SLOVENSKI STANDARD
SIST HD 400.2C S1:1995

01-marec-1995

Hand held motor operated tools - Part 2: Particular specifications - Section C: Grinders, polishers and disc type sanders

Hand-held motor operated tools -- Part II: Particular specifications -- Section C: Grinders, polishers and disc-type sanders

Handgeführte Elektrowerkzeuge -- Teil II: Besondere Bestimmungen -- Hauptabschnitt C: Schleifer, Polierer, Tellerschleifer

Outils portatifs à main à moteur -- Partie II: Règles particulières -- Section C: Meuleuses, lustreuses et ponceuses du type à disque

Ta slovenski standard je istoveten z: **HD 400.2C S1:1980/A1:1991**

ICS:

25.080.50	Brusilni in polirni stroji	Grinding and polishing machines
25.140.20	Električna orodja	Electric tools

SIST HD 400.2C S1:1995 **en**

HARMONIZATION DOCUMENT
DOCUMENT D'HARMONISATION
HARMONISIERUNGSDOKUMENT

HD 400.2
Edition 1
December 1979
Date of approval: 1980-04-24

UDC : 621.9-182.4-83..621.313.13

Key words : Hand-held motor operated tools - particular safety requirements on safety - drills - screwdrivers - impact wrenches - grinders - polishers - disc-type sanders - sanders - circular saws - circular knives - hammers - spray guns

English version

HAND-HELD MOTOR OPERATED TOOLS - PART II: PARTICULAR SPECIFICATIONS:

OUTILS PORTATIFS A MAIN A MOTEUR - PARTIE II: REGLES PARTICULIERES:

HANDGEFÜHRTE ELEKTROWERKZEUGE - TEIL II: BESONDERE BESTIMMUNGEN:

Section A DRILLS
Section B SCREWDRIVERS AND IMPACT WRENCHES
Section C GRINDERS, POLISHERS AND DISC-TYPE SANDERS
Section D SANDERS
Section E CIRCULAR SAWS AND CIRCULAR KNIVES
Section F HAMMERS
Section G SPRAY GUNS

==========

C E N E L E C

==========

EUROPEAN COMMITTEE FOR ELECTROTECHNICAL STANDARDIZATION
COMITE EUROPEEN DE NORMALISATION ELEOTROTECHNIQUE
EUROPÄISCHES KOMITEE FÜR ELEKTROTECHNISCHE NORMUNG

GENERAL SECRETARIAT : 2, Rue Bréderode, Boîte no 5
1000 BRUSSELS

INDEX

Foreword

Endorsement Notice

A. DRILLS
1. Scope
2. Definitions
4. General notes on tests
7. Marking
11. Heating
16. Endurance
18. Mechanical hazards
20. Construction

B. SCREWDRIVERS AND IMPACT WRENCHES
2. Definitions
6. Classification
7. Marking
10. Input and current
11. Heating
16. Endurance
20. Construction
23. Supply connection and external flexible cables and cords

C. GRINDERS, POLISHERS AND DISC-TYPE SANDERS
2. Definitions
7. Marking
11. Heating
18. Mechanical hazards
20. Construction
23. Supply connection and external flexible cables and cords

D. SANDERS
1. Scope
2. Definitions
7. Marking
16. Endurance
19. Mechanical strength

E. CIRCULAR SAWS AND CIRCULAR KNIVES
2. Definitions
7. Marking
11. Heating
18. Mechanical hazards
19. Mechanical strength
20. Construction

F. HAMMERS
2. Definitions
11. Heating
16. Endurance
19. Mechanical strength
20. Construction
23. Supply connection and external flexible cables and cords
24. Terminals for external conductors

G. SPRAY GUNS
1. Scope
2. Definitions
7. Marking
9. Starting
16. Endurance
19. Mechanical strength
20. Construction
21. Components
27. Creepage distances, clearances and distances through insulation

FIGURES

A 1 Apparatus for testing impact drills and hammers

E 1 Method of measurement of maximum opening angle for circular saws and circular knives

Addendum Temporary national deviations from HD 400.2

FOREWORD

This Harmonization Document has been prepared by the Secretariat of CENELEC Technical Committee 313 in accordance with the decisions taken by this committee during its meetings held in October 1977 in Baden/Vienna and in November 1978 in Stockholm.

This Harmonization Document is based on CEE Publication 20, Part II, Sections A to G, second edition, 1977. The reasons for the common modifications to this publication are mentioned in the last column of the Endorsement Notice, in accordance with the CENELEC Internal Regulations.

Note 1. The contents of this Harmonization Document will be re-examined as soon as new amendments to CEE Publication 20, Part II, Sections A to G, have been published.

Note 2. For components used in hand-held motor operated tools, reference is made to CENELEC Harmonization Documents or, in the absence of such documents, to other international standards. Only in so far as these standards are harmonized by CENELEC, the requirements for components will be identical.

Note 3. Temporary national deviations from this Harmonization Document are mentioned in an addendum to this document which does not form part of this Harmonization Document and has the status of a CENELEC report. It is published separately.

These sections A - G of Part II in HD 400.2 have to be used together with Part I in HD 400.1.

The clauses of these sections supplement or modify the corresponding clauses in Part I. Where there is no corresponding clause or sub-clause in these sections, the clause or sub-clause of Part I applies without modification as far as is reasonable. Where the text of these sections states "addition", "modification" or "replacement", the relevant requirement, test specification or explanation of Part I should be adapted accordingly.

ENDORSEMENT NOTICE

CEE Publication 20, Part II, Sections A to G, second edition, 1977, applies, except for the following common modifications:

SECTION CLAUSE	MODIFICATION	REASON
A DRILLS	No deviation	
B SCREWDRIVERS AND IMPACT WRENCHES		
23	CENELEC specifies for impact wrenches a harmonized cable not lighter than HO7 RN-F.	CLC TC 313 found it technically correct that the type of cable be in relation to the stresses to be expecte in normal use.
C GRINDERS, POLISHERS AND DISC-TYPE SANDERS		
18.2	CENELEC amend this sub-clause by a note stating that this requirement does not apply to cup-type brushes and to disc-type sanders for use with abrasive papers.	Technical improvement
23.2	CENELEC specifies for - angle grinders with wheel diameters exceeding 150 mm, - straight grinders with wheel diameters exceeding 130 mm, and - all grinders with water supply a harmonized cable not lighter than HO7 RN-F.	Adaptation to EN 68 As stated for Section
D SANDERS	No deviation	
E CIRCULAR SAWS AND CIRCULAR KNIVES		
18.2	As an amendment CENELEC HD includes a figure showing the measuring method for the opening angle between the fixed and the movable guards.	Improvement with a vie to attaining a uniform testing practice.
F HAMMERS		
23.2	CENELEC specifies a harmonized cable not lighter than HO7 RN-F.	As stated for Section B.
G SPRAY GUNS		
Scope	CENELEC provisionally limits the scope of this section to spray guns for handling non-flammable sprays. Consequently, CEE Sub-clauses 7.13 and 20.23 are to be eliminated too.	Provisional limitatio of scope until harmonized rules for handling flammable or explosive substances are available.

SECTION A

DRILLS

1. SCOPE

1.1 Addition:
Impact drills are within the scope of this section.

2. DEFINITIONS

2.2 MODIFICATION:
18. NORMAL LOAD DENOTES THE LOAD OBTAINED WHEN THE DRILL, PLACED IN THE HORIZONTAL POSITION, IS OPERATED CONTINUOUSLY, THE TORQUE APPLIED TO THE SPINDLE BEING SUCH THAT THE OUTPUT, IN WATTS, IS EQUAL TO 15D, WHERE D IS:

FOR DRILLS DELIVERED WITH A CHUCK, THE MAXIMUM DIAMETER, IN MILLIMETRES, OF THE BIT MARKED ON THE CHUCK,

FOR OTHER DRILLS, THE MAXIMUM DIAMETER, IN MILLIMETRES, OF THE BIT FOR DRILLING IN STEEL MARKED ON THE DRILL.

4. GENERAL NOTES ON TESTS

4.8 **Modification:**
In the case of drills having electronic shifting devices allowing the setting of different speed ranges the test is made at the maximum speed setting of the lowest speed range. If there is, in addition to an electronic speed shifting device, a gear allowing mechanical speed shifting, the gear is set for the lowest speed.

7. MARKING

7.1 MODIFICATION:
DRILLS SHALL BE MARKED WITH:
RATED NO-LOAD SPEED IN REVOLUTIONS PER MINUTE, IF EXCEEDING 10 000, PRECEDED BY THE SYMBOL n_o.

ADDITIONS:
DRILLS SHALL BE MARKED WITH:
MAXIMUM DIAMETER, IN MILLIMETRES, OF THE BIT FOR DRILLING IN STEEL HAVING A TENSILE STRENGTH OF 390 N/mm2.

IF THE DRILL IS MARKED WITH THE SPEED AT NORMAL LOAD, THE VALUE OF THE SPEED SHALL BE PRECEDED BY THE LETTER n.

Addition:
The marking for rated no-load speed and for speed at normal load may accordingly be as follows:

n_o 12 000/min or n_o 12 000/min
n 9000/min or

n_o 12 000/min
n 2000/4500/9000/min

7.6 **ADDITION:**
SPEED AT NORMAL LOAD ..... n
RATED NO-LOAD SPEED..... n_o .

11. HEATING

11.1 Modifications:
The drill is operated continuously, the torque applied to the spindle being such that the output, in watts, is equal to 12D, where D is:
for drills delivered with a chuck, the maximum diameter, in millimetres, of the bit for drilling in steel marked on the chuck,
for other drills, the maximum diameter, in millimetres, of the bit for drilling in steel marked on the drill.

If, however, the rated input exceeds the input measured during the test of sub-clause 10.1, the test is made with a torque equal to 0.8 times the torque necessary to attain rated input. The voltage is then adjusted to the value specified, the torque being kept constant while the voltage is adjusted.

16. ENDURANCE

16.2 Modification:
Impact drills are operated continuously with no load and, if the impact mechanism can be engaged and disengaged at will, with the impact mechanism not engaged, for 12 h, at a voltage equal to 1.1 times rated voltage and then for 12 h at a voltage equal to 0.9 times rated voltage. The speed is adjusted to the highest value of the highest range.
The drill is then mounted, in the vertical position, in an apparatus as shown in figure A 1, and is operated at rated voltage or at the mean value of the rated voltage range, for four periods of 6 h each, the interval between these periods being at least 30 min and, if the impact mechanism can be engaged and disengaged at will, with the impact mechanism engaged.

During these periods, the drill is operated intermittently, each cycle comprising a period of operation of 30 s and a rest period of 90 s with the drill switched off.

Addition:
During the test in the apparatus, an axial force just sufficient to ensure steady operation of the impact mechanism is applied to the drill through a resilient medium.

18. MECHANICAL HAZARDS

ADDITION:
18.2 CHUCK KEYS SHALL BE SO DESIGNED THAT THEY DROP EASILY OUT OF POSITION WHEN RELEASED; THEY SHALL NOT BE FIXED TO THE DRILL BY MEANS OF A CHAIN, A STRING OR SIMILAR MEANS.

Compliance is checked by inspection and by manual test.

This requirement does not exclude the provision of clips for holding the key in place when not in use; metal clips fixed to the flexible cable or cord are, however, not allowed.

20. CONSTRUCTION

20.11 Additions:
For drills which must be held in normal use by two persons and for which it is manifestly impracticable to incorporate the mains switch in the handle, the switch may be so positioned that one hand is to be freed from the handle to operate its actuating member.
An example of a drill for which it may be manifestly impracticable to incorporate the mains switch in the handle is a three-phase Class III drill.

20.21 Modification:
Additional interference suppressors may also be incorporated in the flexible cable or cord.

ADDITION:
20.22 DRILLS WHICH CAN BE FITTED WITH BITS HAVING A DIAMETER EXCEEDING 16 mm, SHALL BE PROVIDED WITH TWO SIDE HANDLES OR SHALL HAVE PROVISION FOR FITTING A SIDE HANDLE IN ADDITION TO THE NORMAL HANDLE.

Compliance is checked by inspection.

More detailed requirements are under consideration.

SECTION B

SCREWDRIVERS AND IMPACT WRENCHES

2. DEFINITIONS

2.2 MODIFICATION:

18. NORMAL LOAD DENOTES, FOR A.C. TOOLS, 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:

$P_o + 0.3\ P_1$ ..... FOR SCREWDRIVERS MARKED WITH THE SYMBOL Ⓜ AND FOR IMPACT WRENCHES,

$$P_o \frac{300\ (1 + \frac{P_2}{P_o}) + 1.3\ (n_o + n_2)}{550 + n_o + n_2}$$ ..... FOR OTHER SCREWDRIVERS,

WHERE:

P_o 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_o 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.

Additions:

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

Note:

A definition for normal load for d.c. tools is under consideration.

6. CLASSIFICATION

6.1 ADDITION:

SCREWDRIVERS ARE CLASSIFIED:

4. ACCORDING TO PURPOSE:

SCREWDRIVERS FOR SCREWING INTO METAL ONLY,
SCREWDRIVERS FOR SCREWING INTO WOOD AND METAL.

7. MARKING

7.1 ADDITION:

SCREWDRIVERS FOR SCREWING INTO METAL ONLY SHALL BE MARKED WITH:

SYMBOL INDICATING THEIR PURPOSE.

7.6 ADDITION:

SYMBOL INDICATING THE PURPOSE OF SCREWDRIVERS FOR SCREWING INTO METAL ONLY ..... Ⓜ.

10. INPUT AND CURRENT December 1979

10.1 Modification:
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

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

16. ENDURANCE

16.2 Modification:
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.

20. CONSTRUCTION

20.21 Modification:
Additional interference suppressors may also be incorporated in the flexible cable or cord.

23. SUPPLY CONNECTION AND EXTERNAL FLEXIBLE CABLES AND CORDS

23.2 Modification:

For impact wrenches non-detachable flexible cables or cords shall not be lighter than ordinary polychloroprene sheathed flexible cable (Code designation HO 7 RN-F).

SECTION C

GRINDERS, POLISHERS AND DISC-TYPE SANDERS

2. DEFINITIONS

2.2 MODIFICATION:

18. NORMAL LOAD DENOTES THE LOAD OBTAINED WHEN THE TOOL IS OPERATED CONTINUOUSLY FOR A PERIOD OF 30 min, THE TORQUE APPLIED TO THE SPINDLE BEING:

$1.5\ D^{1.5}\ L.10^{-5}$ N m ..... FOR PERIPHERAL GRINDERS AND PERIPHERAL POLISHERS WITH A WHEEL DIAMETER NOT EXCEEDING 55 mm IN THE NEW CONDITION,

$2.5\ D^{1.5}\ L.10^{-5}$ N m ..... FOR OTHER PERIPHERAL GRINDERS AND PERIPHERAL POLISHERS,

$1.3\ D^{3}.10^{-7}$ N m ..... FOR FACIAL GRINDERS, FACIAL POLISHERS AND DISC-TYPE SANDERS,

$1.5\ D^{1.5}.10^{-4}$ N m ..... FOR VALVE-SEAT GRINDERS,

WHERE D IS THE DIAMETER, IN MILLIMETRES, OF THE GRINDING WHEEL OR DISC, AND L THE WIDTH, IN MILLIMETRES, OF THE GRINDING OR POLISHING WHEEL IN THE NEW CONDITION.

ADDITION:

29. DISC-TYPE SANDER DENOTES AN ABRADING TOOL IN WHICH THE ABRASIVE MATERIAL IS FIXED TO THE SURFACE OF A ROTATING DISC.

7. MARKING

7.1 ADDITIONS:

GRINDERS, POLISHERS AND DISC-TYPE SANDERS SHALL BE MARKED WITH:

RATED NO-LOAD SPEED IN REVOLUTIONS PER MINUTE,
INDICATION OF DIRECTION OF ROTATION.

TOOLS DESIGNED FOR OPERATION AT MORE THAN ONE SPEED SHALL BE MARKED WITH THE RATED NO-LOAD SPEED FOR EACH OF THE SPEED SETTINGS IN SUCH A WAY THAT IT IS CLEAR WHICH SPEED CORRESPONDS WITH EACH OF THE SETTINGS.

This is in agreement with EN 68, Clause 11.

MOREOVER, THE DIRECTION OF ROTATION OF THE WHEEL OR DISC SHALL BE CLEARLY INDICATED BY AN ARROW, RAISED OR SUNK, OR BY ANY OTHER MEANS NO LESS VISIBLE AND INDELIBLE.

7.13 ADDITION:

GRINDERS WITH WATER SUPPLY, OTHER THAN THOSE OF CLASS III, SHALL BE ACCOMPANIED BY AN INSTRUCTION SHEET STATING THAT THE GRINDER MUST BE SUPPLIED FROM AN ISOLATING TRANSFORMER AND INDICATING THE TYPE OF TRANSFORMER TO BE USED.

11. HEATING

11.1 Modification:

The tool is operated for a period equal to the rated operating time or, in the absence of the relevant marking, for 30 min, the torque applied to the spindle being equal to that specified for normal load or to that corresponding with the load necessary to attain rated input, whichever is the higher.

18. MECHANICAL HAZARDS

ADDITIONS:

18.2 TOOLS DESIGNED FOR OPERATION WITH ABRASIVE DISCS, SCRATCH BRUSHES OR THE LIKE, SHALL BE PROVIDED WITH A FIXED GUARD HAVING SUFFICIENT MECHANICAL STRENGTH TO PREVENT PARTS OF THE DISC OR BRUSH BEING THROWN OUT IN THE EVENT OF BREAKAGE. THE OPENING IN THE GUARD SHALL NOT BE LARGER THAN NECESSARY FOR THE INTENDED USE OF THE TOOL.

This requirement does not apply to cup-type brushes and to disc-type sanders for use with abrasive papers.

Compliance with this requirement is checked in conjunction with test requirements as laid down in EN 68, Clause 9.