

Product Information

MES hydrate

Catalog Numbers **M2933**, **M5287** and **M8250**
Store at Room Temperature

CAS # 4432-31-9 (anhydrous)
Molecular Formula: $C_6H_{13}NO_4S \cdot x H_2O$
Molecular Weight: 195.24 (anhydrous)

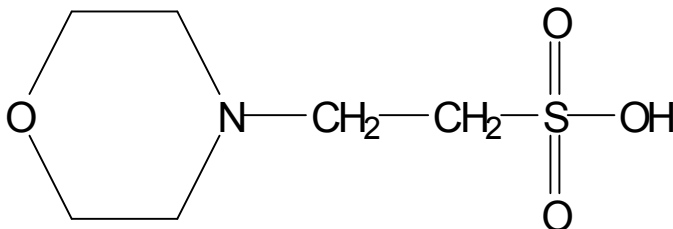
Synonyms: 4-Morpholineethanesulfonic acid hydrate;
2-(N-Morpholino)ethanesulfonic acid hydrate

Assay: $\geq 99.5\%$ (titration)

M2933 is Biotechnology Performance Certified and
plant cell culture tested.

M5287, SigmaUltra, is tested for trace ions.

Product Description



Melting point: decomposes above $300\text{ }^{\circ}\text{C}$ ¹
 $pK_a = 6.10$ at $25\text{ }^{\circ}\text{C}$ ^{1,2}
Useful buffering range: pH 5.5-6.7
 $\Delta pK/\Delta T = -0.011^{\circ}\text{C}^{-1}$ ²
Metal binding constants (log K) at $20\text{ }^{\circ}\text{C}$, for
0.1 M solution:
 Mg^{2+} , 0.8; Ca^{2+} , 0.7; Mn^{2+} , 0.7; Cu^{2+} , negligible.^{1,3}

MES is one of a number of so-called "Good" buffers developed for biological applications, with the criteria: midrange pK_a , maximum water solubility and minimum solubility in all other solvents, minimal salt effects, minimal change in pK with temperature, chemically and enzymatically stable, minimal absorption in visible or UV spectral range and easily synthesized.¹

A buffer using MES can be prepared by titrating with NaOH to the desired pH. Alternatively, stock solutions of MES and MES sodium salt can be mixed to attain the desired pH. Standard mixing tables using stock solutions to prepare buffers of a given pH have been published.³ MES is *not* recommended for buffering at pH 7.4; other buffers should be considered.¹

Precautions and Disclaimer

For research or further manufacturing use only. Not intended for direct use in humans or animals. TSCA-exempt use only in US. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.

Preparation Instructions

MES is soluble in water, giving a clear colorless solution at concentrations of 0.5 M or higher. (M 8250 is tested at 20 g/80 mL water, or approximately 1.3 M.)⁴ The pH of a solution should be between 2.5 and 5, depending on concentration. A saturated solution at $0\text{ }^{\circ}\text{C}$ is approximately 0.65 M.¹

Storage/Stability

Solutions are stable at $2-8\text{ }^{\circ}\text{C}$ for months. Sterilize by filtration through $0.2\text{ }\mu\text{m}$ filters. Autoclaving is not recommended for any sulfonic acid buffer. If buffers must be nuclease-free, treat the water first, then add the buffer after autoclaving. When MES solutions are autoclaved, they turn yellow (although pH does not change measurably). The identity of the yellow breakdown product is unknown.⁴

References

1. Good, Norman E. et al., *Biochemistry*, 5, 467-477 (1966).
2. *Methods in Enzymology*, 182, 24-38 (1990).
3. *Data for Biochemical Research*, 3rd Ed., eds. Dawson, R.M.C. et al., (Oxford Press, 1987), p. 410, 424, 431.
4. Sigma data

PHC 11/08-1