

INSPECTION & SERVICE GUIDELINES



CARBO-LINK RIGGING

- 02** Introduction
- 03** Regular inspection
Annual inspection
- 04** Full service
CL TORQUE considerations
- 05** Repairs
General considerations

SUSTAINING MAXIMUM PERFORMANCE

Routine maintenance is critical. Performance, reliability and safety of the standing rigging, yacht and crew depend on detailed inspection schedules as with any other part of the yacht.

These guidelines are for the 'in service' management of Carbo-Link's CL SOLID rigging, including CL SOLID, CL ELLIPSE, CL TORQUE and CL HYBRID. This document is also suitable for admission to any class registration, subject to agreement by the relevant classification society.

The following service intervals are recommended, though the depth and periodicity must take into account:

- Sailing miles endured by the standing rigging
- Operating conditions the rigging has experienced (hard racing, motoring, gentle cruising, for example)
- Routine inspections/maintenance to be carried out on the mast
- Inspection intervals specified by insurance and classification bodies

Regular Inspection

Mast stepped: visual inspection at intervals matching operating conditions (after heavy weather, deliveries, racing etc.)

Annual Inspection

Mast stepped: visual inspection by a Carbo-Link technician.

Full Service (dependent on mast manufacturers recommendations)

Mast unstepped: complete undress and strip for a full mast and rigging service, including NDT where necessary.

Any service and inspection should give the highest priority to critical areas:

- Locations where an in-service damage event is a possibility
- Highly loaded areas
- Mast, deck & spreader interfaces

Carbo-Link strongly recommends a thorough reporting process for all inspections. Including but not limited to:

- Date and location
 - Scope and extent of inspection
 - Updates for the next inspection
 - Referral to specific items for further investigation
 - Photographic evidence
-

Warranty

- See section 1.9 'Warranty & Liability' in Carbo-Link General Sales Terms & Conditions.
- Download available at 'www.carbo-link.com/downloads'.

Lifespan

- Given proper use and regular maintenance as per these guidelines, CL SOLID carbon rigging will retain its original structural properties for 20+ years.
- CL SOLID rigging does not have to be returned to Carbo-Link for service or inspection.

REGULAR INSPECTION

- Comprehensive visual inspections with the mast in at regular intervals.
 - Including, but not limited to, the following: training & race days, long passages, heavy motoring, and deliveries.
-

- Visual inspection of:
 - All end terminations
 - All mast and deck interfaces
 - All cable-free lengths
 - All spreader tips and interfaces
 - All locking fasteners
 - Ensure free articulation of all moving parts
- Check for:
 - Proper cable & fitting alignment along the load path
 - Cracks, de-lamination, deformation or abrasion
 - Loose or missing locking fasteners
 - Corrosion or lack of lubrication in end fittings
- Experienced crew members should carry out regular inspections.
- Update any rigging inspection log book with thorough analysis and photo evidence.
- Any concerns should be raised with Carbo-Link at the earliest convenience.

ANNUAL INSPECTION

- Comprehensive visual inspection with the mast in. To be executed on an annual basis by Carbo-Link.
 - When sailing in the upper WL ranges (such as racing yachts), we recommend this service at least twice a year.
-

- Pre-service evaluation based on regular inspection reports to identify critical areas for further investigation
- If possible, though not essential, jack the mast down to unload all rigging cables and expose terminations & mast interfaces.
- Visual inspection of:
 - All cable end terminations
 - All mast and deck interfaces
 - All cable-free lengths, where possible
 - All spreader tips and interfaces
 - Ensure free articulation of all moving parts
- Check for:
 - Cracks, de-lamination, deformation or abrasion
 - Proper cable & fitting alignment along the load path
 - Clean, inspect and re-lubricate all interface hardware where possible
 - Replace all accessible locking fasteners and re-do the orientation pen or marker
 - Jack the mast up if required before checking all rig tensions and cable alignments are correct
- A Carbo-Link technician should conduct the inspection.
- Update any rigging inspection log book with thorough analysis and photo evidence.

FULL SERVICE

- Full service with the mast out and undressed. To be executed approximately every 5 years by Carbo-Link.
 - When sailing in the upper WL ranges (such as racing yachts), we recommend a more frequent full service.
-
- Pre-service evaluation based on regular inspection reports to identify critical areas for further investigation.
 - Unstep the mast, undress the rigging and store together with the mast at full length.
 - Carbo-Link rigging does not require off-site service.
 - All integrated metal components and carbon free lengths do not require replacing. Any interface or external component should be thoroughly inspected and tested, and replaced accordingly.
 - Thorough cleaning and inspection of:
 - All cable terminations and interfaces
 - All mast and deck interfaces
 - All cable-free lengths
 - All spreader tips and interfaces
 - Ensure free articulation of all moving parts
 - Check for:
 - Cracks, de-lamination, deformation or abrasion
 - NDT hardware such as pins, threaded seats & toggles together with rigging cables in any areas of concern
 - Evaluate test results and observations before discussing repairs or replacements
 - Replace all hangers (if installed)
 - Replace all locking fasteners
 - Re-lubricate all threads and moving parts
 - A Carbo-Link technician, in collaboration with a contracted service partner, should conduct the inspection.
 - Update any rigging inspection log book with thorough analysis and photo evidence.

CL TORQUE CABLES

- The dynamic nature of torsional cables requires additional service periods and actions.
-
- In addition to the regular, annual and full service:
 - Expose the lower cable termination by lifting the torque tube at least twice a year (between each season)
 - Remove the headsail after, including but not limited to, the following: every regatta, delivery, heavy weather
 - The key areas to inspect are:
 - Mast interface: pin termination to swivel, spline integrity, cable section directly below the spline entry (cone)
 - Deck interface: pin termination integrity, collar integrity, cable section around the top of the torque tube
 - Cable alignment between top and bottom, swivel & furling unit
 - Cable-free length, especially around the bottom of the spline & halyard swivel and above the torque tube
 - Structural cable swivel: this should rotate by hand together with the cable (see suppliers manual)
 - Furling unit, the real-time adjuster and jaw together with the tack attachment (see suppliers manual)
 - Halyard swivel integrity: ease & smoothness of rotation, no odd noises (see Carbo-Link's Halyard Swivel Manual)
 - The cable lag should be tested with the head sail removed:
 - It should be possible to rotate the cable by hand, try this from the top and bottom of the cable.
 - Feel for flat spots or signs of wear in the swivel when turning at the upper end.
 - Run the cable hydraulically with a crew member aloft and check for cable lag & alignment from top-to-bottom.

REPAIRS

- Carbo-Link must be contacted immediately in case of damage or general concern.
 - Any repair completed without Carbo-Link's knowledge and approval will void all Warranty & Liability.
-

- DO NOT attempt any repair procedure before contacting Carbo-Link
- After the initial contact, Carbo-Link will:
 - Evaluate and assess the damage
 - Produce a custom repair procedure if necessary
 - Supply additional pre-preg and equipment, if required

GENERAL CONSIDERATIONS

- A summary of Carbo-Link's standing rigging service & inspection guidelines.
-

- CL SOLID rigging should be inspected at regular intervals.
- CL SOLID rigging should undergo a comprehensive annual service every year.
- CL SOLID rigging should be completely serviced with the mast pulled according to mast supplier requirements.
- When sailing in the upper WL ranges (such as racing yachts), we recommend a more frequent full service.
- All cable specifications are given in the Project Manual.
- Never rework cable terminations. If the fit between interfaces is not perfect, please contact Carbo-Link.
- See Carbo-Link's Halyard Swivel Manual for further service guidelines on CL TORQUE forestays.
- **ESSENTIAL:**
 - Never fix any lashings in the opening of cable terminations
 - Never attempt to coil any rigging
 - Never attempt any repair work without first contacting Carbo-Link
- It is not necessary to send rigging back to Carbo-Link for any inspection or service intervals
- Rigging health can be easily observed at anytime with a visual inspectoin, and non-destructive testing is also possible with the mast stepped for further study if deemed necessary.