
International Standard



6327

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Gas analysis — Determination of the water dew point of natural gas — Cooled surface condensation hygrometers

Analyse des gaz — Détermination du point de rosée des gaz naturels — Hygromètres à condensation à surface refroidie

First edition — 1981-03-15

UDC 665.612.3 : 543.27 : 533.275

Ref. No. ISO 6327-1981 (E)

Descriptors : gas analysis, natural gas, hygrometers, tests, water vapour tests, determination, vapour pressure, humidity, dew point, test equipment.



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 6327 was developed by Technical Committee ISO/TC 158, *Analysis of gases*, and was circulated to the member bodies in September 1979.

It has been approved by the member bodies of the following countries :

Australia	India	Poland
Belgium	Korea, Rep. of	Romania
Czechoslovakia	Libyan Arab Jamahiriya	South Africa, Rep. of
Egypt, Arab Rep. of	Mexico	United Kingdom
France	Netherlands	USSR
Germany, F.R.	Philippines	

No member body expressed disapproval of the document.

Gas analysis — Determination of the water dew point of natural gas — Cooled surface condensation hygrometers

1 Scope

This International Standard describes hygrometers used for the determination of the water dew point of natural gases by detecting water vapour condensation occurring on a cooled surface or by checking the stability of the condensation on this surface.

2 Field of application

The water dew point of processed natural gases in transmission lines normally lies between $-25\text{ }^{\circ}\text{C}$ and $+5\text{ }^{\circ}\text{C}$, which corresponds to water concentrations of 50 to 200 ppm (V/V), according to the pressure of the gas.

The hygrometers considered in this International Standard may be used for determining water vapour pressure, without requiring calibration, in a system operating under total pressures greater than or equal to atmospheric pressure. The relationship between water vapour partial pressure and the observed dew point confers on the method the quality of absolute measurement.

If the test atmosphere contains gases which condense at a temperature in the region of, or above, that of the water dew point, it is very difficult to detect the condensed water vapour.

3 Principle

3.1 Principle of the apparatus

With this type of apparatus, which determines the water content of a gas by measuring the corresponding dew point, a surface (generally a metallic mirror), the temperature of which may be artificially lowered and accurately measured, is exposed to a sample of the gas being tested. The surface is then cooled to a temperature at which condensation occurs and is observed as dew.

Below this temperature, condensation increases with time, whilst above it, condensation decreases or does not occur. This surface temperature is then (for practical applications) taken as the dew point of the gas flowing through the apparatus.

3.2 Determination of water vapour pressure

The partial water vapour pressure in the gas samples is the saturated vapour pressure corresponding to the observed dew point, provided that the gas in the hygrometer is at the same pressure as the gas at the time of sampling.

Published documents are available giving the relationship between saturated vapour pressure and temperature.

It should be noted that if methanol is present, this method determines methanol in addition to water. However, if the methanol content is known, the annex gives, for information, correction factors allowing determination of the actual water dew point.

3.3 Precautions to be taken

It is essential that all sample lines be as short as possible and be sized to produce a negligible pressure drop during measurement. The sample lines and the hygrometer, apart from the mirror, shall be above the water dew point temperature.

4 Characteristics of the apparatus

4.1 General

Condensation apparatus may be designed in various ways. The differences lie mainly in the nature of the condensation surface, the methods used for cooling the surface and for controlling its temperature, the methods used for measuring the surface temperature and the method of detecting the condensation. The mirror and its associated components are normally placed in a small cell through which a sample of the gas flows; at high pressures, the mechanical strength and leak tightness of the cell have to be suitable.

It is recommended that the mirror should be easily removable for cleaning.

Adequate precautions shall be taken if measurements are to be made in the presence of condensable hydrocarbons.

Measurements can be carried out manually or automatically.

Caution : Manufacturers' instructions should be carried out before gas at high pressure is admitted to the cell.