DIONEX

Now sold under the Thermo Scientific brand

Thermo SCIENTIFIC

Product Information Update

Product: Electrochemical Detector Consumables

Bulletin # PIU_ED_1 **Date Issued**: February 2008

The product information bulletin aims to provide general information and specifications about the Dionex products. This information would serve as a guide for the Field service and Application support personnel to ensure the correct configurations are used as well as address specific product and application concerns. For any questions please contact your local technical support specialists

This PIB provides support information for Electrochemical Detector and consumables:

- Eluent compatibility of the different disposable electrodes.
- Recommended gaskets for various working electrodes.
- The new PEEK™ yoke knob assembly for the ED (ICS-3000) cell.
- Potential Shift Measurement of the Reference Electrode using a Digital Voltmeter.
- Recommendations are also included for optimal ED performance.

We will be providing periodic updates on ED Products and recommendations for improving performance.

I. Eluent Compatibility and Recommendations for the Disposable Electrodes

These recommendations ensure optimal performance of the disposable electrodes under continuous exposure to the eluents for 14 days and at temperatures up to 30 °C. For chromatographic conditions requiring higher base concentration Dionex recommends the use of the respective Conventional working electrodes.

Disposable Electrodes (P/N)	[NaOH]	[MSA]	Additional Comments
Gold Carbohydrates: 060139, 060216 *AAA-Certified*: 060082, 060140	- Up to 100 mM NaOH (continuous exposure) - Up to 200 mM NaOH, when used for a single 5-10 min periods during runs with otherwise lower concentrations of NaOH	-NA-	For higher hydroxide containing eluents, use conventional Gold electrodes: 061749 (Carbohydrates) or 063722 (AAA)
Silver: 063003	62.5 mM	-NA-	For higher hydroxide containing eluents, use conventional Silver electrodes: 061755
Platinum: 064440	-NA-	100 mM	For higher MSA containing eluents, use conventional Platinum electrodes: 061751

For proper eluent preparation, please refer to the Technical Note: 71, "**Eluent Preparation for High-Performance Anion-Exchange Chromatography with Pulsed Amperometric Detection**".
The technical note can be accessed at the following web address:
http://www1.dionex.com/en-us/webdocs/58087_TN71_Eluent_Prep_HPAE_PAD_10Oct2007_LPN1932_01.pdf

II. Gaskets' Recommendations for the Electrodes

The following chart tabulates the appropriate gaskets to be used with the specific working electrodes.

Electrode Diameter: 1 mm				
Electrode Type	**Electrode Material**	**Electrode Part No.**	**Compatible Gaskets**	**Gasket Part No.**
Conven-tional	ICS-3000 Gold (Au)	061749	1 Mil* x 1 mm Ultem® ‡	045972
Conven-tional	ICS-3000 AAA Gold (Au)	063722		
Conven-tional	ICS-3000 Silver (Ag)	061755		
Conven-tional	ICS-3000 Platinum (Pt)	061751		
Conven-tional	ICS-3000 Glassy Carbon (GC)	061753		
Conven-tional	ED50 Gold (Au)	044112		
Conven-tional	ED50 AAA Gold (Au)	055832		
Conven-tional	ED50 Silver (Ag)	044114		
Conven-tional	ED50 Platinum (Pt)	044113		
Conven-tional	ED50 Glassy Carbon (GC)	044115		
Disposable	Carbohydrates Gold (Au) [6/pk]	060139	2 Mil x 1 mm Teflon®	060141
	Carbohydrates Gold (Au) [24/pk]	060216		
Disposable	*AAA-Direct* Gold (Au) [6/pk]	060082		
	AAA-Direct Gold (Au) [24/pk]	060140		
Disposable	Silver (Ag) [6/pk]	063003		
Disposable	Platinum (Pt) [6/pk]	064440		
Electrode Diameter: 3 mm				
Conven-tional	ICS-3000 Gold (Au)	063723	3 Mil x 1 mm Teflon	063537
			5 Mil x 1 mm Teflon	063550

* Mil: One mil equals 1/1000 of an inch.
‡ Ultem: Thermoplastic Polyetherimide (PEI).

III. Improved ED3000 Cell PEEK yoke knob assembly (P/N 062154)

The new yoke knob assemblies for the ED cell feature the new PEEK (PolyEtherEetherKetone) housing, replacing the older stainless steel housing. These new knobs have been tested to provide consistent 5 lb-in pressure over prolonged use. The knobs must be turned a full 360 degrees to fully engage the knob.

New PEEK Knob & Assembly

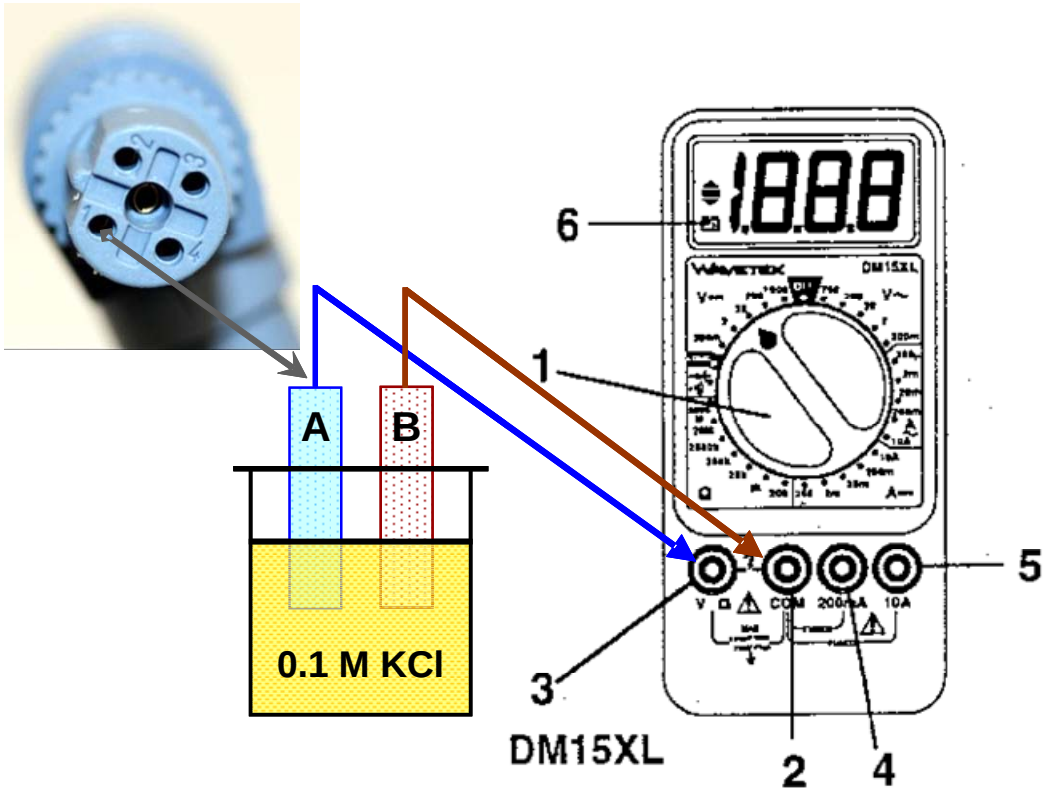
Older Stainless Steel Knob & Assembly

IV. Potential Shift Measurement of the ED3000 pH/Reference Electrode using a Digital Voltmeter

Optimal ED performance is dependent on the application of correct waveform potentials, which in turn is dependent on reference electrode performance. It is important to monitor pH during the chromatographic runs. The reference electrode should be calibrated upon installation or replacement of the ED cell, or if a drift in the pH is observed. The reference electrode potential is measured against a known good or an unexposed reference electrode using a Digital Voltmeter. The testing procedure is shown in the figure below.

- Use a 0.033˝ (0.84 mm) wire to connect the Ag/AgCl halves of the reference electrodes (Pin 1 on the blue connector) to the voltage inputs of the DVM, as indicated in the photograph below.
- Immerse both electrodes in freshly prepared 0.1 M KCl. Set the range to 0-200 mV or similar.

The new electrodes should be in the range of -5 to +10 mV. When used with alkaline eluents, a reference electrode generates a gradually increasing value of its potential over several months.
An electrode with a potential of >30 mV but <50 mV can be regenerated by storing in 3 M KCl (an addition of 0.1 M HCl helps). An electrode indicating potential >60 mV should be discarded.



Electrode A: Test Ag/AgCl Reference electrode (to be measured)
Electrode B: Known good or unexposed Ag/AgCl Reference electrode

Digital Voltmeter (DVM):

1	*Function/Range Switch*	Selects the function (volt, ampere, or ohm) and the range for the measurement.
2	*COM Input Terminal*	Common ground, used in all measurements.
3	*VΩ Input Terminal*	For voltage or resistance measurements.
4	*200 mA Input Terminal*	For small current measurements.
5	*10 A Input Terminal*	For large current measurements.
6	*Low Battery LCD*	Appears when the battery needs replacement.

V. Recommendations for Optimal ED Performance

A. After System Installation

i. It is a good practice to perform an OQ/PQ on the newly installed system which will define the status of the IC system and can be used as a benchmark for troubleshooting any issue at a later date. Refer to document no: 031726, for the OQ/PQ procedure (version 5.11). Threonine peak height observed with the 10μM standard should be greater than 200 nC.

ii. For AAA system installations, it is important to qualify the system using the "*AAA-Direct* system installation Kit", P/N 059539. Please refer to document no: 023741, for further information.

B. For obtaining optimal and stable ED performance:

i. Perform system and ED OQ/PQ as a part of regular maintenance and in case of an ED performance issue, revalidate the system using the ED OQ first.

ii. When installing a new column, clean the guard and analytical columns as well as the fluid lines sequentially ensuring that the ED cell is not in the fluid path. Once all the lines have been cleaned, connect the ED cell.

iii. Ensure the DC door is fully closed while running the applications to ensure stable compartment temperature and electrical shielding.

iv. For obtaining good peak shapes, set the data collection rate (Hz) to 1/waveform time, e.g. the waveform time for the standard quad waveform is 0.5 sec, the data collection rate should be set to 2 Hz.

v. ED Cell Storage recommendations:

1. If the cell will not be used for a short time (less than 2 days), disconnect the tubing from the inlet and outlet fittings and install fitting plugs.
2. If the cell will not be used for more than 2 days, disconnect the outlet and the inlet lines, and disconnect the cell from the system. Disassemble the ED cell and clean the working and the reference electrodes and the cell body. Reference electrodes should be stored in 3 M KCl solution, ensuring the glass membrane remains soaked during storage.