INTERNATIONAL STANDARD

ISO 8486-1

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Bonded abrasives — Determination and designation of grain size distribution —

Part 1:
Macrogrits F4 to F220

Abrasifs agglomérés — Détermination et désignation de la distribution granulométrique —

Partie 1: Macrograins F4 à F220

Reference number
ISO 8486-1:1996(E)

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 8486-1 was prepared by Technical Committee ISO/TC 29, *Small tools*, Subcommittee SC 5, *Grinding wheels and abrasives*.

This first edition of ISO 8486-1 cancels and replaces ISO 8486:1986, which has been technically revised.

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 of this part of ISO 8486 is for information only.

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Bonded abrasives — Determination and designation of grain size distribution —

Part 1:
Macrogrits F4 to F220

1 Scope

This part of ISO 8486 sets forth a method for determining or checking the size distribution of macrogrits from F4 to F220 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.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 8486. At the time of publication, the editions indicated were 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 editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3310-1:1990, *Test sieves — Technical requirements and testing — Part 1: Test sieves of metal wire cloth.*

ISO 9138:1993, *Abrasive grains — Sampling and splitting.*

ISO 9284:1992, *Abrasive grains — Test-sieving machines.*

3 Definitions

For the purposes of this part of ISO 8486 the following definitions apply.

3.1 abrasive grain: Synthetic particulate substance manufactured by crushing and classified into specific grit sizes used for the removal of surplus material by grinding, polishing, lapping, etc.

3.2 grain size distribution: The percentage of individually sized particles contained in the designated grit sizes.

4 Grain size distribution testing

4.1 Equipment

4.1.1 Sieving machine, in accordance with ISO 9284.

4.1.2 Sieves having the aperture sizes indicated in table 1, in accordance with ISO 3310-1.

Test sieves are designated by their aperture size in micrometres if the aperture is less that 1 mm and in millimetres if it is equal to or greater than 1 mm.

4.1.3 Balance accurate to ± 0,1 g.

4.1.4 Timer able to operate for 5 min, with an accuracy of at least ± 5 s.

Table 1 — Series test sieves — Aperture sizes

Nominal sizes and tolerances of aperture sizes	
mm	µm
8 ± 0,25	
6,7 ± 0,21	
5,6 ± 0,18	
4,75 ± 0,15	
4 ± 0,13	
3,35 ± 0,11	
2,8 ± 0,09	
2,36 ± 0,08	
2 ± 0,07	
1,7 ± 0,06	
1,4 ± 0,05	
1,18 ± 0,04	
1 ± 0,033	
	850 ± 29
	710 ± 25
	600 ± 21
	500 ± 18
	425 ± 16
	355 ± 13
	300 ± 12
	250 ± 9,9
	212 ± 8,7
	180 ± 7,6
	150 ± 6,6
	125 ± 5,8
	106 ± 5,2
	90 ± 4,6
	75 ± 4,1
	63 ± 3,7
	53 ± 3,4
	45 ± 3,1

4.2 Procedure

4.2.1 Sample

Take 100 g of grits to be tested from a statistically representative sample in accordance with ISO 9138. The sample to be tested must be dry. Failing this, it must be dried at a temperature of 105 °C until constant weight is reached.

4.2.2 Arrangement of test sieves

Assemble the desired nest of sieves (4.1.2) used for testing each grit category (see table 2) in order of mesh size with the coarsest sieve on the top, progressing to the finest with a pan on the bottom.

Pour the test sample on to the coarsest test sieve, place a cover on the top sieve, and place the entire unit in the sieving machine (4.1.1) with a receiver.

4.2.3 Sieving

Set the timer (4.1.4) controlling the sieving machine and switch on. After sieving is completed, the grit retained on the sieves and in the bottom pan is transferred to a balance (4.1.3) pan and weighed separately beginning with the residue on the coarsest test sieve.

5 Standard grading limits

5.1 Standard grit sizes of fused aluminium oxide and silicon carbide abrasives

Table 2 lists the permissible grading limits for the sizing of fused aluminium oxide and silicon carbide abrasive grain for use in bonded abrasive products and other loose grain applications.

5.2 Interpretation of the sieving test results

The sample is in accordance with this part of ISO 8486 when the values for the residue on the different sieves are within the permissible limits given in table 2. The residue on test sieve 1 corresponds exclusively to 100 g of the tested material in accordance with 4.2.1.

When checking the measured results, allowance must be made for the variations due to the measuring technique. These permissible deviations, given in table 3, have been determined on the basis of the standard deviations resulting from a cooperative test carried out by ISO. The tolerances for production macrogrits given in table 2, are to be increased by these values.

5.3 Example of use of tables 2 and 3

The following is an example of the use of this part of ISO 8486 for an F10 macrogrit:

Taking grit F10, all material shall pass through the coarsest sieve (in this case sieve aperture 3,35 mm). All material may pass through the next coarsest sieve (aperture 2,36 mm), but not more than 20 % may be retained on it.

At least 45 % of the sample shall be retained on the sieve aperture 2 mm but it is permissible to have 100 % pass through sieve aperture 2,36 mm and remain on sieve aperture 2 mm.

The total grit passing through sieve aperture 2,36 mm and retained on sieve aperture 2 mm and sieve aperture 1,7 mm shall add up to at least 70 %. Consequently, if 45 % was retained on sieve aperture 2 mm, then at least 25 % shall be retained on the sieve aperture 1,7 mm.

There is no requirement for material retained on the finest sieve, in this case the sieve aperture 1,4 mm,

but not more than 3 % is permitted to pass through the sieve aperture 1,4 mm.

It is easy to determine from this example the procedure to be followed for each grain size in the table.

The post delivery testing of the grit F10 should include the variations shown in table 3. In the case of test sieve 2 it means that the 20 % value increases to 24 % according to table 3 (plus 4 %).

6 Designation

The designation of macrogrits for fused aluminium oxide or silicon carbide complying with the requirements of this part of ISO 8486 shall comprise

a) the type of abrasive;

b) the designation of the grit including the letter "F" for a bonded abrasive followed by a characteristic number representing the grit size.

EXAMPLE

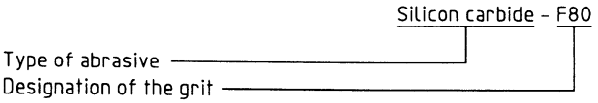

Table 2 — Size distribution of macrogrits F4 to F220

Grit designation	Test sieves 1			2			3			3 and 4			3, 4 and 5			Remainder in the bottom pan
	Aperture size sieve 1 w_1		Residue Q_1	Aperture size sieve 2 w_2		Residue Q_2 max.	Aperture size sieve 3 w_3		Residue Q_3 min.	Aperture size sieve 4 w_4		Sum of the residues $Q_3 + Q_4$ min.	Aperture size sieve 5 w_5		Sum of the residues $Q_3 + Q_4 + Q_5$ min.	ΔQ max.
	mm	µm	%	mm	µm	%	mm	µm	%	mm	µm	%	mm	µm	%	%
F4	8	—	0	5,6	—	20	4,75	—	40	4	—	70	3,35	—	1)	3
F5	6,7			4,75			4			3,35			2,8			
F6	5,6			4			3,35			2,8			2,36			
F7	4,75			3,35			2,8			2,36			2			
F8	4	—	0	2,8	—	20	2,36	—	45	2	—	70	1,7	—	1)	3
F10	3,35			2,36			2			1,7			1,4			
F12	2,8			2			1,7			1,4			1,18			
F14	2,36			1,7			1,4			1,18			1			
F16	2	—	0	1,4	—	20	1,18	—	45	1	—	70	—	850	1)	3
F20	1,7			1,18			1				850			710		
F22	1,4			1			—	850			710			600		
F24	1,18			—	850	25		710			600	65		500		
F30	1	—	0	—	710	25	—	600	45	—	500	65	—	425	1)	3
F36	—	850			600			500			425			355		
F40		710			500	30		425	40		355			300		
F46		600			425			355			300			250		
F54	—	500	0	—	355	30	—	300	40	—	250	65	—	212	1)	3
F60		425			300			250			212			180		
F70		355			250	25		212			180			150		
F80		300			212			180			150			125		
F90	—	250	0	—	180	20	—	150	40	—	125	65	—	106	1)	3
F100		212			150			125			106			75		
F120		180			125			106			90			63		
F150		150			106	15		75			63			45		
F180	—	125	0	—	90	15	—	75	1)	—	63	40	—	53	65	1)
F220		106			75			63			53			45	60	

1) Not specified.

Table 3 — Permissible deviation as a result of variations in the measuring technique

Grit designation	Test sieve No.					Remainder of grit in the bottom pan %
	1	2	3	3 and 4	3, 4 and 5	
	Permissible deviation %					
F4	0	+ 4	− 4	− 4	—	—
F5						
F6						
F7						
F8	0	+ 4	− 4	− 4	—	—
F10						
F12						
F14						
F16	0	+ 4	− 4	− 4	—	—
F20						
F22						
F24						
F30	0	+ 4	− 4	− 4	—	—
F36						
F40						
F46						
F54	0	+ 4	− 4	− 4	—	—
F60						
F70	0	+ 3	− 3	− 3	—	—
F80						
F90	0	+ 3	− 3	− 3	—	—
F100						
F120						
F150						
F180	0	+ 3	− 3	− 3	− 3	—
F220						

NOTE — Percentages are of original sample mass.