

EU RO Mutual Recognition Technical Requirements

CABLE TRAYS & DUCTS (GLASS REINFORCED PLASTIC /GRP)	Version	0.3
	Adoption Date	1 January 2023
	Application Date	1 July 2023
	Tier	3
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1. PRODUCT DESCRIPTION

1.a General description of the product

Cable Trays and ducts (glass reinforced plastic) used on board ships.

1.b Application limitations

- a) The load on the cable trays/protective casings shall be within the Safe Working Load (SWL). The support spacing shall not be greater than the Manufacturer's recommendation nor in excess of spacing at the SWL test. In general, the spacing shall not exceed 2 meters;
Note: The selection and spacing of cable tray/protective casing supports shall take into account the following:
 - cable trays/protective casings' dimensions;
 - mechanical and physical properties of their material;
 - mass of cable trays/protective casings;
 - loads due to weight of cables, external forces, thrust forces and vibrations;
 - maximum accelerations to which the system may be subjected;
 - combination of loads.
- b) The sum of the cables' total cross-sectional area, based on the cables' external diameter shall not exceed 40% of the protective casing's internal cross-sectional area. This does not apply to a single cable in a protective casing;
- c) Cable trays/protective casings made of plastic materials shall be supplemented by metallic fixing and straps;

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- d) When plastics cable trays/protective casings are used on open deck, they are additionally to be protected against UV light;
- e) Penetrations through fire class divisions are out of the scope of this technical requirement.

1.c Intended use

Cable trays intended for the support and accommodation of cables and possibly other electrical equipment in electrical and/or communication systems installations on board ships.

1.d System context

See 1.a. and 1.b. above.

2. DESIGN EVALUATION

2.a Engineering evaluation requirements

2.a i. Technical Requirements

- a) Each type of cable trays/protective casings shall be assigned a Safe Working Load and is to be designed accordingly;
- b) Cable trays/protective casings are to be designed to the following ambient temperatures:
 - **-25°C to 90°C for outdoor use**
 - **+5°C to 90°C for indoor use.**

Note:

Impact test temperature: lowest range of outdoor/indoor ambient (as applicable).

End of Note

2.a.ii. Technical documents to be submitted

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

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The technical specifications and drawings, describing the types for which approval is requested, shall show compliance with the relevant requirements.

2.b Type testing requirements

- a) Type tests are to be carried out in accordance with the test requirements as per IEC 61537 as shown in **table 1** below.
- b) The test method of impact resistance shall be according to chapter 2.1 of Rec. 73. The test is to be performed according to IEC 60068-2-75 (Impact Resistance):
 - i) The test is to be carried out on test samples of cable tray lengths or cable ladder lengths of 250 mm \pm 5 mm long. Test samples of ladder are to consist of two side-members with one rung positioned centrally. Test sample of mesh trays is to be prepared in such a way that there will be a wire in the centre;
 - ii) Before the test, plastic components are to be aged at a temperature of 90°C \pm 2°C for 240 hours continuously;
 - iii) The test sample is to be mounted on wooden fibreboard of thickness 20 mm \pm 2 mm;
 - iv) The test sample to be tested is to be placed in a refrigerator, the temperature within which is maintained at the test temperature with a tolerance of \pm 2°C;
 - v) After 2 hours, the test sample is to be removed from the refrigerator and immediately placed in the test apparatus;
 - vi) At 10 s \pm 1 s after removal of each test sample from the refrigerator, the hammer is to be allowed to fall with impact energy, the mass of the hammer and the fall height;
 - Approximate Energy 10 J;
 - Mass of Hammer 5,0 kg;
 - Fall Height 200 \pm 2 mm;
 - vii) The impact is to be applied to the base or the rung in the first test sample, to one of the side members in the second test sample, and to the other side member in the third test sample. In each case, the impact is to be applied to the centre of the face being tested;
 - viii) After the test, the test sample is to show no signs of disintegration and/or deformation that will impair safety;

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- c) IACS UR E10, Test 21 (Flame Retardant);
- d) IMO Resolution MSC.307(88) (FTP Code 2010) Part 2 (Smoke and toxicity test).

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 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.euromr.org/technical-requirements>)

Table 1

IEC 61537 Test reference subclause	Description	Notes
	Dimensions	
8	Information about the product	Inspection
	Construction	
9.1	Surface does not damage the cables	Visual and manual inspection
9.2	When the manufacturer does not declare the use of gloves during installation	Visual and manual inspection
9.3.1	Screw thread test repeatability	Manual test
9.3.2	Reusable mechanical connections repeatability	Manual test
9.3.3	Non-reusable mechanical connection	Visual and manual

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		inspection
9.4	Apparatus mounting device	Visual inspection
9.5	Regular perforations over base	Visual inspection and measurement
9.6	Regular rung pattern over base	Visual inspection and measurement
Mechanical properties		
10.2	<p style="text-align: center;">SWL test procedure</p> <p>The SWL test procedure is described in IACS Rec No.73 (2002) item 2.2.</p> <ul style="list-style-type: none"> -SWL test to be performed on smallest and largest size of cable tray or ladder lengths, having same material, joint and topological shape. -SWL test temperature to be either max & min only, or max only if there is documentation showing that structural properties decrease when temperature increases, or at any temperature within the range if there is documentation showing that the structural properties do not differ by more than 5% of the average within the range. - Max deflection under SWL not to exceed L/100, and no defect at 1,7xSWL (L=distance between supports) -All loads are to be uniformly distributed over the length and width of the test samples, as shown in 4-8-4A1/Figure 1. -The loads are to be applied in such a way that a uniform distribution is ensured even in the case of extreme deformation of the test samples. -To allow for settlement of the test samples, a pre-load of 10% of SWL, unless otherwise specified, is to be applied and held for at least five (5) min, after which the measurement apparatus is to be calibrated to zero. -Then, the load is to be gradually increased evenly, longitudinally and transversely up to the SWL continuously. When a continuous increase is impractical, the load may be increased by increments. These increments are not to exceed about a quarter of the SWL. The load increments are to be distributed through the load plates longitudinally and transversely as evenly as is practical. -After loading, the deflection is to be measured at the points specified to give a practical mid-span deflection -The test sample with load is to be left and the deflections measured every five (5) minutes until the difference between two consecutive sets of readings becomes less than 2% of the first set of the two readings. The maximum deflection for the purpose of 4-8-4A1/5.3i) is the first set of the readings measured at this point under the test load. -When subject to SWL, the test sample, their joints and internal fixing devices are to show no damage or crack visible to normal view or 	Required

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	corrected vision without magnification. -Then, the load is to be increased to 1.7 times SWL -The test sample with the load are to be left and the deflections measured every five (5) min until the difference between two consecutive sets of readings becomes less than 2% of the first set of the two readings. The test sample is to sustain the increased loading without collapsing. However, buckling and deformation of the test sample are allowable at this excess loading	
10.8.1	Tests for SWL of cantilever brackets	Required
	Electrical properties	
11.2	Electrical non-conductivity Cable tray system components shall be deemed electrically non-conductive if having surface resistivity values of 106 Ω. Note: Cable trays/protective casings passing through a hazardous area should be electrically conductive.	Required

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

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 equivalent;
- b) Type No. or symbol;
- c) Serial No. and date of manufacture;
- d) Particulars or ratings.

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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.

6. APPROVAL DATE AND REVISION NUMBER

Date	Revision	Comment
31 January 2014	0.0	Accepted by Advisory Board
31 January 2015	0.1	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	0.2	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 January 2023	0.3	Added para 2.c. Added parar 9. Copyright (ref 21030_)

7. BACKGROUND AND REFERENCE DOCUMENTS

- a) IACS UR E16;
- b) IACS Recommendation 73;
- c) 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@euromr.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>.

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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