

ECN Technical Note 3

Preparation of Conductivity & pH Solutions

Three solutions are routinely required as part of the ECN Water Handling Protocol and this note gives details of how they are made up. Solution 1 is used as the high calibration point for the conductivity meter and solutions 2 and 3 as AQC check solutions for the conductivity measurement and pH measurement respectively. Dilution of the AQC sample that is provided by ECN for inclusion with the chemical analysis might be best left to a chemistry laboratory specialist.

1. Calibration Solution for Conductivity Meter (0.01 M KCl, 1411 μ S at 25°C)

- Place 2-3 g of AR potassium chloride (KCl) in a 50 ml beaker and dry in an oven for 3-5 hours at 105°C then cool to room temperature in a desiccator.
- Weigh 0.746 g of KCl into another 50 ml beaker.
- Dissolve the KCl in the beaker with good quality de-ionised water, e.g. 'Option water'.
- Pour the solution from the 50 ml beaker into a 1.0 litre volumetric flask. Thoroughly rinse the beaker into the flask with de-ionised water. Fill the flask almost to the mark then shake it to fully dissolve the KCl. Top up to the mark and invert the flask a few more times so the solution is fully mixed.
- Rinse out the storage bottle with de-ionised water then shake dry and rinse again with a small amount of the KCl solution then shake dry again.
- Fill the storage bottle with the new solution and label with appropriate information including the expiry date. This solution has a shelf life of 1 year.

2. Conductivity AQC Solution (0.5 mM KCl, 74 μ S at 25°C)

- Place 2-3 g of AR potassium chloride (KCl) in a 50 ml beaker and dry in an oven for 3-5 hours at 105°C then cool to room temperature in a desiccator.
- Weigh 0.03728 g of KCl into another 50 ml beaker.
- Dissolve the KCl in the beaker with good quality de-ionised water, e.g. 'Option water'.
- Pour the solution from the 50 ml beaker into a 1.0 litre volumetric flask. Thoroughly rinse the beaker into the flask with de-ionised water. Fill the flask almost to the mark then shake it to fully dissolve the KCl. Top up to the mark and invert the flask a few more times so the solution is fully mixed.
- Rinse out the storage bottle with de-ionised water then shake dry and rinse again with a small amount of the KCl solution then shake dry again.
- Fill the storage bottle with the new solution and label with appropriate information including the expiry date. This solution has a shelf life of 2 months.

3. pH AQC Solution (0.05 mM H₂SO₄, pH 4.00 at 25°C)

- Obtain 5 mM Sulphuric Acid (H₂SO₄). (This has to be diluted from a commercially available solution, has a 2 year shelf life and making it might be best left to a chemistry laboratory specialist).
- Two-thirds fill a 250 ml volumetric flask with de-ionised water.
- Wearing gloves and eye protection, use a pipette and bulb to add 2.5 ml of the 5 mM H₂SO₄ to the volumetric flask. Never add water to acid!
- Rinse pipette into the flask with de-ionised water then fill the flask with de-ionised water to the mark and invert several times to mix.
- Rinse out the storage bottle with de-ionised water then shake dry and rinse again with a small amount of the H₂SO₄ solution then shake dry again.
- Fill the storage bottle with the new solution and label with appropriate information including the expiry date. This solution has a shelf life of 2 months.