

TYPE APPROVAL CERTIFICATE

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

with type designation(s)

EC6 Carbon Composite Standing rigging with end fitting sizes 9 to 90

Issued to

FUTURE FIBRES RIGGING SYSTEMS, S.L.**Alcácer, Valencia, Spain**

is found to comply with

DNV GL class programme DNVGL-CP-0413 – Type approval – Carbon and PBO cable rigging for sailing yachts**Application :****Standing Rigging elements for Sailing Yachts**Issued at **Hamburg** on **2020-04-15**This Certificate is valid until **2025-04-14**.for **DNV GL**DNV GL local station: **Area NB/CMC Iberia**Approval Engineer: **Hasso Hoffmeister**

.....
Andree Orth
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 GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") 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

EC6 Carbon Composite Standing rigging with end fitting sizes 9 to 90

Application/Limitation

General:

Carbon Fibre composite standing rigging made of a bundled plurality of pultruded, pre-consolidated carbon fibre composite 1 tow and 3 tow rods. They are terminated in metal cone fittings, comprising a) an "external" end fitting comprising an internal thread for accepting a variety of different interfaces, free articulating fittings and b) an "internal" end fitting made to bear against a tang fitting. The products underwent a design review and physical prototype testing, according to DNVGL-CP-0413. Further, the production facilities were audited.

Details

The certification is valid for:

- "Discontinuous" EC6 carbon composite standing rigging cables
- "Continuous" EC6 carbon composite standing rigging cables
- Braid cover materials for Category A chafe protection
 - o Technora
 - o Polyester
 - o Spectra
 - o High tenacy polyester
 - o Ultra High Molecular Weight Polyethylene (UHMWPE)
 - o Dytec
- End fittings:
 - o Internal Nanolite Fitting
 - o External Nanolite Fitting

The type approval is valid for the complete range in the table (see page 3) below including the split design for continuous cables as specified in the approval documentation

Maintenance and Replacement details are to be regarded from the documentation of the manufacturer.

Limitations:

The Type Approval covering:

- Structural integrity of standing rigging cables, according to DNVGL-CP-0413:
 - o Static ultimate strength
 - o Fatigue strength
 - o Chafe resistance
 - o Impact resistance

Product Range

Cable Part Number*	Nominal axial stiffness EA	MBL**	MWL***
	[MN]	[kN]	[kN]
9-21-1	3	35	12
9-37-1	6	61	20
12-38-1	6	63	21
12-73-1	12	120	40
15-74-1	12	122	41
15-121-1	20	200	67
18-122-1	20	201	67
18-199-1	33	328	109
21-200-1	33	330	110
21-283-1	47	467	156
24-284-1	47	469	156
24-361-1	60	596	199
27-362-1	60	597	199
27-475-1	79	784	261
30-476-1	79	785	262
30-559-1	93	923	308
35-560-1	93	925	309
35-769-1	128	1269	423
40-770-1	128	1271	424
40-1039-1	173	1714	571

Cable Part Number*	Nominal axial stiffness EA	MBL**	MWL***
	[MN]	[kN]	[kN]
18-41-3	20	203	68
18-61-3	29	302	101
21-62-3	30	307	102
21-91-3	43	450	150
24-92-3	44	455	152
24-121-3	58	599	200
27-122-3	58	604	201
27-151-3	72	747	249
30-152-3	72	752	251
30-187-3	89	926	309
35-188-3	90	931	310
35-265-3	126	1312	437
40-266-3	127	1317	439
40-337-3	161	1668	556
45-338-3	161	1673	558
45-421-3	201	2084	695
50-422-3	201	2089	696
50-535-3	255	2648	883
55-536-3	255	2653	884
55-649-3	309	3213	1071
60-650-3	310	3218	1073
60-769-3	367	3807	1269
70-770-3	367	3350	1117
70-1069-3	509	4650	1550
80-1070-3	510	4655	1552
80-1417-3	675	6164	2055
90-1418-3	676	6168	2056
90-1813-3	864	7887	2629

(*) Cable name designation:

XX = Fitting size
YY = Number of carbon rods in bundle
Z = number of 24K Carbon tows in a single rod

(**) MBL = Minimum Break load. Statistically assured minimum values, derived from static tensile tests

(***) MWL = Maximum Working Load, derived from "tensile to slack" fatigue testing

Marking of product

Each product shall be marked with the TA Certificate number.

Periodical assessment

Job Id: **262.1-033110-1**
Certificate No: **TAK00001W4**

For retention of the Type Approval, a DNV GL surveyor shall perform periodical assessment after two years (+/-90 days) and after 3.5 years (+/-90 days) to verify that the conditions for the approval are complied with.

Type Approval documentation

END OF CERTIFICATE