

Mechanical vibration — Measurement of vibration on ships —

Part 3: Pre-installation vibration measurement of shipboard equipment

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National foreword

This British Standard is the UK implementation of ISO 20283-3:2006+A1:2016. It supersedes BS ISO 20283-3:2006 which is withdrawn.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 ISO text carry the number of the ISO amendment. For example, text altered by ISO amendment 1 is indicated by A1 A1.

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A list of organizations represented on this subcommittee can be obtained on request to its secretary.

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Partie 3: Mesurage des vibrations des équipements de bord avant leur installation



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Foreword

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

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 20283-3 was prepared by Technical Committee ISO/TC 108, *Mechanical vibration and shock*, Subcommittee SC 2, *Measurement and evaluation of mechanical vibration and shock as applied to machines, vehicles and structures*.

 A list of parts in the ISO 20283-series can be found on the ISO website. 

Introduction

Operating machinery and equipment aboard ships can create vibration and excessive structure-borne sound. As a result, the limits for sound pressure levels specified by contracting partners for spaces occupied by crew and passengers may be exceeded. Where it is anticipated that structure-borne sound from machinery can adversely affect occupied spaces, this part of ISO 20283 can be applied with the aim of selecting low-vibration machinery.

Measurement of the vibration of individual equipment units, conducted according to standardized procedures and compared with contractually agreed-on acceptance criteria, will provide the requisite information to the shipbuilder for the proper selection and installation of the equipment.

Mechanical vibration — Measurement of vibration on ships —

Part 3:

Pre-installation vibration measurement of shipboard equipment

1 Scope

This part of ISO 20283 gives guidelines, requirements and procedures for the measurement of vibration generated by types of shipboard equipment, and which can be transmitted into a ship structure as structure-borne sound, as part of the factory acceptance test (FAT) of the equipment unit. It specifies the measurements to be conducted for well-defined operating and mounting conditions of the unit, e.g. in the supplier's test rig.

This part of ISO 20283 is a framework for providing representative test results. It is applicable to shipboard equipment intended for passenger ships, merchant ships, yachts and high-speed craft.

This part of ISO 20283 is concerned with translational vibration, since rotational vibration is not considered to be a substantial contributor to structure-borne sound. However, it does not provide numerical limits for equipment vibration or transmitted structure-borne sound.

2 Normative references

A1 The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1683, *Acoustics — Preferred reference values for acoustical and vibratory levels*

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

3 Terms and definitions

A1 For the purposes of this document, the terms and definitions given in ISO 2041, ISO 80000-8 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at <http://www.electropedia.org/>

— ISO Online browsing platform: available at <https://www.iso.org/obp/> **A1**

3.1

equipment

any machine, system, subsystem or part thereof which causes vibration and is intended to be installed aboard ships

EXAMPLE 1 Main propulsion plant: diesel engine, gas turbine, main reduction gear, electric propulsion motor.

EXAMPLE 2 Mechanical ventilation as well as heating, ventilation and air-conditioning (HVAC) system: air supply and exhaust fans, air-conditioning units, air-conditioning water cooling units, fresh water pumps, etc.

EXAMPLE 3 Auxiliary equipment: diesel engine or gas turbine driven generators, hydraulic plants, electric motors, etc.

NOTE Excluded are pumps directly fitted to reduction gears, diesel engines, etc., fans directly fitted to electric propulsion motors, generators, electric motors, etc., and any other auxiliary equipment attached to larger units that are subject to the pre-testing procedure.

3.2

resilient mount

device with elastic properties used to reduce transmission of structure-borne vibration

NOTE This is typically a shaped block of rubber or similar elastic material used at discrete locations at the component attachment point(s) for the purpose of supporting the component and providing vibration isolation between the component and the support foundation or structure. Use of these devices approximates a **practically free condition** (3.12) within a broad frequency range.

3.3

compound mount

double-resilient mount

three-element system consisting of an intermediate mass, the amount of which is comparable to that of the mounted equipment contained between two sets of resilient elements

NOTE Compound mounts are used to achieve greater vibration attenuation than is available with the use of simple resilient mounts. The isolated equipment is supported by the three-element system.

3.4

rigidly mounted equipment

equipment which is solidly attached to the support structure

3.5

support structure

mechanical structure of various types upon which equipment is installed

3.5.1

mounting fixture

support structure mainly intended to be used for rigidly mounted equipment with relatively light framework or structure for the purpose of vibration testing, and which is used above resilient mounts

EXAMPLE Common base frame.

NOTE The fixture can also be used for resiliently mounted equipment for the purpose of vibration testing.

3.5.2

foundation

support structure which is used below the resilient mounts and which may or may not resemble the ship structure

3.5.3

subbase

bedplate

support structure required for shipboard installation and which is necessary to hold down one or more components within alignment

3.5.4

testbed

support structure normally consisting of a massive and reinforced concrete structure to which the entire assembly of equipment, mounts and support structures is attached