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## Coated abrasives — Determination and designation of grain size distribution —

### Part 3: Microgrit sizes P240 to P5000

ICS: 25.100.70

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CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

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## 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 29, *Small tools*, Subcommittee SC 5, *Grinding wheels and abrasives*.

This third edition cancels and replaces the second edition (ISO 6344-3:2013), which has been technically revised.

The main changes compared to the previous edition are as follows:

- Title has been changed editorially and updated due to the extension of grit designations up to P5000;
- Relevant content of the withdrawn ISO 6344-1:1998 has been updated and transferred to this part and ISO 6344-3;
- References to the withdrawn ISO 6344-1:1998 have been deleted;
- Normative references have been updated;
- [Clause 3](#) "Terms and definitions" has been updated;
- [Clause 4](#) "Testing of microgrit sizes P240 to P1200" has been revised in its content and order;
- Former Subclause 4.3.5.3 "Plotting the grain size distribution curve" has been shortened (former Figures 5 and 6 have been deleted) and adapted to the state of the art. It is now named "Representation of the grain size distribution curve";
- Checking mineral 280 has been deleted;
- Former [Tables 3](#) and [4](#) for the theoretical equivalent grain diameters have been moved to a new informative [Annex A](#) "Theoretical equivalent grain diameters,  $d$ , for grits of fused aluminium oxide and for grits of silicon carbide";
- The content of [Clause 5](#) "Testing of microgrit sizes P1500 to P5000" has been revised completely, also due to the addition of the grit designations P3000, P4000 and P5000;

- Former [Subclause 5.2](#) "Designation of the test method" has been deleted;
- [Clause 7](#) "Marking" has been revised;
- Former [Annexes A](#) and [B](#) have become [Annexes B](#) and [C](#);
- Bibliography has been updated.

A list of all parts in the ISO 6344 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

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# Coated abrasives — Determination and designation of grain size distribution —

## Part 3: Microgrit sizes P240 to P5000

### 1 Scope

This part of ISO 6344 defines terms and definitions and specifies a method for determining and testing the grain size distribution of electro-fused aluminium oxide and silicon carbide microgrit sizes P240 to P5000 for coated abrasive products.

It applies to grits used in the manufacture of coated abrasive products and to grits extracted from coated abrasive products for test purposes.

### 2 Normative references

There are no normative references in this document.

### 3 Terms and definitions (standards.iteh.ai)

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

#### 3.1

##### **microgrit**

abrasive grit having a median equivalent diameter of 58,5 µm to 2,7 µm whose grain size distribution is determined by sedimentation

#### 3.2

##### **grain size distribution**

particle size distribution

##### **PSD**

percentage of grains of different sizes composing the macrogrit or microgrit

## 4 Testing of microgrit sizes P240 to P1200

### 4.1 General

The testing of microgrit sizes P240 to P1200 by sedimentation shall be carried out using the US sedimentometer (see 4.2).

The grain size distribution of microgrit sizes P240 to P1200 is determined using the following criteria:

- a) the maximum grain diameter (theoretical equivalent grain diameter) of the first sedimented grain ( $d_{s0}$  value) shall not exceed the maximum permissible  $d_{s0}$  value;

- b) the grain diameter (theoretical equivalent grain diameter) shall not exceed the maximum permissible  $d_{s3}$  value at the 3 % point of the grain size distribution curve;
- c) the median grain diameter (theoretical equivalent grain diameter) shall be within the specified tolerances of the  $d_{s50}$  value at the 50 % point of the grain size distribution curve;
- d) the grain diameter (theoretical equivalent grain diameter) shall exceed the minimum permissible  $d_{s95}$  value at the 95 % point of the grain size distribution curve.

The grain size distribution limits ( $d_s$  values) for P240 to P1200 based on testing with US sedimentometer shall be according to [Table 1](#).

**Table 1 — Limit  $d_s$  values for P240 to P1200**

Grit designation	$d_{s0}$ value	$d_{s3}$ value	Median grain size		$d_{s95}$ value
	max. $\mu\text{m}$	max. $\mu\text{m}$	$d_{s50}$ value $\mu\text{m}$		min. $\mu\text{m}$
P240	110	81,7	58,5	$\pm 2,0$	44,5
P280	101	74,0	52,2	$\pm 2,0$	39,2
P320	94	66,8	46,2	$\pm 1,5$	34,2
P360	87	60,3	40,5	$\pm 1,5$	29,6
P400	81	53,9	35,0	$\pm 1,5$	25,2
P500	77	48,3	30,2	$\pm 1,5$	21,5
P600	72	43,0	25,8	$\pm 1,0$	18,0
P800	67	38,1	21,8	$\pm 1,0$	15,1
P1000	63	33,7	18,3	$\pm 1,0$	12,4
P1200	58	29,7	15,3	$\pm 1,0$	10,2

NOTE The  $d_s$  values are results of cooperative tests.

## 4.2 Test procedure using the US sedimentation tube

### 4.2.1 General

The principle of measurement is to determine the volume as a function of time of particles settled in the collecting tube. The equivalent grain size diameters are calculated using Stokes' law.

All four criteria ( $d_{s0}$ ,  $d_{s3}$ ,  $d_{s50}$ ,  $d_{s95}$ ) according to [4.1](#) shall be fulfilled simultaneously.

### 4.2.2 Test apparatus

The US sedimentation tube consists of a vertical sedimentation tube of 940 mm in length and of 20 mm inside diameter. It is surrounded by a water jacket in which the water temperature is maintained at a constant level.

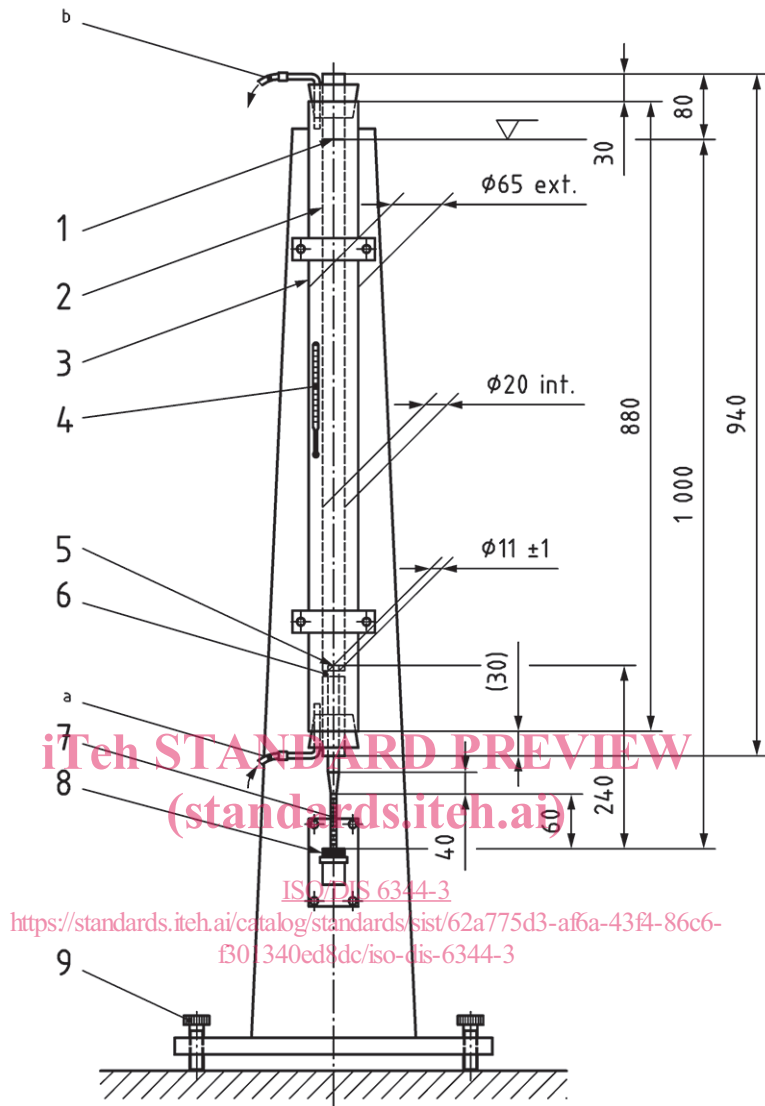
A graduated collecting tube is fixed at the bottom of the sedimentation tube. The whole assembly is mounted on a frame, the base plate of which is fitted with level adjusting screws for keeping the tube vertical (see [Figure 1](#)).

For the design and dimensions of the collecting tube, see [Figure 2](#).

To improve the accuracy of sedimentation volume readings, it is recommended that a horizontal beam light source and a magnifying glass be used. A time printer renders the recording of the sedimentation times easier.



Dimensions in millimetres



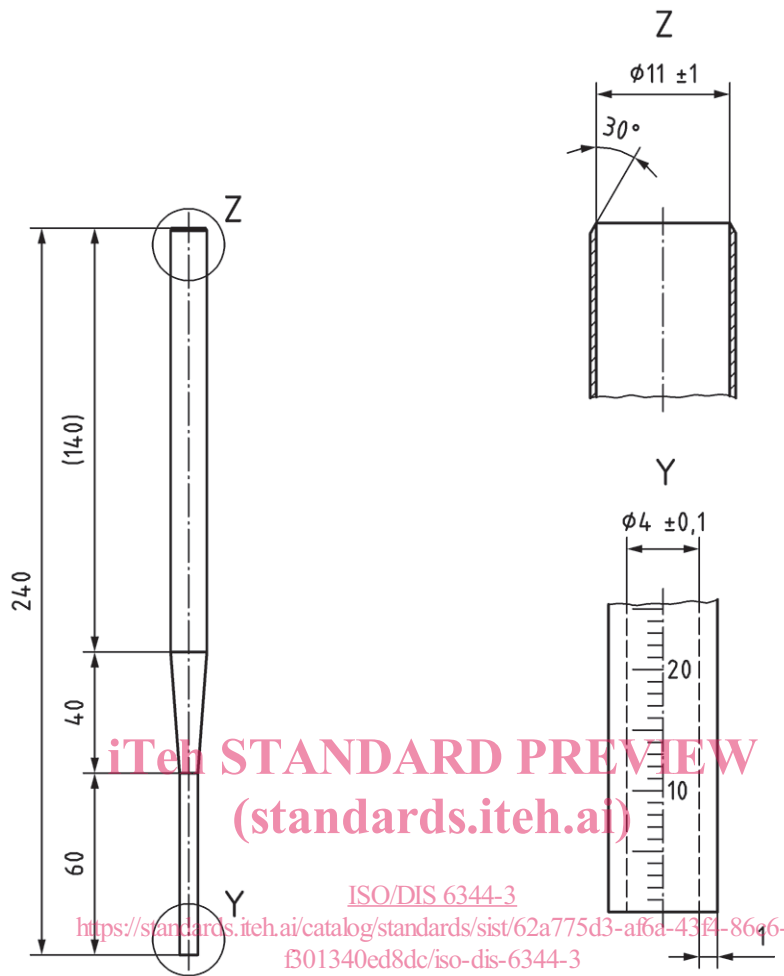
**Key**

- 1 methyl alcohol level (initial)
- 2 sedimentation tube
- 3 water jacket
- 4 thermometer
- 5 collecting tube
- 6 rubber centring spacer

- 7 scale for height of sedimentation
- 8 rubber gasket
- 9 vertical adjusting screws
- a Water inlet.
- b Water outlet.

**Figure 1 — US sedimentation tube**

Dimensions in millimetres



NOTE The following parameters are recommended:

- Dial graduation and figures should be in white.
- 50 division marks at equal intervals (graduation about 1 mm).
- Length of division mark: 3 mm
- Length of every fifth division mark: 4 mm
- Thickness of division mark: 0,25 mm

Figure 2 — Collecting tube

## 4.2.3 Test equipment

### 4.2.3.1 Sedimentation medium

Use methyl alcohol of 95 % to 99 % purity as the sedimentation medium.

Adjust the sedimentation medium using the checking minerals specified in [4.2.4.1.3](#).

### 4.2.3.2 Dispersing agent

In order to avoid grain agglomeration, a dispersing agent, such as EDTA (tetrasodium salt of ethylenediamine tetra-acetic acid), shall be added to the methyl alcohol, i.e. 4 ml of a 1 % aqueous EDTA-solution per litre of methyl alcohol.

#### 4.2.3.3 Checking minerals

The adjustment of the whole measuring procedure is controlled by means of checking mineral 320<sup>1)</sup>. Each supply of checking mineral is accompanied by a cumulative volume grain size distribution curve (see [Figure 3](#)). The 10 %, 20 %, 30 %, 40 % and 50 % points shall not deviate by more than  $\pm 2$  % from the sizes indicated in [Table 2](#).

NOTE The grain size distributions of the checking minerals 320 do not correspond to the grain size distribution of the microgrit P320 of this part of ISO 6344.

**Table 2 — Grain diameter of the checking mineral 320**

Volume fraction of the settled checking mineral	Grain diameter
%	<i>d</i> µm
0	75,1
3	58,7
10	49,8 ± 1,00
20	44,2 ± 0,88
30	40,5 ± 0,81
40	37,5 ± 0,75
50	34,9 ± 0,70
60	32,5
70	30,1
80	27,5
90	24,4
100	16,5

1) Checking mineral 320 (edition 2009) can be obtained by: State Materials Testing Institute Darmstadt (Staatliche Materialprüfungsanstalt Darmstadt, MPA), Grafenstraße 2, D-64283 Darmstadt, Germany. This information is given for the convenience of users of this part of ISO 6344 and does not constitute an endorsement by ISO of the product named. Equivalent products may be used if they can be shown to lead to the same results.