

ALUMINIUM OXIDE (Al₂O₃) MOISTURE SENSOR

The aluminium oxide (Al₂O₃) sensor provides accurate determination of dew point, frost point, ppm, or relative humidity in most industrial gases. The operating principle of the aluminum oxide sensor is that its capacitance varies with the moisture concentration. The sensor is capable of both ppm and dew point measurements in most industrial gas streams. The electronics are mounted internally and process the signal from the sensor and display the readings on the front display panel.

Aluminium Oxide Moisture Sensor Theory

An aluminum layer on a ceramic support is anodized to form a thin porous layer of aluminum oxide. The aluminum oxide is then coated with a thin, permeable layer of gold. The gold and the aluminium layers form the sensor electrodes.

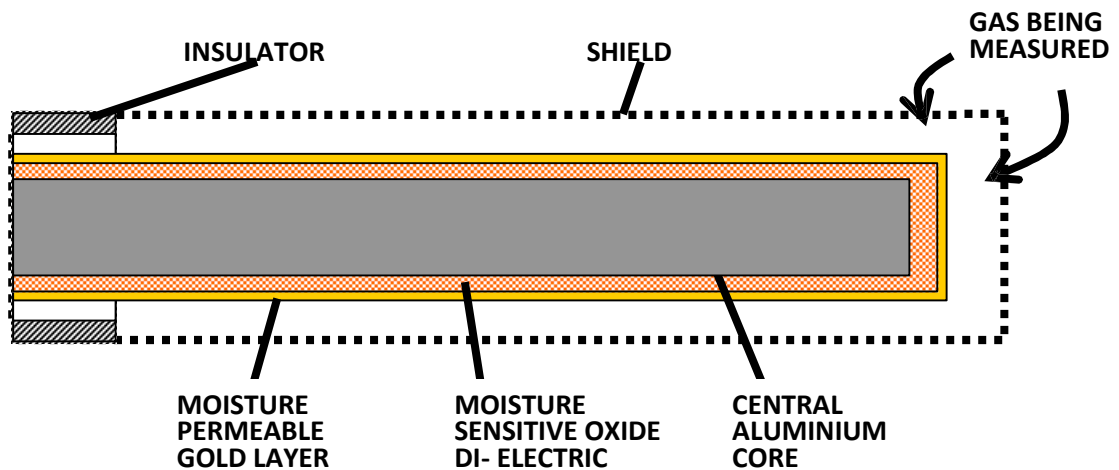


Figure 1. Cross-section of aluminium oxide sensor.

The gold layer is permeable to moisture and conductive. This forms the second electrode of a capacitor.

The pores in the aluminum oxide layer absorb moisture from the gas stream in relation to the moisture content of the gas stream.

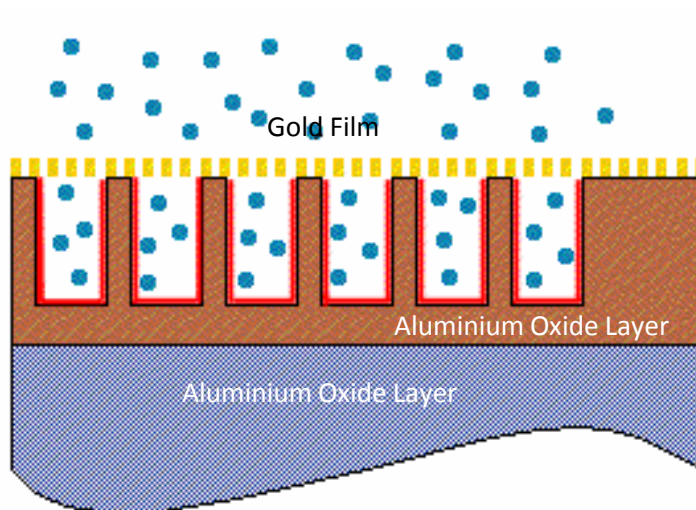


Figure 2. Close-up view of aluminium oxide sensor

The absorption of water molecules changes the capacitance of the sensor. The capacitance of the sensor is measured which is then converted to the moisture value.

The radius of the pores in aluminium oxide layer make the sensor specific to water molecules.

Uses of the Aluminium Oxide Sensor

The aluminium oxide sensor is suitable for use on virtually any application where moisture measurements are required.

The applications for the moisture analysers fall into two industrial areas:

Gas Producers - for ensuring product quality

Gas Users - to ensure reliability of inert gas blankets.

Typical industries are Semiconductor, Metal Treatment, and Plastics.