

# EU RO Mutual Recognition Technical Requirements

<b>ELECTRIC DRIVEN MOTORS</b>	Version	0.5
	Adoption Date	1 January 2023
	Application Date	1 July 2023
	Tier	1
This document is subject to controlled issue and can be found here: <a href="http://www.euromr.org/technical-requirements">http://www.euromr.org/technical-requirements</a> <b>*** Uncontrolled if downloaded or printed ***</b>		

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## 1. PRODUCT DESCRIPTION

### 1.a General description of the product

An electric driven motor is an electrical machine powered by direct current (DC) or alternating current (AC) converting electrical energy into mechanical energy.

### 1.b Application limitations†

These technical requirements are not applicable to:

- electric motors  $\geq 50$  kW
- electric propulsion motors
- electric azimuth steering motors for podded propulsion thrusters
- electric motors  $\geq 7.5$  kW for essential services.

These technical requirements do not cover certification with respect to explosion protection.

† The EU MR type approved product is generally not used as a stand-alone product but integrated as component in a sub-system or system. When a product is presented with an EU RO MR Type Approval Certificate for given application, its acceptability with regards to conditions defined in 1b, 1c and 1d of this Technical Requirement will be evaluated by the EU RO in charge of classing the ship or being in charge of the unit/system certification.

### 1.c Intended use

Nil

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## 1.d System context

Nil

## 2. DESIGN EVALUATION

### 2.a Engineering evaluation requirements

#### 2.a i. Technical Requirements

Rating: Temperature rise of machines to be verified in relation to insulation class.

#### 2.a.ii. Technical documents to be submitted

**IMPORTANT:** The English Language shall be used for all submitted documents.

- a) Main drawings for assembled machines revealing details of air gap, shaft and bearings with dimensions and tolerances inserted;
- b) References to design standards, rules, specifications, etc.;
- c) Test results (from tests already carried out, if any). One copy only;
- d) Applicant's proposal to Product Sample Test and Routine Test;
- e) Documentation of reliability and endurance on board ships and Mobile Offshore Units, if any;
- f) Special operational limitations;
- g) Field of Application;
- h) List of Type designations for each variant;
- i) Construction details:
  - I. Voltage;
  - II. Power;
  - III. Speed;
  - IV. Temperature class;
  - V. Insulation class;
  - VI. Enclosure (IP) class;
  - VII. Explosion protection + certificate from recognised test laboratory;
  - VIII. Special properties, if any.

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- j) Test programme, which as a minimum includes the elements for Type testing and routine testing. The test programme shall refer to the relevant IEC standards for each test.

## 2.b Type testing requirements

- a) Visual inspection according to IACS URE13 (1);
- b) Examination of technical documentation according to IACS URE13 (1);
- c) Temperature-rise test at full load according to IACS URE13 (5) and IEC 60034-1/8;
- d) Overspeed test: 20% in excess of the rated RPM for 2 min. (not applicable for squirrel cage motors) according to IACS URE13 (8) and IEC 60034-1/9.7;
- e) High voltage test 1 min. according to IACS URE13 (9) and IEC 60034-1/9.2;
- f) Insulation resistance to be measured according to IACS URE13 (2);
- g) Winding's resistance to be measured according to IACS URE13 (3);
- h) Checking vibration /balance including operation of the bearing or lubrication system according to IACS URE13 (10);
- i) Verification of degree of enclosure protection (IP) according to IACS URE13 (11);
- j) For DC motors: Measuring of speed vs. load within speed range;
- k) For DC motors: Overload test: 50% in excess of the rated current for not less than 2 min and 60% in excess of the rated current for not less than 15sec operating at highest full-field speed in accordance with URE13 (6) and IEC 60034-1/9.3.3. Overload test to be performed both for type test and routine test;
- l) For AC motors: No load current at rated voltage and frequency in accordance with IACS URE13 (10);
- m) For AC motors: Overtorque test = 60% overtorque 15 sec. in accordance with IACS URE13 (6) and IEC 60034-1/9.4;
- n) For HV machines: Dry lightning impulse test or equivalent of the coil interturn insulation in accordance with IEC 60034-15;
- o) Tests to be carried out:
  - I. cold endurance (IEC 60068-2-1);
  - II. vibration (IEC 60068-2-6);
  - III. dry and damp heat (IEC 60068-2-2 и 60068-2-30).

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- p) Type tests shall be carried out in the presence of the EU RO Surveyor. In cases where the tests are conducted at Nationally Accredited Laboratories, the presence of the EO RO's surveyor may be omitted †.
- q) Test specimens shall be taken from the production line or at random from stocks †.

† For further clarification of witnessing of tests and sampling the test specimen(s), refer to paragraphs 6, 7 and 8 of the EU RO "Design Evaluation Scheme" procedure (Appendix V of EU RO Framework Document for the Mutual Recognition of Type Approval found on <http://www.euromr.org/Guidance%20for%20Mutual%20Recognition>).

## **2.c Type testing requirement for certificate renewal**

The manufacturer is to notify the RO of any modification or changes to the manufacturing specifications that may affect the MR TA to be renewed.

## **3. PRODUCTION REQUIREMENTS**

- a) Routine tests in accordance with IEC 60034-1;
- b) Refer to EU RO "Product Quality Assurance (PQA)" procedure (Appendix VI of EU RO Framework Document for the Mutual Recognition of Type Approval).

## **4. MARKING REQUIREMENTS**

Manufacturers of the approved equipment are, in principle, to mark the product before shipment for identification of approved equipment as per referenced standard. In addition, and as a minimum, the following items to be marked at the suitable place:

- a) Manufacturer's name or trade mark;
- b) Type designation under which the product is type approved;
- c) Rated Voltage;
- d) RPM;
- e) Rated power;
- f) Ambient temperature;
- g) Power factor;
- h) Rated current;

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- i) Rated frequency;
- j) Insulation class;
- k) IP class;
- l) No. of phases (AC machines), serial No., duty type.

## 5. TYPE APPROVAL CERTIFICATE CONTENT

The EU RO MR Type Approval Certificate shall contain the minimum information as defined in the EU RO Framework Document for the Mutual Recognition of Type Approval - see Appendix I EU RO MR Type Approval Certificate Information.

The following information is specifically applicable to products relevant to this technical requirement and shall be included on the relevant EU RO MR Type Approval Certificate:

- a) Type Approval Documentation;
- b) Tests carried out;
- c) Marking of product;
- d) Certification retention survey.

## 6. APPROVAL DATE AND REVISION NUMBER

Date	Revision	Comment
8 July 2012	0.0	Accepted by Advisory Board
31 January 2014	0.1	Added reference to the EU RO Framework Document for the Mutual Recognition of Type Approval.
31 January 2015	0.2	CRF018 – Revision to par. 2.a.ii - Technical documents to be submitted in English; CRF020 – Revision to par. 5 - 'Type Approval Certificate Content'.
1 April 2016	0.3	CRF025 – Updated to new MR TR document format incl. par. 8; CRF026/026a – Witness testing & control of test specimen; CRF028 – addition of 6 month application clause.
1 May 2020	0.4	CRF046 and 47 (KR and RS rule changes), insertion of generic sentence 1b
1 January 2023	0.5	Added para 2.c Added para 9 Copyright (ref 21030_)

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## 7. BACKGROUND AND REFERENCE DOCUMENTS

- a) IACS UR E 13 Test requirements for rotating machines;
- b) IEC Publication 60092-301 (1995-03): Part 301 Equipment-generators and motors;
- c) IEC Publication 60034-1 (2004-04), Rotating electrical machines. Part 1: Rating and performance;
- d) Other relevant parts of IEC Publication 60034-series;
- e) IEC (2002), "IEC 60721 – Classification of environmental conditions";
- f) IEC (2007), "IEC 60068 – Environmental Testing";
- g) EU RO Framework Document for the Mutual Recognition of Type Approval.

## 8. MAINTENANCE & CLARIFICATION OF TECHNICAL REQUIREMENTS

Anyone wishing to propose changes to this document or request clarification of technical issues should contact the EU RO MR Group Secretariat in the first instance: [Secretariat@euomr.org](mailto:Secretariat@euomr.org).

Review and approval of change requests shall follow the EU RO MR Maintenance Process detailed in the EU RO Framework Document for the Mutual Recognition of Type Approval: <http://www.euomr.org/Guidance%20for%20Mutual%20Recognition>

## 9. LEGAL PROVISIONS / COPYRIGHT

- a) Underlying legal provisions in accordance with EU RO Framework Document for the Mutual Recognition of Type Approval;
  - b) Copyright © 2022. All EU RO MR Group rights reserved.
- For a list of EU RO MR Group members please see <https://www.euomr.org/about-us>.

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