

U. S. DEPARTMENT OF COMMERCE  
NATIONAL BUREAU OF STANDARDS

CERTIFICATE

for

Standard Sample 189

POTASSIUM TETROXALATE  
(pH Standard)

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Purity

This lot of potassium tetroxalate dihydrate ( $\text{KHC}_2\text{O}_4 \cdot \text{H}_2\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$ ) was prepared to insure high purity and uniformity and to assay close to 100 percent. However, it is certified only as a pH standard, not as a pure substance.

pH Values

The pH values of aqueous solutions of Standard 189 at 25°C at four concentrations are as follows:

Molarity(M)	pH	Molarity(M)	pH
0.01	2.156	0.05	1.681
0.025	1.867	0.1	1.520

The 0.05-M solution is recommended for use as a standard for pH measurements in the acid range. In common with other strongly acid solutions, it has a high buffer value and a high dilution value. In other words, its pH is little influenced by chance contamination with traces of acid or base but is relatively sensitive, in comparison with buffer solutions of moderate acidity, to changes in concentration. Nevertheless, the dilution value is not high enough to impair significantly its usefulness as a pH standard. The pH of this 0.05-M solution as a function of temperature is given in the following table:

°C	pH	°C	pH	°C	pH
0	1.671	25	1.681	50	1.712
5	1.671	30	1.685	55	1.719
10	1.669	35	1.693	60	1.726
15	1.674	40	1.697		
20	1.676	45	1.704		

The uncertainty of the assigned pH values is estimated not to exceed  $\pm 0.010$  unit. The pH was derived from emf measurements of cells without liquid junction by the method of calculation described in the Journal of Research of the National Bureau of Standards 51, 189 (October 1953).

#### Directions for Use

Preparation of the 0.05-molar solution: Transfer 12.70 g (air weight) to a 1-liter volumetric flask and fill to the mark with distilled water. It is not necessary to remove dissolved atmospheric carbon dioxide from the water or to dry the salt before weighing it. The tetroxalate solutions are satisfactorily stable without the addition of preservatives. In order to minimize effects of evaporation and accidental contamination, however, it is recommended that a fresh standard solution be prepared every two months.

(signed) EDWARD WICHERS, Chief  
Division of Chemistry

Washington, D. C.  
January 6, 1954.