SLOVENSKI STANDARD
SIST EN ISO 10370:1998

01-maj-1998

Naftni proizvodi - Določevanje koksnega ostanka - Mikro metoda (ISO 10370:1993)

Petroleum products - Determination of carbon residue - Micro method (ISO 10370:1993)

Mineralölerzeugnisse - Bestimmung des Koksrückstandes - Mikroverfahren (ISO 10370:1993)

Produits pétroliers - Détermination du résidu de carbone - Méthode micro (ISO 10370:1993)

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ICS:

75.080	Naftni proizvodi na splošno	Petroleum products in general

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EUROPEAN STANDARD

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English version

Petroleum products - Determination of carbon residue - Micro method (ISO 10370:1993)

Produits pétroliers - Détermination du résidu de carbone - Méthode micro (ISO 10370:1993)

Mineralölerzeugnisse - Bestimmung des Koksrückstandes - Mikroverfahren (ISO 10370:1993)

This European Standard was approved by CEN on 1995-07-06. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Foreword

The text of the International Standard from ISO/TC 28 "Petroleum products and lubricants" of the International Organization for Standardization (ISO) has been taken over as a European Standard by the Technical Committee CEN/TC 19 "Petroleum products, lubricants and related products".

This European Standard shall be given the status of a National Standard, either by publication of an identical text or by endorsement, at the latest by February 1996, and conflicting national standards shall be withdrawn at the latest by February 1996.

According to CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 10370:1993 has been approved by CEN as a European Standard without any modification.

INTERNATIONAL STANDARD

ISO 10370

First edition
1993-09-15

Petroleum products — Determination of carbon residue — Micro method

Produits pétroliers — Détermination du résidu de carbone — Méthode micro

Reference number
ISO 10370:1993(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 10370 was prepared by Technical Committee ISO/TC 28, *Petroleum products and lubricants*.

Annexes A and B of this International Standard are for information only.

International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland

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Petroleum products — Determination of carbon residue — Micro method

WARNING — The use of this International Standard may involve hazardous materials, operations and equipment. This International Standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this International Standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

1 Scope

This International Standard specifies a method for the determination of the amount of carbon residue, in the range 0,10 % (*m/m*) to 30,0 % (*m/m*), left after evaporation and pyrolysis of petroleum products under specified conditions. For products which yield a residue in excess of 0,10 % (*m/m*), the test results are equivalent to those obtained by the Conradson carbon residue test (see ISO 6615).

This International Standard is also applicable to petroleum products which consist essentially of distillate material, and which may yield a carbon residue below 0,10 % (*m/m*). On such materials, a 10 % (*V/V*) distillation residue is prepared by the procedure described in ISO 3405 before analysis.

Both ash-forming constituents, as defined by ISO 6245, and non-volatile additives present in the sample add to the carbon residue value and are included in the total value reported.

NOTES

1 The carbon residue value serves as an approximation of the tendency of petroleum products to form carbonaceous deposits under similar degradation conditions, and can be useful in the assessment of relative carbon-forming tendencies of products within the same class. Care should be taken in the interpretation of results.

2 The presence of organic nitrates incorporated in certain distillate fuels will yield abnormally high values for the carbon residue. The presence of alkyl nitrate in the fuel may be detected by ASTM Test Method D 4046.

2 Normative reference

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

ISO 3405:1988, *Petroleum products — Determination of distillation characteristics.*

3 Definition

For the purposes of this International Standard, the following definition applies.

3.1 carbon residue: The whole residue produced from the specific conditions of evaporation and pyrolysis described in this International Standard.

4 Principle

A weighed aliquot of the oil sample is placed in a glass vial and heated to 500 °C under an inert (nitrogen) gas stream in a controlled manner for a specific time. Volatiles formed during the reactions are swept away by the inert gas. The carbonaceous residue remaining is weighed.

5 Reagents and materials

5.1 Nitrogen, oxygen-free, with appropriate regulation to provide a delivery pressure of 0 kPa to 200 kPa.

NOTE 3 The practical minimum delivery pressure is 140 kPa.

6 Apparatus

6.1 Glass sample vials, of 2 ml capacity, 12 mm outside diameter, approximately 35 mm high.

NOTE 4 A vial of 4 ml capacity, 12 mm outside diameter, approximately 72 mm high is available for use with samples of very low carbon residue content [below approximately 0,20 % (*m/m*)]. No precision data has been obtained with these vials.

6.2 Eyedropper or small rod, suitable for sample transfer.

6.3 Coking oven, comprising a circular heating chamber approximately 85 mm diameter by 100 mm deep for top-loading, capable of heating to 500 °C at a rate of between 10 °C and 40 °C per min, with exhaust port of 13 mm inside diameter for nitrogen purge of oven chamber (inlet near top, exhaust at bottom centre), with thermocouple sensor located in oven chamber next to but not touching sample vials, and with lid capable of sealing out air. The condensate outlet leads into a short vertical section where most of the vapour condenses and falls into a removable trap located directly below the oven. A schematic diagram is given in figure 1.

6.4 Sample vial holder, comprising a cylindrical aluminium block approximately 76 mm diameter by 17 mm thick with 12 evenly spaced holes (for vials) each 13 mm diameter by 13 mm deep. The holes shall be arranged in a circular pattern approximately 3 mm from the perimeter. The holder shall have legs 6 mm long with guides to centre in the oven chamber, and an index mark on the side to use as position reference. A typical holder is shown in figure 2.

6.5 Thermocouple, iron-constantan, with exterior read-out and a range including 450 °C to 550 °C.

6.6 Analytical balance, of 0,1 mg sensitivity.

6.7 Cooling vessel: desiccator or similar tightly closed vessel, without desiccant.

7 Sample preparation

7.1 For samples which consist essentially of distillate material, either follow the procedure given in 7.2 to 9.4 or prepare a distillation residue following a modified procedure of ISO 3405, given in 7.1.1 and 7.1.2.

7.1.1 Assemble the apparatus as directed in ISO 3405 but omit placing the thermometer in the neck of the distillation flask. Secure the neck of the flask with a snug-fitting, well-rolled cork or silicone rubber stopper.

NOTE 5 A thermometer is not required, as it is the volume of distillate collected that is critical, not the temperature of distillation.

7.1.2 Discontinue heating when 89 ml of distillate has been collected in the receiver. When 90 ml has been recovered, remove the receiver and replace with a small flask. Collect the remainder of the drainings from the condenser and combine with the warm residue from the distillation flask. This combined residue represents a 10 % (*V/V*) bottom portion of the original sample; use it in place of the sample as described in 7.2 to 9.4.

7.2 Thoroughly stir the sample to be tested, first warming if necessary to reduce its viscosity. If the samples are in liquid form transfer directly to the vials using a rod or syringe. If the samples are solid materials they shall either be heated, or frozen with liquid nitrogen and then shattered to provide manageable pieces.

8 Sample transfer

8.1 During weighing and filling, handle the vials with forceps to minimize weighing errors. Discard the vials after use.

8.2 Weigh the clean sample vials, and record the mass to the nearest 0,1 mg.

Dimensions in millimetres

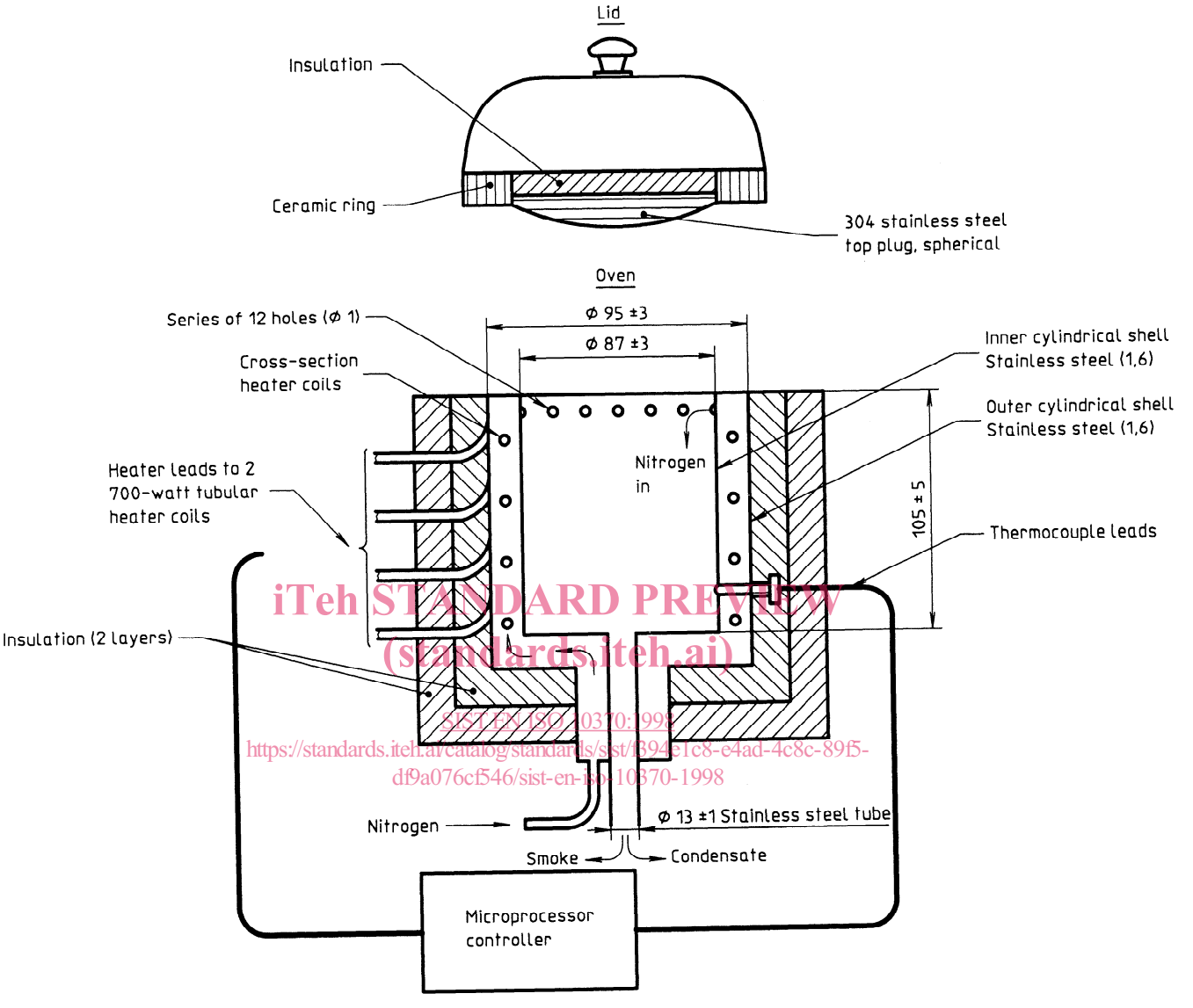

Figure 1 — Oven and lid