



BSI Standards Publication

Ships and marine technology — Hydraulic performance tests for waterjet propulsion system

National foreword

This British Standard is the UK implementation of [ISO 4679:2023](#).

The UK participation in its preparation was entrusted to Technical Committee SME/32, Ships and marine technology - Steering committee.

A list of organizations represented on this committee can be obtained on request to its committee manager.

Contractual and legal considerations

This publication has been prepared in good faith, however no representation, warranty, assurance or undertaking (express or implied) is or will be made, and no responsibility or liability is or will be accepted by BSI in relation to the adequacy, accuracy, completeness or reasonableness of this publication. All and any such responsibility and liability is expressly disclaimed to the full extent permitted by the law.

This publication is provided as is, and is to be used at the recipient's own risk.

The recipient is advised to consider seeking professional guidance with respect to its use of this publication.

This publication is not intended to constitute a contract. Users are responsible for its correct application.

© The British Standards Institution 2023
Published by BSI Standards Limited 2023

ISBN 978 0 539 13360 8

ICS 47.020.20

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 June 2023.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

INTERNATIONAL STANDARD

ISO
4679

First edition
2023-06-19

Ships and marine technology — Hydraulic performance tests for waterjet propulsion system

*Navires et technologie maritime — Essais de performance
hydraulique pour le système de propulsion hydrojet*



Reference number
ISO 4679:2023(E)
Documents
Document Sharing Hub
© ISO 2023



COPYRIGHT PROTECTED DOCUMENT

© ISO 2023, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms, definitions, symbols and abbreviated terms	1
4 Measurement and acceptance criteria	3
4.1 General	3
4.2 Measurement range	4
4.3 Stable operating conditions of measuring systems	4
4.4 Evaluation of flow and head	5
4.5 Evaluation of efficiency or power	5
5 Measurement uncertainty	6
5.1 General	6
5.2 Statistical evaluation of overall measurement uncertainty	6
5.2.1 Evaluation of the random uncertainty	6
5.2.2 Evaluation of the systematic uncertainty	6
5.2.3 Overall uncertainty	7
5.2.4 Determination of overall uncertainty of efficiency	7
5.3 Conversion	8
5.3.1 Conversion to the guarantee conditions	8
5.3.2 Translation of the test results	8
6 Test method	9
6.1 Test condition	9
6.1.1 Test location	9
6.1.2 Test personnel	9
6.1.3 Test date	9
6.1.4 Test outline	9
6.1.5 Environment and water quality	9
6.2 Test device	10
6.3 Test items	10
6.3.1 General	10
6.3.2 Performance test	10
6.3.3 NPSH test	11
7 Test report	11
Annex A (informative) Test report	12
Annex B (informative) Working section of the test device	15
Bibliography	18

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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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.

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

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 — Hydraulic performance tests for waterjet propulsion system

1 Scope

This document specifies the measurement and acceptance criteria and the test report of hydraulic performance tests for waterjet propulsion system of Class A and Class B.

The test methods for the waterjet propulsion pump with and without the inlet duct are both specified. This document is applicable to the hydraulic performance test of water jet propulsion under the specified test conditions. This document specifies the precision grade of Class A for hydraulic model tests of water jet propulsion and Class B for acceptance tests of small and middle-sized or intermediate test models.

In addition, this document specifies the test conditions of Class A and Class B, and recommendations and requirements for test equipment to ensure that the test can be carried out under the conditions of corresponding accuracy.

This document does not include miscellaneous parts of waterjet unit, such as steering and reversing gear, hydraulic system and control system.

2 Normative references

There are no normative references in this document.

3 Terms, definitions, symbols and abbreviated terms

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

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

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

3.1

waterjet unit

unit that consists of *waterjet propulsion system* (3.2), steering and reversing gear, hydraulic system and control system which is able to steer and reverse the main body

3.2

waterjet propulsion system

propulsion system that consists of *waterjet pump* (3.3), nozzle and inlet duct (generally the impeller of waterjet pump is integrated with the nozzle) and that is able to drive the main body moving

3.3

waterjet pump

pump that transfers the energy of prime mover to water by rotating impeller

Note 1 to entry: The waterjet pump obtains a counter-acting force and drives the main body moving. It consists of impeller, guide vane, shell and shaft (hereinafter referred to as “pump”). The main types are mixed-flow type and axial flow type. The axial flow waterjet pump is one in which the liquid is discharged axially from the impeller. The mixed-flow waterjet pump is one in which the liquid is discharged from impeller with an angle α ($0^\circ < \alpha < 90^\circ$) to the shaft line, also called the inclined waterjet pump.

3.4 flow rate

Q

volume of liquid discharged by *waterjet pump* (3.3) per unit time

3.5 pump total head

H

algebraic difference between the outlet total head, H_2 , and the inlet total head, H_1

Note 1 to entry: Pump total head is given by [Formula \(1\)](#):

$$H = H_2 - H_1 \quad (1)$$

where

H_1 is the inlet total head, expressed in Pa;

H_2 is the outlet total head, expressed in Pa.

Note 2 to entry: Unless otherwise specified, the baseline of the head is the waterjet propulsion shaft line.

[SOURCE: ISO 9906:2012, 3.2.15, modified — notes 1 and 2 to entry have been modified.]

3.6 pump power input

P

power transmitted to the pump by its driver

[SOURCE: ISO 17769-1:2012, 2.1.11.2, modified — note 1 to entry has been deleted.]

3.7 pump efficiency

η

proportion of the *pump power input* (3.6), P , delivered as pump power output, P_u , at given operating conditions

Note 1 to entry: Pump efficiency is given by [Formula \(2\)](#):

$$\eta = \frac{P_u}{P} \quad (2)$$

where

P_u is useful mechanical power transferred to the liquid during its passage through the pump, given by [Formula \(3\)](#);

$$P_u = \rho g Q H \quad (3)$$

[SOURCE: ISO 17769-1:2012, 2.1.12.1, modified — Formula (3) has been added and the symbols have been explained.]

3.8 type number

K

dimensionless quantity, defined by [Formula \(4\)](#):