BSI Standards Publication

Mechanical vibration — Evaluation of machine vibration by measurements on non-rotating parts

Part 3: Industrial machines with nominal power above 15 kW and nominal speeds between 120 r/min and 15 000 r/min when measured in situ

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National foreword

This British Standard is the UK implementation of ISO 10816-3:2009+A1:2017. It supersedes BS ISO 10816-3:2009, which is withdrawn.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.

The UK participation in its preparation was entrusted to Technical Committee GME/21/5, Mechanical vibration, shock and condition monitoring - Vibration of machines.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Second edition
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Mechanical vibration — Evaluation of machine vibration by measurements on non-rotating parts —

Part 3: Industrial machines with nominal power above 15 kW and nominal speeds between 120 r/min and 15 000 r/min when measured in situ

Vibrations mécaniques — Évaluation des vibrations des machines par mesurages sur les parties non tournantes —

Partie 3: Machines industrielles de puissance nominale supérieure à 15 kW et de vitesse nominale de fonctionnement entre 120 r/min et 15 000 r/min, lorsqu'elles sont mesurées in situ

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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).

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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 second edition cancels and replaces the first edition (ISO 10816-3:1998), which has been technically revised. The main change is the deletion of pumps from the scope, which are now dealt with in ISO 10816-7.

A list of all parts in the ISO 10816 series can be found on the ISO website.

Introduction

[A1] ISO 20816-1 gives general guidelines for evaluating the vibration of various machine types when the vibration measurements are made on rotating and on non-rotating (and, where applicable, non-reciprocating) parts of complete machines.[A1] This part of ISO 10816 provides specific guidance for assessing the severity of vibration measured on bearings, bearing pedestals, or housings of industrial machines when measurements are made *in situ*.

Two criteria are provided for assessing the machine vibration. One criterionconsiders the magnitude of the observed vibration; the second considers the changes in the magnitude. It must be recognized, however, that these criteria do not form the only basis for judging the severity of vibration. For some machine types, it is also common to judge the vibration based on measurements taken on the rotating shafts. Shaft vibration measurement requirements and criteria are addressed in separate documents, namely [A1] ISO 7919-3 and ISO 20816-1.[A1]

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INTERNATIONAL STANDARD ISO 10816-3:2009(E)

Mechanical vibration — Evaluation of machine vibration by measurements on non-rotating parts —

Part 3: Industrial machines with nominal power above 15 kW and nominal speeds between 120 r/min and 15 000 r/min when measured in situ

1 Scope

This part of ISO 10816 gives criteria for assessing vibration levels when measurements are made *in situ*. The criteria specified apply to machine sets having a power above 15 kW and operating speeds between 120 r/min and 15 000 r/min.

〈A1〉 The machine sets covered by this part of ISO 10816 include:

— steam turbines and generators with outputs less than or equal to 40 MW;

— steam turbines and generators with outputs greater than 40 MW and speeds other than 1 500 r/min, 1 800 r/min, 3 000 r/min or 3 600 r/min (although generators seldom fall into this category);

— rotary compressors;

— industrial gas turbines with outputs less than or equal to 3 MW;

— electrical motors of any type;

— blowers or fans.

NOTE However, the vibration criteria presented in this part of ISO 10816 are generally only applicable to fans with power ratings greater than 300 kW or fans which are not flexibly supported. As and when circumstances permit, recommendations for other types of fans, including those with lightweight sheet metal construction, will be prepared. Until such time, classifications can be agreed between the manufacturer and the customer, using results of previous operational experience, see also ISO 14694. 〈A1〉

The following are excluded from this part of ISO 10816:

— 〈A1〉 steam turbines and/or generators with outputs greater than 40 MW and speeds of 1 500 r/min, 1 800 r/min, 3 000 r/min or 3 600 r/min (see ISO 20816-2); 〈A1〉

— 〈A1〉 gas turbine sets with outputs greater than 3 MW (see ISO 10816-4 and ISO 20816-2); 〈A1〉

— machine sets in hydraulic power generating and pumping plants (see ISO 10816-5);

— machines coupled to reciprocating machines (see ISO 10816-6);

— rotodynamic pumps including integrated electric motors, i.e. where the impeller is mounted directly on the motor shaft or is rigidly attached to it (see ISO 10816-7);

— rotary positive displacement compressors (e. g. screw compressors);

— 〈A1〉 reciprocating compressors (see ISO 10816-8); 〈A1〉

— reciprocating pumps;