
**Mechanical vibration — Balancing
machines — Description and evaluation**

*Vibrations mécaniques — Machines à équilibrer — Description et
évaluation*



Contents

Page

1 Scope	1
2 Normative reference	1
3 Definitions	1
4 Capacity and performance data of the machine.....	1
4.1 Data of horizontal machines.....	2
4.2 Data of vertical machines.....	6
5 Machine features.....	10
5.1 Principle of operation.....	10
5.2 Arrangement of the machine	10
5.3 Indicating system.....	11
5.4 Plane separation system.....	12
5.5 Setting and calibration of indication.....	12
5.6 Other devices	13
6 Minimum achievable residual unbalance	13
7 Production efficiency	13
7.1 General.....	13
7.2 Time per measuring run	14
7.3 Unbalance reduction ratio	14
8 Performance qualifying factors.....	14
9 Installation requirements	15
9.1 General.....	15
9.2 Electrical and pneumatic requirements.....	15
9.3 Foundation	15

© ISO 1999

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 the publisher.

International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet iso@iso.ch

Printed in Switzerland

10 Proving rotors and test masses	15
10.1 General	15
10.2 Proving rotors	15
10.3 Test masses	17
11 Verification tests	26
11.1 Requirements for performance and parameter verification	26
11.2 Duties of manufacturer and user	26
11.3 Requirement for weighing scale	27
11.4 Test and rechecks	27
11.5 Test speed	27
11.6 Test for minimum achievable residual unbalance (U_{mar} test)	27
11.7 Test for unbalance reduction ratio (URR test)	31
11.8 Test for couple unbalance interference on single-plane machines	40
11.9 Compensator test	40
11.10 Simplified tests	41
Annex A (normative) Definitions	42
Annex B (informative) Information to be supplied to the balancing machine manufacturer by the user	45
Annex C (informative) URR limit diagrams	49
Annex D (informative) Shafts of outboard proving rotors type C	52
Annex E (informative) Modification of old (ISO 2953:1985) proving rotors to this International Standard	54
Annex F (informative) Bibliography	55

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.

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.

International Standard ISO 2953 was prepared by Technical Committee ISO/TC 108, *Mechanical vibration and shock*, Subcommittee SC 1, *Balancing, including balancing machines*.

This third edition cancels and replaces the second edition (ISO 2953:1985). It contains revised and more detailed recommendations for testing the capability of balancing machines, including outboard proving rotors and overhung test planes. It replaces the previous edition of this document.

Annex A is an integral part of this International Standard. Annexes B to F are for information only.

Mechanical vibration — Balancing machines — Description and evaluation

1 Scope

This International Standard gives requirements for the evaluation of the performance and characteristics of machines for balancing rotating components. It stresses the importance attached to the form in which the balancing machine characteristics should be specified by the manufacturers and also outlines criteria and tests for evaluating balancing machines. Adoption of the format suggested in 4.1 and 4.2 makes it easier for the user to compare products of the different manufacturers. Guidance as to the manner in which users should state their requirements is given in annex B.

Details of proving rotors, test masses and performance tests to be employed to ensure compliance with specified unbalance indicating capability are given. Tests for other machine capacities and performance parameters are not contained in this International Standard.

Annex E describes recommended modifications of old ISO proving rotors.

This International Standard does not specify balancing criteria; these are specified in ISO 1940-1.

This International Standard is applicable to balancing machines that support and rotate workpieces which are rigid at balancing speed, and that indicate the amounts and angular locations of required unbalance corrections in one or more planes. It covers both the machines that measure out-of-balance effects on soft bearings and those that measure this on hard bearings.

Technical requirements for such balancing machines are included, however, special features, such as those associated with automatic correction, are excluded.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1925:1990, *Mechanical vibration — Balancing — Vocabulary*.

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 1925 and those given in annex A apply.

4 Capacity and performance data of the machine

The manufacturer shall specify the data listed in 4.1 for horizontal or 4.2 for vertical machines respectively, as applicable, and in a similar format.