



Designation: D8446 – 22

Standard Test Method for Water Vapor Content in Compressed Air Using Electronic Moisture Analyzers¹

This standard is issued under the fixed designation D8446; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers the determination of the water vapor content in compressed air using portable or in-situ electronic moisture analyzers. Such analyzers commonly use sensing cells based on phosphorus pentoxide, P_2O_5 , aluminum oxide, Al_2O_3 , or silicon piezoelectric-type cells or laser-based technologies.

1.2 This test method is applicable for the range of condensation temperatures from -80°C to 60°C .

1.3 Testing is often performed at reduced pressure from the full pressure of the system or source of compressed air depending on the capability of the specific analyzer. Testing above 2000 kPa may introduce additional uncertainty because of changes in the relationship between water vapor pressure and actual moisture content at elevated pressures.

1.4 *Units*—The values stated in SI units are to be regarded as the standard. No other units of measurement are included in this standard.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

¹ This test method is under the jurisdiction of ASTM Committee D22 on Air Quality and is the direct responsibility of Subcommittee D22.13 on Compressed Air Quality.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

D1356 Terminology Relating to Sampling and Analysis of Atmospheres

D4178 Practice for Calibrating Moisture Analyzers

D4230 Test Method for Measuring Humidity with Cooled-Surface Condensation (Dew-Point) Hygrometer

D5454 Test Method for Water Vapor Content of Gaseous Fuels Using Electronic Moisture Analyzers

D7904 Test Method for Determination of Water Vapor (Moisture Concentration) in Natural Gas by Tunable Diode Laser Spectroscopy (TDLAS)

3. Terminology

3.1 *Definitions*—For definitions of other terms used in this test method, refer to Terminology D1356.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *capacitance-type cell, n*—this cell typically uses aluminum coated with aluminum oxide, Al_2O_3 , as part of a capacitor.

3.2.1.1 *Discussion*—The dielectric Al_2O_3 film changes the capacity of the capacitor in relation to the water vapor present. Silicone cells also operate on this principal by reporting a capacitance change when adsorbing or desorbing water vapor.

3.2.2 *dew point, n*—temperature (at a specified pressure) at which liquid water will start to condense from the water vapor present as measured over water.

3.2.2.1 *Discussion*—The term “dew point” is often used to include “frost point” (see 3.2.4) when generally referring to the water content based upon this principle, but there are unique values for each for temperatures below 0°C .

3.2.3 *electrolytic-type cell, n*—this cell is composed of two noble metal electrode wires coated with phosphorus pentoxide, P_2O_5 .

3.2.3.1 *Discussion*—A bias voltage is applied to the electrodes and water vapor chemically reacts generating a current between the electrodes proportional to the reaction with the water vapor present.

3.2.4 *frost point, n*—temperature (at a specified pressure) at which liquid water will start to condense from the water vapor present as measured over ice.

3.2.5 *laser-type cell, n*—consists of a sample cell with an optical head mounted on one end and a mirror mounted on the