

INTERNATIONAL STANDARD

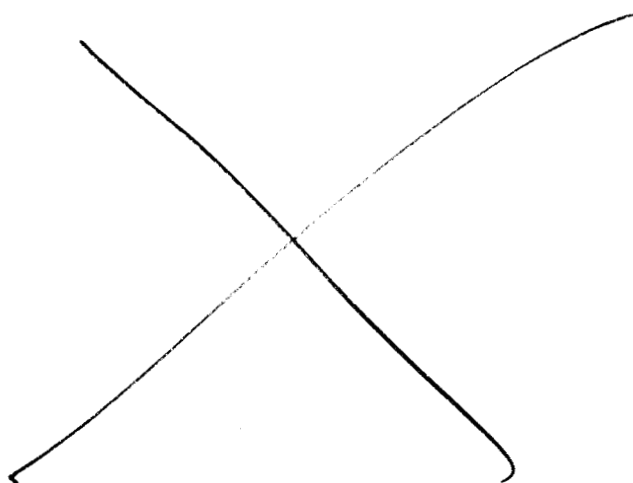


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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Mineral solvents for paints — White spirits and related hydrocarbon solvents

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Descriptors : paints, solvents, hydrocarbons, materials specifications, characteristics, tests.

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 1250 was drawn up by Technical Committee ISO/TC 35, *Paints and varnishes*.

It was approved in March 1969 by the Member Bodies of the following countries :

Austria	Iran	Spain
Belgium	Israel	Sweden
Brazil	Netherlands	Switzerland
Denmark	New Zealand	Turkey
Egypt, Arab Rep. of	Peru	United Kingdom
Germany	Poland	U.S.S.R.
Greece	Portugal	
India	South Africa, Rep. of	

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

France

Mineral solvents for paints — White spirits and related hydrocarbon solvents

0 INTRODUCTION

This International Standard is intended to cover the essential requirements of mineral solvents used in the paint industry, which may be considered as falling into two categories, according to aromatics content, namely : Type A, aromatics content less than 25 %; and Type B, aromatics content of 25 to 50 %. It was at first intended to use the simple title, "White spirit", but discussion showed that this term would not be generally acceptable for such a wide range of solvents, because in some countries it is used with a much more restricted meaning. Accordingly a longer, but more explanatory, title was adopted for the International Standard.

Some of the methods of test given in this document are technically identical with the widely known methods standardized by the American Society for Testing and Materials which are themselves under study by ISO/TC 28, *Petroleum products*. It is expected in due course, therefore, to replace these test methods by cross-references to appropriate International Standards.

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the requirements for two categories of mineral solvents for use in paints and varnishes, as follows :

Type A : having an aromatic content below 25 % (V/V);

Type B : having an aromatic content of 25 to 50 % (V/V).

2 REFERENCES

ISO/R 842, *Sampling raw materials for paints and varnishes*.

ISO 2049, *Petroleum products — Determination of colour*.

ISO 2160, *Petroleum products — Corrosiveness to copper — Copper strip test*.

3 REQUIRED CHARACTERISTICS AND THEIR TOLERANCES

Mineral solvents consist essentially of a mixture of hydrocarbons, but the presence of a denaturant is permitted when agreed between the interested parties; they shall have the characteristics shown in Table 1, page 2.

4 SAMPLES

4.1 Representative samples, each having a volume of not less than 500 ml, shall, wherever possible, be taken in triplicate from one or more original and previously unopened containers or from the bulk during packing, as may be agreed between the interested parties, and shall be packed in clean, dry, airtight containers of dark glass or metal. The containers shall be of such a size that they are nearly filled by the sample. Each sample container so filled shall be sealed with a material unaffected by the contents and marked with the full details and date of sampling.

Guidance on sampling is given in ISO/R 842.

4.2 If an agreed sample is required for the purpose of section 3 in relation to odour, it shall comply in all other respects with the requirements of this specification. It shall have a volume of not less than 500 ml and shall be packed in the manner described in 4.1.

TABLE 1 – Required characteristics and their tolerances

Characteristic	Requirement	Test method
Clarity	clear, no solid matter present	visual inspection
Undissolved water at 20 °C	absent	visual inspection
Odour	if required by purchaser, conform to agreed sample	—
Colour	not darker than standard	see 5.1
Distillation at 1 013 mbar; volume of condensate recovered Method a)*	these limits apply to mineral solvents for paints with or without denaturant not more than 1 ml below 130 °C not more than 10 ml below 145 °C not less than 90 ml below 200 °C end point, not above 220 °C	see 5.2
Method b)*	not more than 1 ml below 132 °C not more than 10 ml below 148 °C not less than 90 ml below 204 °C dry point, not above 220 °C.	see 5.3
Aromatic content	type A : less than 25 % (V/V) type B : 25 to 50 % (V/V) if required, more precise limits may be agreed between the interested parties	see 5.4
Residue on evaporation	not more than 10 mg per 100 ml	see 5.5
Neutrality	when 50 ml of sample are shaken with 10 ml of distilled water, the water layer shall be neutral to methyl orange. by agreement between the interested parties, this requirement may be waived or modified in relation to denatured materials.	
Freedom from objectionable sulphur compounds	no more than slight tarnish of copper strip	see ISO 2160
Aniline point	if required, to be agreed between the interested parties	see 5.6
Flash point	if required, to be agreed between the interested parties	to be agreed between the interested parties
Viscosity reduction power	if required, to be agreed between the interested parties	see 5.7

* By Methods a) and b) are intended the methods specified in 5.2 and 5.3 and corresponding respectively to ASTM D 86 and D 1078, and to equivalent national standards.

For comparison of distillation data obtained by the two methods, use the conversion equations :

$$t_b = (t_a \times 1,025) - 0,993$$

$$t_a = (t_b \times 0,975) + 0,969$$

where

t_a is the temperature, in degrees Celsius, corresponding to a given volume of distillate, recorded according to Method a);

t_b is the temperature, in degrees Celsius, corresponding to the same volume of distillate, recorded according to Method b).

These relations were established by T.R. Donlan (See Materials, Research and Standards, October 1962.)

5 METHODS OF TEST

5.1 Method for the comparison of colour

5.1.1 Standard colour solution

Dissolve 4,8 mg of pure anhydrous potassium dichromate in 1 l of distilled water or deionized water of at least equal purity.

5.1.2 Apparatus

Two 50 ml Nessler cylinders with the height of the 50 ml mark above the inside of the base matched to within 1 mm in the range 110 to 116 mm.

5.1.3 Procedure

Pass the sample through a filter paper about 150 mm in diameter and reject the first 10 ml of filtrate. Fill one of the Nessler cylinders to the mark with the filtered sample, and the other with the standard colour solution. Place the cylinders vertically 75 mm above the surface of an opaque opal glass sheet reflecting diffuse daylight, and compare the colour of the sample with that of the standard colour solution. Report the colour of the sample as being equal to, or lighter or darker than the colour of the standard colour solution.

5.1.4 Remark

Alternative methods, such as in ISO 2049, employing permanent colour standards and giving results equivalent to the specified colour, may be used by agreement between the interested parties.

5.2 Distillation test — Method a)

5.2.1 Definitions

5.2.1.1 volume recovered: The volume, expressed in millilitres, of condensate collected in the receiver at the specified temperature readings on the thermometer.

5.2.1.2 end point (final boiling point): The maximum temperature indicated during the distillation. This temperature is usually reached after the evaporation of all liquid from the bottom of the flask.

5.2.2 Apparatus

The apparatus, a suitable form of which is shown in Figures 1 and 2, shall comprise :

5.2.2.1 Distillation flask, in heat-resistant glass, of 125 ml distillation capacity, conforming to the dimensions shown in Figure 3 a).

5.2.2.2 Thermometer, mercury-in-glass type, nitrogen-filled, graduated on the stem, enamel-backed, and conforming to the following requirements¹⁾ :

Range	– 2 to + 300 °C
Graduation	1 °C
Immersion	Total
Overall length	385 ± 5 mm
Stem diameter	6 to 7 mm
Bulb shape	Cylindrical
Bulb length	10 to 15 mm
Bulb diameter	5 to 6 mm and not greater than stem
Distance from bottom of bulb	
– to 0 °C line	100 to 110 mm
– to 300 °C	333 to 354 mm
Longer lines at each	5 °C
Figured at each	10 °C
Expansion chamber	Required
Top finish	Ring or plain
Scale error not to exceed	± 0,5 °C up to 300 °C
Stability of zero	See Note

NOTE — The thermometer shall be artificially aged by means of a suitable treatment before graduation, in order to secure stability of zero. This treatment shall be such that after the procedure described below the rise at a fiducial point is not greater than the maximum error specified, and the accuracy of the thermometer is within the limits specified.

Heat the thermometer to a temperature equal to its highest reading and keep it at this temperature for 5 min. Allow the thermometer to cool, either naturally in still air or slowly in the test bath (at a specified rate), to 20 °C above ambient temperature or to 50 °C, whichever is the lower, and then determine the zero. If rapid cooling is used, the zero shall be determined within 1 h. Heat the thermometer again to a temperature equal to its highest reading, keep it at this temperature for 24 h, allow the thermometer to cool to one of the two temperatures referred to above, at the same rate as at the start of the test, and re-determine the zero under the same conditions as before.

5.2.2.3 Draught screen

5.2.2.3.1 For use with a gas burner

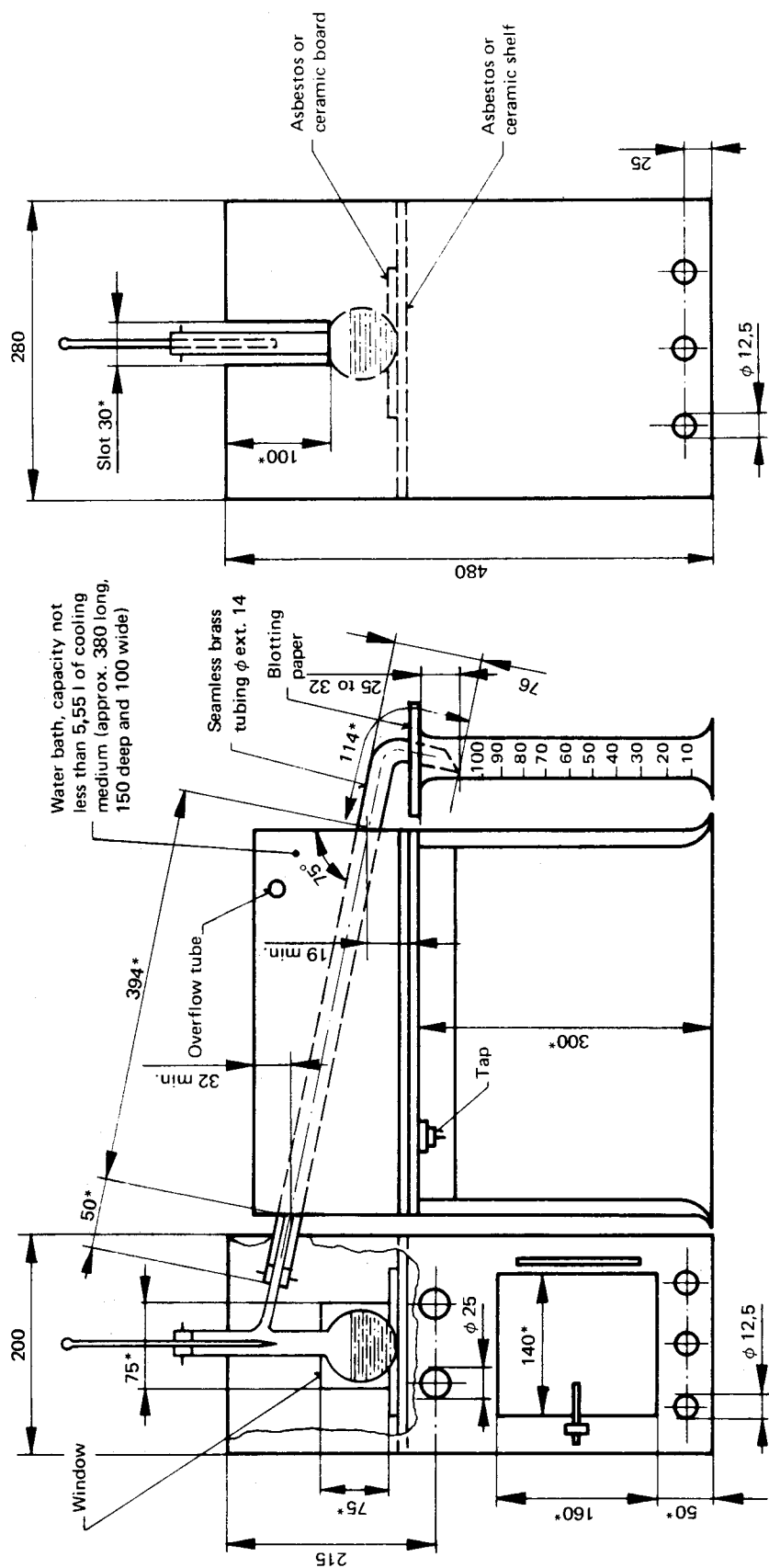
The draught screen shall be rectangular in cross-section and open at the top and bottom. It shall have the dimensions shown in Figure 1 and be made of sheet metal approximately 0,8 mm thick.

In each of the two narrower sides of the draught screen there shall be two circular holes 25 mm in diameter situated 215 mm below the top of the shield, as shown in Figure 1.

In each of the four sides of the draught screen there shall be three holes with their centres 25 mm above the base of the draught screen. These holes shall occupy the positions shown in Figure 1, the diameter of each of the holes being 12,5 mm.

1) The requirements given are taken from the specification for thermometer ASTM 7C; thermometer IP 5C, although differing slightly in its specification, is also suitable for this test.

Dimensions in millimetres



Dimensions marked * are approximate and are given for guidance.

FIGURE 1 — Distillation apparatus using gas burner

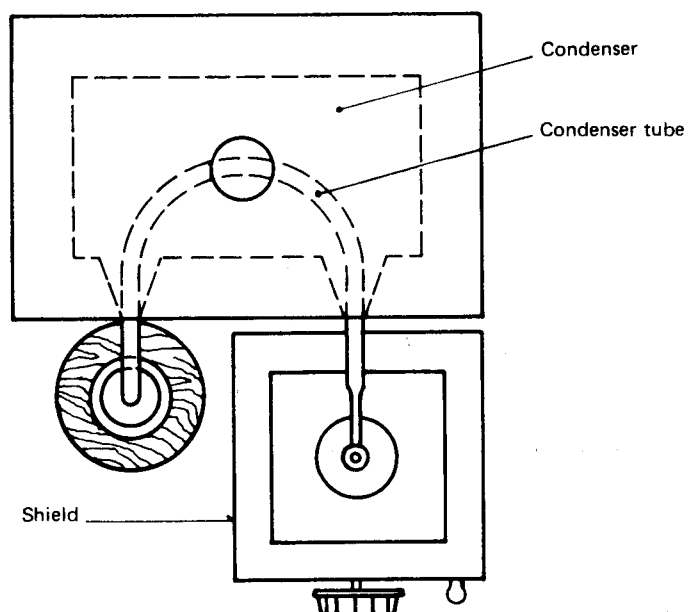
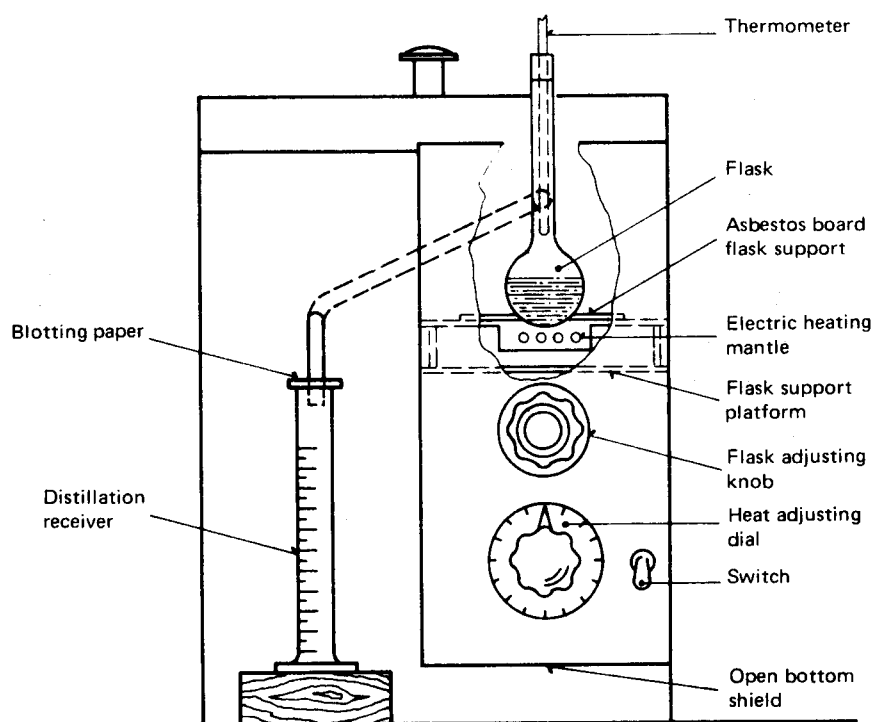


FIGURE 2 — Distillation apparatus using electric heater

Dimensions in millimetres

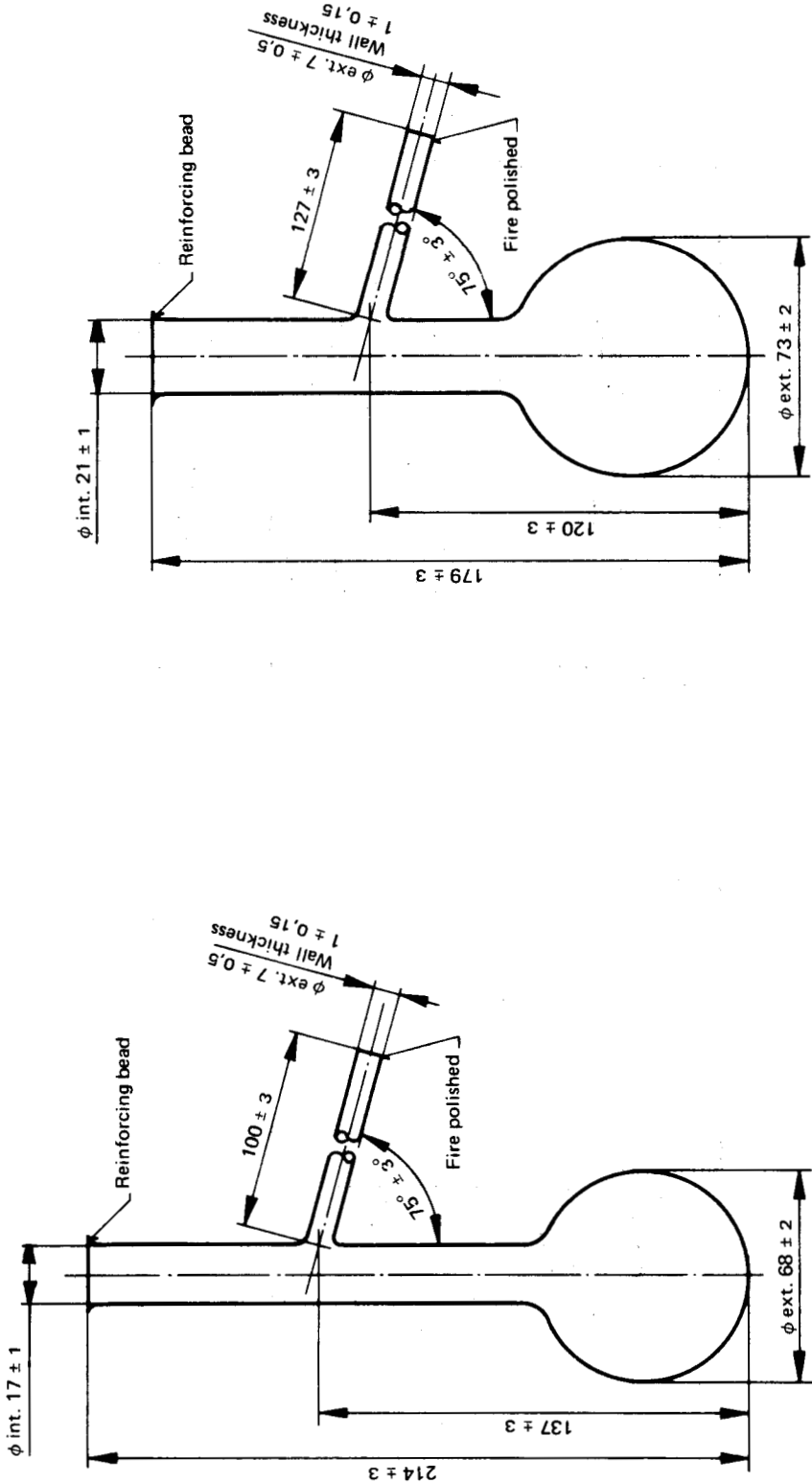


FIGURE 3 — Distillation flasks