INTERNATIONAL STANDARD

ISO 10816-4

Second edition
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AMENDMENT 1
2017-08

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

Part 4:
Gas turbine sets with fluid-film bearings

AMENDMENT 1

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

Partie 4: Turbines à gaz à paliers à film fluide

AMENDEMENT 1

Reference number
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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).

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*.

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

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

Part 4: Gas turbine sets with fluid-film bearings

AMENDMENT 1

Foreword

Replace the complete text of the Foreword by the following:

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This second edition cancels and replaces the first edition (ISO 10816-4:1998), which has been technically revised. The main changes are:

— clarification that the document applies only to gas turbine sets with fluid-film bearings;

— emphasis on acceptance specifications always being agreed on between the supplier and the purchaser of the gas turbine set prior to installation;

— the addition of provisions for evaluating the vibration of coupled gas turbine sets during transient operation;

— introduction of a new annex providing cautionary notes about the use of constant vibration velocity criteria at low frequencies;

— closer alignment of this part of ISO 10816 with ISO 7919-4.

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

Introduction

Replace the first sentence by the following:

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.

Second paragraph

Replace the reference to “ISO 7919-1” with “ISO 20816-1”.

Clause 1, EXAMPLE

Delete “ISO 10816-2 or”.

Replace the listing after the Example by the following:

This part of ISO 10816 is not applicable to the following:

a) aero-derivative gas turbines (including gas turbines with dynamic properties similar to those of aero-derivatives);

NOTE ISO 3977-3 defines aero-derivatives as aircraft propulsion gas generators adapted to drive mechanical, electrical or marine propulsion equipment. Large differences exist between heavy-duty and aero-derivative gas turbines, for example in casing flexibility, bearing design, rotor-to-stator mass ratio and mounting structure. Different criteria therefore apply for these two turbine types.

b) gas turbines with outputs greater than 40 MW and with rated speeds of 1 500 r/min, 1 800 r/min, 3 000 r/min or 3 600 r/min (see ISO 20816-2);

c) gas turbines with outputs less than or equal to 3 MW (see ISO 10816-3);

d) gas turbine driven rotodynamic pumps (see ISO 10816-7);

e) coupled steam turbines and/or generators with outputs less than or equal to 40 MW (see ISO 10816-3);

f) coupled 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);

g) coupled steam turbines and/or 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) (see ISO 10816-3);

h) synchronizing clutches which couple the gas turbine to a steam turbine or generator (see ISO 20816-2);

i) coupled rotary compressors (see ISO 10816-3);

j) gearbox vibration (see this clause);

k) rolling element bearing vibration of any driven equipment.

Clause 1, last paragraph

Replace the reference to “ISO 7919-1” with “ISO 20816-1”.

Clause 2

Replace this clause with the following:

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 7919-4, *Mechanical vibration — Evaluation of machine vibration by measurements on rotating shafts — Part 4: Gas turbine sets with fluid-film bearings*

ISO 20816-1:2016, *Mechanical vibration — Measurement and evaluation of machine vibration — Part 1: General guidelines*

Clause 3, first paragraph

Replace the reference to “ISO 10816-1” with “ISO 20816-1”.

4.1, first paragraph

Replace the reference to “ISO 10816-1” with “ISO 20816-1”.

4.2.4.3, fourth paragraph

Replace the reference to “ISO 10814” with “ISO 21940-31”.

4.3, fifth paragraph

Replace the reference to “ISO 10816-1” with “ISO 20816-1”.

4.5, first paragraph

Replace the reference to “ISO 10816-1:1995” with “ISO 20816-1:2016”.

Annex B

Replace the first sentence with the following:

Consider the case of a 3 000 r/min gas turbine with output less than 40 MW.

Bibliography

Replace the references with the following:

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

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

[3] ISO 3977-3, *Gas turbines — Procurement — Part 3: Design requirement*

[4] ISO 5348, *Mechanical vibration and shock — Mechanical mounting of accelerometers*

[5] ISO 10816-3, *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*

[6] ISO 10816-7, *Mechanical vibration — Evaluation of machine vibration by measurements on non-rotating parts — Part 7: Rotodynamic pumps for industrial applications, including measurements on rotating shafts*

[7] ISO 13373-1, *Condition monitoring and diagnostics of machines — Vibration condition monitoring — Part 1: General procedures*

[8] ISO 13373-2, *Condition monitoring and diagnostics of machines — Vibration condition monitoring — Part 2: Processing, analysis and presentation of vibration data*

[9] ISO 13373-3, *Condition monitoring and diagnostics of machines — Vibration condition monitoring — Part 3: Guidelines for vibration diagnosis*

[10] ISO 20816-2, *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*

[11] ISO 21940-12, *Mechanical vibration — Rotor balancing — Part 12: Procedures and tolerances for rotors with flexible behaviour*

[12] ISO 21940-31, *Mechanical vibration — Rotor balancing — Part 31: Susceptibility and sensitivity of machines to unbalance*

[13] Rathbone T.C. *Vibration tolerances*. Power Plant Engineering, 1939

