



TECHNICAL SPECIFICATION

**Marine energy – Wave, tidal and other water current converters –
Part 301: River energy resource assessment**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	8
4 Symbols, units and abbreviated terms	9
4.1 Symbols and units.....	9
4.2 Abbreviated terms.....	9
5 Methodology overview	10
5.1 Study classification	10
5.2 Project location identification	10
5.3 Resource definition	10
5.4 Methodology	10
5.4.1 General	10
5.4.2 Flow duration curves	11
5.4.3 Velocity duration curves.....	11
5.4.4 Energy production	14
6 Flow Duration Curves	14
6.1 General.....	14
6.2 Measurement-based Flow Duration Curve.....	14
6.3 Hydrologic modelling.....	15
6.3.1 General	15
6.3.2 Stochastic modelling.....	15
6.3.3 Deterministic modelling.....	16
6.4 Computing Flow Duration Curves	17
7 Velocity Duration Curves	19
7.1 General.....	19
7.2 Measurement-based Velocity Duration Curve.....	19
7.3 Hydrodynamic-model-based Velocity Duration Curve	21
7.3.1 General	21
7.3.2 Model selection	21
7.3.3 Model domain	22
7.3.4 Grid resolution.....	22
7.3.5 Model inputs	23
7.3.6 Boundary conditions and forcing.....	24
7.3.7 Field-data requirements	24
7.3.8 Velocity measurements.....	25
7.3.9 Calibration	25
7.3.10 Validation	26
7.3.11 Energy extraction.....	26
7.3.12 Computation of model-based velocities.....	27
7.3.13 Calculating the Velocity Duration Curve.....	28
8 Reporting requirements	29
8.1 General.....	29
8.2 Technical report.....	30
8.2.1 General	30

8.2.2	Development of the Flow Duration Curve	30
8.2.3	Development of the Velocity Duration Curve	31
8.2.4	AEP calculation	31
8.2.5	Additional reporting	31
8.3	Digital database	32
8.4	Test equipment report	32
8.5	Measurement procedure report	32
8.6	Deviations from the procedure	32
Annex A	(normative) Guidelines for field data measurements	33
A.1	Bathymetry	33
A.2	Water level	33
A.3	Discharge	33
A.3.1	General	33
A.3.2	Stage-discharge relationship	34
A.4	Current profiler measurements	34
A.4.1	General	34
A.4.2	Fixed-location velocity profile	34
A.4.3	Discharge and velocity transect survey	35
A.4.4	Instrument configuration	35
A.4.5	Correcting for clock drift	36
A.4.6	Depth quality control	36
A.4.7	Velocity quality control	36
A.5	Turbulence	36
Annex B	(informative) Calculation of energy production	37
B.1	General	37
B.2	Energy production	37
Annex C	(normative) Evaluation of uncertainty	39
C.1	General	39
C.2	Uncertainty analysis	39
C.3	Modelling uncertainty	40
Bibliography	41
Figure 1	– Flowchart outlining the methodology for a resource assessment	12
Figure 2	– Types of hydrologic models for simulating discharge	15
Figure 3	– Example FDC (curve) and assumed non-uniform discretisation (circles)	18
Figure 4	– Example REC power-weighted speed versus discharge relationship using discretised discharge values (circles) in Figure 3	28
Figure 5	– Example VDC using the transfer function derived from the curve fit shown in Figure 4 and the full FDC shown in Figure 3	29
Figure B.1	– Power exceedance probabilities	37
Table 1	– Outline of measurements	13
Table C.1	– List of uncertainty components	40

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 301: River energy resource assessment

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The main task of IEC technical committees is to prepare International Standards. In exceptional circumstances, a technical committee may propose the publication of a technical specification when

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

IEC TS 62600-301, which is a technical specification, has been prepared by IEC technical committee 114: Marine energy – Wave, tidal and other water current converters.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
114/285/DTS	114/301/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.

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.

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

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:

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

The extraction of energy from flowing water in rivers and canals is gaining acceptance around the world as a means of generating electricity without the use of conventional hydropower dams. The purpose of this document is to provide a uniform methodology that will ensure consistency and accuracy in the estimation, measurement, characterisation, and analysis of the river-velocity resource at sites that could be suitable for the installation of an individual or array of River Energy Converters (RECs), together with defining a standardised methodology with which this resource can be described and reported. Application of the estimation, measurement, and analysis techniques recommended in this document will ensure that resource assessment is undertaken in a consistent and equitable manner. This document presents techniques that are expected to provide fair and suitably accurate results that can be replicated by others. This document is intended to be updated as understanding of the resource and its response to power extraction improves.

The overall goal of the methodology is to enable calculation of the Annual Energy Production (AEP) for the proposed individual or array of river energy converters either as part of a feasibility study (generic river energy converter) or a full study. For the full study, this methodology is employed in conjunction with IEC TS 62600-300 applied at each river energy converter location. Consistency is also maintained with IEC TS 62600-201 wherever possible.

In this document, the river energy resource (undisturbed or disturbed by power extraction) is defined by the velocity duration curve. This document describes only the aspects of the resource required to calculate the velocity duration curve and it does not describe aspects of the resource required to evaluate design loads or to satisfy environmental regulations. Furthermore, this document is not intended to cover every eventuality that may be relevant for a particular project. Therefore, this document assumes that the user has access to, and reviews, other relevant IEC documentation before undertaking work (e.g., surveys and modelling), which could also satisfy other requirements.

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

Part 301: River energy resource assessment

1 Scope

This part of IEC 62600 provides:

- Methodologies that ensure consistency and accuracy in the determination of the theoretical river energy resource at sites that may be suitable for the installation of River Energy Converters (RECs);
- Methodologies for producing a standard current speed distribution based on measured, historical, or numerical data, or a combination thereof, to be used in conjunction with an appropriate river energy power performance assessment;
- Allowable data collection methods and/or modelling techniques; and
- A framework for reporting results.

The document explicitly excludes:

- Technical or practical resource assessments;
- Resource characterisation;
- Power performance assessment of river energy converters; and
- Environmental impact studies, assessments, or similar.

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.

IEC TS 62600-1, *Marine energy – Wave, tidal and other water current converters – Part 1: Terminology*

IEC TS 62600-201, *Marine energy – Wave, tidal and other water current converters – Part 201: Tidal energy resource assessment and characterization*

IEC TS 62600-300, *Marine energy – Wave, tidal and other water current converters – Part 300: Electricity producing river energy converters – Power performance assessment*

ISO 1100-2:2010, *Hydrometry – Measurement of liquid flow in open channels – Part 2: Determination of the stage-discharge relationship*

ISO 9825:2005, *Hydrometry – Field measurement of discharge in large rivers and rivers in flood*

ISO 15769:2010, *Hydrometry – Guidelines for the application of acoustic velocity meters using the Doppler and echo correlation methods*

ISO 18365:2013, *Hydrometry – Selection, establishment and operation of a gauging station*

ISO TS 19130-2:2014, *Geographic information – Imagery sensor models for geopositioning – Part 2: SAR, InSAR, lidar and sonar*

ISO TR 24578:2012 *Hydrometry – Acoustic Doppler profiler – Method and application for measurement of flow in open channels*

ISO/IEC 98-1:2009, *Uncertainty of measurement – Part 1: Introduction to the expression of uncertainty in measurement*

ISO/IEC 98-3:2008, *Uncertainty of measurement – Part 3: Guide to the expression of uncertainty in measurement (GUM: 1995)*

IHO (International Hydrographic Organisation), 2008, *Standards for Hydrographic Surveys. Special Publication No. 44. 5th Edition*

ICES, 2006, *Guidelines for Multibeam Echosounder Data*