International Standard 1388/12

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Ethanol for industrial use — Methods of test — Part 12 : Determination of permanganate time

Éthanol à usage industriel — Méthodes d'essai — Partie 12 : Détermination du temps de permanganate

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Foreword

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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 1388/12 was developed by Technical Committee ISO/TC 47, *Chemistry*, and was circulated to the member bodies in February 1980.

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

Australia	Germany, F.R.	Romania
Austria	Hungary	South Africa, Rep. of
Belgium	India	Switzerland
Brazil	Italy	Thailand
Bulgaria	Korea, Rep. of	United Kingdom
China	Netherlands	USSR
Czechoslovakia	Philippines	
France	Poland	

No member body expressed disapproval of the document.

This International Standard has also been approved by the International Union of Pure and Applied Chemistry (IUPAC).

International Standards ISO 1388/1 to ISO 1388/12 cancel and replace ISO Recommendation R 1388-1970, of which they constitute a technical revision.

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Ethanol for industrial use — Methods of test — Part 12 : Determination of permanganate time

1 Scope and field of application

This part of ISO 1388 specifies a method for the determination of the permanganate time of ethanol for industrial use.

This document should be read in conjunction with ISO 1388/1 (see the annex).

2 Definition

permanganate time : The number of minutes required, after adding 2 ml of 0,2 g/l potassium permanganate solution to 50 ml of the sample, for the colour to match that of a colour standard.

3 Principle

Addition to a test portion, under specified conditions, of potassium permanganate solution. Determination of the time taken for the colour of this test solution to match that of a cobalt(II) chloride and uranyl nitrate colour standard.

4 Reagents

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

4.1 Potassium permanganate, 0,2 g/l solution.

Use water previously boiled for 30 min with sufficient dilute potassium permanganate solution to give a stable faint pink coloration. Cool the water before preparation of the solution.

Prepare this solution immediately before use and protect it from light.

4.2 Cobalt(II) chloride and uranyl nitrate, colour standard.

To 5 ml of a 50 g/l solution of cobalt(II) chloride hexahydrate ($CoCl_2 \cdot 6H_2O$), add 7 ml of a 40 g/l solution of uranyl nitrate hexahydrate [$UO_2(NO_3)_2 \cdot 6H_2O$], and dilute with water to 50 ml.

Prepare this solution on the day of use.

5 Apparatus

NOTE — Clean the glassware used so as to avoid any risk of contamination.

Ordinary laboratory apparatus, and

5.1 Water bath, capable of being controlled at 15 ± 0,2 °C.

5.2 Two matched cylinders, of capacity 100 ml, of transparent and colourless glass, graduated at 50 ml and fitted with ground glass stoppers.

5.3 Burette, of capacity 10 ml, graduated in 0,05 ml divisions.

6 Procedure

6.1 Test portion

Carry out the test as soon as possible after receipt of the sample. (Instructions for the storage of the sample are specified in ISO 1388/1.)

Rinse one of the cylinders (5.2), first with 15 to 20 ml of hydrochloric acid, ϱ approximately 1,19 g/ml, about 38 % (m/m) solution, then six times with tap water, twice with distilled water and finally with some of the laboratory sample.

Immediately fill the cylinder to the mark with more of the laboratory sample at a temperature of about 15 °C.

6.2 Determination

Fill the second cylinder (5.2) to the mark with the colour standard (4.2).

Place the cylinder containing the test portion (6.1) in the water bath (5.1), controlled at 15 ± 0,2 °C, so that the water level in the bath is approximately 25 mm below the neck of the cylinder. After 15 min, remove the cylinder from the water bath and, using the burette (5.3), add 2,0 ml of the potassium permanganate solution (4.1). Note the time. Immediately stopper the cylinder, shake, and replace it in the water bath.

Remove the cylinder from the water bath, at intervals of 1 min and compare the colour, viewing vertically downwards against a white background, with the colour of the colour standard. Avoid exposing the test solution to strong daylight.

Note the time at which the colour of the test solution matches that of the colour standard.

7 Expression of results

Report the time, in minutes, from the addition of the potassium permanganate solution, for the colour of the test solution to match that of the colour standard.

Annex

ISO Publications relating to ethanol for industrial use

ISO 1388/1 — General.

ISO 1388/2 — Detection of alkalinity or determination of acidity to phenolphthalein.

ISO 1388/3 — Estimation of content of carbonyl compounds present in small amounts — Photometric method.

ISO 1388/4 — Estimation of content of carbonyl compounds present in moderate amounts — Titrimetric method.

ISO 1388/5 — Determination of aldehydes content — Visual colorimetric method.

ISO 1388/6 — Test for miscibility with water.

ISO 1388/7 — Determination of methanol content [methanol contents between 0,01 and 0,20 % (*V*/*V*)] — Photometric method.

ISO 1388/8 — Determination of methanol content [methanol contents between 0,10 and 1,50 % (*V*/*V*)] — Visual colorimetric method.

ISO 1388/9 — Determination of esters content — Titrimetric method after saponification.

ISO 1388/10 — Estimation of hydrocarbons content — Distillation method.

ISO 1388/11 — Test for detection of furfural.

ISO 1388/12 — Determination of permanganate time.