



**NSAI**  
Standards

Irish Standard  
I.S. EN ISO 22867:2021

Forestry and gardening machinery -  
Vibration test code for portable hand-held  
machines with internal combustion engine  
- Vibration at the handles (ISO  
22867:2021)

**I.S. EN ISO 22867:2021**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

*This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):*

*NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.*

*This document is based on:*

EN ISO 22867:2021

*Published:*

2021-12-15

*This document was published  
under the authority of the NSAI  
and comes into effect on:*

2022-01-02

ICS number:

13.160

65.060.80

NOTE: If blank see CEN/CENELEC cover page

NSAI  
1 Swift Square,  
Northwood, Santry  
Dublin 9

T +353 1 807 3800  
F +353 1 807 3838  
E standards@nsai.ie  
W NSAI.ie

Sales:  
T +353 1 857 6730  
F +353 1 857 6729  
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

## National Foreword

I.S. EN ISO 22867:2021 is the adopted Irish version of the European Document EN ISO 22867:2021, Forestry and gardening machinery - Vibration test code for portable hand-held machines with internal combustion engine - Vibration at the handles (ISO 22867:2021)

This document does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

For relationships with other publications refer to the NSAI web store.

**Compliance with this document does not of itself confer immunity from legal obligations.**

*In line with international standards practice the decimal point is shown as a comma (,) throughout this document.*

This page is intentionally left blank

EUROPEAN STANDARD

EN ISO 22867

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2021

ICS 13.160; 65.060.80; C

Supersedes EN ISO 22867:2011

English Version

## Forestry and gardening machinery - Vibration test code for portable hand-held machines with internal combustion engine - Vibration at the handles (ISO 22867:2021)

Machines forestières et machines de jardin - Code d'essai des vibrations pour machines portatives tenues à la main à moteur à combustion interne - Vibrations au niveau des poignées (ISO 22867:2021)

Forst- und Gartenmaschinen - Schwingungsmessnorm für handgehaltene Maschinen mit Verbrennungsmotor - Schwingungen an den Handgriffen (ISO 22867:2021)

This European Standard was approved by CEN on 27 September 2021.

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

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

<b>Contents</b>	<b>Page</b>
<b>European foreword.....</b>	<b>3</b>
<b>Annex ZA (informative) Relationship between this European Standard and the requirements of EU Directive 2006/42/EC aimed to be covered.....</b>	<b>4</b>

## **European foreword**

This document (EN ISO 22867:2021) has been prepared by Technical Committee ISO/TC 23 "Tractors and machinery for agriculture and forestry" in collaboration with Technical Committee CEN/TC 144 "Tractors and machinery for agriculture and forestry" the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2022, and conflicting national standards shall be withdrawn at the latest by June 2022.

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

This document supersedes EN ISO 22867:2011.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

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

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

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## **Endorsement notice**

The text of ISO 22867:2021 has been approved by CEN as EN ISO 22867:2021 without any modification.

## Annex ZA (informative)

### Relationship between this European Standard and the requirements of EU Directive 2006/42/EC aimed to be covered

This European Standard has been prepared under Commission's standardization request "M/396 mandate to CEN and CENELEC for standardisation in the field of machinery" to provide one voluntary means of conforming to essential requirements of the Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery.

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 ZA.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 ZA.1 — Correspondence between this European Standard and Annex I of Directive  
2006/42/EC amended by Directive 2009/127/EC**

Relevant Essential Requirements of Directive 2006/42/EC	Clause(s)/sub-clause(s) of this EN	Remarks/Notes
1.5.9 Vibrations	4, 6, 7, 8, 9 and Annexes A to E	
2.2.1.1 Instructions	10 and Annexes A to E	

**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.



# INTERNATIONAL STANDARD

**ISO**  
**22867**

Third edition  
2021-11

---

---

## **Forestry and gardening machinery — Vibration test code for portable hand-held machines with internal combustion engine — Vibration at the handles**

*Machines forestières et machines de jardin — Code d'essai des  
vibrations pour machines portatives tenues à la main à moteur à  
combustion interne — Vibrations au niveau des poignées*



Reference number  
ISO 22867:2021(E)

© ISO 2021

**ISO 22867:2021(E)**



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

Page

<b>Foreword</b> .....	<b>iv</b>
<b>Introduction</b> .....	<b>v</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Vibration quantities to be measured and determined</b> .....	<b>2</b>
<b>5 Instrumentation</b> .....	<b>2</b>
5.1 General.....	2
5.2 Accelerometer.....	2
5.3 Fastening of accelerometer.....	2
5.4 Calibration.....	2
5.5 Speed indicator.....	3
<b>6 Measurement direction and location</b> .....	<b>3</b>
<b>7 Test and operating conditions of machine</b> .....	<b>3</b>
<b>8 Measurement and calculation</b> .....	<b>4</b>
8.1 General.....	4
8.2 Validity of measured data.....	5
<b>9 Information to be reported</b> .....	<b>5</b>
<b>10 Declaration and verification of vibration values</b> .....	<b>6</b>
<b>Annex A (normative) Chain-saws</b> .....	<b>8</b>
<b>Annex B (normative) Brush-cutters, grass-trimmers and hand-held edgers</b> .....	<b>12</b>
<b>Annex C (normative) Pole-mounted powered pruners</b> .....	<b>16</b>
<b>Annex D (normative) Hedge trimmers</b> .....	<b>19</b>
<b>Annex E (normative) Garden blowers/vacuums</b> .....	<b>24</b>
<b>Annex F (informative) Summary of results from interlaboratory tests (2007-2008) on a chain-saw, brush saw and grass-trimmer</b> .....	<b>28</b>
<b>Bibliography</b> .....	<b>29</b>

## ISO 22867:2021(E)

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 23, *Tractors and machinery for agriculture and forestry*, Subcommittee SC 17, *Manually portable forest machinery*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 144, *Tractors and machinery for agriculture and forestry*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 22867:2011), which has been technically revised.

The main changes compared to the previous edition are as follows:

- the scope has been expanded to include hand-held edgers;
- [Clause 9](#) (Information to be reported) has been amended to include “method used for in situ check of the instrumentation system”;
- the accelerometer position for pole-mounted powered pruners and long-reach hedge trimmers has been newly defined to better reflect handling of the machine in use;
- the engine speed tolerance for the operation mode “full load” for chain-saws has been broadened from  $3,5 \text{ s}^{-1}$  to  $4,5 \text{ s}^{-1}$ , to account for feasibility when cutting wood;
- hand-held edgers have been included in [Annex B](#);
- the definition of the position of the accelerometer on the front handle of pole mounted pruners in [Annex C](#) has been improved and [Figure C.1](#) has been modified accordingly;
- the definition of the position of the accelerometer on the front handle of long reach hedge trimmers in [Annex D](#) has been improved and [Figure D.3](#) has been modified accordingly.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

This document is a type-C standard as stated in ISO 12100:2010.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organisations, market surveillance, etc.)

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e. g. for maintenance (small, medium and large enterprises);
- consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document. The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document.

When requirements of this type-C standard are different from those which are stated in type-A or -B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

The vibration test code specified in this document is based on ISO 20643:2008, which gives general specifications for the measurement of the vibration emission of hand-held machinery. It differs from ISO 20643:2008 in the number of operators required to be involved in the test, with ISO 20643:2008 requiring at least three operators and this document only one. Another difference is that this document primarily positions the transducers next to the hand in the area between the thumb and the index finger, where they present the least disturbance to the operator gripping the machine.

The determination of vibration characteristics is primarily used for

- manufacturer's declarations,
- comparing data between machines in the machine family concerned,
- development work at the design stage, and
- the estimation of the vibration risk considering the specific conditions (parameters).

The use of this vibration test code ensures reproducibility of the determination of the vibration characteristics. Measurements made during particular operating modes are of interest for assessment of the vibration exposure, for example, over a typical working day.

The work cycles chosen for this test code are based on the following considerations of application:

- a) chain-saws with an engine displacement of  $< 80 \text{ cm}^3$  are used for various operations, including felling, bucking and delimbing;
- b) chain-saws with an engine displacement of  $\geq 80 \text{ cm}^3$  are normally used for felling and bucking.

Delimbing causes the saw to run at racing speed; therefore, racing is included only for saws with an engine displacement  $< 80 \text{ cm}^3$ .

**ISO 22867:2021(E)**

For brush-cutters, grass-trimmers, hedge-trimmers and pole-mounted powered pruners, the cutting mode (full load) is estimated to be valid only for short periods, and racing and idling are the two dominant modes. Moreover, the cutting mode has also been found to be diverse and not able to be performed under repeatable conditions.

For grass-trimmers, the full-load and racing modes are integrated into a single mode, owing to the loading effect of the flexible line.

For brush-cutters, hedge-trimmers, edgers and pole-mounted powered pruners, it is not possible to simulate the full-load mode in a feasible way, since there are no constant load conditions comparable to those of chain-saws. Since the operating mode “racing” is the worst case, it is taken as being representative.

For garden-blowers, full load and idling are the two dominant modes.

In either of these cases, transport and other tasks between operations cause the machine to run at idling. Experience has led to the conclusion that equal duration for the different working modes is a good estimation of daily exposure. The values obtained are values intended to be representative of the average of typical vibration magnitudes in real-world use of the machines. However, the actual magnitudes varies considerably from time to time and depends on many factors, including operator, task and cutting attachment. The state of maintenance of the machine itself might also be of importance.

# Forestry and gardening machinery — Vibration test code for portable hand-held machines with internal combustion engine — Vibration at the handles

**CAUTION** — Some of the test procedures specified in this document involve processes which could lead to a hazardous situation. Any person performing tests in accordance with this document shall be appropriately trained in the type of work to be carried out.

## 1 Scope

This document specifies a vibration test code for determining, efficiently and under standardized conditions, the magnitude of vibration at the handles of portable hand-held, internal-combustion-engine-powered forest and garden machinery, including chain-saws, brush-cutters, grass-trimmers, edgers, pole-mounted powered pruners, hedge-trimmers and garden-blowers.

Although the magnitudes measured are obtained in an artificial operation, they nevertheless give an indication of the values to be found in a real work situation.

Vibration test codes, as described in this document, enable the manufacturer to verify the effort regarding low vibration design.

## 2 Normative references

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.

ISO 5349-2:2001, *Mechanical vibration — Measurement and evaluation of human exposure to hand-transmitted vibration — Part 2: Practical guidance for measurement at the workplace*

ISO 6531:2017, *Machinery for forestry — Portable chain-saws — Vocabulary*

ISO 7112:2018, *Machinery for forestry — Portable brush-cutters and grass-trimmers — Vocabulary*

ISO 7293:1997, *Forestry machinery — Portable chain saws — Engine performance and fuel consumption*

ISO 8041-1:2017, *Human response to vibration — Measuring instrumentation — Part 1: General purpose vibration meters*

ISO 8893:1997, *Forestry machinery — Portable brush-cutters and grass-trimmers — Engine performance and fuel consumption*

ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

ISO 16063-1:1998, *Methods for the calibration of vibration and shock transducers — Part 1: Basic concepts*

ISO 20643:2008, *Mechanical vibration — Hand-held and hand-guided machinery — Principles for evaluation of vibration emission*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6531:2017, ISO 7112:2018, ISO 12100:2010 and ISO 20643:2008 apply.

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

- 
- Looking for additional Standards? Visit Intertek Inform Infostore
  - Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation
-