

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Synthetic Fibre Ropes

with type designation(s)
FBR-POWER-MIXED® RRR ROPE

Issued to
Zhejiang Four Brothers Rope Co., Ltd
Linhai, China

is found to comply with
DNV class programme DNV-CP-0100 – Type approval – Synthetic fibre ropes for towing, mooring and anchoring
ISO 10556:2009 "Fibre ropes of polyester/polyolefin dual fibres"
Cordage Institute, CI-1502:2019 Test Methods for High Modulus Reduced Recoil Risk Rope
OCIMF Mooring Equipment Guidelines (MEG4), Fourth Edition 2018 [test requirements]

Application :

Mooring and Towing of Ships and HSLCs.

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

Issued at **Høvik** on **2022-05-06**

This Certificate is valid until **2027-05-05**.

DNV local station: **Ningbo CMC**

Approval Engineer: **Gisle Hersvik**

for **DNV**

Gustav Heiberg
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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Product description

FBR-POWER-MIXED® RRR ROPE 12: 12-strand braided/plaited synthetic fibre ropes

- Fibre material: Polyester/Polyolefin dual fibres
- With or without marine finish
- UV-stabilized
- Doubled construction: Mixed (polyester+polyolefin) yarns.
Outer Polyolefin yarn covered with high tenacity polyester (HT PES) yarn.
- RRR: Reduced Recoil Risk. An RRR-component is a rope component, which by design is intended to stay intact at first break and thus prevent sudden, complete rope failure and inhibit or prevent recoil.

FBR-POWER-MIXED® RRR ROPE 12 - Compliance with OCIMF Mooring Equipment Guidelines (MEG4)

Mooring Tail Base Design Certificate FBR-POWER-MIXED® RRR ROPE 12 – 48 mm to 96 mm.

- Certificate reference: **FBR/MEG-DNVTBDC-22-001**.

Mooring Tail Certificates will be issued with basis in manufacturer's template for *Mooring Tail Certificate*.

The RRR-feature using an ISP (Inner Stretchy Part, inner core element) has been tested in accordance with Cordage Institute, CI-1502:2019 Test Methods for High Modulus Reduced Recoil Risk Rope.

FBR-POWER-MIXED® RRR ROPE 12, same as **FBR-POWER-MIXED® ROPE 12**, but with ISP.

ISP in FBR-POWER-MIXED® RRR ROPE 12 is reducing danger for recoil and is not influencing ropes' performance indicators.

Rope Characteristics

The Rope Characteristics are tabulated on the next pages observing the following:

Fibre ropes are to be delivered with a linear mass within $\pm 5\%$ of the nominal linear mass given in the tables.

The reference number corresponds to the approximate diameter, in millimetres.

The linear density, in kilotex, corresponds to the net mass per length of rope, expressed in grams per metre or in kilograms per thousand metres.

The breaking forces quoted in the below table relate to spliced ropes.

FBR-POWER-MIXED® RRR ROPE 12: 12-strand braided/plaited synthetic fibre ropes

- Specific gravity: 0.98 (floats in seawater)

ROPE CHARACTERISTICS FBR-POWER-MIXED® ROPE					
Reference number/Size		Linear density		Spliced MBL	
		excl. ISP	incl. ISP		
Diameter [mm]	Circ. [Inch]	[ktex]	[ktex]	kN	mT
32	4	594	624	188	19.2
36	4-1/2	742	772	245	25.0
40	5	915	956	297	30.3
44	5-1/2	1090	1131	353	36.0
45	5-5/8	1148	1189	367	37.4
48	6	1320	1361	408	41.6
50	6-1/4	1410	1474	441	45.0
52	6-1/2	1500	1564	473	48.3
55	6-7/8	1718	1782	529	54.0
56	7	1790	1854	547	55.9
60	7-1/2	2005	2069	622	63.5
64	8	2260	2355	698	71.2
65	8-1/8	2330	2425	718	73.3
68	8-1/2	2540	2635	781	79.7
70	8-3/4	2690	2785	828	84.5
72	9	2840	2935	874	89.2
75	9-3/8	3080	3175	944	96.3
80	10	3490	3617	1059	108.1
85	10-5/8	3933	4060	1197	122.2
88	11	4200	4327	1280	130.6
90	11-1/4	4400	4527	1340	136.7
95	11-7/8	4900	5027	1489	151.9
96	12	5000	5127	1519	155.0

Note:

Diameters 32 mm and 96 mm have been tested in accordance with CI-1502:2019.

Application/Limitation

The CI-1502:2019 approval range covers ropes with nominal diameter from 32 mm to and including 96 mm.

The OCIMF MEG4 approval range covers tails with nominal diameter from 48 mm to and including 96 mm.

Type Approval documentation
Tests carried out

Type Testing carried out in accordance with **Type Approval documentation**, and according to:

- ISO 2307:2019, Fibre ropes -- Determination of certain physical and mechanical properties.
- ISO 9554:2019, Fibre ropes -- General specifications.
- Cordage Institute, CI-1502:2019 Test Methods for High Modulus Reduced Recoil Risk Rope.
- OCIMF's Mooring Equipment Guidelines (MEG4) [requirements to testing].
- DNV-CP-0100.

Marking of product

Product/package shall be marked with *manufacturer's name: Zhejiang Four Brothers Rope Co., Ltd., place of production, type designation and diameter.*

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 Type Approval Certificate.



Job Id: **262.1-036502-1**
Certificate No: **TAK000024B**

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 assessments (for Certificate Retention / Certificate Renewal) shall be performed according to DNV-CP-0338.

This certificate is only valid if required Periodical assessments are carried out with satisfactory results. To check the validity of this certificate, please look it up in <https://approvalfinder.dnvgl.com>

END OF CERTIFICATE