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TECHNICAL SPECIFICATION

colour inside

Marine energy – Wave, tidal and other water current converters – Part 1: Vocabulary

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Part 1: Vocabulary

FOREWORD

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- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical Specification are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 62600-1 which is a Technical Specification, has been prepared by IEC technical committee 114: Marine energy – Wave, tidal and other water current converters.

This 2nd edition cancels and replaces the 1st edition published in 2011, and its Amendment 1, published in 2019. This edition constitutes a technical revision.

This edition includes the following significant technical changes from the previous edition:

a) Approximately 45 % of the original terms which were either not in use, used only in a glossary sense, or which are commonly understood and found in other references were removed.
b) Thirteen (13) terms considered more general than tidal were moved up from IEC TS 62600-200 and added.
c) Eight (8) terms that were added in Amendment 1 to IEC TS 62600-1 were incorporated alphabetically.
d) Six (6) additional new terms were added.

The text of this Technical Specification is based on the following documents:

Draft TS	Report on voting
114/330/DTS	114/342/RVDTS

Full information on the voting for the approval of this Technical Specification can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62600 series, published under the general title *Marine energy – Wave, tidal and other water current converters*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

This Technical Specification has been developed as a tool for the international marine energy community, to assist in creating clarity and understanding. The wave, tidal and water current energy industry has recently experienced a period of rapid growth and sector development. With this expansion, it became apparent that a document defining the terms used within the sector was required. The aim of this document is to present clear and consistent language that will aid the development of programs, projects, and future standards.

This document lists the terms that the marine energy industry uses. It is an evolving document that will change as new terms and symbols are added. The terminologies herein have been harmonized with IEC 60050 and other IEC documents as far as possible. The document does not constitute a full glossary of terms used in the marine energy community.

MARINE ENERGY – WAVE, TIDAL AND OTHER WATER CURRENT CONVERTERS –

Part 1: Vocabulary

1 Scope

This part of IEC 62600 defines the terms relevant to marine energy. For the purposes of this document, sources of ocean and marine renewable energy are taken to include primarily devices that convert wave, tidal and other water current energy into electrical energy, although other conversion methods, systems and products are included.

Terms relating to conventional dam and tidal barrage, offshore wind, marine biomass, and salinity gradient energy conversion are not included in the scope of this document.

This document is intended to provide uniform terminology to facilitate communication between organizations and individuals in the marine energy industry and those who interact with them.

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.

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
annual energy production
estimate of the total energy production of a device during a one-year period obtained by applying the device's power performance characteristics to a relevant energy resource characterization, assuming 100 % availability

Note 1 to entry: Actual annual energy production is unlikely to exceed this estimate.

[SOURCE: IEC 60050-415:1999, 415-05-09, modified – The definition has been revised to be generic by replacing "wind turbine generator system" by "device", and by replacing "the power curve to different reference wind speed frequency distributions at hub height" by "the device's power performance characteristics to a relevant energy resource characterization". For clarity, "obtained" has been added before "by applying". Note 1 to entry has been added.]

3.2
array
<in marine energy> one or more groups of marine energy converters

Note 1 to entry: Array spacing is dictated by hydrodynamic considerations and can be very closely packed so as to constitute a single platform or an arrangement of identical devices.

3.3
availability, <of an item>
See IEV 192-01-23

3.4
capture width
capture length
<of a wave energy converter> power captured by the **wave energy converter** divided by the **wave power** of the incident wave field

3.5
current energy converter
CEC
device that converts energy from water currents to electricity or other useful forms of energy

3.6
cut-in water speed
cut-in water velocity
<of a current energy converter> water speed above which there is power production

Note 1 to entry: The term "cut-in water velocity" is sometimes used in industry, although the concept is in fact a speed.

3.7
cut-out water speed
cut-out water velocity
<of a current energy converter> water speed above which there is no power production

Note 1 to entry: The term "cut-in water velocity" is sometimes used in industry, although the concept is in fact a speed.

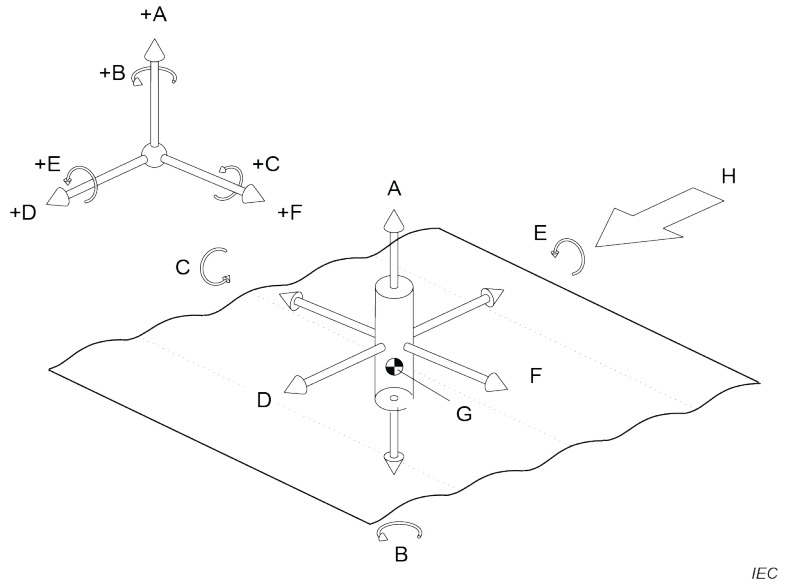
3.8
degrees of freedom, pl
independent displacements and/or rotations that specify the orientation of a body or system

Note 1 to entry: A marine body can experience three linear and three rotational motions as depicted in Figure 1 and A

	Heave	D	Surge	G	Centre of gravity
B	Yaw	E	Roll	H	Incident energy at zero-degree heading
C	Pitch	F	Sway	I	Seabed

Figure 2.

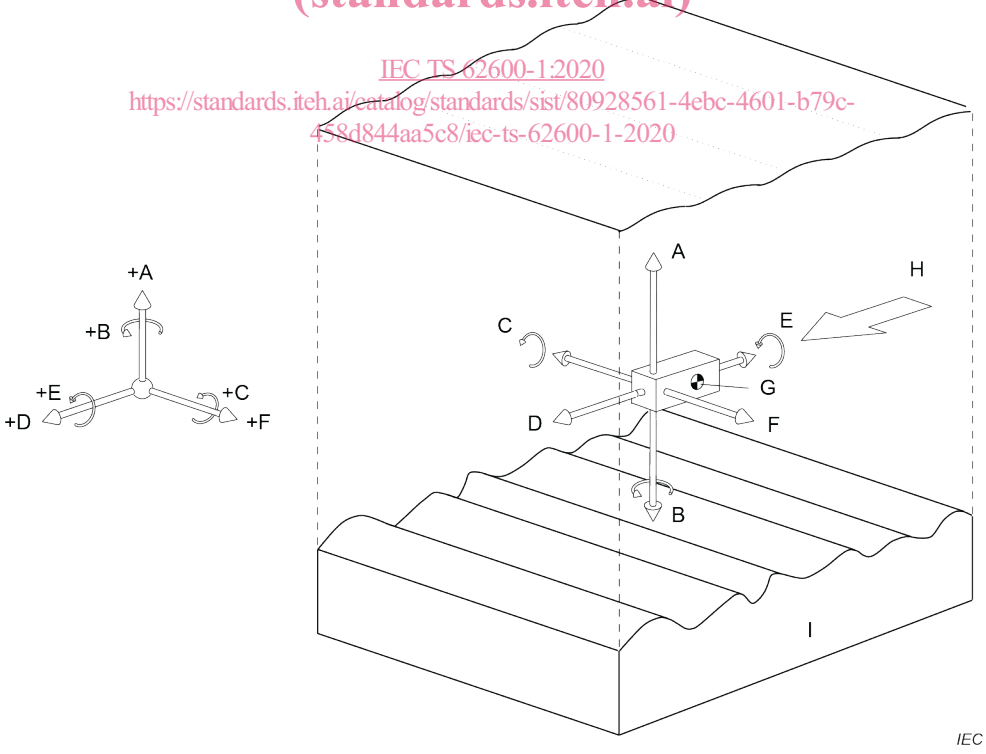
Note 2 to entry: The principal axis is parallel to the mean water surface and aligned with the longest, plan form, dimension of the device. The principal axis for a symmetric device will be parallel to the mean water surface and aligned with a chosen direction of interest. The direction of incident energy will be through the centre of gravity and may be at an angle to the principal axis.



Key

A Heave	D Surge	G Centre of gravity
B Yaw	E Roll	H Incident energy at zero-degree heading
C Pitch	F Sway	

Figure 1 – Six degrees of freedom – Floating device



Key

A Heave	D Surge	G Centre of gravity
B Yaw	E Roll	H Incident energy at zero-degree heading
C Pitch	F Sway	I Seabed

Figure 2 – Six degrees of freedom – Submerged device

3.8.1
heave
motion in a direction perpendicular to the mean water surface

3.8.2
pitch
rotation about the **sway** axis

3.8.3
roll
rotation about the **surge** axis

3.8.4
surge
motion parallel to the principal axis

3.8.5
sway
motion perpendicular to the principal axis and parallel to the mean water surface

3.8.6
yaw
rotation about the **heave** axis

3.9
directional spreading function
<of a water wave> normalized distribution of **wave energy**, D, for a given frequency, f, over the angle of incidence, θ

Note 1 to entry: Since $\int_0^{2\pi} D(\theta, f)\,\mathrm{d}\theta = 1$ the **directional spreading function** can be considered to be a probability density function over direction.

3.10
directional wave spectrum
<of a water wave> distribution of the wave elevation variance density as a function of incident wave frequency and direction

Note 1 to entry: The **directional wave spectrum** is calculated as the product of the **wave spectrum** multiplied with the directional spreading function.

3.11
directionally resolved power
<of a water wave> sum of all **wave power** components propagating in a specified direction in a given sea state

3.12
energy extraction plane
<of a current energy converter> plane that is perpendicular to the **principal axis of energy capture** where device rotation or energy conversion nominally occurs

Note 1 to entry: Refer to Figure 4 for a simplified illustration of the energy extraction plane.

Note 2 to entry: For a **tidal energy converter** device with multiple extraction planes, an appropriate upstream energy extraction plane on both ebb and flood tides should be identified.