

## Why ZEGAZ Instruments' Dewpoint Analyzers Do Not Need Calibration

### KEY CONCEPTS

- ZEGAZ Instruments' Chilled-mirror moisture and hydrocarbon dewpoint analyzers do not need routine calibration
- Chilled-mirror instruments are "first-principle" measurements

### EXECUTIVE SUMMARY

Frequent calibrations are a major issue with most analytical measurements and analyzers. Of course, it would be better if instruments did not require calibrations.

ZEGAZ Instruments' line of dewpoint analyzers, do not require calibration of the core measurement. This may seem counterintuitive, but there is a very good reason for it. Before discussing it, we should consider what a chilled-mirror instrument is.

### CHILLED-MIRROR INSTRUMENTS

ZEGAZ Instruments' dewpoint analyzers are, at their core, very advanced automated chilled-mirrors.

Using a chilled-mirror to measure water and/or hydrocarbon dewpoint has many advantages compared to other methods. Most importantly, dewpoint measurement is a first-principle measurement; meaning that the figure-of-merit to be measured (condensation temperature) is being measured directly.

### What is a chilled-mirror instrument?

A chilled-mirror instrument cools a surface in a gas stream. When condensation happens, the temperature of the surface is reported as the dewpoint. All chilled-mirrors, whether manual or automated, have three elements in common:

1. *A surface that can be cooled in a controllable manner. This is the surface where condensation happens at dewpoint.*
2. *A temperature sensor for the cooled surface. One must know the temperature of the cooled surface. This temperature is reported as the dewpoint when condensation happens.*
3. *A method to detect the onset of condensation. In manual chilled-mirrors, it is the human eye that detects the onset of condensation. In automated chilled-mirror units, it is usually an optical method. ZEGAZ Instruments' analyzers use the most advanced detection method called CEIRS™ to detect the onset of condensation.*

In a chilled-mirror measurement, the surface is cooled until condensation is detected. Because ZEGAZ Instruments' analyzers use infrared beams to provide an unambiguous detection of the moment when dewpoint happens, the main sensor to be calibrated is the temperature sensor. The temperature sensor that ZEGAZ Instruments uses is a small thermistor that will hold its calibration indefinitely since it is not exposed to air or moisture. Therefore no calibration of the sensor is needed.

Other moisture measurement methods are usually subject to drift or degradation of the sensor element. Since ZEGAZ Instruments' chilled-mirror is a spectroscopic method (it essentially uses photons as sensors), it will not be subject to drift or degradation. The only surface that is exposed to gas in ZEGAZ Instrument analyzers is a very inert ceramic. This inert ceramic is completely immune to any type of degradation even in presence of harsh acids or alkali environment.

ZEGAZ Instrument has collected years of data from its instruments in the field. None of them has lost its original calibration. None of the ceramic pieces have been degraded or rendered inoperable.

*For more information, please contact your authorized dealer or ZEGAZ Instruments.*