ACM Instruments

Cell Design

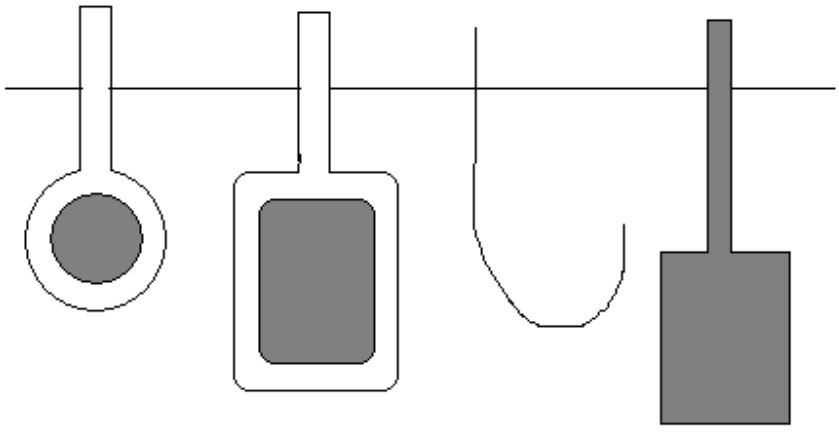
Many laboratory corrosion tests take place in flat-bottomed glass reaction vessels with multi-access glass tops. These usually hold one litre of electrolyte and allow a thermometer; gas sparging tube; platinum auxiliary; lugin tube and sample to be rigidly immersed in the electrolyte. The sample can take a few basic forms.

1 Fully submerged sample with electrical connection and edges masked using epoxy resin. After the resin has cured the sample face is ground down using a metallurgists polishing wheel to an acceptable finish and then cleaned.

2 The masked plate sample is also fully submerged with the back and sides covered in epoxy (or a beeswax\colophony mix) and an area of the front left clear. This is different to 1 above in that the sample is not ground down making it suitable for painted samples.

3 The wire loop electrode is often used when testing materials like stainless steel to avoid crevices between the masking material and the sample. A thin loop of wire is immersed with very little in contact with the waterline.

4 The cricket bat style specimen is a modification of the wire loop for more solid pieces of metal. The sample is narrowed at the top so that the portion of the electrode in contact with the water is small.



The reference electrode is often a commercial saturated calomel electrode (SCE) either directly dipped into the solution or connected remotely by a salt bridge and lugin probe. A small piece of platinum attached to the end of a glass rod makes the auxiliary electrode. A magnetic stirrer can be used along with a hot plate if required. If a lugin is used there is often a large amount of mains noise picked up between the test cell and the metallic part of the SCE. This noise acts as an additional reference voltage for the potentiostat causing the cell to be polarised with a mains frequency voltage on top of the desired voltage. This additional signal can be of the order of 100s of mV so the working electrode is polarised by exactly this picked-up voltage. To remove this perturbing voltage use a noise reducing electrode in the cell.