

This is a preview of "ISO 21940-13:2012". [Click here to purchase the full version from the ANSI store.](#)

First edition
2012-03-15

Mechanical vibration — Rotor balancing —

Part 13: Criteria and safeguards for the *in-situ* balancing of medium and large rotors

Vibrations mécaniques — Équilibrage des rotors —

Partie 13: Critères et sauvegardes relatifs à l'équilibrage in situ des rotors moyens et grands



Reference number
ISO 21940-13:2012(E)

© ISO 2012

This is a preview of "ISO 21940-13:2012". [Click here to purchase the full version from the ANSI store.](#)



COPYRIGHT PROTECTED DOCUMENT

© ISO 2012

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

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

This is a preview of "ISO 21940-13:2012". Click here to purchase the full version from the ANSI store.

Contents

Page

Foreword	iv
Introduction.....	vi
1 Scope	1
2 Normative references.....	1
3 Terms and definitions	2
4 <i>In-situ</i> balancing	2
4.1 General	2
4.2 Reasons for <i>in-situ</i> balancing	2
4.3 Objectives of <i>in-situ</i> balancing	3
5 Criteria for performing <i>in-situ</i> balancing	3
6 Safeguards	4
6.1 Safety of personnel while operating close to a rotating shaft.....	4
6.2 Special operating envelope for <i>in-situ</i> balancing	4
6.3 Integrity and design of the correction masses and their attachments.....	4
6.4 Machinery-specific safety implications.....	4
7 Measurements	5
7.1 Vibration measurement equipment	5
7.2 Measurement errors	5
7.3 Phase reference signals	6
8 Operational conditions	7
9 Reporting.....	8
9.1 General	8
9.2 Report introduction	9
9.3 Vibration measurement equipment	9
9.4 Results.....	9
9.5 Text information	10
Annex A (normative) Precautions and safeguards for specific machine types during <i>in-situ</i> balancing.....	12
Annex B (informative) Example of an <i>in-situ</i> balancing report for a boiler fan ≤ 1 MW.....	13
Annex C (informative) Example of an <i>in-situ</i> balancing report for a large >50 MW turbine generator set.....	17
Bibliography.....	23

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 21940-13 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 first edition of ISO 21940-13 cancels and replaces ISO 20806:2009, of which it constitutes a minor editorial revision.

ISO 21940 consists of the following parts, under the general title *Mechanical vibration — Rotor balancing*:

- *Part 1: Introduction*¹⁾
- *Part 2: Vocabulary*²⁾
- *Part 11: Procedures and tolerances for rotors with rigid behaviour*³⁾
- *Part 12: Procedures and tolerances for rotors with flexible behaviour*⁴⁾
- *Part 13: Criteria and safeguards for the in-situ balancing of medium and large rotors*⁵⁾
- *Part 14: Procedures for assessing balance errors*⁶⁾

1) Revision of ISO 19499:2007, *Mechanical vibration — Balancing — Guidance on the use and application of balancing standards*

2) Revision of ISO 1925:2001, *Mechanical vibration — Balancing — Vocabulary*

3) Revision of ISO 1940-1:2003, *Mechanical vibration — Balance quality requirements for rotors in a constant (rigid) state — Part 1: Specification and verification of balance tolerances* (+ Cor.1:2005)

4) Revision of ISO 11342:1998, *Mechanical vibration — Methods and criteria for the mechanical balancing of flexible rotors* (+ Cor.1:2000)

5) Revision of ISO 20806:2009, *Mechanical vibration — Criteria and safeguards for the in-situ balancing of medium and large rotors*

6) Revision of ISO 1940-2:1997, *Mechanical vibration — Balance quality requirements of rigid rotors — Part 2: Balance errors*

This is a preview of "ISO 21940-13:2012". [Click here to purchase the full version from the ANSI store.](#)

- *Part 21: Description and evaluation of balancing machines*⁷⁾
- *Part 23: Enclosures and other protective measures for balancing machines*⁸⁾
- *Part 31: Susceptibility and sensitivity of machines to unbalance*⁹⁾
- *Part 32: Shaft and fitment key convention*¹⁰⁾

7) Revision of ISO 2953:1999, *Mechanical vibration — Balancing machines — Description and evaluation*

8) Revision of ISO 7475:2002, *Mechanical vibration — Balancing machines — Enclosures and other protective measures for the measuring station*

9) Revision of ISO 10814:1996, *Mechanical vibration — Susceptibility and sensitivity of machines to unbalance*

10) Revision of ISO 8821:1989, *Mechanical vibration — Balancing — Shaft and fitment key convention*

Introduction

Balancing is the process by which the mass distribution of a rotor is checked and, if necessary, adjusted to ensure that the residual unbalance or the vibrations of the journals or bearing supports and/or the forces at the bearings are within specified limits. Many rotors are balanced in specially designed balancing facilities prior to installation into their bearings on site. However, if remedial work is carried out locally or a balancing machine is not available, it is common to balance the rotor *in situ*.

Unlike balancing in a specially designed balancing machine, *in-situ* balancing has the advantage that the rotor is installed in its working environment. Therefore, there is no compromise with regard to the dynamic properties of its bearings and support structure, nor from the influence of other elements in the complete rotor train. However, it has the large disadvantage of restricted access and the need to operate the whole machine. Restricted access can limit the planes at which correction masses can be added, and using the whole machine has commercial penalties of both downtime and running costs. Where gross unbalance exists, it may not be possible to balance a rotor *in situ* due to limited access to correction planes and the size of correction masses available.