

What value should my Hull potential be?

The measurement of Hull potentials has been illustrated in articles and videos on this site.

https://www.youtube.com/watch?v=zWBp6_gap6k

<https://www.edt.co.uk/Hull%20Potential>

However the most difficult thing for boat owners is to understand what the value should be and to understand where there is a problem.

The first thing to say is that the measurement should be made regularly as the Hull is corroding from day 1 and it will only decline. The key is to identify issues, find the cause and act.

The action is normally replacing anodes or simply moving your boat from an oxidising environment. Corrosion is caused by the loss of electrons (oxidation) of the metal hull. You protect the hull by adding a more active metal e.g. Magnesium, Zinc or Aluminium. This is known as Cathodic protection.

If there is stray DC on your boat or a neighbouring vessel the corrosion is markedly accelerated. The most drastic corrosion will occur where the earth rods in a marina or harbour are not effectively grounded. In such instances electrons are accelerated towards the nearest anodes which means they are extracted from adjacent metals. i.e. your sacrificial anodes and then your hull or drives.

We have put together a table of potentials that you should expect from the common metals when measured using a Silver/Silver Chloride reference (link) electrode. Some published data shows the values using a Copper Sulphate reference electrode is which instances they will be around 100mV more positive so beware. More importantly do not use a silver spoon as a reference. It is not a reference electrode and has a potential of its own which changes as it oxidises (tarnishes).

Potentials of Metals in water:

Platinum	100mV
Brass or Bronze	300mV
Cast Iron	600mV
Mild steel (rusted)	300 - 600mV
Mild Steel	600 - 900 mV (depends on the grade/quality)
Aluminium	900mV
Aluminium Alloy (5% Zinc)	1150mV
Zinc	1200mV
Magnesium	1850mV

Note: The Hull is connected to the positive terminal and all results will be negative.

The reading is in mV and is called a Potential difference measurement. Electrons are stored in the metal structure and have the potential to be released in the oxidation process.

Magnesium has more bound electrons in its structure that are readily lost and therefore it corrodes first. This makes it a most effective sacrificial anode. It is however only suitable for inland waterways due to its rate of loss.

Zinc is the next anode of choice for river craft and some Marine vessels however Aluminium would be generally more practical in sea going boats.

With a combination of metals the Hull potential will be a hybrid of the two. Note the Aluminium Alloy value above which is between the Aluminium and Zinc values. A significant coverage of sacrificial anodes will make the Boat hull, on average more negative.
