

EU RO Mutual Recognition Technical Requirements

FLOW SWITCHES	Version	0.0
	Adoption Date:	1 January 2019
	Application Date:	1 July 2019
	Tier	7
This document is subject to controlled issue and can be found here: http://www.euromr.org/technical-requirements *** Uncontrolled if downloaded or printed ***		

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1. PRODUCT DESCRIPTION

1.a General description of the product

Fluid flow switches are generally made of a casing containing the switch and a probe or other similar device projecting from the same and immersed in, or in other ways sensing the presence of, the fluid flow (set-in type). The device may include a short pipe fitting (flow-through type): in this case, the pipe fitting as well as any other component subject to internal pressure of fluid is not covered by the scope of the present Technical Requirement.

Based on the principle of operation, the following types are considered: mechanical flow switches (e.g. paddle-type, shuttle-type, piston-type) and pressure-based flow switches (e.g. differential pressure).

In general, flow switches are intended to open/close an electrical circuit (signal) upon reaching of a certain set point of flow, and are actuated by the energy conveyed by the fluid. Electronic components, when fitted, may be supplied by an external source of power or by internal batteries. Software based flow switches are not covered by the scope of this TR.

1.b Application limitations[†]

- Application (medium): liquids (fuel, lubricating oil, hydraulic oil, water, liquids transported in cargo holds), gases (air, vapour, inert gas, vaporized cargo gas).
- 'Ex' certification is not within the scope of these Technical Requirements;
- Rated voltage not to exceed 1000 V AC (frequency not exceeding 1000 Hz) or 1500 V DC In case of additional flow metering and/or transmitting functions, the specific TRs for flow gauges and transmitter apply.

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†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

Providing an on/off signal in absence/presence of fluid flow above a certain threshold or set point, within piping installations and machinery.

1.d System context

Piping installations, machinery appliances and components.

2. DESIGN EVALUATION

2.a Engineering evaluation requirements

2.a i. Technical Requirements

- a) Materials used for construction of body/casing of flow switches, exposed to fluid pressure, shall be nodular/spheroidal cast iron, stainless steel or bronze, in compliance with recognized Standards;
- b) The electrical contacts shall be installed in a casing made from material resistant to mechanical damages and oils, or other typical marine influences, and of proper IP degree (enclosure protection); proper locking means (locktabs, lockwire etc.) shall be provided in order to prevent the flow setting devices from getting loose;
- c) Reliable operation of electrical and electronic part shall be ensured at relative air humidity of 100% under following ambient temperature conditions:
 - 0°C to +55°C in enclosed spaces
 - 0°C to +70°C (minimum) close to combustion engines, boilers and similar; in case of components intended to be mounted on machinery associated with, or in spaces subject to, higher temperature, the relevant ambient temperature range is to be in accordance with specific machinery and installation, or with specific ambient temperature
 - -25°C to +45°C on open deck (-25°C to +55°C for electronic equipment)

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No damage to electrical and electronic parts shall be caused by temperature up to +70°C;

- d) Flow switches shall operate reliably under shocks having an acceleration of $\pm 5,0$ g and at a frequency of 40 to 80 shocks per minute;
- e) EU RO MR Technical Requirements for "Sensors" (Tier 1) shall be complied with.

2.a.ii. Technical documents to be submitted

- a) Dimensional and sectional views/drawings, material specifications;
- b) Technical description of working principle and operation; if intended for use within alarm systems, arrangements for testing during normal operation;
- c) Technical data/specification;
- d) Electrical/electronic diagrams and connections; if fitted, PCBs views/layout, views, dimensions, Test Reports (testing scope - see 2.b. below); parts list

2.b Type testing requirements

- a) Electrical/electronic elements - according to IACS UR E10 all presented tests;
- b) EU RO MR Technical Requirements for "Sensors" (Tier 1) to be complied with.
NOTE: Power supply variations and Power supply failure only if external power supply is provided - see power supply details in a.m. 1.a.
- c) Test specimens shall be taken from the production line or from stocks*;
- d) 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 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 <https://www.euomr.org/technical-requirements>)

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) found on <https://www.euomr.org/technical-requirements>)

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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 operating temperature and IP grade.

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:

- List of EMC/environmental test levels applied;
- Hardware, firmware, software name and revision, as applicable.

6. APPROVAL DATE AND REVISION NUMBER

Date	Revision	Comment
2018-07-01	0.0	Approved by EU RO MR Steering Committee

7. BACKGROUND INFORMATION / REFERENCES

- EU RO Framework Document for the Mutual Recognition of Type Approval;
- IACS UR E10.

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.

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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: <https://www.euomr.org/technical-requirements>

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