

U. S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS

CERTIFICATE
FOR

STANDARD SAMPLE 187

BORAX
(pH standard)

PURITY

This lot of borax ($\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$) was prepared to insure high purity and uniformity. It meets the specifications of the American Chemical Society for reagent-grade material, but should not be considered as entirely free from impurities such as traces of free acid or alkali, carbon dioxide, chlorides, sulfur compounds, and heavy metals.

pH Values

The pH values at 25° C for 4 concentrations of solutions of borax are as follows:

Molarity	pH	Molarity	pH
0.005	9.18	0.025	9.17
.01	9.18	.05	9.20

The 0.01-molar solution is recommended for the calibration of pH equipment. The pH of this solution as a function of temperature is given below:

°C	pH	°C	pH	°C	pH
0	9.46	25	9.18	50	9.01
5	9.39	30	9.14	55	8.99
10	9.33	35	9.10	60	8.96
15	9.27	40	9.07		
20	9.22	45	9.04		

An uncertainty of ± 0.01 pH unit is estimated. The pH values were derived from emf measurements of cells without liquid junction, and equations and values for natural constants accepted by the National Bureau of Standards

DIRECTIONS FOR USE

Preparation of a 0.01-molar solution: Crush gently any large lumps of the salt (the salt must not be dried in an oven before use). Transfer 3.814 g of the salt to a 1-liter volumetric flask, dissolve and fill to the mark with distilled water having a pH of not less than 6.5 and not more than 7.5. Water of this quality can be obtained by boiling distilled water for 15 minutes and cooling it under carbon-dioxide-free conditions. Protect the buffer solution from contamination with atmospheric carbon dioxide by use of a soda-lime tube, and keep the stopper of the bottle in place except when actually pouring out some of the buffer. In the calibration of pH equipment, the use of the buffer in air within 10 minutes after its removal from the bottle will ordinarily be permissible. The 0.01-M solution prepared on the volume (molar) basis has a pH value to within 0.001 unit of that prepared on the weight (molal) basis.

(Signed) E. U. CONDON, Director.
G.E.F.L.

January 13, 1947.

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