



Compressed breathing gas is used in a variety of scenarios; most typically in diving, tunneling, altitude or emergency service applications. The quality of the supplied gas is required to meet a standard (EN12021 1999) in respect of:

- Oxygen content
- Lubricant content
- Carbon Dioxide content
- Carbon Monoxide content
- Odour or taste
- Water content
- No free liquid water

These factors contribute to the health and safety of persons breathing the gas, and as such demand careful consideration by suppliers and users.

Importance of Water Vapour

The water content of the gas is important for two reasons:

- Free water within the gas circuit can give rise to corrosion that may deteriorate the functionality of equipment over time and give rise to toxic contaminants that may harm the user.
- As the compressed air expands through the pressure regulators, condensation can occur. This can cause liquid water or ice to form with the associated risk of valve blockage or failure.

Eliminating both risks requires that the water content of compressed gas should meet specified values. Gas suppliers are legally required to perform routine checks of system performance.

EN12021 Specified Water Vapour Concentrations:

Nominal pressure bar	Maximum water content of air at atmospheric pressure and 20 °C in mg·m ⁻³
40 to 200	50
> 200	35
Note: The water content of the air supplied by the compressor for filling 200 bar or 300 bar cylinders should not exceed 25 mg·m ⁻³	

These values are defined to ensure that excess free water and condensation are not problematical at the point of gas delivery.

Measurement Options:

Within the breathing gas industry, two types of measurement systems are typically employed:

Colormetric or Draeger tubes: glass tubes containing a chemical reagent that reacts to the presence of water vapour. These offer a low cost, fast and convenient method of checking the water vapour concentration.

Impedance or capacitive dew point sensors: typically based on aluminium oxide or polymer sensors, a wide range of types are available, often in portable formats to allow users to spot check in-situ.

In both cases, measurement uncertainty can be quite significant for different reasons. For this reason, chilled mirror instruments provide a dependable method of providing a reference measurement that can be easily recalibrated by standards laboratories within national accreditation schemes such as SCS, NVLAP, DKD, UKAS, COFRAC etc.

MBW Calibration/RH Systems:

MBW Calibration and US partner RH Systems manufacture chilled mirror dew point hygrometers that are internationally used by standards laboratories at national, accredited and industrial level.

Available in a range of version covering dew/frost points from -100 to +95°C, the instrument range incorporates the features necessary to provide reliable measurements in all conditions. Notable features that support their use in the breathing gas sector include:

- Pressure rating up to 300bar with integral pressure measurement
- Water vapour enhancement factors across the full pressure range
- Integral calculation software to provide measurement output in units including ppm, mg·m⁻³
- Fully self contained and easily transportable

For further information visit www.mbw.ch or www.rhsystems.net

