



# IECRE OPERATIONAL DOCUMENT

**IEC System for Certification to Standards relating to Equipment for use in Renewable Energy applications (IECRE System)**

**Conformity assessment of Marine Energy systems design by RECB**





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IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
Fax: +41 22 919 03 00  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

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## 1 Objectives

The objective is the definition of the evaluation method and procedure applied for Conformity Assessment and certification of Marine Energy systems.

## 2 Norms and standards

The following referenced document is indispensable for the application of this document.

IEC TS 62600-2:2019 Marine Energy - Wave, tidal and other water current converters – Part 2: Design requirements for marine energy systems.

IEC TS 62600-101:2015 Marine Energy - Wave, tidal and other water current converters – Wave energy resource assessment and characterization.

IEC TS 62600-201:2015 Marine Energy - Wave, tidal and other water current converters – Part 201: Tidal energy resource assessment and characterization.

IEC TS 62600-301:2015 Marine Energy - Wave, tidal and other water current converters – Part 301: River current energy resource assessment and characterization.

IEC TS 62600-4:2020 Marine Energy - Wave, tidal and other water current converters – Part 4: Specification for establishing qualification of new technology

IEC TS 62600-10:2015 Marine Energy - Wave, tidal and other water current converters - Assessment of mooring system for marine energy converters.

IECRE Operational Document OD-310:2020 ME Certification Scheme: Conformity Statement Requirements.

## 3 Required documentation

The following documentation shall be provided by the applicant for the design evaluation as applicable:

- Scope, based on IEC TS 62600-2:2019 Clause 1 Figure 1
- Design process, based on IEC TS 62600-2 Clause 5.1 Figure 2
- Technology and Risk Assessment per IEC TS 62600-2 Clause 5.3 and 5.4
- Site description including adjacent structures and components report (impact on the MEC). The guidance of the newly issued IEC TS 62600-4:2020 shall be considered.
- Environmental conditions, according to IEC TS 62600-2 clause 5.7 and Clause 6
- Site and Resource Characterization per IEC TS 62600-101, 202, or 301 as applicable
- Basis of Design, based on IEC TS 62600-2:2019 Clause 5.6
- MEC specifications, including dimensions, materials, load cases, static systems and boundary conditions, etc.
- Technology Qualification Conformity Statement, if applicable, according to IEC TS 62600-4.
- Drawings and Design calculations
- Design load report, based on IEC TS 62600-2:2019 Clause 7 Design Load Cases
- Mooring system description as a boundary system with critical interface per IEC TS 62600-10:2015
- Manufacturing description and specifications
- Life cycle considerations and analyses, based on IEC TS 62600-2 Clause 12
- Transportation, installation, O&M, and decommissioning plans

## 4 Evaluation methods and procedures

### 4.1 Introduction

The purpose of design conformity assessment is to confirm that the MEC unit of a specific type is designed and documented in conformity with design assumptions, specific standards and other technical requirements.

The evaluation covers the MEC system as defined by the Scope, based on IEC TS 62600-2:2019 Clause 1 Figure 1

- Structural, including the interface to the mooring system
- Mechanical, including the effects on the system of the power take-off
- Electrical, including the interface to the electrical cable system and connections
- Control, including the interface to telemetry

The following are defined as boundary systems with critical interfaces with load exchange or electrical connection that must be defined for evaluation by this OD and shall be assessed within the Type Certification for the MEC system:

- Environmental
- Resource
- Mooring system, covered by IEC TS62600-10
- Sea-based Infrastructure, including the electrical cable system
- Shore-based Infrastructure, including the electrical cable system
- Telemetry
- Electric cable system
- The lightning protection system

### 4.2 Basis of design

The RECB shall assess the design basis which shall identify all requirements, assumptions and methodologies essential for the design and the design documentation, including:

- Codes and standards
- Design parameters, assumptions, methodologies and principles
- Other life cycle requirements, e.g. for manufacture, transportation, installation and commissioning as well as for operation and maintenance

### 4.3 Design evaluation

The purpose of the design evaluation is to examine whether the MEC system is designed and basis of design is documented to be in conformity with the design assumptions, specific standards and other technical requirements of IEC TS 62600-2. The evaluation of design shall be carried out by means of document review and independent analysis.

The RECB shall verify the following aspects:

- Materials properties  
The properties of the materials used in the MEC system design shall be proven by material testing to be consistent with the properties applied in the design calculations. All material tests shall be in general carried out by RETL and shall comply with the requirements of the relevant test standards. Deviating procedures shall be agreed with the RECB in advance.
- MEC system structure
- MEC system characteristics  
It shall be assessed that the characteristic data of the MEC system given in the specification and related documents are consistent with the design documentation in order to ensure that the subsequent usage of these data is sufficiently verified.
  - Mechanical data: it shall be assessed that the MEC characteristic mechanical data (e.g. mass, etc.) given in the MEC specification are consistent with the

properties resulting from the drawings under consideration of the material properties and tolerances.

- Hydrodynamic data:
  - Stability analysis
  - Watertight integrity
  - MEC system modelling

The structural calculation model used by the designer for the verification of the MEC system design shall be assessed by the RECB for suitability by reviewing the design calculation report. For e.g. the application of finite element method, the mesh and the used technologies (e.g. element type, boundary conditions, etc.) shall be checked.
- Design load cases
- Evaluation of design strength calculations

The MEC system design calculations provided by the designer shall be evaluated by the RECB through documentation review supported by the results from RECB's independent strength calculations in regard to:

  - Ultimate strength analysis

In addition to operational loads also transport and installations loads shall be considered in the strength calculations.
  - Fatigue failure analysis

The independent fatigue strength calculation shall among others properly consider the mean stress effects.
- Manufacturing procedures

During the design evaluation, the manufacturing procedures shall be assessed for suitability to reach the quality and material strength assumed during the design verification.  
MEC system manufacturing procedures shall be evaluated based on the applied and agreed design standard.
- Transportation, installation and maintenance procedures

The plans, analyses, and manuals shall be reviewed for compliance with the requirements in the design basis e.g. transport requirements and MEC system inspection and repair procedures.

#### 4.4 Independent analyses

When necessary, independent analyses shall be performed to verify the conformity of the MEC system design. The extent of independent analyses will depend upon the certification sought and in discussion with the RECB

## 5 Reporting

The evaluation report shall cover the following:

- 1) Introduction
- 2) Scope of evaluation
  - a) MEC system characteristics/description
  - b) Purpose/scope of the evaluation
  - c) Reference standards
- 3) Documentation
  - a) Reports
  - b) Specifications
  - c) Drawings
  - d) Documentation for information only
- 4) Evaluation

- a) Methodology
- b) Evaluation results
- c) Remarks
- d) Deviations as noted in the Introduction to IEC TS 62600-2.
- 5) Conditions and Interfaces
- 6) Conclusion (including possible outstanding issues)

The reporting template in OD-310-T01 shall be used for the reporting.

## Annex A: Application Form for a Certification Body Applying for Conformity Assessment of Marine Energy Systems Design

*(For Use With IEC/TS 62600-2 Only)*

Please provide the information requested (as applicable) below.

The following application shall be completed by the Renewable Energy Certification Body (RECB) seeking to certify conformity assessment of Marine Energy System Design. Upon completion, it should be submitted to the IECRE Secretariat.

NOTE: Incomplete applications will not be processed until full documentation has been received.

The applicant RECB shall provide full details concerning the information requested in the tables below:

Table D.1: Applicant Information

Legal Entity Name:	Click here to enter text.
Address:	Click here to enter text.
Contact person:	Click here to enter text.
E-mail:	Click here to enter text.
Tel.:	Click here to enter text.
Fax:	Click here to enter text.
Website:	Click here to enter text.

Table D.2: Application Criteria and Documentation/Confirmation

Application criteria	Documentation / Confirmation provided
1. Provide documentation of IECRE RECB certification.  Be accredited to ISO/IEC 17065  OR  Be accepted as a member of the International Association of Classification Societies (IACS) ( <i>according to IECRE 03</i> ).	Please provide a copy of your accreditation certificate & scope,  OR state “not currently accredited”.
2. Peer review: Certification Bodies must demonstrate experience in delivering conformity assessment of Marine Energy Systems Design services according to IEC/TS 62600-2 (or an equivalent internal process) and provide an overview of reports issued in the last three years that state compliance with the standard, or a representative report.	Please provide a list of documents submitted in accordance with the requirements of IEC/TS 62600-2, or equivalent internal process.  Click here to enter text.
3. Certification Bodies must indicate their agreement to undergo peer assessment on a	Please check “yes” below:



<b>Application criteria</b>	<b>Documentation / Confirmation provided</b>
periodic basis that is established by the ME-SWG and REMC.	<input type="checkbox"/> Yes
4. Certification Bodies must agree to adhere to the Rules of Procedure (RoP), ODs and current, and future clarification sheets.	Please check "yes" below: <input type="checkbox"/> Yes
5. Certification Bodies must agree to pay the relevant application fee.	Please check "yes" below: <input type="checkbox"/> Yes
6. Certification Bodies must agree to pay the peer assessment fee, which will be established together with the assessors.	Please check "yes" below: <input type="checkbox"/> Yes
7. For a period of 3 years from the approval of this document, a self-assessment scheme will be in place which will negate the need for on-site peer assessment. This will require document submission.	Please check "yes" below, if applying under this mechanism: <input type="checkbox"/> Yes
8. A site-based or remote peer assessment will be done by a group of identified peers. A specific peer may be refused provided that appropriate and acceptable argumentation is submitted.	Please check "yes" below: <input type="checkbox"/> Yes

**INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION**

3, rue de Varembé  
PO Box 131  
CH-1211 Geneva 20  
Switzerland

Tel: + 41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

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RELATING TO EQUIPMENT FOR USE IN RENEWABLE  
ENERGY APPLICATIONS (IECRE SYSTEM)**

IECRE Secretariat c/o IEC  
3, rue de Varembé  
PO Box 131  
CH-1211 Geneva 20  
Switzerland

Tel: + 41 22 919 02 11  
[secretariat@iecre.org](mailto:secretariat@iecre.org)  
[www.iecre.org](http://www.iecre.org)