

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

JJF 1588-2016

**Calibration Specification for Vector Hydrophones in Frequency
Range 1 kHz to 10 kHz(Free-field Comparison Method)
(English Translation)**

Issued on: November 25, 2016

Implemented on: February 25, 2017

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

Table of Contents

Introduction (II)	
1 Scope (1)	
2 References (1)	
3 Terms and units of measurement (1)	
3.1 Vector hydrophone (1)	
3.2 Axial sensitivity asymmetry (1)	
3.3 Horizontal suppression ratio (1)	
3.4 Vector - sound pressure channel phase difference (2)	
4 Overview (2)	
5 Metrological characteristics (2)	
5.1 Free-field voltage sensitivity level (2)	
5.2 Free field velocity sensitivity level (2)	
5.3 Free field sound pressure gradient sensitivity level (2)	
5.4 Vector - Sound pressure channel phase difference (2)	
5.5 Directivity (2)	
6 Calibration conditions (2)	
6.1 Environmental conditions (2)	
6.2 Measurement standards and other equipment (2)	
7 Calibration items and calibration methods (4)	
7.1 Calibration items (4)	
7.2 Calibration method (4)	
8 Calibration results (8)	
8.1 Calibration data processing (8)	
8.2 Calibration Certificate (8)	
8.3 Uncertainty of measurement of calibration results (9)	
9 Re-school time interval (9)	
Appendix A Contents of the Calibration Certificate (10)	
Appendix B Example of Evaluation of Uncertainty in Voltage Sensitivity Level (14)	

1 Specification for, kHz to 10 kHz Vector Hydrophone Calibration

(Free field comparison method) in Frequency Range 1 kHz to 10 kHz

(Free-field Comparison Method) 2016-11-25 release 2017-02-25 Implementation State Administration of Quality Supervision, Inspection and Quarantine issued Specification for 1 kHz to 10 kHz Vector Hydrophone Calibration (Free field comparison method) Coordinate unit. National Acoustics Metrology Technical Committee the main drafting unit. China Shipbuilding Industry Corporation, the seventh one five research institute Participated in the drafting unit. Institute of Acoustics, Chinese Academy of Sciences China Shipbuilding Heavy Industry Sound Technology Co., Ltd this specification entrusts the National Acoustics Metrology Technical Committee to explain

9 Re-school time interval (9)

Appendix A Contents of the Calibration Certificate (10)

Appendix B Example of Evaluation of Uncertainty in Voltage Sensitivity Level (14)

Introduction

This specification is based on JJF 1071-2010 "National Metrological Calibration Rules".

This specification refers to the IEC 60565 "water sound hydrophone 0.01 Hz ~ 1 MHz frequency range calibration"

(Underwater acoustics-Hydrophones-Calibration in frequency range 0.01 Hz to 1 MHz) and JJG 185-1997 "500 Hz ~ 1 MHz measurement hydrophone" in the hydrophone free field voltage Sensitivity Level 2 calibration method, measurement uncertainty is evaluated according to JJF 1059.1-2012.

This specification is the first release.

Specification for 1 kHz to 10 kHz Vector Hydrophone Calibration (Free field comparison method)

1 Scope

This specification applies to the calibration of vector hydrophones used in the frequency range of 1 kHz to 10 kHz at atmospheric pressure.

2 reference file

This specification refers to the following documents.

Measurement of hydrophone for 500 Hz ~ 1 MHz JJG 185-1997 Standard Terminology and Definitions for JJF 1001-2011 Terminology and definitions of acoustical metrology nouns JJF 1034-2005 JJF 1340-2012 20 Hz ~ 2000 Hz Vector hydrophone calibration specification Acoustics quantities and units Terminology of acoustics nouns GB/T 3947-1996 for dated

references, only the dated edition applies to this specification; references that are not dated , The latest version (including all modifications) applies to this specification.

3 terms and units of measurement JJF 1001-2011, JJF 1034-2005, GB 3102.7-1993 and GB/T 3947-1996 and the following terms and definitions apply to this specification.

This specification uses the amount and unit specified in GB 3102.7-1993.

3.1 vector hydrophone the hydrophone, which is a ratio of the output voltage to the particle velocity or the sound pressure gradient, has a similarity to the cosine function Shape, and the characteristic does not vary with frequency.

[JJF 1340-2012, definition 3.1] 3.2 axial sensitivity asymmetry axialdeviationofsensitivity Vector hydrophone vector channel free field voltage sensitivity level difference between two maxima.

[JJF 1340-2012, definition 3.5] Note.

1. In decibels (dB).
2. Also known as directivity asymmetry or maximum nonuniformity.

3.3 lateral inhibition than lateralrejectionratio the Difference between the Maximum and the Minimal Value of the Vector Channel of the Vector Hydrophone.

[JJF 1340-2012, definition 3.6] Note.

1. In decibels (dB).
2. also known as the depth of the pits.