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## **Mechanical vibration — Measurement and evaluation of machine vibration —**

### **Part 2: Land-based gas turbines, steam turbines and generators in excess of 40 MW, with fluid-film bearings and rated speeds of 1 500 r/min, 1 800 r/min, 3 000 r/min and 3 600 r/min**

*Vibrations mécaniques — Mesurage et évaluation des vibrations de machines —*

*Partie 2: Turbines à gaz, turbines à vapeur et alternateurs à paliers à film fluide excédant 40 MW pour applications terrestres, avec des vitesses nominales de fonctionnement de 1 500 r/min, 1 800 r/min, 3 000 r/min et 3 600 r/min*



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ISO copyright office  
Ch. de Blandonnet 8 • CP 401  
CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
copyright@iso.org  
www.iso.org

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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.

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

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

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

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

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

This first edition of ISO 20816-2 cancels and replaces ISO 7919-2:2009 and ISO 10816-2:2009, which have been technically revised.

The main change compared to the previous edition is that the scope has been extended to change the lower output limit for large steam turbines and generators from 50 MW to 40 MW and requirements have been incorporated for large gas turbines with outputs greater than 40 MW, which are contained in ISO 7919-4 and ISO 10816-4. A consequence of the inclusion of large gas turbines in this document is that both ISO 7919-4 and ISO 10816-4 have been amended.

A list of parts in the ISO 20816 series can be found on the ISO website.

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## Introduction

ISO 20816-1 provides the general requirements for evaluating the vibration of various machine types when the vibration measurements are made on both non-rotating and rotating parts. This document provides specific provisions for assessing the vibration of the bearing housings or pedestals and rotating shafts of large, land-based gas turbines, steam turbines and generators. Measurements at these locations characterize the state of vibration reasonably well. Evaluation criteria, based on previous experience, are presented. These can be used for assessing the vibratory condition of such machines. It should be noted that in those cases where there is a high ratio between the mass of the bearing supports and the rotor, lower values of vibration of the bearing housings or pedestals can be appropriate.

Two criteria are provided for assessing the machine vibration when operating under steady-state conditions. One criterion considers the magnitude of the observed vibration; the second considers changes in the magnitude. In addition, different criteria are provided for transient operating conditions.

The evaluation procedures presented in this document are based on broad-band measurements. However, because of advances in technology, the use of narrow-band measurements or spectral analysis has become increasingly widespread, particularly for the purposes of vibration evaluation, condition monitoring and diagnostics. The specification of criteria for such measurements is beyond the scope of this document. They are dealt with in greater detail in the relevant parts of ISO 13373 which establish provisions for the vibration condition monitoring of machines.