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AMERICAN NATIONAL STANDARD

**Mechanical vibration — Rotor balancing — Part 11:
Procedures and tolerances for rotors with
rigid behaviour
(a nationally adopted international standard)**

Secretariat:

Acoustical Society of America

Approved on September 24, 2019:

American National Standards Institute, Inc.

Abstract

This nationally adopted international standard establishes procedures and unbalance tolerances for balancing rotors with rigid behaviour. It specifies a) the magnitude of the permissible residual unbalance, b) the necessary number of correction planes, c) the allocation of the permissible residual unbalance to the tolerance planes, and d) how to account for errors in the balancing process. This document does not cover the balancing of rotors with flexible behaviour. Procedures and tolerances for rotors with flexible behaviour are dealt with in ANSI/ASA S2.81/Part 12/ISO 21940-12.

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ANSI/ASA S2.81-2019/Part 11/ ISO 21940-11:2016

Accredited Standards Committee S2, Mechanical Vibration and Shock

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Foreword

[This Foreword is for information only and is not a part of the American National Standard ANSI/ASA S2.81-2019/ Part 11/ISO 21940-11:2016 American National Standard Mechanical vibration – Rotor balancing – Part 11: Procedures and tolerances for rotors with rigid behaviour(a nationally adopted international standard). As such, this Foreword may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the standard.]

This standard comprises a part of a group of definitions, standards, and specifications for use in mechanical vibration and shock. It was developed and approved by Accredited Standards Committee S2 Mechanical Vibration and Shock under its approved operating procedures. Those procedures have been accredited by the American National Standards Institute (ANSI). The Scope of Accredited Standards Committee S2 is as follows:

Standards, specification, methods of measurement and test, and terminology in the field of mechanical vibration and shock, and condition monitoring and diagnostics of machines, including the effects of exposure to mechanical vibration and shock on humans, including those aspects which pertain to biological safety, tolerance and comfort.

This standard is an identical national adoption of ISO 21940-11:2016 Mechanical vibration — Rotor balancing —Part 11: Procedures and tolerances for rotors with rigid behaviour, which was prepared by ISO/TC 108/SC 2.

The ANSI/ASA equivalents to ISO/IEC standards referenced herein are given below:

- ANSI/ASA S2.81/Part 2/ISO 21940-2 is an identical national adoption of ISO 21940-2.
- ANSI/ASA S2.81/Part 12/ISO 21940-12 is an identical national adoption of ISO 21940-12.
- ANSI/ASA S2.81/Part 14/ISO 21940-14 is an identical national adoption of ISO 21940-14.

At the time this Standard was submitted to Accredited Standards Committee S2, Mechanical Vibration and Shock for approval, the membership was as follows:

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Suggestions for improvements to this standard will be welcomed. They should be sent to Accredited Standards Committee S2, Mechanical Vibration and Shock, in care of the Standards Secretariat of the Acoustical Society of America, 1305 Walt Whitman Road, Suite 300, Melville, New York 11747. Telephone: 631-390-0215; FAX: 631-923-2875; E-mail: asastds@acousticalsociety.org.

Introduction

Rotor balancing is a procedure by which the mass distribution of a rotor (or part or module) is checked and, if necessary, adjusted to ensure the unbalance tolerance is met. This document covers the balancing of rotors with rigid behaviour. A rotor is said to be rigid when the flexure of the rotor caused by its unbalance distribution can be neglected with respect to the agreed unbalance tolerance at any speed up to the maximum service speed. For these rotors, the resultant unbalance, and often moment unbalance, are of interest, which when combined are expressed as a dynamic unbalance of the rotor.

The balancing machines available today enable residual unbalances to be reduced to very low limits. Therefore, it is necessary to specify an unbalance quality requirement for a balancing task, as in most cases it would not be cost-effective to reduce the unbalance to the limits of the balancing machine.

In addition to specifying an unbalance tolerance, it is necessary to consider the errors introduced by the balancing process. This document takes into account the influence of these errors to distinguish clearly between the specified permissible residual unbalance and the reduced residual unbalance values to be achieved during the balancing process.

Draft American National Standard

Mechanical vibration — Rotor balancing — Part 11: Procedures and tolerances for rotors with rigid behaviour

1 Scope

This document establishes procedures and unbalance tolerances for balancing rotors with rigid behaviour. It specifies

- a) the magnitude of the permissible residual unbalance,
- b) the necessary number of correction planes,
- c) the allocation of the permissible residual unbalance to the tolerance planes, and
- d) how to account for errors in the balancing process.

NOTE In ISO 21940-14, the assessment of balancing errors is considered in detail. Fundamentals of rotor balancing are contained in ISO 19499 which gives an introduction to balancing.

This document does not cover the balancing of rotors with flexible behaviour. Procedures and tolerances for rotors with flexible behaviour are dealt with in ISO 21940-12.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 21940-2 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

4 Pertinent aspects of balancing

4.1 General

Rotor balancing is a procedure by which the mass distribution of a rotor is examined and, if necessary, adjusted to ensure that the residual unbalance or vibration in service is within specified limits. It should be noted that the vibration in service can originate from sources other than unbalance.