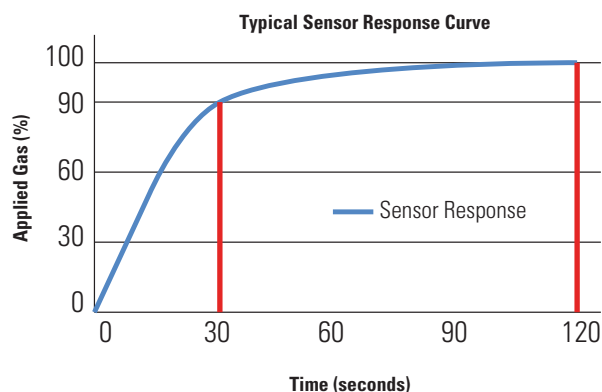
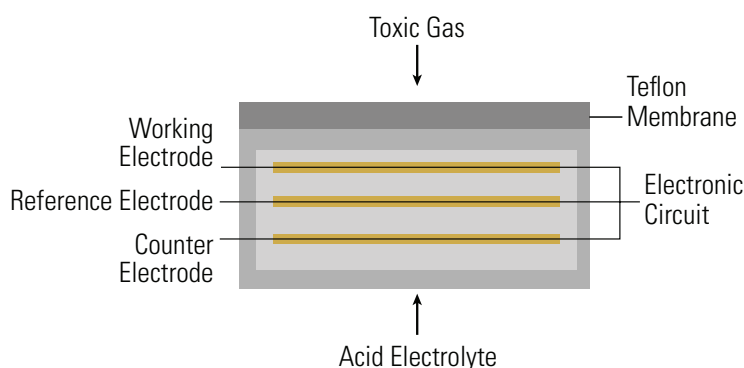


## Electrochemical Sensors

The basic components of an electrochemical sensor are a working (or sensing) electrode, a counter electrode, and some may contain a reference electrode. These electrodes are enclosed in the sensor housing in contact with a liquid electrolyte. The working electrode is on the inner face of a Teflon membrane that is porous to gas, but impermeable to the electrolyte.

The gas diffuses into the sensor and through the membrane to the working electrode. When the gas reaches the working electrode, an electrochemical reaction occurs: either an oxidation or reduction depending on the type of gas. For example, carbon

monoxide may be oxidized to carbon dioxide, or oxygen may be reduced to water. An oxidation reaction results in the flow of electrons from the working electrode to the counter electrode through the external circuit; and conversely a reduction reaction results in a flow of electrons from the counter electrode to the working electrode. This flow of electrons constitutes an electric current, which is proportional to the gas concentration. The electronics in the instrument detect and amplify the current and scale the output according to the calibration. The instrument then displays the gas concentration in parts per million (ppm) for toxic gas sensors and percent by volume for oxygen sensors.



## Reactive Gas Sensor Guidelines $\text{Cl}_2$ , $\text{NO}_2$ , $\text{HCl}$ , $\text{NH}_3$ , $\text{SO}_2$ , $\text{ClO}_2$ , $\text{HCN}$ , $\text{PH}_3$

### Calibration Requires

Flow gas @ 0.5 LPM

For gas sampling and instrument calibration of reactive gases (gases for which there is a dedicated ISC sensor), use urethane tubing.

For the following exotic gases:  $\text{Cl}_2$ ,  $\text{ClO}_2$ ,  $\text{HCl}$ , and VOCs, use Teflon-lined Sample Tubing.

### Manual Calibration

1. Use a constant flow regulator rated at 0.5 lpm
2. Use a demand flow regulator for instruments with a pump
3. When using a multi-gas instrument with both  $\text{Cl}_2$  and  $\text{H}_2\text{S}$  sensors, calibrate the  $\text{Cl}_2$  sensor first to eliminate the negative cross interference of  $\text{H}_2\text{S}$

### Docking Station Calibration

The Docking Station is programmed to select the proper sequence for calibration of reactive gases.

**NOTE:** Do not attempt to disassemble a sensor; if the sensor is cracked, dented, or otherwise visibly damaged, the sensor must be packaged and returned to Industrial Scientific or disposed of according to official regulations. For additional information, please contact your local Industrial Scientific representative. Global contact information can be found at [www.indsci.com/offices](http://www.indsci.com/offices).