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STANDARD

10101-3

First edition
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**Natural gas — Determination of water by
the Karl Fischer method —**

Part 3:

Coulometric procedure

*Gaz naturel — Dosage de l'eau par la méthode de Karl Fischer —
Partie 3: Méthode coulométrique*



Reference number
ISO 10101-3:1993(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 10101-3 was prepared by Technical Committee ISO/TC 193, *Natural gas*, Sub-Committee SC 1, *Analysis of natural gas*.

ISO 10101 consists of the following parts, under the general title *Natural gas — Determination of water by the Karl Fischer method*:

- *Part 1: Introduction*
- *Part 2: Titration procedure*
- *Part 3: Coulometric procedure*

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Natural gas — Determination of water by the Karl Fischer method —

Part 3: Coulometric procedure

WARNING — Local safety regulations must be taken into account, when the equipment is located in hazardous areas. Due to the toxicity and odour of pyridine, the user should ensure that there is adequate ventilation.

1 Scope

This part of ISO 10101 specifies a coulometric procedure for the direct determination of water content by the Karl Fischer method. The method applies to natural gas and other gases which do not react with Karl Fischer reagents.

It applies to water concentrations between 5 mg/m^3 and $5\,000 \text{ mg/m}^3$. Volumes are expressed at a temperature of $273,15 \text{ K}$ ($0 \text{ }^\circ\text{C}$) and a pressure of $101,325 \text{ kPa}$ (1 atm).

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 10101. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 10101 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 5725:1986, *Precision of test methods — Determination of repeatability and reproducibility for a standard test method by inter-laboratory tests.*

ISO 10101-1:1993, *Natural gas — Determination of water by the Karl Fischer method — Part 1: Introduction.*

3 Principle

A measured volume of gas is passed through the titration cell, where the water is absorbed by the anodic solution. The iodine required for the determination of water by the Karl Fischer reaction is generated coulometrically from iodide. The quantity of electricity is directly proportional to the mass of iodine generated and hence to the mass of water determined.

The principle and chemical reactions of the Karl Fischer method are given in ISO 10101-1:1993, clauses 3 and 4; interferences are also described in clause 4 of ISO 10101-1.

4 Reagents

4.1 Reagents specially formulated for coulometric determination.

NOTE 1 A typical composition of the anodic solution is as follows: 34 % (*m/m*) trichloromethane, 3 % (*m/m*) tetrachloromethane, 22 % (*m/m*) methanol, the remainder being sulfur dioxide and pyridine.

Other reagents may be used, for the coulometric determination by the Karl Fischer method, if they have shown to be satisfactory.