

Surface adhesion measurements in aquatic biofilms using magnetic particle induction: MagPI

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Appendix 1: List of parts

Electromagnet setup

- Variable power supply with displays over voltage and current (0–30 V)
- Iron bolt (not stainless steel), 100 × 10 mm
- Iron bolt (not stainless steel), 100 × 5 mm
- Coat insulated copper thread, 30 m, 26 gauge (0.405 mm, 133.9 Ω/km)
- Coat insulated copper thread, 50 m, 32 gauge (0.202 mm, 538.3 Ω/km)
- Nail polish for extra insulation between bolt and thread
- Loctite glue gun for protective coating over the finished copper coil
- Solder
- Solder pen for connection of wires between copper coil and power supply
- Laboratory stand with variable connectors
- Micromanipulator

Permanent magnet setup

- Neodymium magnets 20 × 5mm (1–5), e.g., from e-magnets
- Test tube with lid to be converted to protective magnet holder
- Laboratory stand with variable connectors
- Micromanipulator

Ferrous fluorescent particles

- Bulk of varying particle sizes from licensed distributor Partrac, UK (http://www.partrac.com/content/01_home.php)
- Sieve set, same as for determination of particle size composition of sediment

For calibrations

- Hall sensor
- Gauss meter, e.g., from Unilab

Videoclip 1

Prototype MagPI during calibration run. The ferrous test beads were placed on a Petri dish lid, and the current to the variable electromagnet was increased. The particles at first align to the magnetic field and then begin to jump the gap between the surface and the magnet. Once the current is switched off, the majority of particles then drop from the magnet, and the rest can be removed by a gentle shake.

For further information of this type of research, contact: Professor David M. Paterson (d.paterson@st-and.ac.uk) or go to <http://biology.st-andrews.ac.uk/serg/index.html>.