

Implementation of ISO 8486-2:1996

Bond abrasives — Determination and designation of grain size distribution —

Part 2: Macrogrits F230 to F1200

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- Abrasive Industries Association (AIA)
- Advanced Manufacturing Technology Research Institute (AMTRI)
- British Abrasives Federation (BAF)
- British Iron and Steel Producers' Association (BISPA)
- Coated Abrasives Manufacturers' Association (CAMA)
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National foreword

This British Standard reproduces verbatim ISO 8486-2:1996 and implements it as the UK national standard.

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- aid enquirers to understand the text;
- present to the responsible international committee any enquiries on interpretation, or proposals for change, and keep UK interests informed;
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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the ISO title page, pages ii to iv, pages 1 to 25 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

INTERNATIONAL STANDARD

ISO
8486-2

First edition
1996-08-15

Bonded abrasives — Determination and designation of grain size distribution —

Part 2:

Microgrits F230 to F1200

*Abrasifs agglomérés — Détermination et désignation de la distribution
granulométrique —*

Partie 2: Micrograins F230 à F1200



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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.

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.

International Standard ISO 8486-2 was prepared by Technical Committee ISO/TC 29, *Small tools*, Subcommittee SC 5, *Grinding wheels and abrasives*.

ISO 8486 consists of the following parts, under the general title *Bonded abrasives — Determination and designation of grain size distribution*:

- *Part 1: Macrogrits F4 to F220*;
- *Part 2: Microgrits F230 to F1200*.

Annex A, Annex B and Annex C of this part of ISO 8486 are for information only.

1 Scope

This part of ISO 8486 sets forth a method for determining or checking the size distribution of microgrits from F230 to F1200 in fused aluminium oxide and silicon carbide.

It specifies the grit designation for the testing of those grits used in the manufacture of bonded abrasive products and general industrial applications and those removed from bonded products as well as loose grits used in polishing.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this part of ISO 8486. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this part of ISO 8486 are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 8486-1:1996, *Bonded abrasives — Determination and designation of grain size distribution — Part 1: Macrogrits F4 to F220*.

3 Definitions

For the purposes of this part of ISO 8486 the definitions given in ISO 8486-1 as well as the following apply.

3.1

microgrits

grits with grain size distributions which are determined by sedimentation

4 Method of checking grain size distribution

4.1 Grain size distribution

The grain size distribution of microgrits F230 to F1200 is determined according to the following criteria:

- a) the grain size (theoretical grain diameter) must not exceed the maximum permissible d_{s3} value at the 3 % point of the grain size distribution curve;

- b) the median grain size (theoretical grain diameter) must be within the specified tolerances of the d_{s50} value at the 50 % point of the grain size distribution curve;

- c) the grain size (theoretical grain diameter) must attain at least the $d_{s94/95}$ value at the 94/95 % point of the grain size distribution curve.

These three criteria must be met. The values are specified in Table 1 for the photosedimentometer (94 %) and in Table 2 for the US sedimentometer (95 %).

Testing of microgrits F230 to F1200 is carried out by sedimentation according to clause 5 of this standard.

4.2 Grading

The “F” microgrit-series is a graduated series of eleven microgrits starting at a median particle size of 53 μm and ending at 3 μm determined by photosedimentometer. This series follows on from the finest grain in the “F” series macrogrits F220 (63 μm) and uses the same ratio as that series, i.e. $\sqrt[4]{2}$.

The calculation of the individual grain size values (see Table 3) has been made as follows:

- a) the ratio of the median grain sizes F230 and F240 is $\sqrt[4]{2} \cdot f^0$ i.e. it corresponds approximately to the progressive ratio of the test sieves for macrogrits;
- b) the ratio of the median grain sizes of the following grits F240 and F280 is $\sqrt[4]{2} \cdot f^1$;
- c) the ratio of the succeeding grain sizes is $\sqrt[4]{2} \cdot f^n$ where $n = 1, 2, 3, 4, 5, 6, 7, 8, 9$ and where the following equation applies to the factor “f”

$$53 = 3 \left(\sqrt[4]{2} \right)^{10} \cdot f^{(0+1+2+3+\dots+9)}$$

$$f = \frac{45 \sqrt[4]{\frac{53}{3 \left(\sqrt[4]{2} \right)^{10}}}}{3 \left(\sqrt[4]{2} \right)^{10}} = 1,0257$$

This produces a series of ratios starting at 1,189 and ending at 1,495.

Table 1 — Grain size distribution of microgrits F230 to F1200 (photosedimentometer)

Grit designation	d_{s3} value max. μm	Median grain size d_{s50} value μm	d_{s94} value min. μm
F230	82	53 ± 3	34
F240	70	$44,5 \pm 2$	28
F280	59	$36,5 \pm 1,5$	22
F320	49	$29,2 \pm 1,5$	16,5
F360	40	$22,8 \pm 1,5$	12
F400	32	$17,3 \pm 1$	8
F500	25	$12,8 \pm 1$	5
F600	19	$9,3 \pm 1$	3
F800	14	$6,5 \pm 1$	2
F1000	10	$4,5 \pm 0,8$	1
F1200	7	$3 \pm 0,5$	1 (at 80 %)

Table 2 — Grain size distribution of microgrits F230 to F1200 (US sedimentometer)

Grit designation	d_{s3} value max. μm	Median grain size d_{s50} value μm	d_{s95} value min. μm
F230	77	$55,7 \pm 3$	38
F240	68	$47,5 \pm 2$	32
F280	60	$39,9 \pm 1,5$	25
F320	52	$32,8 \pm 1,5$	19
F360	46	$26,7 \pm 1,5$	14
F400	39	$21,4 \pm 1$	10
F500	34	$17,1 \pm 1$	7
F600	30	$13,7 \pm 1$	4,6
F800	26	11 ± 1	3,5
F1000	23	$9,1 \pm 0,8$	2,4
F1200	20	$7,6 \pm 0,5$	2,4 (at 80 %)

NOTE These values were calculated by the following algorithms, based on ISO round-robin tests. Factors for conversion from Eppendorf photosedimentometer (x) to US sedimentometer (y) are:

d_{s3} value	$y = 0,760x + 15,1$	$k^a = 0,999\ 7$
d_{s50} value	$y = 0,961x + 4,8$	$k^a = 0,999\ 2$
$d_{s94/95}$ value	$y = 1,090x + 1,3$	$k^a = 0,999\ 7$

^a k is the correlation factor via which the confidence interval limits for linear relationships were verified.

Table 3 — Calculation of the f^n factors (photosedimentation)

Grit designation	Median grain size μm	Formula
F230	53	Starting point
F240	45	$f^0 = 1 = \frac{53}{44,5} \cdot \frac{1}{\sqrt[4]{2}}$
F280	37	$f^1 = \frac{44,5}{36,5} \cdot \frac{1}{\sqrt[4]{2}}$
F320	29	$f^2 = \frac{36,5}{29,2} \cdot \frac{1}{\sqrt[4]{2}}$
F360	23	$f^3 = \frac{29,2}{22,8} \cdot \frac{1}{\sqrt[4]{2}}$
F400	17	$f^4 = \frac{22,8}{17,3} \cdot \frac{1}{\sqrt[4]{2}}$
F500	13	$f^5 = \frac{17,3}{12,8} \cdot \frac{1}{\sqrt[4]{2}}$
F600	9	$f^6 = \frac{12,8}{9,3} \cdot \frac{1}{\sqrt[4]{2}}$
F800	7	$f^7 = \frac{9,3}{6,5} \cdot \frac{1}{\sqrt[4]{2}}$
F1000	5	$f^8 = \frac{6,5}{4,5} \cdot \frac{1}{\sqrt[4]{2}}$
F1200	3	$f^9 = \frac{4,5}{3} \cdot \frac{1}{\sqrt[4]{2}}$

5 Testing of microgrits F230 to F1200

5.1 General

The testing of microgrits F230 to F1200 is carried out by sedimentation.

Criteria for the determination of the grain size distribution are

- the theoretical grain size at the 3 % point of the grain size distribution curve (d_{s3} value),
- the theoretical grain size at the 50 % point of the grain size distribution curve (d_{s50} value) and
- the theoretical grain size at the 94/95 % point of the grain size distribution curve ($d_{s94/95}$ value).

The permissible values are given in Table 4 and Table 5.

Table 4 — Permissible deviations resulting from the variations due to the measuring technique (photosedimentometer)

Grit designation	Permissible deviations for the values		
	d_{s3} μm	d_{s50} μm	d_{s94} μm
F230	+ 3,5	$\pm 2,5$	– 1,5
F240			
F280	+ 2,5	$\pm 1,5$	– 0,8
F320			
F360			
F400			
F500	+ 2	± 1	– 0,5
F600			
F800			
F1000	+ 1,5	$\pm 0,5$	– 0,4
F1200			

Table 5 — Permissible deviations resulting from the variations due to the measuring technique (US sedimentometer)

Grit designation	Permissible deviations for the values		
	d_{s3} μm	d_{s50} μm	d_{s95} μm
F230	+ 1,5	$\pm 1,5$	– 1,5
F240			
F280	+ 1,5	± 1	– 1,5
F320			
F360			
F400			
F500	+ 1,5	$\pm 0,8$	– 1,5
F600			
F800			
F1000	+ 1,5	$\pm 0,5$	– 1,5
F1200			

5.2 Designation of the test method

The designation of the test method for microgrits F230 to F1200 shall include an indication of the measuring instrument used thus:

- test-MICRO F — Eppendorf photosedimentometer;
- test-MICRO F — Sedigraph series;
- test-MICRO F — US sedimentometer;
- test-MICRO F — “Others”.