

The **basic components** used to conform a chain mooring set are the following:



Chain

Shackles, at least three of them (tail, swivel, and sinker shackles)

Swivels (usually one)

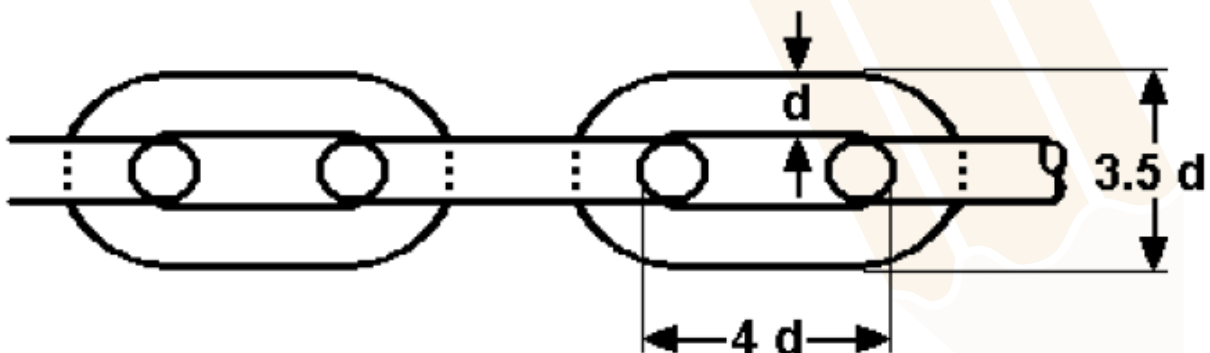
Sinker or anchor (usually one)

It is important that all aforementioned components are manufactured with the same quality and materials, to minimize electrolytic corrosions and avoid weak points.

It is also important to consider that the pull resistance of the mooring set will be the pull resistance of its weaker component, for this reason, especial attention should be put into the specifications when acquiring the mooring accessories (usually the weaker component).

The most important and basic component of a chain mooring set is the actual chain.

Chain size is usually defined by chain link diameter; however, different chain lengths may be encountered depending on supplier, specifications and national standards. Chain length is defined as the ratio between the bar diameter and the inside length of the chain link.



Chain lengths from $3D$ to $9D$ are currently in use. Shorter link chains require more links, and are heavier and more expensive, more so, it exists the possibility that a shorter link would not accept a determined size of shackle. On the other hand, shorter links are easier to handle with a winch and are a little more wear resistant. Longer chain links are less propense to knotting and easier to handle with a hook.

Consideration must be given to handling method, weight, resistance and other characteristics when choosing a chain length.

Chain is manufactured from different grades of steel combining different performances regarding to wear, corrosion resistance and cost. Steels with a high carbon content (0.2%) and high manganese content (1.5%) have proved to be very effective for buoy mooring chain. It should be noted that Lloyd's U grades and German DIN grades are based on the chain strength and do not specify a particular grade of steel. In conclusion, both chain strength and chain steel composition characteristics must be carefully chosen and clearly specified when defining a chain mooring set.

MATERIAL	Min %	Máx %
Aluminium	0,015	0,025
Carbon	0,25	0,26
Chromium	0,2	0,3
Manganese	1,4	1,6
Molybdenum	0,1	1,2
Nickel	0,2	0,3
Phosphorus	0	0,02
Silicon	0,2	0,35
Sulphur	0	0,02
Vanadium	0,08	0,12

Table. Typically accepted chain steel composition

To sum up, a chain specification document should include the maximum possible of the following information:

- Material specification.
- Treatments
- Dimensions
- Mechanical properties
- Test procedures and details

Proper use of this kind of information should enable the Aids to Navigation authority to purchase chain with proven quality, that will perform in a consistent and safe manner in service, minimizing operative issues and maintenance works.