

ICS 17.160  
CCS J 04



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

**GB/T 11348.5-2008**

Replacing GB/T 11348.5-2002

---

**Mechanical vibration evaluation of machine vibration by  
measurements on rotating shafts -- Part 5: Machine sets in  
hydraulic power generating and pumping plants**

**(English Translation)**

**Issued on: September 27, 2008**

**Implemented on: May 1, 2009**

---

**Issued by: General Administration of Quality Supervision, Inspection and  
Quarantine**

## Table of Contents

|                                                                                                                                           |    |
|-------------------------------------------------------------------------------------------------------------------------------------------|----|
| Foreword .....                                                                                                                            | 3  |
| 1 Scope .....                                                                                                                             | 5  |
| 2 Normative References .....                                                                                                              | 6  |
| 3 Measurement Procedures .....                                                                                                            | 7  |
| 4 Evaluation Criteria .....                                                                                                               | 8  |
| Annex A (Normative) Evaluation Criteria for Relative Shaft Vibration of Hydraulic Turbine Sets under Specified Operating Conditions ..... | 11 |
| Annex B (Informative) Special Features of Shaft Vibration of Hydraulic Machine Sets .....                                                 | 17 |
| Annex C (Informative) Analysis Procedure and Applied Regression Technique.....                                                            | 20 |
| Annex D (Informative) Objectives of this Edition of GB/T 11348.5 .....                                                                    | 22 |
| Bibliography .....                                                                                                                        | 24 |

## Foreword

GB/T 11348 Mechanical Vibration - Measurements of Machine Vibration by Measurements on Rotating Shafts can be divided into the following 5 parts:

- Part 1: General Guidelines;
- Part 2: Large Land-Based Steam Turbine Generators in Excess of 50MW with Normal Operating Speeds of 1500r/min, 1800r/min, 3000r/min and 3600r/min
- Part 3: Coupled Industrial Machines;
- Part 4: Gas Turbine Sets;
- Part 5: Machine Sets in Hydraulic Power Generating and Pumping Plants.

This Part is Part 5 of GB/T 11348.

This Part of GB/T 11348 equivalently adopts the international standard ISO 7919-5:2005 Mechanical Vibration - Evaluation of Machine Vibration by Measurements on Rotating Shafts - Part 5: Machine Sets in Hydraulic Power Generating and Pumping Plants (English Version). This Part equivalently adopts ISO 7919-5:2005.

For the ease of use, compared with ISO 7919-5:2005, this Part made the following editorial modifications:

- Change "this international standard" into "this Part";
- Delete the foreword of the international standard;

- Use the decimal point symbol "." to replace the decimal point symbol ",";
- Change the name of the original standard;
- As for other international standards cited in ISO7919-5:2005, there are those that are equivalently adopted by China, then the corresponding international standards are replaced by Chinese standards; but directly cited international standards that have not been equivalently adopted as Chinese standards.

This Part revised GB/T 11348.5-2002 Mechanical Vibration of Non-Reciprocating Machines - Measurements on Rotating Shafts and Evaluation Criteria - Part 5: Machine Sets in Hydraulic Power Generating and Pumping Plants. Compared with GB/T 11348.5-2002, this Part has the major technical changes as follows:

- Modify the evaluation criteria; use a wider division, divide the entire evaluation

## 1 Scope

This Part of GB/T 11348 gives guidelines for applying evaluation criteria for shaft vibration measured at, or close to, the bearings of machines or machine sets in hydraulic power generating and pumping plants under normal operating conditions.

These guidelines are presented in terms of both steady-state running vibration and any amplitude changes that can occur in these steady vibration values.

**NOTE 1:** The numerical values specified are not intended to serve as the only basis for vibration evaluation since, in general, the vibratory condition of a machine is assessed by consideration of both the shaft vibration and the associated structural vibration (see GB/T 11348.1 and GB/T 6075.1).

This Part is applicable to machines or machine sets in hydraulic power generating and pumping plants where the hydraulic machines have speeds from 60 r/min to 1 800 r/min, shell- or shoe-type sleeve bearings, and main engine power of at least 1 MW.

The position of the shaft line can be vertical, horizontal or at an arbitrary angle between these two directions.

Machine sets covered by this Part include a combination of

- a) hydraulic turbines and generators,
  - b) pumps and electrical machines operating as motors,
  - c) pump-turbines and motor-generators, and
  - d) hydraulic turbines, pumps and motor-generators (classic pump-storage machine sets).
- including auxiliary equipment (e.g.: starting turbines or exciters lying in the shaft line).

This Part is also applicable to turbines or pumps connected to generators or electrical

motors via gears and/or radially flexible couplings.

**NOTE 2:** Electrical machines with speeds between 1 000 r/min and 1 800 r/min are evaluated according to the criteria specified in GB/T 11348.3.

This Part is not applicable to:

- a) pumps in thermal power plants or industrial installations (for these machines, see GB/T 11348.3),
- b) hydraulic machines or machine sets having rolling element bearings, or
- c) hydraulic machines with water-lubricated bearings.

As specified in GB/T 11348.1, shaft vibration of machines or machine sets in hydraulic power generating and pumping plants can be determined with regard to the following tasks:

- a) task A: changes in vibrational behaviour;
- b) task B: excessive kinetic load;
- c) task C: the monitoring of radial clearance.

## 2 Normative References

The provisions in following documents become the provisions of this Part through reference in this Part of GB/T 11348. For dated references, the subsequent amendments (excluding corrigendum) 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.

GB/T 11348.1 Mechanical Vibration of Non-Reciprocating Machines - Measurements on Rotating Shafts and Evaluation Criteria - Part 1: General Guidelines (GB/T 11348.1-1999, idt ISO 7919-1:1996 Mechanical Vibration - Evaluation of Machine Vibration by Measurements on Non-Rotating Parts - Part 1: General Guidelines)

GB/T 17189 Code for Field Measurement of Vibrations and Pulsation in Hydraulic Machines (Turbines Storage Pumps and Pump-Turbines) (GB/T 17189-2007, IEC 60994:1991)

GB/T 21487.1 Rotating Shaft Vibration Measuring Systems - Part 1: Relative and Absolute Sensing of Radial Vibration (GB/T 21487.1-2008, ISO 10817-1:1998, IDT)