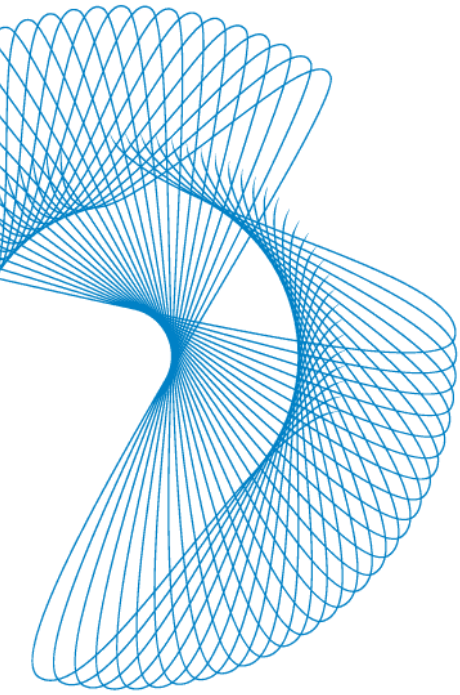
MARITIME NEW ZEALAND



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1. General

Maritime New Zealand Advisory (MNZ) Circulars are designed to give assistance and explanations about the standards and requirements set out in the rules. However, the notes contained in Advisory Circulars should not be treated as a substitute for the rules themselves, which are the law. When a number such as 40E.7 is referred to, this is a reference to a specific rule within Part 40E.

2. Background to the rule

At present all commercial sailing ships that are not solely powered by sail are required to be in safe ship management (SSM). As part of that, they are required to comply with "all applicable maritime and marine protection rules". With regards to design, construction and equipment there is no maritime rule specifically for sailing ships. As a consequence, *Maritime Rule Part 40A Design, Construction and Equipment Non-SOLAS Passenger Ships* is being used instead. This rule is not suitable for sailing ships as it is written for ships that are primarily powered by an engine, not by sail.

3. Purpose of Part 40E

Part 40E prescribes the design, construction and equipment requirements for New Zealand commercial sailing ships. Part 40E will also prescribe specific requirements for bareboat charter yachts, including provisions for record-keeping, age and competence of masters, numbers of persons that may be carried and operating limits.

4. Application of the rule

The rule applies to a sailing ship that is a New Zealand ship other than –

- a sailing ship of 45 metres or more in length that proceeds beyond coastal limits
- sailing ships that carry more than 12 passengers and undertake an international voyage
- open sailing ships.

A sailing ship is defined as a commercial ship that –

a) is designed to be navigated under wind power for which any motor provided is an auxiliary means of propulsion only; or

b) is a ship that possesses a non-dimensional ratio of [sail area/(volume of displacement)2/3] of more than 9

Existing ships

An existing ship will not have to comply with the rule unless it undergoes a major alteration or modification, major repair or a permanent change to its operating limits.

5. Key provisions of the rule, Sub-part 2 Design Construction and Equipment

5.1 Subdivision and damage stability

.1 Rule 40E.9(2) requires that a multihull ship must be designed so that it will float for more than 12 hours when capsized

a) With any two hatches are open; or

b) any hull between watertight bulkheads is holed."

.2 In order to comply with subrule (2) above –

c) flotation material is used, it must be protected from damage;

d) an air tank is used for flotation, it must be –

i) clearly marked “AIR TANK – DO NOT PUNCUTURE”; and

ii) provided with means of drainage and mean of checking that the air cavity has not been in-filled by liquid or any other material that would reduce the buoyancy; and

e) an intact compartment penetrated by a door or hatch is used to demonstrate positive buoyancy after capsize, the door or hatch must be –

i) of watertight construction; and

ii) clearly marked on both sides “WATERTIGHT ACCESS – KEEP CLOSED AND SECURED WHEN AT SEA”.

5.2 Egress

Rule 40E.15(8) requires every new multihull ship that proceeds beyond inshore limits to have a means of emergency escape fitted to every main inhabited watertight compartment so that the means of escape is above both upright and inverted waterlines.

The means of escape may be a normal hatch or a section of the hull that can be pushed out in an emergency. It does not need to have a normal handle that can be moved by anyone in the vessel.

5.3 Volume of water recesses

Rule 40E.19(2) requires the volume of every watertight recess in the weatherdeck of a ship of less than 24 metres in length to be approved by a surveyor.

The following paragraphs provide guidance for the maximum acceptable volume for watertight recesses in the weather deck on ships of less than 24 metres in length.

a) The volume (Vc) of the recess should not exceed the value obtained from the following equation –

Vc = 0.10 x L x B x F

Where:

L = Length,

B = Breadth of ship, and

F = Freeboard abreast the recess (or cockpit); and

b) There should be a means of drainage from the recess that is capable of efficient operation when the ship is heeled to 30 degrees. The means of drainage must have an effective area, excluding grills and baffles, of at least 10 cm2 for a ship not proceeding beyond the coastal limit and 20 cm2 for a ship proceeding beyond the coastal limit.

c) For all ships with more than one recess in the deck the cumulative volume of the recesses should not exceed the volume Vc given in (a) and drainage of each recess must be determined by rule 40E.21(3).

5.4 Weathertight integrity

Rule 40E.20(5) prescribes the requirements for access hatches. It is recommended that if the permanently attached covers of these hatches are hinged, the hinges be located on the forward side.

5.5 Bilge Pumps

Table 2.0 in 40E.25 specifies the number and capacity for bilge pumps.

Note: Where the ship is required to be fitted with 2 power pumps and the capacity of those pumps is not more than 20 per cent less than the specified capacity, the deficiency may be made good by an equivalent excess of capacity in the other power pump.

5.6 Inlets and discharges

Rule 40E.32(2) states “Every opening in the engine room or machinery space and every fitting attached to the shell of the ship must be constructed of steel, bronze, copper or other ductile fire-resistant material acceptable to the surveyor.”

Other ductile fire-resistant material includes, fibre reinforced plastic

5.7 Electrical general

Rule 40E.34(d) requires that a ship must be fitted with a permanently installed electrical system that minimises the risk of fire. The risk of fire can be minimised by locating the electrical equipment well clear of those areas whether flammable gases are likely to accumulate, and by ensuring the equipment is constructed so as to prevent the escape of sparks.

5.8 Lightning protection

Rule 40E.43 provides requirements if lightning protection is fitted.

It is recommended that for the installation of a lightning protection system, the *American Boat and Yacht Council Incorporated (ABYC) Standards and Recommended Practices for Small Craft Project E4 Lightning Protection* should be used.

6. Key provisions of the rule, Structural fire protection

6.1 Heating and cooking installations

Rule 40E.48(3)(e) requires gas detectors to be fitted where gas may accumulate on the ship. Rule 40E.48(7) provides requirements around the carriage of LPG cylinders.

The associated footnote 12 refers to rule 40D.56(3)-(5) with regards to compartments where those cylinders may be stored on a ship 24 metres or more in length. Information on storage of gas cylinders can be found in maritime rule 40D.56 by clicking on the link below

http://www.maritimenz.govt.nz/Rules/Rule-documents/Part40D-maritime-rule.pdf

6.3 Navigating position

Rule 40E.58(2) requires wheelhouse windows forward of the helm position, or essential for the safe navigation of the ship to be clear, not polarised or tinted.

Wheelhouse windows that are essential for the safe navigation of the ship must be carefully considered. Navigation at night time, in reduced visibility as well as during a clear day, must be taken into account.

6.4 Rigging

Rule 40E.60(1) requires scantlings and materials of a ship's mast and spars and the ship's structure supporting the masts and spars must, be to the satisfaction of the surveyor, be adequate to absorb the forces likely to be experienced in normal service."

It should be noted that multihull masts, spars and rigging must be able to absorb greater forces than monohull vessels.

6.5 Maintenance plan

The condition of the rig should be monitored in accordance with a planned maintenance schedule. The schedule should include, in particular, regular monitoring of all the gear associated with safe work aloft and on the bowsprit (see 40E.63 Working aloft).

7. Sails

7.1 Other appropriate means of depowering the mainsail

Rule 40E.62(1) Mainsails must be capable of being depowered either by reefing or by other appropriate means such as furling

7.2 Storm sails

.1 Design and Materials

Rule 40E.62(3) specifies the requirements for ships, other than ships engaged in short day sailing or proceeding beyond enclosed waters, to carry storm sails (i.e. storm trysail, storm jib, and heavy weather jib).

It is strongly recommended that owners consult their designer and sailmaker to decide the most effective size for storm sails. The purpose of these sails is to provide safe propulsion for the yacht in severe weather.

Every storm sail should either be of highly visible material or have a highly visible coloured patch added on each side. A rotating wing mast used in lieu of a trysail should be a highly visible coloured patch on each side.

Aromatic polyamides, carbon and similar fibres should not be used in a trysail or storm jib but spectra, dyneema and similar materials are suitable. Heavy weather jibs should not contain aromatic polyamides, carbon and similar fibres other than spectra or dyneema.

.2 Storm Sail Specifications

The following specifications provide the storm sail requirements for a ship to which rule 40E.60(3) applies and are based on the *ISAF Offshore Special Regulations by the Offshore Racing Council Limited.*

a) Sheeting positions on deck should be provided for each storm sail.

b) Each storm sail should have a means to attach the luff to the stay, independent of any luff-groove device.

c) One storm trysail capable of being sheeted independently of the boom with area not greater than 17.5% mainsail luff length x mainsail foot length. The storm trysail should have neither headboard nor battens, however a storm trysail is not required in a ship with a rotating wing mast that can adequately substitute for a trysail.

d) The ship's sail number and letter(s) placed on both sides of the trysail (or on rotating wing mast as substitute for a trysail) in as large a size as practicable.

e) One storm jib of area not greater than 5% height of the foretriangle squared, with luff maximum length 65% height of the foretriangle.

f) One heavy-weather jib (or heavy-weather sail in a ship with no forestay) of area not greater than 13.5% height of the foretriangle squared and without reef points.

g) One storm trysail as in (3) above, or mainsail reefing to reduce the luff at least 40%.

h) In a ship with an in-mast furling mainsail, the storm trysail must be capable of being set while the mainsail is furled.

i) One trysail track should allow for the trysail to be hoisted quickly when the mainsail is lowered whether or not the mainsail is stowed on the main boom.

j) One drogue (for deployment over the stern), or alternatively a sea anchor or parachute anchor (for deployment over the bow).

Appendix 1: Intact Stability Requirements

Appendices 1.3 and 1.4 permit the use of ISO 12217-2 *Small craft – Stability and buoyancy assessment and categorisation – Part 2: Sailing boats of hull length greater than or equal to 6 m* and ISO 12217-3 *Small craft – Stability and buoyancy assessment and categorisation – Part 3: boats of hull length less than 6 m,* instead of the requirements laid out in those appendices.

ISO 12217-2 sets design categories based on the option chosen to assess the vessel. Below is a table that equates the ISO categories with New Zealand operational limits.

Table 1 – Minimum required standard for monohull ships using ISO 12217-2

	Minimum required standard		
Permitted area of operation	Range of stability	ISO 12217 Design Category	Permitted ISO stability Assessment options
Unlimited	90+60×(24-LOA)/17	A	1
Offshore	90+60×(24-LOA)/17	A	1
Coastal	90+60×(24-LOA)/20	B	1
Restricted Coastal	90+60×(24-LOA)/25	B	1
Inshore	90+60×(24-LOA)/25	C	1 and 2
Enclosed	90+60×(24-LOA)/25	C	1 and 2
	90+60×(24-LOA)/25	C	1, 2, 5, and 6

ISO 12217-2 also introduces the STIX (Stability Index) for those vessels that are approved with ISO 12217-2 Design Categories A or B.

The stability index is determined from:

STIX = (7+2.25LBS)(FDS×FIR×FKR×FDL×FBD×FWM×FDF)0.5+§

Where:

LBS = Length base size = (2LWL + LH)/3

FDS = Dynamic stability factor

FIR = Inversion recovery factor

FKR = Knockdown recovery factor

FDL = Displacement-length factor

FBD = Beam-displacement factor

FWM = Wind moment factor

FDF = Downflooding factor

§ = constant as defined in ISO 12217-2 Part 6.4.9

Table 2 – Permitted are of operation for multihull ships using ISO 12217-2

Permitted area of operation	ISO 12217 Design Category	"Bare Poles" safe wind speed should exceed
Unlimited	A	36 knots
Offshore	A	36 knots
Coastal	B	32 knots
Restricted Coastal	B	28 knots
Inshore	C	25 knots
Enclosed	C	25 knots

(1) Appendix 1.3(2)(b) allows for ships less than 12 metres in length to prove their positive righting moment by the means of a physical Pull-Down Test. During the Pull-Down Test –

(a) all gear must be stowed normally; and

(b) outboard motors must be in the required position; and

(c) the keel must be locked down; and

(d) there must be no sails hoisted.

Fire-extinguisher requirements

Appendix 3 sets out the requirements for the number and type of fire extinguishers to be carried. Reference should be made to the table in *Maritime Rule 42B.57 Portable Fire Extinguishers* for size, classification and rating standards. The rule can be accessed from the link below.

http://www.maritimenz.govt.nz/Rules/Rule-documents/Part42B-maritime-rule.pdf

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