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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 20485.16-2018

Replacing GB/T 13823.19-2008

Methods for the calibration of vibration and shock transducers -- Part 16: Calibration by earth gravitation

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Foreword

GB/T 20485 "Calibration of vibration and shock sensor calibration" series of standards mainly by the basic concept, absolute calibration, comparison method calibration, ring

Simulation Calibration and other five major categories of components, the published sections are as follows.

--- Part 1. Basic concepts;

--- Part 11. Laser interference absolute calibration;

--- Part 12. Absolute calibration of reciprocal vibration;

--- Part 13. Laser interferometer absolute calibration;

--- Part 15 . Absolute calibration of angular vibration by laser interferometry ;

--- Part 16. Earth Gravity Calibration;

--- Part 21. Calibration of the vibration comparison method;

--- Part 22. Impact Comparison Calibration;

--- Part 31. Transverse vibration sensitivity test;

--- Part 33. Magnetic sensitivity tests;

--- Part 41. Calibration of laser vibrometers;

--- Part 42 . Calibration of the gravitational acceleration method for high precision seismometers .

The planned release sections are.

--- Part 17. Absolute calibration by centrifuge method;

--- Part 32. Accelerometer frequency and phase response tests for impact test excitation

methods;

--- Part 43. Calibration of accelerometers based on model parameter identification;

--- Part 44. On-site vibration calibrator calibration;

--- Part 45. Calibration of vibration sensors with built-in calibration coils.

This part is Part 16 of GB/T 20485.

This section was drafted in accordance with the rules given in GB/T 1.1-2009.

This Part replaces GB/T 13823.19-2008 "Calibration of Earthquake Gravity and Shock Sensor Calibration Methods".

This section compared with GB/T 13823.19-2008, except for editorial changes, the main technical differences are as follows.

--- A more detailed description of the scope of application, the uncertainty is written separately as Chapter 3 (see Chapter 1 and Chapter 3,

Chapter 1 of GB/T 13823.19-2008);

--- Added -30° and 30°, 150° and 210°, -45° and 45°, 135° and 225°, -60° and in the mounting platform

At angles of 60°, 120°, and 240°, the platform angle error increases from +/-0.5° to +/-0.1°, which increases the calculation of the earth's gravity.

(see Chapter 4, GB/T 13823.19-2008 Chapter 3);

--- Added additional test steps in the calibration method, added DC bias considerations and schematic diagram of the calibration structure (see

Chapter 5, chapter 5 of GB/T 13823.19-2008);

--- Modify the description of the calibration uncertainty assessment in the Appendix (see Appendix A, Appendix A of GB/T 13823.19-2008);

--- Deleted the preferred value (see Chapter 4 of GB/T 13823.19-2008).

This section uses the translation method equivalent to the use of ISO 16063-16.2014 "Vibration and shock sensor calibration method Part 16. Earth weight

Force Calibration (in English).

The Chinese documents that are consistent with the normatively quoted international documents in this section are as follows.

--- GB/T 20485.1-2008 Vibration and shock sensor calibration method Part 1. Basic concepts (ISO 16063-1.

1998, IDT)

This part is proposed and managed by the National Standardization Technical Committee for Machinery Vibration, Impact and Condition Monitoring (SAC/TC53).

This section was drafted by. China Aviation Industry Corporation Beijing Great Wall Metrology and Measurement Technology Institute, Suzhou integrated calibration testing and certification

Limited company, Guangzhou Dynamic Integrated Testing and Certification Co., Ltd.

1 Scope

This part of GB/T 20485 specifies the equipment and operation required for absolute calibration of an accelerometer using Earth's gravity.

program.

This section applies to linear accelerometers with DC (zero frequency) response, such as strain gauge, piezoresistive, variable capacitance, and servo acceleration

Meter.

This section applies to the calibration of the sensitivity amplitude, using the acceleration generated by the local gravity as a reference value at 0 Hz.

With proper calibration equipment, this section can be used to calibrate the sensitivity amplitude, using the local gravity component of acceleration

The reference value is 0Hz. Instrument specifications include environmental conditions and the specific performance requirements of the equipment used.

The sensitivity of the dc response accelerometer obtained using this section can be used in the flat part of the accelerometer's low frequency range. Applicable

The flatness of the frequency range will be calculated into the measurement uncertainty (UoM).

This section applies to reference standard accelerometers and working standard accelerometers, as well as complete accelerometers (accelerometers included

Bigger and reading unit).

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article

Pieces. For undated references, the latest version (including all amendments) applies to this document.

ISO 16063-1 Vibration and Shock Sensor Calibration Methods Part 1. Basic Concepts

(Methods for the calibration of

vibrationandshocktransducers-Part 1.Basicconcepts)

3 Measurement uncertainty

It is hoped that all users in this section will perform an uncertainty assessment in accordance with Appendix A to provide a measurement uncertainty assessment report. Given

A calibration example is provided to help establish a system that meets different uncertainty requirements.

When the local gravitational acceleration value gl is known and used, a measurement uncertainty of 0.1% can be obtained.

When the local gravitational acceleration value, gl, is unknown, the standard gravitational acceleration gn (ignoring the influence of latitude and altitude) can be used.

0.5% measurement uncertainty. This estimate assumes that the Earth's gravitational acceleration is 9.80665 m/s2 +/- 0.026 m/s2.

The uncertainty limits mentioned in this chapter apply to devices with a maximum lateral sensitivity of 5%.

A more detailed description of the uncertainty component is given in Appendix A.

The measurement uncertainty is expressed as the expanded measurement uncertainty (hereinafter referred to as the uncertainty) in accordance with the requirements of ISO 16063-1.

4.1 Overview

In order to comply with the scope of Chapter 1 and obtain the uncertainty of Chapter 3, this chapter recommends the necessary performance of the equipment and is listed below.