INTERNATIONAL STANDARD

ISO 19499

First edition
2007-07-15

Mechanical vibration — Balancing — Guidance on the use and application of balancing standards

Vibrations mécaniques — Équilibrage — Lignes directrices pour l'utilisation et l'application de normes d'équilibrage

Reference number
ISO 19499:2007(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

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 19499 was prepared by Technical Committee ISO/TC 108, *Mechanical vibration, shock and condition monitoring*.

Introduction

Vibration caused by rotor unbalance is one of the most critical issues in the design and maintenance of machines. It gives rise to dynamic forces which adversely impact both machine and human health and well-being. The purpose of this International Standard is to provide a common framework for balancing rotors so that appropriate methods will be used. This standard serves essentially as guidance on the usage of other International Standards on balancing in that it categorizes types of machine unbalance. As such, it can be viewed as an introductory standard to the series of International Standards on balancing developed by ISO/TC 108.

Balancing is explained in a general manner, as well as the unbalance of a rotor. A certain representation of the unbalance is recommended for an easier understanding of the necessary unbalance corrections.

Mechanical vibration — Balancing — Guidance on the use and application of balancing standards

1 Scope

This International Standard provides an introduction to balancing and directs the user through the available International Standards associated with rotor balancing. It gives guidance on which of these standards should be used. Individual procedures are not included here as these will be found in the appropriate International Standards.

2 Normative references

The following referenced documents are indispensable for the application 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 1925:2001, *Mechanical vibration — Balancing — Vocabulary*

ISO 2041, *Vibration and shock — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1925 and ISO 2041 apply.

4 Fundamentals of balancing

4.1 General

Balancing is a procedure by which the mass distribution of a rotor (or part or module) is checked and, if necessary, adjusted to ensure that balance tolerances are met.

Rotor unbalance may be caused by many factors, including material, manufacture and assembly, wear during operation, debris or an operational event. It is important to understand that every rotor, even in series production, has an individual unbalance distribution.

New rotors are commonly balanced by the manufacturer in specially designed balancing machines before installation into their operational environment. Following rework or repair, rotors may be rebalanced in a balancing machine or, if appropriate facilities are not available, the rotor may be balanced *in situ* (see ISO 20806 for details). In the latter case, the rotor is held in its normal service bearings and support structure and installed within its operational drive train.

The unbalance on the rotor generates centrifugal forces when it is rotated in a balancing machine or *in situ*. These forces may be directly measured by force gauges mounted on the structures supporting the bearings or indirectly by measuring either the motion of the pedestal or the shaft. From these measurements, the unbalance can be calculated and balancing achieved by adding, removing or shifting of correction masses on the rotor. Depending on the particular balancing task, the corrections are performed in one, two or more correction planes.