

Title	Demonstrate knowledge of the design and specification of yacht spars and rigging		
Level	4	Credits	4

Purpose	People credited with this unit standard are able to: explain the requirements of a yacht rig design specification; identify yacht spar material attributes; explain engineering principles applicable to yacht rigs; identify yacht rig tensioning and measuring systems; explain mast deck support and waterproofing types; and identify rig regulatory requirements.
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Classification	Boating Industries > Boatbuilding
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Available grade	Achieved
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Guidance Information

- References:
Sheahan, M, *Sailing Rigs and Spars, Installation, Maintenance, Tuning* (GT Foulis & Co Ltd, 1990), ISBN 0854297537;
Approved Code of Practice for Load Lifting Rigging December 2012;
and *Industrial Rope Access in New Zealand: Best Practice Guidelines May 2012*, available at www.worksafe.govt.nz.
- Definitions
Classification society rules refer to class society or superyacht rules that may apply to larger boats being built to class and may include reference to structural rules.
Racing class rules refers to rules specific to individual boat classes and may include reference to measurements and specifications for boat classes.
Regional rules may include yachting safety regulation compliance, compliance with countries council or state or national requirements, and regional compliance rules such as CE and may include reference to rules such as the ability to be able to lower sails at sea.
Rig refers to the complete assembly of mast, boom, standing, and running rigging and attached components.

Outcomes and performance criteria

Outcome 1

Explain the requirements of a yacht rig design specification.

Performance criteria

- 1.1 Purpose of the design specification is explained in terms of rigging construction requirements.
- 1.2 Scope of a typical rig design specification is identified in terms of drawings, specification information, and format.
- Range includes but is not limited to – spar construction and section, standing and running rigging detail, fittings, dimensions.

Outcome 2

Identify yacht spar material attributes.

Range includes but is not limited to – material grades and processing type, strength characteristics, corrosion characteristics.

Performance criteria

- 2.1 Aluminium grades are identified in terms of suitability for spar extrusions.
- 2.2 Composite materials are identified in terms of suitability for spar making.
- Range carbon, other reinforcements, processing methods.
- 2.3 Timber types necessary for spar making are identified in terms of species.

Outcome 3

Explain engineering principles applicable to yacht rigs.

Performance criteria

- 3.1 Behaviour of columns in compression is explained in terms of column support methods used for yacht masts.
- Range two pin end, one pin end and one fixed end, two fixed ends.
- 3.2 Influence of spar section shape and wall thickness is explained in terms of buckling, bending, and the concept of moments of inertia.
- 3.3 Typical loads on mast and on the rigging components are explained in terms of tension and compression.
- Range includes but is not limited to – tension and compression of the spar, spreaders, standing rigging, halyards, booms, spinnaker poles, bowsprits, prods, deck spreaders, davits.

Outcome 4

Identify yacht rig tensioning and measuring systems.

Performance criteria

- 4.1 Tensioning components are identified in terms of name and function.
- Range includes but is not limited to – rigging screws, mast jacks/chocks, lashing, hydraulics, bridles and purchases.
- 4.2 Tension measurement devices are identified according to function in a yacht rig.
- Range may include but is not limited to – tension gauges, load sensing pins.

Outcome 5

Explain mast deck support and waterproofing types.

Performance criteria

- 5.1 Mast collar function and design types are explained in terms of mast support.
- 5.2 Mast collar function and design types are explained in terms of limiting the ingress of water to the interior of the vessel.
- Range includes but is not limited to – pour in products, O rings, canvas or rubber boots.

Outcome 6

Identify rig regulatory requirements.

Performance criteria

- 6.1 Regulatory requirements are identified in terms of racing class rules, classification society rules, and regional rules.

Planned review date	31 December 2024
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	21 November 2008	N/A
Rollover and Revision	2	25 July 2019	N/A

Consent and Moderation Requirements (CMR) reference	0136
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

Comments on this unit standard

Please contact the NZ Marine and Composites ITO training@nzmarine.com if you wish to suggest changes to the content of this unit standard.