Catalog

Electrochemistry accessories.

BioLogic.

Your one-stop-shop for accessories and add-ons.

As one of the world's first designers and manufacturers of high-performance electrochemical measurement instruments, BioLogic has forged its place in the international market.

Our comprehensive product portfolio covers cutting-edge scientific products in such diverse applications as electrochemistry, battery testing and fuel cell/material testing.

And supporting these high-precision measurement tools is an extensive line of product accessories, ranging from sophisticated quartz crystal microbalances to electrodes.

So whatever your field of research, we can provide you with high-quality, hard-wearing equipment.

BioLogic accessories: a one-stop-shop to suit your every need.

BioLogic Add-on Instruments.

Accessories.

BluRev Rotating disk/rotating ring disk electrodes

Steady state efficiency

Exploit the power of EC-Lab with BluRev rotating disk solutions

BluRev is a range of robust, versatile, rotating disk (RDE) and rotating ring-disk (RRDE) electrodes ideal for use with BioLogic potentiostats. A range of quick-fit exchangeable electrode tips (multiple materials/diameters) can be easily added to the body.

Driven by EC-Lab software, an industry standard for potentiostat control software, BluRev instruments can be used independently or as part of an integrated setup, where the end-user controls each element of his experiment remotely with total ease.

BluRev and Enclosure: A fully integrated solution

The BluRev's custom designed enclosure has been specifically designed to facilitate the operation and set-up of the BluRev RRDE. This makes it easy to hold the RRDE body as well as the BioLogic potentiostat cables. The result is a fully integrated, purpose-built rotating electrode system.

Which one do I need? An RDE or RRDE?

What are the advantages of the extra "R" ? Click here

Rotating Electrodes.

BluRev Systems

These modular research instruments demonstrate excellent levels of accuracy, particularly at high rotation rates, and are the only devices on the market to display both target and actual rates of rotation – data that can greatly assist users during experiments by enabling them to monitor rotation rates in real-time.

The RC-10k control unit offers an accuracy of -1 rpm over the whole rotational range for precise and fully Reproducible experimental conditions.

The speed can be set manually or remotely by using the analog output of a BioLogic instrument. Any other device with an analog output can also be used.

With EC-Lab, you can easily program, perform and analyse ring-disk, Levich and Koutecky-Levich experiments and also uwse the new EIS element Winf that will directly give you the diffusion coefficient.

See Application note #66 to "EIS measurements on a Rotating Disk Electrode (RDE) Part I: Determination of a diffusion coefficient using the new element Winf"

094-RDE without tip

Specifications

Rotational range/rpm	100 - 10,000 (9000 for RRDE)
Accuracy/rpm	1 typical over the whole rotational range
Precision/rpm	3 typical over the whole rotational range
Runout/mm	<0.1
Setting resolution/rpm	10 (Manual control) or 25 (Remote control)
Materials of RRDE/RDE	PEEK, Al alloy
Inert gas inlet for shaft corrosion protection/mm	Ø 2
Operating temperature/°C	10 - 40
Power	24 Vdc, 1 A max
Max consumption/W	24
Dimensions/mm	RC-10k: 95x227x178 (HxWxD), RDE/RRDE: 233.6 (length with tip)
Weight/kg	RC-10k: 1.00 RDE/RRDE: 0.36 (without tip)

BluRev RRDE and RDE	Catalog n°	094-RC/RDE	094-RC/RRDE
Content			
RC-10k Rotation controller	**094-RC**	1	1
Rotating disk electrode (motor, shaft, electrode body with 1 pairs of Ag/C brushes)	**094-RDE**	1	-
Rotating ring-disk electrode (motor, shaft, electrode body with 2 pairs of Ag/C brushes)	**094-RRDE**	-	1
DB9 to BNC connector for external control of RC-10k	**092-22/1**	1	1
1 m BNC/BNC cable	**COR28100**	1	1
Replacement Ag/C brush	**094-RDE-BRUSH**	2	4
1 transport case	**-**	1	1

BluRev Tips

All standard tip bodies (M6 thread) are made of PEEK, but for experiments requiring a high chemical resistance, PTFE versions are also available.

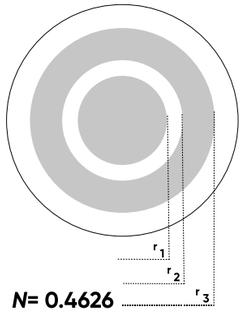
All tips are polished to obtain a final roughness Ra of 50 µm (*Ra = 10 nm for the Boron Doped Diamond tip).

RDE Tips

Disk electrodes for RDE	Catalog n°
Glassy Carbon (3 mm)	**094-GC/3**
Glassy Carbon (5 mm)	**094-GC/5**
Glassy Carbon, PTFE body (3 mm)	**094-PTFE-GC/3**
Glassy Carbon, PTFE body (5 mm)	**094-PTFE-GC/5**
Silver (3mm), 99.9 %	**094-Ag/3**
Aluminum (3 mm), 99.9 %	**094-Al/3**
Copper (3 mm), 99.9 %	**094-Cu/3**
Nickel (3 mm), 99.9 %	**094-Ni/3**
Stainless steel (3 mm), 99.9 %	**094-316L/3**
Platinum (2 mm), 99.9 %	**094-Pt/2**
Gold (2 mm), 99.9 %	**094-Au/2**
Boron Doped Diamond (3 mm) 500 µm diamond layer Boron doping level between 500 and 1000 ppm	**094-BDD/3**

RRDE Tips

Ring-Disk electrodes for RRDE	Catalog n°
Glassy Carbon Ring & Disk (Nmax = 0.4626)	**094-GC-GC**
Pt Ring (99.9 %) - Glassy Carbon Disk (Nmax = 0.4626)	**094-Pt-GC**



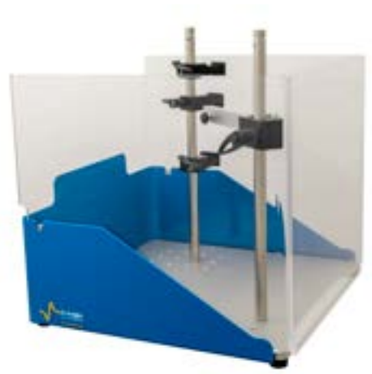
Dimensions/mm: r1=1.5 ; r2 = 2 ; r3 = 3.
N = maximum theoretical collection factor using Albery formula [1].
[1] W. J. Albery and S. Bruckenstein, Trans. Faraday Soc. 62 (1966) 1920.

BluRev Cells

The BluRev RDE/RRDE range is compatible with a wide range of cells – in particular the EL-ELECTRO-80, EL-ELECTRO-80DJ or EL-ELECTRO-150DJ kits.
Please note: if you already possess one of these cells, you will need a special adaptor cap: **094-A-CAP**.

Cells	Catalog n°
PTFE 5 holes cap compatible with BluRev RDE (needed if you already have an EL-ELECTRO cell)	**094-A-CAP**

BluRev enclosure



BluRev Enclosure	Catalog n°
Protective housing and stand kit for the BluRev	**094-ENCL**

Contents

1 stainless steel plate with M6 threaded holes to fix support poles
2 support poles to hold BluRev RDE and the cell
(N.B: The clamp and the clamping nut are not included)
1 clamping flange for the BluRev
3 half-clamps for the potentiostat cables(all BioLogic cables are supported)
1 plexiglas protective housing

Specifications	
Dimensions with protective housing (HxWxD)/mm	287x318x308
Weight (with protective housing)/kg	5.3

BluRev: Background information and theory.

RDE

W_{inf}:direct access to the diffusion coefficient.

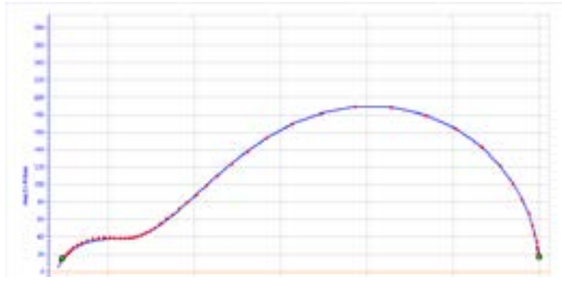
Levich and Koutecký-Levich methods[1] are powerful analysis tools used to obtain kinetic electrochemical parameters such as the diffusion coefficient of a redox species in a given medium and the reaction constant. These analyses require potentiodynamic curves at various rotation speeds.

However, fitting impedance measurements made on a redox reaction occurring at a rotating electrode, at only one rotation speed, also enables the direct measurement of the diffusion coefficient.

A PEIS measurement was performed on a 2 mm Pt electrode, using an equimolar solution of $K_3Fe(CN)_6$ and $K_4Fe(CN)_6$ with concentrations of 5 mM in 0.1 M KCl, a BluRev RDE rotating at 2000 rpm.

The considered electrochemical reaction is the following:
$[Fe(CN)_6]^{3-} + e^- \leftrightarrow [Fe(CN)_6]^{4-}$

The obtained impedance graph is shown above to the right.



Using ZFit and the equivalent circuit shown below that contains W_{inf} as a diffusion impedance, we directly obtain the diffusion coefficient of the species of interest, in our case 7.8 x 10^{-6} cm^2/s, which is in agreement with the data found in the literature[2,3]. For more detailed information please see the EC-Lab application note #66[4].

RRDE

For RRDE measurements, a bipotentiostat is needed. A bipotentiostat controls the two working electrodes i.e. one channel to control the disk electrode and the other to control the ring. An SP-300 equipped with two channels would be an appropriate instrument for RRDE applications.

Because of the presence of two working electrodes in the same setup, a specific connection mode
(to avoid any ground loop trouble) is needed.
This can be achieved in two different ways:

- *Isolating the two channels (at least one potentiostat in floating mode),*
- *Grounding the counter electrode.*

The "CE-to-ground" mode of the BioLogic instruments provides this unique capability. Of these two options, the latter is preferred because there is less leakage of current. All of the BioLogic multichannel potentiostats (except cyclers) offer such types of electrode connection. At the disk electrode, the electro-active species are oxidized or reduced according to the applied potential. This new species is detected by reduction or oxidation at the ring, respectively. In a typical experiment, a CV is performed on the disk electrode and a constant voltage is applied on the ring electrode. This is the CV-CA technique that is available in EC-Lab® in the "bipotentiostat" techniques folder.

(1) Application Note #56 "Electrochemical reaction kinetics measurement: the Levich and Koutecký-Levich analysis tools"
(2) A. J. Bard, W. Faulkner, in: Electrochemical Methods, Fundamentals and Applications, 2nd Ed., Wiley, New York (2001) 381.
(3) D. R. Lide, H. V. Kehiaian, in: CRC handbook of thermophysical and thermochemical data, CRC Press, Inc., Boca Raton, (1994)
(4) Application Note 66 "EIS measurements on a Rotating Disk Electrode (RDE) Part I: Determination of a diffusion coefficient using the new element W_{inf}"

BluQCM Quartz crystal microbalance

Small footprint.
High-sensitivity/reproducibility.

Patented Quick-Lock for easy setups and excellent reproducibility

The small footprint QCM that packs a punch

The BluQCM QSD is a single channel, compact and modular instrument. Its lows footprint and lightweight makes it particularly suitable for crowded labs. It is available as standalone, with temperature control or/and flow control.

The flexibility of the BluQCM QSD is relevant to both electrochemically driven mass weighing applications (electroplating/corrosion, electrode modifications) and the more advanced studies of solid/liquid interfaces (interface rheology, biomolecular interactions).

Quick-lock sensors facilitate set up and increase experimental reproducibility.

Simultaneous measurements can be performed of up to 7 overtones (fundamental included) enabling a complete determination of the layers' properties. Measurements in air, gas, and liquid are possible.

A fast acquisition rate increases mass sensitivity and patented quick-lock sensor cells facilitate set-ups as well as increase the reproducibility of experiments.

All that, and you can control all coupled instruments, including potentiostat/galvanostats, with the same software for eQCM experiments.

QCM: History and principles
QCM: Why measuring at overtones matters
QCM: When is the Sauerbrey equation valid?
QCM: Measurement principles

QCM: Four articles available on BioLogic Learning Center Click links to left

BluQCM: A modular approach to QCM

Acoustic sensing principle

The acoustic sensing principle is based on the precise detection of changes on the properties of an acoustic (mechanical) wave traveling through the bulk of the acoustic wave sensor.

QCM-AWS sensors consist of a thin piece of quartz confined between a pair of metal-based electrodes. An alternating current applied to the quartz crystal induces mechanical oscillations on the quartz due to the piezoelectric effect. A wave is generated and propagated through the sensor and the films attached to it. The resonance frequency of this wave depends on the oscillating mass of the sensor and its adhering layers. When a thin film is attached to the sensor, the properties of the wave change as well, modifiying the resonance frequency and amplitude. If the film is thin and rigid, the decrease in frequency is proportional to the mass of the film.

QSD-300: Quartz Crystal

General function	
Operation modes	Tracking* and high resolution** at single and multiple overtones
Sensors technologies	QCM, HFF-QCM, LOVE-SAW
Cells available	See p.3
Liquid volume above sensor/µL	3 – 45 (depending on sensor and cell type)
Temperature control	Optional (QSD-TCU)
Measurement in air	Yes
Simultaneous overtones measurements	Up to 7 (up to 13th)
Dimensions (HxWxD)/mm	90x220x260
Weight/ kg	3
Sensor	
Frequency range/MHz	4 – 160
Best frequency resolution/Hz	0.1
Best frequency accuracy/Hz	± 0.5
Max. acquisition rate***/points/s	250
Best mass sensitivity in liquid****/pg/cm²	50
Best dissipation sensitivity	10^{-7}
Catalog n°	
BluQCM QSD-300	**AW-QSD-300**

FCU: Flow Control Unit

General function	
Syringe volume/µL	250 (default)*
Flow rate range for a 250 µL syringe/µL/min**	12.5-14500 (Standard) 0.625 - 1062.5 (Smooth)
Dimensions (H x W x D)/mm	195x70x250
Weight/kg	0.75
Catalog n°	
Standard flow control unit	**AW-QSD-FCU**
Smooth flow control unit	**AW-QSD-FCUS**

*Other syringe volumes are available upon request, from 12.5 µL to 5000 µL
** Flow rates depend on the syringe volume. For the standard flow unit, the flow rate change is 0.6250 - 290000 µL/min. For the smooth flow unit, it is 0.0313-21250 µL/min. For more information, please contact your local reseller.

TCU: Temperature Control Unit

General function	
Temperature control range/°C	15 - 45
Temperature stability/°C	±0.05
Dimensions (H x W x D)/mm	60x220x260
Weight/kg	4.5
Catalog n°	
BluQCM QSD-TCU	**AW-QSD-TCU**

BluQCM Cells

eQCM

In-batch eQCM	Flow eQCM	Hermetic Li research in batch
		
AW-BEQ01Q (*AW-BEQATQ for the Air-tight type) *AW-BEQ02Q for 1 inch sensor	**AW-FEQ01Q**	**AW-BEQLIQ**

Reference and counter electrodes have to be purchased separately (except for eQCM flow cells where the Pt plate counter electrode is integrated in the lid of the cell).

	Reference electrode		Counter electrode
	Aqueous	Non-aqueous	
In-batch eQCM cells	RE-1B A-012167	RE-7 A-012171	Pt wire 23 cm coiled A-002234
Flow eQCM cells	RE-1S A-012168	RE-7S A-012172	Pt disk integrated in the cell lid

QCM

In-batch	Flow	In-batch probe
		
AW-BQ01Q (14mm sensor) AW-BQ02Q (1"sensor) AW-BQ01HQ (HFF sensor)	**AW-FQ01Q (14mm sensor) AW-FQ01HQ (HFF sensor)**	**AW-PEQ11Q (14 mm sensor)**

Sensors

Sensor type	Substrate	Material	Resonant freq./ MHz	Finish	Quantity	Catalog N°
14 mm WRAPPED	Cr	Au	10	Polished	10	**AW-R10AU10P**
	Ti	Au	10	Polished	10	**AW-R10AU11P**
	-	Cu	5	Polished	10	**AW-R5CUP**
	-	Al	10	Polished	10	**AW-R5ALP**
	-	C	10	Polished	10	**AW-R10C10P**
	-	Pt	10	Polished	10	**AW-R10PT10P**
	Cr	Au	5	Polished	10	**AW-R5AU10P**
	Ti	Au	5	Rough	10	**AW-R5AU11**
	Ti	Au	5	Polished	10	**AW-R5AU11P**
	Cr	SiO2 over Au	5	Polished	10	**AW-R5SIO2P**

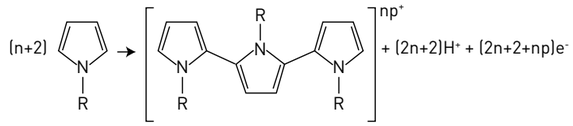
Sensor type	Substrate	Material	Resonant freq./ MHz	Finish	Quantity	Catalog N°
1 INCH	Cr	Au	5	Polished	5	**AW-R5AU20P**
	Ti	Au	5	Polished	5	**AW-R5AU21P**
	-	Pt	5	Polished	5	**AW-R5PT20P**
	Cr	Au	9	Rough	5	**AW-R9AU20**
	Cr	Au	9	Polished	5	**AW-R9AU20P**
	Ti	Au	9	Rough	5	**AW-R9AU21**
	Ti	Au	9	Polished	5	**AW-R9AU21P**
HFF-QCM	Cr	Au	50	-	5	**AW-R50AU01H**
	Cr	Au	100	-	5	**AW-R100AU01H**
	Cr	Au	150	-	5	**AW-R150AU01H**

BluQCM: Background information and theory.

Measurement examples

Electropolymerization of pyrrol

The polypyrrol film was deposited on an Au-coated quartz using cyclic voltammetry (twenty cycles).



The quartz electrode was immersed in an acetonitrile solution (Bu_4NPF_6 0.2 mol/L) containing a solution of 1 methylpyrrol monomer (0.01 mol/L).

(1): G. Sauerbrey, Phys. Verh., 1957, 8, 113-114.
(2): G. Sauerbrey, Z. Phys., 1959, 155, 206-222.
(3): Application note #13. Section "Apps & literature of EC-Lab division".

Polypyrrol film growth on the quartz working electrode

Fig. 1 represents polypyrrol film growth on the quartz electrode during successive cycles of cyclic voltammetry. The reversibility of the charge transfer in such a polymer film is often dependent on the deposition mode (quasi-reversible in this example). This growth is very regular but tends to slow down during the last cycles. This can be due to an interfacial depletion of the solution in methyl pyrrol species in the layer close to the electrode surface and to a saturation of the working electrode surface area.

QCM measurements during the film growth

Fig. 1 shows the resonant frequency decrease and the resonant resistance increase while the polymer film is growing. Moreover, the variation is dependent on the potential sweep resulting in a pseudo oscillation of frequency and resistance related to successive cycles. This plot can also be made versus potential (see fig. 1).

Fig. 1: overlaid frequency and current vs. E_{We} of the polymer film growth. Scanning at 100mV/s between 0 and 1.018V.
Fig. 2: graphic zoom on one cycle showing the renant frequency and the current density versus elapsed time[3].

Fig. 1

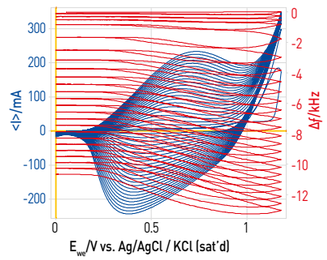
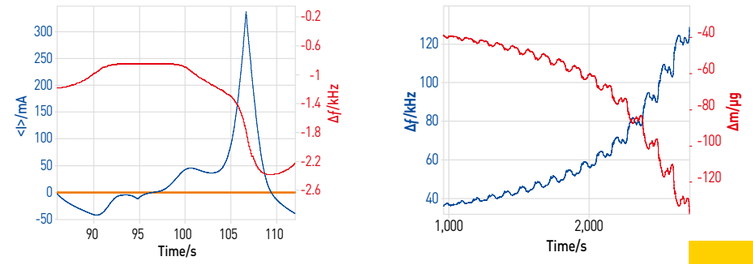


Fig. 2



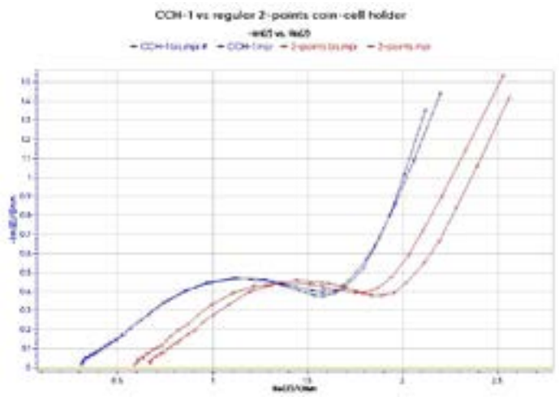
Battery Accessories.

Four point cell holders

Four points are better than two

More reliable measurements, higher repeatability levels.

By measuring only the impedance of the cell, a 4-point connection battery holder enables reliable and repeatable measurements. Its design negates measurements of connector and holder-related impedances.
All of our battery holders, with the exception of the CCH model, are built around the 4-point connection design.



Coin Cell Holders

CCH-1

CCH

	CCH-1	CCH-8	CCH
Cell max diameter/mm		24	
Cell height/mm		1.6 - 3.2	
Number of channels	1	8	4
Measurement type 4/2 point		4 point	2 point
To be used with	Any instruments	VSP VMP3 VSP-300 VMP-300 MPG2 BCS-805 BCS-810	MPG-2 VMP3
Climatic chamber compatibility	Yes (-30 to 80°C)	Yes (-30 to 80°C)	No
Catalog n°	**096-126**	**096-128/H** **Cables must be purchased separately**	**092-22/14**

CCH-8 CABLES

CCH-8

Compatible with	Length	Catalog number
BCS-805 BCS-810	2.5 m long	**096-128/C25**
	5 m long	**096-128/C50**
VSP / VSP-3e VMP-3e VSP-300 VMP-300 MPG2	75 cm long	**092-22/24a**
	2,5 m long	**092-22/24b**

Four points are better than two

Visit our Learning Center article "**Why four point measurements**"? to find out why

Or click **here** for the CCH-1 cell holder video.

Cylindrical Cell Holders

BH-1i

2 and 4 mm receptacles are available for the current (power) cables. For voltage (sense) cables, only 2 mm receptacles are available.

CBH-8

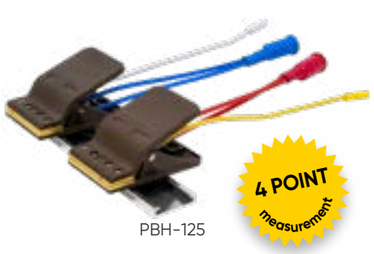
4 mm receptacles are available for the current (power) and voltage (sense) cables.

CBH-4

	BH-1i	CBH-4	CBH-8
Cell max diameter/mm	26	60	
Cell min height/mm	0	30	
Cell max height/mm	76	100	
Number of channels	4	4	8
Max current/A	15	32	
Measurement type	4 point	4 point	
Receptacles diameter/mm	2 and 4	4	
To be used with		All instruments	
Max operating T°/°C	60	80	
Size : HxWxD/mm	205x150x95	335x260x150	335x520x150
Weight/kg	0.6	1.9	3.8
Catalog n°	**092-22/15**	**092-C32/4**	**092-C32/8**

More reliable measurements, higher repeatability levels.

Pouch Cell Holders



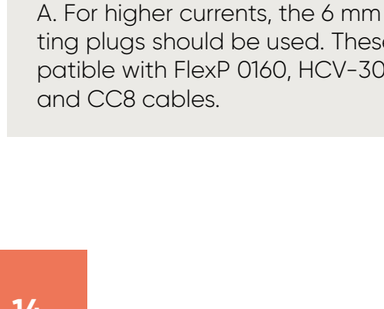
PBH-125

	PBH-125	PBH-150	PBH-4	PBH-8
Min leads separation distance/mm	0		12	
Max leads separation distance/mm	110*		44	
Number of channels	1		4	8
Max current/A	25	50	32	
Measurement type	4 point			
Receptacles diameter/mm	4 (power) 2 (voltage)	6 (power)** 4 (voltage)	4	
To be used with	All instruments			
Max operating T°/°C	80	100	80	
Size : HxWxD/mm	40x50x210***		135x325x180	135x650x180
Weight/kg	0.2***		1.9	3.8
Catalog n°	**092-P25/1**	**092-P50/1**	**092-P32/4**	**092-P32/8**

*Measured using the guide rail and the middle of the clamp.

Eyelet ring (The connection kit **094-110/CNT can be used for an easier connection to 6 mm diameter cables).

***Measured with the two clamps mounted on the guide rail.



PBH-4

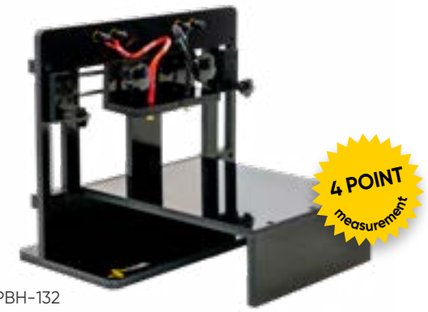
PBH-4 & PBH-8 holders: 4 mm receptacles are available for the current (power) and voltage (sense) cables.

Prismatic and Pouch Cell Holders

PPBH-1100

	PPBH-132	PPBH-1100
Cell min height/mm	0	
Cell max height/mm	139	
Min leads separation distance/mm	66	
Max leads separation distance/mm	155	
Number of channel	1	
Max current/A	32	100
Measurement type	4 point	
Receptacles diameter/mm	4 (power and sense)	4 (power and sense) and 6 (power)
To be used with	All instruments	
Max operating T°/°C	80	
Size : HxWxD/mm	265x320x300	320x320x360
Weight/kg	3	5.1
Catalog n°	**092-PC32/1**	**092-PC100/1**

Pouch cell and prismatic holder: 4 mm receptacles can be used for currents up to 32 A. For higher currents, the 6 mm flush mounting plugs should be used. These are compatible with FlexP 0160, HCV-3048, CC4-60A and CC8 cables.



PPBH-132

Pouch cell and prismatic holder: 4 mm receptacles are available for the current (power) and voltage (sense) cables.

Battery Accessories.

Current Collectors

BioLogic's current collectors offer the possibility to connect in parallel several channels and increase the maximum current that can be passed through the cell, in order to simplify and reduce the footprint of your setup.

CC8

CC4-60A

CC4-200A

	CC4-60A	CC8	CC4-200A
Connection details			
Input			
Power cables/receptacles diameter/mm	4		6 (IP2x)
Voltage sense receptacles diameter/mm	2		4
Number of input channels	4	8	4
Max current/channel/A	15		50
Output			
Power receptacles diameter/mm	6 (IP2x)		8 (Amphenol, IP2x)
Voltage sense receptacles diameter/mm	2 (IP2x)		4 (IP2x)
Max output current/A	60	120	200
Cables details			
Output power cables	1 pair of 2 m power cables with 6 mm receptacles		1 pair of 2.5 m power cables with 8 mm receptacles and M8 threads
Output voltage cables	1 pair of 2 m sense cables with 2 mm banana plugs		1 pair of 2.5 m sense cables with 4 mm banana plugs
Instrument compatibility	BCS-815 VSP-300 VMP-300	BCS-815*	FlexP0160 FlexP0060 HCV-3048
Included connection kit	**094-110/CNT****		**093-200/CNT****
Measurement type	4 point		
Max operating T°/°C	80		
Size (with feet) : HxWxD/mm	70x170x88	70x300x88	120x248x169
Weight/kg	3.8		
Catalog n°	**096-022**	**096-015/1**	**093-100/CC4**

*The CC8 comes with BCS tablets and cables. It is also compatible with the VSP-300 and VMP-300 and can be provided without cables and tablets using the following part number: 096-015.

Sense Adapter Module (SAM-50)

SAM-50

This can be added to a multichannel system to perform stack measurements up to 60 V for 5 channel boards and a 10-element measurement. 3 SAM-50s can be linked to follow-up 30 elements.

Sense Adapter Module	Catalog n°
SAM-50	**092-26**

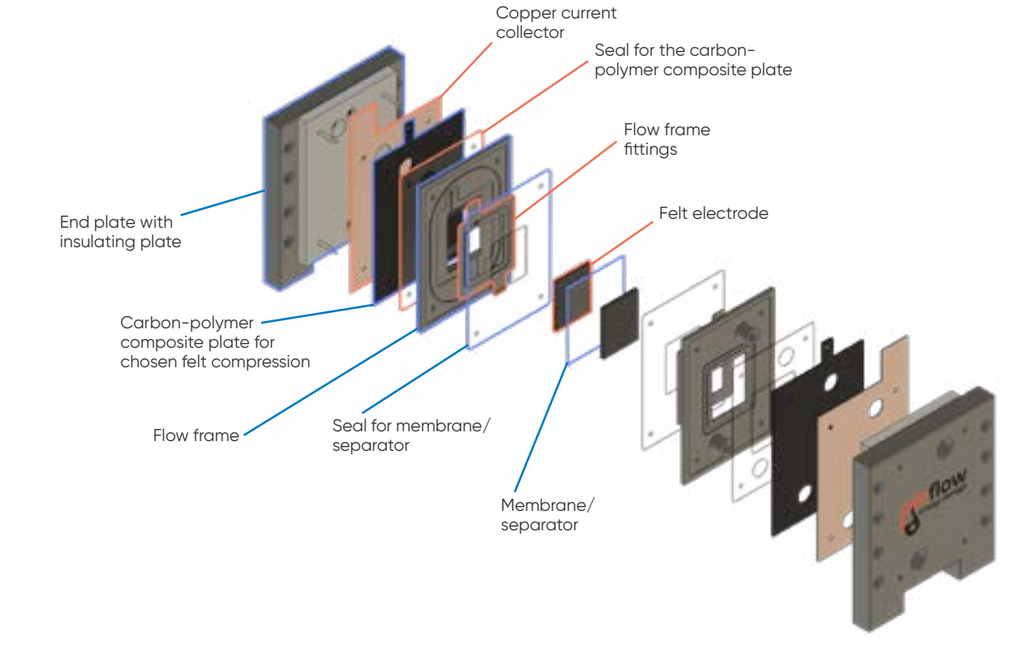
Redox Flow Battery Cells.

This range of redox flow battery cells are manufactured by **Pinflow energy storage**.

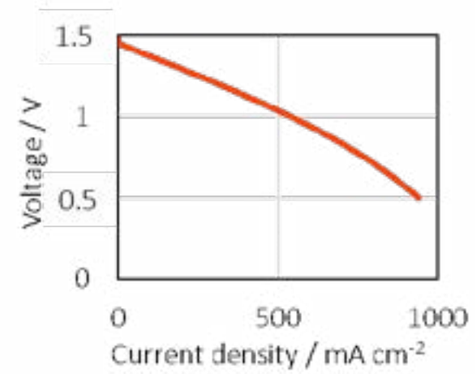
BioLogic provides two types of redox flow batteries with two different active surface areas: 5 cm^2 and 10 cm^2. This package allows you to work with both aqueous or organic electrolytes depending on your research needs or studies. For direct use, we have different testing packages available, made up of 8 felts and four membranes, that can be chosen between Fumasep F-1850, multiple Nafion types or Vanadion.

Sealings and bipolar plates can also be purchased separately as spare parts.

Complete turnkey set-ups with climatic chambers and flow control are also available. Please ask your local reseller for more information or see the table below.



Pinflow RFB cells exhibit low internal resistance as can be seen on the following curve. Typical values of internal resistance are lower than 2 Ω.cm^2.

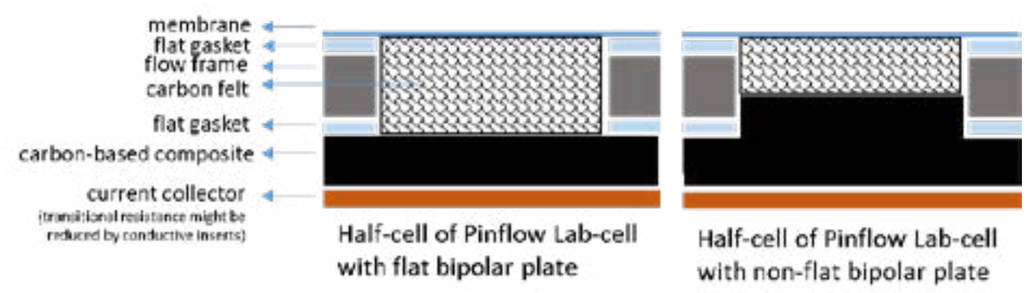


Pinflow cells were used and characterized in the following papers:

https://doi.org/10.1016/j.memsci.2018.02.011
https://doi.org/10.1016/j.jpowsour.2018.01.079

The lab cells from Pinflow are specially designed to control the pressure applied on the carbon felts that are used as electrodes. Using rigid components and non-flat bipolar plates, one can not only perform reproducible experiments, but also, it is possible to use various electrode thicknesses.

The schematic below shows that by providing non-flat carbon polymer composite plates one can control the compression and the thickness of the carbon felt electrode being used. The thickness of the electrode compartment can be easily set up using carbon-polymer composite plates with a defined stump or pit.



Description			5 cm^2	10 cm^2
Lab Cells		Standard	**P-LABCELL/5**	**P-LABCELL/20**
		For organic media	**P-LABCELL/5F**	**P-LABCELL/20F**
Consumables	Testing packages (8x felts, 4x membranes)	Fumasep F-1850	**P-TEST-PACK/5-11**	**P-TEST-PACK/20-11**
		Nafion N115	**P-TEST-PACK/5-13**	**P-TEST-PACK/20-13**
		Nafion N117	**P-TEST-PACK/5-14**	**P-TEST-PACK/20-14**
		Nafion N212	**P-TEST-PACK/5-15**	**P-TEST-PACK/20-15**
		Vanadion	**P-TEST-PACK/5-16**	**P-TEST-PACK/20-16**
	Membranes (x1)	Fumasep F-1850	**P-MEMB/5-11**	**P-MEMB/20-11**
		Nafion N115	**P-MEMB/5-13**	**P-MEMB/20-13**
		Nafion N117	**P-MEMB/5-14**	**P-MEMB/20-14**
		Nafion N212	**P-MEMB/5-15**	**P-MEMB/20-15**
		Vanadion	**P-MEMB/5-16**	**P-MEMB/20-16**
Spare parts	Pack of sealings (x10)	Standard	**P-PSEAL/5**	**P-PSEAL/20**
		For organic media	**P-PSEAL/5F**	**P-PSEAL/20F**
	Sealings	Standard	**P-SSEAL/5**	**P-SSEAL/20**
		For organic media	**P-SSEAL/5F**	**P-SSEAL/20F**
	Bipolar plates (1x set of 2)	-	**P-SBIPOL/5**	**P-SBIPOL/20**
	Tubing	-	**P-TUBINGS**	
	Fittings	-	**P-FPM**	
Accessories	Felt cutter	-	**P-CUTTER/5**	**P-CUTTER/20**
	Wrench	-	**P-WRENCH**	
	Stand	-	**P-STAND**	
	Peristaltic pump	-	**P-LABCELLPUMP/2**	
	Climate chamber	-	**P-CCHAMBER**	
	Data acquisition module	-	**P-DATAMOD**	

Application note: Need more information?

In this application note, a Vanadium Redox Flow Battery (VRFB) was characterized using typical DC and AC techniques: galvanostatic charge and discharge cycling and Electrochemical Impedance Spectroscopy (EIS). **Click here**

AN71

Analytical Cells.

Small Volume Cells

Each voltammetry cell is designed for a specific application (specific working electrode, volume of solution, oxygen-free condition, etc.).
For example, for voltammetry investigations using standard working electrodes with an outer diameter (OD) of 6 mm, the fixed configuration of SVC-3 kit is recommended.
For applications requiring other working electrode shapes, the SVC-2 is more suitable.

If only a small amount of the electroactive compound is available, SVC-2 in the microvolume mode is recommended. Here is a list of the available cells:

- SVC-2, modular
- SVC-3, for a volume of 5 to 20 mL, only for working electrode with OD of 6 mm
- VC-4, for a volume of 1 to 3 mL, only for working electrode with OD of 6 mm
- Bulk electrolysis cell, for a volume of 100 mL

SVC-2

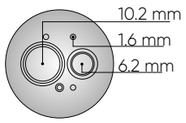
SVC-3

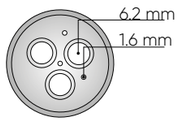
VC-4

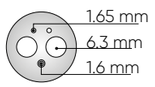
Bulk electrolysis cell

Small Volume Cells		Catalog n°		Catalog n°		Catalog n°		Catalog n°
Products	SVC-2	**A-012668**	SVC-3	**A-012669**	VC-4	**A-011224**	Bulk electrolysis cell	**A-001197**
Content								
Sample vial/mL	20 (7 pieces)	**A-001056**	20 (7 pieces)	**A-001056**	5 (7 pieces)	**A-011504**	100 (1 piece)	**A-012632**
Counter electrode (CE)/mm	57	**A-002222**	50	**A-002222**	57	**A-002222**	230	**A-002234**
PTFE cap		**A-012670**		**A-012671**		**A-011226**		**A-0 12551**
Purge tube (ETFE), 100 mm		**-**		**-**		**-**		**-**
Additional items	Adapter 10 to 6 mm	**-**			Cell holder	**A-011227**	Porous carbon electrode	**A-010530**
							Lid for CE	**A-001198**
							Chamber for CE	**A-001196**
							O-ring	**A-001236**
							Port plug	**A-009131**
							Stirrer bar	**A-000178**
Options								
Sample holder/mm	9.0 (2 pieces)	**A-012177**	6.0 (2 pieces)	**A-012176**				
Cell holder	for 20 mL	**A-001209**	for 20 mL	**A-001209**				
Purge tube (ETFE)/m	1	**A-010537**	1	**A-010537**	1	**A-010537**	1	**A-010537**
Working electrodes	See page 17		See page 17		See page 17			
Reference electrodes	See page 18		See page 18		See page 18		See page 18	

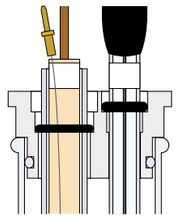
PTFE cap





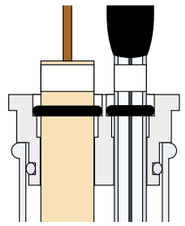


SVC-2 modularity:
microvolume mode

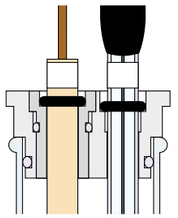


Small amount of solution
(200 µL in the sample holder)

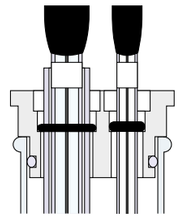
oxygen free mode



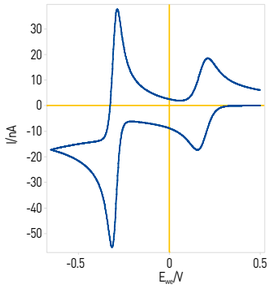
For electrode
with OD of 10 mm



For electrode
with OD of 6 mm



For microelectrode
with OD of 4 mm



Please note that a full, purpose-built, analytical kit is also available SK-2 (A-012763) but the reference electrode must be purchased separately.
This kit includes:

- SVC-3 kit (A-012669)
- PK-3 polishing kit (A-011975) see page 16
- one glassy carbon electrode, OD 6.0 mm, ID 3.0 mm (A-002012) see page 17
- one platinum electrode, OD 6.0 mm, ID 1.6 mm (A-002013) see page 17

Cell geometry

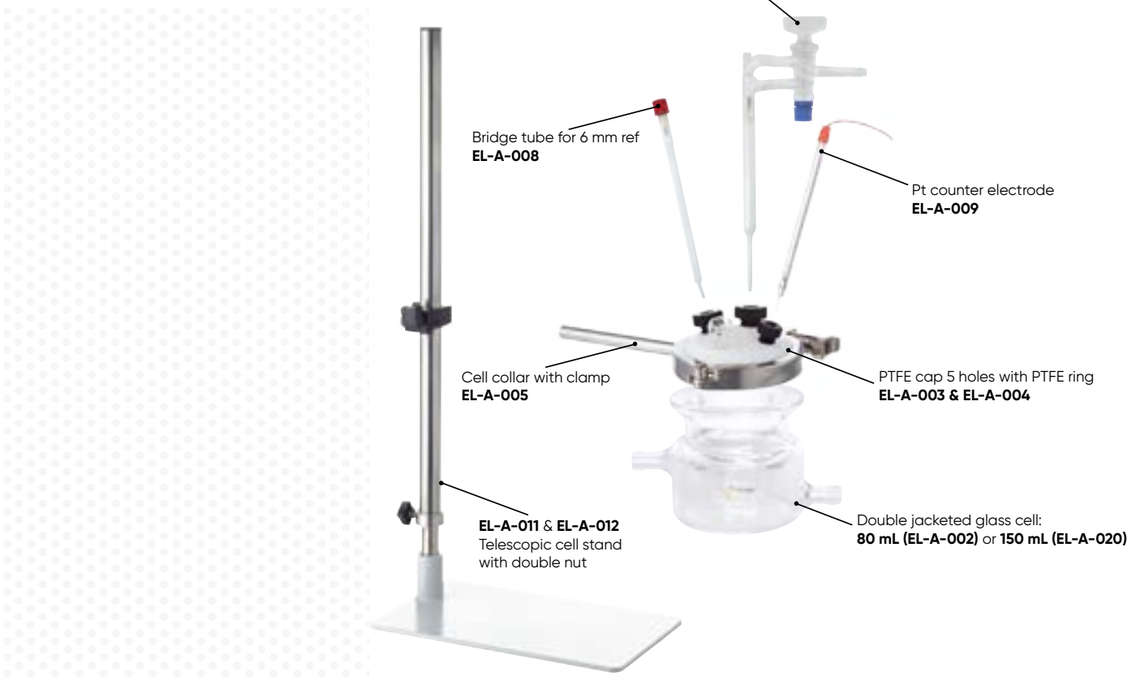
The geometry of the cell should be optimized to reduce the ohmic drop.
Working and reference electrodes must be positioned close to one another.
The counter electrode should not limit the transfer of electrons, so its contact surface should be larger than the contact surface of the working electrode.

Analytical Cells.

Large Volume Cells

This cell is perfect for standard analytical electrochemistry experiments with electrolyte volumes of several tens of mL.

It is also compatible with the BluRev product range, ie electrode rotators.



Analytical Cell kits	EL-ELECTRO-80	EL-ELECTRO-80DJ	EL-ELECTRO-150DJ
Glass cell	EL-A-001 (80 mL)	EL-A-002 (80 mL) (double jacketed)	EL-A-020 (150 mL) (double jacketed)
PTFE cap 5 holes		EL-A-003	
PTFE ring, silicon encapsulated, OD 102 mm		EL-A-004	
Cell collar with camp		EL-A-005	
PTFE ring, silicon encapsulated, OD 102 mm		EL-A-008	
Bridge tube for reference electrode, OD 6 mm		EL-A-009	
Purge tube	Ø		EL-A-016
Double purge tube	Ø		EL-A-006
Double nut 25 mm and 12 mm diameter	Ø		EL-A-011
Telescopic cell stand	Ø		EL-A-012
Options			
Electrode bridge extension for electroanalytical cell		EL-A-022	
Bridge tube for reference electrode of OD 8 mm		EL-A-017	
PT100 probe		EL-C-014	
220 V - Magnetic stirrer & header, without PT100		EL-C-015A	
110 V - Magnetic stirrer & header, without PT100		EL-C-015B	
Aluminum base holder for magnetic stirrer		EL-C-018	
Set of 10 porous 4 mm glass frits (CoralPor) with PTFE heat shrink (200 mm)		092-VYC4	

Multi Purpose Cells.

FlexCell®

These cells manufactured by Gaskatel are ideal for corrosion experiments in aggressive media, as well as studies on Gas Diffusion Electrodes (GDE) and membranes. Their unique design and a specific choice of materials allow repeatability and keep away from common pitfalls in other cells: heterogeneous electric field, variable ohmic drop, crevice corrosion, degradation of the cell. Used in combination with the robust HydroFlex® or MiniHydroFlex® hydrogen reference electrode, this is the perfect cell for corrosion, membrane and GDE studies. Two versions are available: PTFE and PP.

FlexCell® PTFE

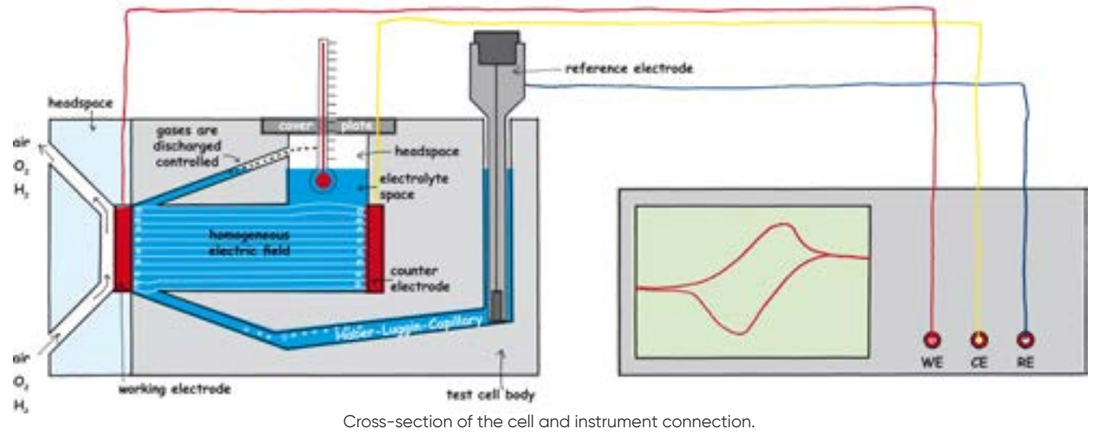
FlexCell® PP

Description	Catalog n°
FlexCell® PP – Electrochemical Test Cell made of PP	**G-FLEXCELL/PP**
FlexCell® Analyte Compartment in PP for membrane studies	**G-COMP/PP**
FlexCell® PTFE – Electrochemical Test Cell made of PTFE	**G-FLEXCELL/PTFE**
FlexCell® Analyte Compartment in PTFE for membrane studies	**G-COMP/PTFE**
Options to be ordered separately (see p. ???)	
HydroFlex® Hydrogen Reference Electrode	**G-HYDROFLEX**
HydroFlex® Hydrogen Reference Electrode Starter Kit	**G-HYDROFLEX-KIT**
MiniHydroFlex® Hydrogen Reference Electrode	**G-MINIHYDROFLEX**

PTFE analyte compartment

PP analyte compartment

Operating conditions	
Max. exposure time/h	24
Temperature/°C	-20 to 120°C
pH range	-2 to 16
Max. current/A	3



Cross-section of the cell and instrument connection.

Designation	Max. sample size /cm	Max. sample thickness /mm*	Active area /cm²	Electrolyte volume /ml	Dimensions (w/o screws adapters) (H x W x D)/mm
FlexCell®	3 x 5	10	3	30	75 x 100 x 132
Analyte Compartment	3 x 5	10	3	12	75 x 100 x 30

*Longer wing screws can be supplied

Materials	
Main	PP or PTFE
Gasket	Silicon
O rings	EPDM
Cover plate	PSU
Gas compartments	PMMA or PSU
Counter electrode	Pt-Ir

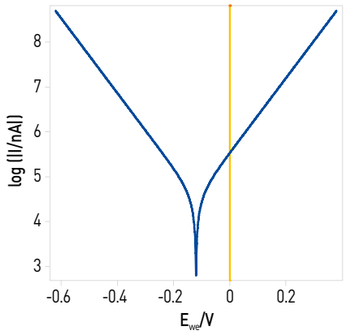
PP	PolyPropylene
PTFE	PolyTetraFluorEthylene
PSU	PolySUlfone
PMMA	PolyMethylMethAcrylate
EPDM	EthylenePropyleneDiene Monomer
Pt	Platinum
Ir	Iridium

Corrosion Cells.

Standard Corrosion Cells

The standard corrosion cell is available with a single or double jacket glass cell for temperature control. It is provided with two graphite rods to be used as counter electrodes, a bridge tube, to ensure the minimum distance between the reference and the working electrode, and purge tubes, to maintain a controlled gaseous environment.

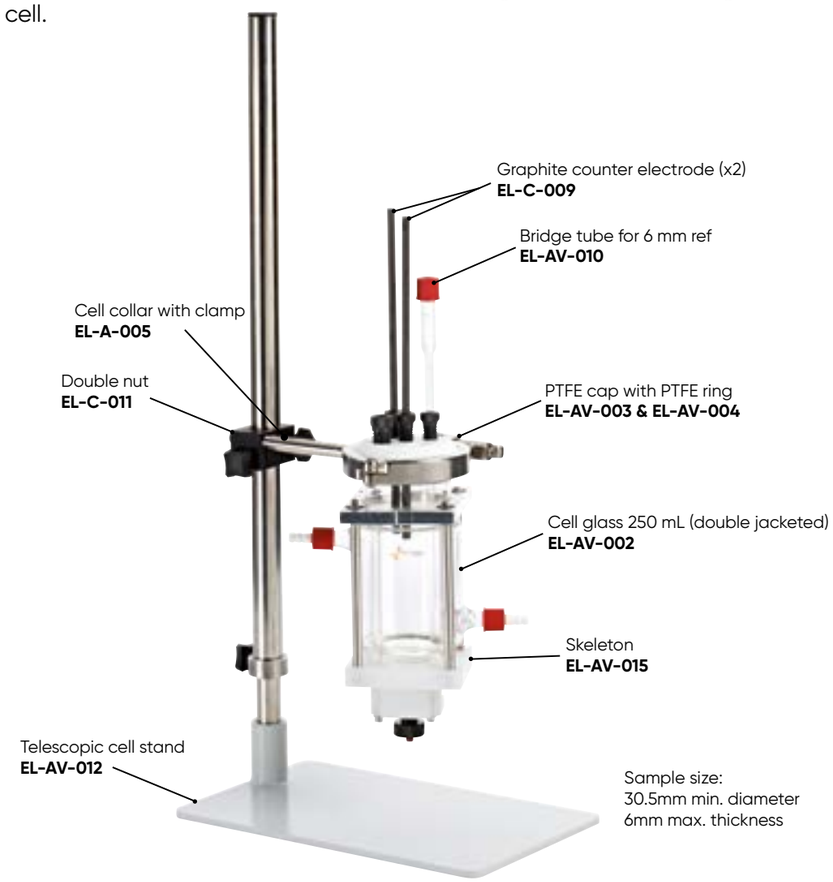
Two kits are available: a standard one and an advanced kit with telescopic cell stand, sample holder and double purge tubes.



Corrosion Cell kits		Basic corrosion cell kit EL-CORR-1	Complete corrosion cell kit EL-CORR-1DJ
Glass cell 1 L		EL-C-001	EL-C-002 (double jacketed)
PTFE cap		EL-C-003	
PTFE ring, silicon encapsulated, OD 102 mm		EL-C-004	
Cell collar with clamp		EL-C-005	
Graphite counter electrode rod (2 pieces) ρ = 1.070 µΩ cm		EL-C-009	
Bridge tube for 6 mm diameter reference electrode		EL-C-008	
Purge tube		EL-C-016	Ø
Double purge tube		Ø	EL-C-006
Double nut 25 mm and 12 mm diameter		Ø	EL-C-011
Telescopic cell stand		Ø	EL-C-012
Sample holder 1 cm² (max sample thickness 3.4 mm and max diameter 14.6 mm)		Ø	092-C-016
Options			
Bridge tube for 8 mm diameter reference electrode		EL-C-017	
PT100 probe (indicate connector type)		EL-C-014	
Magnetic stirrer & heater, without PT100 probe	220 V	EL-C-015A	
	110 V	EL-C-015B	
Aluminum base holder for magnetic stirrer and 1 L cell vial		EL-C-018	
Set of 10 porous frits (4 mm CoralPor™) with PTFE heat shrink (200 mm)			

Avesta Cell

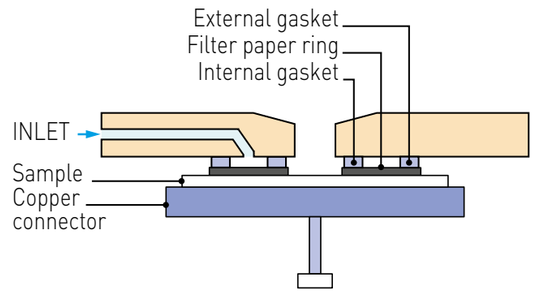
The Avesta Cell is an electrochemical cell developed for pitting corrosion testing (ASTM G150).
It is designed to avoid microcrevice corrosion formed between the working electrode and the gasket at the bottom aperture of the cell.



Avesta Cell	Catalog n°
Avesta cell kit	**EL-AVESTA**
Content	
Double jacketed cell glass 250 mL	**EL-AV-002**
PTFE cap 5 holes	**EL-AV-003**
O-ring PTFE silcone encapsulated	**EL-AV-004**
Cell collar with clamp	**EL-A-005**
Double purge tube	**EL-AV-006**
Filter paper ring (100 pieces)	**EL-AV-007**
Graphite counter electrode rods (2 pieces) ρ = 1.070 µΩ cm	**EL-C-009**
Bridge tube for RE 6 mm	**EL-AV-010**
Double nut	**EL-C-011**
Telescopic cell stand	**EL-AV-012**
Skeleton	**EL-AV-015**
Options	
Peristaltic pump for low flow	**EL-AV-008**
Bridge tube for reference electrode with OD of 8 mm	**EL-AV-013**
Single purge tube	**EL-AV-014**
Temperature probe PT100	**EL-C-014**
Set of 10 porous frits (4 mm CoralPor™) with PTFE heat shrink (200 mm)	**092-VYC4**

A filter paper ring placed between the sample and the gasket is flooded by distilled water in order to eliminate crevice corrosion.

The water flow is controlled by a peristaltic pump (EL-AV-008).

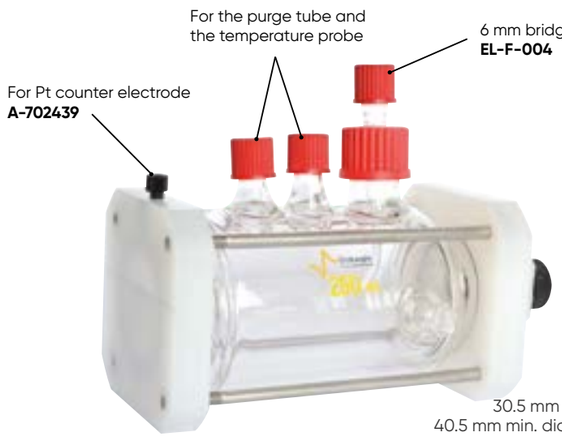


Corrosion Cells.

Flat Cells, 1 to 10 cm² sample area

This cell with a volume of 250 mL is perfect for experiments on flat specimens of 1 or 10 cm² surface area.

This cell has a double jacket for temperature control and three holes for reference electrodes, purge tubes and temperature probes with an inner diameter of 17.6 mm and the two others of 8.3 mm.



Sample size:
30.5 mm min. diameter (EL-FLAT-1CM)
40.5 mm min. diameter (EL-FLAT-10CM)6 mm max. thickness

Flat cell kit	Glass kits		PVDF kits	
	1 cm² EL-FLAT-1CM	10 cm² EL-FLAT-10CM	1 cm² EL-FLAT-1CM-PVDF	10 cm² EL-FLAT-10CM-PVDF
Platinum mesh counter electrode (54 mm wire/ 80 mesh), 25 x 35 mm	A-702439			
Reference electrode bridge tube (6 mm diameter)	EL-F-004		Ø	
Glass part for flat cell (250 mL)	EL-F-002		EL-F-PVDF	
Mechanical parts	EL-FLAT-3H	EL-FLAT-4H	EL-FLAT-3H	EL-FLAT-4H

Investigations in agressive media

If the experiment is performed in more agressive media such as fluorhydric acid, it is possible to obtain the body of the flat cell in PVDF* instead of glass (Polyvinylidenefluoride) .

	Fluorhydric acid 48%		Sulfuric acid 98%		Phosphoric acid 85%		Hydrochloric acid 35%		Nitric acid 70%		Perchloric acid		Sodium hydroxide 50%		Potassium hydroxide concentr.	
Temperature	20° C	50° C	20° C	50° C	20° C	50° C	20° C	50° C	20° C	50° C	20° C	50° C	20° C	50° C	20° C	50° C
PTFE	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
PVDF*	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Borosilicated glass	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Options	Catalog n°
PVDF body (single-jacketed)	**EL-F-PVDF**
EPDM O-rings for 1 cm² with PEEK ferrule for CE*	**EL-SEAL-1B**
EPDM O-rings for 10 cm² with PEEK ferrule for CE*	**EL-SEAL-10B**
PTFE O-rings for 1 cm² with PEEK ferrule for CE*	**EL-SEAL-T1B**
PTFE O-rings for 10 cm² with PEEK ferrule for CE*	**EL-SEAL-T10B**
EPDM O-rings for 1 cm²*	**EL-SEAL-1**
EPDM O-rings for 10 cm²*	**EL-SEAL-10**
PTFE O-rings for 1 cm²*	**EL-SEAL-T1**
PTFE O-rings for 10 cm²*	**EL-SEAL-T10**
Set of 10 porous frits (4 mm CoralPor™) with PTFE heat shrink (200 mm)	**092-VYC4**

* The O-ring kits include 4 O-rings for the glassware side and 10 O-rings for the sample side

Galvanic Cells, 1 to 10 cm² sample area

Thanks to the modular design of the flat cell, it is possible to place two different materials at each end of the cell.

The surface area may be 1 or 10 cm².

Sample size:
30.5 mm min. diameter (EL-GAL-1CM)
40.5 mm min. diameter (EL-GAL-10CM)
6 mm max. of thickness

Galvanic Cell kits	1 cm² EL-GAL-1CM	10 cm² EL-GAL-10CM
Content		
Flat cell kit 1 cm²	EL-FLAT-1CM	EL-FLAT-10CM
Galvanic kit 1 cm²	092-FLAT/1	092-FLAT/10

Plate Material Evaluating Cell, up to 1 cm² sample area

This cell was developed to evaluate a plate material such as metals, semi-conducting plates, etc.

The sample plate is sandwiched between the two cell blocks. The required volume of solution is about 1 mL.

Plate Material Evaluating Cell	Catalog n°
Plate material evaluating cell	**A-011951**
Content	
PTFE cell [body & base] (1 piece)	-
O-ring (1 piece)	-
Screw 20 mm (1 piece)	-
Purging tube, 100 mm	-
Platinum counter electrode (1 piece)	**A-002222**
Options	
O-ring (10 pieces)	**A-012022**

Coating Cell

Coating Cell	Catalog n°
Coating cell kit	**EL-COAT**
Content	
Glass for coating cell	**EL-P-002**
Nylon base with three feet	**EL-P-003**
Rubber cup with two holes	**EL-P-004**
Metallic clamp	**EL-P-005**
O-ring for coating cell	**EL-P-006**
Graphite rod counter electrode (L: 145 mm, OD: 6 mm, ρ = 1.070 µΩ cm)	**EL-P-009**
Options	
Bridge tube for 6 mm reference electrode	**EL-P-008**
Mask for 1 cm² (20 pieces)	**EL-P-011**
Mask for 3 cm² (20 pieces)	**EL-P-012**
Mask for 10 cm² (20 pieces)	**EL-P-013**

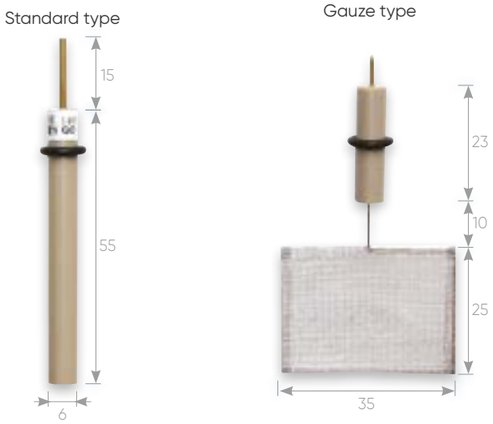
Electrodes.

Working Electrodes

To address every application, a wide range of working electrodes (WE) is available with diameters ranging from 7 µm up to 6 mm and made of different materials.

BioLogic exclusive

M-BDD-3: Boron-doped diamond 3 mm diameter disk



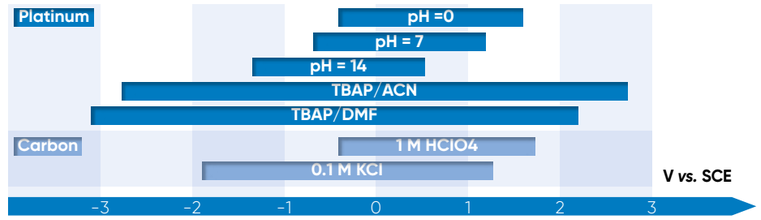
Dimensions in mm

Working Electrodes		Isolation	OD/mm	Electrode Ø ±4%	Catalog n°
Carbon	Standard glassy carbon electrode	PEEK	10	5 mm	**A-002417**
		PEEK	6	3 mm	**A-002012**
		PEEK	6	1.6 mm	**A-012297**
		PEEK	6	1 mm	**A-002411**
	Small glassy carbon electrode	PEEK	3	1.6 mm	**A-012298**
		PEEK	3	1 mm	**A-002412**
	Standard pyrolytic graphite electrode, Basal plane	PEEK	6	3 mm	**A-002252**
	Standard pyrolytic graphite electrode, Edge plane	PEEK	6	3 mm	**A-002253**
	Standard plastic formed carbon electrode	PEEK	6	3 mm	**A-002408**
		PEEK	6	1 mm	**A-002409**
	Small plastic formed carbon electrode	PEEK	3	1 mm	**A-011854**
Platinum (99.95% purity)	Standard platinum electrode	PEEK	10	5 mm	**A-002420**
		PEEK	6	3 mm	**A-002422**
		PEEK	6	1.6 mm	**A-002013**
	Small platinum electrode	PEEK	3	1.6 mm	**A-002313**
Gold	Standard gold electrode	PEEK	10	5 mm	**A-002418**
		PEEK	6	3 mm	**A-002421**
		PEEK	6	1.6 mm	**A-002014**
	Small gold electrode	PEEK	3	1.6 mm	**A-002314**
Silver	Standard silver electrode	PEEK	10	5 mm	**A-002416**
		PEEK	6	3 mm	**A-002419**
		PEEK	6	1.6 mm	**A-002011**
	Small silver electrode	PEEK	3	1.6 mm	**A-002315**
Palladium	Standard palladium electrode	PEEK	6	1.6 mm	**A-002019**
	Small palladium electrode	PEEK	3	1.6 mm	**A-002319**
Nickel	Standard nickel electrode	PEEK	6	1.5 mm	**A-002016**
Copper	Standard copper electrode	PEEK	6	1.6 mm	**A-002017**
		PEEK	6	3 mm	**A-012584**
Iron (99.65% purity)	Standard iron electrode	PEEK	6	1.5 mm	**A-002018**
		PEEK	6	3 mm	**A-012585**
Carbon paste	Standard carbon paste electrode hole depth 4 mm	PEEK	6	3 mm	**A-002210**
	Small carbon paste electrode hole depth 4 mm	PEEK	3	1.6 mm	**A-002223**
	Carbon paste oil base 1 g				**A-001010**
Boron-doped diamond	Doping level between 500 and 1000 ppm. The electrode is a 500 µm thick disk attached to a conductive rod in brass. It is polished with an Ra < 10 nm.	PEEK	7	3 mm	**M-BDD-3**

Maintenance of working electrodes

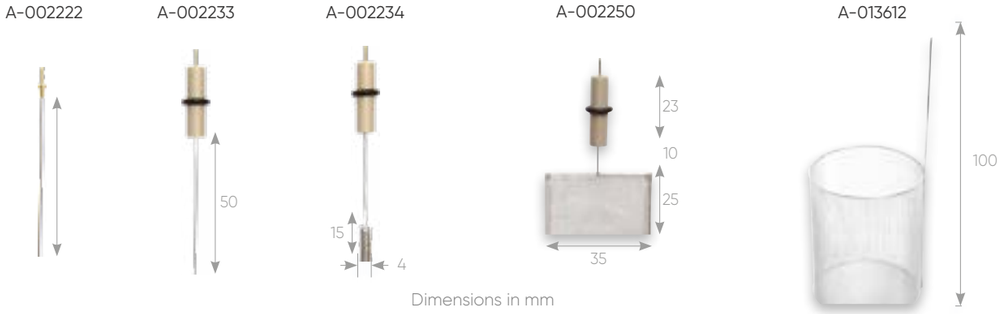
To refresh the electrode surface, we recommend polishing it before each measurement.

	Catalog n°
PK-3 electrode polishing kit	**A-011975**
Content	
0.05 µm polishing alumina (20 mL)	**A-001050**
1 µm polishing diamond (10 mL)	**A-002054**
Glass plate (1 piece)	**A-002249**
Alumina polishing pad (10 pieces)	**-**
Diamond polishing pad (10 pieces)	**-**
Spare parts	
Alumina polishing pad (20 pieces)	**A-001040**
Diamond polishing pad (20 pieces)	**A-001041**
Emery paper UF800 (20 pieces)	**A-012611**
Coarse polishing pad (20 pieces)	**A-001042**
6 µm polishing diamond (10 mL)	**A-002053**



Window of electroactivity for working electrodes in different media

Counter Electrodes



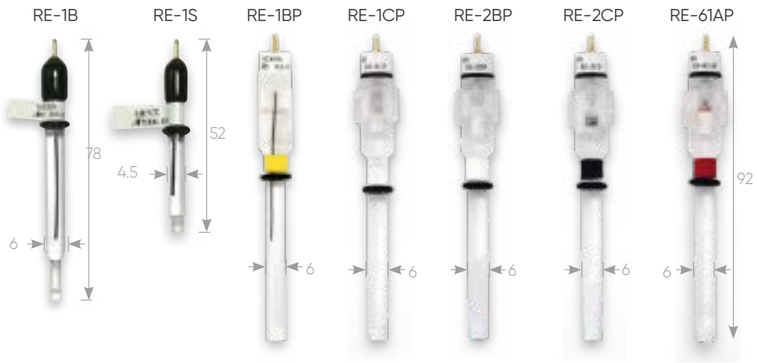
Dimensions in mm

Counter Electrodes	Size/mm	Wire Ø/mm	Surf. area/ cm²	Purpose	Catalog n°
Platinum*	57	0.5	~ 0.7	SVC-2, VC-4, plate material evaluating cell	**A-002222**
	50	0.5	~ 0.7	SVC-3	**A-002233**
	230	0.5	~ 3.6	RRDE-3A, bulk electrolysis, SVC-3	**A-002234**
Gold	230	0.5	~ 3.6	RRDE-3A, bulk electrolysis, SVC-3	**A-012638**
Nickel	230	0.5	~ 3.6	RRDE-3A, bulk electrolysis, SVC-3	**A-012639**
Platinum* gauze electrode, PEEK body 80 mesh	25x35	0.08	~ 22.9		**A-002250**
Platinum* gauze electrode, 54 mm wire 80 mesh	25x35	0.08	~ 22.9	Flat cell	**A-702439**
Platinum* electrode for bulk electrolysis cell 80 mesh	40x50	0.5	~ 47.4	Bulk electrolysis cell	**A-013612**
Gold gauze electrode, PEEK body 100 mesh	25x35	0.07	~ 29		**A-002251**

Electrodes.

Small-Size Reference Electrodes
for aqueous media

Reference electrodes are divided into two groups according to the media in which the electrode is immersed (aqueous or organic media).



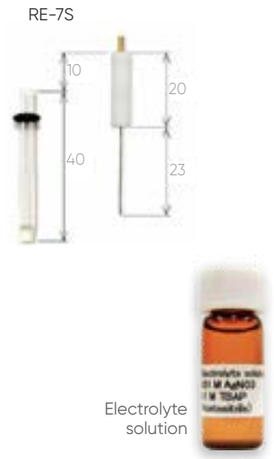
Small-Size Reference Electrode for Aqueous Media (Ag/AgCl, Hg)	Junction	Electrolyte	Purpose	Catalog n°
RE-1B Ag/AgCl reference electrode[1]	IPPG*	3 M NaCl	SVC-2, SVC-3, VC-4, bulk electrolysis, RRDE-3A, flat cell	**A-012167**
RE-1S Ag/AgCl reference electrode[1]	IPPG*	3 M NaCl	SECM	**A-012168**
RE-1BP reference electrode (Ag/AgCl)	Ceramic	3 M NaCl	SVC-2, SVC-3, VC-4, bulk electrolysis, RRDE-3A, EQCM, flat cell	**A-013613**
RE-1CP Ag/AgCl reference electrode	Ceramic	Saturated KCl	SVC-2, SVC-3, VC-4, bulk electrolysis, RRDE-3A, flat cell	**A-013429**
RE-2BP Hg/Hg_2Cl_2 reference electrode	Ceramic	Saturated KCl	SVC-2, SVC-3, VC-4, bulk electrolysis, RRDE-3A, flat cell	**A-013430**
RE-2CP Hg/Hg_2SO_4 reference electrode, free from chloride	Ceramic	Saturated K_2SO_4	SVC-2, SVC-3, VC-4, bulk electrolysis, RRDE-3A, flat cell	**A-013431**
RE-61AP Hg/HgO reference electrode main body in polyacetal resin	Ceramic	1 M NaOH	For alkaline media	**A-013395**
Spare parts				
Set of 10 porous 2.8 mm glass frits (CoralPor™) with high temperature PTFE heat shrink (200 mm long, 3.2 mm diameter). Only compatible with: A-012167, A-01277, A-0.12178				**092-VYC3**
Set of 10 porous 2.8 mm glass frits (CoralPor™) with low temperature PVDF heat shrink (200 mm long, 3.2 mm diameter). Only compatible with: A-012167, A-01277, A-0.12178				**092-VYC3A**
Set of 10 porous 2.8 mm glass frits (CoralPor™) with PTFE heat shrink (200 mm long, 4.8 mm diameter) Only compatible with A-012168				**092-VYC5**
Options				
RE-PV preservative vial for reference electrode, 10 mL				**A-012108**
Bridge tube Ø 9.0 mm (2 pieces)				**A-012177**
Bridge tube Ø 9.0 mm (22 pieces)				**A-012307**

* Ion Permable Porous Glass

Support: How to check your reference electrode

BioLogic's Learning Center is a great source of information for tech-tips, theory and product information. Visit our Learning Center or **click here** to find out how why reference electrode maintenance is so important.

Small-Size Reference Electrodes
for non aqueous media



Small-Size Reference Electrodes for Non Aqueous Media (Ag/Ag^+)	Junction	Electrolyte	Purpose	Catalog n°
RE-7 non aqueous reference electrode (Ag/Ag^+)	IPPG*	Ag/Ag^+/ACN**/ TBAP***	CV	**A-012171**
RE-7S non aqueous reference electrode (Ag/Ag^+)	IPPG*	Ag/Ag^+/ACN**/ TBAP***	SECM	**A-012172**
Spare parts				
Electrolyte solution (10 mL)				**A-012549**
PTFE cap with Ag wire (for RE-7)				**A-012057**
Sample holder 6 mm diameter (for RE-7) (2 pieces)				**A-012176**
Set of 10 porous 2.8 mm glass frits (CoralPor) with high temperature PTFE heat shrink (200 mm long, 3.2 mm diameter). Only compatible with: A-012717, A-012177, A-012178				**092-VYC3**
Set of 10 porous 2.8 mm glass frits (CoralPor) with low temperature PVDF heat shrink (200 mm long, 3.2 mm diameter). Only compatible with: A-012717, A-012177, A-012178				**092-VYC3A**
Set of 10 porous 2.8 mm glass frits (CoralPor™) with PTFE heat shrink (200 mm long, 4.8 mm diameter) Only compatible with A-012171				**092-VYC5**
Options				
RE-PV preservative vial for reference electrode, 10 mL				**A-012108**
Bridge tube Ø 9.0 mm (2 pieces)				**A-012177**
Bridge tube Ø 9.0 mm (22 pieces)				**A-012307**

* Ion Permable Porous Glass
** Acetonitrile
*** Tetra Butyl Ammonium Perchlorate

Don't forget!

There is a huge amount of supporting information on www.biologic.net. The BioLogic Learning Center has over 130 articles and if you need to drill down deeper, there are over 80 application notes and 50 technical notes for the field of electrochemistry alone.

www.biologic.net

Maintenance of Reference Electrodes.

Store your reference electrode immersed in the electrolyte

When not in use, we recommend that you keep reference electrodes in sealed, air-tight vials in order to prolong their life. The storage solution should be identical to the filling solution of the reference electrode. Prefer a cold and dark place.

Prevent contamination

To prevent contamination of the reference electrode, a sample holder can be used.

Potentials of common reference electrodes

E/V vs. NHE at 25 °C

0.930	Hg/HgO/ NaOH (0.1 M)
0.650	Hg/Hg_2SO_4 / K_2SO_4 (sat)
0.624	Fc/Fc^+ TBAP (0.1M) ACN
0.542	Ag/Ag^+ TBAP (0.1M) ACN
0.241	Hg/Hg_2Cl_2 KCl (sat)*
0.236	Hg/Hg_2Cl_2 NaCl (sat)*
0.205	Ag/AgCl/ KCl (3.5 M)
0.197	Ag/AgCl/ KCl (sat)
0.194	Ag/AgCl/ NaCl (sat)
0.000	NHE Normal Hydrogen Electrode

* Hg/Hg_2Cl_2 : Calomel

Replace the junction when needed

If you are using IPPG junctions, yellowish discoloration indicates contamination. This is caused by the absorption of organic compounds into the pores. The average pore diameter of IPPG is about 40 - 200 Å.

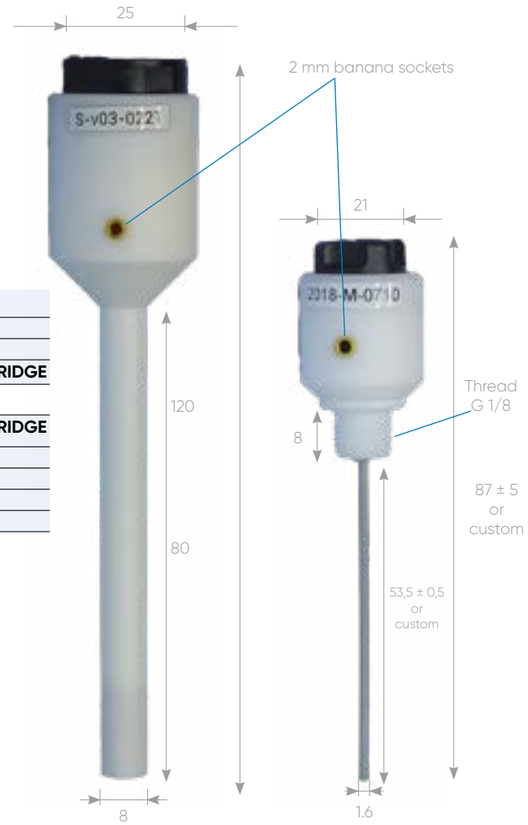
If you are using CoralPor™ junctions, you might want to use one of the available replacement kits.

The average pore diameter of CoralPor™ is about 4 - 10 nm.

Replacement kits	Compatible reference electrodes	Compatible bridge tubes	Content
092-VYC3	A-012167 A-012178	A-012176 A-012306 A-012177 A-012307	10 glass frits (ϕ 2.8mm Coralpor™) 200 mm long heat shrink tube (ϕ 3.2 mm)
092-VYC4	∅	EL-C-005 EL-C-017 EL-F-004B EL-F-004 EL-A-017 EL-A-008	10 glass frits (ϕ 4 mm CoralPor™) 200mm long heat shink tube (ϕ 4.8 mm)
092-VYC5	A-012168	∅	10 glass frits (ϕ 2.8 mm CoralPor™) 200 mm long heat shrink tube (ϕ 4.8 mm)

Hydrogen Reference Electrodes.

These hydrogen reference electrodes, manufactured by Gaskatel, are beneficial in that they are Hg-free and not made of glass, which extends their range of operating conditions. These robust reference electrodes are easy to use and robust. Hydrogen is contained within a cartridge that is easily replaceable.



Dimensions in mm

Description	Catalog n°
HydroFlex® Hydrogen Reference Electrode	**G-HYDROFLEX**
HydroFlex® Starter Kit*	**G-HYDROFLEX-KIT**
MiniHydroFlex® Hydrogen Reference Electrode	**G-HYDROFLEX-CARTRIDGE**
Options	
HydroFlex® Hydrogen Cartridge (x4)	**G-HYDROFLEX-CARTRIDGE**
MiniHydroFlex® Hydrogen Cell (x2)	**G-MINIHYDRO-CELL**
Bridge tube for use of HydroFlex®with EL-ELECTRO	**EL-A-017**
Bridge tube for use of HydroFlex®with EL-CORR	**EL-C-017**
Bridge tube for use of HydroFlex®with EL-FLAT	**EL-F-004B**

Operating conditions	
Cartridge lifetime/months	12 (MiniHydroFlex®), 6 (HydroFlex®)
Temperature/°C	-20 to 120 (PTFE body)
pH range	-2 to 16

The HydroFlex® electrodes are compatible with the FlexCell®.

Part	Materials
Body	PTFE, PP
Shaft	PEEK, PTFE
Cap and cartridge	PC or PVC
Measuring electrode	Pt, Pd
PP	PolyPropylene
PTFE	PolyTetraFluorEthylene
PVC	PolyVinylChloride
PC	PolyCarbonate
PEEK	PolyEtherEtherKetone
Pt	Platinum
Pd	Palladium

HydroFlex® Starter Kit Content
1 HydroFlex® Hydrogen reference electrode incl. 1 hydrogen cartridge
1 connector lead
1 hydrogen cartridge
1 cartridge wrench
1 operating time wrench

Connection Accessories.

High-Temperature Extension Cables

These extension cables are intended to be connected between the instrument's cell cable and the cell.

Available in two different sizes, 1.3 m and 2.5 m long and with a maximum temperature of 150 °C, these cables are compatible with:

SP-50e, SP-150e, VSP, VSP-3e, VMP-3e and boosters for Essential range instruments (20 A maximum)
SP-200, SP-240, SP-300, VSP-300, VMP-300, and boosters for Premium range instruments (20 A maximum) BCS-805, BCS-810 and BCS-815

High-temperature cables	1.3 m	2.5 m m
Temperature /°C	-40 °C to 150 °C	
Max current /A (2 mm connectors)	2	
Max current /A (4 mm connectors)	20	
Cable diameter /mm	12.7	
Catalog n°	**092-25/1**	**092-25/2**

Glove Box Cables

Hermetic cell cable for glove box

As standard, the potentiostat and the booster are provided with a 1.5 m long cell cable. The cable connected from the booster to the potentiostat is 0.8 m long for VMP3 based instruments.

For some applications, the user may need different length cables. For this reason, longer cables are available (for more information, contact your sales representative).

For applications carried out in glove boxes, cell cables are also available.

Hermetic cell cable for glove box	VMP3	VMP-300
Catalog n°	**092-23/5**	**094-101/6** (standard cable)
		094-101/8 (low current cable)
Content:		
Feedthrough type	12 pins	25 pins*
Inside glovebox (length: 1 m)	Cable with 2 mm connectors on one side and 12-pin Jaeger connector on the other side	Cable with electrometer on one side and 25-pin connector on the other side
Outside glovebox (length: 1.5 m)	Cable with SubD25 connector on one side and 12 -pin Jaeger connector on the other side (length 1.5 m)	Cable with SubD25 connector on one side and 12 -pin Jaeger connector on the other side (length 1.5 m)
Requirement:		
Hole to make in the glove box/mm	27	45

*Two feedthrough seals one installed in the glove box wall the other dedicated to the channel board calibration outside the box

Set-up connection

Bad connections can affect measurements (stability of potentiostat, artefacts etc).

In order to optimise your set-up, we recommend you use the accessories described in this section.

Multi-electrode investigation cables

For the Essential product range, we offer several options to facilitate the use of connection cables when multi-electrode experiments are performed, for example, RRDE experiments or corrosion experiments on several samples using the same reference and the same counter electrode.

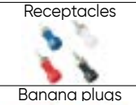
Nstat box (8 channels)

Bipot cable: dedicated to RRDE applications

Description	Nb of channels	Length	Catalog n°
Bipot cable (for SP-150e, VSP, VSP-3e and VMP-3e)	2	1.5 m	**092-22/12**
Nstat box (for VSP, VSP-3e and VMP-3e). External power supply required.	4	1.5 m	**092-16**
	4		**092-22/3**
External power supply for the Nstat box			**096-16/1**

Connectors

Aligator clips



Receptacles

Banana pluas

Adaptors

Content	Catalog n°
2 mm 8x Red, 8x Blue, 8x White, 4x Black	**092-1001/40**
4 mm 3x Red, 3x Blue, 3x Black	**092-1001/41**
2 mm 20x Red, 20x Blue, 20x White, 15x Black	**092-1001/42**
4 mm 12x Red, 12x Blue, 12x Black	**092-1001/43**
2 mm 10x Red, 10x Blue, 10x White, 10x Black	**092-1001/44**
4 mm 8x Red, 8x Blue, 8x White	**092-1001/45**
2mm recep.-4mm banana plugs 16x Red, 16x Blue	**092-1001/47**
4mm recep. to 2mm banana plugs (x20)	**092-1001/48**

Connection kits

Connection kits			Catalog n°
For standard board	4 alligator clips of 2 mm: 3 receptacles of 2 mm:	red, blue, white, black red, blue, white	**092-1001/30**
For booster board	3 alligator clips of 2 mm: 2 alligator clips of 4 mm: 3 receptacles of 2 mm: 2 receptacles of 4 mm:	red, blue, white red, black red, blue, white blue, white	**092-1001/31**
For HCV-3048, FlexP 0060, 0160, CC4-60A and CC8	Contains: 2x6 mm receptacles: 4 lugs with 4 mm receptacles:	red, blue red, blue	**094-110/CNT**
For FlexP0012 and CC4-200A	Contains: 2 Amphenol 8 mm receptacles, 4 lugs with 4 mm receptacles	red, black red, blue	**093-200/CNT**

094-110/CNT

093-200/CNT

Connection Accessories.

External Device Connection

IS1

DB9-8 BNC

External device connection	Catalog n°
DB9-8 BNC connector for auxiliary I/O	**092-22/1**
IS1 isolation module for auxiliary I/O for VMP-300 based instruments	**094-081/5**

Pt Probe	Catalog n°
PT100 temperature probe, to be connected to the auxiliary I/O, temperature range: -50 °C to 250 °C, Dimensions: 3 x 20 mm, Length of cable: 2.5 m, Accuracy: ±1 °C For T° measurement in air	**092-22/13**
PT100 temperature probe for T° measurement in solution with SubD9 connector	**EL-C-014**
PT100 temperature probe for T° measurement in solution with triad connector	**EL-C-014/1**

Test Boxes

Test Boxes		Catalog n°
Test Box 2	Several circuits with high precision resistors, for calibration and validation	**092-22/6**
Test Box 3	Three circuits: linear, two non-linear systems (Tafel & passivating) for teaching and demonstration	**092-22/7**

Test Box 2

Test Box 3

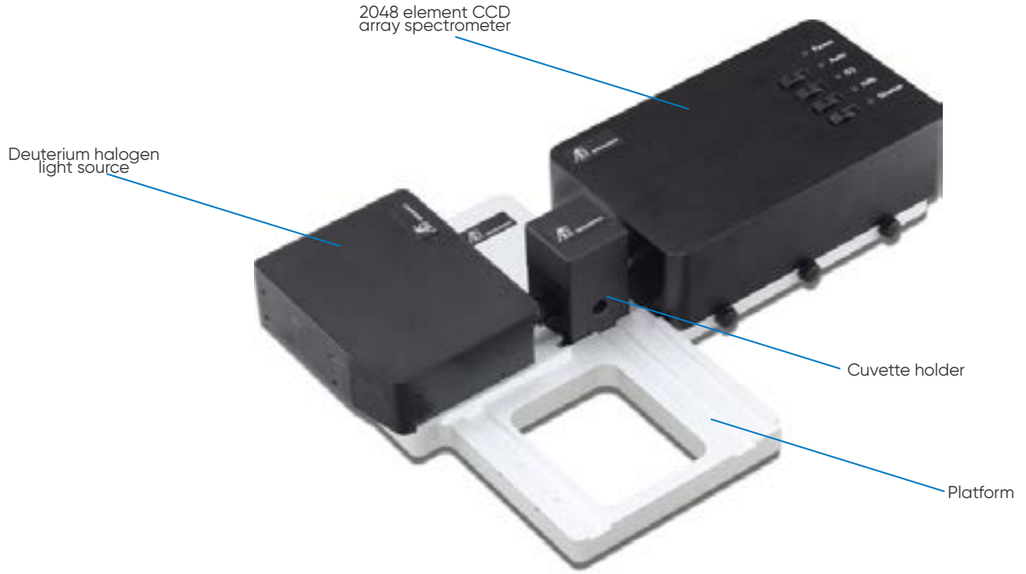
Faraday Cages

To avoid any external perturbations, especially for low current applications, we recommend using a Faraday cage.

Please note that in order to ensure that the cage is fully functional, it must be earthed by connecting it to the ground (this is done via a green plug on the instrument's rear panel).

Faraday cages	Catalog n°
FC-45 Faraday cage, 450x450x450 mm	**094-084/1**
Stand for FC-45	**094-084/2**

Spectroelectrochemistry.



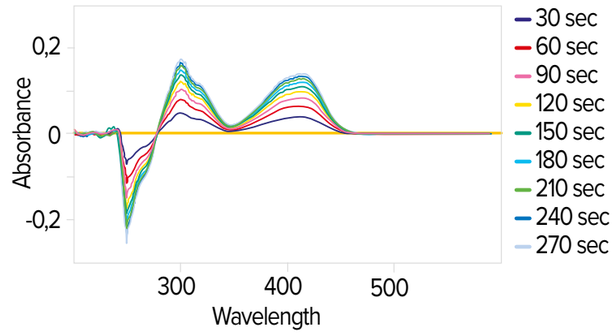
Spectrometer System

Spectroelectrochemistry (SEC) can be useful to elucidate electrochemical reaction mechanisms. The spectroelectrochemical kit is made up of three parts (spectrometer, light source and cuvette holder).

The spectrometer is equipped with a trigger to synchronize electrochemical and spectroscopic measurements.

Spectrometer specifications	
Detector	2048 element linear silicon CCD array
Full description	SEC2021-025-DUVN
Detector range/nm	200 - 1025
Grating	Blaze wavelength (300 nm)
Slit/µm	25
Wavelength resolution/nm	1.3
Fiber connector	SMA905 Core diameter: 600 µm NA=0.22
Interface	USB2.0
Operating system	WindowsTM 7 / 8.1 / 10 (32bit / 64bit)
Dimensions (HxWxD)/mm	32x86x110

SEC2020 Spectrometer system	Catalog n°
SEC2020 spectrometer kit	**A-013609**
Content	
SEC2021 Spectrometer (x 1)	-
SEC2022 Deuterium halogen light source (x 1)	-
SEC2023 Cuvette holder (x 1)	-
SEC2024 Platform (x 1)	-
AC adaptor (x 1)	-
Power cable (x 1)	-
USB cable (x 1)	-
Collimator (x 2)	-
Fiber collimator (x 1)	-
Platform screw (x 7)	-
External device connection trigger cable (x 1)	-
Light source control trigger cable (x 1)	-
Plastic cuvette (x 1)	-
SMA905 adaptor for light source (x 3)	-
SMA905 adaptor for light shielding (x 2)	-
Hexagon wrench 0.89 mm (x 1)	-
Hexagon wrench 1.50 mm (x 1)	-
Software (USB memory) (x 1)	-
Waterproof box (x 1)	-
Quick manual, wavelength calibration data sheet, linearity test data sheet and warranty certificate are also included.	
Option	
Connecting cable to synchronize the SEC2020 with BioLogic instrument.	**092-22/11**



The SEC2020 spectrometer system uses the Czerny-Turner optical mount. This system is an M-shaped structure symmetrical to the grating (4) and is an optical system with extremely small aberration.

Light source structure

Light source specifications	
Light type	Deuterium halogen light source
Wavelength range/nm	200 - 1700
Stability	<0.1%
Drift/h	0.25%
Bulb life/h	>1000 (D2 lamp) >2000 (halogen lamp)
Fiber connector	SMA905
Size (HxW×D)/mm	46x100×165

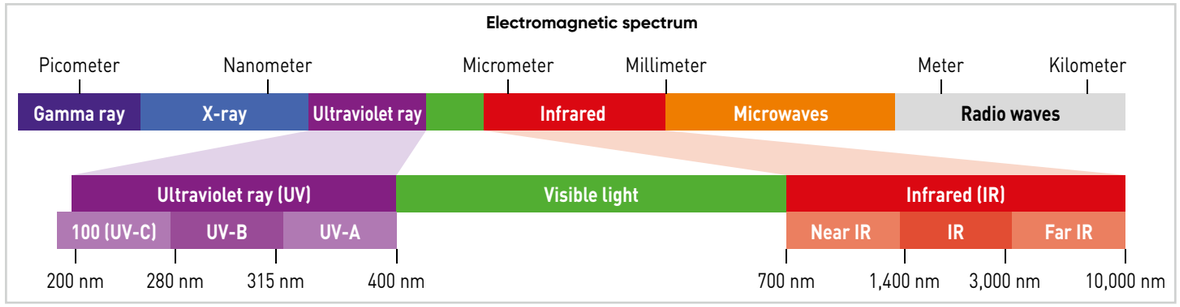
1. SMA905 Connector
2. Slit
3. Collimating mirror
4. Grating
5. Focus mirror
6. 2048 element CCD array

Utilization modes

Transmittance	
Absorbance/transmittance	- Concentration of chemicals (solution) - Polymer extrusion processes - DNA quantification
Reflectance	- Freshness testing - Film thickness/composition (quality control) - Activation energy of photocatalytic species - Textile quality control

Fluorescence	
Fluorescence	- Marine organisms - Biology (DNA, protein, cell proliferation assay, histamine-analysis, alga monitoring) - Environmental fields (waste water analysis, ground water trace studies, hydrocarbon detection, dissolved oxygen) - Plant efficiency (plant physiology, plant breeding, horticulture, agronomy, agrochemicals, pollution studies, forestry, ecology) - Tissue diagnosis
Scattering	- Oil concentrations of oil/water system - Raman spectroscopy - Physical transition phenomena (e.g, melting point, glass transition crystallize temperature)

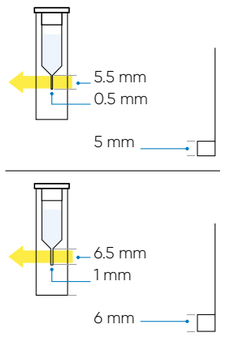
Irradiance	
Emission	- Astronomy (e.g, spectra of Hale-Bopp, plasma monitoring) - In situ metal monitoring - Luminescence (PL,EL), LED & laser wavelength



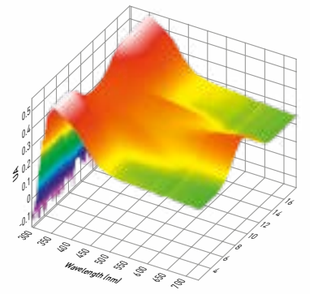
Static Cell

A-012813 | A-012815 | A-012606 | A-012609 | A-011501 | Purging tube

Quartz glass spectroelectrochemical cell kit		Platinum	Catalog n°	Gold	Catalog n°
0.5 mm			**A-012813**		**A-012814**
	Content				
	Platinum counter electrode		**A-012609**		**A-012609**
	Thin layer quartz glass cell		**A-012815**		**A-012815**
	PTFE cap		**A-011501**		**A-011501**
	Purging tube (ETFE, 100 mm)		**-**		**-**
	Gauze working electrode	80 mesh, height 5 mm	**A-012606**	100 mesh, height 5 mm	**A-012607**
1 mm			**A-013510**		**A-013511**
	Content				
	Platinum counter electrode		**A-012906**		**A-012906**
	Thin layer quartz glass cell		**A-012907**		**A-012907**
	PTFE cap		**A-011501**		**A-011501**
	Purging tube (ETFE, 100 mm)		**-**		**-**
	Gauze working electrode	80 mesh, height 6 mm	**A-011498**	100 mesh, height 6 mm	**A-012017**



Options	
RE-1BP Ag/AgCl reference electrode	**A-013613**
RE-7 non aqueous reference electrode	**A-012171**
Purging tube (ETFE), 1 m	**A-010537**



Scanning Product Accessories.

Probes

A range of probes dedicated for use with our SECM, SVP, SKP and LEIS scanning probe applications are available for the M370 and M470 systems. SECM probes can also be used with SECM150

Probes	Catalog n°
Fused silica-based SECM 10 µm diameter Platinum disk	**U-23/10**
Fused silica-based SECM 15 µm diameter Platinum disk	**U-23/15**
Fused silica-based SECM 25 µm diameter Platinum disk	**U-23/25**
Capillary based SECM 1 µm diameter Platinum disk	**U-P5/1**[1,2]
Capillary based SECM 2 µm diameter Platinum disk	**U-P5/2**[1,2]
Capillary based SECM 5 µm diameter Platinum disk	**U-P5/5**[1]
Capillary based SECM 10 µm diameter Platinum disk	**U-P5/10**
Capillary based SECM 15 µm diameter Platinum disk	**U-P5/15**
Capillary based SECM 25 µm diameter Platinum disk	**U-P5/25**
SKP 500 µm diameter	**U-SKP370/1**
HR SKP 150 µm diameter	**U-SKP-150**
LEIS	**U-LEIS370/1**
SVP	**U-SVP370/1**

[1]Unsuitable for ic-SECM/ [2]Unsuitable for M370

VCAM3
Video Microscope System

The VCAM3 is a long working distance video microscope which allows users to view the positioning between probe tip and sample surface in many scanning probe electrochemistry techniques.

VCAM3 specifications

Working Distance	130 mm
Min illumination/lux	0.003
Field of view/mm	1.6*2 mm (max) to 13*8mm (min)
Operation temperature/°C	-30 to +70
Catalog n°	**U-VCAM3**

M470
Local Hero

If you need a local view of electrochemistry, look no further than the BioLogic M470 scanning electrochemical workstation.

A fully modular instrument, the M470 can be tailored to scan 9 techniques from 7 modules. And user-friendly software means that no time will be lost learning to operate the instrument, whether you are a specialist in local electrochemstry, or new to the field.

Techniques Available

SECM
ic-SECM
ac-SECM
LEIS
SVP
SDS
ac-SDS
SKP
OSP

Visit www.biologic.net/products/m470/
or click **here** for more information

Scanning Product Accessories.

Cells

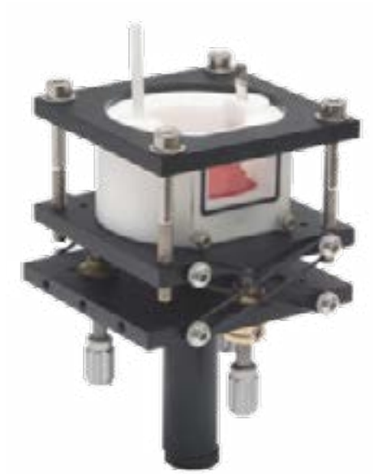
Three cells are available :
The TriCell™ is a large volume, wide scan range cell, dedicated to LEIS, SVP, SKP, SDS techniques.
The µTriCell™ and its Shallow version are dedicated to SECM techniques (dc, ac and ic mode). The Shallow µTriCell™ contains a slightly smaller volume of electrolyte than the µTriCell™ is more accessible and ideal for ic-SECM.

The Foil Cell has been designed for use with flat, foil type samples, such as those used for battery electrodes. It has been designed to mount directly on the baseplate of the µTriCell™ and Shallow µTriCell™.

All TriCells accomodate samples mounted in a 32 mm diameter resin cylinder.

Cells	Volume (mL)	Catalog n°
TriCell™	700	**U-TRICELL**
µTriCell™	7	**U-uTRICELL**
Shallow µTriCell™	6	**U-SuTRICELL**
Foil Cell	1	**U-uFoilCell**

TriCell™



µTriCell™

Shallow µTriCell™

Foil Cell™

M470 Glovebox Cables

The M470 Scanning Electrochemical Workstation is supplied with a full set of standard cables for use with all techniques.

For applications requiring use of the M470 in a glove box, additional cell cables are available.

These are supplied as a set of internal, feedthrough and external cables to replace a single cable.

Hermetic scan stage cable for glove box

	Electrometer	Piezo Strain Gauge	Piezo Drive	Scan Stage	3300
Content :					
Feedthrough Type/pins	8	6	3	8	25
Inside glove box	Electrometer cable connects directly to 8 pin LEMO feedthrough.	Cable with connector to piezo strain gauge on one side and 6-pin Jaeger connector on the other side (length 1.5 m)	Cable with connector to piezo drive on one side and 3-pin Jaeger connector on the other side (length 1.5 m)	Cable with connector to scan stage on one side and 8-pin Jaeger connector on the other side (length 1.1 m)	Cable with 4 mm connectors on one side and 25-pin Jaeger connector on the other side (length 1 m)
Outside glove box	1 m cable with connector to SCV470 in one side and 8 pins LEMO connector in the other side	Cable with connector to SCV470 on one side and 6-pin Jaeger connector on the other side (length 1 m)	Cable with connector to SCV470 on one side and 3-pin Jaeger connector on the other side (length 1 m)	Cable with connector to SCV470 on one side and 8-pin Jaeger connector on the other side (length 1.1 m)	Cable with connector to SCV470 on one side and 25-pin Jaeger connector on the other side (length 1 m)
Requirement:					
Hole to make in the glove box/mm	12.1	21	21	27	45
Max. Required	1	1	1	3	2
Catalog n°	**U-HC470ELE-L**	**U-HC470PSG**	**U-HC470PD**	**U-HC470STG**	**U-HC3300CL**

*When used with an M470 and SP-300 configuration the SP-300 Ultra Low Current (ULC) glove box cable sets are also required.

USB-PIO

The USB-PIO, designed for use with the M470, allows external devices to be switched on and read. It can be used to control up to four different channels individually or collectively using the M470 software.

The USB-PIO can interface directly to user supplied cables, or to the supplied breakout PCB using the DB25 pin female connector.

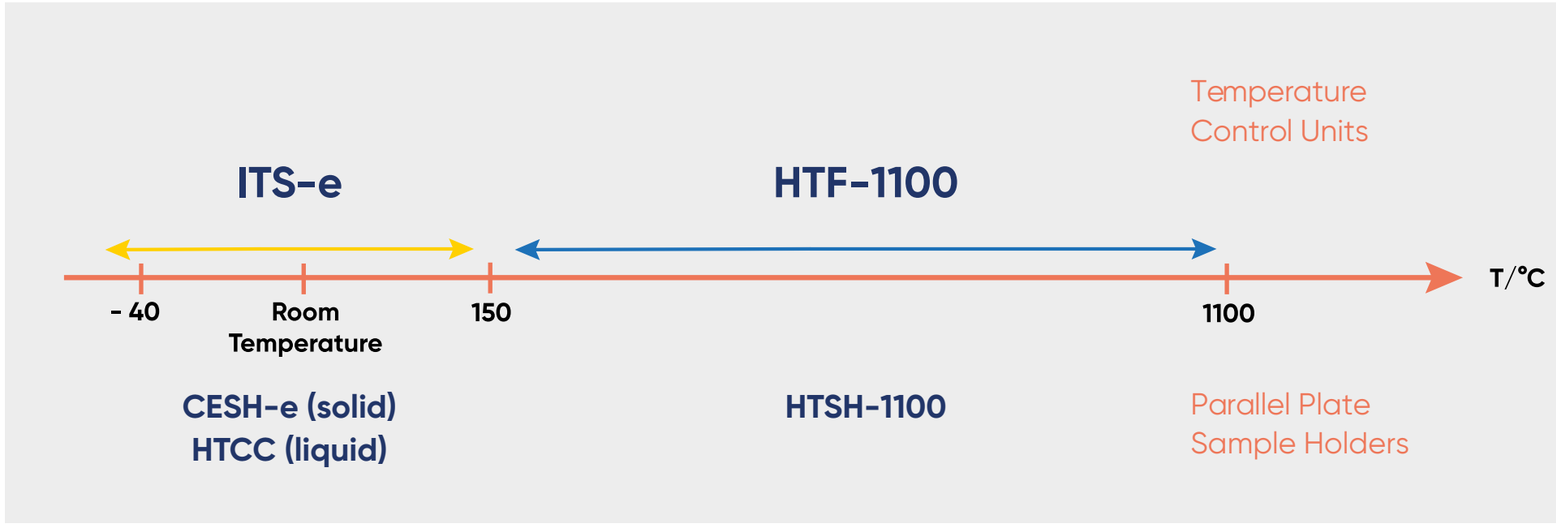
USB-PIO Specifications

Temperature/°C	0 - 50
Power supply	100 VAC-240 VAC, 50/60 Hz
Fuse/A	1
Gas pressure	< 34 kPa max.
Interface	IEEE-488, RS-232C
Weight/kg	3.8

Material Testing Accessories.

How to identify the correct solution

As the electrical properties of materials depend on temperature, a Temperature Control Unit and a Sample Holder are needed to control the temperature and hold the sample (solid, pasty and liquid sample) between the parallel plates.



Temperature Control Units

High Temperature Furnace (HTF-1100)
HTF-1100 is a horizontal laboratory tube furnace dedicated to the electrical characterization of materials and to heat treatment in the temperature range between the ambient and 1100 °C.

HTF-1100 & HTSH-1100

Intermediate Temperature System (ITS-e)
ITS-e is a compact temperature chamber dedicated to the characterization of electrical properties of materials by impedance spectroscopy under controlled atmosphere in the temperature range between -35 °C and 150 °C.

ITS

Temperature Control Unit	Operating Temp.	Features	Catalog n°
HTF-1100	RT to 1100 °C	Heating rate adjustable K-type thermocouple	**097-110**
In-plane ITS-e	-35 to 150 °C	Temperature accuracy: 0.3 °C PT1000 probes	**097-140e**
Through-plane ITS-e	-35 to 150 °C		**097-140e**

Sample Holders

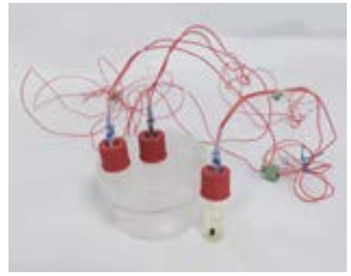
High Temperature Sample Holder (HTSH-1100)
HTSH-1100 is a test fixture dedicated to the characterization of electrical properties of materials at high temperatures (up to 1100°C).

HTSH-1100

Controlled Environment Sample Holder (CESH-e)
CESH-e is a sample holder designed to the electrical characterization of flat material samples in parallel plate configuration in the temperature range between -40 °C and 150 °C.

High Temperature Conductivity Cell (HTCC)
HTCC is a parallel plate conductivity cell dedicated to laboratory measurements in a wide conductivity range (200 mS/cm to 2 µS/cm).

CESH-e on its base



HTCC

Other accessories	Catalog n°
Cable kit for CESH-e and MTZ-35	**097-150e/01**
Cable kit for CESH-e and Potentiostat	**097-150e/02**
Thickness measurement kit	**097-150e/10**
Liquid conductivity kit	**097-160**

Sample Holders		Operating Temp.	Features	Compatibility	Catalog n°
HTSH-1100	Φ=25 mm	RT to 1100°C	Quartz tube for controlled atmosphere Leak-tight up to 2 bar relative K-type thermocouple	HTF-1100 Tubular furnaces	**097-133/S**
	Φ=12 mm				**097-132/S**
	Φ=03 mm				**097-130/S**
CESH	In-plane	-40 to 150 °C	Leak-tight up to 2 bar relative	ITS Other temperature units	**097-150/1**
	Through-plane				**097-150/2**
HTCC	Platinized (x1)	-50 to 180 °C	Cell factor: K = 1 +/- 5% cm^{-1} volume: 0.5 - 1.0 mL	MCS 10	**098-010/10**
	Non-platinized (x1)				**098-010/11**

Premium.

When only the best will do

VMP-300 16 channels,
150 A down to 100 fA

SP-200
1 Channel, 500 mA
down to 100 fA

SP-240
1 Channel, ± 4 A
down to 100 fA

SP-300
2 Channels, 10 A
down to 100 fA

VSP-300
6 Channels, 40 A
down to 100 fA

BioLogic Premium is a range of state-of-the-art potentiostats designed for researchers who need the fastest, most precise, potentiostats available.

Premium potentiostats boast some of the most powerful specifications available: 100 fA to 150 Amps, 7 MHz EIS measurements and a sampling rate that can reach 1 data point every µs.

Premium by name. Premium by nature.

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Essential.

Tools for Electrochemists

VMP-3e, 16 channels,
± 1 A down to 20 nA

SP-50e
1 channel, ± 1 A
down to 20 nA

SP-150e
2 channels, 1 A
down to 20 nA

VSP-3e
8 channels,
± 1 A down to 20 nA

A range of powerful, modular, high-precision, research-grade potentiostats built to handle almost any academic or industrial application imaginable.

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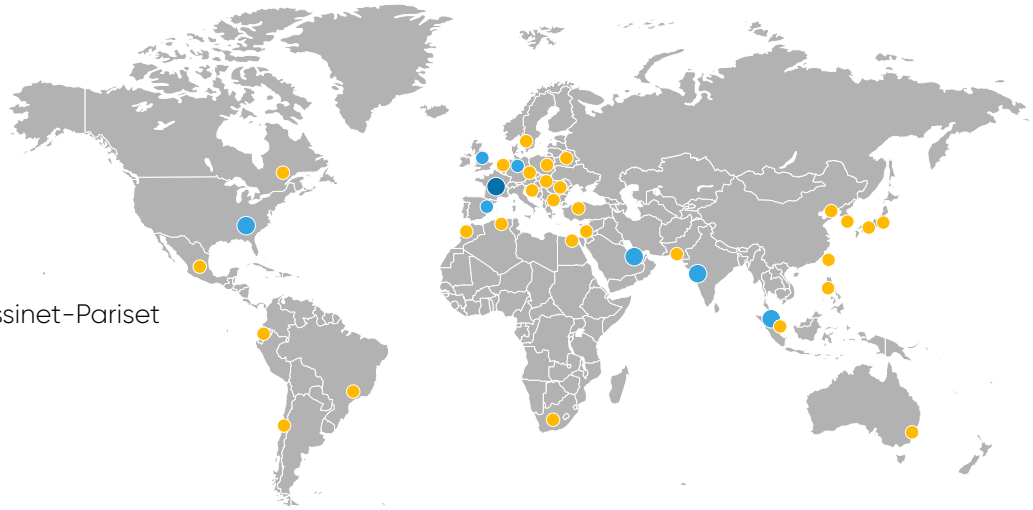

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