DNV·GL

Certificate No:
TAK000014R

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Aramid Fibre Products

with type designation(s)
CYMAX Aramid Woven (200-800 g/m²) with or without CSM (20-1200 g/m²)

Issued to
Chrong Yi Composite Co. Ltd.
Taoyuan, Taiwan

is found to comply with
DNV GL class programme DNVGL-CP-0092 – Type approval – Aramid fibre reinforcements
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. Fatigue properties have been verified, and are listed on the certificate.

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Issued at **Høvik** on **2018-02-07**
This Certificate is valid until **2023-02-06**.
DNV GL local station: **Kaohsiung**

Approval Engineer: **Gisle Hersvik**

for **DNV GL**

Rikard Törnqvist
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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Product description

CYMAX Aramid Fibre Products:
Aramid Woven (200-800 g/m²) with or without CSM (20-1200 g/m²)

Legends:
A: Aramid
W: Woven
CSM: Chopped Strand Mat

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

Property - Orientation	**Test Method**	**AWP458**		
Tensile Strength – 0°	ISO 527	385	msmv	MPa
Tensile Modulus – 0°	ISO 527	23 800	msv	MPa
Tensile Elongation – 0°	ISO 527	1.8	msmv	%
Interlaminar Shear Strength	ISO 14130	39.2	mean	MPa
Compressive Strength	ISO 604	48.7	msmv	MPa
Compressive Modulus	ISO 604	9 700	msv	MPa
Compressive Elongation	ISO 604	-	-	-
Fatigue [1)]	ISO 527	No crack	-	-
Resin		SWANCOR 901-TP – Epoxy Vinylester Resin		
Curing Procedure used for Type Testing		24 hrs at 25°C		

* Laminates produced to have a fibre content of 41.8% by weight.
[1)] See details on next page.

Legend:
msmv = Manufacturer's Specified Minimum Value (verified to be below mean – 2 x standard deviation of Type Test results)
msv = Manufacturer's Specified Value
mean = Mean of Type Test results

Application/Limitation

Moisture content in the aramid fibre is approx. 4.1%.

Any significant changes in design and / or quality of the material will render the approval invalid.

Type Approval documentation

Tests carried out

Type testing carried out in accordance with **Type Approval documentation**.

Fatigue testing carried out with the following test results, ref. Test Report from Industrial Technology Research institute, Report No. 10254C02135-1-1-02 f 2014-03-11:

Property	**Acceptance criteria**	**AWP458**
Fatigue	$N > 10^5$	No crack

Fatigue testing was carried out under the following conditions:
Frequency = 10 Hz

R = -1 (Minimum fatigue stress/ Maximum fatigue stress)
Fatigue Stress = 0.45 x static stress (tensile or compressive whichever is lesser)
= 24.0 MPa (mean compressive strength used as basis)

Marking of product

Product shall be marked with *manufacturer's name*: **Chrong Yi Composite Co., Ltd, Taiwan** and *type designation*.

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