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Ships and marine technology — Manoeuvring of ships —

Part 6: Model test specials

Navires et technologie maritime — Manoeuvres des navires —

Partie 6: Spécificités des essais sur modèle

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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).

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For an explanation on 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.

The committee responsible for this document is ISO/TC 8, *Ships and marine technology*, Subcommittee SC 6, *Navigation and ship operations*.

This second edition cancels and replaces the first edition (ISO 13643-6:2013), of which it constitutes a minor revision with the following changes:

— in 3.6 *xyψ*-carriage was inserted;

— in Table 1 "DNDPDYS" row, the symbol was changed from "$N_{\phi\mathrm{dyn}}$" to "$N'_{\phi\mathrm{dyn}}$";

— in Table 1 "DYDVTS" row, the SI-unit was changed from "—" to "1";

— in Equation (20) "ρ_{w}" was changed to "ρ";

— in 7.3 paragraph 3, "moments" was changed to "motions".

A list of all parts in the ISO 13643 series can be found on the ISO website.

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Ships and marine technology — Manoeuvring of ships —

Part 6:
Model test specials

1 Scope

This document defines symbols and terms and provides guidelines for the conduct of tests to determine the hydrodynamic forces and moments due to prescribed motions under a planar-motion, a circular-motion or an oblique towing or flow system for models of surface ships and submarines. It also defines symbols and terms and provides guidelines for the conduct of tests in a wind tunnel. It is intended to be read in conjunction with ISO 13643-1.

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 13643-1, *Ships and marine technology — Manoeuvring of ships — Part 1: General concepts, quantities and test conditions*

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:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
planar motion test
manoeuvring test to determine the hydrodynamic forces and moments as functions of lateral velocity and acceleration as well as of angular velocity and acceleration about the *z*-axis or the *y*-axis, respectively

3.2
circular motion test
manoeuvring test to determine the hydrodynamic forces and moments as a function of the angular velocity for surface ships primarily about the *z*-axis, for submarines primarily about the *z*-axis, as well as the *y*-axis

3.3
oblique towing or flow test
manoeuvring test to determine the forces and moments as a function of the drift angle and of the manoeuvring device angle and, in the case of submarines, the angle of attack and hydroplane deflections, in a towing tank, a circulating water tunnel, or a wind tunnel

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3.4
wind tunnel test
test to determine the aerodynamic forces and moments acting upon the above-water portion of the ship as a function of the relative wind

Note 1 to entry: A wind tunnel may also be used for the underwater hull.

3.5
manoeuvring device
rudder, azimuthing thruster, hydroplane, cycloidal propeller or equivalent system used to manoeuvre a vessel

3.6
***xyψ*-carriage**
sub carriage (secondary towing system) to the towing carriage that allows a differential longitudinal, a transverse and a rotational motion of the model in the horizontal plane

4 Test-related physical quantities

Test-related physical quantities are according to Table 1. General quantities and concepts are according to ISO 13643-1.

Table 1 — Test-related physical quantities

Symbol	CC-code	SI-unit	Concept	
			Term	Definition or explanation
A_{LV}	ALV	m^2	Lateral area above waterline	(see ISO 13643-1)
A_{XV}	AXV	m^2	Transverse projected area of ship above waterline	Projected cross section area above DWL, generally without rigging, railings, etc.
AP	AP	—	After perpendicular	(see ISO 13643-1)
a_0	A0PMM	m	Displacement amplitude of the model movement	—
C	CWI	N	Cross force	Force perpendicular to relative wind direction
C_C	CC	1	Cross force coefficient	$2C / (\varrho_A V_{WRA}^2 A_{LV})$
C_D	CD	1	Drag coefficient	$2D / (\varrho_A V_{WRA}^2 A_{LV})$
C_{DAX}	CDAX	1	Drag coefficient	$2D / (\varrho_A V_{WRA}^2 A_{XV})$, relative to cross section
C_K	CK	1	Roll-moment coefficient	$2K / (\rho_A V_{WRA}^2 A_{LV} L_{OA})$
C_N	CN	1	Coefficient of moment about z-axis	$2N / (\varrho_A V_{WRA}^2 A_{LV} L_{OA})$
C_X	CX	1	Longitudinal-force coefficient	$2X / (\varrho_A V_{WRA}^2 A_{LV})$
C_{XAX}	CXAX	1	Longitudinal-force coefficient	$2X / (\varrho_A V_{WRA}^2 A_{XV})$, relative to cross section
C_Y	CY	1	Lateral-force coefficient	$2Y / (\varrho_A V_{WRA}^2 A_{LV})$

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