Certificate no.:
TAK00002DZ

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Synthetic Fibre Ropes

with type designation(s)
X2 ULTIMA Mooring Lines, X2 ULTIMA Mooring Tails

issued to
Garware Technical Fibres Limited
Pune, Maharashtra, **India**

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"
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 **Hamburg** on **2024-08-23**
This Certificate is valid until **2029-08-22**.
DNV local unit: **India CMC MES**

for **DNV**

Approval Engineer: **Gisle Hersvik**

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

X2 ULTIMA: 8-strand plaited synthetic fibre rope

- Fibre material: Polyester/polyolefin dual fibre
- Specific gravity: 0.99 (floats in seawater)

Compliance with OCIMF Mooring Equipment Guidelines (MEG4)

Mooring Line Base Design Certificate – For X2 ULTIMA 28 mm and 96 mm
Ref No.: GTF/MLBDC/ULTIMA/24/B1 **Issue date**: 2024-05-08
Mooring Line Certificate will be issued with reference to Mooring Line Base Design Certificate.

Mooring Tail Base Design Certificate – For X2 ULTIMA 48 mm and 96 mm
Ref No.: GTF/MTBDC/ULTIMA/24/B1 **Issue date**: 2024-05-08
Mooring Tail Certificate will be issued with reference to Mooring Tail Base Design Certificate.

Garware Technical Fibres Limited has performed the full test scenario as per OCIMF MEG4.

Rope Characteristics

The Rope characteristics are tabulated on the next page observing the following:

Fibre ropes are to be delivered with a linear mass ±5% of the nominal linear mass given in the table.

All BF (Break Force) values are given for the un-spliced ropes.
All LDBF (Line Design Break Force) values are given for the spliced ropes.

X2 ULTIMA: 8-strand plaited synthetic fibre ropes

Diameter [mm]	Line Linear Density (LLD) [kg/m]	Line Tenacity (LT) [kg/m]	BF -unspliced [ton]	LDBF -spliced [ton]
28	0.455	39.56	20.0	18.0
30	0.508	39.86	22.5	20.3
32	0.632	36.31	25.5	23.0
33	0.605	43.14	29.0	26.1
34	0.646	41.80	30.0	27.0
36	0.741	40.08	33.0	29.7
38	0.830	40.50	37.35	33.6
40	0.914	40.77	41.4	37.3
41	0.979	40.45	44.0	39.6
42	1.009	40.67	45.6	41.0
44	1.114	40.88	50.6	45.5
46	1.218	40.79	55.2	49.7
48	1.345	41.29	61.7	55.5
49	1.401	41.24	64.2	57.8
50	1.432	41.92	66.7	60.0
51	1.490	41.86	69.3	62.4
52	1.550	41.23	71.0	63.9
54	1.656	41.58	76.5	68.9
55	1.683	41.87	78.3	70.5
56	1.706	42.73	81.0	72.9
57	1.803	42.43	85.0	76.5
58	1.926	42.06	90.0	81.0
60	1.955	42.35	92.0	82.8
62	2.086	42.17	97.75	88.0
64	2.209	41.84	102.7	92.4
66	2.279	42.45	107.5	96.8
68	2.450	42.24	115.0	103.5
70	2.588	42.08	121.0	108.9
72	2.832	41.66	131.1	118.0
73	2.853	42.08	133.4	120.1
74	2.932	41.75	136.0	122.4
75	3.041	41.97	141.8	127.6
76	3.155	41.65	146.0	131.4
78	3.323	41.44	153.0	137.7
80	3.364	41.87	156.5	140.9
82	3.593	40.83	163.0	146.7
84	3.765	40.88	171.0	153.9
85	3.855	40.95	175.4	157.9
86	3.946	40.60	178.0	160.2
88	4.205	39.81	186.0	167.4
90	4.409	39.91	195.5	176.0
92	4.609	39.74	203.5	183.2
94	4.809	39.82	212.75	191.5
96	5.000	39.33	218.5	196.7

The data in the table is provided by Garware Technical Fibres Limited.

Application/Limitation

The OCIMF MEG4 approval range covers ropes with diameter from 28 mm to and including 96 mm.
Mooring lines: 28 to 96 mm
Mooring tails: 48 to 96 mm

Type Approval documentation

Tests carried out

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

- OCIMF's Mooring Equipment Guidelines (MEG4) [requirements to testing].
- ISO 10556: 2009, Fibre ropes of polyester/polyolefin dual fibres.
- DNV-CP-0100.

The fibre ropes are manufactured in accordance with:

- Product Specification (X2 ULTIMA), QAD/D/82 of 2024-05-08.

Marking of product

Product shall be marked with *manufacturer's name*: **Garware Technical Fibres Limited, India**, *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