भारतीय मानक

लेपित अपघर्षक — विशिष्टि

(चौथा पुनरीक्षण)

Indian Standard

COATED ABRASIVES — SPECIFICATION

(Fourth Revision)

ICS 25.100.70

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

July 2002

Price Group 5

FOREWORD

This Indian Standard (Fourth Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Abrasives Sectional Committee had been approved by the Basic and Production Engineering Division Council.

This revision has been prepared by amalgamating its Parts 1 and 2 to make the standard user friendly. This revised standard apart from the usage of grit numbers for designating grain sizes, recognises the grade designations also, such as FINE, MEDIUM, COARSE, etc, as additional reference.

'ZIRCONIA ALUMINA' is a new entry in this revised standard as an abrasive.

For the determination of particle size, screen aperture sizes based on IS 460 (Part 1) may be used for 220 and coarser grits, whereas, for 240 and finer grits, sedimentation method conforming to IS 5282 : 1969 may be used.

It has been observed that, under tropical conditions, coated abrasives are prone to attack by micro-organism, with consequent reduction in the strength of the backing material as well as in the binding power of the adhesive. For this reason, provision has been made for 'Fungicidal' treatment of the adhesive. This is applicable only for natural adhesives, such as animal hide glue, starch.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

COATED ABRASIVES — SPECIFICATION

(Fourth Revision)

1 SCOPE

This standard covers the requirements for coated abrasives, both manual and mechanised applications.

2 REFERENCES

2.1 The following standards contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
460 : 1985	Test sieves : Part 1 Wire cloth test sieves (*third revision*)
2817 : 1965	Methods for sampling of coated abrasives
5282 : 1969	Liquid sedimentation methods for determination of particle size of powders

3 TERMINOLOGY

3.1 For the purpose of this standard, the following definitions shall apply.

3.1.1 *Abrasive* — A natural or synthetic substance, that is reduced by crushing and grading to specific grit sizes and is then made into products, free of extraneous materials, for grinding, polishing, lapping and other similar processes. for example, Flint (Natural), Aluminium Oxide (Synthetic).

3.1.2 *Backing* — The support or platform, to which the abrasive material is applied by mean of adhesives. Backing may be of paper, cloth, fibre, polyester, combination of any two of them or any other suitable material.

3.1.3 *Bond* — The adhesive, with which the abrasive grains are held on backing, for example, Animal Hide glue, Resins.

3.1.4 *Coated Abrasive* — The finished product, formed, when a layer of adhesive called the 'making coat' is applied to a backing material, such as paper cloth, fibre, combinations, followed by the deposition of an abrasive grain and the application of a second layer of adhesive, called the 'sizing coat', over the abrasive grain.

3.1.5 *Coating Density*

a) *Closed coat* — A coat, in which the abrasive grains completely cover the surface of the backing.

b) *Open coat* — A coat, in which the abrasive grains are spaced apart from each other.

NOTE — Coating density shall be in 'closed coat' unless specified otherwise.

3.1.6 *Machine Direction* — The direction of the backing/coated product, parallel to the direction of flow of the stuff on the paper making machine (applicable for paper, fibre).

The direction of backing/coated product, parallel to the direction of the 'wrap yarns' of the woven fabric (applicable for cloth).

3.1.7 *Cross Direction* — The direction of the backing/coated product, at right angle to the machine direction.

3.1.8 *Grit* — Number indicating the size of the abrasive grain.

3.1.9 *Weight* — Weight of the given specimen of the backing/coated product, expressed in terms of 'grams per square metre' or 'kg/1 000 square metre', under standard atmospheric conditions.

3.1.10 *Ream*— 500 sheets of coated abrasives, of specified size.

4 MATERIAL

4.1 Abrasives

Abrasives used, shall be of high grade, free from extraneous materials and shall conform to Table 1.

4.1.1 *Grading*

The Particle size/Fineness/Coarseness of abrasive grains and the allowable limits, shall conform to Table 2 for Emery and Table 3 for Aluminium Oxide, Silicon Carbide, etc. Testing shall be done, as described in Annex A.

For grits 240 and finer, the grit sizes shall be determined by Liquid Sedimentation method, in accordance with IS 5282.

Table 1 Properties of Abrasives

(*Clause* 4.1)

Types of Abrasives	Specific Gravity *Min*	Hardness		General Quality
		On Moh's Scale	On Knoop's Scale	
(1)	(2)	(3)	(4)	(5)
FLINT	2.65	7.0	1 230	High grade material crushed from clean, hard Quartz/ Quartzite/Flint. Relatively transparent.
EMERY	3.60	8.0	1 400	Natural/Synthetic forms. Aluminium Oxide — 56 percent *Min* by mass. Combined Iron Oxide — 35 percent *Max* by mass.
ALUMINIUM OXIDE	3.95	9.2	2 100	Good quality fused Aluminium oxide, mainly brownish in colour, containing sharp edges. Relatively tougher man made abrasive.
SILICON CARBIDE	3.20	9.5	2 480	Good quality fused Silicon Carbide, mainly black in colour, glittering, containing more sharp edges. Hardest and sharpest man made abrasive.
ZIRCONIA ALUMINA	4.60	9.0	1 600	Toughest man made abrasive. Mainly ash grey in colour.

Table 2 Allowable Limits for Flint and Emery

(*Clause* 4.1.1)

Grit No.	Nil Retention on IS Sieve	*Max* 25 Percent Retention on IS Sieve	*Min* 50 Percent Retention on IS Sieve	Control Sieve Comulative 90 Percent Retention on IS Sieve
	(μ m)	(μ m)	(μ m)	(μ m)
(1)	(2)	(3)	(4)	(5)
24	850	710	600	425
30	710	600	425	300
36	600	500	355	250
40	500	425	300	212
50	425	355	212	150
60	355	250	180	125
80	250	212	150	106
100	212	180	125	90
120	180	150	106	75
150	125	106	75	53
180	106	75	53	*Min* 70 percent retention
220	90	63	45	*Min* 70 percent retention

4.2 Application of Backing

Backing is decided with respect to the product design as well as the end use of the product. As found earlier, backing used shall be Paper, Cloth, Vulcanised Fibre or Combination of any two of the above, viz Paper/ Cloth, Fibre/Cloth, Cloth/Cloth, etc (*see* Table 4).

4.3 Bond

4.3.1 *Glue Over Glue (G/G)* — A bond in which both the making and sizing coats consist of high quality Animal Hide glue. Either or both coats may contain fillers.

4.3.2 *Resin Over Glue (R/G)* — A bond in which the maker coat is glue and the sizer coat consists of good quality polymeric materials, such as synthetic resins. Either or both coats may contain fillers.

4.3.3 *Resin Over Resin (R/R)* — A bond in which both the making and sizing coats consist of synthetic resins. Either or both coats may contain fillers.

4.3.4 *Waterproof (W/P)* — A bond in which both making and sizing coats consist of resin or varnish, which is insoluble in water. The backing is of waterproof type.

Table 3 Allowable Limits for Aluminium Oxide, Silicon Carbide and Zirconia Alumina

(*Clause* 4.1.1)

Sieve No. (μm)	Grit No. 24	30	36	40	50	60	80	100	120	150	180	220
	Percentage Retention on Specified Mesh (Cumulative)											
1410	NIL											
1190	–	NIL										
1000	0-1	–	NIL									
850	10-18	0-1	–									
710	52-70	10-18	0-1	NIL								
600	*Min* 92	52-70	10-18	–	NIL							
500		*Min* 92	52-70	0-7	–	NIL						
425			*Min* 92	35-50	0-3	–						
355				80-92	20-32	0-1	NIL					
300				*Min* 96	66-84	10-18	–	NIL				
250					*Min* 96	52-70	0-3	–	NIL			
212						*Min* 92	20-32	0-1				
180							66-84	10-18	–	NIL		
150							*Min* 96	52-70	0-7	–	NIL	
125								*Min* 92	34-50	0-3	–	NIL
106									80-92	0-32	0-2	–
90									*Min* 96	66-84	10-20	0-2
75										*Min* 90	50-74	10-20
63											*Min* 90	50-74
53												*Min* 90

Table 4 Types of Backings

(*Clause* 4.2)

Backings	Weight Code	General Quality	Finished Product Tensile Strength, N/25 mm²	
			Lengthwise	Breadthwise
(1)	(2)	(3)	(4)	(5)
Paper	A	Good quality kraft paper of substance 68-80 g/m²	100	60
	C	Good quality kraft paper of substance 100-120 g/m²	140	80
	D	Good quality kraft paper of substance 150-170 g/m²	180	100
	E	Good quality manila paper of substance 215-240 g/m²	500	250
Cloth	J	Cotton cloth twill weave (heavy drill)	550	270
	X	Cotton cloth twill weave (heavy drill)	600	300
Fibre	—	Vulcanized fibre 0.80 mm thick	1 250	800
		Vulcanized fibre 0.6 mm thick	1 000	700
Combinations	—	Combination of two backings, paper, cloth or fibre	Tensile strength shall be equal to the sum of the tensile strengths of the two backings being combined	

NOTE — 1 N (Newton) = 0.1 kgf (approx).

5 WORKMANSHIP

The coated abrasive product shall be free from any imperfections that may affect its serviceability.

6 FORM

Coated abrasive products may be supplied in various forms, such as Sheets, Discs, Rolls, Belts and other converted shapes, depending upon the product and its end use as given in Table 5.

7 DIMENSIONS AND TOLERANCES

Dimensions and tolerances of the coated abrasive products shall be as given in **7.1** and **7.2**.

7.1 Sheets

Coated abrasives in the form of sheets, shall be supplied in the size of 280 × 230 mm unless specified otherwise. For both the dimensions, the tolerance limit shall be ± 3mm.

7.2 Discs

Discs shall be supplied in the dimensions desired by the purchaser. Tolerances are given below:

	Diameter Balance	*Eccentricity, Max*
Up to 230 mm diameter	: ± 1.5 mm	1.5
230 to 610 mm diameter	: ± 3.0 mm	3.0
Above 610 mm diameter	: ± 5.0 mm	5.0

7.2.1 Fibre discs shall be supplied in 178 mm dia unless otherwise specified. The centre hole size and the slots are as described by the purchaser.

7.3 Rolls

Finished products in the form of rolls, shall be supplied in 50 m lengths and shall not have more than two joints/cuts. The shortest piece shall not be less than 7 m in length. Width of the roll shall be as specified by the purchaser, with a tolerance of ± 2 mm.

7.4 Belts

When supplied in the form of belts, belt length and width shall conform to the following tolerances:

Belt Length, mm	*Tolerance,* mm
Up to 1 000	± 3.0
Over 1 000 and up to 4 000	± 5.0 for width < 1 000
Over 4 000	± 10.0 for width ≥ 1 000

Table 5 Form and Shapes for Coated Abrasives

(*Clause* 6)

Bond Type	Abrasive Type	Backing Type	Physical Type	Grit Range	General Utility
(1)	(2)	(3)	(4)	(5)	(6)
G/G	Flint	Paper, Combination	Sheets, Rolls	14-220	Hand sanding in wooden furniture finishing, prepainting preparation of walls and shoe soles finishing
	Emery	Paper, Cloth	Sheets, Rolls	24-220	Hand sanding mainly on metallic surfaces
	Aluminium Oxide	Paper, Cloth & Combination	Sheets, Rolls, Belts & Discs	24-400	Light sanding on wood ferrous metals, etc
	Silicon Carbide	Paper, Cloth & Combination	Sheets, Rolls, Belts & Discs	36-1 200	Light sanding on leather, glass, non-ferrous metals etc
R/G	Aluminium Oxide	Paper, Cloth	Rolls Belts & Discs	24-400	Machine sanding on plywood, teak, chip board, ferrous metals
	Silicon Carbide	Paper, Cloth	Rolls, Belts & Discs	60-1 200	Machine sanding on glass, leather, rubber, non-ferrous metals
R/R	Aluminium Oxide	Cloth, Fibre	Rolls, Belts & Discs	24-400	Heavy duty/high speed grinding on metals, where heat generation is high for example, weld removal, flat metal finishing
	Silicon Carbide	Cloth	Rolls, Belts	36-220	High speed grinding on cast iron, hardened glass, stainless steel buffing, etc
	Zirconia	Cloth, Fibre	Rolls, Belts & Discs	24-60	Heavy duty applications, where rapid stock removal is essential for example, stainless steel
W/P	Silicon Carbide	Paper	Sheets, Discs	80-1 200	Wet sanding on glass, metals, plastics, putty & painted surface
		Cloth	Rolls, Belts	36-400	Mechanical wet grinding on hardened glass, metals

Belt Width, mm	*Tolerance,* mm
Up to 50	± 1.0
Over 50 and up to 1 000	± 2.0
Over 1 000	± 3.0

7.4.1 For belt lengths of 4 m and above, two joints shall be permitted, while the minimum length of the individual pieces shall not be less than 40 percent of the total belt length.

8 SAMPLING

Methods of sampling and criteria for conformity of coated abrasives shall be in accordance with IS 2817.

9 PRODUCT EVALUATION AND TESTING

Product shall be tested according to type of bond described in **9.1**, **9.2**, **9.3**, **9.4** and **9.5**.

9.1 Tensile Strength

Tensile Strength of the finished product is mainly controlled by the type of backing used. Table 4 prescribes the tensile strength of the finished product, with respect to the backing used.

Testing shall be done, as described in Annex B.

9.2 Dry Rub Test for Glue/Glue Products

Material to material dry rub testing for glue/glue products is given in Annex C.

9.3 Wet Rub Test for Waterproof Paper Products

Material to perspex wet rub testing for water proof paper product is given in Annex D.

9.4 Dry Rub Test for Resin/Glue Products

Material to workpiece dry rub testing for resin/glue products (Paper backed) is given in Annex E.

9.5 Belt Grinding Test for Resin/Glue and Resin/ Resin Products

Belt grinding test for resin/glue and resin/resin products (cloth backed) is given in Annex F.

9.6 Disc Grinding Test for Resin/Resin Products

Disc grinding test for resin/resin products (fibre backed) is given in Annex G.

10 FUNGICIDAL TREATMENT

Wherever Animal Hide glue is employed in the construction of a coated product, suitable fungicides shall be included in the adhesive formulations, wherever felt necessary.

11 MARKING

Each sheet, roll, belt, disc or any other converted shape, shall be marked with the following:

a) Manufacturer's name and/or trade-mark;
b) Abrasive material used;
c) Name of the product;
d) Grit number;
e) Name of the country of manufacture; and
f) Discretionary markings, such as product code, date of manufacture, commercial name of the product, machine direction indications, etc.

12 PACKING

12.1 All coated products shall be suitably packed with polyethylene wrapper and sealed in cartons.

12.2 All sheet goods are arranged into quires of 25 sheets each, as a first stage. Then they are taped with polyethylene/rubber/twine bands. The quires are then packed as per pre-agreed methods, using polyethylene bags, bitumen line jute wrappers.

12.3 Glue bonded sheet goods are packed in quarter/ half/full reams in a cardboard cartons or bundled using wooden planks on both the sides.

13 STORAGE OF COATED ABRASIVE PRODUCT

13.1 It is advisable to despatch/use the coated products on FIFO (First in First Out) basis.

13.2 Until usage, the coated products shall be left safe, in the original package.

13.3 Coated products shall be stored away from direct sunlight, rain, highly moist area and sources of heat, ideal storage conditions for coated product are given below:

Temperature	27 to 37°C
Relative humidity	55 to 65 percent

14 INFORMATION TO BE SUPPLIED BY THE PURCHASER

It is recommended that the purchaser furnish information on the following, while placing an order:

a) Type of Abrasive for example, Aluminium Oxide
b) Type of Bond for example, Resin/Glue
c) Type of Backing for example, Paper
d) Grit Number for example, Grit 60
e) Form for example, Belts
f) Dimensions for example, 150 × 3 500 mm
g) Specific requirements, if any for example, 'Open Coat'.

ANNEX A

(*Clause* 4.1.1)

GRADING TEST

A-1 Grading of abrasive is carried out by sieving 100 gm of abrasive grains in a recognised testing machine, employing sieves of 200 mm mean internal diameter, as specified in IS 460 (Part 1).

A-2 The sieves shall be arranged in a set of five, the set being rotated at 290 rev/min and subjected to 156 taps per min.

A-3 After running the machine for the stipulated time, the retention of the abrasive grain on each sieve shall be weighed individually and expressed in terms of percentage.

A-4 Grits finer than 220 shall be tested by 'Liquid Sedimentation' method, in accordance with IS 5282.

ANNEX B

(*Clause* 9.1)

TENSILE STRENGTH

B-1 A minimum of three specimens shall be taken in both the directions namely machine and cross. It is advisable to take the specimens from three different places, which are positioned diagonally across (for machine direction samples)/along (for cross direction samples) the width of the product.

B-2 The specimens shall be free from creases, folds or any other defects that may affect the test results.

B-3 Specimen size for fibre and fibre backed products:
25 mm wide and 150 mm long

Specimen size for paper and paper backed products:
25 mm wide and 175 mm long

Specimen size for cloth backed products:
25 mm wide and 175 mm long

Specimen size for cloth:
50 mm wide and 250 mm long

In the case of cloth, wider strips shall be cut and the threads frayed from the sides and finally reduced to 50 mm wide.

B-4 Each specimen shall be fixed in an approved tensile testing machine, so that the length between the grips is 100 mm for fibre/fibre backed products, 125 mm for paper, paper/cloth backed products and 200 mm for Cloth, as the case may be. The load shall then be applied uniformly and the rate of traverse of the jaw, through which the load is applied, shall be adjusted to 250 mm/min.

B-5 To determine the wet tensile strength, for waterproof products, soak the specimens in water, for 10 mins, excess water is removed in folds of blotting paper and the test is conducted as mentioned above.

B-6 The tensile strength of the material, in the respective directions, are recorded in terms of kg/25 mm width or kg/50 mm width, as the case may be.

ANNEX C

(*Clause* 9.2)

DRY RUB TEST FOR GLUE/GLUE PRODUCTS

C-0 Material to material for dry rub testing for glue/ glue products is carried out as given in subsequent clauses given below.

C-1 This test carried out on rub test machine, which is based on reciprocating mechanism, in which the bottom table is fixed and the upper arm moves to and fro.

C-2 A strip of material under test is cut to size with template and fixed on the static table (grain side up), provided in the testing machine.

C-3 Another strip of the same material is cut to size with template, weighed and fixed to the bottom of standard weight (grain side down) and held in jig, which moves to and fro on the test specimen, fixed on the static table.

C-4 The machine is switched on, making the abrasive sides of the test specimens rub each other, while the jig moves to and fro.

C-5 After the completion of test duration of the stipulated number of strokes, the machine is switched off and the pre-weighed test strip is weighed again.

C-6 The difference between the initial and final weighments gives the Dry Rub Test value in gm.

This value denotes the adequacy of the bond level.

C-7 Apart from the rub test value, it is advisable to have a visual observation of the tested strips and make qualitative assessments regarding backing exposure flaking, etc.

ANNEX D

(*Clause* 9.3)

WET RUB TEST FOR WATERPROOF PAPER PRODUCTS

D-0 Material to perspex for wet rub testing for water proof paper products is carried out as given in subsequent clauses below.

D-1 The basic machine is the same as seen in Annex C.

D-2 A strip of material under test is cut to size with template and soaked in water for a minimum of 10 min.

D-3 The soaked strip is fixed (grain side up) to the static bottom plate of the machine.

D-4 An acrylic perspex of 115 mm long, 65 mm wide in suitable thickness is weighed, fixed to the bottom of standard weight and held in the jig, which moves on the test strip fixed on the static table.

D-5 The machine is switched on, making the test strip and the perspex to rub, while controlled and continuous water spray is effected throughout the grinding area.

D-6 After the stipulated time, the machine is switched off, the acrylic perspex is taken out, wiped dry and weighed again.

D-7 The difference between the initial and final weighments gives the performance level of the test specimen which is expressed in gm. This value denotes the adequacy the bond level.

D-8 Apart from the wet rub test value, it is advisable to have a qualitative check of the tested sample and observe for backing exposure, flaking, tearing residual sharpness, etc.

ANNEX E

(*Clause* 9.4)

DRY RUB TEST FOR RASIN/GLUE PRODUCTS

E-0 Material to work piece for dry rub testing for rasin/glue products is carried out as given in subsequent clauses below.

E-1 The machine and the standard weight are the same as seen in Annex C.

E-2 A strip of the material under test is cut to size with template, weighed and fixed to the static bottom table of the testing machine.

E-3 Work piece for testing Silicon Carbide products: acrylic perspex (as in Annex D).

Work piece for testing Aluminium Oxide products: Teak Wood

Size of the work pieces shall be the same as seen in Appendix D, namely 115 mm long, 65 mm wide in suitable thickness.

E-4 The work piece is weighed, fixed to the bottom groove of the standard weight as seen in Annex D.

E-5 The machine is switched on, making the work piece and the test specimen to rub, while controlled and continuous air blowing is effected on the grinding surface.

E-6 After the completion of the stipulated test period, the machine is switched off. Both the test material and the work piece are taken out, cleaned and weighed once again.

E-7 The difference between the initial and final weighments of the work piece and the test piece, gives the performance level (Work) and the wear value respectively of the test sample.

E-8 Apart from the work and the wear values, it is advisable to make qualitative observation of both the tested sample (backing exposure, flaking, residual sharpness, degree of loading, etc) as well as the used work piece (surface finish).

ANNEX F

(*Clause* 9.5)

BELT GRINDING TEST FOR RASIN/GLUE AND RASIN/RASIN PRODUCTS

F-1 This test is carried on back stand idler unit — Contact wheel grinding.

F-2 Belt is generally in 50 mm wide and 2 000 mm long (50 × 2 000 mm), either with Lap or Butt joint, suitably prepared for belt grinding operations.

F-3 Once the preparation of belt joint is over, a minimum holding period of 12 h is required, to take the belt for grinding test.

F-4 WORK PIECE

Mild steel flat of 6 mm thickness, 40 mm width (6 mm × 40 mm) in suitable safe length.

F-5 The test belt is weighed and its length measured.

F-6 The belt is mounted on the machine, ensuring all the required safety precaution namely joint, holding period, running direction of the belt, tension, etc.

F-7 The work piece is also weighed.

F-8 The grinding machine is switched on and allowed for free running with the test belt for one min, as a safety measure.

F-9 The work piece is held firm on the running test belt, against the contact wheel either manually or by means of controlled mechanism with consistent pressure.

F-10 After completion of the stipulated time, the work piece is taken out and the machine is switched off.

F-11 Both the belt and work piece are weighed again. The length of the test belt is also measured.

F-12 The difference in the weighments of the work piece gives the degree of stock removal, called 'WORK'.

The difference in the weighments of the test belt gives the weight loss suffered by the product, called 'WEAR'.

The difference in the measurements of the test belt length gives the elongation experienced by the product, called 'STRETCH'.

F-13 Apart from the values of work, wear and stretch, it is advisable to have a qualitative observation of the tested belt regarding BACKING EXPOSURE, FLAKING JOINT WEAR, RESIDUAL SHARPNESS, etc.

ANNEX G

(Clause 9.6)

DISC GRINDING TEST FOR RASIN/RASIN PRODUCTS

G-1 This test is conducted on PORTABLE DISC GRINDER, generally of pneumatic type.

G-2 The size of the disc/test specimen will be of 178 mm diameter, with a centre hole of 23 mm dia.

G-3 WORK PIECE

RAIL STEEL of 200 to 300 mm long.

G-4 The test disc is weighed.

G-5 The work piece is also weighed.

G-6 The work piece is fixed firmly, in a vice, horizontally.

G-7 The test disc is fixed to the spindle provided with the grinder.

G-8 The grinder is switched on and made to run over the top portion of the work piece, thus effecting a firm and consistent grinding.

The grinding pressure is managed either manually or by controlled mechanism, in order to obtain uniform thrust of grinding.

G-9 After completion of the stipulated time, the grinder is switched off and the test disc is dismantled from the machine.

G-10 Both the work piece as well as the test disc are weighed again.

G-11 The difference between the initial and final weighments of the work piece gives the degree of stock removal, called 'WORK'.

The difference between the initial and final weighments of the test disc gives the weight loss suffered by the product, called 'WEAR'.

G-12 Apart from the work and wear values, it is advisable to make a qualitative assessment of the tested product, by visual observation namely BACKING EXPOSURE, FLAKING, RESIDUAL SHARPNESS, damages, etc.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 1986 to promote harmonious development of the activities of stardardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc: No. BP 09 (0023).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 323 01 31, 323 3375, 323 94 02

Telegrams: Manaksanstha
(Common to all offices)

Regional Offices:		Telephone
Central	: Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	323 76 17, 323 38 41
Eastern	: 1/14 C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi KOLKATA 700054	337 84 99, 337 85 61 337 86 26, 337 91 20
Northern	: SCO 335-336, Sector 34-A, CHANDIGARH 160022	60 38 43 60 20 25
Southern	: C.I.T. Campus, IV Cross Road, CHENNAI 600113	254 12 16, 254 14 42 254 25 19, 254 13 15
Western	: Manakalaya, E9 MIDC, Marol, Andheri (East) MUMBAI 400093	832 92 95, 832 78 58 832 78 91, 832 78 92

Branches : AHMEDABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. LUCKNOW. NAGPUR. NALAGARH. PATNA. PUNE. RAJKOT. THIRUVANANTHAPURAM. VISAKHAPATNAM.

Printed at Simco Printing Press, Delhi

AMENDMENT NO. 1 OCTOBER 2004
TO
IS 715 : 2002 COATED ABRASIVES — SPECIFICATION

(Fourth Revision)

(*Page* 5, *clause* **9**) — Substitute the following for the existing:

'9 PRODUCT EVOLUTION AND TESTING

Product shall be tested according to type of bond described in **9.1**, **9.2**, **9.3**, **9.4**, **9.5**, **9.6** and **9.7**.'

(*Page* 5, *clause* **9.6**) — Insert the following clause after **9.6**:

'9.7 Determination of Aluminium Oxide

The procedure for determining aluminium oxide and combined iron oxide shall be as given in Annex H.'

(*Page* 9, *Annex* G) — Insert the following Annex at the end:

ANNEX H

(*Clause* 9.7)

DETERMINATION OF ALUMINIUM OXIDE IN ABRASIVES

H-1 METHOD

H-1.1 Crush the sample to a finely divided powder in an agate pestle and mortar and weigh out approximately 0.3 g of the sample in a platinum crucible. Mix thoroughly with about ten times its weight of crushed potassium bisulphate, taking care not to loose any material during mixing.

H-1.2 Fuse the mixture in an ordinary Bunsen burner in a completely oxidizing flame, first slowly, till the frothing ceases and then vigorously for about half an hour, till a clear melt is obtained. Allow the mass to cool and take up the melt in 100 ml of hot distilled water containing 20 ml of hydrochloric acid in a beaker. Heat to boil and allow it to settle till the silica settles at the bottom. Filter through paper pulp in a 250-ml graduated flask. Wash the residue thoroughly several times with hot water, collecting the filterate.

H-1.3 Make up the filterate to a volume of 250-ml by adding water. Take an aliquot portion, 50 ml in a 250-ml beaker and add water to make the volume approximately to 100 ml. Add about five grams of ammonium chloride and then ammonia until the solution is slightly alkaline. Boil continuously for about five minutes and allow the precipitate to settle. Filter through No. 31 Whatman filter paper and wash the residue thoroughly with the hot water containing a little of ammonium nitrate. Ignite the residue to constant weight in a weighed platinum crucible. Reweigh the contents. The difference gives the combined weight of iron oxide (Fe_2O_3) + aluminium oxide (Al_2O_3) – total oxide (R_2O_3). Take another 100 ml of the solution in a 250-ml beaker and heat to boil. As the solution begins to boil add drop by drop stannous chloride solution till the yellow colour of the solution changes to colourless one. Allow it to cool in ice and to the ice cooled solution add 10 ml of mercuric chloride solution and stir it well and keep it for five minutes A silky precipitate is formed. Make the solution to about 200 ml with cold distilled water and titrate with N/20 Standard potassium permanganate solution to a permanent pink colour, adding a few millilitres of phosphoric acid. From the amount of standard solutions used, calculate the percentage of iron oxide as given in the following formula:

$$\text{Iron oxide } (Fe_2O_3) = \frac{\text{Millilitres of potassium permanganate used} \times \text{Strength of the potassium permanganate} \times 250 \times 0.079\,84}{\text{Weight of the sample}}$$

The difference between total oxide and iron oxide gives the weight of the aluminium oxide.

NOTE — The above method is for the determination of Al_2O_3 which may exist as free alumina or in a combination with other molecules.

(MGPD 09)