

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Vinyl Ester Resins**with type designation(s)
Ripoxy™ R-800 Series

Issued to

Showa Denko K.K., Tatsuno Plant
Tatsuno Hyogo, Japan

is found to comply with

DNV GL class programme DNVGL-CP-0083 – Type approval – Polyester resin, vinylester resin, gelcoat and topcoat
DNV GL rules for classification – High speed and light craft
DNV GL standard DNVGL-ST-0342 – Craft**Application :****Grade 1 resin for use in marine vessels according to stated Rules/Standards.****Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.**Issued at **Høvik** on **2017-01-27**This Certificate is valid until **2022-01-26**.for **DNV GL**DNV GL local station: **Kobe**Approval Engineer: **Gisle Hersvik**

Martin Strande
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.



Job Id: **262.1-004882-7**
Certificate No: **TAK00000NC**

Product description

Vinyl ester resins **Ripoxy™ R-800 Series**, including variants;
- Ripoxy™ R-802, Ripoxy™ R-804, Ripoxy™ R-806,
- Ripoxy™ R-802EX, Ripoxy™ R-804EX and Ripoxy™ R-806EX.

The following properties have been verified by Type Testing of cured resin:

Property	Test Method	Ripoxy™ R-806EX		
Fracture Elongation	ISO 527	7,08	%	mean
Fracture Elongation	ISO 527	6,10	%	msmv
Tensile Strength	ISO 527	78,83	MPa	mean
Tensile Strength	ISO 527	78,29	MPa	msmv
Tensile Modulus	ISO 527	3200	MPa	msv
Flexural Strength	ISO 178	124,2	MPa	mean
Flexural Strength	ISO 178	122,5	MPa	msmv
Flexural Modulus	ISO 178	3100	MPa	msv
Water Absorption	ISO 62	34,5	mg	mean
HDT	ISO 75	106,2	°C	mean
Barcol Hardness	ASTM D2583	40	-	msv
Density	ISO 1675	1,130	g/cm ³	msv
Curing Procedure for Type Testing		24 hrs at 23 °C + post cure 3 hrs at 80 °C		
Curing Agent		55 % MEKPO: 1,5 %. Promoter EX: 0,5 %		

Legend:

msv: manufacturer's specified value, verified to be within $\pm 10\%$ of mean of Type Test results

msmv: manufacturer's specified minimum value, verified to be below mean - 2sdev of Type Test results

mean: mean of Type Test results

MEKPO: methylethylketoneperoxide

Promoter EX: 6 % cobalt naphtenate/dimethyl aniline 6:4

Type Approval documentation

Tests carried out

Type Testing carried out according to **Type Approval documentation**.

Marking of product

Product shall be marked with *manufacturer's name*; **Showa Denko K.K., Japan**, and *type designation*; **Ripoxy™ R-800 Series**.

The marking is to be carried out in such a way that it is visible, legible and indelible. The marking of product is to enable traceability to the DNV GL Type Approval Certificate.

Periodical assessment

The scope of the Periodical Assessment is to verify that the conditions stipulated for the Type Approval is complied with and that no alterations are made to the product design or choice of materials.

Periodical Assessment to be performed after 2 and 3.5 years (Certificate Retention) and at renewal after 5 years (Certificate Renewal).

The main elements of the Periodical Assessment are to:



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- Ensure that **Type Approval documentation** is available.
- Review design, materials, production process, and performance with respect to possible changes, in order to ensure compliance with **Type Approval documentation** and/or referenced material specifications.
- Ensure traceability between manufacturer's product marking and DNV GL Type Approval Certificate.

END OF CERTIFICATE