Mercury working electrodes have found widespread use due to the high overpotential for hydrogen ion reduction and the reproducibility of the metal surface.

The original mercury electrode was the Dropping Mercury Electrode (DME), in which the growth of the drop on the tip of a capillary and the drop lifetime were controlled by gravity. The next development was the Static Mercury Drop Electrode (SMDE), in which a valve was used to dispense a drop of mercury on the capillary tip. This drop was then dislodged by a drop knocker. The Hanging Mercury Drop Electrode (HMDE) is a stationary electrode derived from the SMDE, and is used extensively for quantitative trace analysis.

The latest innovation in mercury electrode technology is the Controlled Growth Mercury Drop Electrode (CGME), which was developed by BAS, in cooperation with Prof. Janet Osteryoung at North Carolina State University and Prof. Zygmunt Kowalski at the Institute of Materials Science in Krakow, Poland (US Patent No. 4,846,955). In the CGME, the drop growth is controlled by a fast response valve. The opening of this valve is controlled by a computer-generated pulse sequence, which leads to a stepped increase in the drop size. The drop size can therefore be varied by changing the number of pulses and/or the pulse width, so a wide range of drop sizes is available.

The rate of growth of the mercury drop can be controlled by varying the time between the pulses. Therefore, a slowly growing mercury drop suitable for stripping experiments can be generated. There are two important advantages of the CGME vs. the conventional HMDE for such experiments. First, there is no contamination of the capillary due to back diffusion. Second, the slow growth of the mercury drop during the deposition step leads to a homogeneous distribution of the analyte within the drop.

The BAS 100B/W, the CV-50W, and the EC epsilon control the electrode while it is in the CGME or SMDE modes. Earlier models (BAS 100, 100A, and 100B) control in the SMDE mode only, and only manual operation of dispense and dislodge is available with the CV-27. When the DME mode is selected, the valve is held open continuously for classical polarography experiment. A 100 µm bore capillary is recommended for the DME mode.

A metal Faraday cage is available for the CGME as an option. The cage is placed over the cell and capillary assembly and is easily removed.

Mercury is not included with CGME due to international laws that prohibit the shipping of this metal by air. Please purchase 3X- or 4X-distilled mercury from a company that is licensed to ship mercury.

Features

- Wide range of drop sizes
- Programmable drop growth with the BAS 100B/W and CV-50W
- DME, SMDE, and CGME modes
- HMDE available in SMDE and CGME modes
- Good electrical contact minimizes electrode resistance
- Fast response time
- Rapid drop stabilization
- Small volume glass cell vials
- Water-jacketed cell vial
- Cell top compatible with BAS voltammetry electrodes
- Standard addition port
- Quick-connect input gas line connector
- Easy maintenance
- Minimal metal contact reduces metal contamination
- Self-contained power supply
- Mounted magnetic stirrer with 50-800 rpm
- Manual and remote control of mercury dispense, drop knock, stirrer on/off, inert gas purge/blanket
- Minimal chance of mercury spills
- Standard package:
  - Cell stand with magnetic stirrer and gas purge utilities
  - 150 µm ID glass capillary
  - Platinum auxiliary electrode
  - Ag/AgCl reference electrodes (3)
  - Standard glass cell vials (12)
  - Stir bar
  - Startup kit (vacuum degas kit, mercury loading syringe, blunt needle, tubing)
  - Mercury pickup tool (plastic rod with silver tip) and plastic spill tray
  - Manual

Specifications

**Cell Modes**
CGME, SMDE, and DME

**Operations**
Manual and remote control of mercury dispense; drop knocker; stir on/off; gas purge/blanket

**Magnetic Stirrer**
16 selectable rates from 50-800 rpm

**Mercury Reservoir**
Sealed reservoir minimizes opportunity for mercury spills. Minimal use of metal parts within reservoir or capillary to avoid metal contamination.

**Mercury Degassing**
Mercury degassing kit is included with purchase and includes a hand-actuated vacuum pump and accessories

**Spill Management**
Spill tray and mercury pickup tool are included in the standard package

**Standard Capillary**
150 µm (0.006") ID. Large diameter reduces plugging and loss of electrode contact. Beveled tip design

**Gas Purging**
5 psi max. Needle valve controlled.

**Cell Top**
Separate port in cell top for dispensing sample or reagents. Accommodates BAS voltammetry electrodes for use as a cell stand for voltammetry experiments.

**Options**
- 100 µm ID capillary
- Faraday cage
- Small volume and water-jacketed cell vials

**Physical**
42 x 18 x 23 cm (H x W x D), 6 kg
### Ordering Information

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MF-1400</td>
<td>Controlled Growth Mercury Electrode</td>
</tr>
<tr>
<td>MR-1208</td>
<td>Glass Cell Vials, 12/pkg.</td>
</tr>
<tr>
<td>MF-1084</td>
<td>Low Volume Cell Vial, 6/pkg.</td>
</tr>
<tr>
<td>ER-9132</td>
<td>Magnetic Stir Bar, 1 ea.</td>
</tr>
<tr>
<td>MW-4601</td>
<td>Mercury Trap, 1 ea.</td>
</tr>
<tr>
<td>MF-2090</td>
<td>Beveled Capillary Assembly, 150 µm ID, 1 ea.</td>
</tr>
<tr>
<td>MF-2092</td>
<td>Beveled Capillary Assembly, 100 µm ID, 1 ea.</td>
</tr>
<tr>
<td>MF-2069</td>
<td>Mercury Collector Rod, 1 ea.</td>
</tr>
<tr>
<td>MF-7150</td>
<td>Vacuum Prime Pump, 1 ea.</td>
</tr>
<tr>
<td>MR-1212</td>
<td>Water-Jacketed CGME Cell Vial, 1 ea.</td>
</tr>
<tr>
<td>MF-2093</td>
<td>CGME Septum, 1 ea.</td>
</tr>
<tr>
<td>MF-1028</td>
<td>CGME Valve Seal, 1 ea.</td>
</tr>
<tr>
<td>MF-2052</td>
<td>RE-5B Reference Electrode, 1 ea.</td>
</tr>
<tr>
<td>MF-2079</td>
<td>RE-5B Reference Electrode, 3/pkg.</td>
</tr>
<tr>
<td>MW-1032</td>
<td>Auxiliary Electrode, 1 ea.</td>
</tr>
<tr>
<td>MR-2052</td>
<td>2&quot; Blunt Tip Needle, 1 ea.</td>
</tr>
<tr>
<td>MW-1034</td>
<td>Cell Top Plug, Kel-F, 1 ea.</td>
</tr>
<tr>
<td>MR-1241</td>
<td>O-ring for working electrode contact</td>
</tr>
<tr>
<td>EF-1425</td>
<td>Faraday Cage</td>
</tr>
<tr>
<td>MR-3850</td>
<td>Spill Tray, 19&quot; x 12&quot; x 1.25&quot;</td>
</tr>
<tr>
<td>MR-3818</td>
<td>Teflon Cell Top</td>
</tr>
</tbody>
</table>