
International Standard



5275

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

Aromatic hydrocarbons — Test for presence of mercaptans (thiols) — Doctor test

Hydrocarbures aromatiques — Essai de détection des mercaptans (thiols) — «Doctor test»

First edition — 1979-10-15

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UDC 547.53 : 547.569.1 : 543.857.6

Ref. No. ISO 5275-1979 (E)

Descriptors : aromatic hydrocarbons, chemical tests, detection, thiols.

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 5275 was developed by Technical Committee ISO/TC 78, *Aromatic hydrocarbons*, and was circulated to the member bodies in October 1977.

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

Australia	Hungary	Portugal
Austria	India	Romania
Brazil	Israel	South Africa, Rep. of
Bulgaria	Korea, Rep. of	Turkey
Chile	Mexico	United Kingdom
Czechoslovakia	Netherlands	USSR
France	Philippines	Yugoslavia
Germany, F. R.	Poland	

No member body expressed disapproval of the document.

Aromatic hydrocarbons — Test for presence of mercaptans (thiols) — Doctor test

WARNING — Aromatic hydrocarbons are generally toxic by inhalation, ingestion or skin absorption. Volatile aromatic hydrocarbons are also highly flammable.

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the "Doctor" test for the presence of mercaptans (thiols) in aromatic hydrocarbons.

Hydrogen sulphide may also be detected by the test.

The method is inapplicable in the presence of more than traces of peroxides.

2 PRINCIPLE

Shaking of a test portion with sodium plumbite solution and observation of the mixture. From its appearance, the presence or absence of mercaptans (thiols), hydrogen sulphide, peroxides or elemental sulphur may be deduced, and may be confirmed by the addition of sulphur, shaking and observation of the appearance of the final mixture.

3 REAGENTS

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

3.1 Sulphur, sublimed ("flowers of sulphur"), dry.

Store in a closed container.

3.2 Sodium plumbite solution (Doctor solution).

Dissolve 25 g of lead acetate trihydrate $[(CH_3COO)_2Pb \cdot 3H_2O]$ crystals in 200 ml of water, filter and add to a solution of 60 g of sodium hydroxide in 100 ml of water. Heat the mixture on a boiling water bath for 30 min, cool and dilute to 1 000 ml with water.

Store the solution in a tightly closed, rubber-stoppered bottle and filter before use if it is not clear.

3.3 Cadmium chloride solution, containing 100 g of cadmium chloride and 10 ml of hydrochloric acid, about 36 % (m/m) or approximately 11 M.

3.4 Potassium iodide, 100 g/l solution freshly prepared.

3.5 Acetic acid, 100 g/l solution.

3.6 Starch, 5 g/l solution, freshly prepared.

4 APPARATUS

4.1 **Stoppered cylinder**, made of glass, of 50 ml capacity, and several **unstoppered glass cylinders**.

5 SAMPLING¹⁾

Take a representative sample of not less than 1 000 ml from the bulk of the material.

6 PROCEDURE

6.1 Preliminary test

Place 10 ml of the sample and 5 ml of the sodium plumbite solution (3.2) in the stoppered cylinder (4.1) and shake together vigorously for 15 s. Observe the appearance of the mixture and continue the procedure as indicated in the table.

TABLE — Variations of "Doctor test"

Observation	Inference	Continue test as described in
Black precipitate forms immediately	Hydrogen sulphide present	6.2
Brown precipitate forms slowly	Peroxides probably present	6.3
During the shaking period the solution becomes opalescent and then darkens in colour	Mercaptans and elementary sulphur present	—
No change occurs or yellow colour is produced		6.4

1) The sampling of aromatic hydrocarbons will form the subject of ISO 1995.