MC100 MICROCELL

INSTRUCTIONS FOR USE

Introduction

This microcell is designed for use with the 1302 oxygen electrode. It can be used either for spot determination of the oxygen content of small samples of water, blood etc., or as an in-line flowcell.

Construction

The microcell comprises a base section into which the electrode is fitted and a glass water jacket containing the 70µl sample chamber. When the water jacket is fully screwed into the base section, the chamber seals against a neoprene gasket which also makes a seal around the electrode tip and thereby forms the floor of the assembled chamber.

Assembly

Unscrew the cap at the bottom of the base section of the holder and remove.

Insert the electrode into the centre hole.

Feed the knurled cap over the cable and screw it fully on to the thread. The three O rings on the electrode cable exert the correct amount of pressure to seal the nose of the electrode to the neoprene gasket which forms a part of the floor of the microcell chamber.

Connect the inlet and outlet tubes of the water jacket to a pumped source of constant temperature water. Allow the water to enter slowly at first, to avoid the production of small air bubbles which can impair visibility of the sample chamber. Invert the microcell until all air bubbles have been flushed away. Clamp the support rod at a suitable height on a clamp stand, with the microcell in a vertical position.

Electrode Calibration

Calibrate the electrode within the cell using zero oxygen solutions and with air saturated water, as described in the 781, 782 or 928 Instruction Manual. If using sulphite solution for zero setting, flush the chamber with water several times to remove all traces of it afterwards.

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Microflowcell Operation

The sample chamber has a 19g stainless steel tube as an entry port and a Luer male exit. Make connections via fine polyethylene tubing (supplied) with as thick a wall as possible. Avoid the use of silicone rubber tubing because of its very high permeability to oxygen. Calibrate the electrode within the cell with fully saturated water at the same temperature as that in the water jacket, and flowing at the same rate as in subsequent measurements. It is a good idea to include the facility to pass fully saturated water over the electrode every few hours during a long run to check for possible drift of the electrode output. Ensure that no air bubbles are allowed to enter the flow line. If air bubbles are apparent when first connected up, pass a weak detergent solution through the cell and then flush this away completely with clean water.

'Spot' Measurements

Connect polythene overflow tubing to the exit port, using the shortened 19g hypodermic needle provided. In some cases it is preferable for the sample chamber not to drain between samples. If this is the case, arrange for the overflow tube to terminate at the same level as the inlet tube, so that siphoning does not occur.

The 19g inlet tube is fitted with a sleeve of polythene tubing. Fit the shortened 19g hypodermic needle to a 1ml hypodermic syringe and carefully withdraw the sample. Now put the needle into the polythene tubing sleeve until it touches the inlet tube. Inject the sample slowly and steadily. Rapid injection will create a hydrostatic pressure increase which will compress the electrode membrane and cause a transient increase in the reading on the oxygen meter.

Make sure that no air bubbles are introduced into the chamber. If bubbles do find their way in and adhere to the glass or base of the chamber, they can usually be removed by flushing the chamber with a weak detergent solution. It is a good idea to keep a weak detergent solution in the chamber overnight or for other short periods when it is not in use. If the chamber becomes coated with proteins during blood oxygen determinations, it can easily be dismantled for cleaning. (See below)

Cleaning the chamber and water jacket

Disconnect the outlet (and inlet if fitted for microflowcell operation) tube to the sample chamber. Switch off the pumped water supply and drain the water jacket. Drain the sample chamber by blowing air through it. Now almost completely unscrew the knurled cap which holds the electrode in place. Unscrew the water jacket and wash as required. The water jackets are not interchangeable between different microcell base sections without making an adjustment. If it is necessary to make an interchange, proceed as below.

Electrode removal

Before removing the electrode to change the membrane, flush the sample chamber with distilled water and then drain it and dry the chamber. Unscrew the knurled collar at the base of the electrode holder and withdraw the electrode. It is not necessary to drain the water jacket in order to remove the electrode.

Fitting a replacement water jacket

Remove the electrode and unscrew the stainless steel support rod from the base section. With a hexagonal 2.5mm 'Allen' key (supplied), unscrew the grub screw within and slide the central probe holder downwards by about 1cm. Remove the neoprene gasket (washer) from the tip of the electrode holder. In its place insert the orange plastic spacer which is provided with the replacement water jacket. Screw in the water jacket until it seals on the bottom 'O' ring. Slide the probe holder upwards until the sample chamber seats against the plastic spacer. Whilst exerting upwards pressure to keep the two surfaces together, use the Allen key to retighten the grub screw. Refit the stainless steel support rod. Now unscrew the water jacket, remove the spacer and replace the neoprene gasket. The gasket may appear to be oversize but this is because the edges of the gasket seating are undercut to hold it in position. Screw in the water jacket again. The sample chamber will now seal against the gasket with the correct amount of compression.