SLOVENSKI STANDARD
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Hand-held non-electric power tools - Safety requirements - Part 6: Assembly power tools for threaded fasteners

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Handgehaltene nicht-elektrisch betriebene Maschinen - Sicherheitsanforderungen - Teil 6: Maschinen für Schraubverbindungen

Machines portatives a moteur non électrique - Prescriptions de sécurité - Partie 6: Machines portatives d'assemblage pour éléments de fixation filetés

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Hand-held non-electric power tools - Safety requirements - Part 6: Assembly power tools for threaded fasteners

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This European Standard was approved by CEN on 26 May 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 Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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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of an identical text or by endorsement, at the latest by December 2000 and conflicting national standards shall be withdrawn at the latest by December 2000.

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 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.

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 ZA (informative) Clauses of this European Standard addressing essential requirements or other provisions of EU Directives.

This standard also contains a Bibliography.

0 Introduction

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

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

Other EN 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

The standard 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, EN 792-6, applies to hand-held, non-electric, power tools for tightening or installing of threaded fasteners. 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.

Power tools covered by this part of the standard:

- air-hydraulic impulse wrenches
- impact wrenches
- fastener installation tools
- nut runners
- open-ended spanners
- ratchet wrenches
- screwdrivers

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 assembly power tools for threaded fasteners 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 the publications referred to in this European Standard are valid only when they are incorporated in this standard 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	Safety of machinery - Terminology
EN 12096	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 15744:1999	Noise measurement code - hand held non-electric power tools – Engineering method (grade 2) (ISO/DIS 15744:1999)
EN 28662-1	Hand-held portable power tools - Measurement of vibrations at the handle - Part 1: General (ISO 8662-1:1988)
EN ISO 8662-7	Hand-held portable power tools - Measurement of vibrations at the handle - Part 7: Wrenches, screwdrivers and nut runners with impact, impulse or ratchet action (ISO 8662-7:1997)
ISO 3857-1	Compressors, pneumatic tools and machines - Vocabulary - Part 1: General
ISO 5391	Pneumatic tools and machines - Vocabulary
ISO 9158	Road vehicles - Nozzles spouts for unleaded fuel
ISO 9159	Road vehicles - Nozzles spouts for leaded gasoline and diesel fuel

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 assembly power tools for threaded fasteners

3.2.1 screwdriver: Rotary power tool, with a reversible or non-reversible spindle fitted with a screwdriver bit, for the purpose of tightening or loosening threaded fasteners, usually screws.

Screw drivers can be straight, pistol-grip or angle types, and may or may not have a clutch; these terms are defined by ISO 5391.

3.2.2 nutrunner: Rotary power tool, with a reversible or non-reversible spindle fitted with a drive adapter for the purpose of tightening or loosening nuts and bolts.

Nutrunners can be pistol-grip or angle drive types, and may or may not have a clutch. This category includes two-speed and crow-foot nut runners; these terms are defined by ISO 5391.

3.2.3 impact wrench: Rotary power tool, with a reversible spindle driving a hammer which periodically strikes an anvil which includes a drive adapter for the purpose of tightening or loosening nuts and bolts without producing any major torque reaction on the power tool.

Impact wrenches can be straight, pistol or angle drive types and may or may not be torque controlled; these terms are defined by ISO 5391.

3.2.4 air-hydraulic impulse wrench: Nutrunner where the torque for tightening or loosening threaded fasteners is obtained by a hydraulic impulse mechanism.

Air-hydraulic impulse wrenches have the same types as impact wrenches.

3.2.5 fastener installation tool: Screwdriver with a reverse mechanism and a threaded drive spindle for installing threaded captive fasteners; may be straight, pistol-grip or angle drive type.

3.2.6 open-ended spanner: Nutrunner or a ratched wrench with an open end socket

NOTE: In US the term "Tube wrench" is used.

3.2.7 reaction bar: Mechanical device for absorption of the reaction torque.

3.2.8 ratchet wrench: Angle drive wrench which progressively rotates a socket by means of ratchet and pawl coupling.

3.2.9 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.

For other terms, see EN 1070 and also ISO 3857-3 and ISO 5391. For examples of assembly power tools for threaded fasteners see annex A.

4 List of hazards

The following hazards can occur in the use of assembly power tools for threaded fasteners.

Hazard type	Reference to safety requirement	
	By design or guarding	Information for use
4.1 Mechanical hazards - crushing - 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	 5.7.1. 5.1.1 5.1.1 5.1.2 5.1.3	 6.2.2 6.2.2 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	
4.4 Hazards caused by noise	5.3	6.2.2
4.5 Hazards generated by vibration - hazards caused by the operator putting hands on the nut-running socket	5.4	6.2.2 6.2.2
4.6 Hazards generated by materials and substances processed, used or exhausted - exhaust air - lubricants - hydraulic fluid	 5.5.1 5.5.2	 6.2.2
4.7 Hazards caused by neglecting ergonomic principles - repetitive strain injuries - unsuitable postures - inadequate grip design and tool balance - effects of reaction forces upon operator - neglected use of personal protection equipment	 5.6.1, 5.6.3, 5.6.4 5.6.1 5.6.2	 6.2.2 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 - unintentional locking - start in unexpected direction	 5.7.1 5.7.2 5.7.3 5.7.4	 6.2.2

5 Safety requirements and measures

5.1 Mechanical safety

5.1.1 Surfaces, edges and corners

Accessible parts of assembly power tools for threaded fasteners, except the inserted 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

Assembly power tools for threaded fasteners shall be so designed that they can be laid aside and remain in stable position on a plane surface.

5.1.3 High pressure ejection

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

5.1.4 Guards

Guards covering the inserted tool are not required.

5.2 Thermal safety

Surface temperatures of parts of the power tools 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 workpiece, it is not possible to give any detailed advice in this standard.

5.3 Noise

5.3.1 General

The emission of noise from a hand-held power tool shall be kept as low as possible.

The noise emission from using hand-held power tools emanates from three main sources:

- the hand-held power tool itself
- the inserted tool
- the workpiece.

NOTE: Generally, the manufacturer has no possibility of influencing the noise emitted by the processed workpiece.