
Hand-held non-electric power tools - Safety requirements - Part 4: Non-rotary percussive power tools

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Handgehaltene nicht-elektrisch betriebene Maschinen - Sicherheitsanforderungen - Teil 4: Nicht drehende, schlagende Maschinen

Machines portatives a moteur non électrique - Prescriptions de sécurité - Partie 4: Machines portatives non rotatives a percussion

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4: Non-rotary percussive power tools**

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percussion

Handgehaltene nicht-elektrisch betriebene Maschinen -
Sicherheitsanforderungen - Teil 4: Nicht drehende,
schlagende Maschinen

This European Standard was approved by CEN on 26 May 2000.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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.

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

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CONTENTS	page
Foreword	3
0 Introduction	3
1 Scope	4
2 Normative references	5
3 Terms and definitions	6
3.1 General terms and definitions	6
3.2 Terms and definitions related to non-rotary percussive power tools	6
4 List of hazards	7
5 Safety requirements and measures	8
5.1 Mechanical safety	8
5.2 Thermal safety	8
5.3 Noise	8
5.4 Vibration	9
5.5 Materials and substances processed, used or exhausted	9
5.6 Ergonomics	9
5.7 Safety related measures and means	10
6 Information for use	10
6.1 Marking , signs and written warnings	10
6.2 Instruction for use	11
7 Verification	13
7.1 Noise	13
7.2 Vibration	13
7.3 Unintentional start	13
7.4 Structure of verification	14
Annex A (informative) Examples of non-rotary percussive power tools covered by this part	15
Annex B (informative) Symbols for labels and signs	16
Annex C (normative) Safety requirements related to the internal combustion engines	17
Annex ZA (informative) Clauses of this European Standard addressing essential requirements or other provisions of EU Directives	20
Bibliography	21

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 792-4, applies to non-electric power tools used for chipping, riveting, breaking of concrete and asphalt, ramming etc. 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:

- breakers
- chipping hammers
- chisels, small
- engraving pens
- needle scalers
- pick hammers
- pile drivers
- punches
- rammers
- riveting hammers
- scaling hammers
- stone working tools
- spades
- tampers.

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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.

For those power tools which are driven by an internal combustion engine the particular safety requirements related to the engine are dealt with in annex C.

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)
prEN 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 28662-5	Hand-held portable power tools - Measurement of vibrations at the handle Part 5: Pavement breakers and hammers for construction work (ISO 8662-5:1992)
EN ISO 8662-9	Hand-held portable power tools - Measurement of vibrations at the handle Part 9: Rammers (ISO 8662-9:1996)
ISO 3857-3	Compressors, pneumatic tools and machines - Vocabulary Part 3: Pneumatic tools and machines.
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 inserted tool: Tool inserted in the power tool to perform the intended work.

3.1.3 service tool: Tool intended for performing maintenance or service on the power tool.

3.1.4 control device: Device to start and stop the power tool or to change the direction of the rotation or to control the functional characteristics such as speed and power.

3.1.5 maximum operating pressure: Maximum pressure that the power tool is intended to be operated at, as specified by the manufacturer.

3.2 Terms and definitions related to non-rotary percussive power tools

3.2.1 non-rotary percussive power tool: Power tool, which delivers a series of percussive blows, without rotary action of the inserted tool.

For other terms, see EN 1070 and also ISO 3857-3 and ISO 5391.
For examples of non-rotary percussive power tools see annex A.

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4 List of hazards

The following hazards can occur in the use of non-rotary percussive power tools. For hazards that can occur in power tools driven by an internal combustion engine, see annex C.

Hazard type	Reference to safety requirement	
	By design or guarding	Information for use
4.1 Mechanical hazards <ul style="list-style-type: none"> - cutting - crushing - friction or abrasion hazard - ejection of parts - loss of stability - whipping hose - ejection from high pressure hydraulic systems - hose and hose coupling specifications 	5.1.1 5.1.1 5.1.3 5.1.2 5.1.4	6.2.2 6.2.2 6.2.2
4.2 Electrical hazards		6.2.2
4.3 Thermal hazards <ul style="list-style-type: none"> - 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	5.4	6.2.2
4.6 Hazards caused by materials and substances processed, used or exhausted <ul style="list-style-type: none"> -inhalation of harmful dust - exhaust air and gases - lubricants - hydraulic fluids 	5.5.1 5.5.1 5.5.2	6.2.2 6.2.2 6.2.2
4.7 Hazards caused by neglecting ergonomic principles <ul style="list-style-type: none"> - repetitive strain injuries - unsuitable postures - inadequate grip design and tool balance - neglected use of personal protective equipment 	5.6.1, 5.6.2 5.6.1	6.2.2 6.2.2
4.8 Hazards caused by failure of energy <ul style="list-style-type: none"> - 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 <ul style="list-style-type: none"> - start and stop device - unintentional start 	5.7.1 5.7.2	

5 Safety requirements and measures

5.1 Mechanical safety

5.1.1 Surfaces, edges and corners

Accessible parts of non-rotary percussive power tools, 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

Non-rotary percussive power tools shall be so designed that they can be laid aside and remain in stable position on a plane surface.

5.1.3 Ejection of parts

Non-rotary percussive power tools shall be equipped with a retainer to prevent ejection or falling out of the inserted tool.

5.1.4 High pressure ejection

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

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 1: 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.

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5.3 Noise

5.3.1 General

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

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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.

5.3.2 Noise emitted by the hand-held power tool

The noise emitted by the hand-held power tool itself can be divided into:

- noise from the motor
- noise from exhaust air or gases at pneumatic tools
- vibration induced noise.

The noise from the exhaust of air and gases is one major contributor of noise from pneumatic driven hand-held power tools. A silencer of good design will reduce this noise. The principles contained in EN ISO 11688-1 should be followed to reduce the noise emitted by the power tool.

NOTE: The exhaust air or gases can also be piped away in a hose away from the operator, however this method has limitations in practice.

Vibration induced noise can be reduced by use of acoustic isolation and vibration damping.

5.4 Vibration

Vibration at the handle of a hand-held power tool shall be kept as low as possible. The principles contained in CR 1030-1 should be followed to reduce the vibration emitted by the power tool.

5.5 Materials and substances processed, used or exhausted

5.5.1 Exhaust air or gas

For non-rotary percussive power tools driven with compressed air or gas or by an internal combustion engine the exhaust air or gases shall be directed in such a way that it cannot cause a hazard to the operator and so that any secondary effects are minimized. e.g. blowing the dust and reflected air or gas from the workpiece onto the operator.

5.5.2 Lubricants

Lubricants for non-rotary percussive power tools, specified by the manufacturer, shall not cause hazards to the operator or the environment.

5.6 Ergonomics

5.6.1 Design of the handle

SIST EN 792-4:2000

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Handles and other parts used for gripping the power tools shall be designed to ensure that the operator is able to grip the non-rotary percussive power tool correctly and to perform the expected work. Handles shall suit the functional anatomy of the hand and the dimensions of the hands of the operator population. See 3.6 of EN 292-2:1991 and EN 614-1.

Power tools having a mass greater than 2 kg (including the inserted tool) shall be capable of being supported by two hands whilst being lifted or operated.