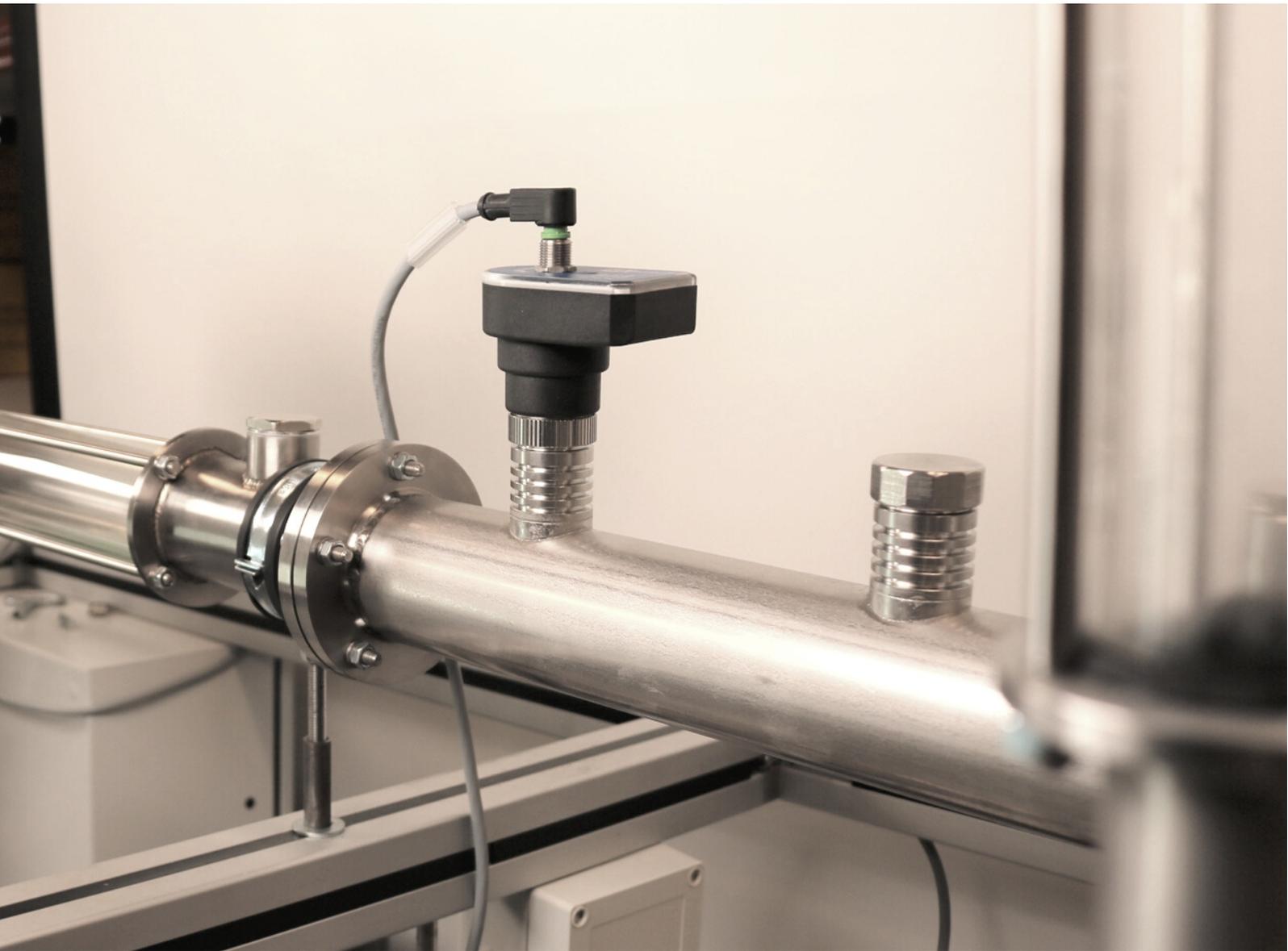


# Vapor Quality Sensor

For Scientific Measurements

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**WRITTEN BY**

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The sensor is delivered with a dry calibration in dry gas and a functional calibration for Vapor Quality Control. This functional calibration is not precise, and you need to make a calibration at a known level for higher accuracy



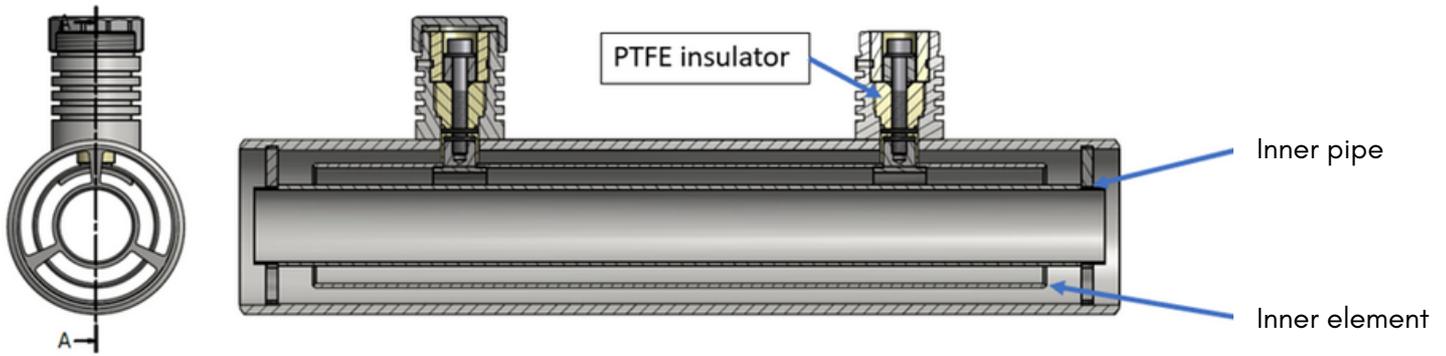
The working principle is capacitive which means, that in reality the sensor is a capacitor, and the fluid is the dielectric media. The total capacitance is measured, and the volume percentage is calculated based on the assumption that gas has a dielectric constant of 1 and the liquid has a higher value. The calibration covers the geometry and the dielectric constant of the liquid – this is found experimentally at operating temperature.



The Vapor Quality sensor can measure very small amounts of liquid in a gas flow. The sensor is designed and used for controlling evaporators which means there is little focus on accuracy. Normally the sensor is calibrated for dry gas only because this is what matters for the control system.

For larger amounts of liquid, it needs additional calibration to provide an accurate value. With an additional calibration, you can expect to reach  $\pm 10\%$  accuracy depending on the model used, based on the mA signal. You can get it much better if you make a full calibration curve and make a compensation for the circular section.

The sensor illustrated is the Inline Vapor Quality sensor. This sensor measures between the inner element and both the inner pipe and the outer pipe. There is no measurement inside the inner pipe, and that is not a problem as the center section is normally filled with gas, and the liquid flow close to the outer pipe where the boundary layer secures a lower velocity. The sensor is available in diameters from 25 to 65 mm. For smaller pipe diameters, we have other products.



We call it a Vapor Quality sensor but, it measures the Vol% of liquid. The sensor is instant and measures what is inside it, but the velocity is not measured. This means there will be a tendency that liquid will overrepresent because it travels slower through the sensor.

## Conclusion

The sensor can be used for liquid measurement in gas, but it need calibration to a known liquid level to be precise. In the standard delivery condition, it is only accurate for dry gas.



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[Watch Vapor Quality demonstration video](#)

[Watch Vapor Quality Design + Function video](#)



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