

APPENDIX F

Drogues and Sea Anchors

TERMINOLOGY

The term “**drogue**” generally means a device dragged from the stern of a vessel which allows the vessel to continue to make steerage way through the water but at reduced speed. The term “**sea anchor**” generally means a device streamed from the bows of a vessel which practically halts the vessel in the water.

LIFERAFTS

Every liferaft has a sea anchor supplied as part of its equipment. A sea anchor is critical to the safe use of a liferaft and dramatically reduces the chance of liferaft capsize. Its secondary function is to limit drift. A spare sea anchor may be carried in a grab bag. Sea anchors in liferafts should comply with ISO 17339 and the opportunity should be taken at service intervals to ensure this.

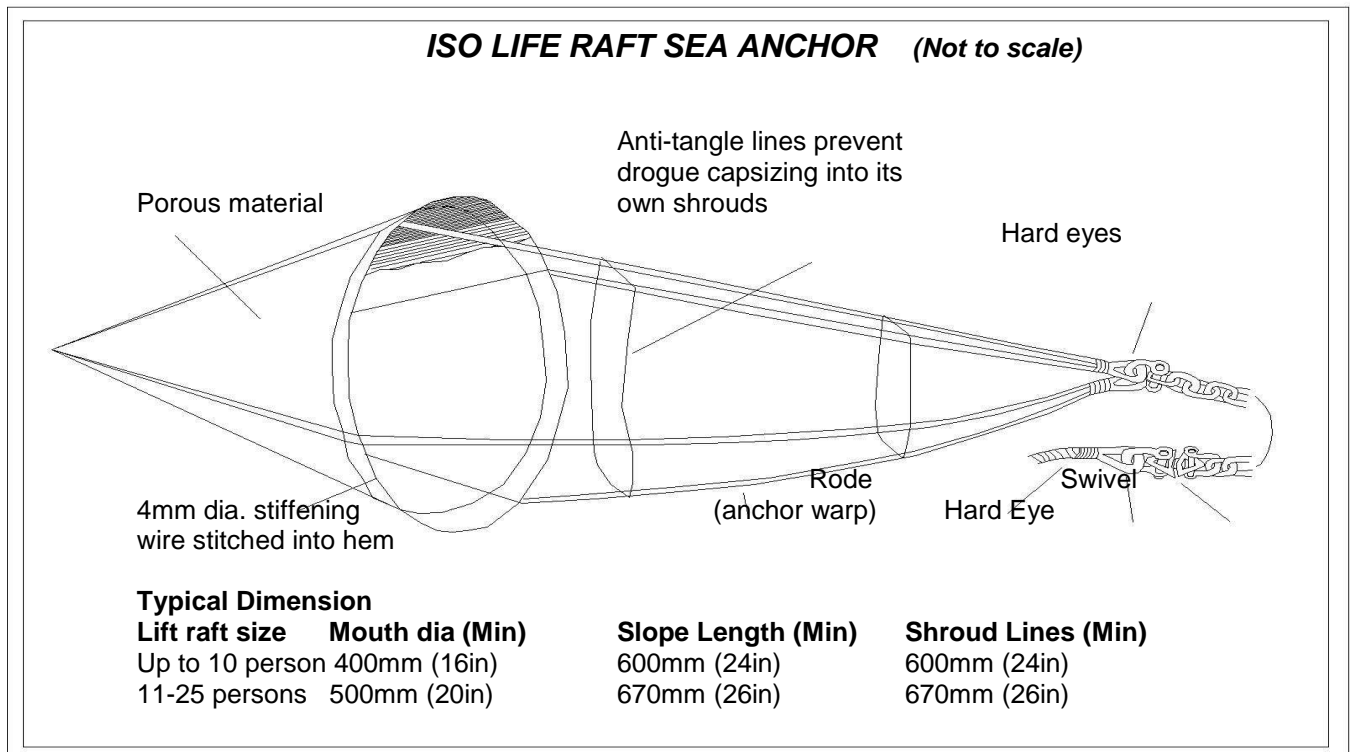
There are 5 basic design requirements for an ISO 17339 compliant life raft sea anchor:

- (1) It should be a cone with minimum mouth diameter of 400mm for up to 10 person raft, 500mm for 11 to 25 persons, and 800mm for lifeboats over 9m. Other shapes may be used so long as it develops drag equivalent to a cone of this diameter. The minimum drag requirements at 3kt tow speed are 35kg for up to 10-person rafts, 54.5kg for 11-25 person rafts, and 140kg for life boats over 9m.***
- (2) The material must be porous and rot proof allowing water penetration of 100-120 l/s/m². Note this requirement is a bit unusual since a typical material for small sea anchors is plastic coated polyester, which is not porous.***
- (3) It must have a braided construction towline at least 30m long and at least 8mm diameter with a breaking strength (including knots and attachments) at least 750kg for rafts up to 10-person and 1000kg for rafts greater than 10 persons. Any knot will reduce the breaking strength by approximately 50%, so to have a 750kg system strength would require 1500kg (3300lbs) line, which is generally the breaking strength of 12mm polypropylene line or 8mm polyester line.***
- (4) The sea anchor shroud lines must be designed to prevent the sea anchor from tumbling through itself. The shrouds and attachments***

should exceed 90kg in strength for up to 10 person rafts, 140kg for 11-25 person rafts and 360kg for lifeboats over 9m.

(5) The sea anchor must be stable when towed at up to 6 kts.

(6) The sea anchor mouth must be reinforced by a corrosion resistant ring (usually stainless wire) that will open immediately on deployment and remain open.



DROGUES ON YACHTS

A number of research programs have been conducted including one for the RORC by the Southampton University Wolfson Unit. In tests drogue deployment repeatedly prevented typical yacht forms from being slewed sideways and rolled in heavy breaking seas.

Deployment of a drogue over the stern means that heavy water will break over that part of the yacht, so all openings must be properly secured shut.

A “series-drogue” (many small cones secured to a long rode) invented by Donald Jordan has the ability to continue to provide drag even if part of the device is “surfing” under a wave crest. It should be noted that the series drogue requires a strong attachment point (see system loads in the table below) with a chafe free lead aft to the water.

Recommended series drogue specifications

Vessel	System	# cones	Rode
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<i>displacement</i>	<i>load</i>		<i>length</i>
10,000lbs	8,000lbs	100	246ft
20,000lbs	14,000lbs	116	277ft
30,000lbs	20,000lbs	132	303ft
40,000lbs	25,000lbs	147	332ft
50,000lbs	30,000lbs	164	361ft

SEA ANCHORS ON YACHTS

The most common form of sea anchor for yachts is the “parachute” anchor developed from aviation parachutes. Specialist manufacturers have accumulated much data to demonstrate the effectiveness of the device which can enable a vessel to take seas bows-on, reduce drift to the order of one knot, and resist capsize. ***The rode and attachment point for the sea anchor should be strong enough to hold the full displacement of the vessel (on racing boats, often a bridle to the primary winches). The most common failure mode for sea anchors is the rode/bridle chafing thru. Thus the rode must be extremely well protected from chafe all the way from the attachment point out over the bow.***

Recommended sea anchor specifications

<i>Vessel displacement</i>	<i>Sea anchor diameter</i>	<i>Rode diameter*</i>
10,000lbs	6ft	1/2 inch
20,000lbs	9ft	5/8 inch
30,000lbs	12ft	5/8 inch
40,000lbs	16ft	5/8 inch
50,000lbs	21ft	3/4 inch

**** Recommended rode length is 10 time LOA***