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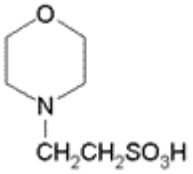
69889 / 69890 / 69892 / 69897 MES monohydrate

Synonyms: (2-(N-Morpholino)ethanesulfonic acid, 4-Morpholineethanesulfonic acid monohydrate)
CAS number: 145224-94-8

Product Description:

Molecular Formula:	$C_6H_{13}NO_4S \cdot H_2O$
Molecular Weight:	213.25 g/mol
Melting point:	decomposes above 300 °C[2]
pH:	2.5 - 4.0 (0.5 M in H_2O, 25°C)
pK_a:	6.10 at 25 °C [2,3]
Useful buffering range:	pH 5.5-6.7
$\Delta pK/\Delta T$:	-0.011 [3]
A_{260nm} (0.5 M in H_2O):	0.025 [1]
A_{280nm} (0.5 M in H_2O):	0.020 [1]



Metal binding constants (log K) at 20 °C, for 0.1 M solution: Mg^{2+}, 0.8; Ca^{2+}, 0.7; Mn^{2+}, 0.7; Cu^{2+}, negligible.[2,4]
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 reasonably easily synthesized.[2]
MES is not recommended for buffering at pH 7.4; other buffers should be considered.[2]
All qualities are tested for trace ions and all can be used for biological and biochemistry applications.
69889 BioChemika Ultra, for molecular biology
69897 BioChemika Ultra, for luminescence (for optical applications)
69890 BioChemika Ultra (for use in biochemical and biological techniques where highly purified products are needed)
69892 BioChemika (for use in biochemical and biological techniques)

A buffer using MES free acid can be prepared by titrating the free acid with sodium hydroxide to the desired pH ($pK_a \pm 1$). Alternatively, volumes of equimolar MES free acid and sodium MES can be mixed to attain the desired pH. Standard mixing tables using stock solutions to prepare a buffer of a given pH have been published.[4]

Solubility / Stability:
MES is soluble in water, giving a clear colorless solution at concentrations of 0.5 M or higher.
The pH of a solution should be between 2.5 and 5, depending on concentration. A saturated solution at 0 °C is approximately 0.65 M.[2]
Solutions should be stable at 2-8 °C for months.

Sterilization:
Sterilization should be by filtration through 0.2 μm filters. Autoclaving is not recommended for any sulfonic acid buffers. If buffers must be nuclease-free, it is best to treat the water, then add the buffer solids 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.[1]

References:

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