

INTERNATIONAL STANDARD

ISO 1524

Third edition
2000-07-01

Paints, varnishes and printing inks — Determination of fineness of grind

Peintures et vernis — Détermination de la finesse de broyage



Reference number
ISO 1524:2000(E)

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.ch
Web www.iso.ch

Printed in Switzerland

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 1524 was prepared by Technical Committee ISO/TC 35, *Paints and varnishes*, Subcommittee SC 9, *General test methods for paints and varnishes*.

This third edition cancels and replaces the second edition (ISO 1524:1983). The changes are that the 0 µm to 15 µm gauge has been deleted and that the method of checking the groove depth has been deleted as other methods are now available. The standard now is also applicable to printing inks.

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Paints, varnishes and printing inks — Determination of fineness of grind

1 Scope

This International Standard is one of a series of standards dealing with the sampling and testing of paints, varnishes, printing inks and related products.

It specifies a method for determining the fineness of grind of paints, inks and related products by use of a suitable gauge, graduated in micrometres.

It is applicable to all types of liquid paints and related products. Of the three gauges referred to in 4.1 the 100 μm gauge is suitable for general use, but the 50 μm and especially the 25 μm gauge will only provide reliable results in the hands of skilled laboratory personnel. Particular caution is necessary in interpreting readings of less than 10 μm .

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 1513:1992, *Paints and varnishes — Examination and preparation of samples for testing*.

ISO 15528:—¹⁾, *Paints, varnishes and raw materials for paints and varnishes — Sampling*.

3 Term and definition

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

3.1

fineness of grind

reading obtained on a standard gauge under specified conditions of test, indicating the depth of the groove(s) of the gauge at which discrete solid particles in the product are readily discernible

4 Apparatus

4.1 Gauge, consisting of a block of a hardened steel approximately 175 mm long, 65 mm wide and 13 mm thick.

It is recommended that, at least for use with water-dilutable paints, a block of stainless steel should be used.

The top surface of the block shall be both plane and ground smooth and shall contain one or two grooves approximately 140 mm long and 12,5 mm wide parallel to the longer sides of the block. The depth of each groove shall be

1) To be published.

uniformly tapered along its length from a suitable depth (for example 25 µm, 50 µm or 100 µm) at one end to zero at the other end and shall be graduated as specified in Table 1. A diagram of a typical gauge is given in Figure 1.

Table 1 — Graduation of typical gauges and recommended ranges

Dimensions in micrometres		
Maximum depth of groove	Interval of graduations	Recommended range
100	10	40 to 90
50	5	15 to 40
25	2,5	5 to 15

Dimensions in millimetres

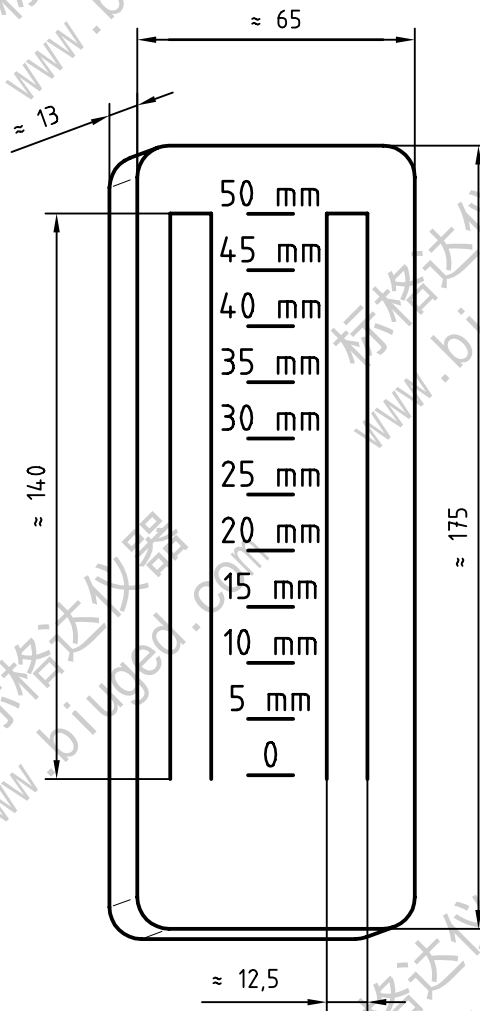


Figure 1 — Typical gauge

The depth of the groove at any position along its length shall not depart from its nominal value at any position across the groove depth by more than 2,5 µm.

The top surface of the block shall be finished by fine grinding or lapping; it shall be flat so that all points lie between two parallel planes 12 µm apart and, in addition, at every position along the surface, the transverse generator shall

be straight so that all points along it lie between two parallel straight lines $1\ \mu\text{m}$ apart. The top and bottom surfaces of the block shall be parallel within $25\ \mu\text{m}$.

NOTE Steel gauges of approximate dimensions stated are suitable for the test, but other gauges giving similar results may be used.

The precision of the fineness-of-grind determination depends in part on which gauge is used (see clause 6). Therefore it is essential to identify the gauge ($100\ \mu\text{m}$, $50\ \mu\text{m}$ or $25\ \mu\text{m}$) when reporting results or specifying requirements.

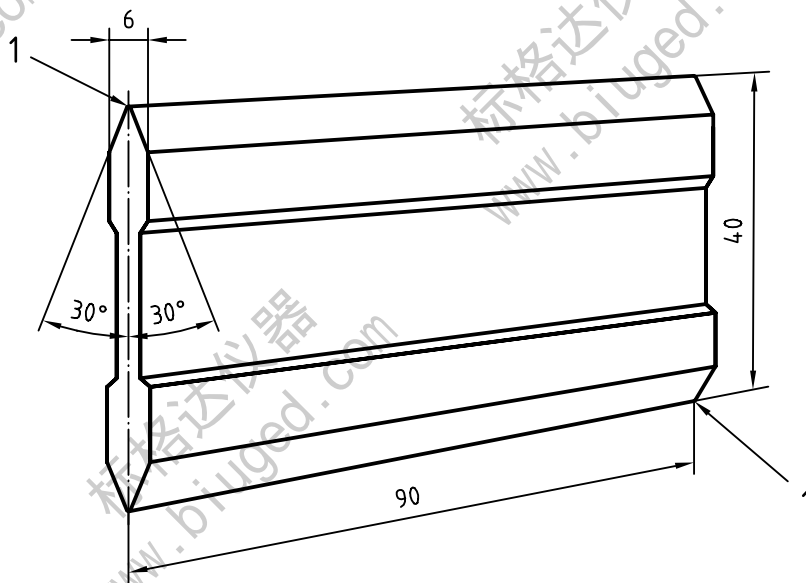
4.2 Scraper, consisting of a single- or double-edged steel blade approximately 90 mm long, 40 mm wide and 6 mm thick. The edge(s) on the long side(s) shall be straight and rounded to a radius of approximately 0,25 mm. A drawing of a suitable scraper is shown in Figure 2.

The scraper shall be periodically checked for wear, damage or warpage. Reject the scraper if inspection reveals damage.

NOTE The top surface of the gauge may be used for routine checking of the scraper, provided it itself is not worn or warped.

When not in use, the scraper should be stored in a container lined with velvet or similar soft material.

Dimensions (approximate) in millimetres



Key

1 Scraping edge, $R\ 0,25$

Figure 2 — Suitable scraper

5 Sampling

Take a representative sample of the product to be tested as described in ISO 15528.

Examine and prepare each sample for testing, as described in ISO 1513.

6 Procedure

6.1 Carry out a preliminary determination to establish the size of gauge most suitable for the test and the approximate fineness of grind of the test sample (see Table 1 and the note to 6.5). This approximate determination shall not be included in the results of the test.

Then carry out the test in triplicate.

6.2 Place the gauge (4.1), which shall be thoroughly clean and dry, on a flat, horizontal surface.

6.3 Pour a sufficient amount of the sample into the deep end of the groove so that it overflows the groove slightly. Take care that during pouring the sample does not trap any air.

6.4 Grasp the scraper (4.2) between the thumbs and fingers of both hands and place it edgewise in contact with the surface of the gauge at the extreme deep end of the groove with the length of the scraper parallel to the width of the gauge. While holding the scraper perpendicular to the surface of the gauge and at right angles to the length of the groove, draw it at a uniform rate over the surface of the gauge to a point beyond the zero depth of the groove in 1 s to 2 s. In the case of lithographic inks, or fluids of similar consistency, the time required to draw the scraper over the length of the groove shall be not less than 5 s, in order to avoid too low a result. Apply sufficient downward pressure on the scraper to ensure that the groove is filled with the sample and that any surplus is removed.

6.5 As quickly as possible (within seconds) after the completion of the drawdown, view the gauge from the side in such a manner that the line of vision is at right angles to the long dimension of the groove and at an angle of not more than 30° nor less than 20° to the surface of the gauge while it is in a light that will make the pattern of the sample in the groove readily visible.

NOTE If the rheology of the sample is such that a smooth pattern is not obtainable after drawdown, a minimal quantity of an appropriate thinner or binder solution may be added to the sample by hand stirring, and the test repeated. Any dilution should be stated in the test report. In some instances, the dilution of the sample may lead to flocculation and the fineness of grind may be affected.

6.6 Observe the point where the product first shows a predominately speckled appearance and, in particular, where a 3 mm wide band across the groove contains five to ten particles (see Figures 3 and 4). Disregard any scattered specks that may appear prior to the point where the predominately speckled appearance begins. Estimate the position of the upper limit of the band to the nearest:

- 5 μm for the 100 μm gauge;
- 2 μm for the 50 μm gauge;
- 1 μm for the 25 μm gauge.

6.7 Clean the gauge and scraper carefully with a suitable solvent immediately after each reading.

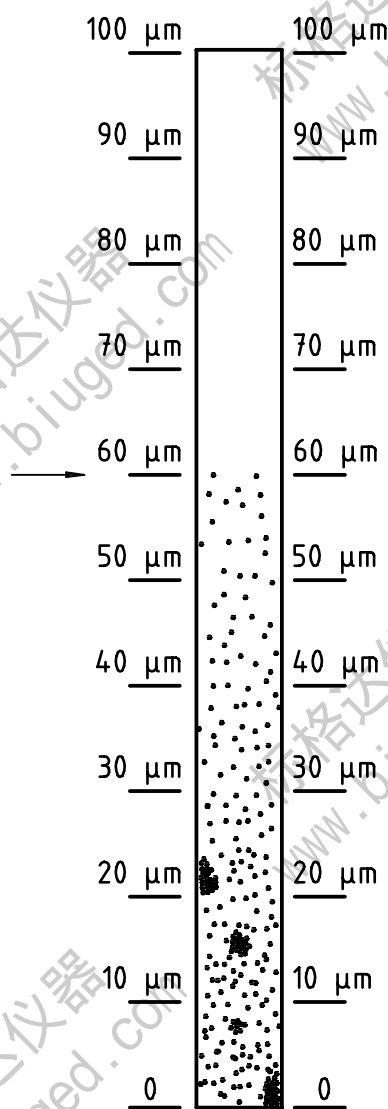


Figure 3 — Typical reading on gauge

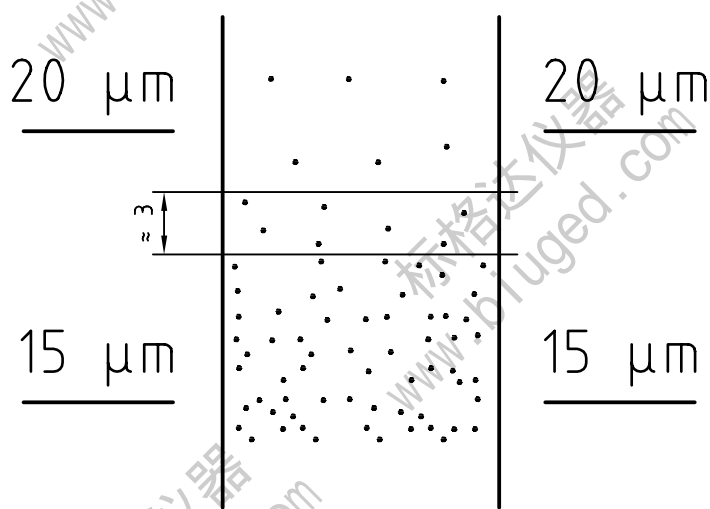


Figure 4 — Enlarged view of gauge reading 18 micrometers

7 Expression of results

Calculate the mean of the three determinations and record the result to the same precision as the original readings (see 6.6).

8 Precision

8.1 Repeatability, r

The value below which the absolute difference between two single test results obtained on identical material by one operator in one laboratory using the same equipment within a short interval of time using the standardized test method may be expected to lie with a 95 % probability, is 10 % of the range of the gauge.

8.2 Reproducibility, R

The value below which the absolute difference between two single test results obtained on identical material by operators in different laboratories using the standardized test method may be expected to lie with a 95 % probability, is 20 % of the range of the gauge.

9 Test report

The test report shall contain at least the following information:

- a) all details necessary for complete identification of the product tested;
- b) a reference to this International Standard (ISO 1524);
- c) designation of the gauge used;
- d) details of any dilution (see 6.5);
- e) the result of the test, expressed in micrometres, as indicated in clause 7;
- f) any deviation, by agreement or otherwise, from the procedure specified;
- g) the date of the test.

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