BSI Standards Publication

Machine tool spindles — Evaluation of spindle vibrations by measurements on non-rotating parts

Part 2: Direct-driven spindles and belt-driven spindles with rolling element bearings operating at speeds between 600 r/min and 30 000 r/min

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National foreword

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Broches pour machines-outils — Évaluation des vibrations des broches par mesurage sur les parties non tournantes —

Partie 2: Broches à entraînement direct et broches à entraînement par courroie à roulements à billes opérant à des vitesses entre 600 r/min et 30 000 r/min

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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).

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This document was prepared by Technical Committee ISO/TC 39, *Machine tools*, Subcommittee SC 2, *Test conditions for metal cutting machine tools*.

A list of all parts in the ISO 17243 series, published under the general title, *Machine tool spindles — Evaluation of spindle vibrations by measurements on spindle housing*, can be found on the ISO website.

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Part 2: Direct-driven spindles and belt-driven spindles with rolling element bearings operating at speeds between 600 r/min and 30 000 r/min

1 Scope

This document provides information on how to assess the severity of machine tool spindle vibrations measured on the spindle housing. It gives specific guidance for assessing the severity of vibration measured on the spindle housing at customer sites or at the machine tool manufacturer's test facilities.

Its vibration criteria apply to direct-driven spindles and belt-driven spindles intended for stationary machine tools with nominal operating speeds between 600 r/min and 30 000 r/min.

It is applicable to those spindles of the rolling element bearing types only, to spindles assembled on metal cutting machine tools, and for testing, periodic verification, and continuous monitoring.

It does not address

— geometrical accuracy of axes of rotation (see ISO 230-7),

— unacceptable cutting performance with regards to surface finish and accuracy,

— vibration severity issues of machine tool spindles operating at speeds below 600 r/min or exceeding 30 000 r/min (due to lack of supporting vibration data and limitations in many vibration measurement instruments), or

— frequency domain analyses such as fast Fourier transform (FFT) analyses, envelope analyses or other similar techniques.

Annex A presents an introduction to alternative bearing condition assessment techniques.

2 Normative references

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 1925, *Mechanical vibration — Balancing — Vocabulary*

ISO 2041, *Mechanical vibration, shock and condition monitoring — Vocabulary*

ISO 2954, *Mechanical vibration of rotating and reciprocating machinery — Requirements for instruments for measuring vibration severity*

ISO 13372, *Condition monitoring and diagnostics of machines — Vocabulary*

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