

ICS 21.120.40

CCS N 73



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 9239.1-2006

**Mechanical vibration -- Balance quality requirements for rotors
in a constant (rigid) state -- Part 1: Specification and verification
of balance tolerances**

(English Translation)

Issued on: September 8, 2006

Implemented on: February 1, 2007

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine of the People's Republic of China**

Table of Contents

Foreword...	3
Introduction...	5
1 Scope...	6
2 Normative references...	6
3 Terms and definitions...	7
4 Pertinent aspects of balancing...	11
5 Similarity considerations...	15
6 Specification of balance tolerances...	20
7 Allocation of permissible residual unbalance to tolerance planes...	22
8 Allocation of balance tolerances to correction planes...	24
9 Assembled rotors...	26
10 Verification of residual unbalance...	27
Annex A...	30
Annex B...	34
Annex C...	36
Annex D...	37
Annex E...	39
Bibliography...	42

Foreword

GB/T 9239 "Mechanical vibration - Balance quality requirements for rotors in a constant (rigid) state" consists of the following two parts:

- Part 1: Specification and verification of balance tolerances;
- Part 2: Balance errors.

This Part is Part 1 of GB/T 9239.

This Part is identical to ISO 1940-1:2003 "Mechanical vibration - Balance quality requirements for rotors in a constant (rigid) state - Part 1: Specification and verification of balance tolerances" (English version, Second edition).

This Part is drafted in accordance with ISO 1940-1:2003 and its technical

corrigendum 1 published in 2005 by using translation method. The text structure and technical content are consistent with that of ISO 1940-1:2003.

For convenience of use, this Part has made the following editorial modifications:

- DELETE the foreword of ISO 1940-1:2003;
- REPLACE the decimal point symbol "," with the decimal point symbol ".";
- MODIFY the introductory phrase in Clause 2 "Normative references";
- The international standards referenced in Clause 2 of ISO 1904-1:2003 are changed into the corresponding national standards directly referenced by this Part;
- CORRECT the misprints (see the footnote of A.3).

This Part replaces GB/T 9239-1988 "Balance quality of rigid rotors - Determination of permissible residual unbalance".

This Part has made the following modifications to GB/T 9239-1988:

- MODIFY the standard name;
- ADD table of contents, foreword, introduction, and normative references;
- ADJUST the overall structure of the standard according to ISO 1940-1:2003;
- REDEFINE parts of terms;
- INTRODUCE reference planes for balance tolerances; tolerance planes replace the using correction planes;
- DELETE some examples;
- MODIFY the Annex A;
- MODIFY the Annex B;
- ADD Annex C, Annex D, and Annex E;
- ADD the bibliography.

Annex A, Annex B, Annex C, Annex D, and Annex E of this Part are informative.

This Part was proposed by China Machinery Industry Federation.

This Part shall be under the jurisdiction of National Standardization Technical Committee of Mechanical Vibration and Impact.

Responsible drafting organization of this Part: Changchun Institute of Test Machine.

Participating drafting organizations of this Part: Xiaogan Songlin International Measuring Device Co., Ltd., Changchun Zhonglian Test Equipment Co., Ltd., Shanghai Schenck Machinery Co., Ltd., No. 6354 Institute of China State Shipbuilding Corporation, and Zhengzhou Machinery Research Institute.

Main drafters of this Part: Liu Zhili, Zhang Shimin, Shao Chunping, Wang Chaorong, Yang Dechun, and Huang Runhua.

The historical version replaced by this Part is as follows:

- GB/T 9239-1988.

Mechanical vibration - Balance quality requirements

for rotors in a constant (rigid) state - Part 1:

Specification and verification of balance tolerances

1 Scope

This Part of GB/T 9239 gives specifications for rotors in a constant (rigid) state. It specifies:

- a) balance tolerances,
- b) the necessary number of correction planes, and
- c) methods for verifying the residual unbalance.

Recommendations are also given concerning the balance quality requirements for rotors in a constant (rigid) state, according to their machinery type and maximum service speed. These recommendations are based on worldwide experience.

This Part of GB/T 9239 is also intended to facilitate the relationship between the manufacturer and user of rotating machines, by stating acceptance criteria for the verification of residual unbalances.

Detailed consideration of errors associated with balancing and verification of residual unbalance are given in GB/T 9239.2.

This Part of GB/T 9239 does not cover rotors in a flexible state. The balance quality requirements for rotors in a flexible state are covered by GB/T 6557.

2 Normative references

The provisions in following documents become the provisions of this Part through reference in this Part of GB/T 9239. For dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this Part, however, parties who reach an agreement based on this Part are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

9.1 General

Assembled rotors may be balanced as integral rotors or on the component level. For each assembly, the unbalances of the components superimpose and assembly errors create additional unbalances, for instance, because of runout and play (see GB/T

9239.2 for details).

NOTE: If assembly errors are not decisive, the choice of balancing process may be governed by the availability of balancing machines.

9.2 Balanced as a unit

The best way to take care of all unbalances in the rotor and all related assembly errors in one step is to balance the rotor as a fully assembled unit.

If a rotor is balanced as an assembly but needs to be disassembled afterwards (e.g. for mounting into the housing), it is recommended to mark each component angularly to ensure identical angular positions during reassembly.

NOTE: The above-mentioned problems with runout and play can still exist.

9.3 Balanced on component level

If individual components are balanced separately, the following comments are important.

a) Usually all components are balanced to the same specific residual unbalance (see Clause 5). However, allowing for additional assembly errors (see GB/T 9239.2) means that the specific residual unbalance of each component shall be