

Mooring buoys are generally selected on the basis of their ability to support the attached mooring chain and associated swivels, shackles, and pendant. Most moorings have a heavy bottom chain with a length equal to 1.5 times the water depth coupled to a lighter top chain with a length equal to the water depth plus 5 feet which in turn is coupled to a mooring pendant with a length equal to 3 times the height of the boats bow. These dimensions vary widely depending on local practice and conditions. The top chain and pendant are supported by the mooring buoy at the juncture of the top chain and pendant. The limited swing mooring shown on a previous posting employs 2 anchors and 2 chains connected to a single mooring buoy. To limit the swing the unsupported length of the chains is longer than used on a conventional mooring. The buoyancy of mooring buoy is sometimes listed as the total buoyancy of a submerged buoy and at other times by the buoyancy of the buoy with more than half the buoy above the water. Take care to select by the later method. The buoyancy listed is for fresh water which is .975 that of salt water. The weight of chain is for G3 galvanized chain. The chain lengths listed are that witch the buoy can support. The additional weight of swivels, shackles and pendant must be considered.

BUOY DIA.	BUOYANCY	1/4" CHAIN	5/16" CHAIN	3/8" CHAIN	1/2" CHAIN
12"	9.75 lbs.	14.5'	9.8'	6.7'	3.6'
15"	22.4 lbs.	33.5'	22.4'	15.3'	8.3'
18"	43.9 lbs.	65.5'	43.9'	30.0'	16.3'
24"	97.5 lbs.	145.5'	97.5'	66.8'	36.3'
1 gal bottle	4.17 lbs.	6.2'	4.2'	2.9'	1.6'

The following chain sizes are recommended for reasonably protected harbors with winds up to 60 mph.

BOAT LENGTH	UP TO 15'	UP TO 20'	UP TO 25'	UP TO 30'	UP TO 35'
TOP CHAIN	3/8"	3/8"	1/2"	1/2"	1/2"
BOTTOM CHAIN	5/8"	3/4"	3/4"	3/4"	1"

The above chain sizes are to insure long life despite the wear imposed upon the chain from sand and rock abrasion as well as damage from electrolysis and acidic water. The weight of the chain protects against shock loads from waves and wakes. Lighter chain should use more scope.

Danforth recommends the following holding power for anchored boats. Unattended moored boat holding power should be higher.

BOAT LENGTH	0-9'	10-16'	16-25'	25-30'	30-34'
WINDS TO 20 KNOTS	150 lbs.	275 lbs.	580 lbs.	900 lbs.	1285 lbs.
WINDS TO 60 KNOTS	270 lbs.	500 lbs.	1050 lbs.	1600 lbs.	2300 lbs.

Cast iron or steel mushroom anchors use their weight and density to dig themselves into mud or soft sand and make good mooring anchors in suitable bottoms. Manufacturer recommended weights for a given boat length are shown below.

BOAT LENGTH	15'	20'	25'	30'	40'
ANC. WEIGHT	150 lbs.	200 lbs.	250 lbs.	300 lbs.	400 lbs.

Pyramid anchors function much like mushroom anchors but would appear to bury themselves more quickly and their short shanks make them good for shallower water. Suitable weights shown below.

BOAT LENGTH	To 15'	16-20'	21-25'	26-39'	40'
ANC. WEIGHT	70 lbs.	150-lbs.	200-300 lbs.	400-700 lbs.	800 lbs.

When using concrete "mooring blocks" it should be remembered that concrete of average density weights 150 lbs./cu. ft. in air but only 87.6 lbs./cu. ft. in fresh water. Thus a 200 pound mooring block weights only 116.8 pounds in fresh water. Due to this low density concrete does not tend to bury itself in harder bottom materials. Most concrete moorings must be massive to provide reliable holding unless deeply buried in mud or sand.

A relatively new mooring anchor which has demonstrated remarkable holding power is the helix mooring anchor. These anchors are screwed into the bottom to a depth of 4 ' or more and be coupled together to provide increased holding power. They need to be screwed in till the eye is level with the bottom and so they may not be suitable for use where ledge underlies a thin soil bottom. The helix anchor provides the most holder power per dollar of any anchor. Their major drawback is they often require diver or professional installation. These anchors can be used with very short scope. Some firms installing this type of anchor will also provide moorings on underwater ledge by fastening the mooring to the rock.