
INTERNATIONAL STANDARD



3840

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Petroleum distillates — Determination of olefinic plus aromatic hydrocarbons content

Distillats du pétrole — Détermination de la teneur en hydrocarbures oléfiniques et aromatiques

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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 3840 was drawn up by Technical Committee ISO/TC 28, *Petroleum products*, and was circulated to the Member Bodies in August 1975.

It has been approved by the Member Bodies of the following countries :

Australia	Ghana	Portugal
Austria	Hungary	Romania
Belgium	India	South Africa, Rep. of
Brazil	Iran	Spain
Canada	Israel	Sweden
Czechoslovakia	Italy	Turkey
Egypt, Arab Rep. of	Mexico	U.S.A.
France	Netherlands	U.S.S.R.

The Member Body of the following country expressed disapproval of the document on technical grounds :

Poland

Petroleum distillates — Determination of olefinic plus aromatic hydrocarbons content

1 SCOPE AND FIELD OF APPLICATION

1.1 This International Standard specifies a method for the determination of the olefinic plus aromatic hydrocarbons content of gasolines, naphthas, kerosines, and other petroleum distillates which are substantially free from butanes and butenes and which have a 90 % recovery point not over 315 °C when determined in accordance with ISO 3405. The method is not directly applicable to determinations above 98,5 % (V/V) olefins plus aromatics if a 10 ml test portion is used, nor above 97,0 % (V/V) if a 5 ml test portion is used.

NOTE — For best results, depentanized test portions should be used.

1.2 The results obtained by the prescribed procedure represent all acid-absorbable materials in the test portion. These, besides aromatic and olefinic hydrocarbons, comprise a variable portion of compounds containing sulphur, nitrogen, oxygen or combinations thereof. Hence, in the interpretation of results, the presence or absence of appreciable proportions of non-hydrocarbon materials should be considered. In petroleum distillates, the proportion of non-hydrocarbon materials is generally low enough for the acid absorption to be taken as a measure of total olefinic plus aromatic hydrocarbons and, in the absence of olefins (bromine number less than 1), as a measure of aromatics, after an empirical correction for co-absorbed saturates has been applied. This solubility correction is subject to variation depending on the material analysed. Also, the contraction of volume may include certain minor effects such as the volume change which occurs when hydrocarbons of different types are mixed; these effects are usually considerably less than the precision of the method, and, therefore, are negligible.

2 REFERENCES

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

ISO 3839, *Petroleum distillates and commercial aliphatic olefins — Determination of bromine number — Electro-metric method*.¹⁾

3 PRINCIPLE

A measured volume of the test portion, contained in a specified flask, is shaken in a prescribed manner, at the temperature of melting ice, with a solution of phosphorus(V) oxide in concentrated sulphuric acid. After the test portion has reacted, the flask is centrifuged to separate the phases and the unreacted portion is measured.

4 REAGENTS

During the analysis, use only reagents of recognized analytical grade, and only distilled water or water of equivalent purity.

4.1 Sulphonation acid.

Prepare (CAUTION, see below) a mixture containing 70 % (m/m) of the sulphuric acid (H₂SO₄) (4.2) and 30 % (m/m) of phosphorus(V) oxide (P₂O₅). This is done conveniently as follows : add 500 g of phosphorus(V) oxide to 633 ± 5 ml of the sulphuric acid (4.2) contained in a conical flask. Stir with a glass rod or mechanical stirrer until only a small amount of residue remains, cover with a beaker while the mixture cools to room temperature, and decant into acid bottles provided with a closure which will protect the reagent from dilution with moisture from the atmosphere. Prepare the reagent as rapidly as possible to minimize absorption of moisture from the air during preparation.

CAUTION — While preparing the reagent, the operator should wear the face mask or safety goggles (5.5) and place the flask in a basin.

4.2 Sulphuric acid, 95 to 96 % (m/m).

5 APPARATUS

5.1 Standard and precision sulphonation flasks, of heat-resistant glass, well annealed, and meeting the requirements shown in figures 1, 2 and 3.

1) At present at the stage of draft.

Dimensions in millimetres

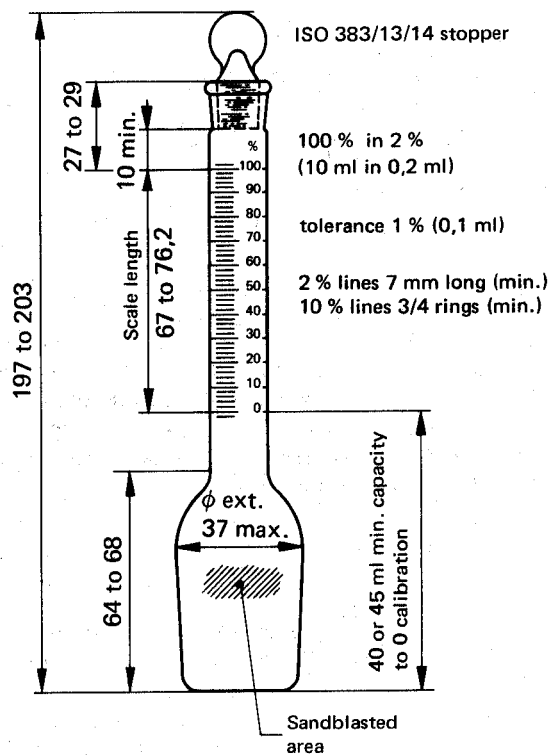


FIGURE 1 — Standard sulphonation flask

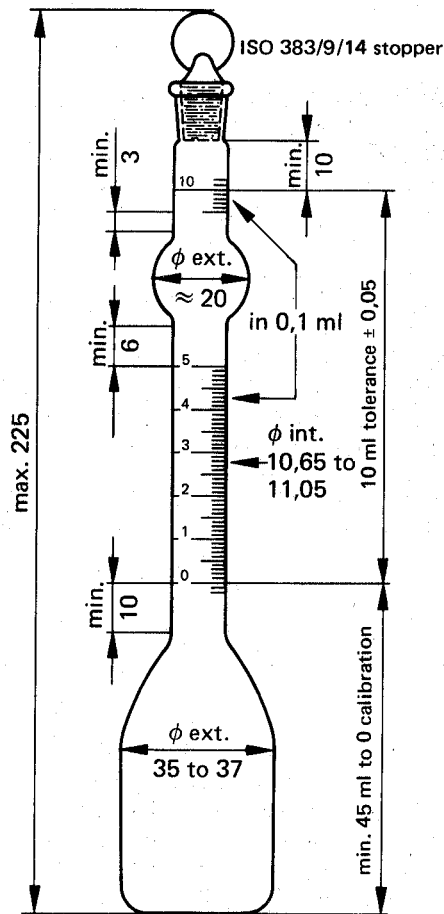


FIGURE 2 — Precision sulphonation flask for 10 ml test portion

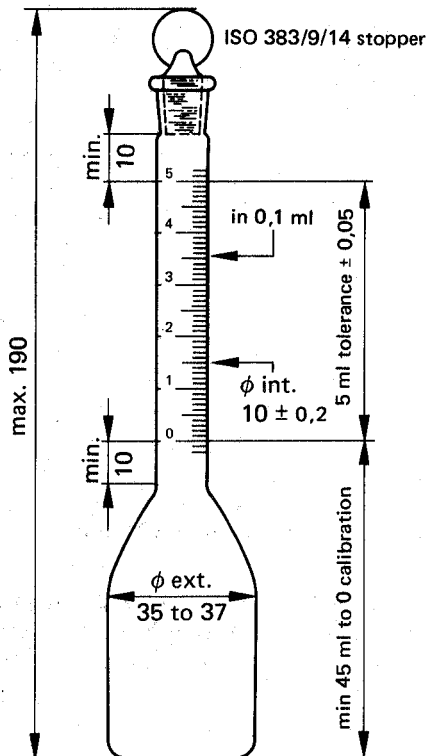


FIGURE 3 — Precision sulphonation flask for 5 ml test portion