

Design

Lagoon Mooring Blocks

Mark 1 Danforth Anchors

The **mark 1** design consists of four 100kg galvanised standard Danforth anchors (Lloyds register of shipping approval No ANCH 4012) (16mm fluke-plate thickness), each shackled with 25mm pin-diameter mild steel “D” shackles to a 14 metre length of 25mm standard link mild steel chain. These anchors and chains are arranged to radiate (like the spokes of a wheel) from a central 40mm pin diameter screw-pin bow shackle. Each of the anchors is buried at least 500mm into the lagoon floor in a “flukes down” attitude. A 14 metre length of 25mm standard link mild steel chain is shackled between the central shackle and a swivel assembly which is in turn shackled to the thimble eye of a 12 metre length of 25mm poly-propylene rope attached to the yellow Norwegian buoy with a white foam pick-up buoy.

Mark 2 Danforth Anchors

The **mark 2** design is similar to the mark 1 except that there are 3 rather than 4 anchors, each with 20mm fluke plate thickness and shortened stocks, and metal components are heavier, with thicker sections as shown in the attached illustration. In addition, there is a length of 20mm open link galvanised chain between the swinging ground chain and a 5 metre length of 25mm poly-propylene rope attached to the yellow Norwegian buoy with a white foam pick-up buoy.

Both Danforth mooring systems are designed to hold a 2 tonne load applied at a scope of 5:1. This is roughly equivalent to the force applied by a vessel presenting 25 square metres of windage area in a wind of 75 knots. This holding capacity is dependent on the scope and diminishes rapidly if the system is shortened in any way, such as is the case when some operators attach the vessel by a short line directly to the ground chain. All operators should be instructed to attach at least ten metres of the vessel’s line between the mooring apparatus and the vessel’s fairlead in order to maintain adequate scope at high tide.

All components have a Working Load Limit (WLL) of at least 5 tonne when new. The WLL of the heavier chain and shackles greatly exceeds the design load. Oversize chain is deployed both to provide a catenary action to buffer shock loads and to retain design strength after severe corrosion.