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INTERNATIONAL STANDARD

colour inside

Rotating electrical machines –
Part 14: Mechanical vibration of certain machines with shaft heights 56 mm and higher – Measurement, evaluation and limits of vibration severity

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Part 14: Mechanical vibration of certain machines with shaft heights 56 mm and higher – Measurement, evaluation and limits of vibration severity

FOREWORD

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International Standard IEC 60034-14 has been prepared by IEC technical committee 2: Rotating machinery.

This fourth edition cancels and replaces the third edition, published in 2003, and its amendment 1, published in 2007. It constitutes a technical revision.

The significant technical changes with respect to the previous edition are:

a) 6.2 is significantly changed to better explain the definition “free suspension”.
b) 6.3: a second method of rigid mount is added since the first method is not always possible on the test floor.
c) 7.1: an improved option for shaft key is defined.
d) Clause 8: considerable effort to harmonize with NEMA MG 1 and IEEE 841 and API 541, and also establish levels which are achievable and more in line with best practices. Table 1 is reduced to two shaft-height range sections.
e) 8.2: definition of twice line frequency simplified along with Figure 7 added.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
2/1906/FDIS	2/1914/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60034 series, published under the general title *Rotating electrical machines*, can be found on the IEC website.

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ROTATING ELECTRICAL MACHINES –

Part 14: Mechanical vibration of certain machines with shaft heights 56 mm and higher – Measurement, evaluation and limits of vibration severity

1 Scope

This part of IEC 60034 specifies the factory acceptance vibration test procedures and vibration limits for certain electrical machines under specified conditions, when uncoupled from any load or prime mover.

It is applicable to DC and three-phase AC machines, with shaft heights 56 mm and higher and a rated output up to 50 MW, at operational speeds from 120 min^{-1} up to and including 15 000 min^{-1}.

This document is not applicable to machines mounted *in situ* (on site), three-phase commutator motors, single-phase machines, three-phase machines operated on single-phase systems, vertical waterpower generators, turbine generators greater than 20 MW and machines with magnetic bearings or series-wound machines.

NOTE For machines measured *in situ,* refer to applicable parts of ISO 20816, ISO 10816 and ISO 7919.

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.

IEC 60034-1, *Rotating electrical machines – Part 1: Rating and performance*

IEC 60034-7, *Rotating electrical machines – Part 7: Classification of types ofconstructions and mounting arrangements ~~and terminal box position~~ (IM Code)*

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

~~ISO 7919-1, *Mechanical vibration of non-reciprocating machines – Measurements on rotating shafts and evaluation criteria – Part 1: General guidelines*~~

~~ISO 8821, *Mechanical vibration – Balancing – Shaft and fitment key convention*~~

ISO 10817-1, *Rotating shaft vibration measuring systems – Part 1: Relative and absolute sensing of radial vibration from rotating shafts*

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

ISO 21940-32, *Mechanical vibration – Rotor balancing – Part 32: Shaft and fitment key convention*

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Rotating electrical machines –
Part 14: Mechanical vibration of certain machines with shaft heights 56 mm and higher – Measurement, evaluation and limits of vibration severity

Machines électriques tournantes –
Partie 14: Vibrations mécaniques de certaines machines de hauteur d'axe supérieure ou égale à 56 mm – Mesurage, évaluation et limites de l'intensité vibratoire

IEC 60034-14:2018-08(en-fr)

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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MACHINES ÉLECTRIQUES TOURNANTES –

Partie 14: Vibrations mécaniques de certaines machines de hauteur d'axe supérieure ou égale à 56 mm – Mesurage, évaluation et limites de l'intensité vibratoire

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La Norme internationale IEC 60034-14 a été établie par le comité d'études 2 de l'IEC: Machines tournantes.

Cette quatrième édition annule et remplace la troisième édition, parue en 2003 et son amendement 1, paru en 2007. Cette édition constitue une révision technique.

Les modifications techniques majeures par rapport à l'édition précédente sont:

a) Le 6.2 est modifié de manière significative afin de mieux définir «suspension libre».
b) En 6.3, ajout d'une deuxième méthode de montage rigide puisque la première méthode n'est pas toujours réalisable sur le banc d'essai.

c) En 7.1, définition d'option améliorée pour les clavettes d'arbre.

d) À l'Article 8, effort d'harmonisation avec les normes NEMA MG 1, IEEE 841 et API 541, et définition de niveaux réalisables et plus conformes aux meilleures pratiques. Le Tableau 1 est réduit à deux plages de hauteur d'axe.

e) En 8.2, définition simplifiée de «deux fois la fréquence de ligne», et ajout de la Figure 7.

Le texte de cette Norme internationale est issu des documents suivants:

FDIS	Rapport de vote
2/1906/FDIS	2/1914/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

Une liste de toutes les parties de la série IEC 60034, publiées sous le titre général *Machines électriques tournantes*, peut être consultée sur le site web de l'IEC.

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MACHINES ÉLECTRIQUES TOURNANTES –

Partie 14: Vibrations mécaniques de certaines machines de hauteur d'axe supérieure ou égale à 56 mm – Mesurage, évaluation et limites de l'intensité vibratoire

1 Domaine d'application

La présente partie de l'IEC 60034 spécifie les procédures d'essai d'acceptation de vibration en usine et les limites de vibration pour certaines machines électriques, dans des conditions spécifiées, sans être couplées à une charge ou à une machine entraînée.

Elle est applicable aux machines à courant continu et aux machines triphasées à courant alternatif de hauteur d'axe supérieure ou égale à 56 mm et de puissance assignée inférieure ou égale à 50 MW, à des vitesses de fonctionnement de 120 min^{-1} jusqu'à et y compris 15 000 min^{-1}.

Le présent document n'est pas applicable aux machines montées *in situ* (sur site), aux moteurs triphasés à collecteurs, aux machines monophasées, aux machines triphasées alimentées en monophasé, aux générateurs hydrauliques verticaux, aux générateurs à turbine de plus de 20 MW et aux machines à paliers magnétiques ou aux machines à enroulement série.

NOTE Pour les machines mesurées *in situ*, se référer aux parties applicables de l'ISO 20816, de l'ISO 10816 et de l'ISO 7919.

2 Références normatives

Les documents suivants cités dans le texte constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60034-1, *Machines électriques tournantes – Partie 1: Caractéristiques assignées et caractéristiques de fonctionnement*

IEC 60034-7, *Machines électriques tournantes – Partie 7: Classification des formes de construction et les dispositions de montage (Code IM)*

ISO 2954, *Vibrations mécaniques des machines tournantes ou alternatives – Exigences relatives aux appareils de mesure de l'intensité vibratoire*

ISO 10817-1, *Systèmes de mesure des vibrations des arbres tournants – Partie 1: Captage relatif et captage absolu des vibrations radiales des arbres tournants*

ISO 20816-1, *Vibrations mécaniques – Mesurage et évaluation des vibrations de machines – Partie 1: Lignes directrices générales*

ISO 21940-32, *Vibrations mécaniques – Équilibrage des rotors – Partie 32: Convention relative aux clavettes d'arbres et aux éléments rapportés*