BRITISH STANDARD

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12348:2000
+A1:2009

Core drilling machines on a stand — Safety

ICS 25.080.40

National foreword

This British Standard is the UK implementation of EN 12348:2000+A1:2009. It supersedes EN 12348:2000 which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CEN text carry the number of the CEN amendment. For example, text altered by CEN amendment A1 is indicated by ⟩A1⟨.

The UK participation in its preparation was entrusted by Technical Committee B/513, Construction equipment and plant, and site safety, to Subcommittee B/513/6, Demolition, cutting, roughening, smoothing and splitting machines - Safety.

A list of organizations represented on this Subcommittee 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.

Compliance with a British Standard cannot confer immunity from legal obligations.

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English Version

Core drilling machines on stand - Safety

Foreuses à béton (carotteuses) sur colonne - Sécurité

Kernbohrmaschinen auf Ständer - Sicherheit

This European Standard was approved by CEN on 26 June 2000 and includes Amendment 1 approved by CEN on 1 March 2009.

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 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 Management Centre has the same status as the official versions.

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Foreword

This document (EN 12348:2000+A1:2009) has been prepared by Technical Committee CEN/TC 151 "Construction equipment and building material machines - Safety", the secretariat of which is held by DIN.

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 October 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

This document includes Amendment 1, approved by CEN on 2009-03-01.

This document supersedes EN 12348:2000.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ⟩A1⟩ ⟨A1⟩.

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

⟩A1⟩ For relationship with EU Directives, see informative Annexes ZA and ZB, which are integral parts of this document. ⟨A1⟩

The annex A is normative and contains "Noise test code - Grade 2 of accuracy", annex B is normative and contains "Pictograms", annex C is normative and contains "Verification of surface temperature", and the annex ZA is informative and contains „Relationship of this European Standard with EU Directives“.

This European Standard also contains a Bibliography.

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

This European standard is a Type C-standard as stated in ⟦A1⟩ EN ISO 12100-1 ⟨A1⟧.

The machinery concerned and the extent to which hazards are covered are indicated in the scope of this standard.

This European standard has been prepared by taking into account the safety requirements of EN 791:1995 which are applicable to core drilling machines on a stand.

1 Scope

This European Standard applies to core drilling machines on transportable stands equipped with a diamond core drill bit, usually with a water supply connection device, and intended to drill holes into stone, concrete and similar mineral materials in a stationary position where the power for the tool rotation is supplied by an electrical, hydraulic, pneumatic or internal combustion prime motor.

The feed movement of the drill head and core drill bit may be effected by manual, mechanical or hydraulic means.

This European Standard deals with all significant hazards pertinent to core drilling machines on a stand when used as intended and under the conditions foreseen by the manufacturer (see clause 4). This standard specifies the appropriate technical measures to eliminate or reduce risks arising from the significant hazards.

This standard does not apply to:

— percussive or rotary-percussive rock drills either mounted or unmounted;

— hand held power drills;

— hydraulic or pneumatic power supply sources;

— mobile undercarriages to which machines can be fitted.

This European Standard does not apply to machinery covered by EN 791:1995.

This European Standard covers electrical hazards by making reference to relevant European Standards (see 5.2).

Those hazards that are relevant for all mechanical, electrical, hydraulic and other equipment of machinery and that are dealt with in standards for common use are not covered by this European Standard. Reference to pertinent standards of this kind is made where such standards are applicable and so far as is necessary.

In this European Standard, core drilling machines on a stand are called "machines" and diamond core drill bits are called “tools”.

NOTE The term "diamond" is used as a generic word which covers all varieties of abrasive products such as diamond, borum nitride.

This European Standard applies primarily to machines which are manufactured after the date of approval of the standard by CEN.

2 Normative references

[A1] The following referenced documents are indispensable for the application 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. [A1]

[A1] *deleted text* [A1]

[A1] EN 206-1:2000, *Concrete — Part 1: Specification, performance, production and conformity* [A1]

EN 294:1992, *Safety of machinery - Safety distances to prevent danger zones being reached by the upper limbs*

[A1] *deleted text* [A1]

EN 791:1995, *Drill rigs - Safety*

[A1] EN 953 [A1], *Safety of machinery – Guards - General requirements for the design and construction of fixed and movable guards*

[A1] *deleted text* [A1]

EN 982:1996, *Safety of machinery - Safety requirements for fluid power systems and their components - Hydraulics*

EN 983:1996, *Safety of machinery - Safety requirements for fluid power systems and their components - Pneumatics*

[A1] EN 12096, *Mechanical vibration — Declaration and verification of vibration emission values* [A1]

[A1] *deleted text* [A1]

[A1] prEN ISO 3744:2006, *Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering method in an essentially free field over a reflecting plane (ISO/DIS 3744:2006)* [A1]

[A1] EN 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 5349-2:2001)*

EN ISO 8041, *Human response to vibration — Measuring instrumentation (ISO 8041:2005)* [A1]

EN ISO 11201:1995, [A1] *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 (ISO 11201:1995)* [A1]

[A1] EN ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

EN ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles (ISO 12100-2:2003)*

EN ISO 13732-1:2008, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 1: Hot surfaces (ISO 13732-1:2006)*

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 13850:2008, *Safety of machinery — Emergency stop — Principles for design (ISO 13850:2006)*

EN ISO 20643:2008, *Mechanical vibration — Hand-held and hand-guided machinery — Principles for evaluation of vibration emission (ISO 20643:2005)* ⟨A1⟩

⟨A1⟩ EN 60204-1:2006, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2005, modified)* ⟨A1⟩

⟨A1⟩ EN 60335-1:2002, *Household and similar electrical appliances — Safety — Part 1: General requirements (IEC 60335-1:2001, modified)* ⟨A1⟩

⟨A1⟩ EN 60335-2-41:2003, *Household and similar electrical appliances — Safety — Part 2-41: Particular requirements for pumps (IEC 60335-2-41:2002)* ⟨A1⟩

EN 61029-1:2000, *Safety of transportable motor operated electric tools – Part 1: General requirements (IEC 61029-1:1990, modified)*

⟨A1⟩ prEN 61029-2-6:2007, *Safety of transportable motor-operated electric tools — Part 2-6: Particular requirements for diamond drills with water supply (IEC 61029-2-6:1993, modified)* ⟨A1⟩

⟨A1⟩ ISO 5348, *Mechanical vibration and shock — Mechanical mounting of accelerometers*

ISO 7000:2004, *Graphical symbols for use on equipment — Index and synopsis*

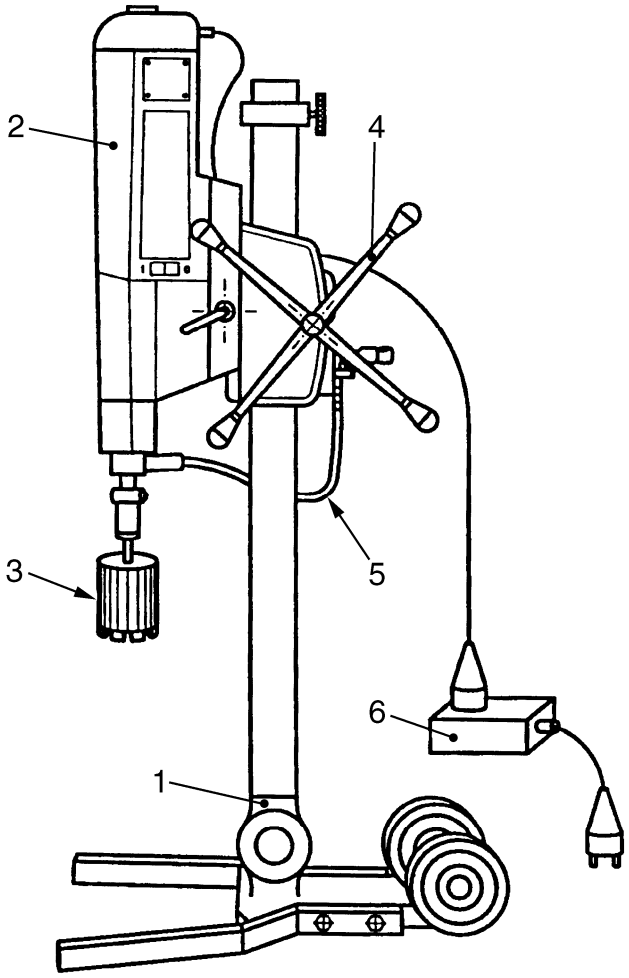
ISO 16063-1, *Methods for the calibration of vibration and shock transducers — Part 1: Basic concepts* ⟨A1⟩

3 Terms and definitions

For the purposes of this European Standard the terms and definitions stated in ⟨A1⟩ EN ISO 12100-1:2003 ⟨A1⟩ apply.

Additional terms and definitions specifically needed for this European Standard are added below.

3.1
core drilling machine
machine used to drill holes with a diamond core bit into walls, floors and ceilings made of concrete, natural stone and other mineral building materials. The machine is mounted on a transportable stand having a drive spindle which is equipped with a core drill bit. It is (generally) equipped with a water supply. It may have manual or powered feed. Figure 1 shows a typical example of a core drilling machine



Key

1 Frame (drill stand) including a column which may be tiltable and a base
2 Drilling unit
3 Diamond core drill bit including any connecting accessories (not being part of the machine)
4 Control devices for the operating functions and feed mechanism of the machine
5 Water supply system
6 Residual current device (RCD)

Figure 1 — Main parts of a core drilling machine

3.2
drilling unit
the drilling unit consists of all the components required for drilling. The following list is a typical example:

— drill head with prime mover. This prime mover may be: internal combustion, electric, pneumatic, or hydraulic;

— drive spindle

— water supply system;

— on/off control for feed;

— on/off control for rotation;

— on/off control for water supply

3.3
drill stand
This contains all the devices for positioning and fixing:

— base with means for fixing it in position by e.g. anchors or clamps. It can be equipped with additional wheels for transport;

— column, (may be tiltable), equipped with means for guiding the drilling unit

3.4
〚A1〛 rated no-load spindle speed 〚A1〛
speed of the drive spindle, in revolutions per minute (min-1), at rated conditions specified by the machine manufacturer without tool and under 〚A1〛 no-load 〚A1〛

3.5
nominal mass
the mass of the machine equipped with all its dismountable parts, but without the tool mounted and the attached tank(s) being empty

3.6
maximum operating mass
the mass of the machine equipped with all its dismountable parts, ready for use, with the tool mounted and the attached tank(s) being full

4 List of significant hazards

This clause contains all significant hazards and hazardous situations, as far as they are dealt with in this European Standard, identified by risk assessment significant for this type of machinery and which require action to eliminate or reduce risk.

	Table 1 — List of significant hazards	
	Hazards	**Relevant subclauses**
4.3	Cutting and severing hazard	5.1.1, 5.1.2, 5.1.3, 5.1.5
4.4	Entanglement hazard	5.1.2, 5.1.3, 5.1.5
4.5	Drawing-in or trapping hazard	5.1.2, 5.1.3, 5.1.5
4.6	Impact hazard	5.1.2, 5.1.4
4.7	Fluid injection hazard	5.1.7, 5.7
4.8	Hazards caused by ejection of parts (material/work pieces)	5.1.4, 5.1.5, 5.9, 7.2
4.9	Hazards caused by loss of stability	5.1.4, 7.2
	(machinery and machine parts)	
4.10	Slip, trip and fall hazard in relationship with	5.7, 7.2
	Machinery	
4.11	Hazards caused by either direct or indirect electrical contact	5.2, 7.2
4.12	Hazards resulting in burns and/or scalds, by possible contact of persons with flames, explosions or by radiation from heat sources	5.4, 7.2
4.13	Health damaging effects of a hot or cold work environment or of noise	5.10, 7.2
4.14	Hazards resulting from contact with or inhalation of harmful fluids, gases, mists, fumes and dusts	5.5, 5.8, 7.2
4.15	Hazards caused by fire and/or explosion	7.2
4.16	Unhealthy postures or excessive efforts	5.3, 7.2
4.17	Hazards caused by inadequate local lighting	7.2
4.18	Hazards caused by human errors	7.1, 7.2
4.19	Hazard combinations	5.1.1, 7.1, 7.2
4.20	Hazard caused by failure of energy supply (of energy and/or control circuits)	5.1.5, 5.1.6, 5.2, 7.2
4.21	Hazards caused by failure/disorder of control system	5.1.5, 5.2, 7.2
	Hazards	Relevant subclauses
4.22	Hazards caused by errors of fitting	7.1, 7.2

	Table 1 — List of significant hazards	
	Hazards	**Relevant subclauses**
4.23	Hazards caused by temporarily missing and/or incorrectly positioned safety related measures/means, for example	
4.23.1	Guards of all kinds	5.1.2.1, 7.2
4.23.2	Safety related protection devices of all kinds	7.2
4.23.3	Starting and stopping devices	7.2
4.23.4	Safety signs and tags	7.1, 7.2
4.23.5	Information and warning devices of all kinds	7.1, 7.2
4.23.6	Essential equipment and accessories for safe adjustment and/or maintenance	7.2
⟩A1⟨ 4.24	Hazards generated by vibration	5.11 ⟩A1⟨

5 Safety requirements and/or measures

Machinery shall comply with the safety requirements and/or measures of this clause and in addition with ⟩A1⟨ EN ISO 12100-1:2003 and EN ISO 12100-2:2003 ⟩A1⟨ for hazards which are relevant but not significant and which are not dealt with in this standard.

For the application of EN 294:1992, ⟩A1⟨ EN 953 ⟩A1⟨, EN 982:1996, EN 983:1996 and ⟩A1⟨ EN 60204-1:2006 ⟩A1⟨ the manufacturer shall carry out an adequate risk assessment for the requirements thereof where choice is necessary.

NOTE This specific risk assessment should be part of the general risk assessment relating to the hazards not covered by this standard.

Covering each individual significant hazard is sufficient for covering combinations of hazards.

5.1 Mechanical hazards

5.1.1 General

As components and parts have to be manually handled, all the accessible parts shall be free of sharp parts and burrs which could generate hazards when setting, using, handling, and maintaining the machine. Burrs resulting from, for example, manufacturing, casting or welding shall be eliminated and sharp edges shall be smoothed.

5.1.2 Protection against moving parts

5.1.2.1 Transmission parts

Rotating transmission parts (for example shafts, couplings and belt drives) with the exception of the drive spindle end shall be provided with fixed guards to prevent contact. ⟩A1⟨ These guards shall comply with EN 953 and 5.3.2.2 of EN ISO 12100-2:2003. ⟩A1⟨ Fixed guards shall be held in position either by welding or by mounting them in such a way that they can be opened or removed only with the aid of tools or keys.

Guards shall comply with the provisions of EN 294:1992 on safety distances.

[A1] *deleted text* [A1]

5.1.2.2 Feed of the drilling unit on the column

The drilling unit shall be lockable [A1] at least in one position [A1] or shall be designed to be self-sustaining in any [A1] stop- [A1] position on the column.

[A1] Machines equipped with a powered feed system shall be self-sustaining in any stop-position. [A1]

Machines shall be designed in such a way, that separation of the drilling unit from the column needs an intentional action.

End stops corresponding to the two ends of the working stroke shall be fitted.

Components such as rope(s), chain(s) and belt(s), which may be integral part(s) of the feed system of a machine and are directly involved in the pull-down and pull-up operation of the drilling unit, shall fulfil the following requirements:

— they shall be selected with a safety factor of 3,5, (e.g. minimum breaking force in relation to maximum load) in normal operation as intended by the manufacturer;

— an adequate and safe means of tensioning shall be provided.

5.1.2.3 Fixing of drilling bit to the drive spindle

The drive spindle end shall be designed in such a way that the core drilling bit and the connecting accessories can be mounted in order to prevent self-loosening during normal drilling operation.

5.1.3 Safety distance for hand fed machines

The shortest distance between a manual feed control device and the tool(s) intended by the machine manufacturer shall be > 2,5 cm.

5.1.4 Stability [A1] *deleted text* [A1]

5.1.4.1 [A1] Stability during work [A1]

The drill stand shall be equipped with fixing devices which will allow rigid and safe mounting to the material to be drilled. For anchor fixing, slotted hole(s) shall be provided.

Nuts and screws intended to adjust the stand in position shall need intentional action to loosen them.

NOTE Due to the various existing fixing systems for different machine applications it is not possible to give precise technical requirements for these systems in this standard.

5.1.4.2 [A1] Stability during transportation, assembly and dismantling

As the stability of the drill rig is not given for these situations the operators manual shall give instructions for safe handling. [A1]

5.1.5 Control device

5.1.5.1 General

For control functions in electric, hydraulic and pneumatic systems see clauses 7, 9, 11, and 13 of [A1] EN 60204-1:2006 [A1], EN 982:1996, EN 983:1996, and for safety related parts, see [A1] EN ISO 13849-1:2008 [A1].

5.1.5.2 Start and stop control device for the drive of the spindle and the powered feed

Machines shall be equipped with separate control devices to start and stop the drive of the spindle and to start and stop the powered feed.

Starting shall only be possible by an intentional actuation of both of these starting control devices.

The stop control devices shall cut the relevant power supply.

[A1] For cable-less control, an automatic stop, which holds the carriage in a sustained position, shall be activated when correct signals are not received, including loss of communication.

Access to danger zones that cannot be supervised by the operator from the different possible control positions shall be avoided by appropriate provisions. [A1]

5.1.5.3 [A1] Emergency stop

Emergency stop device is not required for manual fed machines as it would not reduce the stopping time the operator being close to the drill motor.

All machines with remote control and/or automatic feed shall be fitted with an easily accessible emergency stop in the system. This emergency stop shall be in accordance with EN ISO 13850:2008. It shall stop all dangerous movements as quickly as possible without creating an additional hazard. [A1]

5.1.6 Failure of the power supply

An interruption of the power supply and a reestablishment after an interruption shall not lead to a dangerous situation in particular:

— the machine shall not be restarted automatically, an intentional action shall be necessary;

— the machine shall not be prevented from stopping if the stop command has been given;

— neither movement nor dangerous actions shall occur.

Such failures shall not impede any stop function.

NOTE Manual feed machines, the power of which does not exceed 750 W and which are intended to be used with core drills, the diameter of which does not exceed 60 mm are considered as presenting no particular danger in the case of restoration of energy supply.

5.1.7 Dissipation of residual energy

On pneumatically powered machines a main line valve shall be provided which either connects the machines to the air supply or in the closed position shuts off the air supply and releases the air pressure in the drilling unit when stopping the machine.

5.2 Electrical hazards

5.2.1 General

Machines with an electric motor the power of which is less than or equal to 4 kW shall fulfil the electrical safety requirements of EN 61029-1:2000 and [A1] prEN 61029-2-6:2007 [A1].

Machines with an electric motor the power of which is more than 4 kW and a current less than 16 A shall fulfil the electrical safety requirements of [A1] EN 60204-1:2006 [A1], in particular clauses 4, 5, 6, 14, 15 and 16. In addition to [A1] 4.4.3 of EN 60204-1:2006 [A1] these machines shall work as intended in an ambient temperature range of 0 °C to 40 °C.

For machines with three phase electrical supply a device enabling phase inversion (to ensure correct tool rotation) shall be provided.

The enclosure of the electrical controls shall provide a degree of protection of at least IP 54 (see EN 60529:1991).

5.2.2 Water pump

Where water is supplied by an electrical pump for flushing the drilling tool the pump shall fulfil the relevant requirements of [A1] EN 60335-1:2002 [A1] and [A1] EN 60335-2-41:2003 [A1].

5.3 Ergonomics

Machines or parts having a mass greater than 25 kg shall have hoisting points for lifting devices that allow their transport and handling during the installation. These points shall be indicated in the operator's manual.

5.4 Thermal hazards

5.4.1 Handles and other surfaces which require continuous contact shall have a surface temperature not exceeding 43°C.

5.4.2 Controls and other parts of the machine which are contacted occasionally shall meet the limits as given in [A1] EN ISO 13732-1:2008 [A1] according to the chosen material for a contact period up to 10 s, lowest curve.

5.4.3 Hot areas which may be contacted unintentionally shall meet the levels of [A1] EN ISO 13732-1:2008 [A1] for a contact period below 1 s. These areas shall be either located at a distance greater than 120 mm from the gripping areas, or they shall be protected by shields.

These shields shall be designed to reduce the heat transfer from the surface to the body of the operator. This may be achieved by a structured surface, ribs or special coating.

5.4.4 Test method

The test method to verify the surface temperature of the machine is prescribed in annex C.

The machine parts whose temperatures exceed the permissible limits of [A1] EN ISO 13732-1:2008 [A1] for a contact time not exceeding 1 s and whose surface is greater than 10 cm², shall not be accessible to the test cone (see annex C).

5.5 Exhaust fumes (internal combustion engine machines) and exhaust compressed air (pneumatic machines)

Internal combustion engine and pneumatic motor exhausts shall be directed away from the intended operator's position.

5.6 Hydraulic and pneumatic machines

5.6.1 Hydraulic machines

The hydraulic systems shall comply with the requirements of EN 982:1996.

5.6.2 Pneumatic machines

Pneumatic systems shall comply with the requirements of EN 983:1996.

5.6.3 Hoses and pipes under pressure

The requirements of EN 982:1996 and EN 983:1996 shall be complied with.

Machines with hoses and pipes under pressure shall be so designed that all components with¬stand the effect of hot surfaces, inlet pressure and stored energy.

Pipes, hoses and fittings shall be able to withstand the stresses from the pressure. The hoses shall be marked with the rated working pressure.

Flexible hydraulic hoses intended for pressures higher than 15 MPa shall be fitted with swaged or screwed fittings.

Hydraulic hoses and pipes shall be separated from electric power wiring and be guarded against hot surfaces and sharp edges.

Pipes and hoses which have to be disconnected in operation shall be fitted with self sealing couplings. Couplings shall be marked to ensure correct reconnection.

5.7 Fluid containers

When filled according to manufacturer's instructions, fluid containers except water tanks, and in particular, batteries and fuel system, oil tank, shall be designed and constructed to prevent spillage whatever the position of the drilling unit.

The tanks for hydraulic fluid shall be fitted with level indicators.

5.8 Water supply and dust emission

Machines intended for drilling with a water supply shall be equipped with a water supply device (water swivel). The volume of water supplied to the core drill bit shall be sufficient to provide adequate bit flush and dust suppression.

Machines intended for dry drilling shall include a dust swivel located at the appropriate place and of suitable shape and size. This device shall be capable of being connected to a dust suction device.

5.9 Rotational speed

Under the rated conditions of power supply specified by the machine manufacturer, the maximum rotational speed of the spindle in revolutions per minute shall not exceed that marked on the machine (see 7.1).

The rotational speed of the spindle not being equipped with a drilling tool shall be measured under the conditions specified by the manufacturer.

5.10 Noise

5.10.1 Noise reduction at the design stage

A reduction in noise shall be obtained at the design stage of machines to be fitted with either a combustion engine or a pneumatic motor at least by the incorporation of an exhaust silencer (muffler).

NOTE General technical information on widely recognised technical rules and means to design low noise machinery can be found in EN ISO 11688-1:1998 and ⟦A1⟩ EN ISO 11688-2:2000 ⟨A1⟧.

5.10.2 Noise emission measurement, declaration and verification procedures

Measurement, declaration and verification of noise emission values shall be made according to the noise test code given in annex A.

5.11 ⟦A1⟩ Vibration

5.11.1 Vibration reduction at the design stage

Whole-body vibration is not relevant for this type of machinery.

The hand-arm vibration shall be reduced to the lowest level taking into account the technical progress.

5.11.2 Vibration measurement, declaration and verification procedures

Measurement, declaration and verification of hand-arm vibration values shall be made according to the vibration test code given in Annex D. ⟨A1⟧

5.12 Maintenance

The parts of the machine which require regular maintenance shall be designed and placed so as to be easily accessible.

In particular for machines with combustion engine:

— the oil drain shall be designed to allow easy recovery of the used oil;

— the sump drain plug shall be recognisable.

6 Verification of safety requirements and/or measures

The verification methods of the safety requirements are self-evident or are prescribed in the pertinent clauses in this standard.

7 Information for use

The written instructions shall be drawn up according to ⟦A1⟩ 6.5 of EN ISO 12100-2:2003 ⟨A1⟧.

7.1 Marking

7.1.1 Regular marking

The marking plate (e. g. adhesive sticker) shall carry in a visible and permanent way the following information:

— [A1] business name and full address of the manufacturer and, where applicable, his authorized representative; [A1]

— [A1] designation of the machinery; [A1]

— designation of type and serial number if any;

— year of manufacture;

— mandatory marking[1]

7.1.2 Other information

The following shall be also indicated on the machine:

— the installed power in kW at rated speed(s) (or Watts);

— the rated [A1] no-load [A1] speed(s) (see 3.4) in revolutions per minute (min-1);

— the maximum diameter of the core drill which can be used on the machine;

— the nominal mass of the machine (see 3.5);

— the symbol: "read the operator's manual" (see annex B);

Control devices shall be marked without ambiguity in accordance with relevant standards.

7.1.3 Warning about residual risks

The machine shall be marked with warning signs (see annex B) to inform the machine user about residual risks.

7.2 Accompanying documents

A special set of instructions, specifying the conditions for installation, starting up, use, maintenance, handling and carrying (transport) shall be supplied with the machine.

In general there may be three written instructions:

— operator’s instructions;

— maintenance instructions;

— spare parts list.

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[1] [A1] 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. Machinery. [A1]

7.2.1 Operator's instructions

The operator's manual shall contain at least the following items:

7.2.1.1 Description of the machine

The description of the machine shall contain the following items:

— a general description of the machine with sketches;

— an explanation of the pictograms and symbols used on the machine and in the documentation;

— a list of core drill bits to be used, with their nominal characteristics, diameter and length;

— a list of materials which can be drilled by the machine;

— the conditions of drilling and in particular for machines having a suction grip fixing device the following information shall be given: "suction grip fixing device shall never be used alone for drilling in unstable positions such as on vertical walls and on the ceiling";

— a list of attachments which can be used and if necessary their rated characteristics;

— the noise emission values of the machine determined at no load in accordance with annex A;

— information concerning the fuel (if relevant) and on all other fluids to be used;

— information that any modification which could lead to a change from the original characteristics of the machine, for example, rotational speed or maximum diameter of the core drill bit may be done only by the manufacturer of the machine who shall confirm that the machine is still in conformity with the safety regulations;

— ⟦A1⟩ information on hand-arm vibration shall be given in the instruction handbook, see Annex D. ⟨A1⟧

7.2.1.2 Instructions for transport, handling and storage of the machine and its dismountable parts

The instructions for transport, handling and storage of the machine and its dismountable parts shall contain at least the following items:

— the nominal mass of the machine (see 3.5);

— the maximum operating mass of the machine (see 3.6);

— conditions for slinging and lifting of the machine;

— information about the parts to be dismounted, emptied or fixed during transport and the necessary information concerning their mounting and dismounting;

— ⟦A1⟩ information about conditions of insufficient stability and how to avoid them. ⟨A1⟧

7.2.1.3 Instructions for the installation and the use of the machine

The instructions for the installation and the use of the machine shall at least contain the following items:

— mounting and assembling procedures of the parts of the machine;

— recommended core drill bits and connecting means to the spindle;

— information about a safe organisation of the work place including intended operator's po¬sition;

— instruction for fixing the stand on the material to be drilled;

— if relevant, conditions for connection to power supply and to water supply;

— information about residual risks [A1] *deleted text* [A1];

— [A1] information about carriage locking devices, if relevant (see 5.1.2.2); [A1]

— advice for using the phase inversion device of 3 phase machines (see 5.2.1);

— advice to check correct rotation of tool;

— warning to prevent any contact with the rotating tool;

— for machines with an internal combustion engine information about filling with fuel, fire precautions while filling the fuel tank, fuel storage, warning against smoking;

— advice that machines with an internal combustion engine should not be used in confined areas;

— [A1] warning, that in case of insufficient air circulation and danger of exhaust gas accumulation (example: in trench) means for leading the exhaust gas out of the operators position are required; [A1]

— note, that machines intended for dry drilling shall be only operated in connection with an appropriate dust suction device (including information to the required performance and connection of this device);

— information on control devices (in particular start and stop devices);

— [A1] information, that from each control position, the operator must be able to ensure that no-one is in the danger zones otherwise it is not allowed to start or operate the machine; [A1]

— the precautions to be taken for mounting and removing the core drill bit, in particular

— placing the control device in the "off" position;

— isolating the machine from its energy source by unplugging the mains power supply for electric machines, or by putting the machine out of action for other machines.

— particular precautions to be taken when drilling into ceilings;

— information about handling, method of mounting and dismounting core drill bit;

— information on the [A1] reasonably foreseeable misuse [A1];

— instructions for the identification and localisation of defects, of debugging, and for restarting after an interruption;

— information about the need of wearing adequate clothing and personal protection equipment (e. g. eye and ear protection);

— note that the site shall be cleared of everything which may hamper the drilling action;

— note that the correct mounting of safety devices such as stop, fixing devices etc. shall be verified;

— note that for safety reasons each damaged (cracked) tool shall be replaced;

— [A1] as blockages are likely to occur, information on the method to be followed for safely unblocking;

— information concerning electromagnetic compatibility (EMC) shall be given by the manufacturer where machinery is likely to emit non-ionising radiation. [A1]

7.2.2 Maintenance instructions

The maintenance instructions shall contain at least the following items:

— the list of operations, for example, adjustment, maintenance, lubrication, repair, cleaning and servicing can be carried out only while the machine is shut down and the prime mover stopped;

— type and frequency of inspections and replacement intervals (for example for hydraulic hoses);

— instructions concerning the maintenance procedures which may be carried out by the user;

— list of the maintenance procedures which require particular technical knowledge and which shall be performed only by competent persons;

— diagrams and sketches to allow the correct repair of the machine;

— for machines with an electrical power supply, the instructions given in EN 61029-1:2000 and [A1] prEN 61029-2-6:2007 [A1] concerning electrical safety.

7.2.3 Spare parts list

The spare parts list shall contain all relevant safety related spare parts (including hydraulic hoses) with an unambiguous identification and information about the location of the part to be replaced.

7.2.4 Presentation of information

Important information, in particular the information needed to control the machine shall be presented in an unambiguous manner and so that it is easily understood. Pictograms (if possible standardised) are preferred (see annex B).

The operator’s instructions shall be written in the official language(s) of the EU country in which the machine is intended to be used.

Annex A
(normative)

Noise test code - Grade 2 of accuracy

A.1 General

This noise test code specifies all requirements to carry out efficiently and under standardized conditions, the determination of the noise emission values of core drilling machines on a stand.

[A1] NOTE 1 The level of noise emission may be assessed with reference to comparative emission data for similar machinery, e. g. same motor on different drill rig or same rig equipped with different motor of same technology. [A1]

The grade of accuracy of this measurement method is grade 2 according to [A1] prEN ISO 3744:2006 [A1].

[A1] Measurements shall be carried out on a new machine in concrete. For detailed operating conditions refer to Table D.1 (except the requirement mounting of the accelerometer(s) of D.1.1). [A1]

A.2 Measurement of the [A1] A-weighted [A1] emission sound pressure level at the work station

[A1] The A-weighted emission sound pressure level at the working station shall be measured in accordance with EN ISO 11201:1995 under the following conditions: [A1]

— the machine shall be placed in working environmental conditions which fulfil the requirements of clause 6 of EN ISO 11201:1995, equipped with its tool, set for a cutting operation, and shall run [A1] as defined in Table D.1 [A1];

[A1] *deleted text* [A1]

— the microphone position shall be related to the size of the operator which is determined by 1,75 (± 0,05) m, the operator being positioned to actuate the feed control of the machine (see also 11.1 of EN ISO 11201:1995);

— 3 series of measurements shall be made and the mean value shall be recorded.

A.3 Determination of the sound power level emitted by the machine

The sound power level emitted by the machine shall be measured in accordance with [A1] prEN ISO 3744:2006 [A1].

NOTE The environmental conditions for the noise measurement as stated in clause 4 of [A1] prEN ISO 3744:2006 [A1] should be observed.

The operating conditions of the machine and the calculation method of the value are the same as those used for the measurement of emission sound pressure level at work station (see A.2).

[A1] The measurement method referring to the measurement surface as shown in Figure A.1 shall be used. [A1]

[A1] NOTE In case above mentioned measurement method is not applicable, alternative methods as shown in Clause 7 of prEN ISO 3744:2006 can be used. [A1]

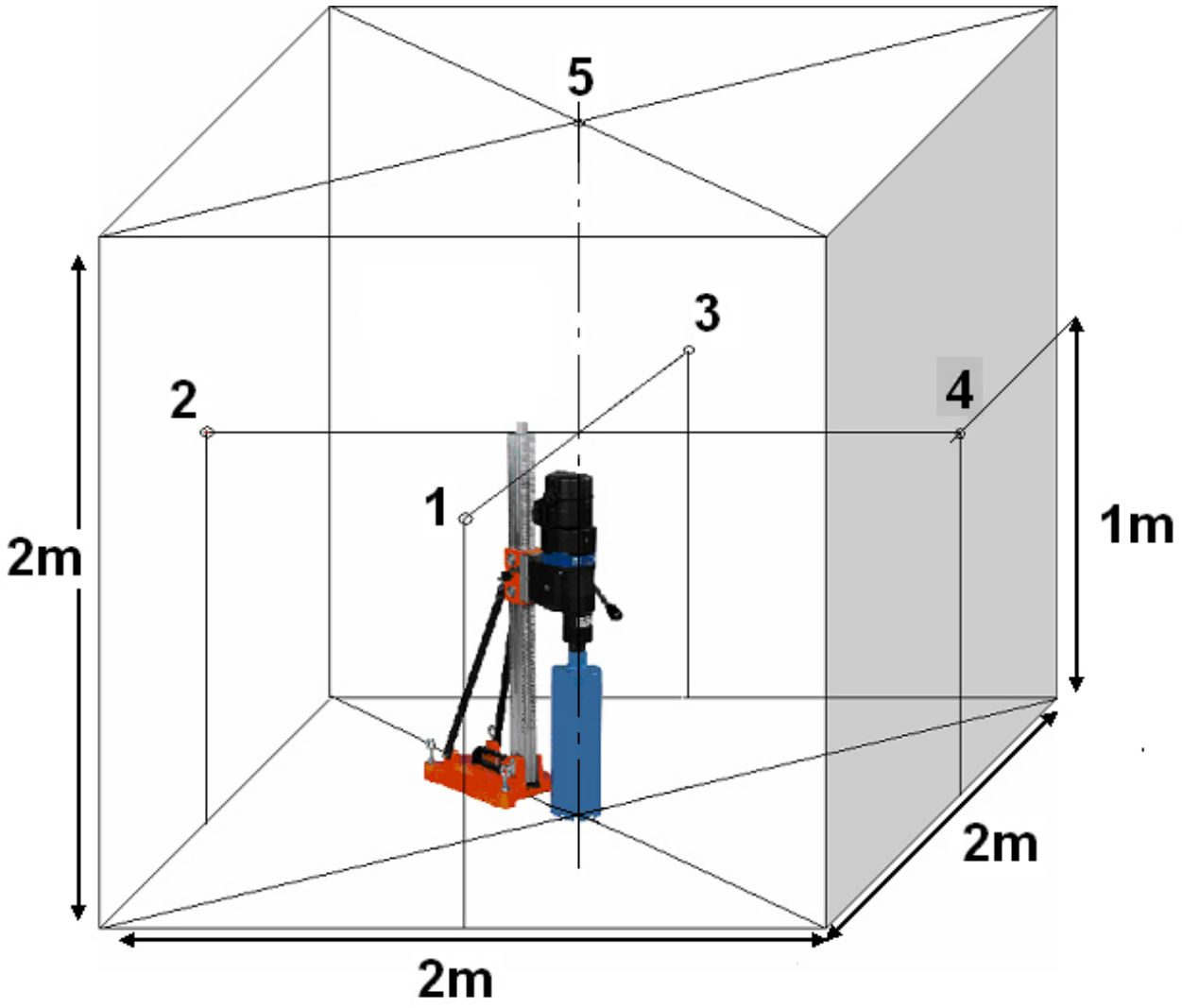

Figure A.1 — Microphone positions for free field measurements over a reflecting plane

A.4 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 and/or from the basic standards referred to shall be recorded together with the technical justification for such deviations.

A.5 Information to be reported

The following information, when applicable, shall be compiled and reported for all measurements made in accordance with the requirements of this European Standard.

a) Machine under test:

— description of the machine, manufacturer, type and serial number, type and dimension of core bit, year of manufacture;

— operating conditions in accordance with Table D.1.

b) Instrumentation:

— equipment used for the measurements, including name, type, serial number and manufacturer;

— method used to calibrate the instrumentation system;

— date and place of the most recent calibration.

c) Noise and other data:

— location of the microphone(s) positions (a sketch may be included, if different from Figure A.1);

— all other data as requested in 9.4 of prEN ISO 3744:2006. ⟨A1⟩

It shall be stated that all requirements of the noise test code and/or from the standards referred to have been fulfilled, and, if relevant, any unfulfilled requirements shall be identified; the deviations from the requirements shall be stated and technical justification for the deviations shall be given.

A.6 Noise declaration by the manufacturer

The noise declaration shall explicitly state that the noise emission values have been obtained according to this noise test code. If this statement is not true, the noise declaration shall indicate clearly what the deviations are.

The noise emission values to be declared are:

— the A-weighted time-averaged emission sound pressure level at the work station when it is greater than 70 dB(A). If the level is less than or equal to 70 dB(A), this fact shall be indicated;

— the sound power level of the machine if the A-weighted time-averaged emission sound pressure level at the work station is greater than ⟨A1⟩ 80 dB(A) ⟨A1⟩;

— the C-weighted peak emission sound pressure level at the work station if it is greater than 63 Pa (130 dB in relation to 20 μPa);

NOTE 1 Additional noise emission values may be given in the noise declaration, but only in such a way, that they cannot be confused with the declared values.

NOTE 2 EN ISO 4871:1996 gives a method to determine noise emission values to be declared and to verify the declared values. The methodology is based on the use of the measured values and measured uncertainties. The latter are the uncertainties associated with the measurement procedure (which is determined by the grade of accuracy of the measurement method used) and the production uncertainty (variation of noise emission from one machine to another of the same type made by the same manufacturer).

In the case of verification of declared values, this shall be done by using the same mounting, installation and operating conditions of the machine as those used for the initial determination of noise emission values.

⟨A1⟩ Unless the manufacturer has other figures available, the associated measurement uncertainties are those offered by prEN ISO 3744 and EN ISO 11201, i. e.:

— 2,5 dB for the A-weighted sound power level;

— 4 dB for the A-weighted emission sound pressure level. ⟨A1⟩

Annex B
(normative)

Pictograms

Figure B.1 — "Read operator's manual"

(see [A1] ISO 7000:2004 [A1])

Annex C
(normative)

Verification of surface temperature

C.1 Test equipment

The measuring equipment shall have an accuracy of ± 1 °C.

C.2 Test method

The motor or engine shall be operated at its maximum no load speed until the surface temperature is stable. The test shall be conducted in the shade. Temperatures are to be determined by correcting the observed temperature by the difference between the specified ambient and the test ambient temperature.

Ambient temperature shall be 20 (± 3) °C.

The hot surface area(s) greater than 10 cm² shall be identified.

The test cone (see figure C.1) shall be moved in all positions, the tip of the cone shall be directed towards the hot area.

When moving the test cone, it shall be determined whether or not the cone tip or conical surface of the cone contacts the hot surface area(s).

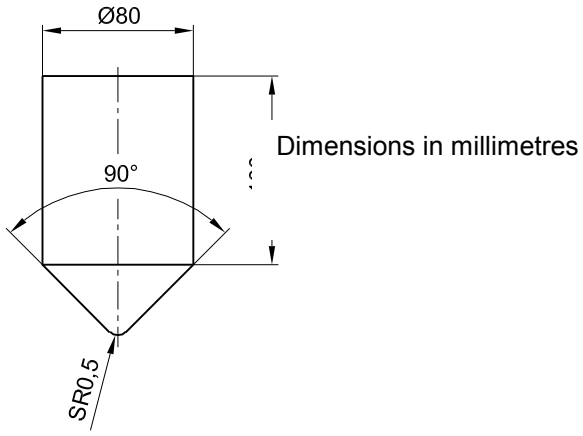

Figure C.1 — Test cone to detect hot surfaces

C.3 Test acceptance

The tip or conical surface of the test cone shall not contact any hot surface.

Annex D
(normative)

A1 Vibration test code

D.1 General

The vibration test code specified in this annex gives the information necessary for determining efficiently and under standardized conditions the vibration emission characteristics of core drilling machines on stand.

It presents a test procedure for establishing the magnitude of vibration at the handle of the machine, and is suitable for product control as well as type tests.

It is intended that the results obtained be used to compare different machines or different models of the same type of machine.

D.2 Terms and definitions

For the purpose of this annex, the terms and definitions given in EN ISO 20643:2008 apply.

D.3 Vibration parameters to be measured and determined

Quantities to be measured are the weighted accelerations in three perpendicular directions, a_{hwx}, a_{hwy} and a_{hwz}.

Quantities to be determined are vibration total values, a_{hv}, and the equivalent vibration total value, $a_{hv,eq}$, for the handle.

NOTE Mathematically, a_{hv} is the root-sum of the squares of the three root-mean-square (r.m.s.) single-axis acceleration values of the frequency-weighted hand transmitted vibration values (a_{hwx}, a_{hwy}, a_{hwz}).

D.4 Instrumentation

D.4.1 General

The vibration measurement system and frequency weighting for hand-arm shall be in accordance with EN ISO 8041.

D.4.2 Accelerometer

The total mass of the vibration accelerometer giving the acceleration in the three directions at each measuring position shall be as low as possible, and shall not in any case exceed 25 g, including the mounting, but excluding the cable, according to EN ISO 5349-2:2001, 6.1.5.

NOTE The sensitive element intended to pick-up the vibration and to convert it into electrical signals is an accelerometer. A tri-axial accelerometer will permit measurements in the x, y and z axes, simultaneously.

D.4.3 Fastening of accelerometer

The accelerometer shall be mounted firmly on the handle by means of a fastening device according to ISO 5348 and EN ISO 5349-2:2001, 6.1.4.

For measurement on the handle with resilient covers (e. g. a cushioned handle), it is permissible to use an adaptor for the accelerometer. The adaptor shall consist of a formed light rigid plate with a mounting arrangement for the accelerometer used. Care shall be taken that the mass, size and shape of the adaptor do not significantly influence the signal from the accelerometer in the frequency range of interest. For further information, see EN ISO 5349-2:2001, 6.1.4.2 and 6.1.4.3.

D.4.4 Calibration

The whole measuring chain — including the accelerometer — shall be checked before and after use, as well as whenever necessary to ensure accuracy during any sequence of measurements, in accordance with EN ISO 8041. The accelerometers shall be calibrated in accordance with ISO 16063-1.

D.5 Operating conditions, testing and declaration of results

Measurements shall be carried out on a new machine in concrete. For detailed operating conditions refer to Table D.1.

No alterations to the initial settings are permitted once measurements have commenced.

The measured vibration of the machine can be influenced by the operator, therefore the test shall be conducted with at least 3 different operators. The operators shall therefore be skilled and able to operate the machine properly.

NOTE Gripping force on the handle will influence the vibration measurements.

Information on hand-arm vibration shall be given in the instruction handbook:

— The vibration total value to which the hand-arm system is subjected, if it exceeds 2,5 m/s^2. Where this value does not exceed 2.5 m/s^2, this shall be mentioned.

— The uncertainty of measurement.

Table D.1 — Operating Conditions

		Operating conditions
1.1	Mounting of the accelerometer(s)	The accelerometer shall be mounted firmly on the handle by means of a fastening device according to ISO 5348 and EN ISO 5349-2:2001, 6.1.4.2 and 6.1.4.3. The position of the accelerometers shall be as near as possible to the hand without obstructing the normal grip. Make sure that the vibration measurement is only conducted during that time, the hands have contact to the handle-bars on which the accelerometer is mounted. Vibration measurement on a star handle without contact of the hand will influence the results and shall be avoided.

		Operating conditions
1.2	Mounting of the drill stand on the concrete	Standard fixing device as described by the manufacturer, perpendicular to the concrete surface. Machines being fixed with tension belts, ground nails, etc. can also be fixed with anchors if corresponding attachments are foreseen by the manufacturer.
1.3	Drilling system	The drilling system shall be equipped with the maximum allowed core bit diameter (standard specification) for each stand-/drive-combination. The drilling speed shall be adjusted according to the value recommended by the manufacturer for that diameter. Motor shall be operated at rated power.
1.4	Concrete	Concrete slab C30/37 (see EN 206-1:2000) at least 100 mm thickness with 10 mm reinforcement bar(s), located at 50 mm below the surface.
1.5	Test cycle	The center of the hole shall cross the reinforcement bar (tolerance ± 10 % of the core bit outside diameter). Measurement starts when the core bit has contact to the concrete block in 5 mm depth and stops at 100 mm.
1.6	Number of tests	3 per operator NOTE If it can be shown that the vibration is not affected by operator characteristics, it is acceptable to perform 3 measurements with one operator only.
1.7	Operating temperature	For internal combustion engines, the engine shall be at operating temperature before the test is commenced.

D.6 Uncertainties

The method for the calculation of uncertainty is given in EN 12096.

D.7 Information to be reported

The following information, when applicable, shall be compiled and reported for all measurements made in accordance with the requirements of this European Standard.

a) Machine under test:

   1) description of the machine, manufacturer, type and serial number, type and dimension of core bit, year of manufacture;

   2) operating conditions in accordance with Table D.1.

b) Instrumentation:

   1) equipment used for the measurements, including name, type, serial number and manufacturer;

   2) methods used to fasten the accelerometers;

   3) method used to calibrate the instrumentation system;

   4) date and place of the most recent calibration of the accelerometer calibrator.

c) Vibration and other data:

1) location of the accelerometer positions (a sketch may be included, if necessary);

2) measurement values and arithmetic mean values;

3) declared value;

4) remarks, if any;

5) date and place of measurements;

6) uncertainties. ⟨A1⟩

Annex ZA
(informative)

[A1] Relationship between this European Standard and the Essential Requirements of EU Directive 98/37/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive Machinery 98/37/EC, amended by 98/79/EC.

Once this standard is cited in the Official Journal of the European Communities under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard confers, within the limits of the scope of this standard, a presumption of conformity with the relevant Essential Requirements of that Directive and associated EFTA regulations.

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard. [A1]

Annex ZB
(informative)

[A1] Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive Machinery 2006/42/EC.

Once this standard is cited in the Official Journal of the European Communities under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard confers, within the limits of the scope of this standard, a presumption of conformity with the relevant Essential Requirements of that Directive and associated EFTA regulations.

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard. [A1]

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[1] EN ISO 4871:1996, Acoustics – Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)

[2] EN ISO 11688-1:1998, Acoustics – Recommended practice for the design of low noise machinery and equipment – Part 1: Planning (ISO/TR 11688-1:1995)

[3] ▌A1⟩ EN ISO 11688-2:2000, Acoustics – Recommended practice for the design of low-noise machinery and equipment – Part 2: Introduction to the physics of low-noise design (ISO/TR 11688-2:1998) ⟨A1▐

▌A1⟩ *deleted text* ⟨A1▐

[4] EN 60529:1991, Degrees of protection provided by enclosures (IP code) (IEC 60529:1989)

▌A1⟩ *deleted text* ⟨A1▐

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