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Mechanical vibration — Vibration of rotating machinery equipped with active magnetic bearings —

Part 2: Evaluation of vibration

*Vibrations mécaniques — Vibrations de machines rotatives équipées de
paliers magnétiques actifs —*

Partie 2: Évaluation des vibrations



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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 14839-2 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*.

ISO 14839 consists of the following parts, under the general title *Mechanical vibration — Vibration of rotating machinery equipped with active magnetic bearings*:

- *Part 1: Vocabulary*
- *Part 2: Evaluation of vibration*

The following part is under preparation:

- *Part 3: Evaluation of stability margin.*

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Introduction

This part of ISO 14839 concerns steady-state values of rotor vibrations and the AMB coil currents and voltage measured during nominal steady-state operation, but not the transient condition while passing critical speeds. The regulations of these transient vibrations passing at the critical speeds are established in ISO 10814 in which the modal sensitivity, the so-called amplification factor (Q-factor), is then evaluated. This topic is beyond the scope of this part of ISO 14839.

Because of the stiff support of oil-film bearings with small clearances [e.g. bearing radial clearance (C) divided by the journal radius (R), $C/R \approx 0,001$], shaft vibration should be regulated within low levels to avoid oil-film rupture of the lubricant and metal contact inside the bearing. In contrast, the relatively soft support of AMBs and correspondingly large clearances (e.g. $C/R \approx 0,005$), a larger vibration level is often observed in AMB rotors, but is quite normal and acceptable. The lower stiffness introduces no major problems in the transmission force to the machine foundation. Compared to the oil-film bearing rotor standards (see the ISO 7919-1 series), this part of ISO 14839 provides greater values of zone limits for vibration assessment and acceptance.

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