

BS EN 50636-2-100:2014



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Household and similar electrical appliances — Safety

Part 2-100: Particular requirements for hand-held mains-operated garden blowers, vacuums and blower vacuums

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National foreword

This British Standard is the UK implementation of EN 50636-2-100:2014.

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 secretary.

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

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June 2014

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English Version

Household and similar electrical appliances - Safety - Part 2-100:
Particular requirements for hand-held mains-operated garden
blowers, vacuum cleaners and blower vacuums

Appareils électrodomestiques et analogues - Sécurité -
Partie 2-100 : Exigences particulières pour les souffleurs,
aspirateurs et aspiro-souffleurs portatifs pour le jardin,
alimentés par le secteur

Sicherheit elektrischer Geräte für den Hausgebrauch und
ähnliche Zwecke - Teil 2-100: Besondere Anforderungen für
handgehaltene netzbetriebene Laubgebläse und/oder -
sauger

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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 CENELEC member.

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

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 50636-2-100:2014) has been prepared by CLC/TC 116, "Safety of motor operated electric tools".

The following dates are fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2014-12-20
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2016-11-25

EN 50636-2-100:2014 includes the following significant technical changes:

- rewording of some clauses;
- alignment to the European Machinery Directive 2006/42/EC;
- alignment to EN 60335-1:2012.

This document is to be used in conjunction with EN 60335-1:2012 and its amendments "*Household and similar electrical appliances - Safety – Part 1: General requirements*".

When "Part 1" is mentioned in this standard, it refers to EN 60335-1:2012.

This document supplements or modifies the corresponding clauses in Part 1, so as to convert that publication into the European Standard "*Particular requirements for **hand-held** mains-operated **garden blowers, vacuums and blower vacuums***".

Where a particular subclause of Part 1 is not mentioned in this document, that subclause applies as far as is relevant. Where this standard states "addition", "modification" or "replacement", the relevant text in Part 1 is to be adapted accordingly.

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

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

The following numbering system is used:

- subclauses, notes, tables and figures that are numbered starting from 101 are additional to those in Part 1;
- additional annexes are lettered AA, BB, etc.;

NOTE In this European Standard the following print types are used:

- requirements proper: in roman type;
- *test specifications: in italic type;*
- explanatory matter: in smaller roman type.

Words in **bold** in the text are defined in clause 3. When a definition concerns an adjective, the adjective and the associated noun are also in bold.

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

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.

For the relationship with EU Directive 2006/42/EC, see informative annex ZZ, which is an integral part of this document.

Warning: Other requirements arising from other EU Directives can be applicable to the products falling within the scope of this European Standard.

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Introduction

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

The machinery concerned and the extent to which hazards, hazardous situations and events are covered is as indicated in the scope of this document.

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

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1 Scope

Replacement:

This European Standard specifies the safety requirements and their verification for the design and construction of **hand-held** mains-operated electrical **garden vacuums**, and **garden blower/vacuums** with or without **shredding means** and **garden blowers**, hereinafter referred to as **machine(s)**, for use at and around the home or for similar purposes, their **rated voltage** being not more than 250 V single phase.

This European Standard does not apply to:

- machines powered by combustion engines,
NOTE 1 Combustion engine-driven machines are covered by EN 15503.
- machines driven by an external power source;
- machines powered from a 3 phase supply;
- vacuum cleaners intended primarily for use indoors, for water suction cleaning or animal grooming;
NOTE 2 EN 60335-2-2 deals with this type of machine.
- walk-behind, hand-guided (support-wheeled) and ride-on machines;
- combination of a mains driven and/or battery powered blowers and vacuums with internal combustion engines (hybrid);
- **back-pack powered blowers** and **back-pack powered vacuums**.

EMC and environmental aspects, except noise, have not been considered in this standard.

This European Standard deals with all the significant hazards presented by **hand-held** mains-operated electrical **garden vacuums**, **garden blower/vacuums** with or without **shredding means** and **garden blowers** when they are used as intended and under conditions of misuse which are reasonably foreseeable.

This European Standard is not applicable to machines, which are manufactured before the date of publication of this document by CENELEC.

2 Normative references

This clause of Part 1 is applicable except as follows:

Addition:

EN 60335-1:2012, *Household and similar electrical appliances – Safety – Part 1: General requirements* (IEC 60335-1:2010, mod.)

EN 60068-2-75:1997, *Environmental testing – Part 2: Tests – Test Eh: Hammer tests* (IEC 60068-2-75:1997)

EN 62233:2008, *Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure* (IEC 62233:2005, mod.)

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

EN 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 3744:2010)

EN ISO 4871:2009, *Acoustics – Declaration and verification of noise emission values of machinery and equipment* (ISO 4871:1996)

EN 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* (ISO 11201:2010)

EN ISO 11688-1:2009, *Acoustics – Recommended practice for the design of low-noise machinery and equipment – Part 1: Planning* (ISO/TR 11688-1:1995)

EN ISO 12100:2010, *Safety of machinery - General principles for design - Risk assessment and risk reduction* (ISO 12100:2010)

EN ISO 13849-1:2008, *Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design* (ISO 13849-1:2006)

EN ISO 13849-2:2012, *Safety of machinery – Safety-related parts of control systems – Part 2: Validation* (ISO 13849-2:2012)

EN ISO 13857:2008, *Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs* (ISO 13857:2008)

ISO 7000, *Graphical symbols for use on equipment – Registered symbols*

ISO 11090-1:1998, *Machine tools – Test conditions for die sinking electro-discharge machines (EDM) – Terminology and testing of accuracy – Part 1: Single column machines (cross slide table type and fixed table type)*

3 Definitions

This clause of Part 1 is applicable except as follows:

3.1.9 *Replacement:*

3.1.9

normal operation

the machine is operated at **rated voltage** when fully assembled in the most onerous operating conditions

Addition:

3.101

debris collector

part or combination of parts that provides a means for collecting **debris**

3.102

discharge opening

gap or opening through which **debris** may be discharged

3.103

guard

part of the machine or component incorporated to provide protection for the operator and/or bystander by means of a physical barrier

3.104

hand held garden blower

machine supported by hand, possibly assisted by a harness, etc., which blows **debris** (subsequently referred to as **blower**)

3.105

hand held garden blower/vacuum

machine supported by hand, possibly assisted by a harness, etc., which may perform as a **garden blower**, or, as a **garden vacuum** for picking up **debris** into a **debris collector**

Note 1 to entry In the **vacuum** mode there may also be a facility for shredding material.

3.106

hand held garden vacuum

machine supported by hand, possibly assisted by a harness, etc., which collects **debris** into a **debris collector**

Note 1 to entry This may also have a facility for shredding material.

3.107

handle

any part likely to be hand-held for guiding the machine in normal use

3.108

intended use

any use of the machine which is reasonably foreseeable, as described in the user instructions, and which is consistent with such activities as operating, starting, stopping or connecting to (or disconnecting from) a power source

3.109

operator control

any control requiring operator actuation to perform specific functions

3.110

clean fan construction

a construction where the **debris** being vacuumed up does not come into contact with the air-moving fan

3.111

dirty fan construction

a construction where the **debris** being vacuumed up comes into contact with the air-moving fan

3.112

operator presence control

a control designed so that it will automatically interrupt power to a drive when the operator's actuating force is removed

3.113

lock-on operator control

a control designed so that power to a drive is sustained when the operator's actuating force is removed

3.114

back-pack powered blower

garden blower designed to have the power source carried on the operator's back by means of a supporting device consisting of a frame and harness

3.115

back-pack powered vacuum

garden vacuum designed to have the power source and collector carried on the operator's back by means of a supporting device

3.116

debris

any organic material of vegetable origin such as leaves and grass clippings

3.117

shredding means

device designed to cut **debris** into smaller pieces

3.118

tortuous path

a design method which prevents access for the upper extremities by forcing them to orientations which are beyond their natural range of movements

4 General requirement

This clause of Part 1 is applicable.

5 General conditions for the tests

This clause of Part 1 is applicable except as follows:

5.6 Addition:

Electronic speed control devices are set for the highest speed.

All tests of Clause 21 shall be carried out on a new machine.

6 Classification

This clause of Part 1 is applicable except as follows:

6.1 Replacement:

Machines shall be of **class II** with respect to protection against electric shock.

Compliance is checked by inspection and by the relevant tests.

7 Marking and instructions

This clause of Part 1 is applicable except as follows:

7.1 Addition:

The machines shall be marked with

- business name and full address of the manufacturer and, where applicable his authorized representative;
- year of construction;
- designation of the machine,
designation of machine may be achieved by a combination of letters and/or numbers provided this code is explained by giving the explicit designation such as “garden vacuums”, “garden blowers”, “garden blower/vacuums”, etc. in the instructions supplied with the machine;

NOTE 1 An example of such code is “A123B”.

- designation of series or type,
allowing the technical identification of the product. This may be achieved by a combination of letters and/or numbers and may be combined with the designation of machine;

NOTE 2 The term “designation of series or type” is also known as model number.

- serial number, if any;
- mandatory markings;

NOTE 3 For machines and their related products intended to be put on the market in the EEA, CE-marking as defined in the applicable European Directive(s), e.g. the Machinery Directive.

- rated power in watts or **rated current** in amperes;

Guards designed to be opened or removed shall have a sign warning of the relevant hazard visible on the machine both when the **guard** is closed and when it is opened or removed.

Controls which may give rise to a hazard (e.g. mains switch in accordance with Clause 24.1) when operated shall be marked or so placed as to indicate clearly which part of the machine they control.

Where replaceable during normal use, except for spring type tines, the tines shall be marked to identify the part number(s) and the manufacturer, importer or supplier.

Marking giving warning information shall be easily legible and located as close as practicable to the relevant hazard.

The substance of the following warnings shall be placed in a prominent position on the machine. If a pictogram is used it shall be that shown in Annex AA. It shall be in contrasting colours to the base material. If it is embossed, stamped or cast colours are not required.

Markings or safety signs giving cautionary information shall be located close to the hazard.

A warning shall be located in a position easily visible to the operator, indicating the following (in words or pictograms/symbols):

WARNING:

- Switch off and remove plug from mains before cleaning or maintenance.
- Read the operator's manual.
- Do not expose to rain.
- Wear eye protection.
- Keep bystanders away.

7.9 This clause of Part 1 is not applicable.

7.12 Replacement:

An instruction manual shall be supplied with the machine, giving operating, servicing, maintenance and safety instructions that comply as appropriate with EN ISO 12100:2010, 6.4. The words 'Original instructions' shall appear on the language version(s) verified by the manufacturer or his authorised representative. Where no 'Original instructions' exist in the official language(s) of the country where the machine is to be used, a translation into that/those language(s) shall be provided by the manufacturer or his authorised representative or by the person bringing the machine into the language area in question. The translations shall bear the words 'Translation of the original instructions', and they shall be accompanied by a copy of the 'Original instructions'.

This instruction manual shall include:

- a) a repeat of those warnings required to be marked on the machine together with further explanation, where appropriate. Where safety signs are used in the marking on the machine, their function shall be explained;
- b) a warning to never allow children, persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge or people unfamiliar with these instructions to use the machine, local regulations may restrict the age of the operator;
- c) a warning to never operate the machine while people, especially children, or pets are nearby;
- d) a general description of the machine, the **intended use**, instructions for the proper use of the machine including advice on what the machine should be used for, how to use it for the intended purpose(s) and any reasonably foreseeable misuse thereof;
- e) warnings concerning ways - that experience has shown might occur - in which the machinery shall not be used;
- f) instructions for the proper assembly and disassembly of the machine for use, if the machine is not supplied in a completely assembled form;
- g) instructions for proper adjustment and any necessary user maintenance of the machine, including timescales and a warning of the danger of moving hazardous parts;
- h) instructions for the recommended replacement or repair of, or service attention to, critical components. Where parts are consumable, the spare part shall be clearly identified, e.g. by the use of a part number or other means;
- i) instructions on the operation of all controls;
- j) information how to start the machine safely;

- k) instructions for the operating position and the correct and safe operation of the machine such as moving, safe positioning, handling, clearing blockages and keeping the discharge chute clear of processed material for use, preparation, maintenance and storage of the machine;
- l) an advice to not overreach and to keep the balance at all times, to always be sure of the footing on slopes and to walk, never run;
- m) a warning not to touch moving hazardous parts before the machine is disconnected from the mains and the moving hazardous parts have come to a complete stop;
- n) an advice on the use, length and type of extension cords to be used (not lighter than required by 25.7);
- o) if a collecting facility is provided with the machine, instructions for when and how to attach and detach the collection device to and from the machine;
- p) information about the residual risks that remain despite the inherent safe design measures, safeguarding and complementary protective measures adopted;
- q) instructions to always wear substantial footwear and long trousers while operating the machine;
- r) instructions to disconnect the supply (e.g. remove the plug from the mains or remove the disabling device)
- whenever the machine is left by the user;
 - before clearing a blockage;
 - before checking, cleaning or working on the machine;
 - after striking a foreign object to inspect the machine for damage;
 - if the machine starts to vibrate abnormally, for immediately check;
- s) instructions when, where and how to inspect the machine, the supply and extension cord for signs of damage or ageing and, if permitted, how to make repairs;
- t) a warning never to operate the machine with defective **guards** or shields, or without safety devices, or if the cord is damaged or worn;
- u) an advice not to connect a damaged cord to the supply or touch a damaged cord before it is disconnected from the supply for the reason that damaged cords can lead to contact with live parts;
- v) an advice to keep extension cords away from moving hazardous parts to avoid damages to the cords which can lead to contact with live parts;
- w) the operating method to be followed in the event of accident or breakdown;
- x) instructions how to disconnect the machine from the mains, if the cord becomes damaged or entangled during use;
- y) recommendations:
- to connect the machine only to a supply circuit protected by a residual current device (RCD) with a tripping current of not more than 30 mA,
 - to avoid using the machine in bad weather conditions especially when there is a risk of lightning;
- z) information about airborne noise emissions of the machine according to Annex CC, this includes:
- give the A-weighted emission sound pressure level at the operator position as measured according to Annex CC, where this exceeds A-weighted 70 dB(A); where this level does not exceed A-weighted 70 dB(A), this fact shall be indicated;
 - give the sound power level emitted by the machinery as determined according to Annex CC, where the A-weighted emission sound pressure level at the operator position exceeds A-weighted 80 dB;
 - the uncertainties surrounding the determined noise emission values according to Annex CC.

- aa) the vibration total value to which the hands are subjected as determined according to Annex BB, where this exceeds 2,5 m/s²; where this level does not exceed 2,5 m/s², this fact shall be indicated;
- bb) the uncertainty of measurement for vibration value;
- cc) instructions how to proceed in case of abnormal vibrations;
- dd) mass in kilograms;
- ee) an advice to use hearing protection.

NOTE Examples of safety instructions are given Annex EE.

Compliance shall be checked by inspection.

7.12.1 This clause of Part 1 is applicable.

7.12.5 to 7.12.6 These clauses of Part 1 are applicable.

7.15 *Replacement:*

Marking giving cautionary information shall be located as close as practicable to the relevant hazard. Such marking shall be in one of the official languages of the country in which the machine is to be sold or appropriate pictograms/symbols in contrasting colours shall be used. If the marking is cast, embossed or stamped, colours are not required.

8 Protection against access to live parts

This clause of Part 1 is applicable.

9 Starting of motor operated appliances

This clause of Part 1 is not applicable.

10 Power input and current

This clause of Part 1 is applicable.

11 Heating

This clause of Part 1 is applicable.

11.7 *Replacement:*

Machines are operated until steady state conditions are reached.

12 Void

13 Leakage current and electric strength at operating temperature

This clause of Part 1 is applicable.

14 Transient overvoltages

This clause of Part 1 is applicable.

15 Moisture resistance

This clause of Part 1 is applicable.

16 Leakage current and electric strength

This clause of Part 1 is applicable.

17 Overload protection of transformers and associated circuits

This clause of Part 1 is applicable.

18 Endurance

This clause of Part 1 is not applicable.

19 Abnormal operations

This clause of Part 1 is not applicable except as follows:

19.7 Addition:

The test is made on machines of **dirty fan construction** and with a **lock-on operator control**. Machines with **clean fan construction** and/or fitted with an **operator presence control** are not operated under stalled conditions.

Replace Note 1 by the following:

NOTE 1 If a machine has more than one motor, the test is made on the motor driving the air-moving fan that the **debris** comes into contact with.

19.10 This clause of Part 1 is applicable.

20 Stability and mechanical hazards

This clause of Part 1 is applicable except as follows:

20.2 Replacement:

All power driven components shall be guarded to prevent contact during **intended use** and reasonably foreseeable misuse.

NOTE For guidance in connection with risk reduction by design, see 6.2, and for safeguarding measures, see 6.3 of EN ISO 12100:2010.

All **guards** shall be permanently attached to the machine and shall not be **detachable** without the use of **tools**. The opening of **guards** shall require the use of a **tool**. Exceptions to this are the opening or removal of interlocked **guards** which disable the protected moving parts, which shall be in accordance with EN ISO 12100. The safety-related control system of the interlocked **guards** shall comply at least with $PL_r = c$ of EN ISO 13849-1:2008. The interlock system shall cause the moving parts to come to a complete rest before access by the test finger of test probe B of EN 61032:1998 can be gained. The interlock function may be achieved by means of a switch. As a protection against the easy defeating of a switch used for the interlock, it shall not be possible to actuate the switch with the test finger of test probe B of EN 61032:1998 when the guard is open.

Compliance is checked by the methods given in EN ISO 13849-2:2012 and by manual tests using the test finger of test probe B of EN 61032:1998 with a force not exceeding:

- 5 N for testing the actuation of the switch,
- 20 N for testing the accessibility to the moving parts.

For straight line access, apertures and safety distances shall conform to EN ISO 13857:2008, 4.2.4.1 and 4.2.4.3.

For curved access ways, hazardous moving parts shall not be accessible by means of any of the arm probes shown in Figures 1 and 2.

Compliance is checked by inspection, measurement and, if applicable, the following **tortuous path** test.

Each arm probe (see Figure 1 and Figure 2) shall not be able to make contact with the hazardous moving parts when it is inserted into the openings up to the entire length of each arm probe. The articulations of each probe shall be manufactured to enable a rotation of $\pm 90^\circ$ about the articulation axis. The movements of the joints of each probe shall be free enough to allow easy articulation as the probe is inserted into the opening. Each probe shall be applied with a force not exceeding 20 N.

Each arm probe shall be twisted and moved in any direction allowed by the joints when approaching the hazardous moving parts. If necessary, one or more sections of the machine may be cut away to allow the probe to be configured such that it penetrates as far as possible towards the hazardous moving parts. If a section is removed this shall not allow the probe to penetrate further than it would have done before the removal of the section(s).

The test shall be carried out both with and without the **debris collector** in place. If the removal of the **debris collector** causes the power to the fan and/or **shredding means** to be interrupted, the test shall only be done with the **debris collector** in place.

Both arm probes shall not contact the hazardous moving parts. When the test is conducted with the **debris collector** in place it shall not be possible to push any part of the **debris collector** into hazardous moving parts.

Dimensions in mm

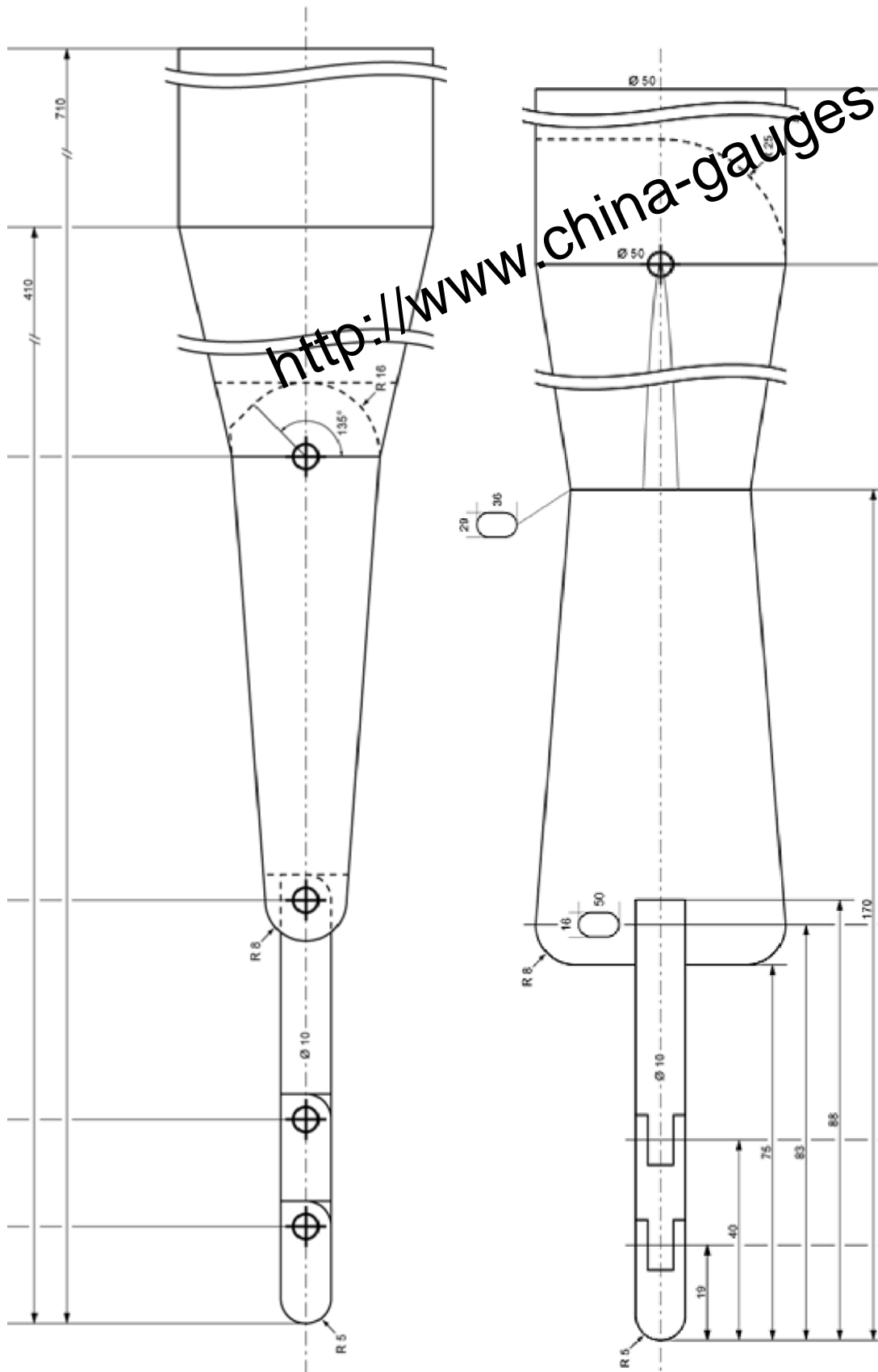
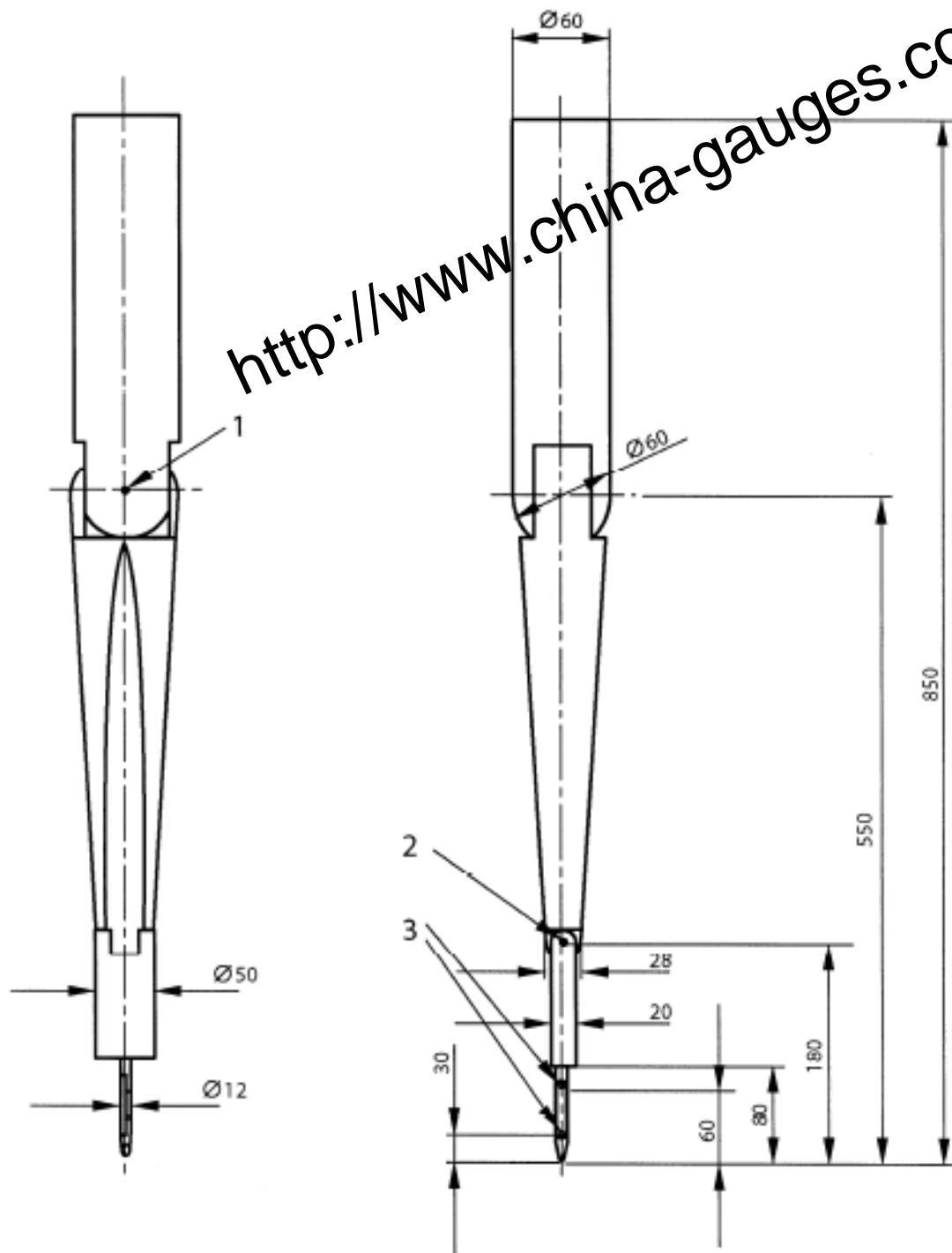


Figure 1 - Young Adult Arm Probe

Dimensions in mm



Key

- 1 axis of rotation of "elbow" joint
- 2 axis of rotation of "wrist" joint
- 3 axes of rotation of "finger" joints

NOTE This figure is not to scale.

Figure 2 - Adult Arm Probe

20.101 Handle

Hand held garden blowers, **garden vacuums and garden blower vacuums shall have at least one handle.**

Additionally, machines with a mass of exceeding 6 kg shall have a harness according to 20.102.

The gripping length of any **handle** required by this standard shall be at least 100 mm.

The gripping length of a bail or closed **handle** shall comprise any length that is straight or curved at a radius of greater than 100 mm together with any blend radius but not more than 10 mm at either or both ends of the gripping surface.

If a straight **handle** is supported centrally (i.e. 'T' type) the gripping length shall be calculated as follows:

- a) for **handles** with a periphery (not included the support) less than 80 mm the gripping length is the sum of the two parts either side of the support;
- b) for **handles** with a periphery (not including the support) of 80 mm or more the gripping length is the complete length from end to end.

Where appropriate the part of the **handle** containing the machine control actuator shall be counted as part of the **handle** gripping length. Finger grip or similar superimposed profiles shall not affect the method of calculating **handle** gripping length.

The operator shall be able to switch off without releasing the hold on the machine.

Compliance is checked by inspection.

20.102 Harness

Machines with a mass of more than 6 kg shall be equipped with at least a single shoulder harness. A double shoulder harness shall be provided for all machines exceeding 7,5 kg.

Single shoulder harnesses shall be designed in a way or be equipped with a quick release mechanism that ensures that the machine can be released quickly from the operator in the event of emergency. Double shoulder harnesses shall always have a quick release mechanism. The quick release mechanism shall only allow separation by deliberate action of the operator. The harness shall be adjustable to the size of the operator.

Machines exceeding 7,5 kg shall be supplied with a pad at the points of contact between the machine and the body.

Compliance is checked by inspection and functional test.

20.103 Noise

20.103.1 Reduction by design and protective measures

The machine shall be so designed and constructed that risks resulting from the emission of airborne noise are reduced to the lowest level taking account of technical progress and the availability of means of reducing noise, in particular at source, see for example EN ISO 11688-1:2009. The major sound sources are:

- air intake system;
- motor/engine cooling system;
- fan;
- vibrating surfaces;
- **shredding means.**

NOTE The success of the applied noise reduction measures can be assessed on the bases of the actual noise emission values in relation to other machines of the same family.

20.103.2 Reduction by information

Information on residual risks, after technical measures to control noise emission at the design stage have been implemented, shall be given in the instruction handbook.

20.104 Vibration

20.104.1 Reduction by design and protective measures

The machine shall be so designed to generate vibration levels as low as practicable. The main sources causing vibrations are the dynamic forces from motor, fan unbalanced moving parts, impact in gear sprockets, bearings and other mechanisms and the interaction between operator and machine.

NOTE CR 1030-1:1995 gives general technical information on widely recognized technical rules and means and can be used as a guideline for the design of reduced hand-arm vibration machines.

20.104.2 Reduction by information

Information on residual risks, after technical measures to control vibration emission at the design stage have been implemented, shall be given in the instruction handbook.

20.104.3 Vibration measurement

The weighted acceleration sum shall be measured and calculated in accordance with Annex BB.

21 Mechanical strength

This clause of Part 1 is applicable except as follows:

The impact energy shall be $1,0 \text{ J} \pm 0,05 \text{ J}$.

21.1.101 Requirements

The casing including all detachable **guards** shall have adequate mechanical strength and be constructed to withstand such rough handling that may be expected in normal use.

Compliance shall be checked by the test in 21.1.102.

21.1.102 Casing strength and rigidity test of hand-held machines

The machine is rigidly supported and three blows are applied to every point of the casing that is likely to be weak with an impact energy of $1,0 \text{ J} \pm 0,05 \text{ J}$ by means of the spring hammer as specified in EN 60068-2-75:1997.

To ensure that the machine is rigidly supported, it may be placed against a solid wall of brick, concrete or similar material. In that case a sheet of polyamide is tightly fixed to the wall, care being taken to ensure that there is no appreciable air gap between the sheet and the wall. The sheet shall have a Rockwell hardness of HR 100, a thickness of at least 8 mm and be sufficiently large to ensure that all parts of the machine are supported.

No parts of the guarding (casing) that are necessary for compliance with the requirements of this European Standard shall have become detached and no visible cracks shall have developed in these parts. It is not necessary for the machine to be operable after the test but, if it is operable, then immediately following this test it shall be run at its maximum speed for 30 s and again, no parts of the machine that are necessary for safe operation shall become detached and no visible cracks shall have developed in these parts.

If there is doubt as to whether a defect has occurred by the application of the preceding blows, this defect is neglected and the group of three blows is applied to the same place on a new sample which shall then withstand the test.

If an inner cover is protected by a decorative cover, the test shall be done with the decorative cover removed.

Damage to the finish, small dents and small chips that do not adversely affect the function of the **guard** are ignored.

Cracks not visible to the naked eye are ignored.

NOTE Further tests for casing/fan strength are being investigated.

21.101 Structural integrity of vacuums

21.101.1 Requirements

The machine shall have sufficient structural integrity to withstand the rigours of **normal operation** and break-up of the fan.

No part of the machine shall have become detached and there shall be no visible holes, tears or cracks in the enclosure surrounding moving parts or in the **debris collector**.

Compliance shall be checked by the test in 21.101.2.

21.101.2 Structural integrity test

A structural integrity test shall be carried out on all machines by vacuuming up ceramic prisms with triangular sides and a prism height of $6,5 \text{ mm} \pm 0,8 \text{ mm}$ and a mass of $0,4 \text{ g} \pm 0,02 \text{ g}$ (see Figure 3).

For machines of which the vacuum power is not capable of sucking up a sample prism the test does not apply.

One kg of the ceramic prisms shall be placed closely packed together in a single layer on a smooth flat hard surface. The machine shall be run at the maximum attainable speed. The in feed opening shall be held as closely as possible to the prisms, the prisms shall be sucked up as quickly as possible for 30 s. The prisms shall be collected in the **debris collector**.

After the ceramic prisms have been ingested the machine shall be run for 30 s more before being turned off.

Dimensions in mm

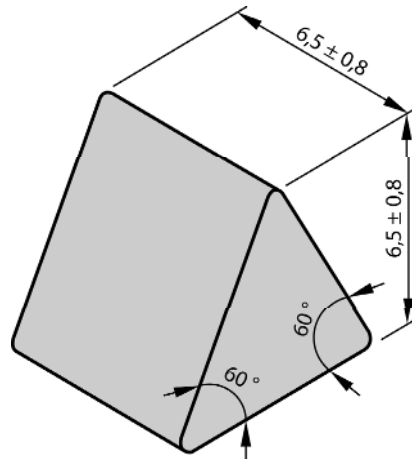


Figure 3 - Ceramic Prism

22 Construction

This clause of Part 1 is applicable.

23 Internal wiring

This clause of Part 1 is applicable.

24 Components

This clause of Part 1 is applicable except as follows:

24.1.3 Modification:

Switches shall be tested for at least 10 000 operations.

25 Supply connection and external flexible cords

This clause of Part 1 is applicable except as follows:

25.1 Replacement:

Machines shall be provided with a **supply cord** or an appliance inlet.

25.5 Replacement:

Machines shall be provided with one of the following:

- a **supply cord** not less than 10 m in length with **type X attachment**;
- a **supply cord** of length not exceeding 0,5 m with **type X or Y attachment** and terminating in a cable coupler;
- an appliance inlet.

25.7 Modification:

Replace the first paragraph by the following:

Supply cords shall not be lighter than:

- if rubber insulated, ordinary tough rubber sheathed flexible cord (code designation H05 RN-F);
- if polyvinyl chloride insulated, ordinary polyvinyl chloride sheathed flexible cord (code designation H05 VV-F);

26 Terminals for external conductors

This clause of Part 1 is applicable.

27 Provision for earthing

This clause of Part 1 is not applicable.

28 Screws and connections

This clause of Part 1 is applicable

29 Clearances, creepage distances, and solid insulation

This clause of Part 1 is applicable except as follows:

29.2 Addition:

Pollution degree 3 applies to this machine.

30 Resistance to heat and fire

This clause of Part 1 is applicable.

31 Resistance to rusting

This clause of Part 1 is applicable.

32 Radiation, toxicity and similar hazards

This clause of Part 1 is applicable except as follows:

Addition:

Machines are tested according to EN 62233:2008

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Annexes

The annexes of Part 1 are applicable except as follows:

Annex B (normative)

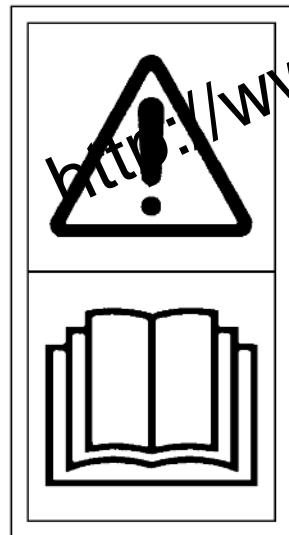
Appliances powered by rechargeable batteries

This annex of Part 1 is not applicable.

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Annex AA
(normative)

Safety signs and symbols which may be used on blowers and blower vacs



Note The symbol in the lower half of this pictogram may be replaced by the symbol shown in Clause 7.6 (symbol 1641 of ISO 7000).

Figure AA.1 - "Read operator's manual"

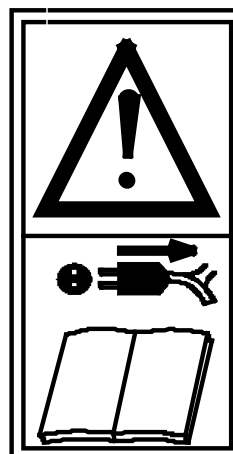
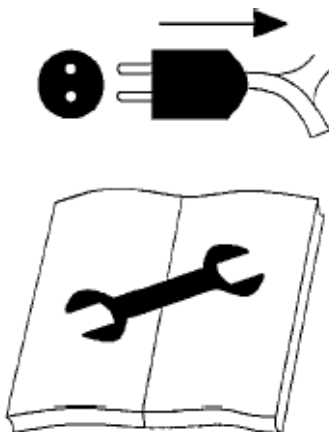


Figure AA.2 – "SWITCH OFF: Remove plug from mains before cleaning or maintenance"



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Figure AA.3 – “Do not expose to rain”



Figure AA.4 – “Wear eye protection”

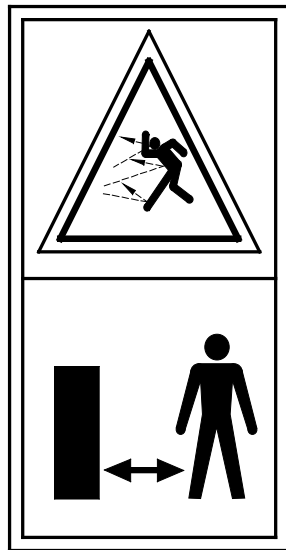


Figure AA.5 – “Keep bystanders away”

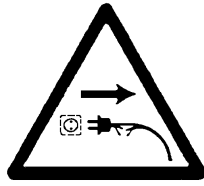


Figure AA.6 – “Disconnect the mains plug if the cord becomes damaged or entangled”

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Annex BB (normative)

Vibration

BB.1 Quantities to be measured

The values measured shall be:

- acceleration according to 3.1 of EN ISO 8662-1:1988, presented as weighted acceleration $a_{h,W}$ according to 3.3 of EN ISO 8662-1:1988;
- rotational speed of the **shredding means**.

BB.2 Instrumentation

BB.2.1 General

For specification of instrumentation, see 4.1 of EN ISO 8662-1:1988.

BB.2.2 Transducer

For specifications of transducer, see 4.1 of EN ISO 8662-1:1988.

BB.2.3 Fastening of transducer

Fastening of transducer shall be in accordance with 4.2 of EN ISO 8662-1:1988.

BB.2.4 Calibration

Calibration shall be made in accordance with 4.8 of EN ISO 8662-1:1988.

BB.3 Measurement direction and measurement location

BB.3.1 Measurement direction

Measurements shall be made on each **handle** for the three directions x, y and z (see Figure BB.1 for **hand-held** machines).

BB.3.2 Measurement location

Typical locations of the transducer assemblies and directions of measurement are shown in Figure BB.1 for **hand-held** machines.

BB.4 Test procedure

BB.4.1 Determination of working procedure

Tests shall be carried out on a new, normal production machine featuring standard equipment.

The machine shall be run until stable conditions are reached before the test is commenced. All speed setting devices shall be adjusted to the highest figure.

The **rated voltage** or the upper limit of the **rated voltage range** and/or **frequency** shall be maintained during the test at 0,98 to 1,02 times the stated values. The supply voltage of mains powered machines is measured at the plug of the cable or cord supplied, not at the plug of any extension cable or cord. If possible battery powered machines shall be powered by an external power source maintained at the nominal voltage of the battery.

During the test, the machine shall be held by a human hand as in **normal operation** and the fan and where applicable the **shredding means** shall be driven. Contact between the hand and the transducer shall be avoided.

BB.4.2 Measurement procedure

BB.4.2.1 General

For each **handle** a series of five tests shall be carried out in all modes using one operator. The machine shall be held out of contact with any surface.

Each reading shall be obtained from the signal time suitable for the test equipment being used. Duration of the test shall not be less than 8 s unless it is proven that a shorter duration will give equivalent results.

Measurement for the three directions (see BB.3) shall be made simultaneously.

BB.4.2.2 Hand-held machines

Adjustable **handle(s)** shall be set to the mid-position. If a harness is provided, it shall be worn by the operator during the test. The machine **handle(s)** shall be held in the normal operating position with the lowest point of the air nozzle (50 ± 25) mm above the ground.

The measurements shall be carried out with an operator who shall be $1,75 \text{ m} \pm 0,05 \text{ m}$ tall.

BB.5 Determination of the measurement result

The measurement result of each **handle** shall be determined as the arithmetic mean over the $a_{h,W}$ value of each test. If a single figure is quoted, it shall be the higher of the two.

BB.6 Reduction as a safety requirement

BB.6.1 Reduction by design and protective measures

The machine shall be designed to generate a vibration level as low as practicable. The main sources causing vibration are the:

- oscillating forces from the motor;
- **shredding means**;
- unbalanced moving parts;
- impact in gears, bearings and other mechanisms;
- interaction between operator, machine and material being worked.

NOTE 1 CR 1030-1:1995 gives general technical information on widely recognised technical rules and means to be followed in the design of machines for low hand-arm vibration solutions.

NOTE 2 Besides the vibration reduction of the source, technical measures to isolate the vibration source from the **handle** may be used, when appropriate, such as isolators and resonating masses.

BB.6.2 Reduction by information

After taking possible technical measures for vibration reduction, it is still recommended that, when appropriate, the instruction handbook recommends:

- the use of low-vibration operating modes, and/or limited time of operation;
- the wearing of personal protection equipment (PPE)

BB.6.3 Vibration measurement

For the measurement of hand/arm vibration, the methods given in Annex BB shall be used.

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Dimensions in mm

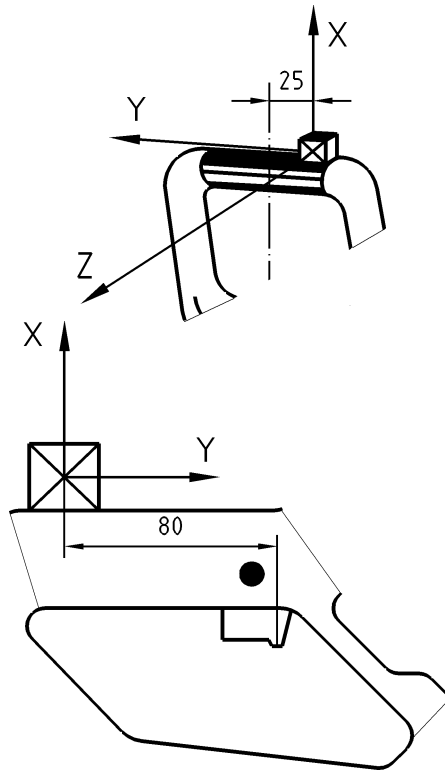


Figure BB.1 – Examples of transducer location/orientation (hand-held machines)

If the measurements of 80 mm cannot be obtained, the transducer is placed at the rear end of that portion of the **handle** intended to be grasped. If the measurement of 25 mm cannot be obtained, the transducer shall be placed as close as possible to this position, avoiding contact with the hand.

Annex CC
(normative)

Noise test code – Engineering method (grade 2)

CC.1 Scope

This noise test code specifies the information necessary to carry out efficiently and under standardised conditions the determination of the noise emission characteristics of hand-held machines.

Noise emission characteristics include the emission sound pressure level at the operator position and the sound power level. The determination of these quantities is necessary for:

- manufacturers to declare the noise emitted;
- comparing the noise emitted by machines in the family concerned;
- purposes of noise control at the source at the design stage.

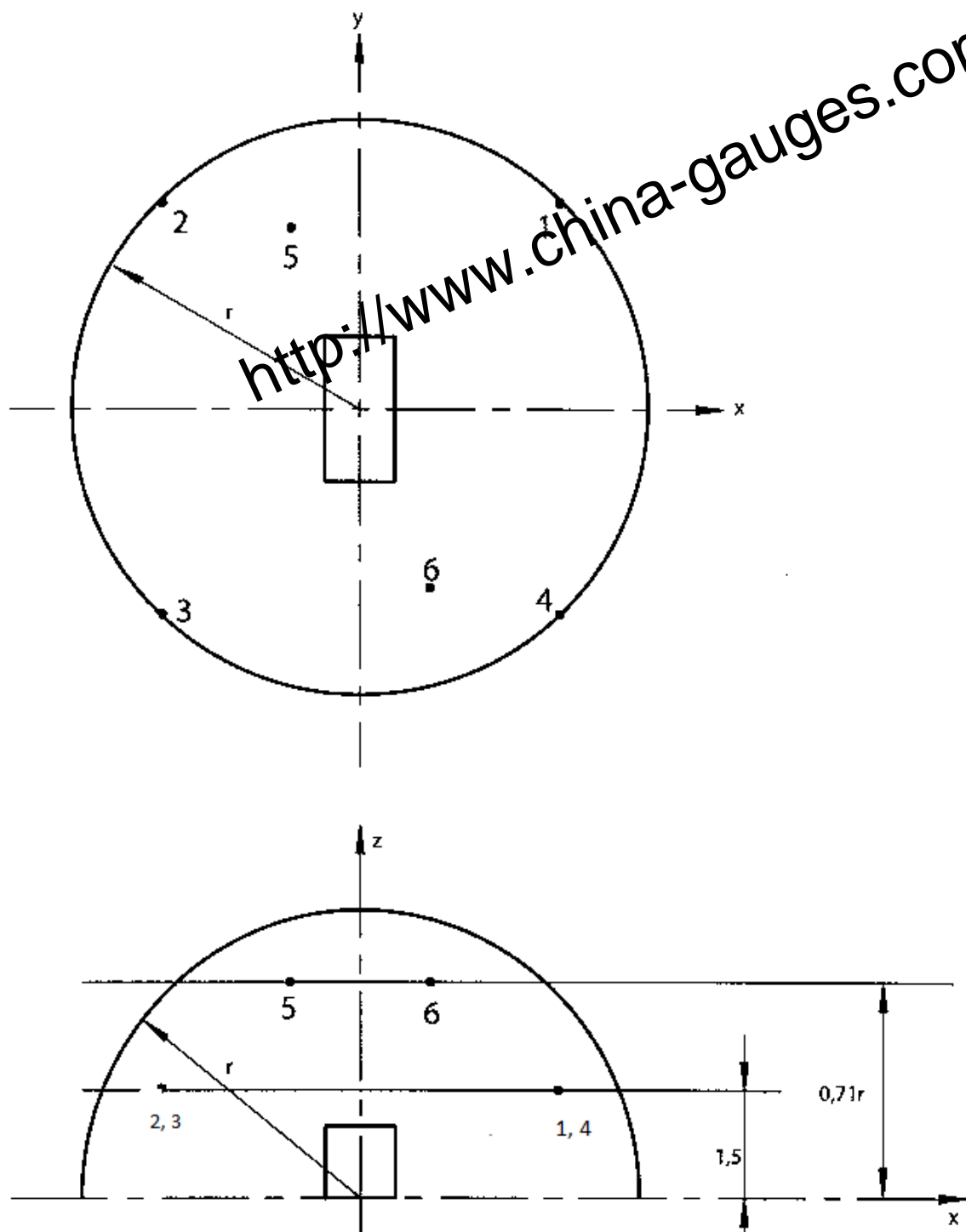
The use of this noise test code ensures reproducibility of the determination of the noise emission characteristics within specified limits determined by the grade of accuracy of the basic noise measurement method used. Noise measurement methods allowed by this standard give results with grade 2 of accuracy.

CC.2 A-weighted sound power level determination

For the determination of A-weighted sound power level, EN ISO 3744:2010 shall be used subject to the following modifications or additional requirements:

- the measurement surface shall be a hemisphere with a radius $r = 4$ m, the microphone array shall be a six microphone arrangement with the positions described in Figure CC.1 and Table CC.1;
- the reflecting surface shall be replaced by an artificial surface which complies with CC.4.1 or by natural grass which complies with CC.4.2. Reproducibility of results using natural grass is likely to be lower than that required for grade 2 of accuracy. In the case of dispute, measurements shall be carried out in the open air and on the artificial surface;
- environmental conditions shall be within the limits specified by the manufacturers of the measuring equipment. The ambient air temperature shall be in the range from 5 °C to 30 °C and the wind speed shall be less than 8 m/s and preferably less than 5 m/s;
- for measurements in the open air K_{2A} shall be taken as 0 dB;
- for measurements indoors, the value of K_{2A} , determined without artificial surface and in accordance with Annex A of ISO 3744:2010, shall be ≤ 2 dB, in which case K_{2A} shall be taken as 0 dB.

Dimensions in mm



Key

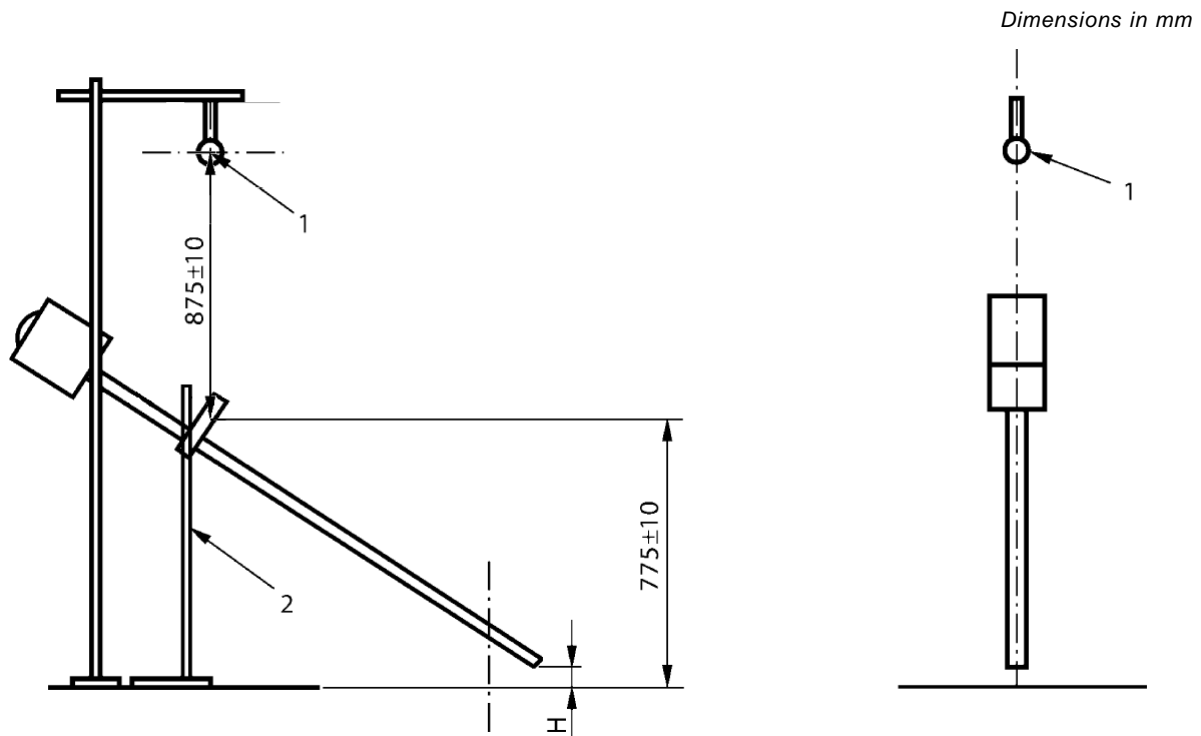
r radius of hemisphere

Figure CC.1 – Microphone positions on the hemisphere (see Table CC.1)

Table CC.1 – Co-ordinates of microphone positions

Position no.	x/r	y/r	z
1	+0,7	+0,7	1,5 m
2	-0,7	+0,7	1,5 m
3	-0,7	-0,7	1,5 m
4	+0,7	-0,7	1,5 m
5	-0,27	+0,65	0,71 r
6	+0,27	+0,65	0,71 r

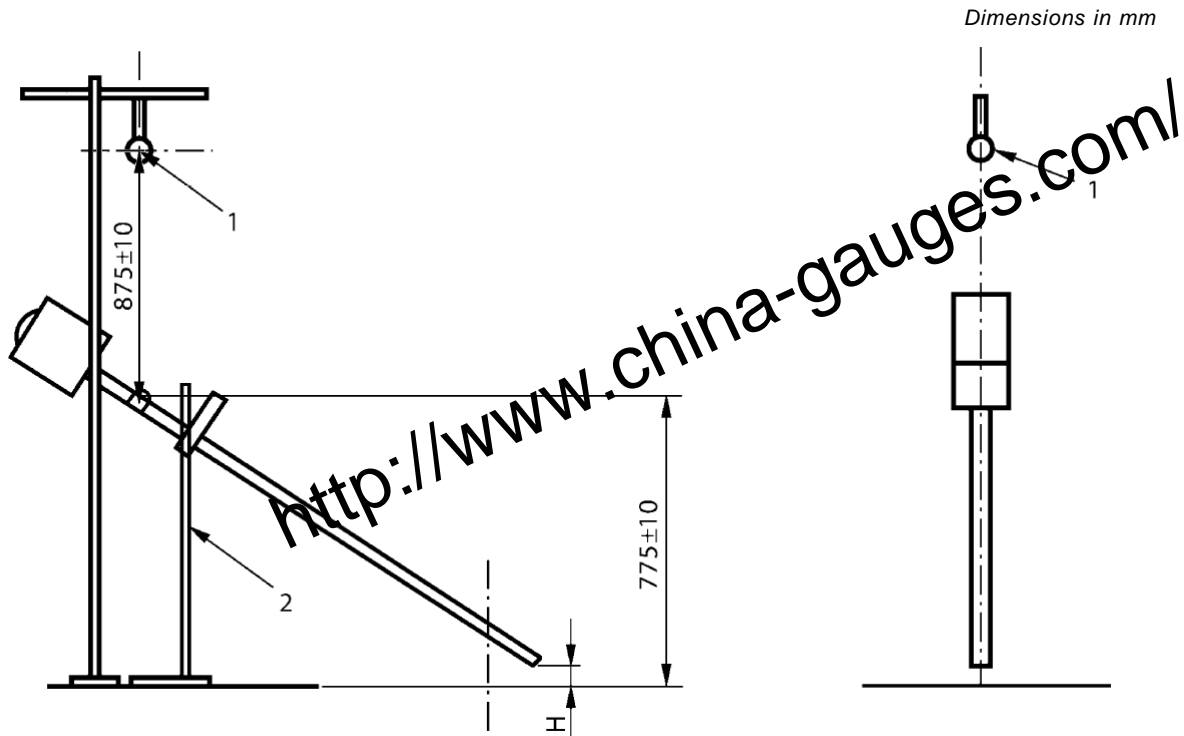
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Key

- 1 lateral position of the microphone (for operator's position)
- 2 test fixture
- H lowest point of the air nozzle

Figure CC.2 - Test set-up for machines with suspension point



Key

- 1 lateral position of the microphone (for operator's position)
- 2 test fixture
- H lowest point of the air nozzle

Figure CC.3 - Test set-up for machines without suspension point

CC.3 A-weighted emission sound pressure level measurement

For the measurement of the A-weighted emission sound pressure level, EN ISO 11201:2010 grade 2 shall be used subject to the following modifications or additional requirements:

- 1) the reflecting surface shall be replaced by an artificial surface which complies with CC.4.1 or by natural grass which complies with CC.4.2. Reproducibility of results using natural grass is likely to be lower than that required for grade 2 of accuracy. In the case of dispute, measurements shall be carried out in the open air and on the artificial surface;
- 2) environmental conditions shall be within the limits specified by the manufacturers of the measuring equipment. The ambient air temperature shall be in the range from 5 °C to 30 °C, and the wind speed shall be less than 8 m/s and preferably less than 5 m/s;
- 3) the microphone positions for the determination of the emission sound pressure level at the workstation are given in the Figures CC.2 and CC.3:
 - a) For machines with a suspension point the microphone shall be located (875 ± 10) mm vertically above the suspension point. See Figure CC.2.
 - b) For machines without suspension point the microphone shall be located (875 ± 10) mm vertically above the centre of the **handle**. See Figure CC.3.

CC.4 Requirements for the test floor

CC.4.1 Artificial surface

The artificial surface shall have absorption coefficients as given in Table CC.2, measured in accordance with EN ISO 354:2003.

Table CC.2 – Absorption coefficients

Frequencies Hz	Absorption coefficients	Tolerance
125	0,1	± 0,1
250	0,3	± 0,1
500	0,5	± 0,1
1 000	0,7	± 0,1
2 000	0,8	± 0,1
4 000	0,9	± 0,1

The artificial surface shall be placed on a hard, reflecting surface and have a size of at least 3,6 m × 3,6 m placed at the centre of the test environment. The construction of the supporting structure shall be such that the requirements for the acoustic properties are also met with the absorptive material in place. The structure shall support the operator to avoid compression of the absorbing material.

NOTE See Annex DD for an example of a material and construction which can be expected to fulfil these requirements.

CC.4.2 Natural grass

The test environment shall be covered, at least for the horizontal projection of the measurement surface used, with high quality natural grass. Before the measurements are taken, the grass shall be cut with a mower to a height of cut as near as possible to 30 mm. The surface shall be clean of grass clippings and **debris** and shall be visibly free of moisture, frost or snow.

CC.5 Installation, mounting and operating conditions

Measurements shall be carried out on a new, normal production machine featuring standard equipment as provided with the machine.

The machine shall be run until stable conditions are reached before the test is commenced. The blowers shall be operated at its nominal speed and the nominal air flow stated by the manufacturer.

For electric motors supplied from mains:

- the supply voltage/ frequency shall comply with the upper limit of the **rated voltage range** and **frequency** and shall be maintained during the test at 0,98 to 1,02 times the stated values;
- the supply voltage of mains powered machines is measured at the plug of the cable or cord supplied, not at the plug of any extension cable or cord.

For electric motors supplied from batteries:

- noise measurements shall be started with fully charged batteries as specified by the User Instructions but shall not be continued when the battery voltage under load drops to lower than 0,9 times the battery voltage under load at the beginning of the measurements for lead-acid batteries, or to lower than 0,8 times for other batteries;
- the battery voltage shall be measured at the battery terminals.

During the test the fan and **shredding means** shall be engaged and unloaded.

Measurements shall be made with maximum motor speed. If the machine has a governor which is below that speed, the measurement shall be made at the maximum revolution speed stipulated by the user instructions with the **shredding means** engaged.

Adjustable **handle(s)** shall be set to the mid-position. If a harness is provided, it shall be used during the test. The machine **handle(s)** shall be held in the normal operating position with the plane of the **shredding means** parallel or perpendicular to the ground, as appropriate, at a height of (50 ± 25) mm.

A motor speed indicator shall be used to check the speed of the motor. It shall have an accuracy of $\pm 2,5$ % of the reading. The indicator and its engagement with the machine shall not affect the operation during the test.

Use a fixture, which holds the machine in the intended position and does not cause any reflections.

NOTE A flexible mount is recommended to avoid any structural resonance.

a) Machines with a suspension point:

The machine shall be attached to the test fixture so that the suspension point is (775 ± 10) mm above the ground. The lowest point of the air nozzle shall be so that H is (50 ± 25) mm above the ground, see Figure CC.2. If the suspension point is adjustable select the position so that dimension H is within the required range.

b) Machines without suspension point:

The machine shall be attached to the test fixture so that the middle of the grip position of the **handle** is (775 ± 10) mm above the ground. The lowest point of the air nozzle shall be so that H is (50 ± 25) mm above the ground. See Figure CC.3.

The machine shall be oriented so that the air nozzle is pointing along and over the x-axis and the centre of the motor is above the centre point for the hemisphere.

The measurement time shall be at least 15 s.

For the sound power level determination, the cutting device shall be above the centre of the hemisphere.

CC.6 Measurement uncertainties

The total measurement uncertainty of the emission sound pressure level respectively sound power level is depending on the standard deviation σ_{R0} given by the applied noise emission measurement method and the uncertainty associated with the instability of the operating and mounting conditions σ_{omc} . The resulting total uncertainty is then calculated from the following formula:

$$\sigma_{tot} = \sqrt{\sigma_{R0}^2 + \sigma_{omc}^2}$$

NOTE 1 σ_{tot} was formerly denoted as σ_R !

The upper bound value of σ_{tot} is about 1,5 dB for a grade 2 measurement method, assuming a noise source which emits sound without significant tones.

NOTE 2 For machines with a rather constant noise emission a value of 0,5 dB for σ_{omc} can apply. In other cases, e.g. a large influence of the material flow into and out of the machine or material flow that varies in an unpredictable manner, it is possible that a value of 2 dB may be more appropriate. Methods to determine σ_{omc} are described in the basic measurement standards.

The expanded measurement uncertainty U , in decibels, shall be calculated from $U = k \sigma_{tot}$, with k the coverage factor.

NOTE 3 The expanded measurement uncertainty depends on the degree of confidence that is desired. For the purpose of comparing the result with a limit value, it is appropriate to apply the coverage factor for a one-sided normal distribution. In that case, the coverage factor $k = 1,6$ corresponds to a 95 % confidence level. Further information is given in EN ISO 4871:2009.

NOTE 4 The expanded measurement uncertainty U is denoted as K in EN ISO 4871:2009.

NOTE 5 The expanded measurement uncertainty as described in this European Standard does not include the standard deviation of production which is used in EN ISO 4871:2009 for the purpose of making a noise declaration for batches of machines.

CC.7 Information to be recorded and reported

CC.7.1 Information to be recorded

The information to be recorded covers all of the technical requirements of this noise test code. Any deviations from this noise test code or from the basic standards upon which it is based are to be recorded together with the technical justification for such deviations.

CC.7.2 Information to be reported

The information to be included in the test report is at least that which is required to prepare a noise declaration or to verify the declared values. Thus as a minimum the following information shall be included:

- reference to this noise test code and to the basic standards used;
- description of the machine;
- description of the mounting and operating conditions;
- the noise emission values obtained.

It shall be confirmed that all requirements of the noise test code have been fulfilled, or, if this is not the case, any unfulfilled requirements shall be identified. Deviations from the requirements shall be stated and technical justification for the deviations shall be given.

CC.8 Declaration and verification of noise emission values

The declaration of the A-weighted emission sound pressure level shall be made as a dual number noise emission declaration according to EN ISO 4871:2009, thus declaring the noise emission value L_{pA} and separately the respective uncertainty K_{pA} .

The declaration of the A-weighted sound power level L_{WA} shall be made as a single number noise emission declaration according to EN ISO 4871:2009, thus declaring the sum of L_{WA} and the respective uncertainty K_{WA} .

The noise emission values shall be rounded to the highest decibel.

The noise declaration shall state that the noise emission values have been obtained according to this noise test code and to the basic standards EN ISO 11201:2010 grade 2 and EN ISO 3744:2010.

If this statement is not true, the noise emission declaration shall indicate clearly what the deviations are from this standard and/or from the basic standards.

If undertaken, verification shall be done according to EN ISO 4871:2009 by using the same mounting, installation and operating conditions as those used for the initial determination of the noise emission values.

Annex DD (informative)

Example of a material and construction fulfilling the requirements for an artificial surface

DD.1 Material

Mineral fibre, 20 mm thick, having an airflow resistance of 41 kN s/m^4 and a density of 25 kg/m^3 .

DD.2 Construction

As is shown in Figure DD.1, the artificial flooring of the measurement site is sub-divided into nine joint planes, each of approximately $1,20 \text{ m} \times 1,20 \text{ m}$. The backing layer (a) of the construction as shown in Figure DD.1 consists of chipboard, 19 mm thick, coated with a plastics material on both sides. Such boards are used, for example, for the construction of kitchen furniture. The cut edges of the chipboards should be protected against moisture by applying a coat of plastic paint. The outsides of the flooring are bordered by a two-legged aluminium section (d), its leg height being 20 mm. Sections of this profile material are also screwed to the edges of the joint planes where they serve as spacers and attachment points.

On the middle joint plane on which the machine is placed during measurement as well as any other place on which the operator can get to stand on, aluminium T-sections (c) with a leg length of 20 mm are mounted as spacers. These sections also provide exact markings which facilitate the alignment of the machine in the middle of the measurement site. The prepared boards are then covered with the insulating felt material (b) cut to size.

The felt flooring of the joint planes which are neither stood on nor driven over (type A surface in Figure DD.1) are covered with a simple wire mesh fastened to the edge strips and to the attachment points; for this purpose, the sections should be provided with holes. Thus, the material is adequately attached, but it remains possible to replace the felt material should it become soiled. As a wire mesh, a so-called aviary wire (e) with a mesh width of 10 mm and a wire diameter of 0,8 mm has proved to be suitable. This wire appears to protect the surface adequately without affecting the acoustic conditions.

Protection by simple wire mesh is not, however, sufficient in the area subjected to traffic (type B surface in Figure DD.1). For these surfaces, the use of wire grating of corrugated steel wire (f) with a diameter of 3,1 mm and a mesh width of 30 mm has proved to be suitable.

The construction of the measurement site as described above offers two advantages: it can be prepared without much time and effort, and all the materials are easily obtainable.

The fact that the microphone positions are not situated directly above the flooring of the measurement site allows the microphones to be easily mounted on stands, assuming that the ground is even and hard as, for example, an asphalt or concrete site.

When arranging the microphones, account has to be taken of the fact that the height of the microphones has to be determined in relation to the surface of the flooring of the measurement site. Therefore, it shall be 40 mm higher when measuring from the ground under the microphone.

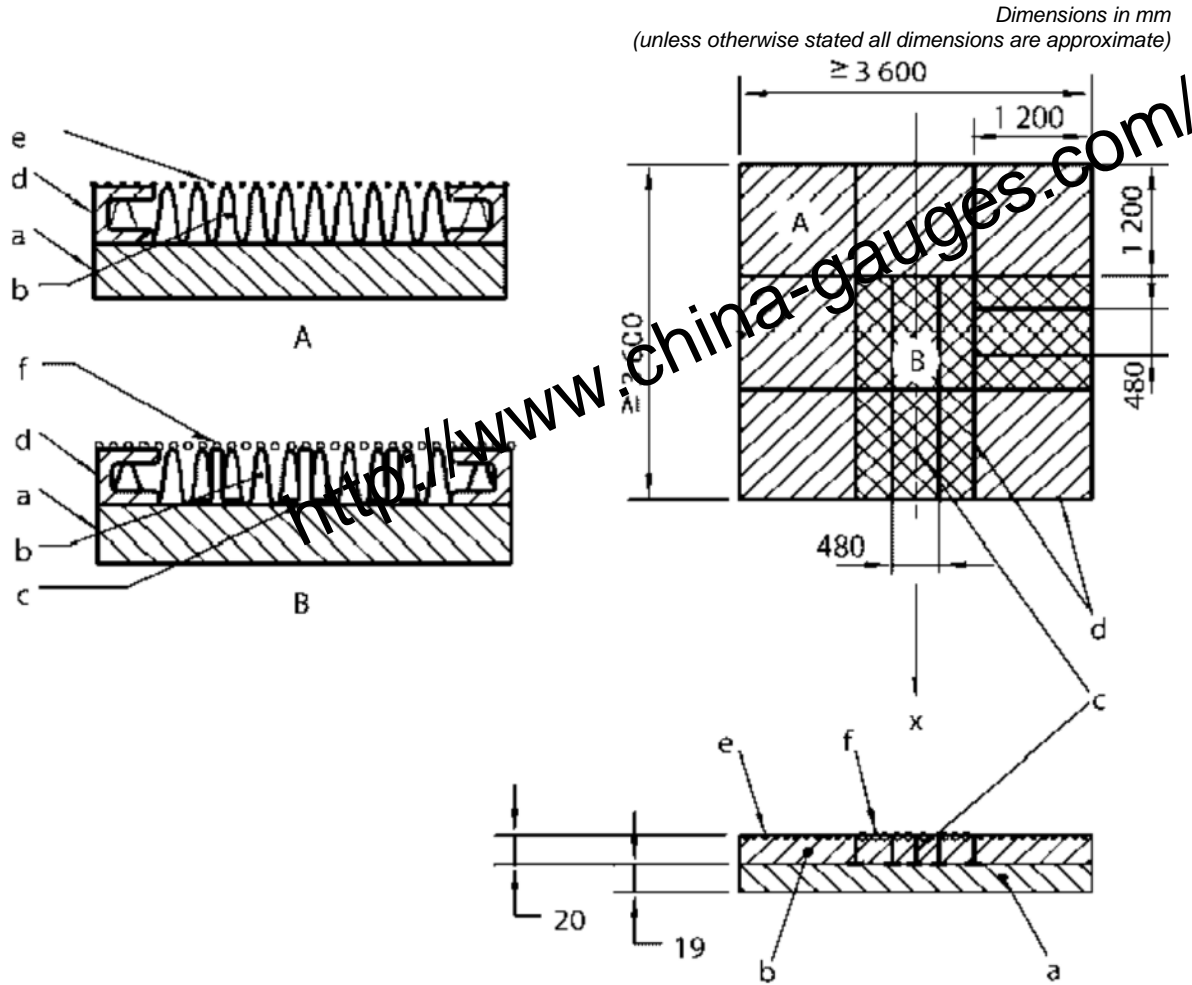


Figure DD.1 – Sketch of the measurement surface covered with an artificial surface (not to scale)

Annex EE (informative)

Safety instructions for hand-held mains-operated electrical garden vacuums, and garden blower/vacuums with or without shredding means and garden blowers

EE.1 General

This annex presents safe operating practices for **hand-held** mains-operated electrical **garden vacuums**, and **garden blower/vacuums** with or without **shredding means** and **garden blowers**.

These practices are not all inclusive. The substance of these requirements should be provided with each machine as appropriate and tailored to the specific type of machine.

It should also include information concerning noise and vibration levels and any necessary warnings, together with the following:

IMPORTANT
READ CAREFULLY BEFORE USE.
KEEP FOR FUTURE REFERENCE.

EE.2 Safe operating practices for hand-held mains-operated electrical garden vacuums, and garden blower/vacuums with or without shredding means and garden blowers

EE.2.1 Training

- a) Read the instructions carefully. Be familiar with the controls and the correct use of the machine.
- b) Never allow children or people unfamiliar with these instructions to use the machine. Local regulations can restrict the age of the operator.
- c) Keep in mind, that the operator or user is responsible for accidents or hazards occurring to other people or their property.

EE.2.2 Preparation

- a) Obtain ear protection and safety glasses. Wear them at all times while operating the machine.
- b) While operating the machine always wear substantial footwear and long trousers. Do not operate the machine when barefoot or wearing open sandals. Avoid wearing clothing that is loose fitting or that has hanging cords or ties.
- c) Do not wear loose clothing or jewellery that can be drawn into the air inlet. Keep long hair away from the air inlets.
- d) Operate the machine in a recommended position and only on a firm, level surface.
- e) Do not operate the machine on a paved or gravel surface where ejected material could cause injury.
- f) Before using, always visually inspect to see, that the **shredding means**, **shredding means** bolts and other fasteners are secure, the housing is undamaged and that **guards** and screens are in place. Replace worn or damaged components in sets to preserve balance. Replace damaged or unreadable labels.

- g) Before use, check the supply and extension cord for signs of damage or aging. If the cord becomes damaged during use, disconnect the cord from the supply immediately. **DO NOT TOUCH THE CORD BEFORE DISCONNECTING THE SUPPLY.** Do not use the machine if the cord is damaged or worn.
- h) Never operate the machine while people, especially children, or pets are nearby.

EE.2.3 Operation

- a) Before starting the machine, make certain that the feeding chamber is empty.
- b) Keep your face and body away from the feed intake opening.
- c) Do not allow hands or any other part of the body or clothing inside the feeding chamber, discharge chute, or near any moving part.
- d) Keep proper balance and footing at all times. Do not overreach. Never stand at a higher level than the base of the machine when feeding material into it.
- e) Always stand clear of the discharge zone when operating this machine.
- f) When feeding material into the machine be extremely careful that pieces of metal, rocks, bottles, cans or other foreign objects are not included.
- g) If the cutting mechanism strikes any foreign objects or if the machine should start making any unusual noise or vibration, immediately shut off the power source and allow the machine to stop. Disconnect the machine from the supply and take the following steps before restarting and operating the machine:
 - i) inspect for damage;
 - ii) replace or repair any damaged parts;
 - iii) check for and tighten any loose parts.
- h) Do not allow processed material to build up in the discharge zone; this may prevent proper discharge and can result in kickback of material through the intake opening.
- i) If the machine becomes clogged, shut-off the power source and disconnect the machine from supply before cleaning **debris**.
- j) Never operate the machine with defective **guards** or shields, or without safety devices, for example **debris collector** in place.
NOTE If a **debris collector** is not used the text of the example may be deleted.
- k) Keep the power source clean of debris and other accumulations to prevent damage to the power source or possible fire.
- l) Do not transport this machine while the power source is running.
- m) Stop the machine, and remove plug from the socket. Make sure that all moving parts have come to a complete stop
 - whenever you leave the machine,
 - before clearing blockages or unclogging chute,
 - before checking, cleaning or working on the machine.
- n) Do not tilt the machine while the power source is running.

EE.2.4 Maintenance and storage

- a) When the machine is stopped for servicing, inspection, or storage, or to change an accessory, shut off the power source, disconnect the machine from the supply and make sure that all moving parts are come to a complete stop. Allow the machine to cool before making any inspections, adjustments, etc. Maintain the machine with care and keep it clean.
- b) Store the machine in a dry place out of the reach of children.
- c) Always allow the machine to cool before storing.

- d) When servicing the **shredding means** be aware that, even though the power source is switched off due to the interlock feature of the **guard**, the **shredding means** can still be moved.
- e) Replace worn or damaged parts for safety. Use only genuine replacement parts and accessories.
- f) Never attempt to override the interlocked feature of the **guard**.

EE.2.5 Additional safety instructions for units with bagging attachments

Switch-off the machine before attaching or removing the bag.

EE.2.6 Recommendation

The machine should be supplied via a residual current device (RCD) with a tripping current of not more than 30 mA.

<http://www.china-gauges.com/>

Annex ZA
(normative)

**Normative references to international publications
with their corresponding European publications**

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60068-2-75	1997	Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests	EN 60068-2-75	1997
IEC 60335-1 (mod) + corr. July + corr. April	2010 2010 2011	Household and similar electrical appliances - Safety - Part 1: General requirements	EN 60335-1	2012
IEC 62233 (mod)	2005	Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure	EN 62233 + corr. August	2008 2008
ISO 354	2003	Acoustics - Measurement of sound absorption in a reverberation room	EN ISO 354	2003
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 4871	1996	Acoustics - Declaration and verification of noise emission values of machinery and equipment	EN ISO 4871	2009
ISO 7000	-	Graphical symbols for use on equipment - Registered symbols	-	-
ISO 11090-1	1998	Machine tools - Test conditions for die sinking electro-discharge machines (EDM) - Terminology and testing of accuracy - Part 1: Single column machines (cross slide table type and fixed table type)	-	-
ISO 11201	2010	Acoustics - Noise emitted by machinery and equipment - Measurement of emission sound pressure levels at a work station and at other specified positions - Engineering method in an essentially free field over a reflecting plane	EN ISO 11201	2010
ISO/TR 11688-1	1995	Acoustics - Recommended practice for the design of low noise machinery and equipment - Part 1: Planning	EN ISO 11688-1	2009

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
ISO 12100	2010	Safety of machinery - General principles for design - Risk assessment and risk reduction	EN ISO 12100	2010
ISO/TR 12100-1	1992	Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology	-	
ISO 13849-1	2006	Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design	EN ISO 13849-1	2008
ISO 13849-2	2012	Safety of machinery - Safety-related parts of control systems - Part 2: Validation	EN ISO 13849-2	2012
ISO 13852	1996	Safety of machinery - Safety distances to prevent danger zones being reached by the upper limbs	-	-
ISO 13857	2008	Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs	EN ISO 13857	2008

<http://www.china-gauges.com/>

Annex ZZ
(informative)

Coverage of Essential Requirements of EU Directives

This European Standard has been prepared under a mandate given to CEN/TC by the European Commission and the European Free Trade Association and within its scope the standard covers all relevant essential requirements as given in EU Directive 2006/42/EC (Machinery Directive).

Compliance with this standard provides one means of conformity with the specified essential requirements of the Directive concerned.

WARNING: Other requirements and other EU Directives may be applicable to the products falling within the scope of this standard.

<http://www.china-gauges.com/>

Bibliography

The bibliography of Part 1 is applicable with the following addition:

CR 1030-1:1995, *Hand-arm vibration – Guidelines for vibration hazards reduction* Part 1:
Engineering methods by design of machinery

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