DNV·GL

Certificate No:
TAK00000UX

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Glass Fibre Products

with type designation(s)
KURABO KURAMAS GT4 8812 (Quadri-axial +45°/90°/-45°/0°); Glassfibre Non-crimp Fabric

Issued to
KURABO INDUSTRIES LTD.
Osaka, Japan

is found to comply with
DNV GL class programme DNVGL-CP-0467 – Type approval – Uni- and multi-axial multi-ply fabrics made of glass fibres
DNV GL rules for classification – High speed and light craft
DNV GL standard DNVGL-ST-0342 – Craft
Det Norske Veritas' Standards for Certification No. 2.20, Lifeboats and Rescue Boats, 2007

Application :

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 **2017-05-24**
This Certificate is valid until **2022-05-23**.
DNV GL local station: **Kobe**

Approval Engineer: **Gisle Hersvik**

for **DNV GL**

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.

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Job Id: **262.1-025311-1**
Certificate No: **TAK00000UX**

Product description

KURABO KURAMAS GT4 8812 (Quadri-axial +45°/90°/-45°/0°); Glassfiber Non-crimp Fabric
- Nominal weight; 879 g/m²

The following properties have been verified by Type Testing of laminates:

Property	**Test Method**	**GT4 8812**		
Tensile Strength - 0°	ISO 527-4,5 (JIS K 7164)	343	mean	MPa
Tensile Modulus - 0°	ISO 527-4,5 (JIS K 7164)	20.6	mean	MPa
Tensile Strain at break - 0°	ISO 527-4,5 (JIS K 7164)	2.4	mean	%
Flexural Strength - 0°	ISO 14125 (JIS K 7017)	567	mean	MPa
Flexural Modulus - 0°	ISO 14125 (JIS K 7017)	19.5	mean	MPa
Flexural Strain at break - 0°	ISO 14125 (JIS K 7017)	3.4	mean	%
Glass fibre content	ISO 1172 (JIS K 7052)	69.2	mean	%
Resin	Neopol 8250L [Japan U-Pica Company, Ltd.] (VARTM Method) An epoxy-bisphenol A based vinylester resin.			
Curing Procedure for Type Testing	12 hrs at room temperature, post-cured 4 hrs at 80°C			

mean = Mean of Type Test results

Manufatured by

Kurabo Industries Ltd. - Anjo Plant, 9-13, Daito-cho, Anjo, Aichi, Japan, 446-8641

DNV GL local station: Kobe

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;* **Kurabo Industries Ltd, Japan**, *place of production*, *date of production/batch No.* and *type designation;* ***KURABO KURAMAS GT4 8812***.

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:

- 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