

# TYPE APPROVAL CERTIFICATE

**This is to certify:****That the Carbon Fibre Products**

with type designation(s)

**CYMAX Bi-axial; LT-Series (400-1000 g/m<sup>2</sup>) and DB-Series (150-1000 g/m<sup>2</sup>) with or without CSM (20-600 g/m<sup>2</sup>)**

Issued to

**Chrong Yi Composite Co. Ltd.  
Taoyuan, Taiwan**

is found to comply with

**DNV GL class programme DNVGL-CP-0434 – Type approval – Uni- and multi-axial multi-ply fabrics made of carbon 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 **2018-02-07**This Certificate is valid until **2023-02-06**.DNV GL local station: **Kaohsiung**for **DNV GL**Approval Engineer: **Gisle Hersvik**

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**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.



## Product description

**CYMAX Bi-axial Carbon Fibre products** of 0°/90° orientations and Double-bias Carbon Fibre products of ±45° orientations:

**LT-Series (400-1000 g/m<sup>2</sup>) and DB-Series (150-1000 g/m<sup>2</sup>) with or without CSM (20-600 g/m<sup>2</sup>).**

*Legends:*

CSM: Chopped Strand Mat

LT: Bi-axial (0°/90°)

DB: Double-bias (±45°)

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

| Property                          | Test Method                                     | DB-400C     |     |             |
|-----------------------------------|-------------------------------------------------|-------------|-----|-------------|
| Tensile Strength – ±45°           | ISO 527-4                                       | 512         | MPa | msmv        |
| Tensile Modulus – ±45°            | ISO 527-4                                       | 43.0        | GPa | msv         |
| Tensile Elongation – ±45°         | ISO 527-4                                       | 1.20 / 0.43 | %   | mean / msmv |
| Compressive Strength – ±45°       | ISO 604                                         | 116         | MPa | msmv        |
| Compressive Modulus – ±45°        | ISO 604                                         | 18.0        | GPa | msv         |
| Compressive Elongation – ±45°     | ISO 604                                         | 4.54 / 3.34 | %   | mean / msmv |
| Fibre content                     | -                                               | 34.6        | %   | mean        |
| Resin                             | SWANCOR CHEMPULSE 901 – Epoxy Vinyl Ester Resin |             |     |             |
| Curing Procedure for Type Testing | 24 hrs at ambient room temperature and pressure |             |     |             |

*Legends:*

msmv = Manufacturer's Specified Minimum Value (verified to be below mean - 2 standard deviation of Type Test results)

msv = Manufacturer's Specified Value (verified to be within mean ±10% of Type Test results)

mean = Mean of Type Test results

## Application/Limitation

Area of application will be evaluated during approval of classified objects.

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**.

### 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.



Job Id: **262.1-027748-1**  
Certificate No: **TAK000014M**

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