

## Technical Bulletin # 55

**To:** Coulometrics Support Personnel  
**From:** Applications/Engineering Dept.  
**Date:** February 10, 2004  
**Subject:** Required Materials for UIC System Components.

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All UIC systems and components require additional materials for proper operation and maintenance. These materials should be on hand before an installation and training technician arrives on-site. This will facilitate the proper installation and training protocols.

**For CM5014 CO<sub>2</sub> Coulometer** – All necessary chemical solutions are supplied with the instrument. For coulometer cell cleaning the following supplies are required:

- **Methyl Alcohol** – equal to, or better than, Histological grade (*Fisher Cat# A433 P-4*)
- **Deionized water**
- **Vacuum source** – can be provided via mechanical vacuum pump or aspirator vacuum pump (*Fisher Cat# 09-960-2*) connected to a faucet.
- **Vacuum tubing** – 1/4" ID, 5/8" OD (*Fisher Cat# 14-173C*)
- **#3 one-hole rubber stopper** (*Fisher Cat# 14-135E*)
- **Barbed connector** (*Fisher Cat# 15-315-6A*)
- **Nitric Acid solution** – 50% (1:1) (*Fisher Cat# LC17770-1*)

**For CM5130 Acidification Module**

- **45% Potassium Hydroxide (KOH)** solution (*Fisher Cat# SP236-500*)
- **-RECOMMENDED- Perchloric Acid (70%)** (*Fisher Cat# A2296-1LB*) – mix 69 ml of perchloric acid solution into 400 ml of water to make a 2N perchloric acid solution. Perchloric acid is **not** oxidizing in a dilute solution.
- **-or- Hydrochloric Acid solution (2N)** (*Fisher Cat# SA431-500*) **-or- Sulfuric Acid solution (2N)** (*Fisher Cat# LC25790-1*) If using either the hydrochloric or sulfuric acid solutions then the following chemicals will be needed for the post-scrubber solution:
  - Silver Nitrate, crystalline (*Fisher Cat# S486-100*)
  - Hydrogen Peroxide (3%) (*Fisher Cat# H324-500*)
- **Calcium Carbonate**, primary standard (*GFS Cat# 337*) – used as a standard for performance verification. The CaCO<sub>3</sub> should be dried at 105°C for several hours prior to use and stored in a dessicator (*such as Fisher Cat# 08615A*).

**For CM5300 Furnace Module** – Post-scrubbers such as magnesium perchlorate, acid dichromate and manganese dioxide are supplied with the furnace unit and are available through UIC. Other necessary supplies are:

- **Oxygen supply** – Ultra High Purity (*Airco – UHP Grade 4.4, 99.994%, 300 or 200 size cylinder*) (*Scott Specialty Gases – UHP Grade, 99.99%, K or A size cylinder*)

- **Two-Stage Regulator** for Oxygen tank (*Airco Model 412, Cat# 412-2331*) (*Scott Specialty Gases Model 18, Cat# 51-18A-540*) (*Fisher Cat# 10-572R*)
- **Female Connector** – 1/8" tube to 1/4" NPT (*Supelco Cat# 21978-U*) (*Swagelok # B-200-7-4*)
- **Calcium Carbonate**, primary standard (*GFS Cat# 337*), **or Benzoic Acid**, certified ACS (*Fisher Cat# A65-500*) – used as a standard for performance verification. The CaCO<sub>3</sub> should be dried at 105°C for several hours prior to use and stored in a dessicator (*such as Fisher Cat# 08615A*).

#### For CM5240 TIC Autosampler

- **Perchloric Acid (70%)** (*Fisher Cat# A2296-1LB*) – mix 69 ml of perchloric acid solution into 400 ml of water to make a 2N perchloric acid solution. Perchloric acid is **not** oxidizing in a dilute solution.
- **Calcium Carbonate**, primary standard (*GFS Cat# 337*) – used as a standard for performance verification. The CaCO<sub>3</sub> should be dried at 105°C for several hours prior to use and stored in a dessicator (*such as Fisher Cat# 08615A*).
- **Nitrogen supply** – High Purity (99.9%) or better
- **Two-Stage Regulator** for Nitrogen tank – CGA 580 fitting.
- **Female Connector** – 1/8" tube to 1/4" NPT (*Supelco Cat# 21978-U*) (*Swagelok # B-200-7-4*)

**For CM5200 Autosampler Furnace** – Post-scrubbers such as magnesium perchlorate, acid dichromate and manganese dioxide are supplied with the furnace unit and are available through UIC. Other necessary supplies are:

- **Oxygen supply** – Ultra High Purity (*Airco – UHP Grade 4.4, 99.994%, 300 or 200 size cylinder*) (*Scott Specialty Gases – UHP Grade, 99.99%, K or A size cylinder*)
- **Two-Stage Regulator** for Oxygen tank (*Airco Model 412, Cat# 412-2331*) (*Scott Specialty Gases Model 18, Cat# 51-18A-540*) (*Fisher Cat# 10-572R*)
- **Female Connector** – 1/8" tube to 1/4" NPT (*Supelco Cat# 21978-U*) (*Swagelok # B-200-7-4*)
- **Calcium Carbonate**, primary standard (*GFS Cat# 337*), **or Benzoic Acid**, certified ACS (*Fisher Cat# A65-500*) – used as a standard for performance verification. The CaCO<sub>3</sub> should be dried at 105°C for several hours prior to use and stored in a dessicator (*such as Fisher Cat# 08615A*).

**For CM5600 Infrared Furnace** – Post-scrubbers such as magnesium perchlorate, acid dichromate and manganese dioxide are supplied with the furnace unit and are available through UIC. Other necessary supplies are:

- **Oxygen supply** – Ultra High Purity (*Airco – UHP Grade 4.4, 99.994%, 300 or 200 size cylinder*) (*Scott Specialty Gases – UHP Grade, 99.99%, K or A size cylinder*)
- **Two-Stage Regulator** for Oxygen tank (*Airco Model 412, Cat# 412-2331*) (*Scott Specialty Gases Model 18, Cat# 51-18A-540*) (*Fisher Cat# 10-572R*)

- **Female Connector** – 1/8" tube to 1/4" NPT (*Supelco Cat# 21978-U*) (*Swagelok # B-200-7-4*)
- **Calcium Carbonate**, primary standard (*GFS Cat# 337*), or **Benzoic Acid**, certified ACS (*Fisher Cat# A65-500*) – used as a standard for performance verification. The CaCO<sub>3</sub> should be dried at 105°C for several hours prior to use and stored in a dessicator (*such as Fisher Cat# 08615A*).

**For CM5014S SO<sub>2</sub> Coulometer** – All necessary chemical solutions are supplied with the instrument.

- **Methyl Alcohol** – equal to, or better than, Histological grade (*Fisher Cat# A433 P-4*)
- **Deionized water**
- **Vacuum source** – can be provided via mechanical vacuum pump or aspirator vacuum pump (*Fisher Cat# 09-960-2*) connected to a faucet.
- **Vacuum tubing** – 1/4" ID, 5/8" OD (*Fisher Cat# 14-173C*)
- **#3 one-hole rubber stopper** (*Fisher Cat# 14-135E*)
- **Barbed connector** (*Fisher Cat# 15-315-6A*)
- **Nitric Acid solution** – 50% (1:1) (*Fisher Cat# LC17770-1*)
- **Sodium Sulfite**, primary standard (*Fisher Cat# MK806404*) – used as a standard for performance verification. The Na<sub>2</sub>SO<sub>3</sub> should be dried at 105°C for several hours prior to use and stored in a dessicator (*such as Fisher Cat# 08615A*).

If there is any doubt as to what supplies are required for your particular application please contact UIC to discuss your usage.

**All Analysis Systems** – All UIC carbon analysis systems require that an analytical microbalance or volumetric measuring device be used for accurate measuring of sample mass or volume. A microbalance such as the Cahn Model C-33 (*Fisher Cat# 20-063-40*) is recommended. Analysis accuracy is dependent on the use of pure, dry standards and precise weighing.

#### **Suppliers –**

- Airco – Check Yellow Pages for dealer nearest you
- Alltech – Call 1-800-ALLTECH to place orders
- Fisher Scientific – Call 1-800-766-7000 to place orders
- GFS Chemicals – 1-800-858-9682
- Scott Specialty Gases – Call 215-766-8861 for dealer nearest you
- Supelco – Call 1-800-359-3041 to place orders