

Table 4. pH variation of methanol-aqueous buffer mixtures.

$${}^s\text{pH} = {}^w\text{pH} + m_{\text{pH}} \phi_{\text{MeOH}}^{d_{\text{pH}}}$$

Buffering system	Aqueous concentration	${}^w\text{pH}$	m_{pH}	${}^s\text{pH}$ at MeOH volume fraction of									
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8		
Acetic acid	0.01 mol·L ⁻¹	3.50	1.85	3.60	3.75	3.91	4.09	4.28	4.48	4.69	4.90		
		4.00	2.22	4.12	4.30	4.49	4.71	4.93	5.17	5.42	5.68		
		4.50	2.25	4.63	4.80	5.00	5.22	5.45	5.69	5.94	6.20		
		5.00	2.25	5.13	5.30	5.50	5.72	5.95	6.19	6.44	6.70		
		5.50	2.25	5.63	5.80	6.00	6.22	6.45	6.69	6.94	7.20		
		6.00	2.25	6.13	6.30	6.50	6.71	6.94	7.19	7.44	7.70		
	0.05 mol·L ⁻¹	3.50	2.17	3.62	3.79	3.98	4.19	4.41	4.65	4.89	5.14		
		4.00	2.22	4.13	4.30	4.49	4.71	4.94	5.17	5.42	5.68		
		4.50	2.23	4.63	4.80	4.99	5.21	5.44	5.68	5.93	6.18		
		5.00	2.23	5.13	5.30	5.49	5.71	5.94	6.18	6.43	6.68		
		5.50	2.23	5.63	5.80	5.99	6.21	6.44	6.68	6.93	7.18		
		6.00	2.23	6.13	6.30	6.49	6.71	6.94	7.18	7.42	7.68		
		Citric acid	0.01 mol·L ⁻¹	2.50	1.52	2.59	2.70	2.84	2.98	3.14	3.30	3.48	3.65
				3.00	1.88	3.11	3.25	3.42	3.60	3.79	3.99	4.20	4.42
3.50	2.16			3.62	3.79	3.98	4.19	4.41	4.64	4.88	5.13		
4.00	2.35			4.13	4.31	4.52	4.75	4.99	5.24	5.50	5.78		
4.50	2.49			4.64	4.83	5.05	5.29	5.55	5.81	6.09	6.38		
5.00	2.61			5.15	5.35	5.58	5.83	6.10	6.38	6.67	6.98		
5.50	2.73			5.65	5.87	6.11	6.37	6.65	6.94	7.25	7.57		
6.00	2.81			6.16	6.38	6.62	6.89	7.18	7.49	7.80	8.13		
6.50	2.84			6.66	6.88	7.13	7.40	7.70	8.00	8.32	8.65		
7.00	2.83			7.16	7.38	7.63	7.90	8.19	8.50	8.81	9.14		
7.50	2.76		7.66	7.87	8.11	8.38	8.66	8.96	9.27	9.59			
0.05 mol·L ⁻¹	2.50		1.86	2.60	2.75	2.91	3.09	3.28	3.48	3.69	3.91		
	3.00		2.15	3.12	3.29	3.48	3.68	3.90	4.13	4.37	4.62		
	3.50		2.30	3.63	3.81	4.01	4.23	4.47	4.71	4.97	5.24		
	4.00	2.39	4.13	4.32	4.53	4.76	5.01	5.26	5.53	5.81			
	4.50	2.48	4.64	4.83	5.05	5.29	5.54	5.81	6.09	6.37			
	5.00	2.58	5.15	5.35	5.57	5.82	6.08	6.36	6.65	6.95			
	5.50	2.68	5.65	5.86	6.09	6.35	6.63	6.91	7.21	7.53			
	6.00	2.73	6.15	6.37	6.61	6.87	7.15	7.44	7.75	8.07			
	6.50	2.75	6.65	6.87	7.11	7.37	7.66	7.95	8.26	8.58			
	7.00	2.74	7.15	7.37	7.61	7.87	8.15	8.45	8.76	9.07			
7.50	2.70	7.65	7.86	8.10	8.36	8.63	8.92	9.23	9.54				

$d_{\text{pH}} = 5/4$ for acetic, citric and phosphoric acid systems.

$d_{\text{pH}} = 1$ for ammonia system.

Table 4 (continued)

Buffering system	Aqueous concentration	w_w pH	m_{pH}	s_w pH at MeOH volume fraction of								
				0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	
Phosphoric acid	0.01 mol·L ⁻¹	2.11	1.51	2.19	2.31	2.44	2.59	2.74	2.91	3.08	3.25	
		3.00	2.36	3.13	3.32	3.52	3.75	3.99	4.25	4.51	4.79	
		3.50	2.40	3.64	3.82	4.03	4.27	4.51	4.77	5.04	5.32	
		6.50	2.99	6.67	6.90	7.16	7.45	7.76	8.08	8.41	8.76	
		7.00	2.98	7.17	7.40	7.66	7.95	8.25	8.57	8.90	9.25	
		7.50	2.94	7.67	7.89	8.15	8.44	8.74	9.05	9.38	9.73	
		8.00	2.85	8.16	8.38	8.63	8.91	9.20	9.51	9.83	10.16	
		8.50	2.62	8.65	8.85	9.08	9.33	9.60	9.88	10.18	10.48	
	0.05 mol·L ⁻¹	2.21	2.54	2.25	2.45	2.67	2.92	3.18	3.45	3.73	4.03	
		3.00	2.81	3.16	3.38	3.62	3.89	4.18	4.48	4.80	5.12	
		3.50	2.81	3.66	3.88	4.12	4.39	4.68	4.99	5.30	5.63	
		6.50	2.96	6.67	6.90	7.16	7.44	7.74	8.06	8.40	8.74	
		7.00	2.95	7.17	7.40	7.66	7.94	8.24	8.56	8.89	9.24	
		7.50	2.94	7.67	7.89	8.15	8.43	8.73	9.05	9.38	9.72	
		8.00	2.88	8.16	8.39	8.64	8.92	9.21	9.52	9.84	10.18	
		8.50	2.73	8.65	8.87	9.11	9.37	9.65	9.94	10.25	10.57	
Ammonia	0.01 mol·L ⁻¹	8.00	-0.69	7.93	7.86	7.79	7.73	7.66	7.59	7.52	7.45	
		8.50	-0.69	8.43	8.36	8.29	8.22	8.16	8.09	8.02	7.95	
		9.00	-0.69	8.93	8.86	8.79	8.72	8.66	8.59	8.52	8.45	
		9.50	-0.69	9.43	9.36	9.29	9.23	9.16	9.09	9.02	8.95	
		10.00	-0.66	9.93	9.87	9.80	9.73	9.67	9.60	9.53	9.47	
	0.05 mol·L ⁻¹	8.00	-0.68	7.93	7.86	7.80	7.73	7.66	7.59	7.52	7.45	
		8.50	-0.68	8.43	8.36	8.30	8.23	8.16	8.09	8.02	7.95	
		9.00	-0.68	8.93	8.86	8.80	8.73	8.66	8.59	8.52	8.45	
		9.50	-0.68	9.43	9.36	9.30	9.23	9.16	9.09	9.02	8.95	
		10.00	-0.68	9.93	9.86	9.80	9.73	9.66	9.59	9.52	9.46	

$d_{\text{pH}} = 5/4$ for acetic, citric and phosphoric acid systems.

$d_{\text{pH}} = 1$ for ammonia system.