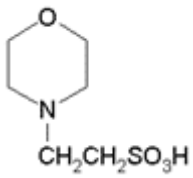
# 69889 / 69890 / 69892 MES monohydrate

**Properties:**

| | |
|---|---|
| CAS Number | 145224-94-8 |
| Molecular Formula: | $C_6H_{13}NO_4S \cdot H_2O$ |
| Molecular Weight: | 213.25 g/mol |
| Melting point: | decomposes above 300 °C [1] |
| pH: | 2.5 - 4.0 (0.5 M in $H_2O$, 25°C) |
| $pK_a$: | 6.10 at 25°C [1,2] |
| Useful buffering range: | pH 5.5-6.7 |
| $\Delta pK/\Delta T$: | -0.011 [2] |
| $A_{260nm}$ (0.5 M in $H_2O$): | 0.025 [3] |
| $A_{280nm}$ (0.5 M in $H_2O$): | 0.020 [3] |




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.[1,4]

**Product Description:**

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.[1]
MES is not recommended for buffering at pH 7.4; other buffers should be considered.[1]
All qualities are tested for trace ions and all can be used for biological and biochemistry applications.
69889 BioUltra, for molecular biology
69890 BioUltra
(for use in biochemical & biological techniques where highly purified products are needed)
69892 BioXtra (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 ($pK_a$ ± 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.[1]
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.[3]

**References:**


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


**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.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