EU RO Mutual Recognition Technical Requirements

RESIN CHOCKS	Version	0.4
	Adoption Date	1 January 2023
	Application Date	1 July 2023
	Tier	1
This document is subject to controlled issue and can be found here: http://www.euromr.org/technical-requirements ***** Uncontrolled if downloaded or printed *****		

1. PRODUCT DESCRIPTION

1.a General description of the product

Mixture of resins (usually epoxy resin) and specific additives, mainly characterized by high values of mechanical properties, with particular regard to compression module, resistance to water and oils, and stability over time.

1.b Application limitations

Each specific installation of cast resin chocks shall normally to be carried out in compliance with installation drawings approved on a case-by-case basis, according to each specific EU RO's Rules. Such specific approval will normally take into account, as a minimum, the following:

a) Total deadweight of supported machinery;
b) Number, size, arrangement and material of chocks and bolts, complete with relevant detailed (dimensioned) drawings;
c) Bolts pre-load and/or elongation, complete with details of tightening procedure;
d) Locking arrangement for bolts and calculation of bolt elongation for bolt connection securing;
e) Longitudinal and lateral stopping arrangements;
f) Sealing arrangement (for installation in stern tube or shaft struts);
g) Anti-rotation devices (for shaft bearings and rudder stock bearings/bushes);

EU RO MR Group Secretariat: secretariat@euromr.org

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h) Manufacturer's instructions (including instructions for special cases e.g. Thin small chock height or cracks in chocks).

Note:
The chocks shall only be poured by companies authorised to do so by the cast resin manufacturer whilst maintaining the boundary conditions required by the process. Authorization, respectively evidence of training the personnel performing the cast resin process, by the cast resin manufacturer has to be presented to the EU RO Surveyor upon request.

End of Note

1.c Intended use

Chocking of machinery and equipment (engines, gearboxes, steering gears, shaft bearings, stern tubes and arrangements), at initial installation or during repair, within the relevant application range (as a function of the specific product, e.g., ranges of application, supported [basic] materials, allowable temperature ranges etc.)

1.d System context

Propulsion shafting and machinery arrangement

2. DESIGN EVALUATION

2.a Engineering evaluation requirements

2.a i. Technical Requirements

a) Ageing;
b) Compressive strength;
c) Creep properties;
d) Deformation under load;
e) Elastic shear modulus;
f) Elastic tensile modulus;
g) Flammability;
h) Flexural strength;
i) Friction coefficient;

j) Hardness;
k) Impact characteristics;
l) Measurement of exotherm temperature;
m) Pulsating compressive strength;
n) Resistance to oils;
o) Resistance to water;
p) Shrinkage during cure;
q) Tensile strength;
r) Thermal expansion;
s) Viscosity of compound at pouring stage (prior to curing);

Tests to be carried out as per recognized standard, in accordance with the Manufacturer's specifications; limit values to be specified, however *compressive creep for the specified load and service temperature to be less than 0.2% under application of critical alignment applications.*

2.a.ii. Technical documents to be submitted

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

a) Data sheet / specification of chocking compound (including all data as per 2.a.i. above);
b) Test reports for compliance with 2.b below;
c) Material Safety Data Sheet and curing/processing conditions;
d) Manufacturer's instructions and recommendations for use, including:
    i. Range of ambient conditions during installation (pouring/curing);
    ii. Gelling time (temperature sequence);
    iii. Curing conditions (tempering);
    iv. Minimum curing time prior to loading vs. ambient temperature;
    v. Surface treatment of supported materials;
    vi. Maximum and minimum chock thickness.

2.b Type testing requirements

a) ASTM D 695 - ISO 604 (elastic modulus / compressive strength);

b) ASTM D 638 - ISO 527-1,2,4,5 (all - as applicable) (tensile strength);
c) ASTM D 621 - (deformation under load);
d) ISO 75-2 (temperature of deflection under load);
e) ASTM D 256 - ISO 180 (impact testing);
f) EN 59 (Barcol Hardness as per ASTM D 2583 prior to bolt tightening and loading);
g) ASTM D 4065 (previously ASTM D 2236) - DIN 53445 - ISO 6721-1 (elastic shear modulus, logarithmic decrement);
h) ASTM D 790 - ISO 178 - ISO 14125 as applicable (flexural strength, maximum strain);
i) ISO 3521 (linear shrinkage during cure);
j) ASTM D 635 - FTP Code, Annex 1, Part V (flammability of self-supporting plastics, low flame spread);
k) DIN 50100 (pulsating compressive test);
l) EN 1465 (tensile lap shear strength);
m) ASTM D 732 (shear strength);
n) DIN 53752 (coefficient of thermal expansion);
o) ISO 175 (resistance to media of the application range);
p) Coefficient of friction against steel, with machined or cast specimen, with or without separating agents (to be defined);
q) Other standards may also be accepted, provided that they are not less effective. Tests shall be carried out in Laboratories recognized by the EU RO or 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 †.
r) Test specimens shall be taken from the production line or from stocks held by the Supplier. Sample conditions shall also be stated by Supplier†.

† 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)

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2.c Type testing requirements 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

Each container of the product shall be marked, as a minimum, with:

a) Manufacturer's name or logo;
b) Type designation;
c) Year / lot number;
d) Expiry date (or shelf life);
e) Storage conditions.

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) Ratings (physical properties, max allowable specific load vs. design temp.)
b) Applicable Standards
c) Service Restrictions (special conditions, requirements for application)
d) Comments (see point 1.b)
e) Notes, Drawing and Documentation (incl. test reports).

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6. APPROVAL DATE AND REVISION NUMBER

Date	Revision	Comment
8 July 2012	0.0	Accepted by Advisory Board
31 January 2014	0.1	Updated as per CRF003, Reference to EU RO Framework Document for the Mutual Recognition of Type Approval added.
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	CRF016 – Revision to technical & type test requirements taking into account the proposals from industry; 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	0.4	Added para 2.c Added para 9 Copyright (ref. 21030)

7. BACKGROUND INFORMATION / REFERENCES

a) ASTM D 695 - ISO 604 (elastic modulus / compressive strength);
b) ASTM D 638 - ISO 527-1,2,4,5 (all - as applicable) (tensile strength);
c) ASTM D 621 - (deformation under load);
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m) ASTM D 732 (shear strength);
n) DIN 53752 (coefficient of thermal expansion);
o) ISO 175 (resistance to media of the application range);
p) Definition: Material Manufacturer - Licensed Material Producer - Application Enterprise - Authorized Application Company;
q) See also 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.

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.euromr.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)

- END -