IEC 62841-4-1

Edition 1.0 2024-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 1
AMENDEMENT 1

Electric motor-operated hand-held tools, transportable tools and lawn and garden machinery – Safety – Part 4-1: Particular requirements for chain saws

Outils électroportatifs à moteur, outils portables et machines pour jardins et pelouses – Sécurité – Partie 4-1: Exigences particulières pour les scies à chaîne

IEC 62841-4-1:2017-10/AMD1:2024-10(en-fr)

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ELECTRIC MOTOR-OPERATED HAND-HELD TOOLS, TRANSPORTABLE TOOLS AND LAWN AND GARDEN MACHINERY – SAFETY –

Part 4-1: Particular requirements for chain saws

AMENDMENT 1

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Amendment 1 to IEC 62841-4-1:2017 has been prepared by IEC technical committee 116: Safety of motor-operated electric tools.

The text of this Amendment is based on the following documents:

Draft	Report on voting
116/816/FDIS	116/837/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Amendment is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications/.

A list of all parts of the IEC 62841 series, under the general title: *Electric motor-operated hand-held tools, transportable tools and lawn and garden machinery – Safety*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

NOTE The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 36 months from the date of publication.

2 Normative references

Replace the existing reference ISO 6533:2012 *with the following new reference:*

ISO 6533:2020, *Forestry machinery – Portable chain-saw front hand-guard – Dimensions and clearances*

Replace the existing reference ISO 7915:1991 *with the following new reference:*

ISO 7915:2021, *Forestry machinery – Portable chain-saws – Determination of handle strength*

Replace the existing reference ISO 9518 *with the following new reference:*

ISO 9518:2018, *Forestry machinery – Portable chain-saws – Kickback test*

Add the following new references:

IEC 60664-3:2016, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

ISO 37:2017, *Rubber, vulcanized or thermoplastic – Determination of tensile stress-strain properties*

3 Terms and definitions

3.111
maximum speed

Replace the existing definition with the following new text:

highest steady-state **saw chain** speed attainable under all conditions of **normal use**, including no-load, when adjusted in accordance with the manufacturer's specifications and/or instructions

Note 101 to entry: The steady-state **saw chain** speed excludes transients such as overshoot that can occur before attaining a steady-state condition.

5 General conditions for the tests

Delete Subclause 5.14.

Add the following new subclause:

5.15 *Addition:*

*For tests carried out at any percentage of **rated input** or **rated current**, except for no-load, the **saw chain** and the **guide bar** may be removed and the **chain saw** loaded by means of a brake.*

7 Classification

Replace the existing text with the following new text:

This clause of Part 1 is applicable, except as follows:

7.2 *Replacement:*

Chain saws shall not be classified with a degree of protection against harmful ingress of water higher than IPX0 according to IEC 60529:1989, IEC 60529:1989/AMD1:1999 and IEC 60529:1989/AMD2:2013.

Compliance is checked by inspection.

8 Marking and instructions

Add the following new subclauses:

8.1 *Replacement:*

Chain saws shall be marked with rating information as follows:

– **rated voltage**(**s**) or **rated voltage range**, in volts. Machines for star-delta connection shall be clearly marked with the two **rated voltages** (for example 230 Δ/ 400 Y). A machine that complies with this standard for a voltage range, may also be marked with any single voltage or smaller voltage range within that range;

– symbol for nature of supply, unless the **rated frequency**(**ies**) or **rated frequency range** is marked. The symbol for nature of supply shall be placed next to the marking for **rated voltage**;

– **rated input**, in watts or **rated current**, in amperes. The **rated input** or **rated current** to be marked on the machine is the total maximum input or current that can be drawn from external circuit at the same time. If a machine has alternative components which can be selected by a **control device**, the **rated input** or **rated current** is that corresponding to the highest loading possible;

– symbol for **class II construction**, for **class II tools** (machines) only.

8.1.101 **Chain saws** shall not be marked with an IP rating for the degree of protection against harmful ingress of water higher than IPX0 in accordance with IEC 60529:1989, IEC 60529:1989/AMD1:1999 and IEC 60529:1989/AMD2:2013. **Chain saws** may be marked with an IP rating for the degree of protection against solid foreign objects and access to hazardous parts in accordance with IEC 60529:1989, IEC 60529:1989/AMD1:1999 and IEC 60529:1989/AMD2:2013.

Compliance is checked by inspection.

8.2 *Replace the existing text of the third dash with the following new text:*

– "Do not expose to rain" or the safety sign specified in Annex AA.

14 Moisture resistance

Add, after Clause 14, the following new subclause:

14.2 This subclause of Part 1 is not applicable.

Replace the existing text of 14.2.1 with the following new text:

14.2.1 This subclause of Part 1 is not applicable.

Add the following new subclause:

14.2.2 This subclause of Part 1 is not applicable.

14.3 *Replace the existing text of 14.3 with the following new text:*

14.3 to **14.5** These subclauses of Part 1 are not applicable for **saw chain** lubrication tanks and lubrication systems intended for use with oil as specified in 8.14.2.

18 Abnormal operation

Add, after 18.5, the following new subclause:

18.6.1 *Addition:*

*Components intended to discharge capacitors to comply with 21.21 and K.21.21 are only subjected to the fault conditions a) to f) whilst connected to the mains or **battery**, as applicable, and no evaluation for compliance is conducted whilst disconnected from the mains or **battery**, as applicable.*

Table 4 – Required performance levels

Replace the existing table with the following new table:

Table 4 – Required performance levels

Type and purpose of SCF	Minimum Performance Level (PL)
Power switch – prevent unwanted switch-on	c
Power switch – provide desired switch-off	c
Provide desired direction of rotation for **cutting lengths** ≤ 300 mm	a
Provide desired direction of rotation for **cutting lengths** > 300 mm	b
Starting current limitation as in 10.2	Not an **SCF**
Prevent exceeding thermal limits as in 18.4 and 18.5.3	a
Manually activated chain brake function if required in 19.107.1 for **chain saws**	b
Prevent **saw chain** speed from exceeding 6 m/s for **chain saws** with no chain brake, if such overspeed would cause non-compliance with 19.107.1	a
Prevent exceeding the required average braking time and the maximum braking time in 19.107.1.2 by more than 0,03 s	a
Overspeed prevention for **chain saws** without a **non-manually activated chain brake** to prevent **saw chain** speed above 18 m/s as in 19.107.2	a
Non-manually activated chain brake function as in 19.107.2	b
Overspeed prevention if such overspeed would cause non-compliance with 19.107.4	a
Provide automatic lubrication of the **saw chain** as in 19.110	Not an **SCF**
Prevent exceeding the maximum run-down time in 19.112 by more than 1 s	a
Operator presence sensor as in 21.18.102	a
Lock-off function as required by 21.18.102	b
Visual or audible indicator as referenced in 21.18.102	Not an **SCF**
Function to fulfil the requirements of 21.21 or K.21.21	Not an **SCF**
Prevent self-resetting as required in 23.3	a

19 Mechanical hazards

19.104 Drive sprocket cover

Replace the first sentence with the following new text:

The **drive sprocket** and **saw chain** shall be covered to provide protection against personal injury.

Add the following new paragraph after the first paragraph:

The **chain saw** shall comply with ISO 6533:2020, 7.3.

Replace the compliance paragraph with the following new text:

Compliance is checked by inspection, by measurement and by the following test.

Delete, in the last paragraph, "and ***saw chain****" after the second "****drive sprocket****" and delete "within the area of the body of the* ***chain saw****" at the end.*

19.107.1.2 *Replace, in the third paragraph, the last sentence with the following new text:*

If no recommendations are provided, the ***saw chain*** *tension shall generally be adjusted so that, when a (0,9 ± 0,1) kg mass is hanging from the centre of the* ***cutting length*** *along the lower portion of the* ***saw chain,*** *the gap between the* ***saw chain*** *side link and the* ***guide bar*** *is (0,020 ± 0,003) mm per millimetre of* ***guide bar*** *length.*

19.107.2 *Replace the existing text of the last paragraph with the following new text:*

Compliance is checked by inspection and by the test of ISO 13772:2009, with the ***power switch*** *in the "on" position and the* ***chain saw*** *disconnected from the power source. For* ***chain saws*** *with the longest nominal* ***guide bar*** *size in accordance with 8.3 less than 500 mm, the threshold level of* ***chain saws*** *for forest service with $\leq$ 40 cm^3 engine displacement shall apply. For* ***chain saws*** *with the longest nominal* ***guide bar*** *size in accordance with 8.3 of 500 mm or greater, the threshold level of* ***chain saws*** *for forest service with $>$ 40 cm^3 engine displacement shall apply. Measurements shall not be carried out on* ***guide bars*** *longer than 500 mm nominal length, except if no* ***guide bar*** *below 500 mm is specified in accordance with 8.3, measurements shall be carried out with the shortest specified* ***guide bar*** *only.*

19.107.4 *Add, after the first paragraph, the following new text:*

This requirement does not apply to **guide bars** with a nominal **cutting length** of more than 630 mm.

NOTE 101 ISO 9518:2018 is not intended for testing **chain saws** with a **cutting length** in excess of 630 mm.

Replace the existing text of the last two paragraphs with the following new text:

The medium-density fibreboard (MDF) samples shall be as specified in ISO 9518:2018.

Compliance is checked by determination of the computed kickback angle or the chain stop angle in accordance with ISO 9518:2018, except that the speed of the ***drive sprocket*** *shall be in accordance with ISO 9518:2018, Table 1 or ISO 9518:2018, Table 2. For* ***chain saws*** *that exceed the speeds of ISO 9518:2018, Table 1 or ISO 9518:2018, Table 2, and where it is not possible to control the speed, the test shall be done at the nearest speed exceeding the values of ISO 9518:2018, Table 1 or ISO 9518:2018, Table 2.*

19.112 Run down time

Replace, in the third paragraph, the last sentence with the following new text:

If no recommendations are provided, the ***saw chain*** *tension shall generally be adjusted so that, when a (0,9 ± 0,1) kg mass is hanging from the centre of the* ***cutting length*** *along the lower portion of the chain, the gap between the* ***saw chain*** *side link and the* ***guide bar*** *is (0,020 ± 0,003) mm per millimetre of* ***guide bar*** *length.*

20 Mechanical strength

Replace the existing text of 20.3.1 with the following new text:

20.3.1 *Replacement:*

*The **chain saw**, equipped with the longest **guide bar** in accordance with 8.3 and with the lubrication tank empty, is dropped three times in total on a concrete surface from a height of 1 m. For these three drops, the sample is tested in the three most unfavourable positions with the lowest point of the machine being 1 m above the concrete surface. Secondary impacts shall be avoided.*

NOTE A method for avoiding secondary impacts is tethering.

*If **attachments** other than **guide bars** are provided as specified and mounted in accordance with 8.14.2, the test is repeated with each **attachment** or combination of **attachments** mounted to a separate machine sample.*

Each drop shall be conducted on a separate sample, unless a single sample can be subjected to multiple drops without failure. If a sample has been subjected to multiple drops and fails, then the drop in the orientation that resulted in the failure is repeated using a new sample. If the new sample passes the test for the drop in that orientation, then the requirements for the drop in that orientation are considered to be fulfilled. The test is continued in this manner until all drops in each of the three orientations are completed.

After the test, the lubrication tank is filled to the maximum level in accordance with 8.14.2.

*It is not necessary for the **chain saw** to be operable after the test. If it is operable after the test, then immediately following this test it shall be run at **maximum speed** at no-load for 30 s.*

20.101 Handles

Replace the text of the last paragraph with the following new text:

*Compliance is checked by the handle strength test of ISO 7915:2021, the test forces for a **chain saw** for forest service with an electric motor shall apply.*

21 Construction

21.18.102 *Replace the second paragraph with the following new text:*

The lock-off device shall be actuated before the **power switch** can enable drive to the **saw chain**.

Replace the paragraph after the note (without the dashes) with the following new text:

After the **power switch** is released, the machine shall return to the original locked state (i.e. at least two separate and dissimilar actions are required before drive to the **cutting means** or **cutting accessory** is possible) within 5 s unless:

Replace the last paragraph with the following new text:

*With the **power switch** in the "off" position, the lock-off device shall not be actuated by the cylindrical face of a 25 mm diameter × 75 mm long steel rod when applied with a force not exceeding 20 N. The axis of the rod is applied perpendicular to the axis of the handle and is:*

– *first rotated around the handle, see Figure 111; and*

– *then applied in the direction perpendicular to the handle axis, see Figure 112*

while bridging the handle surface and surface of the lock-off device and any surface adjacent to the lock-off device. When applying the steel rod, the circular end faces and edges shall not be used for probing.

Add, after 21.18.102, the following new subclause:

21.35 This subclause of Part 1 is not applicable.

21.103 Spiked bumper

Replace "**Chain saws** may" *with* "**Chain saws** with a nominal **guide bar** size or size range in accordance with 8.3 exceeding 400 mm shall".

Delete the Note.

28 Creepage distances, clearances and distances through insulation

Replace the existing text of Clause 28 with the following new text:

This clause of Part 1 is applicable, except as follows.

28.1 *Replacement:*

Creepage distances and **clearances** shall not be less than the values in millimetres shown in Table 12. The values specified in the table do not apply to cross-over points of motor windings.

The values in Table 12 are equal or larger than the values required by IEC 60664-1, when

– an overvoltage category II;

– a material group III;

– a pollution degree 1 for parts protected against deposition of dirt and for lacquered or enamelled windings;

– a pollution degree 3 for other parts;

– inhomogeneous electric field;

– transient overvoltages originating in the equipment not exceeding 4 000 V

are applied.

Protection against deposition of dirt may be achieved through the use of

– encapsulation with a minimum thickness of 0,5 mm; or

– protective coatings that prevent the combined deposition of fine particles and moisture on surfaces between conductors. Requirements for these types of protective coatings are described in IEC 60664-3; or

– enclosures that prevent the ingress of dust by means of filters or seals, provided that no dust is generated within the enclosure itself.

NOTE 1 An example of encapsulation is potting.

If a resonance voltage occurs between the point where a winding and a capacitor are connected together, and metal parts which are separated from **live parts** by **basic insulation** only, the **creepage distance** and **clearance** shall not be less than the values specified for the value of the voltage imposed by the resonance, these values being increased by 4 mm in the case of **reinforced insulation**.

Compliance is checked by measurement.

For machines provided with an appliance inlet, the measurements are made with an appropriate connector inserted. For other machines, they are made on the machine as delivered.

For machines provided with belts, the measurements are made with the belts in place, and the devices intended for varying the belt tension adjusted to the most unfavourable position within their range of adjustment, and also with the belts removed.

Movable parts are placed in the most unfavourable position; nuts and screws with non-circular heads are assumed to be tightened in the most unfavourable position.

*The **clearances** between terminals and accessible metal parts are also measured with the screws or nuts unscrewed as far as possible, but the **clearances** shall then be not less than 50 % of the value shown in Table 12.*

Table 12 – Minimum creepage distances and clearances

Dimensions in millimetres

Distances	Class III tools (machines)		Other machines					
			Working voltage ≤ 130 V		Working voltage > 130 V and ≤ 280 V		Working voltage > 280 V and ≤ 480 V	
	Creepage distance	Clearance	Creepage distance	Clearance	Creepage distance	Clearance	Creepage distance	Clearance
Between parts of different potential [a]:								
– if lacquered or enamelled windings or if protected against deposition of dirt	1,0	1,0	1,0	1,0	2,0	2,0	2,0	2,0
– if not protected against deposition of dirt	2,0 [c]	1,5	2,0 [b]	1,5	3,0 [b]	2,5	8,0 [e]	3,0
Between **live parts** and other metal parts over **basic insulation**:								
– if the **live parts** are lacquered or enamelled windings [d] or if protected against deposition of dirt	–	–	1,0	1,0	2,0	2,0	2,0	2,0
– if not protected against deposition of dirt	–	–	2,4 [c]	1,5	4,0 [c]	3,0	8,0 [e]	3,0
Between **live parts** and other metal parts over **reinforced insulation**:								
– if the **live parts** are lacquered or enamelled windings or protected against deposition of dirt	–	–	5,0	5,0	6,0	6,0	10,0 [e]	6,0
– for other **live parts** not protected against deposition of dirt	–	–	5,0	5,0	8,0	8,0	16,0 [e]	8,0
Between metal parts separated by **supplementary insulation**	–	–	2,5	2,5	4,0	4,0	8,0 [e]	4,0

[a] The **clearances** specified do not apply to the air gap between the contacts of thermal controls, **protective devices**, switches of micro-gap construction, and the like, or to the air gap between the current-carrying members of such devices where the **clearance** varies with the movement of the contacts.

[b] These **creepage distances** are slightly lower than suggested by IEC 60664-1. **Creepage distances** between parts of different potential (functional insulation) are only associated to fire hazard, not to electric shock hazard. As products in the scope of IEC 62841 are products supervised during **normal use**, lower distances are justified.

[c] These **creepage distances** may be reduced to values in accordance with IEC 60664-1, if the insulation parts are of material group II or lower.

[d] Windings are considered to have **basic insulation** if they are wrapped with tape and then impregnated, or if they are covered with a layer of self-hardening resin, and if, after the test of 14.1, an electric strength test as specified in Clause D.2 is withstood, the test voltage being applied between the conductors of the winding and metal foil in contact with the surface of the insulation.

It is sufficient that the wrapping and impregnation, or the layer of self-hardening resin, cover the windings only at places where it is not possible to obtain the **creepage distance** or **clearance** specified for lacquered or enamelled windings.

[e] These **creepage distances** are valid for frequencies up to 30 kHz. For higher frequencies, **creepage distances** shall be in accordance with IEC 60664-4. **Creepage distances** and **clearances** can be reduced in accordance with IEC 60664-1 if the insulation parts are of material group II or lower and/or for **working voltages** ≤400 V, however they shall not be lower than the values required in the column "**Working voltage** > 130 V and ≤ 280 V".

Distances through slots or openings in external parts of insulating material are measured to metal foil in contact with the accessible surface; the foil is pushed into corners and the like by means of the test probe B of IEC 61032:1997, but it is not pressed into openings.

If necessary, a force is applied to any point on internal wiring and bare conductors, other than those of heating elements, to any point on uninsulated metal capillary tubes of ***thermostats*** *and similar devices, and to the outside of metal enclosures, in an endeavour to reduce the* ***creepage distances*** *and* ***clearances*** *while taking the measurements.*

The force is applied by means of the test probe B of IEC 61032:1997, and has a value of:

– *2 N for internal wiring and bare conductors and for uninsulated capillary tubes of* ***thermostats*** *and similar devices;*
– *30 N for enclosures.*

The way in which ***creepage distances*** *and* ***clearances*** *are measured is indicated in Annex A.*

For machines having parts with ***double insulation*** *where there is no metal between* ***basic insulation*** *and* ***supplementary insulation****, the measurements are made as though a metal foil were present between the two insulations.*

Means provided for fixing the machine to a support are considered to be accessible.

Creepage distances *and* ***clearances*** *within optocouplers are not measured if the individual insulations are adequately sealed, and if air is excluded between individual layers of the material.*

For parts of different potential, including conductive patterns on printed circuit boards, except for external mains connection, ***creepage distances*** *and* ***clearances*** *smaller than the minimum values specified*

– *in Table 12; or*
– *for conductive patterns on printed circuit boards as specified below*

are allowed, provided

– *the requirements of Clause 18 are met if these* ***creepage distances*** *and* ***clearances*** *are short-circuited in turn; or*
– *for* ***electronic circuits****, they comply with 18.6 and 18.8.*

For conductive patterns on printed circuit boards, except at their edges, the minimum ***creepage distances*** *and* ***clearances*** *in Table 12 between parts of different potential may be reduced, as long as the peak value of the voltage stress does not exceed:*

– *150 V per mm with a minimum value of 0,2 mm, if protected against the deposition of dirt;*
– *100 V per mm with a minimum value of 0,5 mm, if not protected against the deposition of dirt.*

When the limits mentioned above lead to higher values than those of Table 12, the values of Table 12 apply.

NOTE 2 The above values are equal or larger than the values required by IEC 60664-3.

28.2 Depending on the **working voltage**, the distance through insulation shall be sufficient:

– for **working voltages** up to and including 130 V, the distance through insulation between metal parts shall not be less than 1,0 mm, if they are separated by **supplementary insulation**, and not be less than 1,5 mm, if they are separated by **reinforced insulation**;