Saline Bucket Testing Platform Documentation

# Construction:

## Materials:

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| Home Depot All Purpose Bucket  <https://www.homedepot.com/p/The-Home-Depot-5-Gal-Homer-Bucket-05GLHD2/100087613> | $3.25 |
| Salt (as pure as possible, with no anti-caking agents)  <https://www.amazon.com/Morton-Canning-Pickling-Salt-Box/dp/B00GZCEZ4O> | $9.47 |
| Distilled Water (approx. 3 gal) | Approx. $4.00 |
| Assorted Alligator Clips  <https://www.amazon.com/WGGE-WG-026-Pieces-Colors-Alligator/dp/B06XX25HFX> | $5.99 |
| Siglent SDG2042X Function Generator  <https://www.amazon.com/Siglent-Technologies-SDG2042X-Arbitrary-Function-Generators/dp/B01410O55U#customerReviews> | $499.00 |
| Rigol DS1054Z Digital Oscilloscope  <https://www.amazon.com/Rigol-DS1054Z-Digital-Oscilloscopes-Bandwidth/dp/B012938E76> | $349.00 |
| 24”x24” Titanium Sheeting  <https://store.tmstitanium.com/products/199g/titanium-sheet-plate/cp-grade-2/0.020-thick-24.000-wide-24.000-long>  Or if building only one or two buckets:  <https://store.tmstitanium.com/products/198g/titanium-sheet-plate/cp-grade-2/0.020-thick-12.000-wide-24.000-long> | $65.00 |
| Total Cost: | $935.71 |

## Assembly:

1. Cut the titanium sheeting into 1” wide by 2’ long strips.
   1. This can be done with a bandsaw or metal shears, preferable electric metal shears for smoother cuts. These have worked well for us: <https://www.amazon.com/WEN-3650-4-0-Amp-Variable-Electric/dp/B01M5G99E7>.
   2. Each 24”x24” sheet of titanium is enough for 24 strips. Since each bucket only requires 3 or 4 strips, this is enough for 6-8 buckets. While it is always helpful to have spare titanium for electrode replacements, if the goal is only to build one bucket, purchasing the cheaper 12”x24” sheet is likely the best idea.
2. Create the saline solution.
   1. The optimum electrical impedance of this solution is 1000 ohms or 1kOhm. However, a range of around 100 ohms around this optimal value will suffice.
   2. Create a 0.9% weight by volume saline solution with the salt and the distilled water. You will want at least 1.5-2 gallons of water in the bucket. We recommend not going above 4 gallons to allow for an air gap at the top to reduce possible spillage. Calculate how much salt you need accordingly.
   3. Thoroughly mix the salt into the distilled water, making sure that all of it has dissolved.
   4. Take an impedance measurement of the saline solution. This can be done with an Activa PC+S and a DBS electrode, or with a multimeter (I think).
   5. If the impedance of the solution is too high, add a small amount of salt and measure again. If the impedance is too low, add a small amount of water and measure again.