

**TABLE 3.3 Terminal Settling Velocity for 100- to 2000-Micrometer Spheres at Standard Conditions<sup>a</sup>**

Diameter ( $\mu\text{m}$ )	Re	$V_{\text{TS}}$ (m/s)	Diameter ( $\mu\text{m}$ )	Re	$V_{\text{TS}}$ (m/s)
100	1.65	0.248	360	34.5	1.44
105	1.87	0.268	370	36.5	1.48
110	2.12	0.289	380	38.6	1.52
115	2.38	0.312	390	40.7	1.57
120	2.67	0.335	400	42.9	1.61
125	2.98	0.358	410	45.1	1.65
130	3.31	0.382	420	47.4	1.69
135	3.61	0.402	430	49.8	1.74
140	3.96	0.425	440	52.2	1.78
145	4.33	0.448	450	54.6	1.82
150	4.71	0.472	460	57.1	1.86
155	5.11	0.495	470	59.6	1.90
160	5.52	0.518	480	62.2	1.94
165	5.95	0.542	490	64.8	1.98
170	6.40	0.566	500	67.5	2.02
175	6.87	0.589	550	81.6	2.22
180	7.35	0.613	600	96.8	2.42
185	7.84	0.637	650	113	2.61
190	8.35	0.660	700	130	2.80
195	8.88	0.684	750	149	2.98
200	9.42	0.708	800	168	3.16
210	10.5	0.755	850	189	3.34
220	11.7	0.802	900	210	3.52
230	13.0	0.849	950	233	3.69
240	14.3	0.896	1000	257	3.86
250	15.7	0.943	1100	307	4.19
260	17.1	0.989	1200	361	4.52
270	18.6	1.03	1300	419	4.84
280	20.1	1.08	1400	480	5.15
290	21.7	1.12	1500	546	5.46
300	23.4	1.17	1600	614	5.77
310	25.1	1.21	1700	686	6.06
320	26.9	1.26	1800	762	6.36
330	28.7	1.30	1900	841	6.65
340	30.6	1.35	2000	924	6.94
350	32.5	1.39			

<sup>a</sup>Calculated using the intermediate-region approximation  $C_D = (24/\text{Re})(1 + 0.15\text{Re}^{0.687})$ . Particle density =  $1000 \text{ kg/m}^3$  [ $1.0 \text{ g/cm}^3$ ].

**TABLE 3.4 Reynolds Numbers for Settling Spheres Having  $C_D(\text{Re})^2$  from 10 to  $10^5$ <sup>a</sup>**

$C_D(\text{Re})^2$	0	1	2	3	4	5	6	7	8	9
10	0.40	0.43	0.47	0.51	0.54	0.58	0.61	0.65	0.69	0.72
20	0.75	0.79	0.82	0.86	0.89	0.92	0.96	0.99	1.02	1.06
30	1.09	1.12	1.15	1.18	1.22	1.25	1.28	1.31	1.34	1.37
40	1.40	1.43	1.47	1.50	1.53	1.56	1.59	1.62	1.65	1.68
50	1.71	1.74	1.77	1.80	1.83	1.86	1.89	1.92	1.95	1.98
60	2.01	2.04	2.07	2.10	2.13	2.16	2.19	2.22	2.25	2.27
70	2.30	2.33	2.36	2.39	2.42	2.45	2.47	2.50	2.53	2.56
80	2.59	2.62	2.64	2.67	2.70	2.73	2.75	2.78	2.81	2.84
90	2.86	2.89	2.92	2.95	2.97	3.00	3.03	3.05	3.08	3.11
$C_D(\text{Re})^2$	0	10	20	30	40	50	60	70	80	90
100	3.14	3.40	3.66	3.92	4.17	4.41	4.66	4.90	5.13	5.36
200	5.59	5.82	6.05	6.27	6.49	6.70	6.92	7.13	7.34	7.55
300	7.75	7.96	8.16	8.36	8.56	8.75	8.95	9.14	9.34	9.53
400	9.72	9.90	10.1	10.3	10.5	10.6	10.8	11.0	11.2	11.4
500	11.5	11.7	11.9	12.1	12.2	12.4	12.6	12.8	12.9	13.1
600	13.3	13.4	13.6	13.8	13.9	14.1	14.2	14.4	14.6	14.7
700	14.9	15.0	15.2	15.4	15.5	15.7	15.8	16.0	16.1	16.3
800	16.4	16.6	16.7	16.9	17.1	17.2	17.3	17.5	17.6	17.8
900	17.9	18.1	18.2	18.4	18.5	18.7	18.8	19.0	19.1	19.2
$C_D(\text{Re})^2$	0	100	200	300	400	500	600	700	800	900
1000	19.4	20.8	22.1	23.4	24.7	26.0	27.2	28.4	29.6	30.7
2000	31.8	33.0	34.0	35.1	36.2	37.2	38.2	39.2	40.2	41.2
3000	42.2	43.2	44.1	45.1	46.0	46.9	47.8	48.7	49.6	50.5
4000	51.4	52.2	53.1	53.9	54.8	55.6	56.4	57.3	58.1	58.9
5000	59.7	60.5	61.3	62.1	62.9	63.6	64.4	65.2	65.9	66.7
6000	67.4	68.2	68.9	69.7	70.4	71.1	71.8	72.6	73.3	74.0
7000	74.7	75.4	76.1	76.8	77.5	78.2	78.9	79.6	80.2	80.9
8000	81.6	82.3	82.9	83.6	84.2	84.9	85.6	86.2	86.9	87.5
9000	88.1	88.8	89.4	90.1	90.7	91.3	92.0	92.6	93.2	93.8
$C_D(\text{Re})^2$	0	1000	2000	3000	4000	5000	6000	7000	8000	9000
10000	94.4	100	106	112	117	123	128	133	138	143
20000	148	152	157	162	166	170	175	179	183	187
30000	191	195	199	203	207	211	214	218	222	226
40000	229	233	236	240	243	247	250	254	257	260
50000	264	267	270	273	277	280	283	286	289	292
60000	295	298	301	304	307	310	313	316	319	322
70000	325	328	331	334	336	339	342	345	348	350
80000	353	356	358	361	364	367	369	372	374	377
90000	380	382	385	388	390	393	395	398	400	403

<sup>a</sup>The value of  $C_D(\text{Re})^2$  equals the sum of the row and column headings.

**TABLE 3.5 Reynolds Numbers for Settling Spheres Having  $C_D/Re$  from 0.01 to 100<sup>a</sup>**

$C_D/Re$	0	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009
0.01	106	99.5	93.8	88.8	84.4	80.6	77.2	74.1	71.3	68.8
0.02	66.5	64.3	62.4	60.6	58.9	57.3	55.8	54.5	53.2	52.0
0.03	50.8	49.7	48.7	47.8	46.8	46.0	45.1	44.3	43.6	42.8
0.04	42.1	41.5	40.8	40.2	39.6	39.1	38.5	38.0	37.5	37.0
0.05	36.5	36.0	35.6	35.2	34.7	34.3	34.0	33.6	33.2	32.8
0.06	32.5	32.2	31.8	31.5	31.2	30.9	30.6	30.3	30.0	29.7
0.07	29.5	29.2	29.0	28.7	28.5	28.2	28.0	27.8	27.5	27.3
0.08	27.1	26.9	26.7	26.5	26.3	26.1	25.9	25.7	25.5	25.3
0.09	25.2	25.0	24.8	24.7	24.5	24.3	24.2	24.0	23.9	23.7
$C_D/Re$	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.1	23.6	22.2	21.1	20.0	19.2	18.4	17.7	17.0	16.4	15.9
0.2	15.4	15.0	14.6	14.2	13.8	13.5	13.2	12.9	12.6	12.4
0.3	12.1	11.9	11.7	11.4	11.2	11.1	10.9	10.7	10.5	10.4
0.4	10.2	10.1	9.93	9.80	9.67	9.54	9.42	9.30	9.19	9.08
0.5	8.97	8.87	8.77	8.67	8.58	8.49	8.40	8.32	8.23	8.15
0.6	8.07	8.00	7.92	7.85	7.78	7.71	7.64	7.58	7.51	7.45
0.7	7.39	7.33	7.27	7.21	7.16	7.10	7.05	7.00	6.95	6.90
0.8	6.85	6.8	6.75	6.70	6.66	6.61	6.57	6.53	6.48	6.44
0.9	6.40	6.36	6.32	6.28	6.24	6.20	6.16	6.12	6.09	6.06
$C_D/Re$	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
1	6.03	5.71	5.44	5.20	4.99	4.8	4.63	4.48	4.34	4.21
2	4.09	3.98	3.88	3.79	3.70	3.62	3.54	3.47	3.40	3.33
3	3.27	3.21	3.16	3.11	3.06	3.01	2.96	2.92	2.88	2.84
4	2.80	2.76	2.72	2.69	2.66	2.62	2.59	2.56	2.53	2.51
5	2.48	2.45	2.43	2.40	2.38	2.35	2.33	2.31	2.29	2.27
6	2.25	2.23	2.21	2.19	2.17	2.15	1.13	2.12	2.10	2.08
7	2.07	2.05	2.04	2.02	2.01	2.00	1.98	1.97	1.96	1.94
8	1.93	1.92	1.90	1.89	1.88	1.87	1.86	1.84	1.83	1.82
9	1.81	1.80	1.79	1.78	1.77	1.76	1.75	1.74	1.73	1.72
$C_D/Re$	0	1	2	3	4	5	6	7	8	9
10	1.71	1.63	1.55	1.49	1.43	1.38	1.33	1.29	1.25	1.21
20	1.18	1.15	1.12	1.10	1.07	1.05	1.03	1.01	0.99	0.97
30	0.95	0.93	0.92	0.90	0.89	0.88	0.86	0.85	0.84	0.83
40	0.82	0.81	0.80	0.79	0.78	0.77	0.76	0.75	0.74	0.73
50	0.73	0.72	0.71	0.70	0.70	0.69	0.68	0.68	0.67	0.67
60	0.66	0.65	0.65	0.64	0.64	0.63	0.63	0.62	0.62	0.61
70	0.61	0.61	0.60	0.60	0.59	0.59	0.58	0.58	0.58	0.57
80	0.57	0.57	0.56	0.56	0.55	0.55	0.55	0.54	0.54	0.54
90	0.54	0.53	0.53	0.53	0.52	0.52	0.52	0.51	0.51	0.51

<sup>a</sup>The value of  $C_D/Re$  equals the sum of the row and column headings.