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# **Underwater acoustics — Quantities and procedures for description and measurement of underwater sound from ships —**

Part 2:

## **Determination of source levels from deep water measurements**

*Acoustique sous-marine — Grandeurs et modes de description et de mesurage de l'acoustique sous-marine des navires —*

*Partie 2: Détermination des niveaux de source à partir des mesures par grands fonds*



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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 (see [www.iso.org/directives](http://www.iso.org/directives)).

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This document was prepared by Technical Committee ISO/TC 43, *Acoustics*, SC 3, *Underwater acoustics*.

A list of all parts in the ISO 17208 series can be found on the ISO website.

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

This document has been developed in response to the demand, noted by the International Maritime Organization (IMO) and its Marine Environment Protection Committee (MEPC), for an International Standard for measurement of underwater sound radiated from ships. In this document, the sound radiated by the ship under test is described in terms of an equivalent monopole source level.

The scientific research on the impact of underwater sound on the marine ecosystem necessitates the accumulation of reliable acoustic output data for common sources such as surface vessels. These data can be obtained through at-sea measurement by relevant organizations, such as research institutes, by applying the measurement methodology described in ISO 17208-1. The methodology and measurement configuration are sufficient to give technically sound acoustic data, but are also suitable for end users to conduct the measurements *in situ* in the ocean without access to large fixed noise ranges.

The measurement of underwater sound radiated from ships depends upon various conditions related to the vessel under test and its surrounding environment. Specifically, the speed, draught and operational conditions of the engine(s) of the ship influence the level of radiated underwater sound. Waves, current, depth, temperature and salinity of the water also influence the propagation of underwater sound. The sea surface and bottom can reflect acoustical waves. Ambient noise sources, such as traffic, industry, biological, geological or meteorological noise can also interfere with the measurement of underwater sound radiated from the target ship.

In this document, the radiated noise level measured in deep water ([3.1](#)) according to ISO 17208-1 is converted to monopole source level. The conversion formulae are derived based on the assumption that the surface is a perfect pressure release boundary.