

pH Meter for Use in Estuarine and Coastal Waters



ENVIRONMENT
AGENCY

Accurate pH measurement is desirable for many applications and is essential in speciation calculations, determining the concentration of total ammonia that is in the un-ionised (toxic) form. An earlier R&D project (see R&D Notes 288 & 297) produced improvements in the calculation of un-ionised ammonia, and identified serious shortcomings in our ability to measure pH. Conventional combination electrode devices have inadequate precision and the basis of the pH scale used is flawed particularly under conditions of variable salinity.

The present project has led to the development of an innovative pH meter based on a capillary liquid junction which is accurate to better than ± 0.01 pH units. pH is measured on the free ion concentration scale which is consistent with the ammonia ionisation constants (refer to R&D Note 457).

The device is packaged into a small cabinet and requires only a pumped water supply of *ca* 2 l/min. Measurements can be taken continuously or in batch mode. A laptop PC fitted with a PCMCIA interface is used for control and data logging. Facilities for automatic calibration are built in as standard.

Four instruments have been constructed and these are now installed on the Agency's four coastal survey vessels.

The device has proved simple to operate, reliable and extremely tolerant to high turbidity estuarine waters as well as heavy weather.

For maximum accuracy it is necessary to use artificial sea water (tris) buffers as opposed to conventional NBS buffers, and Plymouth Marine Laboratory have provided details for their preparation.

Use of these pH meters is recommended whenever accurate ammonia distributions are required in estuarine or marine waters.

This R&D Technical Summary relates to information from Project E1/602 contained in the following output:

R&D Technical Report E1 - Operating Manual for PML Estuarine pH Instrument

Internal status: Released to Regions
External status: Public Domain

R&D Technical summary E1

RESEARCH AND DEVELOPMENT
TECHNICAL SUMMARY

Project Manager: Andrew Wither (North West Region)
Research Contractor: Plymouth Marine Laboratory

Copies of these documents are available internally from the Regional Information Centre (Library) and externally from the Foundation for Water Research (Tel: 01628 891589; Fax: 01628 472711).

© Environment Agency

Rio House
Waterside Drive
Aztec West
Almondsbury
Bristol
BS12 4UD

Tel: 01454 624400

Fax: 01454 624409