International Standard 6975

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Natural gas — Determination of hydrocarbons from butane (C_4) to hexadecane (C_{16}) — Gas chromatographic method

Gaz naturel — Détermination des hydrocarbures du butane (C_4) jusqu'à l'hexadécane (C_{16}) — Méthode par chromatographie en phase gazeuse

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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.

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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 6975 was prepared by Technical Committee ISO/TC 158, *Analysis of gases*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Natural gas — Determination of hydrocarbons from butane (C_4) to hexadecane (C_{16}) — Gas chromatographic method

1 Scope and field of application

This International Standard specifies a method of quantitative analysis of C_4 to C_{16} hydrocarbons in natural gas.

NOTES

1 C_4 and C_5 hydrocarbons are measured individually, and the higher hydrocarbons are grouped for each carbon number.

2 Complete analysis may be obtained by combining the results from this method with the unnormalized results from ISO 6974, which covers determination of helium, hydrogen, oxygen, nitrogen, carbon dioxide and hydrocarbons from C_1 to C_8.

3 If used in conjunction with ISO 6974, the results for C_1 to C_8 are those obtained by means of the method described in ISO 6974; the results for C_9 to C_{16} are those obtained by means of the method described in this International Standard.

2 References

ISO 683/13, *Heat-treated steels, alloy steels and free-cutting steels — Part 13: Wrought stainless steels.*

ISO 6142, *Gas analysis — Preparation of calibration gas mixtures — Weighing methods.*

ISO 6974, *Natural gas — Determination of hydrogen, inert gases and hydrocarbons up to C_8 — Gas chromatographic method.*

3 Principle

Injection of a natural gas sample on to a column, the packing of which has been impregnated with silicone oil. The separation is carried out using temperature programming and the constituents are detected by means of a flame ionization detector (FID).

Determination of quantitative results for the C_4 to C_{16} hydrocarbons either by calibrating the chromatograph with a calibration gas mixture containing butane and calculating all other hydrocarbon responses from this, or by applying the value for pentane obtained from ISO 6974 and calculating from this.

When the results are combined with those from ISO 6974, the total of the measured concentrations shall be normalized to 100 %.

NOTE — ISO 6974, with which the results from this analysis can be combined, uses two separations. These involve a molecular sieve 13 X[1] column with a thermal conductivity detector, and a Porapak R[1] column with a thermal conductivity and a flame ionization detector in series.

4 Materials

4.1 Carrier gas: helium, not less than 99,99 % pure[2], free from oxygen and water.

4.2 Auxiliary gases

4.2.1 Hydrogen, not less than 99,99 % pure.[2]

4.2.2 Air, free from hydrocarbon impurities.

4.3 Reference materials: 2-methylpropane, butane and all the straight chain alkanes from C_5 to C_{16}, all not less than 99 % pure.

4.4 Coolant: solid carbon dioxide or liquid nitrogen.

1) 13 X and Porapak R are trade names for commercially available products. At present, no other products intended for this purpose are known to be available commercially. This information is given for the convenience of the user of this International Standard and does not constitute an endorsement of these products by ISO.

2) If the purity of the gas is less than that specified, it is essential to check that the type of impurity present does not interfere with the analysis. Also, even if the carrier gases argon and/or helium fall within the specification, some of the impurities present in these gases can nevertheless interfere with the analysis. Under these circumstances, appropriate purification is essential.