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Safety of hand-held electric motor operated tools - Part 2-2: Particular requirements for screwdrivers and impact wrenches

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Sicherheit handgeführter motorbetriebenen Elektrowerkzeugen -- Teil 2-2: Besondere Anforderungen für Schrauber und Schlagschrauber

Sécurité des outils électroportatifs à moteur -- Partie 2-2: Règles particulières pour les visseuses et visseuses à percussion

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Safety of hand-held electric motor operated tools
Part 2-2: Particular requirements for screwdrivers and impact wrenches

Sécurité des outils électroportatifs à moteur
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This European Standard was approved by CENELEC on 1998-04-01. CENELEC 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 CENELEC 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 CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

This European Standard has been prepared by Technical Committee TC 61F, Hand-held and transportable electric motor operated tools. The text of the draft was submitted to the Unique Acceptance Procedure (UAP) in December 1993 and was approved by CENELEC as EN 50144-2-2 on 1994-10-04.

A draft for an amendment was submitted to UAP in April 1994 and was approved by CENELEC on 1994-10-04 for inclusion into the European Standard.

Amendments to fulfill the essential requirements of the Machinery Directive were submitted to the formal vote in October 1997 and were approved by CENELEC on 1998-04-01 for inclusion into a second edition of EN 50144-2-2.

This European Standard supersedes EN 50144-2-2:1995 and its corrigendum March 1996.

The following dates were fixed:

- latest date by which the EN has to be implemented at a national level by publication of an identical national standard or by endorsement (dop) 2000-06-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2001-12-01

This standard is divided into two parts:

Part 1: General requirements which are common to most hand-held electric motor operated tools (for the purpose of this standard referred to simply as tools).

Part 2: Requirements for particular types of tool which either supplement or modify the requirements given in Part 1 to account for the particular hazards and characteristics of these specific tools.

This European Standard has been prepared under a mandate given to CEN/CENELEC by the European Commission and the European Free Trade Association and supports the essential health and safety requirements of the Machinery Directive.

Compliance with the clauses of Part 1 together with this Part 2 provides one means of conforming with the essential health and safety requirements of the Directive.

For noise and vibration this standard covers the requirements for their measurement, the provision of information arising from these measurements and the provision of information about the personal protective equipment required. Specific requirements for the reduction of the risk arising from noise and vibration through the design of the tool are not given as this reflects the current state of the art.
As with any standard, technical progress will be kept under review so that any developments can be taken into account.

CEN TC/255 is producing standards for non electrically driven screwdrivers and impact wrenches.

Warning: Other requirements and other EC Directives can be applicable to the products falling within the scope of this standard.

This standard follows the overall requirements of EN 292-1 and EN 292-2.

Subclauses and figures which are additional to those in Part 1 are numbered starting from 101.

NOTE In this European Standard the following print types are used:
- Requirements proper;
- *Test specifications;*
- Explanatory matter.

Contents

1 Scope

This clause of Part 1 is applicable except as follows:

1.1 *Addition:*

This European Standard applies to screwdrivers and impact wrenches.

This standard does not give requirements for the design of the tool for the reduction of the risk arising from noise and vibration.

2 Definitions

This clause of Part 1 is applicable except as follows:

2.2.18 *Replacement:*

2.2.18 **normal load:** The load obtained when the tool is operated intermittently, each cycle comprising a period of operation of 10 min and a rest period of 10 min with the tool switched off, the load during the periods of operation being such that the input, in watts, is equal to:

$$P_0 + 0{,}3\,P_1 \quad \text{for impact wrenches,}$$

$$P_0 \times \frac{300 \times \left(1 + \frac{P_2}{P_0}\right) + 1{,}3 \times (n_0 + n_2)}{550 + n_0 + n_2} \quad \text{for screwdrivers}$$

where:

P_0: is the input, in watts, under no load conditions, measured after the tool has been operating for a period of 30 min with no load,

P_1: is the input, in watts, measured when the clutch, adjusted at maximum torque, is slipping or when the impact gear operates; if no clutch is provided, P_1 is 0,7 times the input, in watts, measured under locked-rotor conditions,

P_2: is the input, in watts, measured immediately before the clutch slips when the load is applied gradually, the clutch being adjusted at maximum torque; if no clutch is provided or if the clutch is not adjustable or does not slip, P_2 is 0,7 times the input, in watts, measured under locked-rotor conditions,

n_0: is the speed, in revolutions per minute, of the spindle, after the tool has been operating for a period of 30 min with no load,

n_2: is the speed, in revolutions per minute, of the spindle, corresponding with P_2.

Inputs and speeds are those obtained at rated voltage or at the upper limit of the rated voltage range.

3 General requirements

This clause of Part 1 is applicable.

4 General conditions for the tests

This clause of Part 1 is applicable.

5 Rating

This clause of Part 1 is applicable.

6 Classification

This clause of Part 1 is applicable.

7 Marking and information for use

This clause of Part 1 is applicable except as follows:

7.13 *Additional subclause:*

7.13.101 The instruction sheet shall also include the following: "Hearing protection should be worn when operating impact wrenches".

8 Protection against electric shock

This clause of Part 1 is applicable.

9 Starting

This clause of Part 1 is applicable.

10 Input and current

This clause of Part 1 is applicable except as follows:

10.1 *Replacement:*

Compliance is checked by measuring the input after the tool has been operating for a period of 30 min, at rated voltage or at the upper limit of the rated voltage range, under normal load.

11 Heating

This clause of Part 1 is applicable except as follows:

11.5 *Replacement:*

Temperature rises are determined at the end of the sixth period of operation.

12 Leakage current

This clause of Part 1 is applicable.

13 Environmental requirements

This clause of Part 1 is applicable except as follows:

13.2.3 *Replacement of paragraphs 1, 2 and 3:*

Screwdrivers are tested at no load.

Impact wrenches are tested under load using the loading device shown in Figure 101 which is supported on resilient material and mounted on the bench. The details of the loading device are shown in Figure 102.

For the test the speed is adjusted to 45 r/min ± 5 r/min by means of nut number 12 on the loading device. The feed force should be just sufficient to obtain stable operation.

Each test shall be no more than 10 seconds duration.

13.2.4 *Addition:*

For screwdrivers the bit holder shall be horizontal.

13.3.3 *Replacement of paragraph 1:*

Measurements shall be made in the direction of the reaction torque.

13.3.7 *Replacement of paragraph 1:*

Screwdrivers and impact wrenches are tested under the conditions specified in 13.2.3.

Paragraph 3 is not applicable.

14 Moisture resistance

This clause of Part 1 is applicable.

15 Insulation resistance and electric strength

This clause of Part 1 is applicable.

16 Endurance

This clause of Part 1 is applicable except as follows:

16.2 *Replacement:*

The tool is operated under normal load, at rated voltage or at the upper limit of the rated voltage range, for four periods of 6 h each, the interval between these periods being at least 30 min.

The tool may be switched on and off by means of a switch other than that incorporated in the tool.

In order to prevent abnormal accumulation of carbon dust in any particular place during the test the tool shall be placed in three different positions, the operating time at each position being approximately 8 h. The three positions are horizontal, vertically up and vertically down.

During the test, replacement of carbon brushes is allowed and the tool is oiled and greased as in normal use.

If the temperature rise of any part of the tool exceeds the temperature rise determined during the test of 11.1, forced cooling or rest periods are applied, the rest periods being excluded from the specified operating time.

17 Abnormal operation

This clause of Part 1 is applicable.

18 Mechanical hazards

This clause of Part 1 is applicable.

19 Mechanical strength

This clause of Part 1 is applicable.

20 Construction

This clause of Part 1 is applicable.

21 Components

This clause of Part 1 is applicable.

22 Internal wiring

This clause of Part 1 is applicable.

23 Supply connection and external flexible cables and cords

This clause of Part 1 is applicable except as follows:

23.2 *Replacement* (for impact wrenches):

For impact wrenches non-detachable flexible cables or cords shall not be lighter than heavy polychloroprene sheathed flexible cable (Code designation H07 RN-F).

24 Terminals for external conductors

This clause of Part 1 is applicable.

25 Provision for earthing

This clause of Part 1 is applicable.

26 Screws and connections

This clause of Part 1 is applicable.

27 Creepage distances, clearances and distances through insulation

This clause of Part 1 is applicable.

28 Resistance to heat, fire and tracking

This clause of Part 1 is applicable.

29 Resistance to rusting

This clause of Part 1 is applicable.

30 Radiation

This clause of Part 1 is applicable.