



## Standard Reference Materials

### 2183 MOPSO and 2184 MOPSO Sodium Salt

Standard Reference Materials (SRMs), 2183-MOPSO (3-(N-morpholino)-hydroxypropanesulfonic acid) and 2184-MOPSO Sodium Salt (NaMOPSOate) are intended for preparing solutions for use in calibrating clinical instruments for blood pH measurements in the physiologically important range of pH 7 to 8.

The pH(s) values correspond to  $\log(1/a_{\text{H}})$ , where  $a_{\text{H}}$  is the conventional activity of the hydrogen ion referred to the standard state ( $p^{\circ}=1$  atmosphere) on the molal (mol/kg) scale. The certified values listed below were derived from emf measurements of cells without liquid junction. The uncertainties of the assigned values of pH(s) for the 0.05 mol/kg MOPSO buffer and for the 0.08 mol/kg MOPSO and NaCl buffer are not expected to exceed  $\pm 0.015$  units for the temperature range of 0 to 50 °C.

The pH(s) values for a buffer solution 0.05 mol/kg with respect to MOPSO and NaMOPSOate (MOPSO-NaMOPSOate) as a function of temperature are:

| °C | pH(s) | °C | pH(s) | °C | pH(s) |
|----|-------|----|-------|----|-------|
| 0  | 7.260 | 20 | 6.941 | 37 | 6.699 |
| 5  | 7.176 | 25 | 6.867 | 40 | 6.658 |
| 10 | 7.095 | 30 | 6.795 | 45 | 6.592 |
| 15 | 7.017 | 35 | 6.726 | 50 | 6.528 |

The pH(s) values for a buffer solution 0.08 mol/kg with respect to MOPSO, NaMOPSOate, and NaCl (MOPSO-NaMOPSOate-NaCl) as a function of temperature are:

| °C | pH(s) | °C | pH(s) | °C | pH(s) |
|----|-------|----|-------|----|-------|
| 0  | 7.268 | 20 | 6.940 | 37 | 6.694 |
| 5  | 7.181 | 25 | 6.865 | 40 | 6.654 |
| 10 | 7.098 | 30 | 6.792 | 45 | 6.588 |
| 15 | 7.018 | 35 | 6.722 | 50 | 6.524 |

The MOPSO and MOPSO Sodium Salt were obtained from the Sigma Chemical Co., St. Louis, Missouri.

The analytical measurements for material homogeneity and hydrogen ion activity were performed by Y.C. Wu, P.A. Berezansky, and W.F. Koch of the NIST Inorganic Analytical Research Division, and D. Feng, Guest Scientist, People's Republic of China.

The technical and support aspects involved in the original preparation, certification, and issuance of these Standard Reference Materials were coordinated through the Standard Reference Materials Program by J.C. Colbert.

Gaithersburg, MD 20899  
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DIRECTIONS FOR USE

These SRMs should be dried in a vacuum oven at 2 to 3 Pa and 50 °C for 24 h. Reagent grade NaCl should be dried in an oven at 110 °C for 12 h. All three materials should then be stored in a desiccator over magnesium perchlorate.

Preparation of the 0.05 mol/kg MOPSO-NaMOPSOate buffer solution:

Transfer 11.264 g MOPSO and 12.363 g NaMOPSOate to 1000.0 g of distilled water and mix thoroughly.

Preparation of the 0.08 mol/kg MOPSO-NaMOPSOate-NaCl buffer solution:

Transfer 18.022 g MOPSO, 19.780 g NaMOPSOate, and 4.676 g NaCl, respectively to 1000.0 g of distilled water and mix thoroughly.

The distilled water should not have a conductivity greater than  $2 \times 10^{-6}$  S/cm.

The water used in the preparation of these pH buffer solutions need not be protected from atmospheric carbon dioxide, nor are elaborate precautions needed to exclude air from the solutions. The solutions should, however, be protected against evaporation and from contamination by molds. For highest accuracy, buffer solutions should be replaced monthly or whenever mold is detected.

#### REFERENCE

[1] Feng, D., Koch, W.F., Wu, Y.C., The Second Dissociation Constant and pH of N-2 Hydroxyethylpiperazine-N'-2-ethanesulfonic acid (HEPES) from 0 to 50 °C, Anal. Chem. 61, 1400, (1989).