

GLASS ELECTRODES WITH CALOMEL ELEMENTS FOR pH MEASUREMENTS

117089	STD. 1199-49
117098	STD. 1199-50
117099	STD. 1199-51
117100	

1. GENERAL INFORMATION

These electrodes are used with calomel reference electrodes to measure pH. Because the basic construction is the same (see figure), the instructions on preparation and maintenance apply to all of these electrodes. The 117098, 117099, and 117100 Electrodes are normally used with the 117104 Calomel Reference Electrode and the 117089, Std. 1199-49, Std. 1199-50, and Std. 1199-51 with the 117105 Calomel Reference Electrode. Additional information on each electrode is provided in the table.

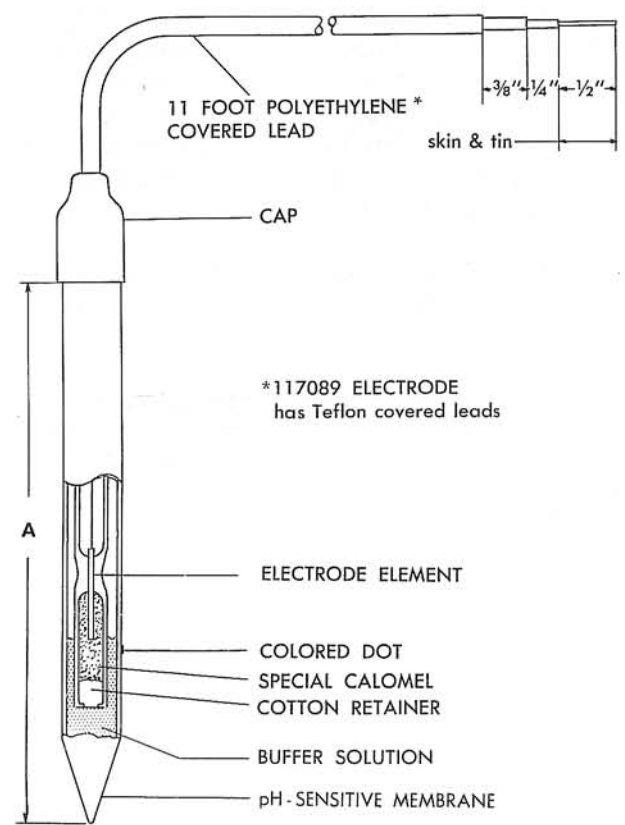
Excluding any asymmetry correction, the emf-pH relationship for an electrode system composed of one of these glass electrodes and an appropriate calomel reference electrode is given by the following equation (which is derived from the Nernst equation):

$$\text{emf} = .00019842 T (\text{pH} - 7)$$

where T = degrees Kelvin.

Since pH measurements depend upon aqueous solutions, high concentrations of non-aqueous solutions (such as alcohol) may alter the glass electrode potential. Hence, the reading of the measuring instrument (whose calibration is based on the Nernst equation) may not be of the required accuracy.

For extremely accurate work,



ELECTRODE	TEMP RANGE °C	COLOR OF DOT	DIST "A" APPROX	ELECTRODE MOUNTING UNIT
Std. 1199-49	0-20	BLUE	4 5/8"	7781 or -2
Std. 1199-50	20-60	BLACK	4 5/8"	7781 or -2
Std. 1199-51	50-90	WHITE	4 5/8"	7781 or -2
117089*	50-90	WHITE	4 5/8"	7781 or -2
117098	0-30	BLUE	6 3/8"	7763 or -4
117099	20-60	BLACK	6 3/8"	7763 or -4
117100	50-90	WHITE	6 3/8"	7763 or -4

*Designed for continuous use above 80 C

nomographs for determining the sodium ion error of electrodes marked with one black or two white dots may be obtained by requesting Directions 77-11-0-9. In the presence of sodium ions, the blue-dot electrode is not recommended for measurements above 10 pH.

If the electrode is used at temperatures outside the recommended temperature range, these two points should be considered:

(1) As the temperature decreases, the electrical resistance of the pH-sensitive membrane increases logarithmically. Hence, at temperatures much below the minimum temperature, the resistance may exceed the value (e. g., 2000 megohms or more) for which the measuring instrument is designed.

(2) High temperatures shorten electrode life. At temperatures above 90 C, the calomel may deteriorate, thus causing electrode failure. For alkaline solutions, the sodium ion error may be too large at temperatures above the recommended maximum temperature.

2. PREPARATION

Remove the electrode from its shipping carton. Be especially careful not to scratch the pH-sensitive membrane.

Condition the electrode by immersing its tip in distilled water or a buffer solution of 7 pH overnight at room temperature. (Any dry electrode should be conditioned in this manner.)

Refer to the directions supplied with the mounting unit for instructions

on installing and connecting for electrode. If the lead is shortened, prepare the end as indicated in the figure. While tinning the end, be careful not to damage the plastic insulation by applying too much heat.

3. MAINTENANCE

As determined by experience, periodically clean the electrode. The tip may be carefully wiped with a soft, wet cloth. Do not scratch it. Oily deposits may be cleaned with a detergent. If it is difficult to remove other deposits, wash the tip with dilute hydrochloric acid and thoroughly rinse it with distilled water.

If the system is not functioning properly, examine the pH-sensitive membrane for scratches or cracks, and check the lead for a broken shield.

To store the electrode, place it vertically in a container of distilled water or a buffer solution of 7 pH. However, if the electrode is being used to measure the pH of alkaline solutions, it is recommended that it be stored in an alkaline buffer solution such as the 101-1-0-3 Buffer Solution (9.18 pH at 25 C). As a result, its response will be rapid the next time it is used.

Continued use of the electrode at high temperatures will cause it to deteriorate slowly which, in turn, may cause the electrode response to become sluggish. To correct sluggish response, immerse the electrode in a rubber or waxed beaker containing a 20 per cent solution of ammonium bifluoride at about 25 C for about one minute. Then thoroughly wash the electrode and store it in distilled water or a buffer solution.



LEEDS & NORTHRUP