

### Anchor Equivalent Holding Power

Determining the holding power of an anchor is very difficult. It depends on the design, the sea bottom type, the angulation of the pull of the rode, anchor mass, mass of material moved when dragging as a ratio to the mass of the anchor, and the ratio of the scope to the depth.

Manufacturers will advise the holding power of their anchor design but this is not correlated to a set holding power standard, as there is none. This means that comparison of holding power for different anchors is rarely possible, so when SR 4.05.1(b) permits anchors of equivalent holding power as a replacement for those in the Tables, it is next to impossible for an Auditor or Owner to know what an equivalent is.

The anchors used by racing yachts are of two basic generic types - the 'plough' which includes the CQR<sup>®</sup>, Delta<sup>®</sup> and similar, and the 'fluke' (in the SRs referred to as a 'spade' type), which includes the Danforth<sup>®</sup>, Fortress<sup>®</sup> and similar. In addition to these, cruising boats use the claw type eg Bruce<sup>®</sup>, stowed on the bow. But there are many other designs, most of which are not suitable for easy stowage and are usually stowed on the bow. The Tables on pages 230 and 231 of the YA Special Regulations provide anchor mass for CQRs and sizes (designated S) for the fluke/spade type.

In the following table, the comparison of Danforth anchors is provided, which gives a correlation as to the mass of the anchor.

Danforth <sup>®</sup> size	Holding power Size - lbs (kg)	Anchor Mass - lbs	Anchor Mass - kg
8S	S600 (266)	9	4
13S	S920 (408)	14	6.2
18S	S1300 (577)	16	7.1
22S	S1600 (711)	25	11.1
40S	S2000 (888)	43	19.1
65S	S3000 (1333)	70	31.1
85S	S3500 (1555)	100	44.4

The following table was taken from an article in SAIL 1997 Sailboat Buyers Guide, written by Michael Tamulaites. The table compares the anchor mass of various types in lbs(kg).

Bruce <sup>®</sup> - lbs (kgs)	Danforth <sup>®</sup> - lbs (kg)	Fortress <sup>®</sup> - lbs (kg)	Plough - lbs (kg)	Yachtsman's - lbs (kg)
4.4 (1.9)	8S- 9 (4)	4 (1.7)	10 (4)	15 (6.6)
11 (4.8)	13S- 14 (6.2)	7 (3.1)	15 (6.6)	25 (11.1)
16.5 (7.3)	22S-25 (11.1)	10 (4)	20 (8)	35 (15.5)
22 (9.7)	40S- 43 (19.1)	15 (6.6)	25 (11.1)	65 (28.8)
44 (19.5)	65S- 70 (31.1)	21 ( 9.3)	35 ( 15.5)	75 (33.3)

It has been well demonstrated by tests that the plough type anchor has a lesser holding power compared to other types, with the exception of the hook type anchor (eg Yachtsman's - also known as a Fisherman's), which is less than the plough.

So as a general guide, a fluke type of similar mass will have a greater holding power than a plough. The mass of a plough anchor must be increased to be equivalent to a lesser mass fluke or claw anchor.