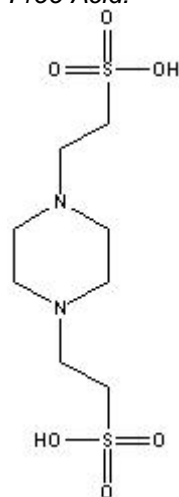


## TECHNICAL INFORMATION

Catalog Number: 102660, 152456, 190256, 190257, 194552, 194838  
**PIPES, free acid and salts**

### Structure:

*Free Acid:*

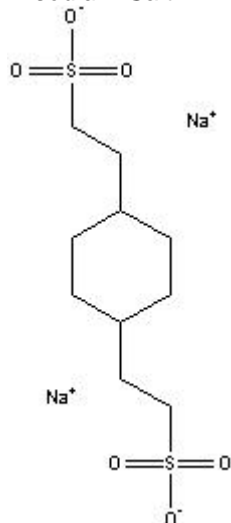


**Molecular Formula:** C<sub>8</sub>H<sub>18</sub>N<sub>2</sub>O<sub>6</sub>S<sub>2</sub>

**Molecular Weight:** 302.4

**CAS #** 5625-37-6

*Disodium Salt:*

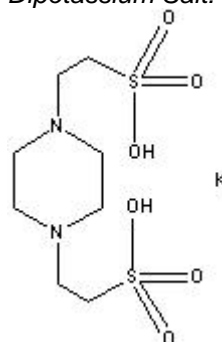


**Molecular Formula:** C<sub>8</sub>H<sub>16</sub>N<sub>2</sub>O<sub>6</sub>S<sub>2</sub>Na<sub>2</sub>

**Molecular Weight:** 346.3

**CAS #** 76836-02-7

*Dipotassium Salt:*

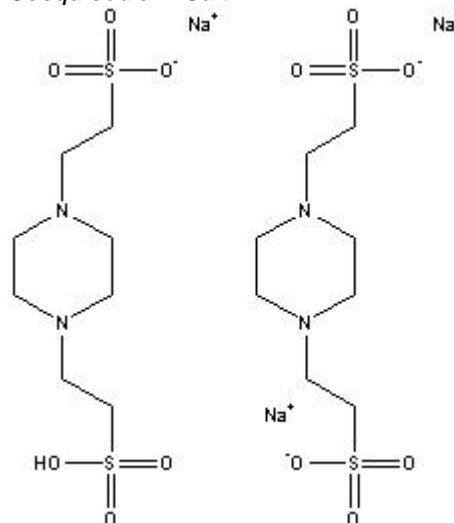


**Molecular Formula:** C<sub>8</sub>H<sub>16</sub>N<sub>2</sub>O<sub>6</sub>S<sub>2</sub>K<sub>2</sub>

**Molecular Weight:** 378.5

**CAS #** 108321-27-3

*Sesquisodium Salt:*



**Molecular Formula:** C<sub>8</sub>H<sub>16.5</sub>N<sub>2</sub>O<sub>6</sub>S<sub>2</sub>Na<sub>1.5</sub>

**Molecular Weight:** 335.3

**CAS #** 100037-69-2

**Synonyms:** Piperazine-N,N'-bis(ethanesulfonic acid); 1,4-Piperazinediethanesulfonic acid; Piperazine-N,N'-bis(2-ethanesulfonic acid)

**Physical Description:** White crystalline powder

**pK<sub>a2</sub>:** 6.8 @ 25°C<sup>2</sup>; 6.66 @ 37°C

**Effective buffering range:** 6.1 - 7.5 (Merck Index reports 6.0 to 8.5<sup>1</sup>)

**DpK/DT:** 0.0085<sup>3</sup>

**Approximate pH for a 0.1 M Solution:**

Dipotassium Salt	Disodium Salt	Sesquisodium Salt
Approx. 7.5 - 10.0	Approx. 10 - 11.5	Approx. 5.5 - 7.5

**Solubility:** Pipes free acid is not very water soluble (approximately 1 g/L @ 100°C) but will solubilize in 0.5 M NaOH; PIPES salts are water soluble (usually resulting in clear, colorless solutions). For sterilization it is recommended to filter sterilize using a 0.2 um filter.

**Description:** PIPES is a zwitterionic N-substituted aminosulfonic acid "Good" buffer.<sup>1</sup>

Buffers can be made by adding a solution of base to PIPES free acid, titrating to the appropriate pH, or by mixing equimolar solutions of the sesquisodium salt and the disodium salt or dipotassium salt, titrating to the appropriate pH.

**Some suggested buffering uses:**

- Use to buffer glutaraldehyde fixative solutions when fixing plant and/or animal tissue samples. This will help prevent the loss of lipids.<sup>4,5</sup>
- Use to buffer glutaraldehyde and formaldehyde when fixing fungal zoospores for fluorescence microscopy and electron microscopy. PIPES tends to give optimal results.<sup>7</sup>

**Availability:**

CATALOG #	DESCRIPTION	SIZE
102660	Disodium salt, 76826-02-7	10g, 25g, 100g, 250g, 500g, 1Kg
152456	Sesquisodium salt, 100037-69-2	10g, 25g, 100g, 500g, 1Kg
190256	Dipotassium salt, 108321-27-3	10g, 25g, 100g, 500g, 1Kg
190257	Free acid, 5625-37-6	10g, 25g, 100g, 500g, 1Kg
194552	Cell culture reagent free acid, 5625-37-6	10g, 25g, 100g, 500g, 1Kg
194838	Molecular biology reagent, 5625-37-6	25g, 100g, 500g

**References:**

- Merck Index, **12th Ed.**, No. 7633.
- Good, N.E., et al., *Biochemistry*, **v. 5**, 456-477 (1966).
- *Methods in Enzymology*, **v. 104**, 404 (1984).
- Salema, R. and Brandao, I., *J. Submicr. Cytol.*, **v. 9**, 79 (1973).
- Schiff, R.I. and Gennaro, J.F., *Scanning Electron Microsc.*, **v. 3**, 449 (1979).
- Yamamoto, K. and Ogawa, K., *Histochemistry*, **v. 77**, 339 (1983).
- Hardham, A.R., *J. Histochem. Cytochem.*, **v. 33**, 110 (1985).