
**Ships and marine technology —
Verification method for portable power
measurement using a strain gauge**

Titre manque





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Foreword

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For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 8, *Ships and marine technology*, Subcommittee SC 2, *Marine environment protection*.

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.

Ships and marine technology — Verification method for portable power measurement using a strain gauge

1 Scope

This document specifies a procedure for the verification of portable power measurement equipment using a strain gauge in the laboratory.

The power measurement equipment verified in accordance with this document can be used on merchant ships.

2 Normative references

The following documents are referred to in the text in such a way that some or all of 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 15016:2015, *Ships and marine technology — Guidelines for the assessment of speed and power performance by analysis of speed trial data*

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

strain gauge

gauge used to measure the strain on an object

Note 1 to entry: As the object is deformed it causes a change in electrical resistance. This change in resistance, usually measured using a Wheatstone bridge, is related to the strain by the quantity known as the gauge factor.

3.2

shaft power meter verification equipment

equipment designed to provide a real torque, produced by a torque arm weighted with a known exact mass, to the torque measurement device

3.3

portable power measurement equipment

equipment temporarily installed on the ship and operated during a sea trial to measure the power delivered to the propeller by the engine and transmission systems, as opposed to the fixed-type shaft power measurement equipment, if installed

4 Composition of the shaft power meter verification equipment

4.1 General

The verification equipment is composed of a torque arm, a weight surface plate, a torque arm axis, a shaft, a torque sensor, a weight and an RPM (revolutions per minute) generator. See [Figure 1](#). The real torque is generated by weights with known exact mass, attached to a torque arm of known length which is attached to the shaft.

Shaft torque shall be measured by means of a verified permanent torque sensor or strain gauges on the shaft.

4.2 Torque generator and RPM generator

4.2.1 General

Torque and RPM are needed for calculating the shaft power output. The ship's power output can be simulated by multiplying the RPM, which are generated by an RPM generator, generating exact RPM, and the torque which is generated by a torque generator.

4.2.2 Torque generator

Torque is applied to the shaft by a torque generator using weights with exact mass and a torque arm with exact length, see [Figure 2](#). Weight shall be corrected and calibrated accurately.

The shaft material properties of the torque generator shall be stated in a test report in accordance with ISO 15016:2015, 6.1.

4.2.3 RPM generator

- a) The RPM generator is composed of a body of revolution, which can be controlled from 0 RPM to 1 RPM, and a tacho sensor which measures the number of revolutions.
- b) The RPM generator shall control the RPM precisely. It shall be designed to attach to the various types of tacho sensors to be linked with the shaft power device.
- c) The RPM generator shall be capable of displaying the current RPM status data. The RPM error rate shall be recorded in the test report as specified in [Annex C](#).
- d) The RPM generator should be calibrated by a facility meeting ISO/IEC 17025. If it is not, it should be verified by a calibrated tachometer.
- e) The engine RPM generator shall be included for exact verification of the shaft power meter as shown in [Figure 1](#).
- f) The RPM error rate shall be measured at least five times for each of the RPM testing conditions.