Certificate no.:
TAK00002C2

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Synthetic Fibre Ropes

with type designation(s)
POWER-MIXED® FLEX, 8- and 12-strand,
POWER-MIXED® SBRFLEX, 12-strand

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"

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 **Hamburg** on **2024-03-14**
This Certificate is valid until **2029-03-13**.
DNV local unit: **Ningbo CMC**

Approval Engineer: **Gisle Hersvik**

for **DNV**

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

POWER-MIXED® FLEX: 8- and 12-strand braided/plaited synthetic fibre ropes
POWER-MIXED® SBRFLEX: 12-strand braided/plaited synthetic fibre ropes

- Fibre material: Polyester/Polyolefin dual fibres
- With or without marine finish
- Specific gravity: <1 (floats in seawater)
- UV stabilized
- Doubled construction: Mixed (polyester+polyolefin yarns Outer Polyolefin yarn covered with high tenacity polyester (HT PES)
- SBR: Sequential Break Rope. An SBR-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.
- POWER-MIXED ® SBRFLEX, same as 12-strand POWER-MIXED ®, but with SBR-component.

The SBR-component 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.

ISP in POWER-MIXED ® SBRFLEX 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 ±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 MBL values quoted in the below tables relate to un-spliced ropes.

POWER-MIXED® FLEX: 8-strand and 12-strand braided/plaited synthetic fibre ropes
- Specific gravity: <1 (floats in seawater)

ROPE CHARACTERISTICS POWER-MIXED® FLEX					
Reference number/Size		**Weight**		**MBL**	
Diameter [mm]	**Circ. [Inch]**	**[ktex]**	**[kg/220m]**	**[kN]**	**[mT]**
40	5	871	192	336	34.3
44	5-1/2	1038	228	400	40.8
48	6	1257	277	462	47.2
50	6-1/4	1343	295	499	50.9
52	6-1/2	1429	314	536	54.7
56	7	1705	375	620	63.3
60	7-1/2	1910	420	705	72.0
64	8	2152	474	791	80.7
68	8-1/2	2419	532	886	90.4
70	8-3/4	2562	564	938	95.7
72	9	2705	595	991	101.1
75	9-3/8	2933	645	1069	109.1
80	10	3324	731	1201	122.5
85	10-5/8	3746	824	1357	138.5
88	11	4000	880	1451	148.0
90	11-1/4	4190	922	1518	154.9
95	11-7/8	4667	1027	1687	172.2
96	12	4808	1058	1721	175.6

POWER-MIXED® SBRFLEX: 12-strand braided/plaited synthetic fibre ropes
- Specific gravity: <1 (floats in seawater)

ROPE CHARACTERISTICS POWER-MIXED® SBRFLEX					
Reference number/Size		**Weight incl. SBR**		**MBL**	
Diameter [mm]	**Circ. [Inch]**	**[ktex]**	**[kg/220m]**	**[kN]**	**[mT]**
40	5	901	198	336	34.3
44	5-1/2	1068	235	400	40.8
48	6	1302	286	462	47.2
50	6-1/4	1388	305	499	50.9
52	6-1/2	1474	324	536	54.7
56	7	1750	385	620	63.3
60	7-1/2	1975	434	705	72.0
64	8	2217	488	791	80.7
68	8-1/2	2484	546	886	90.4
70	8-3/4	2627	578	938	95.7
72	9	2770	609	991	101.1
75	9-3/8	2998	660	1069	109.1
80	10	3415	751	1201	122.5
85	10-5/8	3837	844	1357	138.5
88	11	4091	900	1451	148.0
90	11-1/4	4281	942	1518	154.9
95	11-7/8	4758	1047	1687	172.2
96	12	4899	1078	1721	175.6

Note:
Diameters 40 mm and 96 mm have been tested in accordance with CI-1502:2019.

Application/Limitation

The approval range covers ropes with nominal diameter from 40 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.
- ISO 10556:2009, Fibre ropes of polyester/polyolefin dual fibers.
- Cordage Institute, CI-1502:2019 Test Methods for High Modulus Reduced Recoil Risk Rope.
- Cordage Institute, CI-1500A:2015 Test Methods for Fiber Rope Physical Properties.
- Q/ZJSX 001-2020, Test methods for polyester /polyolefin dual fibers reduced-recoil-risk rope.
- 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.

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.dnv.com

END OF CERTIFICATE