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Hand-held non-electric power tools - Safety requirements - Part 9: Die grinders

Hand-held non-electric power tools - Safety requirements - Part 9: Die grinders

Handgehaltene nicht-elektrisch betriebene Maschinen - Sicherheitsanforderungen - Teil 9: Schleifmaschinen für Schleifstifte

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Machines portatives a moteur non électrique - Prescriptions de sécurité - Partie 9:
Meuleuses d'outillage

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EUROPEAN STANDARD
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EN 792-9

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Hand-held non-electric power tools - Safety requirements - Part 9: Die grinders

Machines portatives à moteur non électrique - Prescriptions
de sécurité - Partie 9: Meuleuses d'outillage

Handgehaltene nicht-elektrisch betriebene Maschinen -
Sicherheitsanforderungen - Teil 9: Schleifmaschinen für
Schleifstifte

This European Standard was approved by CEN on 1 December 2000.

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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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 255 "Hand-held, non-electric power tools - Safety", the secretariat of which is held by SIS.

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of an identical text or by endorsement, at the latest by August 2001, and conflicting national standards shall be withdrawn at the latest by August 2001.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this standard.

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

The "European Committee of Manufacturers of Compressors, Vacuum Pumps and Pneumatic Tools", PNEUROP, has given substantial contributions to this standard.

The standard has been created in close co-operation with CENELEC/TC 61F with the aim of achieving requirements for mechanical safety in the EN 50 144 series, which are similar for hand-held electric and non-electric power tools.

NOTE Other technical committees in CEN dealing with hand-held power tools have been asked to follow the safety requirements as in EN 792.

The annexes to this part of the standard are:

- Annex A (informative) Examples of power tools covered by this part
- Annex B (informative) Labels, signs and tags
- Annex C (informative) Examples of abrasive products used with die grinders
- Annex ZA (informative) Relationship of this European Standard with EU Directives.

0 Introduction **STANDARD PREVIEW**

This European standard is a type C standard as stated in EN 1070:1998.

The machinery concerned and the extent to which hazards, hazardous situations and events are covered are indicated in the scope of this standard.

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of other standards, for machines that have been designed and built according to the provisions of this type C standard.

EN 792 consists of a number of independent parts for individual types of hand-held non-electric power tools.

Other european standards deal with safety rules for hand-held power tools used in e. g. the following fields:

- agriculture and forestry such as chain saws, hedge-trimmers, brush cutters, grass trimmers;
- construction and building such as cutting-off power tools, concrete vibrators;
- food industry, such as fowl secateurs, sheep shears.

Endeavours have been made to achieve co-ordination with the relevant Technical Committees so that the safety requirements are compatible.

This standard is divided in the following parts:

- Part 1: Assembly power tools for non-threaded mechanical fasteners (former part 14)
- Part 2: Cutting-off and crimping power tools (former part 15)
- Part 3: Drills and tappers
- Part 4: Non-rotary percussive power tools
- Part 5: Rotary, percussive power drills
- Part 6: Assembly power tools for threaded fasteners
- Part 7: Grinders
- Part 8: Sanders and polishers
- Part 9: Die grinders
- Part 10: Compression power tools
- Part 11: Nibblers and shears
- Part 12: Small circular, small oscillating and reciprocating saws
- Part 13: Fastener driving tools

Certain parts of EN 792 cover hand-held non-electric power tools, driven by internal combustion engines powered by gaseous or liquid fuel. In these parts, the safety aspects relating to internal combustion engines are found in a normative annex.

The parts are type C standards and refer to pertinent European Standards of type A and B where such standards are applicable.

1 Scope

EN 792 applies to hand-held non-electric power tools driven by rotary or linear motors, powered by compressed air, hydraulic fluid and intended to be used by one operator and supported by:

- the operator's hand or hands;
- a suspension, e. g. a balancer.

This part of EN 792 applies to hand-held, non-electric power tools fitted with collets and used for grinding and surface finishing and chamfering using mounted points, burrs and files and small wire brushes mounted on shafts. This part lists the significant hazards caused by such power tools and specifies safety requirements valid for different aspects of safety during their foreseeable lifetime.

NOTE Grinders without collets for use with cones and plugs with threaded inserts are covered by EN 792-7.

Power tools covered by this part of the standard:

- angle die grinders;

- reciprocating files;
- rotary files;
- straight die grinders.

Special requirements and modifications on a hand-held power tool for the purpose of mounting it in a fixture are not covered by this part.

NOTE At the date of publication no die grinders driven by internal combustion engines are known.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to, applies (including amendments).

| | |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| EN 292-1:1991 | Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology |
| EN 292-2:1991 | Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles and specifications |
| EN 563 | Safety of machinery - Temperatures of touchable surfaces - Ergonomics data to establish temperature limit values for hot surfaces |
| EN 614-1 | Safety of machinery - Ergonomic design principles - Part 1: Terminology and general principles |
| EN 1070:1998 | Safety of machinery - Terminology |
| EN 1127-1 | Explosive atmospheres – Explosion prevention and protection – Part 1: Basic concepts and methodology |
| EN 12 096 | Mechanical vibration - Declaration and verification of vibration emission values |
| EN ISO 4871 | Acoustics - Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996) |
| EN ISO 8662-13 | Hand-held portable power tools - Measurement of vibration at the handle - Part 13: Die grinders (ISO 8662-13:1997) |
| EN ISO 14163 | Acoustics – Guidelines for noise control by silencers (ISO 14163:1998) |
| prEN ISO 15744:1999 | Hand held non-electric power tools – Noise measurement code - Engineering method (grade 2) (ISO/DIS 15744:1999) |
| EN 28662-1 | Hand-held portable power tools - Measurement of vibration at the handle - Part 1: General (ISO 8662-1:1988) |

ISO 3857-3:1989 Compressors, Pneumatic tools and machines, Vocabulary - Part 3: Pneumatic tools and machines.

ISO 5391:1988 Pneumatic tools and machines – Vocabulary

3 Terms and definitions

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

3.1 General terms and definitions

3.1.1

hand-held power tool:

machine driven by rotary or linear motors powered by compressed air, hydraulic fluid, gaseous or liquid fuel, electricity or stored energy (e.g. by a spring) to do mechanical work and so designed that the motor and the mechanism form an assembly that can easily be brought to its place of operation. The hand-held power tool is operated by one or two hands.

NOTE Hand-held power tools driven by compressed air or gas are called pneumatic tools. Hand-held power tools driven by hydraulic liquid are called hydraulic tools.

3.1.2

rotary power tool

hand-held power tool, the machine spindle of which rotates

3.1.3

inserted tool

tool inserted in the hand-held power tool to perform the intended work

3.1.4

service tool

tool intended for performing maintenance or service on the hand-held power tool

3.1.5

control device

device to start and stop the hand-held power tool or to change the direction of the rotation or to control the functional characteristics such as speed and power

3.1.6

maximum operating pressure

maximum pressure that a hand-held power tool may be operated at, as specified by the manufacturer

3.2 Terms and definitions related to die grinders

3.2.1

die grinder

rotary power tool intended for chamfering, deburring, and light cleaning operations and fitted with inserted tools mounted in collet chucks

NOTE A die grinder with a burr is often called a rotary file.

3.2.2

collet chuck

device for attaching the inserted tool by clamping the shank

3.2.3

machine spindle

rotating part of a die grinder, driving the collet chuck and consequently the inserted tool

3.2.4

rated speed, r/min

maximum rotational speed of the machine spindle, in revolutions per minute under operating conditions with the inserted tool mounted and at the upper limit of the energy supply, e.g. pressure or flow, as specified by the manufacturer

3.2.5

maximum operating speed

maximum peripheral speed of an abrasive product, given in m/s, as specified by the manufacturer of the abrasive product

3.2.6

reciprocating file

power tool with a rotary or reciprocating motor driving a file in a reciprocating motion

For other terms, see EN 1070:1998 and also ISO 3857-3:1989 and ISO 5391:1988.
For examples of die grinders see annex A.

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4 List of hazards

The following hazards can occur in the use of die grinders.

| Hazard type | Reference to safety requirement | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|---------------------------------|
| | By design or guarding | Information for use |
| 4.1 Mechanical hazards - cutting - drawing in or trapping (caused by hair, clothing etc. getting entangled in a rotating power tool) - friction or abrasion hazard - loss of stability - whipping hose - ejection from high pressure hydraulic systems - ejection of parts - hose and hose coupling specifications | 5.1.1 5.1.1 5.1.2 5.1.4 5.1.5 | 6.2.2 6.2.2 6.2.2 |
| 4.2 Electrical hazards | | 6.2.2 |
| 4.3 Thermal hazards - explosions - health damage due to hot or cold surfaces | 5.2 5.2 | 6.2.2 |
| 4.4 Hazards caused by noise | 5.3 | 6.2.2 |
| 4.5 Hazards generated by vibration | 5.4 | 6.2.2 |
| 4.6 Hazards generated by materials and substances processed, used or exhausted - inhalation of harmful dust - formation of explosive dust - sparks - exhaust air - lubricants - hydraulic fluid | 5.5.2 5.5.1 5.5.3 | 6.2.2 6.2.2 6.2.2 |
| 4.7 Hazards caused by neglecting ergonomic principles in machine design - repetitive strain injuries - unsuitable postures - inadequate grip design and tool balance - neglected use of personal protection equipment | 5.6.1, 5.6.3, 5.6.4, 5.6.1 | 6.2.2 6.2.2 |
| 4.8 Hazards caused by failure of energy supply - unexpected return of energy supply after a breakdown - incorrect hydraulic fluid flow and outlet pressure | | 6.2.2 6.2.2 |
| 4.9 Hazards caused by missing and/or incorrectly positioned safety related means - start and stop device - unintentional start | 5.7.1 5.7.2 | 6.2.2 |

5 Safety requirements and measures

5.1 Mechanical safety

5.1.1 Surfaces, edges and corners

Accessible parts of die grinders, except the insert tool, shall not have sharp edges or angles or rough or abrasive surfaces, see 3.1 of EN 292-2:1991.

5.1.2 Supporting surface and stability

Die grinders shall be so designed that they can be laid aside and remain in stable position on a plane surface.

5.1.3 Run-down time

The run-down time, after the stop command has been given, shall be as short as possible.

5.1.4 High pressure ejection

Hydraulic systems of the die grinder shall be enclosed so as to give protection against high pressure fluid ejection.

5.1.5 Speed control

The rated speed of the die grinder shall not be exceeded under the conditions marked on the power tool. It shall be possible to measure rotational speed by a tachometer.

At no load, the speed may exceed the rated speed by not more than 10% at rated input values.

5.1.6 Guards

Guards covering the inserted tool are not required.

5.2 Thermal safety

Surface temperatures of parts of the power tool which are held during use or could be inadvertently touched shall follow the provisions of EN 563.

NOTE The limit values for low temperatures are studied by CEN/TC 122.

Power tools for use in potentially explosive atmospheres should comply with EN 1127-1. However because the suitability of a power tool for use in potentially explosive atmospheres will depend not only on the power tool but the inserted tool and the work piece, it is not possible to give any detailed advice in this standard.

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