

## Product Information

### HEPES hemisodium salt

Catalog Number **H9897**  
Store at Room Temperature

CAS RN 103404-87-1

Synonyms: *N*-(2-hydroxyethyl)piperazine-*N'*-(2-ethanesulfonic acid) hemisodium salt;  
4-(2-hydroxyethyl)piperazine-1-ethanesulfonic acid hemisodium salt

#### Product Description

This product has been formulated so the contents of one pouch will dissolve in 1 liter of deionized water to yield 0.1 M sodium HEPES buffer at pH 7.5 at 25 °C.

Molecular formula:  $C_8H_{17.5}N_2O_4S \cdot 0.5Na$   
Molecular weight: 249.30

Useful pH range: 6.8–8.2

$pK_a$  values:<sup>1,2</sup>  $pK_1 \sim 3$   
 $pK_2 = 7.85$  at 0 °C  
7.55 at 20 °C  
7.31 at 37 °C  
 $\Delta pK_a/\Delta T = -0.014/^\circ C^3$

HEPES has been described as one of the best all-purpose buffers available for biological research.<sup>3</sup> At most biological pHs the molecule is zwitterionic and is most effective as a buffer at pH 6.8–8.2. HEPES has been used in a wide variety of applications, including tissue culture.

Buffer strength for cell culture applications is usually in the range of 10–25 mM; HEPES is used in media formulations to stabilize pH at 37 °C.<sup>1</sup> Care must be taken to maintain appropriate osmolality in the media and toxicity with respect to a given cell line must be evaluated. Isotonicity data have been tabulated.<sup>4</sup> HEPES is reportedly superior to the use of  $NaHCO_3$  in controlling pH in tissue and organ culture.<sup>5</sup>

In protein determination procedures, HEPES interferes with the Folin-Ciocalteu protein assay; however, the biuret protein assay is unaffected.<sup>6</sup>

HEPES was the buffer of choice in a protein deposition technique in electron microscopy because it did not affect metal substrates.<sup>7</sup> HEPES does not bind magnesium, calcium, manganese(II) nor copper(II) ions.<sup>8</sup>

#### Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.

#### Preparation Instructions

This product has been formulated so the contents of one pouch will dissolve in 1 liter of deionized water to yield 0.1 M sodium HEPES buffer at pH 7.5 at 25 °C.

Solutions may be autoclaved under standard conditions.<sup>1,2</sup>

#### Storage/Stability

Store the product at room temperature.

#### References

1. Sigma-Aldrich data
2. Medzon, E.L., and Gedies, A., Canadian J. Microbiol., **17**, 651 (1971).
3. Good, N.E., et al., Biochemistry, **5**, 467 (1966).
4. Merck Index, 12th Ed., MISC-51 (1996).
5. Shipman, C., "Control of Culture pH with Synthetic Buffers", Ch. 7 in *Tissue Culture, Methods and Applications* (Academic Press, 1973) p. 709.
6. Himmel, H.M., and Heller, W., J. Clin. Chem. Clin. Biochem., **25**, 909-913 (1987).
7. Panitz, J.A., et al., J. Electron Microscopy Technique, **2**, 285-292 (1985).
8. Good, N.E., and Izawa, S., Methods in Enzymology, **24B**, 53 (1972).
9. Merck Index, 12th Ed., #4687 (1996).
10. Stoscheck, C.M., Methods in Enzymology, **182**, 50 (1990).

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