BSI Standards Publication

Electric motor-operated hand-held tools, transportable tools and lawn and garden machinery — Safety

Part 4-3: Particular requirements for pedestrian controlled walk-behind lawnmowers

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National foreword

This British Standard is the UK implementation of EN IEC 62841-4-3:2021+A11:2021. It is derived from IEC 62841-4-3:2020. It supersedes BS EN 60335-2-77:2010, which will be withdrawn on 31 May 2025.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to text carry the number of the amendment. For example, text altered by CENELEC amendment A11 is indicated by [A11] 〈A11〉.

The UK participation in its preparation was entrusted to Technical Committee CPL/116, Safety of motor-operated electric tools.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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For the Great Britain market (England, Scotland and Wales), if UK Government has designated this publication for conformity with UKCA marking (or similar) legislation, it may contain an additional National Annex. Where such a National Annex exists, it shows the correlation between this publication and the relevant UK legislation. If there is no National Annex of this kind, the relevant Annex ZA or ZZ in the body of the European text will indicate the relationship to UK regulation applicable in Great Britain. References to EU legislation may need to be read in accordance with the UK designation and the applicable UK law. Further information on designated standards can be found at www.bsigroup.com/standardsandregulation.

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UK Government is responsible for legislation. For information on legislation and policies relating to that legislation, consult the relevant pages of www.gov.uk.

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Full document details: BS EN IEC 62841-4-3:2021+A11:2021

© The British Standards Institution 2021
Published by BSI Standards Limited 2021

ISBN 978 0 539 02144 8

ICS 65.060.70; 97.030

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 August 2021.

Amendments/corrigenda issued since publication

Date	Text affected

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 62841-4-3:2021+A11

August 2021

ICS 65.060.70

Supersedes EN 60335-2-77:2010 and all of its amendments and corrigenda (if any)

English Version

Electric motor-operated hand-held tools, transportable tools and lawn and garden machinery - Safety - Part 4-3: Particular requirements for pedestrian controlled walk-behind lawnmowers (IEC 62841-4-3:2020)

Outils électroportatifs à moteur, outils portables et machines pour jardins et pelouses - Sécurité - Partie 4-3: Exigences particulières pour tondeuses à gazon à conducteur à pied (IEC 62841-4-3:2020)

Elektrische motorbetriebene handgeführte Werkzeuge, transportable Werkzeuge und Rasen- und Gartenmaschinen - Sicherheit - Teil 4-3: Besondere Anforderungen für handgeführte Rasenmäher (IEC 62841-4-3:2020)

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European foreword

The text of document 116/467/FDIS, future edition 1 of IEC 62841-4-3, prepared by IEC/TC 116 “Safety of motor-operated electric tools” was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 62841-4-3:2021.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2022–02–06
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2025–08–06

This document supersedes EN 60335-2-77:2010 and all of its amendments and corrigenda (if any).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Any feedback and questions on this document should be directed to the users’ national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 62841-4-3:2020 was approved by CENELEC as a European Standard without any modification.

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Foreword to amendment A11

This document (EN IEC 62841-4-3:2021/A11:2021) was prepared by CLC/TC 116 “Safety and environmental aspects of motor-operated electric tools”.

The following dates are fixed:

• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2022–05–31
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2025–05–31

This document modifies by common modifications EN IEC 62841-4-3:2021, which consists of the text of 116/467/FDIS (IEC 62841-4-3, Ed 1) prepared by IEC/TC 116 “Safety of motor-operated electric tools”.

This document is divided into four parts:

Part 1: General requirements which are common to most hand-held electric motor operated tools (for the purpose of this document referred to simply as tools) which could come within the scope of this document;

Part 2, 3 or 4: Requirements for particular types of tools which either supplement or modify the requirements given in Part 1 to account for the particular hazards and characteristics of these specific tools.

The Part 4-3 is to be used in conjunction with EN 62841-1:2015 and its amendments.

The Part 4-3 supplements or modifies the corresponding clauses in EN 62841-1:2015, so as to convert it into the European Standard: Particular requirements for pedestrian controlled walk–behind lawnmowers.

Where a particular subclause of Part 1 is not mentioned in Part 4-3, that subclause applies as far as relevant. When this document states “addition”, “modification” or “replacement”, the relevant text in Part 1 is to be adapted accordingly.

The following print types are used:

— requirements; in roman type

— *test specifications: in italic type;*

— notes: in smaller roman type.

The terms defined in Clause 3 are printed in **bold typeface**.

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

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 62841-4-3:2020 are prefixed “Z”.

This document follows the overall requirements of EN ISO 12100:2010.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s), see informative Annex ZZ, which is an integral part of this document.

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Compliance with the clauses of Part 1 together with Part 4-3 provides one means of conforming with the essential health and safety requirements of the Directive concerned.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Annex ZA of EN 62841-1:2015 is applicable, except as follows:

Publication	Year	Title	EN/HD	Year
Addition:				
IEC 60664-3		Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution	EN 60664-3	2017
IEC 60664-4		Insulation coordination for equipment within low-voltage systems – Part 4: Consideration of high-frequency voltage stress	EN 60664-4	2006
IEC 61058-2-6	2018	Switches for appliances - Part 2–6: Particular requirements for switches used in electric motor-operated hand-held tools, transportable tools and lawn and garden machinery	EN IEC 61058-2-6	2019
IEC 61672-1	-	Electroacoustics - Sound level meters - Part 1: Specifications	EN 61672-1	2013
ISO 354	2003	Acoustics – Measurement of sound absorption in a reverberation room	EN ISO 354	2003
ISO 5395-1	2013	Garden equipment – Safety requirements for combustion-engine-powered lawnmowers – Part 1: Terminology and common tests	EN ISO 5395-1	2013
+ A1	2017		+ A1	2018
ISO 5395-2	2013	Garden equipment – Safety requirements for combustion-engine-powered lawnmowers – Part 2: Pedestrian-controlled lawnmowers	EN ISO 5395-2	2013
+ A1	2016		+ A1	2016
+ A2	2017		+ A2	2017
ISO 13857	2019	Safety of machinery – Safety distances to prevent hazard zones being reached by upper and lower limbs	EN ISO 13857	2020

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Publication	Year	Title	EN/HD	Year
		Mechanical Vibration – Declaration and Verification of Vibration Emission Values	EN 12096	1997
Replacement:				
IEC 61058-1	2016	Switches for appliances – Part 1: General requirements	EN IEC 61058-1	2018
ISO 3744	2010	Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Engineering methods for an essentially free field over a reflecting plane	EN ISO 3744	2010
ISO 11201	2010	Acoustics – Noise emitted by machinery and equipment – Determination of emission sound pressure levels at a work station and at other specified positions in an essentially free field over a reflecting plane with negligible environmental corrections	EN ISO 11201	2010

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Annex ZZ
(informative)

Relationship between this European Standard and the essential requirements of Directive 2006/42/EC [2006 OJ L157] aimed to be covered

This European Standard has been prepared under a Commission's standardization request M/396 to provide one voluntary means of conforming to essential requirements of Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC.

Once this standard is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of this standard given in Table ZZ.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding essential requirements of that Directive, and associated EFTA regulations.

Table ZZ.1 — Correspondence between this European Standard and Annex I of Directive 2006/42/EC

The relevant Essential Requirements of Directive 2006/42/EC	Clause(s) / sub-clause(s) of this EN	Remarks / Notes:
1.1.2 (Principles of safety integration)	4	-
1.1.3 (Materials and products)	5, 6.1, 21.6, K.5, L.5, L.21	-
1.1.5 (Design of machinery to facilitate its handling)	19.102.3, 19.103.1, K.21.305, L.21.303	-
1.1.6 (Ergonomics)	5, 21.104.1, K.5, L.5, L.21	-
1.2.1 (Safety and reliability of control systems)	5, 18.6, 18.8, 23.1.6, 23.1.10, 23.1.11, 23.3, K.5, K.18.6, K.18.8, K.23.1.10, K.23.1.201, L.5, L.18, L.23.1.10,	-
1.2.2 (Control devices)	5, 8.5, 8.9, 8.10, 8.11, 21.2, 21.4, 21.17, 21.18, K.5, K.21.17.1.2, L.5, L.21	-
1.2.3 (Starting)	5, 21.17, K.5, K.21.17.1.2, L.5, L.21	-
1.2.4.1 (Normal stop)	5, 21.17, K.5, K.21.17.1.2, L.5, L.21	-
1.2.5 (Selection of control or operating modes)	4	-
1.2.6 (Failure of the power supply)	5, 21.104.2, 23.3, K.5, L.5, L.21	-
1.3.1 (Risk of loss of stability)	5, 19.7, 19.102.2.2, K.5, L.5	-
1.3.2 (Risk of break-up during operation)	5, 8.14.2 c), 13.1, 17, 20, 21.23, 21.103, 24.11, 24.12, 24.13, 27, K.5, K.13.1, K.17, K.20, K.24.201, K.24.301, K.27.1, L.5, L.13.1, L.17, L.20, L.21. L.24.201	-
1.3.3 (Risk due to falling or ejected objects)	5, 18.3, 19.102.5, 19.103.3, K.5, L.5, L.18, L.21	-

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The relevant Essential Requirements of Directive 2006/42/EC	Clause(s) / sub-clause(s) of this EN	Remarks / Notes:
1.3.4 (Risks due to surfaces, edges or angles)	19.2, 21.24, L.21	-
1.3.6 (Risks related to variations in operating conditions)	5, 19.102.2, K.5, L.5	-
1.3.7 (Risks related to moving parts)	5, 19.1, 19.102.4, 19.103.4, 21.105, K.5, K.19.1, L.5	-
1.3.8.1 (Moving transmission parts)	5, 19.1, K.5, K.19.1, L.5	-
1.3.8.2 (Moving parts involved in the process)	5, 19.1, 19.102.1, 19.103.2, K.5, K.19.1, L.5	-
1.4.1 (General requirements (for guards and protective devices))	5, 19.1, 20.1, 20.2, 20.3, 20.4, 20.101.1, 20.101.2, 21.22, K.5, K.19.1, K.20.1, K.20.3, K.20.101.1, L.5, L.20, L.21	-
1.4.2.1 (Special requirements for fixed guards)	5, 19.1, 19.9, 19.102.1, 19.103.2, K.5, K.19.1, L.5	-
1.4.2.3 (Special requirements for adjustable guards restricting access)	5, 19.1, K.5, K.19.1, L.5	-
1.5.1 (Risks due to electricity supply)	5, 7, 9, 10, 11, 12, 14, 15, 16, 17, 18.1 to 18.7, 21.3, 21.5 to 21.16, 21.19 to 21.22, 21.25 to 21.34, 21.101, 21.102, 22, 23.1.1 to 23.1.5, 23.1.7 to 23.1.9, 23.2, 23.4, 23.5, 24, 25, 26, 27, 28, K.5, K.7, K.9, K.10, K.11, K.12, K.14, K.16, K.17, K.18.1 to K.18.7, K.21.5 to K.21.16, K.21.19 to K.21.22, K.21.25 to K.21.34, K.21.303, K.21.102, K.22, K.24, K.25, K.26, K.27.1, K.28.1, K.28.2, L.5, L.7.1, L.9, L.10, L.11, L.12, L.14, L.16, L.17, L.18, L.18.201, L.20, L.21, L.22, L.24, L.25, L.26, L.28.1, Annex C	-
1.5.4 (Risks due to errors of fitting)	5, 8.7, 8.8, 8.13, 8.14.2, 21.7, 21.8, 21.19, 27.1, K.5, K.8.7, K.8.8, K.19.201, K.21.201, K.21.203, K.27.1, L.5, L.19.201, L.21	-
1.5.5 (Risks due to extreme temperatures)	5, 12.5, K.5, K.12.1, L.5	-
1.5.6 (Risks due to fire)	5, 13, 18.1, 18.2, 18.4, 18.6, 28.1, K.5, K.12.201, K.13, K.18.1, K.18.6, K.18.201, K.18.202, K.18.203, K.20.1, K.20.3, K.21.201, K.21.203, K.23.201, K.23.202, K.28.1, L.5, L.12.201, L.13, L.18, L.20.201, L.20.202, L.21.201, L.21.203, L.23.201, L.23.202, L.28.1, L.28.201	-

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The relevant Essential Requirements of Directive 2006/42/EC	Clause(s) / sub-clause(s) of this EN	Remarks / Notes:
1.5.7 (Risks due to explosion)	5, K.5, K.12.201, K.18.201, K.18.202, K.18.203, K.19.202, K.20.1, K.20.3, K.21.202, K.21.203, L.5, L.12.201, L.18.202, L.18.203, L.18.204, L.20.201, L.20.202, L.19.202, L.21.202, L.21.203	-
1.5.8 (Noise reduction)	I.2.Z1	-
1.5.9 (Vibration reduction)	I.3.Z1	-
1.5.10 (Risks due to radiation)	5, 6.1, 6.3, K.5, L.5	-
1.5.11 (Risks due to external radiation)	5, 18.8, K.5, K.18.8, L.5, L.18.8	-
1.5.12 (Risks due to laser radiation)	6.2	-
1.5.13 (Emissions of hazardous material and substances)	K.23.301, L.23.301	-
1.6.1 (Machinery maintenance)	K.21.18.Z101, L.21.18.Z101	-
1.6.2 (Access to operating positions and servicing points)	5, 19.101.1, 19.103.1, 21.104, K.5, K.19.101.1.3, L.5, L.19.101.1.3	-
1.6.3 (Isolation of energy sources)	24.1, K.21.18.Z101, K.21.301, K.21.302, K.21.304, K.24.302, L.21.18.Z101, L.21.301, L.21.302	-
1.7.1 (Information and warnings on machinery)	8.1, 8.2, 8.4, 8.6, K.8.1, K.8.4, L.8.1, L.8.4	-
1.7.2 (Warning of residual risks)	8.2, 8.4, K.8.4, L.8.4	-
1.7.3 (Marking of machinery)	8.3, 8.4, 8.12, K.8.3, K.8.4, L.8.3, L.8.4	-
1.7.4 (Instructions)	8.14	-
1.7.4.1 (General principle for drafting of instructions)	8.14	-
1.7.4.2 (Contents of the instructions)	8.14.1, 8.14.2, 8.14.3, K.8.14.1.1, K.8.14.1.101, K.8.14.2, L.8.14.1.1, L.8.14.2	
1.7.4.3 (Sales literature)	-	Not covered

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The relevant Essential Requirements of Directive 2006/42/EC	Clause(s) / sub-clause(s) of this EN	Remarks / Notes:
2.2.1 (General requirements for portable hand-held and/or hand-guided machinery)	5, 19.102.3, 19.103.1, 21.18.1, K.5, L.5, L.21	-
2.2.1.1 (Instructions for portable hand-held and/or hand-guided machinery)	5, 8.14.2 Za) 3), I.3.6.2, K.5, L.5	-
3.3.1 (Control devices)	21.104.3	-
3.3.3 (Travelling function)	5, 19.101.1, K.5, L.5	-
3.3.4 (Movement of a pedestrian controlled machinery)	5, 18.8, 19.101.1, 21.104, K.5, L.5	-
3.4.1 (Uncontrolled movements)	5, 19.7, 19.102.2.2, K.5, L.5, K.19.102.2.2, L.19.102.2.2	-
3.5.1 (Batteries)	K.21	-
3.6.1 (Signs, signals and warnings)	8.2, K.8.2, L.8.2	-
3.6.2 (Marking)	8.1, 8.3, K.8.1, L.8.1	-
3.6.3.1 (Vibrations)	5, 8.14.2 Za) 3), I.3.6.2, K.5, L.5	-

WARNING 1: Presumption of conformity stays valid only as long as a reference to this European standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2: Other Union legislation may be applicable to the product(s) falling within the scope of this standard.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 4-3: Particular requirements for pedestrian controlled walk-behind lawnmowers

FOREWORD

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International Standard IEC 62841-4-3 has been prepared by IEC technical committee 116: Safety of motor-operated electric tools.

The text of this International standard is based on the following documents:

FDIS	Report on voting
116/467/FDIS	116/478/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

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This Part 4-3 is to be used in conjunction with the first edition of IEC 62841-1:2014.

This Part 4-3 supplements or modifies the corresponding clauses in IEC 62841-1, so as to convert it into the IEC Standard: Particular requirements for pedestrian controlled walk-behind lawnmowers.

Where a particular subclause of Part 1 is not mentioned in this Part 4-3, that subclause applies as far as reasonable. Where this document states “addition”, “modification” or “replacement”, the relevant text in Part 1 is to be adapted accordingly.

The following print types are used:

– requirements: in roman type;
– *test specifications: in italic type;*
– notes: in small roman type.

The terms defined in Clause 3 are printed in **bold typeface**.

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

Subclauses, notes, tables and figures in Annex K and Annex L which are additional to those in the main body of this Part 4-3 are numbered starting from 301.

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 publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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.

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

Part 4-3: Particular requirements for pedestrian controlled walk-behind lawnmowers

1 Scope

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

Addition:

This document applies to the design of pedestrian controlled walk-behind

– **cylinder lawnmowers**;

and

– **rotary lawnmowers**

equipped with

– metallic **cutting means**; and/or
– rigid non-metallic **cutting means**; and/or
– non-metallic **cutting means** with one or more cutting elements pivotally mounted on a generally circular drive unit, where these cutting elements rely on centrifugal force to achieve cutting, and have a kinetic energy for each single cutting element of greater than 10 J.

NOTE 101 Machines that have non-metallic **cutting means** and a kinetic energy for each single cutting element of less than or equal to 10 J are considered to be lawn trimmers.

This document does not apply to

– robotic lawnmowers;
– remote-controlled lawnmowers;
– flail mowers or flail-type attachments;
– scissors type lawnmowers;
– grassland mowers;
– sickle bar mowers;
– towed/semi-mounted grass-cutting machines;
– scrub-clearing machines;
– lawn trimmers and lawn edge trimmers;
– lawn edgers;
– grass trimmers;
– brush cutters;
– brush saws;
– agricultural mowers;
– trailing seat/sulky units;
– ride-on machines;

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– non-powered lawnmowers;
– combustion engine powered lawnmowers;
– hybrid and fuel cell powered machines and associated charging systems; and
– garden tractors or their attachments.

NOTE 102 Robotic lawnmowers are covered by IEC 60335-2-107, and will be covered by a future part of IEC 62841.

NOTE 103 Lawn trimmers and lawn edge trimmers are covered by IEC 60335-2-91.

NOTE 104 Lawn trimmers, lawn edge trimmers, grass trimmers, brush cutters and brush saws will be covered by a future part of IEC 62841.

NOTE 105 Lawn edgers will be covered by a future part of IEC 62841.

〖A11〉 This document does not apply to **lawnmowers** with a swing-over handle.

This document covers all significant hazards, hazardous situations or hazardous events relevant for machines covered by this document.

NOTE Z101 Essential requirements not mentioned in Table ZZ.1 are deemed to be not applicable, because the corresponding hazards are either not relevant for machines covered by this document or do not require specific action by the designer. 〈A11〉

2 Normative references

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

Addition:

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

IEC 60664-4, *Insulation coordination for equipment within low-voltage systems – Part 4: Consideration of high-frequency voltage stress*

IEC 61058-2-6:2018, *Switches for appliances – Part 2-6: Particular requirements for switches used in electric motor-operated hand-held tools, transportable tools and lawn and garden machinery*

IEC 61672-1, *Electroacoustics – Sound level meters – Part 1: Specifications*

ISO 354:2003, *Acoustics – Measurement of sound absorption in a reverberation room*

ISO 5395-1:2013, *Garden equipment – Safety requirements for combustion-engine-powered lawnmowers – Part 1: Terminology and common tests*
ISO 5395-1:2013/AMD1:2017

ISO 5395-2:2013/AMD1:2016, *Garden equipment – Safety requirements for combustion engine-powered lawnmowers – Part 2: Pedestrian-controlled lawnmowers*
ISO 5395-2:2013/AMD1:2016/AMD2:2017

ISO 13857:2019, *Safety of machinery – Safety distances to prevent hazard zones being reached by upper and lower limbs*

〖A11〉 *Text deleted* 〈A11〉

EN 12096, *Mechanical Vibration – Declaration and Verification of Vibration Emission Values*

Replacement:

IEC 61058-1:2016, *Switches for appliances – Part 1: General requirements*

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ISO 3744:2010, *Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Engineering methods for an essentially free field over a reflecting plane*

ISO 11201:2010, *Acoustics – Noise emitted by machinery and equipment – Determination of emission sound pressure levels at a work station and at other specified positions in an essentially free field over a reflecting plane with negligible environmental corrections*

3 Terms and definitions

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

3.101
cutter bar
stationary device used on a **cylinder lawnmower** to provide a shearing action in combination with the **cutting means**

3.102
cutting height
shortest vertical distance between the cutting edge of the **cutting means** and the supporting surface of a **lawnmower**

3.103
cutting means
rotating mechanism or rotating part of the **lawnmower** that is designed to perform the cutting action

Note 101 to entry: **Cutting means** are also known as blades, cutting cylinders or reels.

3.104
cutting means assembly
cutting means together with the **cutting means enclosure**, including **cutting means** shaft(s)

3.105
cutting means control
device to engage and disengage the **cutting means** from its drive, in order to start and stop the **cutting means** motion

3.106
cutting means enclosure
part or assembly, including the **discharge chute** and **guard** for **grass catcher** opening, designed to prevent unintended contact with the **cutting means**

3.107
cutting means tip circle
path described by the outermost point of the **rotary lawnmower cutting means** cutting edge as it rotates about its shaft axis

3.108
cutting position
any height setting of the **cutting means** designated by the manufacturer for cutting grass

3.109
cutting width
total distance across the **cutting means** path at 90º to the direction of travel

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3.110
discharge chute
portion of the **cutting means enclosure**, extending outward from the **discharge opening**, designed to control the ejection of material from the **cutting means**

3.111
discharge opening
opening in the **cutting means enclosure** through which material such as grass clippings can be discharged

3.112
grass catcher
part or combination of parts, intended to be used with the **lawnmower**, which provides a means for collecting material such as grass clippings

3.113
lawnmower
pedestrian controlled walk-behind lawn cutting machine, where the **cutting means** cuts approximately parallel to the ground and which uses the ground to determine the **cutting height** by means of wheels, air-cushion or skids, etc.

3.113.1
air-cushion lawnmower
rotary lawnmower which hovers using pressurized air as its ground support

3.113.2
cylinder lawnmower
lawnmower with one or more **cutting means** rotating about a horizontal axis to provide a shearing action with a **cutter bar**

Note 101 to entry: **Cylinder lawnmowers** are also known as reel **lawnmowers**.

3.113.3
rotary lawnmower
lawnmower in which one or more **cutting means**, cutting by impact, rotate about an axis perpendicular to the cutting plane

3.114
maximum speed
highest **cutting means** speed attainable under all conditions of **normal use**, including no-load

3.115
mulching
mode of operation of a **rotary lawnmower**, having a fixed or optional configuration, which returns clippings to the lawn without **discharge openings**

Note 101 to entry: Some **lawnmowers** are converted to a **mulching** type by the use of **mulching** parts or plugs.

3.116
operator control
device requiring operator actuation to perform specific functions during **normal operation**

3.117
operator presence control
device that deactivates rotation of the **cutting means** when the operator's hand(s) is removed from the control

Note 101 to entry: The device typically consists of a combination of a mechanical actuator and other mechanical and electrical components (e.g. tactile switch, relays, load switches).

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3.118
parking brake
device to prevent a stationary machine from moving

3.119
service brake
device for decelerating and stopping a machine from its ground travel speed

3.120
throw line
steepest line in a vertical plane, tangential to the periphery of the cutting cylinder in the direction of rotation, which does not intersect a **guard** or other components of a **cylinder lawnmower**

4 General requirements

This clause of Part 1 is applicable.

5 General conditions for the tests

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

5.4 *Addition:*

Handle positions that are used for storage purposes are not included in this requirement.

5.7.2 *Replacement:*

*Machines are tested at **rated voltage**. Machines having more than one **rated voltage** or having a **rated voltage range** are tested at the highest voltage.*

5.17 *Addition:*

*The mass of the machine includes the **cutting means**, **grass catcher** (empty) (if any), **grass catcher** adapter (if any), **mulching** parts or plug (if any), **cutting means enclosure** cover (if any) in the heaviest configuration in accordance with 8.14.2.*

5.101 *During the tests, the **cutting means** may be adjusted and lubricated as needed to permit operation for extended periods.*

NOTE 101 For example, it is possible that a **cylinder lawnmower cutting means** is not able to run for extended periods at normal adjustment because of lack of lubrication, etc. normally provided by the grass.

5.102 *For tests that are performed at **maximum speed** and no-load, the manufacturer may need to provide special hardware and/or software in order to achieve **maximum speed** at no-load.*

5.103 *The tests are performed using all **cutting means** in accordance with 8.14.2 a) 103).*

6 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable.

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7 Classification

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

7.1 *Replacement:*

Machines shall be of one of the following classes with respect to protection against electric shock:

class II tool (machine), **class III tool** (machine).

Compliance is checked by inspection and by the relevant tests.

7.2 *Addition:*

Class II tools (machines) shall be at least IPX4. **Class III tools** (machines) shall be at least IPX1.

8 Marking and instructions

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

8.1.101 Machines with more than one motor (i.e. separate motors for the **cutting means** and traction drive) shall be marked with the **rated input**, in watts or **rated current**, in amperes, for each motor. These markings may be located on each motor.

Compliance is checked by inspection.

8.2 *Addition:*

Lawnmowers shall be marked with the following safety warnings:

– "⚠WARNING – Beware of thrown objects – keep bystanders away" or one of the safety signs specified in Figure AA.1;

For mains supplied machines:

– "⚠WARNING – Remove plug from mains before maintenance or if cord is damaged" or one of the safety signs specified in Figure AA.2;

– "⚠WARNING – Keep the supply cord away from the blades" or the safety sign specified in Figure AA.3.

Rotary lawnmowers shall be marked with the following safety warning:

– "⚠WARNING – Keep hands and feet away from the blades" or one of the safety signs specified in Figure AA.4.

NOTE 101 In the United States of America, the following additional requirements apply.

For **lawnmowers** in accordance with 16 CFR 1205:

– Warning label for **cylinder lawnmowers** and **rotary lawnmowers**.

(a) General. Walk-behind **cylinder lawnmowers** and **rotary lawnmowers** shall be labeled on the blade (**cutting means**) housing or, in the absence of a blade (**cutting means**) housing, on other blade (**cutting means**) shielding or on an adjacent supporting structure or assembly, with the warning label shown in Figure AA.8. The label shall be at least 82,5 mm high and 102 mm wide, and the lettering and symbol shall retain the same size relation to each other and to the label as shown in Figure AA.8.

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(b) **Rotary lawnmowers**. Walk-behind **rotary lawnmowers** shall have one label as shown in Figure AA.8, on the blade (**cutting means**) housing. The label shall be located as close as possible to any **discharge opening**, or, if there is no **discharge opening**, in a position that is conspicuous to an operator in the normal operating position.

(c) **Cylinder lawnmowers**. Walk-behind **cylinder lawnmowers** shall have one label as shown in Figure AA.8, located as close to the centre of the **cutting width** of the blade (**cutting means**) as possible. However, in the absence of a suitable mounting surface near the centre of the **cutting width**, the label shall be placed on the nearest suitable mounting surface to the centre of the **cutting width**.

8.3 *Addition:*

〚A11〉 For **rotary lawnmowers**, the **cutting means**, where replaceable during **user maintenance**, shall be marked to identify the part number(s) and the manufacturer, importer or supplier. This marking is not required to be clearly discernible from the outside of the machine.

Replacement of the sixth dash:

– the mass of the machine in kg. For this requirement, the mass of the machine includes the mass of a **supply cord** with a length not less than 10 m, if any, in addition to the items specified in 5.17. 〈A11〛

8.9 *Replacement:*

Unless it is obviously unnecessary, switches and controls (e.g. a **cutting means** brake/clutch) which may give rise to a hazard when operated shall be marked or so placed as to indicate clearly which part of the machine they control.

Compliance is checked by inspection.

8.11 This subclause of Part 1 is not applicable for traction drive speed controls.

8.14.1 *Addition:*

The additional safety instructions as specified in 8.14.1.101 shall be given. This part may be printed separately from the “General Machine Safety Warnings”.

8.14.1.1 *Addition for item 2) c):*

For machines classified at least IPX4, the warning may be replaced as specified below.

c) **Do not operate the lawnmower in rain or wet conditions.** *This may increase the risk of electric shock.*

8.14.1.101 Lawnmower safety warnings

a) **Do not use the lawnmower in bad weather conditions, especially when there is a risk of lightning.** *This decreases the risk of being struck by lightning*.

b) **Thoroughly inspect the area for wildlife where the lawnmower is to be used.** *Wildlife may be injured by the lawnmower during operation.*

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c) **Thoroughly inspect the area where the lawnmower is to be used and remove all stones, sticks, wires, bones, and other foreign objects.** *Thrown objects can cause personal injury.*

d) **Before using the lawnmower, always visually inspect to see that the blade and the blade assembly are not worn or damaged.** *Worn or damaged parts increase the risk of injury.*

e) **Before use, check the supply cord and any extension cord for signs of damage or aging. Do not use the lawnmower if the cord is damaged or worn. If the cord is damaged or worn during use, switch off the lawnmower and do not touch the cord before disconnecting it from the supply.** *A damaged supply cord or extension cord may result in electric shock, fire and/or serious injury.*

f) **Check the grass catcher frequently for wear or deterioration.** *A worn or damaged grass catcher may increase the risk of personal injury.*

NOTE 101 It is possible to replace the term “catcher” by an alternative term such as “collector” or “bag”.

NOTE 102 The above warning is omitted for machines that can only be operated as a **mulching lawnmower**.

g) **Keep guards in place. Guards must be in working order and be properly mounted.** *A guard that is loose, damaged, or is not functioning correctly may result in personal injury.*

h) **Keep all cooling air inlets clear of debris.** *Blocked air inlets and debris may result in overheating or risk of fire.*

i) **While operating the lawnmower, always wear non-slip and protective footwear. Do not operate the lawnmower when barefoot or wearing open sandals.** *This reduces the chance of injury to the feet from contact with the moving blade.*

j) **While operating the lawnmower, always wear long trousers.** *Exposed skin increases the likelihood of injury from thrown objects.*

k) **Do not operate the lawnmower in wet grass. Walk, never run.** *This reduces the risk of slipping and falling which may result in personal injury.*

l) **Do not operate the lawnmower on excessively steep slopes.** *This reduces the risk of loss of control, slipping and falling which may result in personal injury.*

m) **When working on slopes, always be sure of your footing, always work across the face of slopes, never up or down and exercise extreme caution when changing direction.** *This reduces the risk of loss of control, slipping and falling which may result in personal injury.*

n) **Use extreme caution when reversing or pulling the lawnmower towards you. Always be aware of your surroundings.** *This reduces the risk of tripping during operation.*

o) **Keep the supply cord away from the cutting blades.** *A damaged supply cord may result in electric shock, fire and/or serious injury.*

p) **Switch off and remove plug from mains if the cord is entangled or damaged.** *Entangled or damaged cords can increase the risk of electric shock.*

q) **Do not touch blades and other hazardous moving parts while they are still in motion.** *This reduces the risk of injury from moving parts.*

r) **When clearing jammed material or cleaning the lawnmower, make sure all power switches are off and the power cord is disconnected.** *Unexpected operation of the lawnmower may result in serious personal injury.*

8.14.2 a) *Addition:*

101) Explanation of the safety devices that the **lawnmower** incorporates as part of the original equipment;

102) Information regarding pre-operating procedures;

103) Information regarding the recommended **cutting means** to be used on the **lawnmower**;

104) Instructions on the permitted operating positions for handles.

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8.14.2 b) *Addition:*

101) Hazards which may be encountered while using the **lawnmower**, such as blockage of the **cutting means**, and how to avoid them while performing typical tasks;

102) Instructions to stop the **cutting means** if the machine has to be tilted for transportation when crossing surfaces other than grass and when transporting the machine to and from the area to be used;

103) Instructions not to tilt the machine when switching on the motor, except if the machine has to be tilted for starting. In this case, instruction not to tilt it more than absolutely necessary and to lift only the part which is away from the operator;

104) Instructions to stop the machine, and remove plug from the socket, and to make sure that all moving parts have come to a complete stop

- after striking a foreign object, and to inspect the machine for damage and make repairs before restarting and operating the machine;
- if the machine starts to vibrate abnormally, and then to immediately inspect for damage, replace or repair any damaged parts and to check for and tighten any loose parts;

105) Recommendation for the use of a **residual current device** with a tripping current of 30 mA or less;

106) Instructions to empty the **grass catcher** before storage.

8.14.2 c) *Addition:*

101) Information regarding regular maintenance routines;

102) Recommendations for cleaning and maintenance before storage;

103) Information explaining the consequences of improper maintenance, the use of non-conforming replacement components, or the removal or modification of safety components;

104) Instruction to replace worn or damaged components in sets to preserve balance, as applicable;

105) Instructions for machines with multiple **cutting means**, to take care as rotating one **cutting means** can cause other **cutting means** to rotate;

106) Instructions to be careful during adjustment of the machine to prevent entrapment of the fingers between moving **cutting means** and fixed parts of the machine;

107) Instructions to always allow the machine to cool down before storing;

108) Instructions regarding replacing or servicing **cutting means**;

109) Advice that when servicing the **cutting means** to be aware that, even though the power source is switched off, the **cutting means** can still be moved.

〈A11〉 **8.14.2 Za)** *Replacement:*

Emissions:

1) The noise emission, measured in accordance with Clause I.2, as follows:

- A-weighted emission sound pressure level L_{pA} and its uncertainty K_{pA}, where L_{pA} exceeds 70 dB(A).
  Where L_{pA} does not exceed 70 dB(A), this fact shall be indicated;
- A-weighted measured and guaranteed sound power level L_{WA}.

2) Recommendation for the operator to wear hearing protection.

3) The vibration total value and its uncertainty measured in accordance with Clause I.3.

When the vibration total value does not exceed 2,5 m/s^2, this shall be stated.

When the vibration total value exceeds 2,5 m/s^2, its value shall be given in the instructions.

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4) The following information:
   - that the declared vibration total value has been measured in accordance with a standard test method and may be used for comparing one machine with another;
   - that the declared vibration total value may also be used in a preliminary assessment of exposure.
5) A warning:
   - that the vibration emission during actual use of the machine can differ from the declared value depending on the ways in which the machine is used; and
   - of the need to identify safety measures to protect the operator that are based on an estimation of exposure in the actual conditions of use (taking account of all parts of the operating cycle such as the times when the machine is switched off and when it is running idle in addition to the trigger time). 〈A11〉

8.14.3 *Replacement:*

If information about the mass or weight of the machine is provided, it shall be the mass specified in 5.17 together with the mass of a **supply cord** with a length not less than 10 m, if any.

Compliance is checked by inspection.

9 Protection against access to live parts

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

9.2 *Addition:*

For machines that are **class II tools**, access to the surface of **basic insulation** or metal parts separated from **live parts** by **basic insulation** is permitted when the **cutting means** is removed, if the use of a tool is required for its removal.

10 Starting

This clause of Part 1 is applicable.

11 Input and current

This clause of Part 1 is applicable.

12 Heating

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

12.2.1 *Replacement:*

The load conditions for the heating test of 12.2 are as follows.

*The test is conducted with the machine mounted on an unperforated flat horizontal surface with the **cutting means** attached, and with the minimum size of openings for connection to the torque load. The traction drive wheels, if any, are lifted the minimum amount required to avoid contact with the unperforated flat horizontal surface. The **lawnmower** is operated with a torque load applied such that **rated input** or **rated current** is drawn until thermal equilibrium is reached under the most unfavourable conditions. For machines with more than one motor (i.e. separate motors for the **cutting means** and traction drive), the **lawnmower** is operated with torque loads such that **rated input** or **rated current** of each motor in accordance with 8.1.101 is drawn until thermal equilibrium is reached under the most unfavourable conditions.*

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*For **lawnmowers** employing non-metallic filaments or one or more pivotally mounted cutting elements as the **cutting means**, at the manufacturer's discretion, the torque may be applied by either*

- *an external mechanical load; or*
- *extending or modifying the cutting elements*

*such that when supplied at **rated voltage**, the machine operates at **rated input** or **rated current**.*

*The most unfavourable conditions are determined using the configuration of **attachments** and **cutting means** in accordance with 8.14.2, which yields the highest temperature at a reference location when evaluated at both minimum and maximum **cutting height**. This determination may be made at one of the required voltages of 12.2 using thermocouples.*

The reference location is chosen on the motor assembly at a location that minimises the cooling effect of air flow.

NOTE A measurement of the rotating speed of the **cutting means** during the heating test is needed in some cases for the test of 17.2.

13 Resistance to heat and fire

This clause of Part 1 is applicable.

14 Moisture resistance

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

14.2 *Replacement:*

The enclosure of the machine shall provide the degree of protection against moisture in accordance with the marking of the machine.

Compliance is checked by the appropriate treatment specified in 14.2.2, with the machine conditions as in 14.2.1.

14.2.1 *Replacement:*

The machine is not connected to the supply.

***Detachable parts** which can be removed without the aid of a tool are removed and subjected, if necessary, to the relevant treatment with the main part. Machines fitted with an appliance inlet, plug or other connector are tested without the mating connector in place. Air filters are not removed.*

14.2.2 *Replacement:*

Machines other than IPX0 are subjected to tests of IEC 60529:2013 as follows:

– *IPX1 machines are subjected to the test described in 14.2.1;*
– *IPX2 machines are subjected to the test described in 14.2.2;*
– *IPX3 machines are subjected to the test described in 14.2.3a;*
– *IPX5 machines are subjected to the test described in 14.2.5. For this test, the water stream is applied from all practicable directions, including the underside of the machine;*

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– *IPX6 machines are subjected to the test described in 14.2.6. For this test, the water stream is applied from all practicable directions, including the underside of the machine;*

– *IPX7 machines are subjected to the test described in 14.2.7. For this last test, the machine is immersed in water containing approximately 1,0 % NaCl.*

Machines classified as IPX4 are subjected to the test described in 14.2.4a of IEC 60529:2013, except as follows:

– *the test is conducted with a circular horizontal unperforated support having a diameter of twice the oscillating tube radius minus 15 cm. The support is placed at the level of the pivot axis of the oscillating tube. During the test, the support is rotated about its vertical axis at a rate of (1 ± 0,1)/min;*

– *the machine is placed on the unperforated support; and*

– *the **cutting height** is set to 30 mm or the next higher **cutting position** when set on a hard level surface. Machines with a maximum **cutting height** setting of 30 mm or less are set at their maximum **cutting height** setting; and*

– *the horizontal centreline of the machine is aligned with the pivot axis of the oscillating tube at the start of test. The movement of the oscillating tube is limited to 90° either side from the vertical, the time for one complete oscillation (2 × 90°) being (6 ± 1) s;*

– *the duration of the test is 10 min.*

*Immediately after the appropriate treatment, the machine shall withstand the electric strength test of Annex D between **live parts** and **accessible parts**, the test voltage being 2 500 V. The function of any **SCF** shall not be impaired.*

14.3 to 14.5 These subclauses of Part 1 are not applicable.

15 Resistance to rusting

This clause of Part 1 is applicable.

16 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

17 Endurance

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

17.2 *Replacement:*

*The machine is operated at no load. The machine is fitted with the most unfavourable **cutting means** in accordance with 8.14.2 a) 103).*

*Series motors are supplied at a voltage such that the rotating speed of the **cutting means** is the same as that obtained in 12.2.1 at **rated voltage** or the lower limit of the **rated voltage range**. Other motor types and **lawnmowers** employing non-metallic filaments or one or more pivotally mounted cutting elements as the **cutting means** are operated at **rated voltage** or the lower limit of the **rated voltage range**.*

The machine is operated for 48 h. If the test is conducted on the same sample used for the tests of Clause 12, the 48 h is reduced by the running time necessary for the tests of Clause 12. During the test, the machine is placed in its normal operating position according to 8.14.2.

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Machines are operated continuously, or for a corresponding number of periods, each period being not less than 8 h.

The machine may be switched on and off by means of a switch other than that incorporated in the machine unless this disables a functionality of the machine switch.

During this test, replacement of the carbon brushes is allowed, and the machine is oiled and greased as in ***normal use****. If mechanical failure occurs and does not impair compliance with this document, the part that failed may be replaced.*

If the temperature rise of any part of the machine exceeds the temperature rise determined during the test of 12.1, forced cooling may be applied. If forced cooling is applied, it shall not alter the air flow of the machine or redistribute carbon deposits.

During these tests, overload protection devices incorporated in the machine shall not activate.

18 Abnormal operation

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

18.5 *Replacement:*

Protection against electric shock shall not be impaired when a **class II tool** (machine) is subjected to overload conditions according to the type of motor.

For machines with

– *motors having electronically commutated stator windings, compliance is checked by the test of 18.5.4;*

– *non-metallic filaments or one or more pivotally mounted cutting elements as the* ***cutting means*** *and series motors, compliance is checked by the test of 18.5.1;*

– *other motors, compliance is checked by the test of 18.5.3.*

18.5.2 This subclause of Part 1is not applicable.

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18.8 *Replacement of Table 4:*

Table 4 — Required performance levels

Type and purpose of SCF	Minimum Performance Level (PL)
Power switch (operator presence control) – prevent unwanted switch-on	b
Power switch (operator presence control) – provide desired switch-off	b
Provide desired direction of rotation of the **cutting means**	Not an **SCF**
Provide desired direction of rotation of the traction drive	a
Function to fulfil the requirements of Clause 18	a
Service brake as in 19.101.1.2	b
Parking brake as in 19.101.1.3	b
Interlocked **grass catcher** or **guard** as in 19.102.2.1	b
Prevent exceeding 150 % of the **cutting means** stopping time as required in 19.102.4 and 19.103.4	a
Prevent increase of rotational speed of **cutting means** that would cause non-compliance with 19.102.5	a
Prevent increase of rotational speed of **cutting means** that would cause non-compliance with 20.101.1	a
Prevent increase of rotational speed of **cutting means** that would cause non-compliance with 20.101.2	a
Prevent increase of rotational speed of **cutting means** that would cause non-compliance with 20.101.3	b
Any other speed limiting device	Not an **SCF**
Lock-off function as required by 21.104.2	b
Traction drive control system as in 21.104.3.1	b
Prevent self-resetting as required in 23.3	a

19 Mechanical hazards

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

19.1 *Replacement:*

All power-driven hazardous parts (e.g. drive belts), other than the **cutting means**, shall be so positioned or enclosed to provide adequate protection. The guarding of the **cutting means** is covered in 19.101, 19.102 and 19.103. Ground contacting parts (e.g. wheels) are considered not to be hazardous and are not required to be guarded.

All openings and safety distances shall conform to 4.2.4.1 and 4.2.4.3 of ISO 13857:2019 unless otherwise specified in this document.

Protective enclosures, covers, **guards** and the like shall have adequate mechanical strength for their intended purpose. They shall not be removable without the use of tools or shall withstand a force of 75 N in any direction.

Opening the following **guards** does not require the use of a tool:

a) interlocking **guards** which disable the protected moving parts;

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b) automatically closing **guards** for grass **discharge chutes**.

The use and adjustment of a **guard** shall not create other dangers, for example by reducing or obstructing the operator's view, by transferring heat, or causing other reasonably foreseeable hazards.

Compliance is checked by inspection, by measurement, by functional test, by the tests of Clause 20 and by means of the test probe B of IEC 61032:1997 with a force not exceeding 5 N. Prior to the application of the test probe, any soft materials (elastomers), such as soft grip coverings, shall be removed. It shall not be possible to touch power-driven hazardous parts with this test probe.

NOTE 101 In the United States of America, the following additional requirements apply.

A protective shield of a **lawnmower** shall have sufficient strength and resilience to sustain forces associated with reasonably foreseeable misuse during operation.

Compliance is checked by the following test.

*A 222 N static tensile force is to be uniformly distributed over not less than half the length of the shield. The force shall be applied for at least 10 s in the direction which produces the maximum stress on the shield. For the test, the shield shall be attached to the **lawnmower** in the manner in accordance with 8.14.2.*

The protective shield shall not permanently separate, crack or deform.

19.3 This subclause of Part 1 is not applicable.

19.4 This subclause of Part 1 is not applicable.

NOTE Requirements for handles are given in 19.102.3 and 19.103.1.

19.5 This subclause of Part 1 is not applicable.

19.6 This subclause of Part 1 is not applicable.

19.7 *Replacement:*

Lawnmowers shall have adequate stability.

Compliance is checked by the following test.

*For **lawnmowers** provided with an appliance inlet or a **supply cord** with a length between 0,2 m and 0,5 m, a mass of (500 ± 20) g is suspended from either*

– *the appliance inlet; or*
– *the **supply cord** plug; or*
– *any **supply cord** retaining device in accordance with 8.14.2*

whichever is the most unfavourable.

*For **lawnmowers** provided with a **supply cord** with a length not less than 10 m, the **supply cord** is placed resting on the inclined plane in the most unfavourable position.*

The machine is placed with the motor switched off in any normal position of use on a plane inclined at an angle of 10° to the horizontal. If, however, the machine is such that, were it to be tilted through an angle of 10° when standing on a horizontal plane, a part of it not normally in contact with the supporting surface would touch the horizontal plane, the machine is placed on a horizontal support and tilted in the most unfavourable direction through an angle of 10°. For the test, the machine is prevented from sliding.

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The machine shall not tip over.

19.8 This subclause of Part 1 is not applicable.

19.101 Requirements for all lawnmowers

19.101.1 Brake requirements and test method

19.101.1.1 General

A **lawnmower** exceeding a mass of 78 kg shall be equipped with a **service brake** and a **parking brake**.

Machines requiring a **service brake** and a **parking brake** shall fulfil the requirements of 19.101.1.2 and 19.101.1.3.

If steering-assist brakes are also used for the **service brake**, it shall be possible to connect them in a way that they apply both brakes with equal force.

Compliance is checked by inspection and by the requirements of 19.101.1.2 and 19.101.1.3.

19.101.1.2 Service brake

The **service brake** shall meet all of the following requirements:

– the **service brake** performance shall only rely on the effectiveness of the braking system;
– the **service brake** control shall be hand-operated;
– the **service brake control device** shall be located within the operator control zone (see Figure 101) and its position shall not interfere with the position of other controls; and
– if the **lawnmower** is equipped with combined traction clutch and brake controls, the **service brake** engagement shall simultaneously disengage the traction clutch.

NOTE 101 Examples of **service brakes** include mechanical, electric and hydrostatic means.

Compliance is checked by inspection and by manual test.

The **service brake** shall be capable of stopping the motion of the **lawnmower** so that the average measured stopping distance does not exceed 0,19 m for each 1 km/h of the maximum forward speed and maximum reverse speed, if a reverse traction drive is provided.

Compliance is checked by the following test.

*The tests are conducted on a **lawnmower** in its heaviest configuration in accordance with 8.14.2 and with*

– *pneumatic tyres, if any, inflated to the maximum recommended pressures for the **lawnmower** in accordance with 8.14.2; and*
– *brakes adjusted in accordance with 8.14.2; and*
– *any **grass catcher** filled to its maximum volumetric capacity with material of density (150 ± 10) kg/m^3. As an alternative to filling the **grass catcher** to its maximum volumetric capacity with a material of (150 ± 10) kg/m^3 density, an equivalent mass may be positioned and secured inside the **grass catcher** at its volumetric centre of gravity.*

The tests shall be conducted on a dry, smooth, hard concrete (or equivalent) surface with a maximum slope of 1 %.

*The **service brake** is first conditioned by running the **lawnmower** for 10 min during which 10 stops shall be performed from the maximum forward speed.*

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*If a reverse traction drive is provided, this break-in period shall be extended to 20 min during which the **service brake** shall be applied to stop the machine 10 times from maximum forward speed, and 10 times from maximum reverse speed.*

*If the **lawnmower** is equipped with separate traction drive and **service brake** controls, the traction drive is simultaneously disengaged with the **service brake** engagement.*

*After the conditioning procedure has been completed, the **service brake** test is conducted three times in the forward direction of travel and, for a **lawnmower** with a reverse traction drive, repeated three times in the reverse direction of travel.*

*With the **lawnmower** operating at its maximum ground speed, the traction drive control is released and a maximum force of 220 N is applied to the centre of the grip area of the hand control for the **service brake**. The stopping distance is measured for each test and the average value is calculated for each direction tested.*

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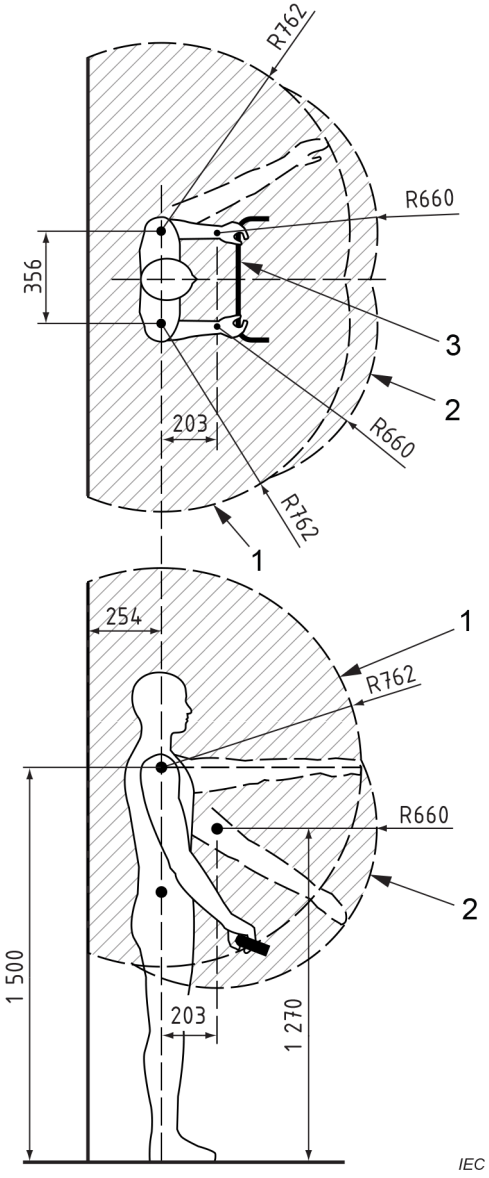
Dimensions in millimetres



Key

1 zone 1 – **operator control** zone

2 zone 2 – **operator control** zone when leaning against handle

3 handle

NOTE 1 Zone 1 is the area into which the extremities of a 95th percentile male can reach from the normal operator position.

NOTE 2 Zone 2 is the area into which a 5th percentile male or a 50th percentile female can reach when against the handle. This zone can also be reached by a 95th percentile leaning forward against the handle.

NOTE 3 All handles within zone 1 will reduce the zone by the space occupied and protected by the handle.

NOTE 4 Zone 1 includes the maximum range of movement of all frequently used **operator controls** but is not intended to represent preferred **operator control** positions.

Figure 101 – Operator control zones

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19.101.1.3 Parking brake

A **lawnmower** required to be equipped with a **service brake** shall also be equipped with a **parking brake**. The **parking brake** shall be capable of holding the **lawnmower** facing both uphill and downhill on a slope up to and including 16,7° (30 %).

To allow the removal of initial slack in the system, a distance of 50 mm movement is allowed during the first 30 s after the **parking brake** has been applied. There shall be no further movement after the 30 s.

The **parking brake** may be combined with the **service brake**.

The maximum force to actuate the **parking brake** shall not exceed

– 220 N for a hand-grip **parking brake**, actuated by hand gripping motion only; or
– 330 N for a hand-lever **parking brake**, actuated by arm motion with a hand on a lever; or
– 450 N for a foot-operated **parking brake**.

The unlocking force shall not exceed the maximum specified actuating force.

NOTE 101 The forces 220 N, 330 N and 450 N are considered as maximum forces that can be applied to meet the test requirements below. The operating forces during **normal use** would in general be less.

If the **lawnmower** is equipped with an automatic **parking brake**, it shall be activated when the **operator presence control** is released.

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

The tests are conducted

– *on the same sample and under the same conditions as in 19.101.1.2, if applicable;*
– *with the transmission in neutral and the motor stopped;*
– *if so equipped, with the hydrostatic bypass valve in the normal position for cutting grass;*
– *on a smooth flat surface with 16,7° (30 %) slope, and a coefficient of friction such that the **lawnmower** does not slide down the slope;*
– *with the **parking brake** applied; and*
– *for a period of 5 min, or if the **parking brake** is hydrostatic, for a period of 60 min.*

19.102 Particular requirements for rotary lawnmowers

19.102.1 Cutting means enclosure

19.102.1.1 General

For **rotary lawnmowers**, the **cutting means enclosure** shall comply with 5.3.1 of ISO 5395-2:2013/AMD1:2016/AMD2:2017, except that

– the foot protection test of Annex C of ISO 5395-1:2013/AMD1:2017 is replaced by the foot protection test of Annex CC, except it is not required to comply with all the other **discharge opening** requirements of ISO 5395-2:2013/AMD1:2016/AMD2:2017 but shall instead comply with the other **discharge opening** requirements of this document; and
– for **rotary lawnmowers** with a front opening, the foot protection requirement of 5.3.2 of ISO 5395-2:2013/AMD1:2016/AMD2:2017 is replaced by the requirements of 19.102.1.2.

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