



CEN/TC 143/WG 2/AH 2.3 N 12

[CEN/TC 143/WG 2/AH 2.3](#)

Coated abrasives - Safety

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Secretariat: DIN

Note du secrétariat UNM à la Commission de normalisation UNM 07 « Meules et abrasifs »

Le projet préliminaire suivant est actuellement soumis pour commentaires par le groupe de travail CEN/TC 143/WG 2/AH 2.3 « *Abrasifs appliqués- Sécurité* » :

prEN 13743 "Exigences de sécurité pour les abrasifs appliqués"

Rappel historique

Ce document fait suite à l'enquête quinquennale de 2006 où la France avait demandé la révision de la norme EN 13743:2002 (voir doc. CEN/TC 143 N 589_UNM 07-810).

Les commentaires examinés lors de la réunion des 24-25 avril 2007 à Cologne ont été pris en compte. La France s'était positionnée sur ces commentaires lors de la réunion UNM 07 du 17 mars 2007 (voir doc. UNM 07-815). Ces commentaires ont été globalement acceptés. Les commentaires sur la plage des vitesses à par exemple été refusé.

Par rapport à la version précédente :

- harmonisation par rapport à l'EN 12413, relative aux produits abrasifs agglomérés
- des facteurs de vitesse d'éclatement sont donnés au lieu de la vitesse minimum d'éclatement
- les essais en survitesse et essais d'éclatement ont été combinés

Pour plus de détails concernant ces modifications, voir l'avant-propos du présent document.

Proposition de vote

Nous vous demandons de bien vouloir nous renvoyer vos commentaires sur le sujet (et en particulier sur les paragraphes 5.3.3, 5.3.6 et 5.3.6.1 qui ont besoin d'être complétés) **avant le 7 décembre 2007.**



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prEN 13743 Coated abrasives WD 2007-11

Date of document	2007-11-16
Expected action	Comment
Due Date	2007-12-14

Background

Dear Experts,

Please find on the following pages the layout for future enquiry draft prEN 13743 'Safety requirements for coated abrasives' (Revision of EN 13743:2001-12), including the changes decided at the last meeting (see doc. WG 2 N 164 and WG 2/AH 2.3 N 11).

Please check the document and make any proposals for changes if necessary, by using the CEN comments table. This table can be found on the homepage of this committee (WG 2 or WG 2/AH 2.3) in the folder '05. Drop-in box for members'.

You can send your filled-in comments table by E-mail attachment to the secretariat, ulrich.schober@din.de or by uploading it into the folder '05. Drop-in box for members' (using the icon 'Add New Item – Document' in the upper right corner).

Deadline for your comments is 14th December 2007.

The next steps would be to include the comments received, if any, in the document and to send it to the parent CEN/TC 143 for starting the project by new work item proposal vote. The foreseen track would be the UAP (unique acceptance procedure): enquiry draft – standard, which means the Formal Vote is taken directly, i.e. the members of CEN have only the possibility to say yes or no to the document and to provide editorial comments only. The advantage is of course the acceleration of the process. This should be possible in this case because we would not await requests for technical changes during the stages of development.

Please send your comments if you would not agree with this UAP procedure, i.e. if you would prefer to keep it by the normal procedure with an enquiry draft publication and with the possibility of additional technical changes.

With kind regards,
Ulrich Schober

CEN/TC 143

Date: 2007-11

prEN 13743:2007

CEN/TC 143

Secretariat: SNV

Safety requirements for coated abrasives

Sicherheitsanforderungen für Schleifmittel auf Unterlagen

Prescriptions de sécurité pour les produits abrasifs appliqués

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Foreword

This document (prEN 13743:2007) has been prepared by Technical Committee CEN/TC 143 "Machine tools - Safety", the secretariat of which is held by SNV.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 13743:2001.

Significant changes against EN 13743:2001 are as follows:

- a) The standard was technically and editorially revised and adapted to EN 12413:2007 about bonded abrasives products;
- b) Table 2 with dimensional abbreviations was deleted;
- c) "Vibration" was included in the list of hazards in Table 3;
- d) Table 5 (now Table 4) containing maximum operating speeds and safety factors was simplified and burst speed factors were given instead of minimum bursting speed;
- e) Table 6 (now Table 5) with dimensional limitations and maximum operating speeds was simplified: now it is no longer distinguished between standard operating speeds and special operating speeds;
- f) Clause 6 about verification and inspection was shortened, 6.1.1 and 6.1.2 about safety speed test and bursting speed test were combined to new 6.2, thereby deleting Table 7 with maximum operating speeds and safety test speeds;
- g) 6.2 about scope of the inspection was deleted together with Table 8;
- h) Clause 7 about information for use was shortened;
- i) the requirements for colour code strips were deleted in Annex A and are now presented in new Annex B;
- j) some values given in the speed conversion table in Annex B (now Annex C) were slightly changed.

Introduction

This European Standard has been prepared to provide one means of conforming with essential safety requirements, e.g. of the General Product Safety Directive and associated EFTA regulations.

This European Standard is addressed to designers, manufacturers, and suppliers of the abrasive products described in the scope. In addition, it helps designers, manufacturers and suppliers of grinding machines in the selection of abrasive products, in order to reduce the risks and achieve conformity of the respective machinery with the Essential Safety Requirements of the Machinery Directive.

The extent to which hazards are covered is indicated in the scope of this European Standard.

1 Scope

This European Standard is applicable to the following coated abrasive products: flap wheels, flap discs, vulcanised fibre discs and spindle mounted flap wheels. It also applies for back-up pads for vulcanised fibre discs.

This European Standard specifies requirements and/or measures for removal or reduction of hazards resulting from the design and application of the coated abrasive products and clamping devices.

This European Standard also contains procedures and tests for verification of compliance with the requirements as well as safety information for use, which is to be made available to the user by the manufacturer.

The hazards taken into consideration are listed in Clause 4 of this standard.

This European Standard does not apply to non-woven web abrasive products, bonded abrasive products and superabrasive products.

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, *Standard atmospheres for conditioning and/or testing — Specifications*

3 Terms, definitions and symbols

For the purpose of this document the following terms and definitions apply.

3.1 General

3.1.1

coated abrasive product

abrasive product composed of backing, abrasive particles and bond and optionally a supporting element

NOTE Examples for supporting elements are pads and spindles.

3.1.2

clamping device

device for fixing and positioning the abrasive product on the spindle of the grinding machine

NOTE Clamping devices include e.g. back-up pads for vulcanised fibre discs, and clamping flanges for flap wheels.

3.2 Grinding machines

3.2.1

stationary grinding machine

grinding machine being fixed in position during operation

NOTE See for example EN 13218.

3.2.2

mobile grinding machine

grinding machine being not fixed in position during operation

NOTE Mobile grinding machines are manually guided (but not supported) by hand during use, e.g. floor grinding machines.

3.2.3

hand-held grinding machine

grinding machine being held in the hand during the grinding process

NOTE See for example EN 792-7, EN 792-9, EN 60745-2-3 and EN ISO 19432.

3.3 Type of application

3.3.1 General

See Table 1.

3.3.2

mechanically guided grinding

grinding process with feed movements of the grinding tool and/or workpiece guided by mechanical means

3.3.3

manually guided grinding

grinding process with feed movements of the grinding tool and/or the workpiece manually guided by the operator

3.3.4

hand-held grinding

grinding process with grinding machine entirely guided by the operator's hands

Table 1 — Type of application

Type of machine	Type of application	Abrasive product	Workpiece
Stationary grinding machines	Mechanically guided grinding	Fixed	Guided mechanically
		Guided mechanically	Fixed
		Guided mechanically	Guided mechanically
Stationary and mobile grinding machines	Manually guided grinding	Guided by hand	Fixed
		Fixed	Guided by hand
Hand-held grinding machines	Hand-held grinding	Guided by hand	Fixed

3.4 Symbols

The symbols used in this European Standard are listed in Table 2.

Table 2 — Symbols

Symbol	Designation	Definition	Unit
n_{ab}	Deflection speed of spindle mounted flap wheels	Revolutions per minute at which the spindle of spindle mounted flap wheels is deflecting under centrifugal force	1/min
n_{max}	Maximum permissible speed of rotation	Revolutions per minute of the new abrasive product at maximum operating speed	1/min
v_s	Maximum operating speed	Maximum permissible peripheral speed of a rotating abrasive product	m/s
f_{br}	Burst speed factor	Minimum bursting speed divided by maximum operating speed: $f_{br} = \frac{v_{br\ min}}{v_s}$	
v_{br}	Bursting speed	Peripheral speed at which the abrasive product breaks due to centrifugal force	m/s
$v_{br\ min}$	Minimum bursting speed	Peripheral speed, which the abrasive product shall at least reach without bursting due to centrifugal force: $v_{br\ min} = \sqrt{S_{br}} \times v_s$	m/s
S_{br}	Safety factor against bursting due to centrifugal force	Bursting speed divided by maximum operating speed, all squared: $S_{br} = \left(\frac{v_{br}}{v_s} \right)^2$	—
S_{ab}	Safety factor of spindle deflection for spindle mounted flap wheels	Deflection speed divided by maximum permissible speed of rotation: $S_{ab} = \frac{n_{ab}}{n_{max}}$	—

4 List of significant hazards

The significant hazards are given in Table 3.

Table 3 — List of significant hazards

Hazard designation	Hazardous situations (Examples)	Relevant clauses in the standard
Ejection of parts	1. Abrasive product breakage caused by:	
	— improper design	5.1, 5.2, 5.3 and 5.4
	— manufacturing defects	5.1
	— wrong selection	5.5, Clause 7 and Annex A
	— improper handling and storage	Clause 7
	— improper use (mounting and grinding process)	Clause 7
	2. Grinding debris	Clause 7
Vibration	Hand arm vibration on hand-held machines caused by:	
	— improper use	Clause 7
	— incorrect mounting	Clause 7

5 Requirements

5.1 General requirements

5.1.1 General

Coated abrasive products shall be designed and manufactured in such a way that they resist the forces and loads that are to be expected when used as intended. They shall not present visible defects affecting safety and shall comply with the requirements listed in the following clauses.

5.1.2 Sequence of maximum operating speeds

Coated abrasive products shall be manufactured for maximum operating speeds according to the following sequence:

< 16 — 16 — 20 — 25 — 32 — 35 — 40 — 45 — 50 — 63 — 80 in m/s

For a conversion table for speeds of rotation and maximum operating speeds as a function of the outside diameter D of the abrasive products, see Annex C.

5.2 Safety factors

5.2.1 Safety factors for flap wheels, flap discs and vulcanised fibre discs

Flap wheels, flap discs and vulcanised fibre discs shall have a safety factor against bursting due to centrifugal forces at their maximum operating speed as given in Table 4.

Table 4 — Safety factors

Type of machine	Type of application	Dimensional limitations with respect to the outside diameter D of the abrasive product	Maximum operating speed v_s m/s	Safety factor S_{br}	Burst speed factor f_{br}
Stationary and mobile grinding machines	Mechanically and manually guided grinding	none	≤ 63	3	1,73
Hand-held grinding machines	Hand-held grinding	none	≤ 50	3	1,73
		≤ 125 mm	$50 < v_s \leq 80$	3	1,73
		> 125 mm	$50 < v_s \leq 80$	3,5	1,87

5.2.2 Safety factors for spindle mounted flap wheels

Spindle mounted flap wheels shall have a safety factor against bursting due to centrifugal forces of $S_{br} = 3$ at their maximum operating speed. The spindle shall have a safety factor against deflection of $S_{ab} = 1,3$.

5.2.3 Safety factor for back-up pads for vulcanised fibre discs

Back-up pads for vulcanised fibre discs shall fulfil a safety factor against bursting due to centrifugal force of $S_{br} = 3,5$ at their maximum permissible speed of rotation.

5.3 Dimensional requirements and maximum operating speeds

Coated abrasive products shall comply with the dimensional limitations and maximum operating speeds as specified in Table 5.

Table 5 — Dimensional limitations and maximum operating speeds

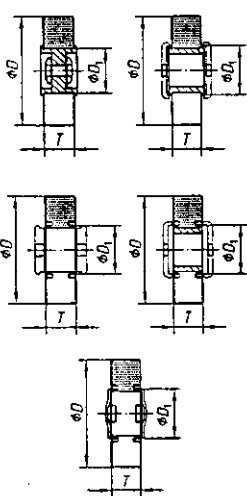
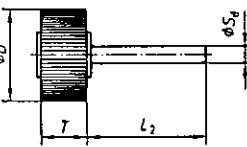
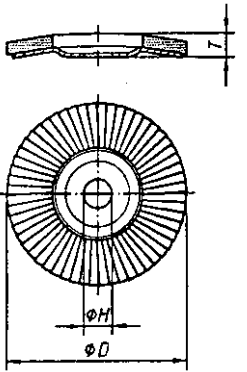
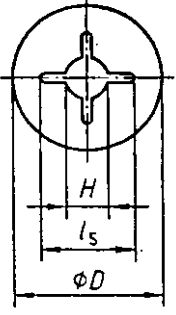
Designation, shape, dimensional letters	Type of machine ^a	Type of application ^a	Maximum operating speeds and dimensional limitations	
			Dimensional limitations	Maximum operating speeds m/s
Flap wheel with or without flange  $D \times T$	Stationary grinding machines Hand-held grinding machines	Mechanically and manually guided grinding Hand-held grinding	$D \leq 600$ $T \leq 300$ $D_1 \geq 0,5D$	40, 50 and 63
Spindle mounted flap wheel  $D \times T \times S_d$	Hand-held grinding machines	Hand-held grinding	$D \leq 80$ $T \leq 50$	40
Flap disc without hook and loop fastening system  $D \times T \times H$	Hand-held grinding machines	Hand-held grinding	$D \leq 230$ $T \leq 22$ $H = 22,23$	80

Table 5 (continued)

Designation, shape dimensional letters	Type of machine ^a	Type of application ^a	Maximum operating speeds and dimensional limitations	
			Dimensional limitations	Maximum operating speeds m/s
Vulcanised fibre disc with or without cross slots  $D \times H$	Hand-held grinding machines	Hand-held grinding	$80 \leq D \leq 235$ $H \leq 0,25D$ max. 40 $l_s \leq 0,44D$ max. 80	80
^a Definitions see 3.2 and 3.3.				

5.4 Marking

Coated abrasive products and back-up pads shall be marked according to Annex A.

6 Verification of the requirements

6.1 Verification of the general requirements

For visible defects affecting safety the coated abrasive product is checked by visual inspection. Damaged abrasive products shall be destroyed.

6.2 Verification of the safety factor (bursting speed test)

Compliance with the safety factor (verification of the bursting strength) is checked by a centrifugal force test. The coated abrasive product mounted in a clamping device on a suitable test rig is loaded with steadily increasing speed of rotation by centrifugal forces up to the minimum bursting speed or until bursting. The speed of rotation shall be measured with an accuracy of $\pm 1\%$. The speed of rotation at bursting of the abrasive product shall be detected and recorded by a suitable device.

Verification of the safety factor for back-up pads is carried accordingly.

For spindle mounted flap wheels the verification is carried out with an overhang length of the spindle of $L_0 = 0$ mm.

The abrasive product and the back-up pad pass the bursting speed test, if they are run at minimum bursting speed for at least 5 s without breaking. For verification of the bursting strength, the samples shall be stored at least 24 h at an ambient temperature of $(20 \pm 2)^\circ\text{C}$ and a relative humidity of $(65 \pm 5)\%$ (standard atmosphere according to ISO 554) prior to the test. All abrasive products subjected to the bursting speed test shall be destroyed.

Verification of the safety factor against deflection of the spindle for spindle mounted flap wheels is carried out with a clamping length of the spindle of 10 mm or with the maximum overhang length of the spindle indicated by the manufacturer.

6.3 Verification of the dimensional requirements

Compliance is checked on the basis of the dimensional data and the data in the drawings using suitable measuring means, e.g. limit gauges, calliper gauges, electronic measuring machines.

6.4 Verification of the marking

Verification of the marking data is effected by visual inspection.

7 Information for use

The manufacturer, supplier or importer of coated abrasive products and back-up pads shall bring information on safe application and safety recommendations for correct use of the products to the notice of the user. The information shall contain safety recommendations as follows:

- a) general information about the products and their properties;
- b) handling and storage;
- c) selection of products for safe and correct use,
- d) conditions to be fulfilled before use of the products;
- e) mounting instructions;
- f) grinding and cutting operations:
 - conditions to avoid,
 - malpractice and incorrect use;
- g) content and meaning of marking and supplied information;
- h) restrictions of use.

The safety recommendations intended as information for use shall be brought to the attention of the user and may be provided

- supplied with the product,
- as periodical information,
- in the course of training arrangements or
- as guidance for practical use.

Annex A (normative)

Marking

A.1 Content of marking

A.1.1 Marking requirements

In Table A.1 the marking requirements applying for the different abrasive coated products and back-up pads are indicated with "X".

Table A.1 — Marking of products

Designation of the product	Specification						
	1	2	3	4	5	6	7
	Manufacturer, supplier, importer, trademark	Dimensions mm	Maximum operating speed ^a m/s	Maximum permissible speed of rotation 1/min or rpm	Declaration of conformity	Restrictions of use	Traceability code
Flap discs	X	X	X	X	X	X	X
Flap wheels	X	X	X	X	X	X	X
Spindle mounted flap wheels	X	X	X	X	X	—	X
Coated vulcanised fibre discs	X	X	X	X	X	X	X
Back-up pads for vulcanised fibre discs	X	—	—	X	X	—	X

^a Option: Additional marking with colour code in accordance with Annex B.

To specification 1

Instead of the name of manufacturer, supplier or importer their registered trademark may be shown.

To specification 2

- Abrasive products — nominal dimensions
- Spindle mounted flap wheels — nominal dimensions, diameter of the spindle and minimum clamping length

To specification 3

Maximum operating speed in metres per second

To specification 4

Maximum permissible speed of rotation in 1/min. The speed of rotation marked on the product should be according to Annex C.

For spindle mounted flap wheels, the maximum permissible speed of rotation as a function of the relevant overhang and the minimum length of spindle within the collet shall be given.

To specification 5

For declaration of conformity with the requirements of this European Standard, the products shall be marked with:

EN 13743

To specification 6



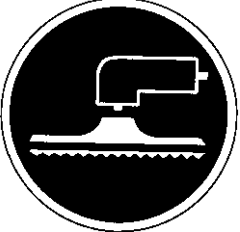
Coated abrasive products for which certain grinding procedures, grinding machines and certain applications have to be obeyed, shall be marked with the corresponding restrictions of use according to Table A.2.

The restrictions of use shall be given in full length (see Table A.2, column 2) or in the form of pictograms (see Table A.2, column 4). They can also be given as short signs (see Table A.2, column 1), provided the full wording is given on a label attached or added to the smallest packaging unit.

To specification 7

To ensure traceability and identification, the coated abrasive products and the back-up pads shall be marked with a traceability code which enables to link an individual product to a limited production quantity. The traceability code can be expressed by, e.g. a production/batch number, date of production or series number.

Table A.2 — Restrictions of use (RE)

1	2	3	4
Short sign	Designation	Application	Symbol
RE 1	Not permitted for hand-held and manually guided grinding	Abrasive product only for use on stationary grinding machines for mechanically guided grinding. NOTE This restriction only applies to abrasive products not for use on grinding machines for hand-held or manually guided grinding but capable of being mounted on such machines.	
RE 3	Not permitted for wet grinding	Abrasive product only suitable on stationary grinding machines for dry grinding.	
RE 8	Only permitted with back-up pad	Abrasive product only for use with additional appropriate back-up pad.	
NOTE Colour design of the symbols in accordance with ISO 3864-2, wherever possible.			

A.1.2 Additional inscriptions

Additional inscriptions on the products such as manufacturer's product name are permitted, provided legibility of the data required according to Table A.1 is not impaired.

A.2 Execution of marking

The marking shall be indelible and legible.

Where possible the marking shall be on the abrasive product. It can be on the product itself or on a fixed label. The traceability code can be either on the product or smallest package.

For products over 80 mm outside diameter when it is not possible to give all specified information on the abrasive product or label, the abrasive product itself shall at least be marked with the maximum operating speed in so far as the surface and shape of the abrasive product permits.

For products with an outside diameter of $D \leq 80$ mm, vulcanised fibre discs and spindle mounted flap wheels, the specified information can appear on a label fixed to the smallest packaging unit.

Annex B (normative)

Colour codes

Colour codes may be used as additional marking of the maximum operating speed, see Table A.1. If they are used, the requirements of Table B.1 shall be met. Colour codes shall only be used for the discrete speed values given in Table B.1.

Table B.1 — Colour codes and design of colour codes

Maximum operating speed v_s m/s	Colour code	
	Number and colour	Width of colour stripe
50	1 × blue	5 mm to 20 mm
63	1 × yellow	
80	1 × red	

Colour code stripes shall extend through the centre and across the whole diameter of the abrasive product or the label. They shall be straight and of even width. A colour design of the label shall not impair the clear recognisability of the colour code.

Annex C (informative)

Speed conversion table

See Table C.1 ¹⁾.

Table C.1 — Speed conversion

Wheel diameter <i>D</i> mm	Peripheral speed v m/s									
	16	20	25	32	35	40	45	50	63	80
	Speed of rotation 1/min or rpm									
6	51 000	64 000	80 000	102 000	112 000	128 000	143 240	160 000	201 000	
8	38 200	48 000	60 000	76 500	84 000	95 500	107 430	120 000	150 500	191 000
10	30 600	38 200	48 000	61 200	67 000	76 500	86 000	95 500	120 500	153 000
13	23 550	29 500	35 600	47 100	51 500	58 800	66 500	73 500	92 600	118 000
16	19 100	23 900	29 850	38 200	41 800	47 800	54 000	59 700	75 200	95 500
20	15 300	19 100	23 900	30 600	33 500	38 200	43 000	47 800	60 200	76 500
25	12 300	15 300	19 100	24 500	26 800	30 600	34 400	38 200	48 200	61 200
32	9 550	11 950	14 950	19 100	20 900	23 900	26 900	30 000	37 600	48 000
40	7 650	9 550	11 950	15 300	16 750	19 100	21 500	23 900	30 100	38 200
50	6 150	7 650	9 550	12 250	13 400	15 300	17 200	19 100	24 100	30 600
63	4 850	6 100	7 600	9 750	10 650	12 150	13 650	15 200	19 100	24 300
80	3 850	4 800	6 000	7 650	8 400	9 550	10 750	12 000	15 100	19 100
100	3 100	3 850	4 800	6 150	6 700	7 650	8 600	9 550	12 100	15 300
115	2 700	3 350	4 200	5 350	5 850	6 650	7 500	8 350	10 500	13 300
125	2 450	3 100	3 850	4 900	5 350	6 150	6 900	7 650	9 650	12 250
150	2 050	2 550	3 200	4 100	4 500	5 100	5 750	6 400	8 050	10 200
180	1 700	2 150	2 700	3 400	3 750	4 250	4 800	5 350	6 700	8 500
200	1 550	1 950	2 400	3 100	3 350	3 850	4 300	4 800	6 050	7 650
230	1 350	1 700	2 100	2 700	2 950	3 350	3 750	4 200	5 250	6 650
250	1 250	1 550	1 950	2 450	2 700	3 100	3 450	3 850	4 850	6 150
300	1 050	1 300	1 600	2 050	2 250	2 550	2 870	3 200	4 050	5 100
350/356	875	1 100	1 400	1 750	1 950	2 200	2 450	2 750	3 450	4 400
400/406	765	960	1 200	1 550	1 700	1 950	2 150	2 400	3 050	3 850
450/457	680	850	1 100	1 400	1 500	1 700	1 950	2 150	2 700	3 400
500/508	615	765	960	1 250	1 350	1 550	1 750	1 950	2 450	3 100
600/610	510	640	800	1 050	1 150	1 300	1 450	1 600	2 050	2 550

1) The values given in the table are not the exact calculated values but recommended values to be used for marking the abrasive products.

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