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**Marine environment sensor  
performance — Specifications,  
testing and reporting — General  
requirements**

*Navires et technologie maritime — Performances des capteurs marins*

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## 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. [www.iso.org/directives](http://www.iso.org/directives)

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received. [www.iso.org/patents](http://www.iso.org/patents)

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 13, *Marine technology*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

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## Introduction

Oceans are intertwined with many of humanity's priorities, including trade, food, energy, climate and security. Understanding what's going on below the sea surface is important for making decisions around maritime boundaries, exploiting energy and mineral resources, expanding waterways, and monitoring aquaculture. All depend on the availability of data produced by marine environment sensors that measure physical, ecological and chemical parameters of seawater, such as salinity, temperature, oxygen, carbon dioxide and acidity.

As an example of the growing importance of these data, marine business is increasingly mandated by law to record them to meet environmental regulations. But common definitions for even basic performance specifications of these sensors, such as accuracy or stability, don't exist. This weakens the utility of the laws and diminishes confidence in sensor performance. It also acts to dampen the market forces driving sensor innovation, as it is difficult for end-users to compare and reward true breakthroughs from existing manufacturers, or to trust new entrants. This document aims to address this by establishing a set of performance specifications common to all marine environment sensors, including terms, definitions and test methods.

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# Marine environment sensor performance — Specifications, testing and reporting — General requirements

## 1 Scope

This document defines terms, specifies test methods and provides reporting requirements for marine sensor specifications to ensure a consistent reporting by manufacturers.

It is applicable to those devices known as conductivity-temperature-depth (CTDs), sound velocity probes, multi-parameter sondes and dissolved gas sensors, that measure parameters such as conductivity, temperature, pressure, sound speed, dissolved oxygen, turbidity, pH, and chlorophyll in seawater.

It is also generally applicable to all marine environment instruments.

NOTE 1 A 'CTD' directly measures conductivity, temperature, and pressure. Depth is derived from pressure using an equation.

NOTE 2 The term 'sound velocity probe' is widely used to describe instruments that measure sound speed. In this document the term 'sound velocity' is used when describing the type of sensor, and the term 'sound speed' is used when describing the parameter or measurand, but these terms can be used interchangeably.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 5725-2:2019, *Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*

ISO/IEC 17025:2017, *General requirements for the competence of testing and calibration laboratories*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

### 3.1

#### quantity

parameter

property of a phenomenon, body, or substance, where the property has a magnitude that can be expressed as a number and a reference

Note 1 to entry: A reference can be a measurement unit, a measurement procedure, a reference material, or a combination of such.

EXAMPLE Pressure,  $P$