measuring technology

Disadvantage:
- limited accuracy
- probe insertions
- only for short term control measurements
- measured values depend on various material parameters

DAkkS accredited calibration or factory calibration KH9xxx, temperature, humidity, and KD92xx, atmospheric pressure, for digital sensor, see chapter „Calibration certificates".
DAkkS accredited calibration meets all the requirements regarding test resources laid down in DIN EN ISO/IEC 17025.