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Mechanical vibration — Measurement and evaluation of machine vibration —

Part 4: Gas turbines in excess of 3 MW, with fluid-film bearings

Vibrations mécaniques — Mesurage et évaluation des vibrations de machines —

Partie 4: Turbines à gaz à paliers à film fluide, excédant 3 MW

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Contents

Foreword

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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).

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).

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.

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 20816-4 cancels and replaces ISO 7919-4:2009 and ISO 10816-4:2009, which have been technically revised. It also incorporates the Amendments ISO 7919-4/Amd.1:2017 and ISO 10816-4/Amd.1:2017.

The main change is that the scope has been reduced to exclude large gas turbines with power outputs greater than 40 MW, fluid-film bearings and rated speeds of 1 500 r/min, 1 800 r/min, 3 000 r/min or 3 600 r/min. Such gas turbines are now covered by ISO 20816-2.

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

Introduction

Documents in the ISO 20816 series have been and are being developed to combine and supersede the ISO 7919 and ISO 10816 series.

ISO 20816-1 is the basic part of the ISO 20816 series that gives the general requirements for evaluating the vibration of various machine types when the vibration measurements are made on both non-rotating and rotating parts. ISO 20816-2 deals with the measurement and evaluation of machine vibration of large gas turbines with certain rotational speeds.

This document provides specific provisions for assessing the vibration of the bearing housings or pedestals and rotating shafts of those gas turbines which are not covered by ISO 20816-2. 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. 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 provided in greater detail in the relevant parts of ISO 13373 which establish provisions for the vibration condition monitoring of machines.