

Buffer Properties

Temperature Dependence of the pH for Commonly Used Buffers

Buffer System	pK _a /20°C	[Delta]pK _a /10°C
MES	6.15	-0.11
ADA	6.6	-0.11
PIPES	6.8	-0.085
ACES	6.9	-0.2
BES	7.15	-0.16
MOPS	7.2	-0.013
TES	7.5	-0.2
HEPES	7.55	-0.14
TRICINE	8.15	-0.21
TRIS	8.3	-0.31
BICINE	8.35	-0.18
GLYCYLGLYCINE	8.4	-0.28

Temperature Dependence of the pH of 50 mM Tris-HCl Solutions

4°C	25°C	37°C
8.1	7.5	7.2
8.2	7.6	7.3
8.3	7.7	7.4
8.4	7.8	7.5
8.5	7.9	7.6
8.6	8	7.7
8.7	8.1	7.8
8.8	8.2	7.9
8.9	8.3	8
9	8.4	8.1
9.1	8.5	8.2
9.2	8.6	8.3
9.3	8.7	8.4
9.4	8.8	8.5

Preparation of 1 M Potassium Phosphate Buffer

Desired pH	1 M K ₂ HP ₄	1 M KH ₂ P ₄
5.8	8.5 ml	91.5 ml
6	13.2 ml	86.8 ml
6.2	19.2 ml	80.8 ml
6.4	27.8 ml	72.2 ml
6.6	38.1 ml	61.9 ml
6.8	49.7 ml	50.3 ml
7	61.5 ml	38.5 ml
7.2	71.7 ml	28.3 ml
7.4	80.2 ml	19.8 ml
7.6	86.6 ml	13.4 ml
7.8	90.8 ml	9.2 ml

Data from Green (1933)

Preparation of 1 M Sodium Phosphate Buffer

Desired pH	1 M Na ₂ HP ₄	1 M NaH ₂ P ₄
5.8	7.9 ml	92.1 ml
6	12.0 ml	88.0 ml
6.2	17.8 ml	82.2 ml
6.4	25.5 ml	74.5 ml
6.6	35.2 ml	64.8 ml
6.8	46.3 ml	53.7 ml
7	57.7 ml	42.3 ml
7.2	68.4 ml	31.6 ml
7.4	77.4 ml	22.6 ml
7.6	84.5 ml	15.5 ml
7.8	89.6 ml	10.4 ml
8	93.2 ml	6.8 ml

Data from ISCO (1982)