

EU RO Mutual Recognition Technical Requirements

TEMPERATURE GAUGES AND TRANSMITTERS	Version	0.3
	Adoption Date	1 January 2023
	Application Date	1 July 2023
	Tier	4
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1. PRODUCT DESCRIPTION

1.a General description of the product

Temperature gauges, temperature sensors and transmitters.

Gauges and sensors may be based on several working principles: bi-metallic (BM), liquid expansion (LE), gas-expansion (GE), thermo-resistors (RTD), thermocouples (TC), infrared (IR), etc.; the relevant features of which vary accordingly.

1.b Application limitations

When used for measurement of fluid temperature in piping systems or pressure vessels, thermometers, temperature transmitters or other temperature sensing devices shall be installed within thermowells so that the devices can be removed without impairing the integrity of the pressurized equipment.

1.c Intended use

Direct or indirect measurement of temperature (of fluids or solids, as applicable) in piping systems, pressure vessels, tanks, cargo holds, enclosed or open spaces, or machinery components.

1.d System context

Piping systems, pressure vessels, tanks, cargo holds, enclosed or open spaces, machinery components.

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2. DESIGN EVALUATION

2.a Engineering evaluation requirements

2.a.i. Technical Requirements

- a) The materials of temperature gauges, sensors and transmitters, likely to come in to contact with the fluid whose temperature they are intended to measure, shall be compatible with the fluid itself;
- b) The minimum degree of protection, as applicable, shall be in accordance with the requirements set forth by the EU RO in charge of the vessel's classification, as a function of the intended location;
- c) Temperature gauges and sensors shall comply with a suitable recognized standard for such devices (e.g. IEC 584 for thermocouples; EN 13190 for GE, LE and BM thermometers; ASTM E 1137-97, ASTM E 644-98, IEC 751 and DIN 43760 for thermoresistors, etc.);
- d) Electrical and electronic temperature sensors and transmitters shall be in compliance with EU RO MR technical requirements for "SENSORS" (Tier 1). See par. 2.1.1 of the same for relevant technical requirements.

2.a.ii. Technical documents to be submitted

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

- a) Technical specifications, data sheets, drawings, installation sheets and type test reports, describing the type and working principles of the temperature gauge or transmitter for which approval is requested, and showing compliance with the relevant technical requirements as per above point 2.a.i;
- b) Documents shall be submitted for electrical/electronic level sensor and transmitter: see the EU RO MR technical Requirement for "SENSORS" (Tier 1).
- c) For products where the function is based on software the quality management system of the manufacturer has to maintain procedures for the life cycle activities and the version control.

2.b Type testing requirements

- a) Type tests shall be carried out as per selected suitable recognized standard;
- b) For electrical/electronic temperature sensors (transmitters/transducers), type testing shall be carried out as per the EU RO MR technical requirement for "SENSORS" (Tier 1) par. 2.2.;

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- c) The version of each type of installed software at the time of testing is to be identified;
- d) Test specimens shall be taken from the production line or from stocks†. 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 an EU RO Surveyor may be omitted†.

† 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.euomr.org/Guidance%20for%20Mutual%20Recognition>)

2.c Type testing requirement for certificate renewal

- a) 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.
- b) If the specified standard(s) is(are) amended or revised, the product is to be re-approved prior to it being supplied to vessels to which the amended standards apply.
- c) The Software history to be provided for review.

3. PRODUCTION REQUIREMENTS

Refer to EU RO "Product Quality Assurance (PQA)" procedure (Appendix VI of EU RO Framework Document for the Mutual Recognition of Type Approval).

Changes to the embedded software (firmware/ system software), if software changes of relevance will void the EU RO certification. The EU RO shall be kept informed of all new version numbers including a description and impacts of change.

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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:

- Manufacturer's name or equivalent;
- Type No. or symbol;
- Serial No. and date of manufacture;
- Particulars or ratings, including IP grade and class of accuracy.

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 EU RO MR Type Approval Certificate:

- Environmental test items and test levels applied, if any;
- Approval conditions including limitations, if any;
- Hardware, firmware [major version. minor version], software name and revision, if and as applicable.

6. APPROVAL DATE AND REVISION NUMBER

Date	Revision	Comment
2015-01-31	0.0	Accepted by EU RO MR Advisory Board
1 April 2016	0.1	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.
28 December	0.2	Updated by TG Software (ref. 18042g)

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2021		
2022-12-06	0.3	Adding para. 9 copyrights (ref. 21030_)

7. BACKGROUND INFORMATION / REFERENCES

- EU RO Framework Document for the Mutual Recognition of Type Approval;
- IEC 584 for thermocouples;
- EN 13190 for GE, LE and BM thermometers;
- ASTM E 1137-97, ASTM E 644-98, IEC 751 and DIN 43760 for thermo-resistors, etc.;
- EU RO MR Technical Requirement for "SENSORS" (Tier 1).

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.

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

- Underlying legal provisions in accordance with EU RO Framework Document for the Mutual Recognition of Type Approval;
- 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>. (The year is either the year of the inclusion of the copyright notice, 2022 for existing TRS, or the year of the adoption of any new TR.)

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