

Oxygen Electrode Chambers

For Liquid and Gas-Phase Applications



Hansatech
Instruments



DW1



Liquid-Phase

- > Cast acrylic construction provides good visibility and uniform illumination of samples
- > Ideal electrode chamber for teaching purposes with all the functionality of research equipment
- > Variable volume reaction vessel between 0.2 and 2.5ml
- > Base mounted S1 oxygen sensor forming the floor of the borosilicate glass reaction vessel
- > Water jacket for effective temperature control of the sample.

The DW1 oxygen electrode chamber provides a highly versatile solution to measurements of dissolved oxygen in liquid-phase samples. It can be used for a wide range of applications from basic teaching through to more advanced research assays.

The DW1 oxygen electrode chamber is constructed from clear cast acrylic providing good sample visibility and uniform illumination. Precise temperature control of the sample and electrode disc can be achieved by connecting the water jacket of the DW1 to a thermoregulated circulating water bath.

The sample is housed within a borosilicate glass reaction vessel which has a variable sample volume of between 0.2 and 2.5ml controlled by the adjustable plunger assembly. This plunger has a stoppered central precision bore allowing additions/subtractions to be made to/from the reaction mixture using a standard Hamilton type syringe.



DW1/AD



Liquid-Phase



Sealed Chamber

- > Gas-tight, height adjustable plunger assembly for low-volume respiration or gas-phase assays
- > Cast acrylic construction provides good visibility and uniform illumination of samples
- > Ideal electrode chamber for teaching purposes with all the functionality of research equipment
- > Variable volume reaction vessel between 0.2 and 2.5ml
- > Base mounted S1 oxygen sensor forming the floor of the borosilicate glass reaction vessel
- > Water jacket for effective temperature control of the sample.

The DW1/AD oxygen electrode chamber provides a highly versatile solution to measurements of dissolved oxygen in liquid-phase samples. It can be used for a wide range of applications from basic teaching through to more advanced research assays.

Due to the gas-tight plunger assembly, the DW1/AD lends itself particularly well to respiration assays in small sample volumes where any minute diffusion of ambient oxygen into the chamber may cause measurement artefacts.

The DW1/AD oxygen electrode chamber is constructed from clear cast acrylic providing good sample visibility and uniform illumination. Precise temperature control of the sample and electrode disc can be achieved by connecting the water jacket of the DW1/AD to a thermoregulated circulating water bath.

The sample is housed within a borosilicate glass reaction vessel which has a variable sample volume of between 0.2 and 2.5ml controlled by the gas-tight adjustable plunger assembly. This plunger has a stoppered central precision bore allowing additions/subtractions to be made to/from the reaction mixture using a standard Hamilton type syringe.



DW2/2



Liquid-Phase



Dark Adaption

- > Electrode chamber designed for simultaneous oxygen / chlorophyll fluorescence measurements
- > Black acetal construction allowing simultaneous fluorescence and dark adapted respiration assays
- > 4 optical ports allow connection of one or more LH11/2R LED light sources or A8 fibre-optic cable
- > Simultaneous fluorescence studies with FMS fluorimeters using appropriate interface adapter
- > Variable volume reaction vessel between 0.2 and 2.5ml
- > Base mounted S1 oxygen sensor forming the floor of the borosilicate glass reaction vessel
- > Water jacket for effective temperature control of the sample.

The DW2/2 electrode system is a modified version of the DW1 electrode chamber and has been designed for use with other instruments to allow simultaneous spectroscopic and oxygen flux measurements. DW2/2 may be used in conjunction with a range of Hansatech Instruments Ltd light sources and detectors including the FMS 1 and FMS 2 modulated chlorophyll fluorescence measurement systems to monitor changes in oxygen flux and fluorescence emission.

The reaction vessel in the DW2/2 is a precision bore borosilicate glass tube with a prepared S1 oxygen electrode disc forming the floor of the reaction vessel during measurements, identical to that found in DW1. It is surrounded by a water jacket constructed from black acetal which provides the ability for dark adaptation of samples or oxygen measurement in complete darkness. There are four optical ports mounted perpendicular to the reaction vessel at right angles to one another. Light sources, fibre optic light guides and detectors may be mounted on the DW2/2 via the ports enabling spectroscopic measurements to be made.



DW3



Liquid-Phase



Large Volume Chamber



Marine Applications

- > Large-volume electrode chamber designed for measurements in sea water samples
- > Square-section borosilicate glass reaction vessel (1-20ml)
- > Large front optical window for uniform illumination of sample
- > Rear optical port to suit small quantum sensors, probe light housing, fibre-optic cable or FMS fluorimeters
- > Base mounted S1 oxygen sensor forming the floor of the borosilicate glass reaction vessel
- > Water jacket for effective temperature control of the sample.

The DW3 large-volume electrode chamber is particularly suited to oxygen evolution / uptake measurements of macroalgae in seawater samples of between 1-20ml. (15-20ml if illumination is required). The square-section borosilicate glass reaction vessel and quartz front window provide good optical qualities over a large surface area when illuminating the sample using the LH36/2R red LED light housing. Samples may either be in stirred suspension or in the case of laminar material, may be vertically supported and retained by the plunger assembly such that they may be fully illuminated.

A prepared S1 oxygen electrode disc is mounted beneath the reaction vessel and forms the floor of the vessel itself providing high sensitivity and rapid response to small changes in oxygen tension within the sample. A rear optical window allows optional insertion of the fibre-optic cable from either the FMS 1 or FMS 2 pulse modulated chlorophyll fluorimeter (using DW3/FA adapter) to provide simultaneous fluorescence measurements.



LD1/2



Gas-Phase



Dark Adaption



Leaf Disc Sample

- > Electrode chamber for oxygen evolution/uptake assays from tissue samples of up to 10cm²
- > Black acetal construction with cast acrylic top window allowing uniform sample illumination
- > Removable top window replaced by interface adapter allowing simultaneous fluorescence measurements with FMS fluorimeters
- > Water jacket for effective temperature control of the sample and electrode disc
- > Base mounted S1 oxygen electrode disc forming the floor of the reaction vessel.

The LD1/2 leaf-disc electrode chamber is a simple device for measuring oxygen exchange from a 10cm² leaf-disc mounted within a sealed, gas-tight chamber.

The LD1/2 is constructed from black acetal with a cast acrylic top window allowing the sample to be evenly illuminated for photosynthesis measurements using either the LH36/2R LED light source (when connected to the Oxylab+ electrode control unit) or the LS2 high-intensity white light source.

A prepared S1 oxygen electrode disc mounts into the base of the LD1/2 with the dome of the electrode forming the floor of the sample chamber.



LD2/3



Gas-Phase



Dark Adaption



Leaf Disc Sample

- > Electrode chamber for measurement of advanced oxygen evolution/uptake assays from tissue samples of up to 10cm²
- > Black acetal construction with top window allowing uniform illumination of the sample area
- > Superior temperature control of sample and electrode disc from 2 large water jackets
- > 2 gas ports providing rapid changes in the gaseous environment above the sample
- > Optical port for connection of external light source or sensor
- > Fibre optic adapter to allow simultaneous fluorescence measurement using FMS fluorimeter.

The LD2/3 leaf-disc electrode chamber allows oxygen uptake /evolution measurements to be performed from leaf-discs, excised needles, algae, mosses, lichens etc with a surface area of up to 10cm². A prepared S1 oxygen electrode disc is mounted directly below the sample chamber with the dome of the electrode forming the chamber floor. LD2/3 features an upper and lower water jacket ensuring superior temperature control of the sample and S1 electrode disc when linked to a temperature controlled circulating water bath. The leaf chamber section has 2 gas ports providing both a calibration and flow-through capability for rapid changes in the gaseous environment above the sample. An additional tapped and stoppered hole is provided for the introduction of an optional temperature sensor or similar auxiliary sensor.

A clear cast acrylic top window allows illumination of the sample via the LH36/2R LED light source with 1 additional optical port provided for either additional illumination or insertion of a quantum sensor, etc. A further port is orientated more vertically towards the sample and allows the fibre-optic cable from the FMS 1 and FMS 2 modulated fluorimeters to be positioned close to the sample allowing simultaneous measurement of chlorophyll fluorescence.

Oxygen Electrode Chambers

Hansatech Instruments oxygen electrode chambers permit a wide and varied range of applications in both liquid and gas-phases. All chambers are fully compatible with the electrode control units product range.

The electrode chambers are constructed from high quality, durable materials providing years of precision oxygen measurements with reliable performance. Chambers may be combined with other components from our product range such as electrode control units, light sources and chlorophyll fluorimeters.

The range of typical applications include simple measurements of photosynthesis in isolated chloroplast suspensions or the study of state respiration changes in mitochondrial suspensions through to more complex experiments involving simultaneous fluorescence/oxygen measurements of excised leaf-discs using an electrode system in conjunction with either FMS 1 or FMS 2 modulated fluorimeters.

As with all our equipment, modifications may be possible to electrode chamber design should your application require a novel approach. Our development team is always on hand to discuss any ideas you may have for modification of an existing design or in some cases, collaborative development of new designs.



Additional Technical Specifications

DW1

Dimensions: 65mm (d) x 105mm (h)
Weight: 100g
Plunger: Variable plunger assembly with central bore for sample additions

DW1/AD

Dimensions: 65mm (d) x 105mm (h)
Weight: 100g
Plunger: Gas-tight variable plunger assembly with central bore for sample additions

DW2/2

Dimensions: 65mm (d) x 105mm (h)
Weight: 100g
Plunger: Variable plunger assembly with central bore for sample additions
Optical Ports: 4 optical port (16mm dia)

DW3

Dimensions: 75mm (d) x 105mm (h)
Weight: 400g
Plunger: Variable plunger assembly with central bore for sample additions
Optical Ports: 4 optical port (16mm dia)

LD1/2

Dimensions: 65mm (d) x 105mm (h)
Weight: 100g
Optical Ports: Optical port (26mm dia), quartz window (36mm dia)

LD2/3

Dimensions: 100mm (d) x 130mm (h)
Weight: 650g
Optical Ports: Cast acrylic top window, optical port (16mm dia), fluorimetry port (FMS1 and 2)



Hansatech Instruments is a British company that has been developing high quality scientific instrumentation for over 40 years. Our systems are used widely for teaching and research in cellular respiration and photosynthesis programs in more than 100 countries throughout the world. We have gained an enviable reputation for quality, reliability and excellent price/performance.



Our product range consists of a range of modular solutions for the measurement of oxygen using Clark type polarographic sensors. We also develop chlorophyll fluorescence measurement systems using both continuous excitation and pulse-modulated measurement techniques with further optical instrumentation for the measurement of sample chlorophyll content.



Purchasers of Hansatech Instruments products can be assured of ongoing support and prompt and efficient attention to enquiries at all times. Support is available both directly and from our global distributor network. Customers are encouraged to register their instruments on our website which allows access to our Support Ticketing System in addition to instruments manuals and software upgrades.

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