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Ships and marine technology — Terms, abbreviations, graphical symbols and concepts on navigation

Navires et technologie maritime — Termes, abréviations, symboles graphiques et concepts relatifs à la navigation

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Foreword

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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 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 6, *Navigation and ship operations*.

This second edition cancels and replaces the first edition (ISO 19018:2004), which has been technically revised.

The main changes compared to the previous edition are as follows:

— Clause 2: updated referenced documents: ISO 31 deleted (its current revision, ISO 80000-3:2019, does no longer mention the nautical mile, knot, degree and minute), and changed from IEC 60872 and IEC 60936 to related original IMO resolutions;

— added Clause 3, “Terms and definitions”, and subsequent clauses renumbered;

— items 4.1.1 to 4.1.3: referenced document changed from “ISO 31-1 and/or Chart INT 1” to “Chart INT” only, as applicable;

— items 6.1 and 6.1.1: abbreviation of “course” changed from “CSE” to “CRS”, and the second sentence of the explanation of 6.1 deleted (harmonized with that in radar navigation; IEC 62288 and/or IEC 62388);

— items 6.1.1 to 6.1.15 and 7.1 to 7.5: updated “Definition, remarks” based on IMO Resolution MSC. 192 (79) (harmonized with abbreviation and definition in IEC 62288 and/or IEC 62388);

— items 6.1.1, 6.1.2 and 6.1.4: added 6.1.1 “course”, 6.1.2 “heading” and 6.1.4 “course to steer" (harmonized with abbreviation and definition in IEC 62288 and/or IEC 62388);

— items 7.1 to 7.5: changed the "Definition, remarks", based on IMO Resolution MSC, 192[79];

— deleted former Clause 15, “Radar navigation”, and former Clause 16, “LORAN-C”; and former Clause 17 renumbered as new Clause 16;

— new Clause 16 (former Clause 17): title changed from “Global Positioning System (GPS)” to “Global Navigation Satellite System (GNSS)”;

— Bibliography: added “[4] IEC 62288:2014”, “[5] IEC 62388:2013”, "[6] IMO Resolution MSC. 191(79)" and "[7] IMO Resolution MSC. 192(79)".

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 — Terms, abbreviations, graphical symbols and concepts on navigation

1 Scope

This document provides terms, abbreviations and graphical symbols for use in maritime navigation on board ships. Symbols for use in mathematical formulae are also given, as applicable.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

Terms, abbreviation and symbols used in navigation are given in Clauses 4 to 16. Abbreviations can prove useful, but they should not be used in mathematical formulae.

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
navigation
process of finding the position of a craft or vehicle, and of planning, recording and controlling its movement from one place to another

4 Special units in maritime navigation

Item No.	Name of the unit	International symbol	Definition, conversion factors and remarks
4.1 Unit of length			
4.1.1	nautical mile	NM in charts: M [a]	1 NM = 1 852 m. The nautical mile is not an SI-unit. This definition was adopted by the First International Hydrographic Conference in 1929.
4.1.2	cable, cable length	cbl	One-tenth of a nautical mile. The cable is not an SI unit.
[a] Symbol M is to be used in Charts according to the "Chart Specifications of the IHO" which came into force at the XIIth International Hydrographic Conference 1982 in Monaco.			

Item No.	Name of the unit	International symbol	Definition, conversion factors and remarks
4.2 Unit of velocity and speed			
4.2.1	knot, knots	kn	$1\,\text{kn} = 1\,\frac{\text{NM}}{\text{h}} = 0{,}514\ 444\,\text{m/s}$ (see Chart INT 1). Velocity is a vector quantity, whereas speed is a scalar having magnitude only. The knot is not an SI unit.
4.3 Unit of angle			
4.3.1	degree	°	$1° = \frac{\pi}{180}\,\text{rad}$
4.3.2	minute	'	$1' = \frac{1°}{60}$ In maritime navigation, angles should be specified in degrees, minutes and decimals of minutes (example: write 17° 40,25' not 17° 40' 15"). Degrees and minutes are not SI units.

[a] Symbol M is to be used in Charts according to the "Chart Specifications of the IHO" which came into force at the XIIth International Hydrographic Conference 1982 in Monaco.

5 Reference directions

5.1 North directions

North directions are horizontal reference directions.

Item No.	Term	Abbreviation	Definition, remarks
5.1.1	true north	TN	Northerly direction of the meridian (see 10.1.12).
5.1.2	magnetic north	MN	Northerly direction of the horizontal component of the Earth's magnetic field (see 15.2).
5.1.3	compass north	CN	Northerly direction of the needle or zero-index of a magnetic compass.
5.1.4	gyro north	GyN	Northerly direction indicated by the gyro-compass.

5.2 Dead ahead direction

Dead ahead direction is the direction ahead of the ship's fore-and-aft line.

6 Course, heading, track, speed

6.1 Course, heading

Course (CRS) and heading (HDG) are angles, measured in the horizontal plane from one of the reference directions specified in Clause 5, counted clockwise from 000° through <360°, written as three-digit numbers.

Item No.	Term	Abbreviation	Definition, remarks
6.1.1	course	CRS	Direction of motion relative to ground or to sea, of a ship, expressed as an angular displacement from north.
6.1.2	heading	HDG	Direction in which the bow of a ship is pointing, expressed as an angular displacement from north. [SOURCE: IMO Resolution MSC. 192(79), Appendix 2.]
6.1.3	true course	TC T CRS	Direction of motion relative to ground or to sea, of a target, expressed as an angular displacement from true north. [SOURCE: IMO Resolution MSC. 192(79), Appendix 2.]
6.1.4	course to steer	CTS	The direction in which the ship is intended to be steered, defined as an angular displacement from true course.
6.1.5	true heading	TH T HDG	Horizontal direction that the bow of a ship is pointing, expressed as an angular displacement from true north.
6.1.6	magnetic course	MC M CRS	Direction of motion relative to ground or to sea, of a ship, expressed as an angular displacement from magnetic north.
6.1.7	magnetic heading	MH M HDG	Horizontal direction that the bow of a ship is pointing, expressed as an angular displacement from magnetic north.
6.1.8	compass course	CC C CRS	Direction of motion relative to ground or to sea, of a ship, expressed as an angular displacement from compass north.
6.1.9	compass heading	CH C HDG	Horizontal direction that the bow of a ship is pointing, expressed as an angular displacement from compass north.
6.1.10	gyro course	GyC Gy CRS	Direction of motion relative to ground or to sea, of a ship, expressed as an angular displacement from gyro north.
6.1.11	gyro heading	GyH GY HDG	Horizontal direction that the bow of a ship is pointing, expressed as an angular displacement from gyro north.
6.1.12	course through water	CTW	Direction of the ship's movement through the water, defined by the angle between the meridian through its position and the direction of the ship's movement through the water, expressed in angular units from true north. [SOURCE: IMO Resolution MSC. 192(79), Appendix 2.]
6.1.13	course of advance, course to make good	COA	Direction from the ship's last fix (see 10.2.5) to the next estimated position (see 10.2.3), expressed in angular units from true north.
6.1.14	course over ground	COG	Direction of the ship's movement relative to the Earth, measured on board the ship, expressed in angular units from true north. [SOURCE: IMO Resolution MSC. 192(79), Appendix 2.]

Item No.	Term	Abbreviation	Definition, remarks
6.1.15	course made good	CMG	Rhumb-line direction (see 10.2.11) between two fixes (see 10.2.5).

6.2 Track

The term “track” is used

a) as the path of voyage over the ground (ground track) or through the water (water track), as plotted in the chart, expressed in angular units from true north (000°) clockwise through <360°; one must distinguish rhumb-line track (see 10.2.11) and great-circle track (see 10.2.9),

b) as the path of radar-targets on a plan position indicator.

Item No.	Term	Abbreviation	Definition, remarks
6.2.1	intended water track	WT	Intended path of the ship's movement through the water.
6.2.2	water track	WAT TRK	Actual path of the ship's movement through the water.
6.2.3	intended ground track	GT	Intended path of the ship's movement over the ground.
6.2.4	ground track	GND TRK	Actual path of the ship's movement relative to the Earth.
6.2.5	track made good	TMG	Track between two fixes (see 10.2.5).

6.3 Speed

Item No.	Name of the term	Abbreviation	Definition, remarks
6.3.1	speed	SPD	Own ship's speed in dead ahead direction (see 5.2) produced by machine or sail.
6.3.2	speed through the water	STW	Speed of the ship relative to the water surface.
6.3.3	speed of advance, speed to make good	SOA	Estimated speed of the ship relative to the Earth.
6.3.4	speed over the ground	SOG	Speed of the ship relative to the Earth, measured on board the ship.
6.3.5	speed made good	SMG	Speed of the ship between two fixes.

7 Bearings

Bearing (BRG) is an angle measured in the horizontal plane from one of the reference directions specified in Clause 5, measured clockwise from 000° through 360°, written as three-digit numbers. In radar navigation, the abbreviation BRG for bearing is preferred.

Item No.	Term	Abbreviation	Definition, remarks
7.1	true bearing	TB T BRG	Direction of a target from own ship’s consistent common reference point (CCRP) or from another target’s position, expressed as an angular displacement from true north. [SOURCE: IMO Resolution MSC. 192(79), Appendix 2, modified – added CCRP.]

Item No.	Term	Abbreviation	Definition, remarks
7.2	magnetic bearing	MB	Direction of a target from own ship's consistent common reference point (CCRP) or from another target's position, expressed as an angular displacement from magnetic north. [SOURCE: IMO Resolution MSC. 192(79), Appendix 2, modified – added CCRP.]
7.3	compass bearing	CB	Direction of a target from own ship's consistent common reference point (CCRP) or from another target's position, expressed as an angular displacement from compass north. [SOURCE: IMO Resolution MSC. 192(79), Appendix 2, modified – added CCRP.]
7.4	gyro bearing	GyB Gy BRG	Direction of a target from own ship's consistent common reference point (CCRP) or from another target's position, expressed as an angular displacement from gyro north. [SOURCE: IMO Resolution MSC. 192(79), Appendix 2, modified – added CCRP.]
7.5	relative bearing	RB R BRG	Direction of a target's position from own ship's consistent common reference point (CCRP) expressed as an angular displacement from own ship's heading. [SOURCE: IMO Resolution MSC. 192(79), Appendix 2, modified – added CCRP.]

8 Corrections

The numerical value of a correction is the best estimate which can be made of the difference between the true and the measured value of a parameter. The sign is such that a correction which is to be added to an observed reading is taken as positive.

Item No.	Name of the term	Abbreviation	Definition, remarks
8.1	magnetic variation	MAG VAR	Angle between the geographic and the magnetic meridians (see 10.1.12 and 15.4) at any place of the Earth, also called magnetic declination, from true north to magnetic north, eastwards named E (sign plus), westwards named W (sign minus).
8.2	deviation	DEV	Angle between the magnetic meridian (see 15.4) and the axis of a compass card, expressed in degrees east or west to indicate the direction in which the northern end of the compass card is offset from magnetic north when it is disturbed by local attraction, from magnetic north to compass north, eastwards named E (sign plus), westwards named W (sign minus).
8.3	total compass error correction	CE	Sum of variation and deviation. Angle between true north and compass north, from true north eastwards named E (sign plus), westwards named W (sign minus).
8.4	speed error correction	δ_{Gy} [a]	Correction of the gyro heading error, which depends on position, speed and course of the ship; sign plus when the ship moves southwards, sign minus when the ship moves northwards.

[a] Formula symbol.