



Reference Electrodes

A reference electrode provides a stable potential whatever the measurement conditions. The main differences between reference electrodes are the type of reference system and the liquid junction.

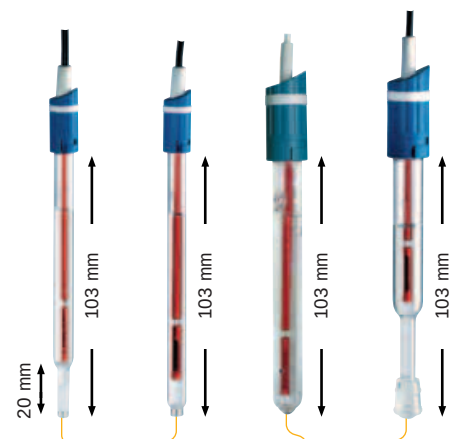
Radiometer Analytical offers electrodes using both Red Rod and traditional technology (calomel, silver-silver chloride, mercurous sulphate and mercuric oxide).

Electrodes with a double junction are mostly designed for measurements using ion-selective electrodes or samples sensitive to Cl⁻ or K⁺.

Sleeve junctions have a high flow to prevent the risk of clogging. Porous pins are used for general applications. Fibre reference electrodes have a slow flow to avoid contamination of the media.


Banana plug

Red Rod reference electrodes



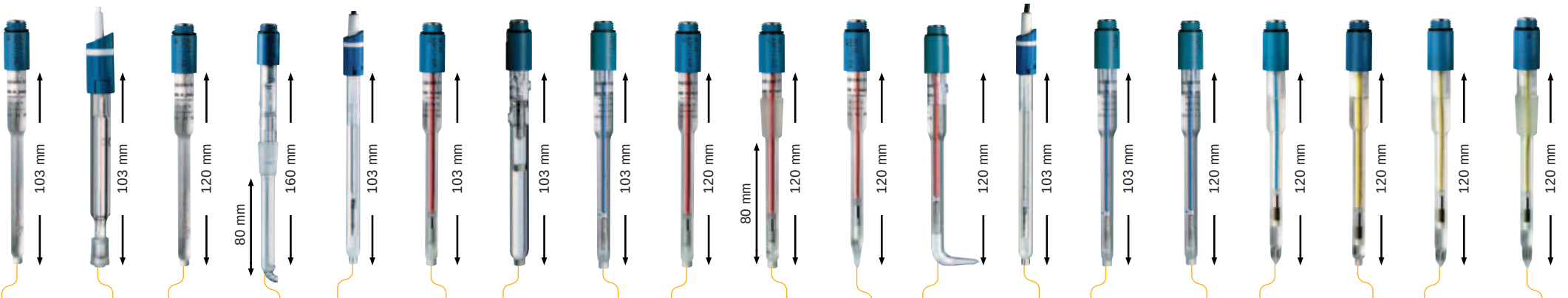
Applications	Micro-samples	General-purpose		Special-purpose
Reference system	Red Rod	Red Rod	Red Rod	Red Rod
Type	REF200	REF201	REF251	REF261
Part no.	E21M008	E21M009	E21M001	E21M010
Temperature range	-10 – 100°C	-10 – 100°C	-10 – 100°C	-10 – 100°C
Lower stem diameter	4 mm	7.5 mm	12 mm	12 mm
Liquid junction	Porous pin	Porous pin	Porous pin/ porous pin	Glass sleeve
Special features	For use with pHG200		Double junction	Sleeve
Salt-bridge solution	Sat. KCl	Sat. KCl	Sat. KCl	Sat. KCl

Reference electrodes


Banana plug


BNC plug


Screw cap



Applications	General-purpose	Non-aqueous media	Voltammetry	Impedance	Special-purpose			Non-aqueous media	Voltammetry				Chloride free		Voltammetry				
Reference system	Ag / AgCl	Ag / AgCl	Ag / AgCl	Ag / AgCl	Calomel	Calomel	Calomel	Calomel	Calomel	Calomel	Calomel	Calomel	Hg / Hg ₂ SO ₄	Hg / Hg ₂ SO ₄	Hg / Hg ₂ SO ₄	Hg / Hg ₂ SO ₄	Hg / HgO	Hg / HgO	Hg / HgO
Type	REF321	REF361	XR300	XR820	REF401*	REF421*	REF451*	REF921*	XR100*	XR110*	XR130*	XR150*	REF601*	REF621*	XR200*	XR230*	XR400*	XR430*	XR440*
Part no.	E21M002	E21M003	B20B300	B20C820	E21M011	E21M004	E21M005	E21M007	B20B100	B20B110	B20B130	B20B150	E21M012	E21M006	B20B200	B20B230	B20B400	B20B430	B20B440
Temperature range	-5 – 80°C	-5 – 80°C	-5 – 80°C	-5 – 80°C	-10 – 60°C	-10 – 60°C	-10 – 60°C	0 – 60°C	-10 – 60°C	-10 – 60°C	-10 – 60°C	-10 – 60°C	0 – 60°C	0 – 60°C	0 – 60°C	0 – 60°C	0 – 60°C	0 – 60°C	0 – 60°C
Lower diameter	8 mm	12 mm	8 mm	8 mm	7.5 mm	8 mm	12 mm	8 mm	8 mm	8 mm	8 mm	8 mm	7.5 mm	8 mm	8 mm	8 mm	8 mm	8 mm	8 mm
Liquid junction	Porous pin	Glass sleeve	Porous pin	Porous pin/ fibre	Porous pin	Porous pin	Porous pin/ porous pin	Porous pin	Porous pin	Porous pin	Fibre	Fibre	Porous pin	Porous pin	Porous pin	Fibre	Porous pin	Fibre	Fibre
Connection	Screw cap	BNC plug shielded cable	Screw cap	Screw cap	Banana plug	Screw cap	Screw cap	Screw cap	Screw cap	Screw cap	Screw cap	Screw cap	Banana plug	Screw cap	Screw cap	Screw cap	Screw cap	Screw cap	Screw cap
Salt-bridge solution	3 M KCl with sat. AgCl	3 M KCl with sat. AgCl	Sat. KCl + sat. AgCl	Sat. KCl + sat. AgCl upper res.	Sat. KCl	Sat. KCl	Sat. KCl in inner reservoir	1 M LiCl	Sat. KCl	Sat. KCl	Sat. KCl	Sat. KCl	Sat. K ₂ SO ₄	Sat. K ₂ SO ₄	Sat. K ₂ SO ₄	Sat. K ₂ SO ₄	0.1 M KOH	1 M KOH	1 M KOH

Obtaining accurate and reproducible results: some tips

✓ To ensure a stable reference potential, the salt-bridge solution should not be more than 5 mm below the electrode filling hole. Top up when required.

✓ Always read the proper storage conditions described in the operating instructions.

✓ Clean your electrodes regularly. The operating instructions give details of the most suitable cleaning procedure. A correctly maintained reference electrode has a lifetime of approximately 2 years.

* These Electrodes Contain Mercury. Dispose According To Local, State Or Federal Regulations.