



SLOVENSKI STANDARD
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Varnostne zahteve za brusilna sredstva

Safety requirements for coated abrasive products

Sicherheitsanforderungen für Schleifmittel auf Unterlagen

Prescriptions de sécurité pour les produits abrasifs appliqués

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EUROPEAN STANDARD

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Safety requirements for coated abrasive products

Prescriptions de sécurité pour les produits abrasifs
appliqués

Sicherheitsanforderungen für Schleifmittel auf Unterlagen

This European Standard was approved by CEN on 5 June 2009.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 13743:2009) has been prepared by Technical Committee CEN/TC 143 "Machine tools - Safety", the secretariat of which is held by SNV.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2010, and conflicting national standards shall be withdrawn at the latest by January 2010.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 13743:2001.

Significant changes against EN 13743:2001 are as follows:

- a) The standard was technically and editorially revised and partly adapted to EN 12413:2007 on bonded abrasive 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 by abandoning the distinction between standard operating speeds and special operating speeds;
- f) Clause 6 on verification and inspection was shortened, 6.1.1 and 6.1.2 about safety speed test and bursting speed test were combined to a new 6.2, thereby deleting Table 7 with maximum operating speeds and safety test speeds;
- g) 6.2 on scope of the inspection was deleted together with Table 8;
- h) Clause 7 on information for use was shortened;
- i) the requirements for colour code stripes were deleted in Annex A and are now presented in a new Annex B;
- j) some values given in the speed conversion table in Annex B (now Annex C) were slightly changed.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

EN 13743:2009 (E)**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 coated abrasive products and back-up pads 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.

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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 to 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 not being fixed in position during operation

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

EN 13743:2009 (E)**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 abrasive product and/or workpiece guided by mechanical means

3.3.3**manually guided grinding**

grinding process with feed movements of the abrasive product 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

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

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4 List of significant hazards

The significant hazards are given in Table 3.

Table 3 — List of significant hazards

Hazard designation	Hazardous situation (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	5.4, 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

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5 Safety 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 conversion of maximum operating speeds into speeds of rotation for different outside diameters D of the abrasive product, 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 limitation for the outside diameter D of the abrasive product mm	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	$50 < v_s \leq 80$	3	1,73
		> 125	$50 < v_s \leq 80$	3,5	1,87

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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 $S_{ab} = 1,3$.

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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 limitations and maximum operating speeds

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