
**Abrasive products — Checking the grit
size of superabrasives**

*Produits abrasifs — Vérification de la dimension des grains des
superabrasifs*

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 6106 was prepared by Technical Committee ISO/TC 29, *Small tools*, Subcommittee SC 5, *Grinding wheels and abrasives*.

This second edition cancels and replaces the first edition (ISO 6106:1979), which has been technically revised.

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Abrasive products — Checking the grit size of superabrasives

1 Scope

This International Standard specifies a method for determining or checking the grit size of superabrasives (diamond or cubic boron nitride) as used for the manufacture of industrial products such as grinding wheels and saws. It is applicable to grit size designations as defined in Tables 2 and 3.

This International Standard describes the grit size designations, the size limits, the sieves to be used in determining them and the procedure to be adopted for checking the grit size exclusive of any coating.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 554:1976, *Standard atmospheres for conditioning and/or testing* — Specifications

3 Terms and definitions

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

3.1

grit

product whose size is defined by sieving

NOTE The smallest grit designation is D or B46.

3.2

grit size

designated on-size fraction located between the upper and a lower control sieve as specified in this International Standard

NOTE The grit may include oversize and undersize factors as specified.

4 Apparatus

4.1 Sieving machine

The test shall only be carried out with test sieving machines giving reproducible and comparable results, e.g. RO-TAP¹⁾ test sieving machines in accordance with ISO 9284.

4.2 Sieves

Electroformed sieves with standard 200 mm to 75 mm diameter stainless frame nested sieves, half-height (nominal 25 mm) shall be used. A cover and pan are required. The precision electroformed sieves with square apertures to be used in the size checking procedure described in this specification must have a supporting grid of 2,2 lines per cm bonded to the top surface of the sieve. Unless this is done, the superabrasive slides over the smooth top surface of the sieve and sieving efficiency is drastically reduced. It is the user's responsibility to ensure continuous compliance of the test sieve to the aperture sizes which shall be in accordance to Table 1.

Table 1 — Apertures sizes and ruling lines of electroformed sieves

Aperture size µm	Ruling lines/cm	Aperture size µm	Ruling lines/cm
1 830	4,97	227	30,3
1 520	5,8	213	30,3
1 280	6,5	197	35,8
1 080	7,9	181	35,8
915	8,5	165	39,4
850	9,2	151	43,7
770	10,9	139	46,3
710	11,8	127	49,2
645	12,2	116	49,2
600	13,4	107	59,1
541	15,0	97	65,6
505	15,7	90	65,6
455	16,4	85	71,6
425	17,9	75	78,7
384	18,7	65	78,7
360	20,3	57	87,5
322	21,9	49	98,4
302	24,6	41	98,4
271	26,2	37	98,4
255	26,2	32	98,4

1) RO-TAP is an example of a suitable product available commercially. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by ISO of this product.

4.3 Sample splitter

A sample splitter which will produce a representative sample shall be used.

4.4 Balance

A laboratory balance shall be used which has a precision of at least 0,01 g if using 200 mm sieves or at least 0,001 g if using 75 mm sieves.

4.5 Timer

A timer with an accuracy of $\pm 1\%$ in 15 min shall be used.

5 Test conditions

The test shall be performed under the following conditions:

Temperature: $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$	} in accordance with ISO 554
Relative humidity: $50\% \pm 5\%$	

6 Test sieving

6.1 Sampling

The material to be tested should preferably be blended and divided utilizing a sample splitter (4.3) so as to obtain a representative sample.

The resulting sample shall be spread out on a pan and allowed to acclimatize at a relative humidity and temperature as specified in Clause 5.

The mass of the sample, measured with the precision specified in 4.4, shall fall within the required range indicated in Tables 2 and 3.

6.2 Preparation for sieving

Assemble the desired stack of sieves (4.2) in the order of aperture sizes with the coarsest sieve on top and with a receiver pan on the bottom. Pour the test sample onto the top sieve and place a lid over it. Place the entire unit into the sieving machine (4.1). The sieve stack must be free to rotate during the sieving cycle, otherwise incomplete sieving and erratic results may occur. To facilitate rotation, maintain a clearance of 3 mm between the sieve stack lid and head yoke of the machine, and ensure that the receiver spring clip does not bind on the bottom pan.

Adaptors for 75 mm sieves are specified in Annex A.

6.3 Sieving procedure

Set the timer (4.5) controlling the sieve shaker to 15 min and turn on the shaker. At the completion of the cycle, remove the stack of sieves from the shaker. Beginning with the top (coarsest) sieve, empty the portion of the superabrasive retained onto a clean piece of glossy paper and tap the frame lightly to aid particle removal. This procedure should be repeated with each subsequent sieve, care being taken not to damage the sieves. Electroformed sieves should not require brushing, but should be cleaned periodically by ultrasonic methods.

7 Evaluation

7.1 Weighing sieved fractions

Oversize, on-size and undersize shall be weighed to the precision specified in 4.4.

If the sum of the masses of all fractions is less than 99 % of the original mass, this procedure shall be repeated on a new sample.

7.2 Calculation of results

Calculate the percentage retained on each sieve and the pan, relative to the cumulative final mass of the sample.

8 Designation and grading limits

8.1 General

The standard grit size designation and allowable limits for each size of superabrasive labelled, designated or otherwise represented as complying with this International Standard are given in Tables 2 and 3 in accordance with Clauses 4 to 6.

8.2 Grit sizes

Tables 2 and 3 present the ISO designations of the superabrasive grit sizes together with the allowable limits for the particle size distribution of each grit size. The numerical designation in Tables 2 and 3 are based upon the requirements specified in Table 1.

8.3 Designation

Superabrasives conforming to this International Standard shall be designated by

- a) "Superabrasives",
- b) reference to this International Standard, i.e. ISO 6106,
- c) the type of superabrasive, D (diamond) or B (cubic boron nitride), and
- d) the ISO grit designation according to Table 2 or 3.

EXAMPLE Superabrasive with D and grit size 151 is designated as follows:

Superabrasive ISO 6106 - D 151

9 Example showing the use of Table 2

The following is an example of the use of this International Standard. Consider ISO size D 151. At least 99,9 % of superabrasive must pass through the oversize limiting sieve — in this case 227 μm . All superabrasive may pass through the upper control sieve — in this case the 165 μm sieve — but not more than 7 % is permitted to be retained on it. It is permissible to have 100 % pass through the upper control sieve, and remain on the lower control sieve (127 μm), the requirement being that the grit passing through the upper control sieve, and retained on the lower control sieve, must be at least 90 %. No more than 7 % shall pass through the lower control sieve, and not more than 0,5 % is permitted to pass through the undersize limiting sieve (90 μm). As further clarification, if 100 % of a superabrasive claimed to be D 151 passes both the oversize limiting and upper control sieves, and 90 % is retained on the lower control sieve, the superabrasive shall be rejected because 10 % of the superabrasive passing through the lower nominal sieve exceeds the maximum 7 % allowed for this grit size.

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Table 2 — Narrow range grit sizes

ISO ^a grit designation	Equivalent mesh sizes ^b	Test weight according to 6.1		Sieve through which 99,9 % must pass (oversize limiting sieve)	Upper control sieve µm	Max. on sieve %	Lower control sieve µm	Min. on sieve %	Max. through sieve %	0,5 % max. through undersize limiting sieve µm
		for 200 mm sieves g	for 75 mm sieves g							
1 181	16/18	80 to 120	9,6 to 14,5	1 830	1 280	5	1 010	93	5	710
1 001	18/20	80 to 120	9,6 to 14,5	1 520	1 080	5	850	93	5	600
851	20/25	80 to 120	9,6 to 14,5	1 280	915	5	710	93	5	505
711	25/30	80 to 120	9,6 to 14,5	1 080	770	5	600	93	5	425
601	30/35	80 to 120	9,6 to 14,5	915	645	5	505	93	5	360
502	35/45	80 to 120	9,6 to 14,5	770	541	5	360	93	5	255
501	35/40	80 to 120	9,6 to 14,5	770	541	5	425	93	5	302
426	40/45	80 to 120	9,6 to 14,5	645	455	5	360	93	5	255
356	45/50	80 to 120	9,6 to 14,5	541	384	5	302	93	5	213
301	50/60	80 to 120	9,6 to 14,5	455	322	5	255	93	5	181
251	60/70	80 to 120	9,6 to 14,5	384	271	5	213	93	5	151
213	70/80	80 to 120	9,6 to 14,5	322	227	5	181	93	5	127
181	80/100	40 to 60	4,8 to 7,2	271	197	7	151	90	7	107
151	100/120	40 to 60	4,8 to 7,2	227	165	8	127	88	8	90
126	120/140	40 to 60	4,8 to 7,2	197	139	8	107	83	8	75
107	140/170	20 to 30	2,4 to 3,6	165	116	12	90	83	12	65
91	170/200	20 to 30	2,4 to 3,6	139	97	12	75	83	12	57
76	200/230	20 to 30	2,4 to 3,6	116	85	12	65	83	12	49
64	230/270	20 to 30	2,4 to 3,6	97	75	12	57	83	12	41
54	270/325	20 to 30	2,4 to 3,6	85	65	12	49	83	12	37
46	325/400	20 to 30	2,4 to 3,6	75	57	12	41	83	12	32

^a To add D or B depending on the abrasive type (D for diamond) or (B for cubic boron nitride), see 8.3.

^b These mesh size designations are not part of this International Standard. They are shown for easy reference only.

The manufacturers of superabrasive grit shall ensure that the size distribution within any of their grit products is maintained at a reasonably consistent proportional degree.

Table 3 — Wide range grit sizes

ISO ^a grit designation	Equivalent mesh sizes ^a	Test weight according to 6.1		Sieve through which 99,9 % must pass (oversize limiting sieve) µm	Upper control sieve µm	Max. on sieve %	Lower control sieve µm	Min. on sieve %	Max. through sieve %	0,5 % max. through undersize limiting sieve µm
		for 200 mm sieves g	for 75 mm sieves g							
1 182	16/20			1 830	1 280		840			600
852	20/30			1 280	915		600			425
602	30/40	80 to 120	9,6 to 14,5	915	645	5	425	93	5	302
427	40/50			600	455		302			213
252	60/80			384	271		181			127

^a See Table 2.

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Annex A
(normative)

Adaptors for 75 mm sieves

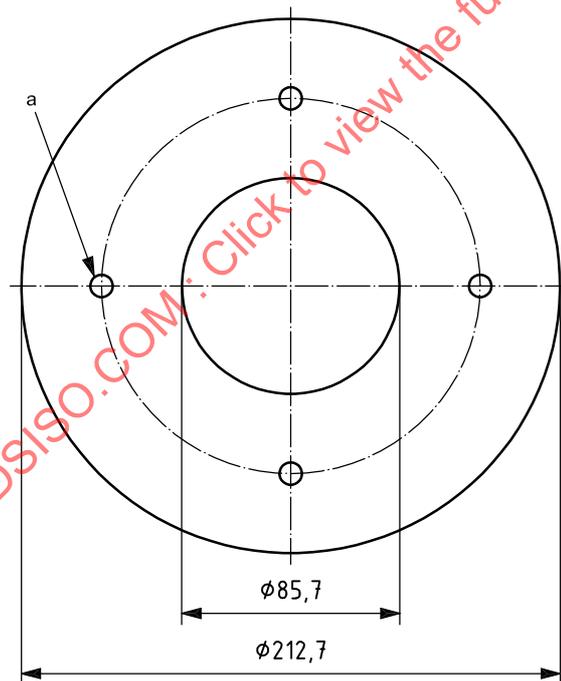
A.1 General

Where 75 mm sieves are used instead of those of 200 mm, adaptors in accordance with A.2 and A.3 shall be used.

A.2 Cover plate adaptor

This consists essentially of a spacer ring made of 6 mm-thick wood, plastic or reinforced plastics material, fitted beneath the standard cover plate of the sieving machine, such that the centre of the ring will accommodate the 75 mm cover while still allowing the stack of sieves some freedom to move, as required by 6.2. See Figure A.1.

Dimensions in millimetres



a Holes to suit.

Figure A.1