

TABLE 7.3.3. Type K thermocouples — thermoelectric voltages,  $E(t_{90})$ , Seebeck coefficients,  $S(t_{90})$ , and first derivative of the Seebeck coefficients,  $dS/dt_{90}$ ; reference junctions at 0 °C—Continued

$t_{90}$ °C	E μV	S μV/°C	$dS/dt_{90}$ nV/°C <sup>2</sup>	$t_{90}$ °C	E μV	S μV/°C	$dS/dt_{90}$ nV/°C <sup>2</sup>	$t_{90}$ °C	E μV	S μV/°C	$dS/dt_{90}$ nV/°C <sup>2</sup>
-150	-4 912.71	23.622	152.05	-100	-3 553.63	30.494	122.37	-50	-1 889.38	35.804	89.96
-149	-4 889.01	23.774	151.48	-99	-3 523.08	30.616	121.74	-49	-1 853.53	35.894	89.33
-148	-4 865.16	23.925	150.91	-98	-3 492.40	30.737	121.11	-48	-1 817.80	35.983	88.70
-147	-4 841.16	24.076	150.33	-97	-3 461.60	30.858	120.48	-47	-1 781.57	36.073	88.08
-146	-4 817.01	24.226	149.76	-96	-3 430.68	30.978	119.85	-46	-1 745.45	36.159	87.47
-145	-4 792.71	24.375	149.18	-95	-3 399.65	31.098	119.22	-45	-1 709.25	36.246	86.85
-144	-4 768.26	24.524	148.61	-94	-3 368.49	31.217	118.58	-44	-1 672.96	36.333	86.24
-143	-4 743.66	24.673	148.03	-93	-3 337.21	31.335	117.95	-43	-1 636.59	36.419	85.63
-142	-4 718.91	24.820	147.45	-92	-3 305.82	31.453	117.31	-42	-1 600.12	36.504	85.02
-141	-4 694.02	24.968	146.88	-91	-3 274.31	31.570	116.67	-41	-1 563.58	36.589	84.41
-140	-4 668.98	25.114	146.30	-90	-3 242.68	31.686	116.03	-40	-1 526.95	36.673	83.81
-139	-4 643.79	25.260	145.72	-89	-3 210.94	31.802	115.38	-39	-1 490.23	36.756	83.21
-138	-4 618.46	25.406	145.14	-88	-3 179.08	31.917	114.74	-38	-1 453.44	36.839	82.60
-137	-4 592.98	25.550	144.56	-87	-3 147.10	32.031	114.09	-37	-1 416.56	36.921	82.00
-136	-4 567.36	25.695	143.98	-86	-3 115.01	32.145	113.45	-36	-1 379.59	37.003	81.40
-135	-4 541.59	25.838	143.40	-85	-3 082.81	32.258	112.80	-35	-1 342.55	37.084	80.80
-134	-4 515.68	25.981	142.82	-84	-3 050.50	32.371	112.15	-34	-1 305.42	37.165	80.20
-133	-4 489.63	26.124	142.24	-83	-3 018.07	32.482	111.49	-33	-1 268.22	37.245	79.60
-132	-4 463.43	26.266	141.66	-82	-2 985.53	32.593	110.84	-32	-1 230.94	37.324	78.99
-131	-4 437.10	26.407	141.07	-81	-2 952.89	32.704	110.19	-31	-1 193.57	37.403	78.39
-130	-4 410.62	26.548	140.49	-80	-2 920.13	32.814	109.53	-30	-1 156.13	37.481	77.77
-129	-4 384.00	26.688	139.90	-79	-2 887.26	32.923	108.88	-29	-1 118.61	37.558	77.16
-128	-4 357.24	26.828	139.31	-78	-2 854.28	33.032	108.22	-28	-1 081.01	37.635	76.53
-127	-4 330.34	26.967	138.72	-77	-2 821.19	33.140	107.56	-27	-1 043.34	37.711	75.93
-126	-4 303.31	27.105	138.13	-76	-2 788.00	33.247	106.90	-26	-1 005.59	37.787	75.28
-125	-4 276.13	27.243	137.54	-75	-2 754.70	33.353	106.24	-25	-967.77	37.862	74.61
-124	-4 248.82	27.380	136.95	-74	-2 721.30	33.458	105.58	-24	-929.87	37.936	73.95
-123	-4 221.37	27.517	136.36	-73	-2 687.78	33.564	104.92	-23	-891.90	38.010	73.28
-122	-4 193.79	27.653	135.76	-72	-2 654.17	33.669	104.26	-22	-853.85	38.083	72.59
-121	-4 166.07	27.789	135.17	-71	-2 620.45	33.773	103.60	-21	-815.73	38.155	71.88
-120	-4 138.21	27.923	134.57	-70	-2 586.62	33.876	102.94	-20	-777.54	38.226	71.15
-119	-4 110.22	28.058	133.98	-69	-2 552.69	33.979	102.28	-19	-739.28	38.297	70.40
-118	-4 082.10	28.191	133.38	-68	-2 518.66	34.081	101.62	-18	-700.95	38.367	69.62
-117	-4 053.84	28.325	132.78	-67	-2 484.53	34.182	100.96	-17	-662.54	38.436	68.82
-116	-4 025.45	28.457	132.18	-66	-2 450.30	34.283	100.30	-16	-624.07	38.503	67.99
-115	-3 996.92	28.589	131.57	-65	-2 415.97	34.383	99.64	-15	-585.54	38.572	67.12
-114	-3 968.27	28.720	130.97	-64	-2 381.53	34.482	98.98	-14	-546.93	38.639	66.22
-113	-3 939.48	28.851	130.37	-63	-2 347.00	34.581	98.33	-13	-508.26	38.705	65.27
-112	-3 910.57	28.981	129.76	-62	-2 312.37	34.679	97.67	-12	-469.52	38.770	64.29
-111	-3 881.52	29.110	129.15	-61	-2 277.65	34.776	97.02	-11	-430.72	38.833	63.25
-110	-3 852.35	29.239	128.54	-60	-2 242.82	34.873	96.36	-10	-391.85	38.896	62.16
-109	-3 823.04	29.367	127.93	-59	-2 207.90	34.969	95.71	-9	-352.93	38.958	61.02
-108	-3 793.61	29.495	127.32	-58	-2 172.88	35.064	95.06	-8	-313.94	39.018	59.81
-107	-3 764.05	29.622	126.71	-57	-2 137.77	35.159	94.42	-7	-274.89	39.077	58.53
-106	-3 734.37	29.748	126.09	-56	-2 102.57	35.253	93.77	-6	-235.79	39.135	57.19
-105	-3 704.56	29.874	125.47	-55	-2 067.27	35.346	93.13	-5	-196.62	39.192	55.76
-104	-3 674.62	29.999	124.86	-54	-2 031.87	35.439	92.49	-4	-157.40	39.247	54.25
-103	-3 644.56	30.124	124.24	-53	-1 996.39	35.531	91.85	-3	-118.13	39.300	52.66
-102	-3 614.37	30.248	123.61	-52	-1 960.81	35.623	91.22	-2	-78.80	39.352	50.96
-101	-3 584.06	30.371	122.99	-51	-1 925.14	35.714	90.59	-1	-39.43	39.402	49.16
-100	-3 553.63	30.494	122.37	-50	-1 889.38	35.804	89.96	0	0.00	39.450	47.24

TABLE 7.3.3. Type K thermocouples --- thermoelectric voltages,  $E(t_{90})$ , Seebeck coefficients,  $S(t_{90})$ , and first derivative of the Seebeck coefficients,  $dS/dt_{90}$ ; reference junctions at 0 °C--Continued

$t_{90}$ °C	E μV	S μV/°C	$dS/dt_{90}$ nV/°C <sup>2</sup>	$t_{90}$ °C	E μV	S μV/°C	$dS/dt_{90}$ nV/°C <sup>2</sup>	$t_{90}$ °C	E μV	S μV/°C	$dS/dt_{90}$ nV/°C <sup>2</sup>
0	0.0	39.450	48.85	50	2 023.1	41.246	21.13	100	4 096.2	41.369	-15.33
1	39.5	39.499	48.35	51	2 064.3	41.266	20.43	101	4 137.6	41.353	-15.90
2	79.0	39.547	47.86	52	2 105.6	41.286	19.73	102	4 178.9	41.337	-16.45
3	118.6	39.594	47.37	53	2 146.9	41.306	19.01	103	4 220.3	41.320	-16.98
4	158.2	39.642	46.88	54	2 188.2	41.324	18.30	104	4 261.6	41.303	-17.50
5	197.9	39.688	46.40	55	2 229.6	41.342	17.57	105	4 302.9	41.285	-18.00
6	237.6	39.734	45.91	56	2 270.9	41.360	16.84	106	4 344.1	41.267	-18.49
7	277.3	39.780	45.42	57	2 312.3	41.376	16.11	107	4 385.4	41.248	-18.95
8	317.1	39.825	44.94	58	2 353.7	41.392	15.37	108	4 426.6	41.229	-19.40
9	357.0	39.870	44.45	59	2 395.1	41.407	14.62	109	4 467.9	41.209	-19.83
10	396.9	39.914	43.97	60	2 436.5	41.421	13.87	110	4 509.1	41.189	-20.24
11	436.8	39.958	43.48	61	2 477.9	41.435	13.11	111	4 550.2	41.169	-20.64
12	476.8	40.001	42.99	62	2 519.3	41.447	12.35	112	4 591.4	41.148	-21.01
13	516.8	40.044	42.50	63	2 560.8	41.459	11.59	113	4 632.5	41.127	-21.36
14	556.9	40.086	42.01	64	2 602.3	41.470	10.82	114	4 673.7	41.105	-21.70
15	597.0	40.128	41.51	65	2 643.7	41.481	10.05	115	4 714.7	41.083	-22.01
16	637.1	40.169	41.02	66	2 685.2	41.491	9.28	116	4 755.8	41.061	-22.30
17	677.3	40.210	40.52	67	2 726.7	41.499	8.51	117	4 796.9	41.039	-22.58
18	717.5	40.250	40.02	68	2 768.2	41.508	7.73	118	4 837.9	41.016	-22.83
19	757.8	40.290	39.51	69	2 809.7	41.515	6.95	119	4 878.9	40.993	-23.06
20	798.1	40.329	39.00	70	2 851.2	41.521	6.17	120	4 919.9	40.970	-23.27
21	838.5	40.368	38.49	71	2 892.8	41.527	5.39	121	4 960.8	40.947	-23.46
22	878.9	40.406	37.98	72	2 934.3	41.532	4.61	122	5 001.8	40.923	-23.62
23	919.3	40.444	37.45	73	2 975.8	41.536	3.83	123	5 042.7	40.899	-23.77
24	959.7	40.481	36.93	74	3 017.4	41.540	3.05	124	5 083.6	40.876	-23.89
25	1 000.2	40.518	36.40	75	3 058.9	41.543	2.27	125	5 124.4	40.852	-23.99
26	1 040.8	40.554	35.86	76	3 100.5	41.544	1.49	126	5 165.3	40.828	-24.07
27	1 081.3	40.589	35.32	77	3 142.0	41.546	0.71	127	5 206.1	40.804	-24.13
28	1 122.0	40.625	34.78	78	3 183.6	41.546	-0.06	128	5 246.9	40.779	-24.17
29	1 162.6	40.659	34.23	79	3 225.1	41.545	-0.83	129	5 287.7	40.755	-24.18
30	1 203.3	40.693	33.67	80	3 266.6	41.544	-1.60	130	5 328.4	40.731	-24.17
31	1 244.0	40.726	33.11	81	3 308.2	41.542	-2.36	131	5 369.1	40.707	-24.14
32	1 284.7	40.759	32.54	82	3 349.7	41.540	-3.12	132	5 409.8	40.683	-24.09
33	1 325.5	40.791	31.96	83	3 391.3	41.536	-3.87	133	5 450.5	40.659	-24.02
34	1 366.3	40.823	31.38	84	3 432.8	41.532	-4.61	134	5 491.1	40.635	-23.93
35	1 407.1	40.854	30.79	85	3 474.3	41.527	-5.35	135	5 531.7	40.611	-23.81
36	1 448.0	40.885	30.20	86	3 515.9	41.521	-6.09	136	5 572.3	40.587	-23.68
37	1 488.9	40.915	29.60	87	3 557.4	41.515	-6.81	137	5 612.9	40.563	-23.52
38	1 529.8	40.944	28.99	88	3 598.9	41.507	-7.53	138	5 653.5	40.540	-23.35
39	1 570.8	40.973	28.37	89	3 640.4	41.500	-8.24	139	5 694.0	40.517	-23.15
40	1 611.8	41.001	27.75	90	3 681.9	41.491	-8.94	140	5 734.5	40.494	-22.94
41	1 652.8	41.028	27.12	91	3 723.4	41.482	-9.63	141	5 775.0	40.471	-22.70
42	1 693.8	41.055	26.48	92	3 764.8	41.472	-10.31	142	5 815.4	40.448	-22.45
43	1 734.9	41.081	25.84	93	3 806.3	41.461	-10.98	143	5 855.9	40.426	-22.17
44	1 776.0	41.107	25.19	94	3 847.8	41.450	-11.64	144	5 896.3	40.404	-21.88
45	1 817.1	41.131	24.53	95	3 889.2	41.438	-12.29	145	5 936.7	40.382	-21.57
46	1 858.3	41.156	23.86	96	3 930.6	41.425	-12.93	146	5 977.1	40.361	-21.25
47	1 899.4	41.179	23.19	97	3 972.1	41.412	-13.55	147	6 017.4	40.340	-20.90
48	1 940.6	41.202	22.51	98	4 013.5	41.398	-14.16	148	6 057.7	40.319	-20.54
49	1 981.8	41.224	21.82	99	4 054.9	41.384	-14.75	149	6 098.1	40.299	-20.16
50	2 023.1	41.246	21.13	100	4 096.2	41.369	-15.33	150	6 138.3	40.279	-19.77

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$t_{90}$ °C	E μV	S μV/°C	$dS/dt_{90}$ nV/°C <sup>2</sup>	$t_{90}$ °C	E μV	S μV/°C	$dS/dt_{90}$ nV/°C <sup>2</sup>	$t_{90}$ °C	E μV	S μV/°C	$dS/dt_{90}$ nV/°C <sup>2</sup>
150	6 138.3	40.279	-19.77	200	8 138.5	39.965	7.76	250	10 153.4	40.710	17.45
151	6 178.6	40.259	-19.36	201	8 178.4	39.973	8.23	251	10 194.1	40.727	17.40
152	6 218.9	40.240	-18.94	202	8 218.4	39.982	8.69	252	10 234.8	40.744	17.34
153	6 259.1	40.221	-18.50	203	8 258.4	39.991	9.13	253	10 275.6	40.762	17.28
154	6 299.3	40.203	-18.05	204	8 298.4	40.000	9.57	254	10 316.3	40.779	17.21
155	6 339.5	40.185	-17.58	205	8 338.4	40.010	10.00	255	10 357.1	40.796	17.13
156	6 379.7	40.168	-17.10	206	8 378.4	40.020	10.42	256	10 397.9	40.813	17.05
157	6 419.8	40.151	-16.61	207	8 418.4	40.031	10.82	257	10 438.8	40.830	16.96
158	6 460.0	40.135	-16.11	208	8 458.5	40.042	11.21	258	10 479.6	40.847	16.87
159	6 500.1	40.119	-15.60	209	8 498.5	40.053	11.59	259	10 520.5	40.864	16.78
160	6 540.2	40.103	-15.08	210	8 538.6	40.065	11.96	260	10 561.3	40.881	16.68
161	6 580.3	40.089	-14.54	211	8 578.7	40.077	12.32	261	10 602.2	40.897	16.58
162	6 620.4	40.074	-14.00	212	8 618.7	40.090	12.67	262	10 643.1	40.914	16.47
163	6 660.5	40.061	-13.45	213	8 658.8	40.102	13.00	263	10 684.0	40.930	16.36
164	6 700.5	40.047	-12.89	214	8 698.9	40.116	13.32	264	10 725.0	40.946	16.25
165	6 740.6	40.035	-12.32	215	8 739.1	40.129	13.63	265	10 765.9	40.963	16.13
166	6 780.6	40.023	-11.75	216	8 779.2	40.143	13.93	266	10 806.9	40.979	16.01
167	6 820.6	40.011	-11.17	217	8 819.4	40.157	14.21	267	10 847.9	40.995	15.89
168	6 860.6	40.000	-10.58	218	8 859.5	40.171	14.48	268	10 888.9	41.011	15.76
169	6 900.6	39.990	-9.99	219	8 899.7	40.186	14.74	269	10 929.9	41.026	15.63
170	6 940.6	39.980	-9.40	220	8 939.9	40.201	14.99	270	10 970.9	41.042	15.51
171	6 980.6	39.971	-8.80	221	8 980.1	40.216	15.23	271	11 012.0	41.057	15.37
172	7 020.5	39.963	-8.20	222	9 020.3	40.231	15.45	272	11 053.1	41.073	15.24
173	7 060.5	39.955	-7.59	223	9 060.6	40.247	15.67	273	11 094.1	41.088	15.11
174	7 100.4	39.948	-6.99	224	9 100.8	40.263	15.87	274	11 135.2	41.103	14.97
175	7 140.4	39.941	-6.38	225	9 141.1	40.278	16.06	275	11 176.3	41.118	14.84
176	7 180.3	39.935	-5.77	226	9 181.4	40.295	16.23	276	11 217.5	41.132	14.70
177	7 220.3	39.929	-5.16	227	9 221.7	40.311	16.40	277	11 258.6	41.147	14.56
178	7 260.2	39.925	-4.55	228	9 262.0	40.327	16.55	278	11 299.8	41.162	14.42
179	7 300.1	39.920	-3.94	229	9 302.3	40.344	16.70	279	11 340.9	41.176	14.28
180	7 340.0	39.917	-3.33	230	9 342.7	40.361	16.83	280	11 382.1	41.190	14.14
181	7 379.9	39.914	-2.73	231	9 383.1	40.378	16.95	281	11 423.3	41.204	14.00
182	7 419.9	39.911	-2.13	232	9 423.4	40.395	17.06	282	11 464.5	41.218	13.87
183	7 459.8	39.909	-1.53	233	9 463.8	40.412	17.16	283	11 505.8	41.232	13.73
184	7 499.7	39.908	-0.93	234	9 504.3	40.429	17.25	284	11 547.0	41.246	13.59
185	7 539.6	39.908	-0.34	235	9 544.7	40.446	17.33	285	11 588.2	41.259	13.45
186	7 579.5	39.908	0.25	236	9 585.2	40.464	17.40	286	11 629.5	41.272	13.31
187	7 619.4	39.908	0.83	237	9 625.6	40.481	17.46	287	11 670.8	41.286	13.17
188	7 659.3	39.909	1.41	238	9 666.1	40.499	17.51	288	11 712.1	41.299	13.04
189	7 699.2	39.911	1.98	239	9 706.6	40.516	17.55	289	11 753.4	41.312	12.90
190	7 739.1	39.913	2.55	240	9 747.2	40.534	17.58	290	11 794.7	41.325	12.76
191	7 779.0	39.916	3.10	241	9 787.7	40.551	17.61	291	11 836.0	41.337	12.63
192	7 819.0	39.919	3.65	242	9 828.3	40.569	17.62	292	11 877.4	41.350	12.50
193	7 858.9	39.923	4.20	243	9 868.8	40.587	17.63	293	11 918.7	41.362	12.37
194	7 898.8	39.928	4.73	244	9 909.4	40.604	17.62	294	11 960.1	41.375	12.24
195	7 938.7	39.933	5.26	245	9 950.0	40.622	17.61	295	12 001.5	41.387	12.11
196	7 978.7	39.938	5.78	246	9 990.7	40.639	17.60	296	12 042.9	41.399	11.98
197	8 018.6	39.944	6.29	247	10 031.3	40.657	17.57	297	12 084.3	41.411	11.85
198	8 058.6	39.951	6.79	248	10 072.0	40.675	17.54	298	12 125.7	41.423	11.73
199	8 098.5	39.958	7.28	249	10 112.7	40.692	17.50	299	12 167.1	41.434	11.60
200	8 138.5	39.965	7.76	250	10 153.4	40.710	17.45	300	12 208.6	41.446	11.48

**TABLE 7.3.3. Type K thermocouples --- thermoelectric voltages,  $E(t_{90})$ , Seebeck coefficients,  $S(t_{90})$ , and first derivative of the Seebeck coefficients,  $dS/dt_{90}$ ; reference junctions at 0 °C--Continued**

$t_{90}$ °C	E μV	S μV/°C	$dS/dt_{90}$ nV/°C <sup>2</sup>	$t_{90}$ °C	E μV	S μV/°C	$dS/dt_{90}$ nV/°C <sup>2</sup>	$t_{90}$ °C	E μV	S μV/°C	$dS/dt_{90}$ nV/°C <sup>2</sup>
300	12 208.6	41.446	11.48	350	14 293.1	41.906	7.58	400	16 397.1	42.241	5.90
301	12 250.0	41.457	11.36	351	14 335.1	41.913	7.54	401	16 439.4	42.246	5.87
302	12 291.5	41.468	11.24	352	14 377.0	41.921	7.50	402	16 481.6	42.252	5.83
303	12 333.0	41.480	11.13	353	14 418.9	41.928	7.46	403	16 523.9	42.258	5.80
304	12 374.4	41.491	11.01	354	14 460.8	41.935	7.41	404	16 566.2	42.264	5.77
305	12 415.9	41.502	10.90	355	14 502.8	41.943	7.37	405	16 608.4	42.270	5.73
306	12 457.4	41.512	10.79	356	14 544.7	41.950	7.34	406	16 650.7	42.275	5.70
307	12 499.0	41.523	10.68	357	14 586.7	41.958	7.30	407	16 693.0	42.281	5.67
308	12 540.5	41.534	10.57	358	14 628.6	41.965	7.26	408	16 735.3	42.287	5.63
309	12 582.0	41.544	10.46	359	14 670.6	41.972	7.22	409	16 777.5	42.292	5.60
310	12 623.6	41.555	10.36	360	14 712.6	41.979	7.19	410	16 819.8	42.298	5.56
311	12 665.1	41.565	10.26	361	14 754.6	41.986	7.15	411	16 862.1	42.303	5.53
312	12 706.7	41.575	10.16	362	14 796.5	41.994	7.11	412	16 904.4	42.309	5.49
313	12 748.3	41.585	10.06	363	14 838.5	42.001	7.08	413	16 946.8	42.314	5.46
314	12 789.9	41.595	9.96	364	14 880.6	42.008	7.04	414	16 989.1	42.320	5.42
315	12 831.5	41.605	9.87	365	14 922.6	42.015	7.01	415	17 031.4	42.325	5.39
316	12 873.1	41.615	9.78	366	14 964.6	42.022	6.98	416	17 073.7	42.331	5.35
317	12 914.7	41.625	9.68	367	15 006.6	42.029	6.94	417	17 116.1	42.336	5.32
318	12 956.3	41.635	9.60	368	15 048.6	42.036	6.91	418	17 158.4	42.341	5.28
319	12 998.0	41.644	9.51	369	15 090.7	42.043	6.88	419	17 200.7	42.347	5.24
320	13 039.6	41.654	9.42	370	15 132.7	42.049	6.84	420	17 243.1	42.352	5.21
321	13 081.3	41.663	9.34	371	15 174.8	42.056	6.81	421	17 285.4	42.357	5.17
322	13 123.0	41.672	9.26	372	15 216.8	42.063	6.78	422	17 327.8	42.362	5.13
323	13 164.6	41.681	9.18	373	15 258.9	42.070	6.75	423	17 370.2	42.367	5.09
324	13 206.3	41.691	9.10	374	15 301.0	42.077	6.71	424	17 412.5	42.372	5.06
325	13 248.0	41.700	9.02	375	15 343.1	42.083	6.68	425	17 454.9	42.377	5.02
326	13 289.7	41.709	8.95	376	15 385.1	42.090	6.65	426	17 497.3	42.382	4.98
327	13 331.4	41.718	8.88	377	15 427.2	42.097	6.62	427	17 539.7	42.387	4.94
328	13 373.1	41.726	8.80	378	15 469.3	42.103	6.59	428	17 582.1	42.392	4.90
329	13 414.9	41.735	8.73	379	15 511.4	42.110	6.56	429	17 624.5	42.397	4.86
330	13 456.6	41.744	8.67	380	15 553.6	42.116	6.53	430	17 666.9	42.402	4.82
331	13 498.4	41.752	8.60	381	15 595.7	42.123	6.50	431	17 709.3	42.407	4.78
332	13 540.1	41.761	8.53	382	15 637.8	42.129	6.47	432	17 751.7	42.411	4.74
333	13 581.9	41.770	8.47	383	15 679.9	42.136	6.43	433	17 794.1	42.416	4.70
334	13 623.7	41.778	8.41	384	15 722.1	42.142	6.40	434	17 836.5	42.421	4.66
335	13 665.4	41.786	8.35	385	15 764.2	42.148	6.37	435	17 878.9	42.426	4.62
336	13 707.2	41.795	8.29	386	15 806.4	42.155	6.34	436	17 921.4	42.430	4.58
337	13 749.0	41.803	8.23	387	15 848.5	42.161	6.31	437	17 963.8	42.435	4.54
338	13 790.8	41.811	8.17	388	15 890.7	42.167	6.28	438	18 006.2	42.439	4.49
339	13 832.7	41.819	8.12	389	15 932.9	42.174	6.25	439	18 048.7	42.444	4.45
340	13 874.5	41.827	8.06	390	15 975.0	42.180	6.22	440	18 091.1	42.448	4.41
341	13 916.3	41.835	8.01	391	16 017.2	42.186	6.19	441	18 133.6	42.452	4.37
342	13 958.2	41.843	7.96	392	16 059.4	42.192	6.15	442	18 176.0	42.457	4.33
343	14 000.0	41.851	7.91	393	16 101.6	42.198	6.12	443	18 218.5	42.461	4.28
344	14 041.9	41.859	7.86	394	16 143.8	42.205	6.09	444	18 260.9	42.465	4.24
345	14 083.7	41.867	7.81	395	16 186.0	42.211	6.06	445	18 303.4	42.470	4.20
346	14 125.6	41.875	7.76	396	16 228.2	42.217	6.03	446	18 345.9	42.474	4.15
347	14 167.5	41.883	7.72	397	16 270.4	42.223	6.00	447	18 388.4	42.478	4.11
348	14 209.4	41.890	7.67	398	16 312.7	42.229	5.96	448	18 430.8	42.482	4.06
349	14 251.2	41.898	7.63	399	16 354.9	42.235	5.93	449	18 473.3	42.486	4.02
350	14 293.1	41.906	7.58	400	16 397.1	42.241	5.90	450	18 515.8	42.490	3.97

**TABLE 7.3.3. Type K thermocouples --- thermoelectric voltages,  $E(t_{90})$ , Seebeck coefficients,  $S(t_{90})$ , and first derivative of the Seebeck coefficients,  $dS/dt_{90}$ ; reference junctions at 0 °C---Continued**



$t_{90}$ °C	E μV	S μV/°C	$dS/dt_{90}$ nV/°C <sup>2</sup>	$t_{90}$ °C	E μV	S μV/°C	$dS/dt_{90}$ nV/°C <sup>2</sup>	$t_{90}$ °C	E μV	S μV/°C	$dS/dt_{90}$ nV/°C <sup>2</sup>
450	18 515.8	42.490	3.97	500	20 644.3	42.628	1.49	550	22 776.4	42.635	-1.25
451	18 558.3	42.494	3.93	501	20 686.9	42.630	1.43	551	22 819.1	42.633	-1.30
452	18 600.8	42.498	3.88	502	20 729.5	42.631	1.38	552	22 861.7	42.632	-1.36
453	18 643.3	42.502	3.84	503	20 772.2	42.633	1.33	553	22 904.3	42.631	-1.41
454	18 685.8	42.506	3.79	504	20 814.8	42.634	1.27	554	22 947.0	42.629	-1.47
455	18 728.3	42.509	3.75	505	20 857.4	42.635	1.22	555	22 989.6	42.628	-1.52
456	18 770.8	42.513	3.70	506	20 900.1	42.636	1.16	556	23 032.2	42.626	-1.58
457	18 813.3	42.517	3.65	507	20 942.7	42.637	1.11	557	23 074.8	42.624	-1.63
458	18 855.9	42.520	3.61	508	20 985.4	42.638	1.06	558	23 117.5	42.623	-1.69
459	18 898.4	42.524	3.56	509	21 028.0	42.640	1.00	559	23 160.1	42.621	-1.74
460	18 940.9	42.527	3.51	510	21 070.6	42.641	0.95	560	23 202.7	42.619	-1.80
461	18 983.4	42.531	3.47	511	21 113.3	42.641	0.89	561	23 245.3	42.617	-1.85
462	19 026.0	42.534	3.42	512	21 155.9	42.642	0.84	562	23 287.9	42.616	-1.90
463	19 068.5	42.538	3.37	513	21 198.6	42.643	0.78	563	23 330.6	42.614	-1.96
464	19 111.0	42.541	3.32	514	21 241.2	42.644	0.73	564	23 373.2	42.612	-2.01
465	19 153.6	42.544	3.28	515	21 283.8	42.645	0.67	565	23 415.8	42.610	-2.07
466	19 196.1	42.548	3.23	516	21 326.5	42.645	0.62	566	23 458.4	42.608	-2.12
467	19 238.7	42.551	3.18	517	21 369.1	42.646	0.57	567	23 501.0	42.605	-2.17
468	19 281.2	42.554	3.13	518	21 411.8	42.646	0.51	568	23 543.6	42.603	-2.23
469	19 323.8	42.557	3.08	519	21 454.4	42.647	0.46	569	23 586.2	42.601	-2.28
470	19 366.3	42.560	3.03	520	21 497.1	42.647	0.40	570	23 628.8	42.599	-2.33
471	19 408.9	42.563	2.98	521	21 539.7	42.648	0.35	571	23 671.4	42.596	-2.39
472	19 451.5	42.566	2.93	522	21 582.4	42.648	0.29	572	23 714.0	42.594	-2.44
473	19 494.0	42.569	2.88	523	21 625.0	42.648	0.24	573	23 756.6	42.591	-2.49
474	19 536.6	42.572	2.83	524	21 667.7	42.648	0.18	574	23 799.2	42.589	-2.55
475	19 579.2	42.575	2.78	525	21 710.3	42.649	0.13	575	23 841.8	42.586	-2.60
476	19 621.8	42.578	2.73	526	21 753.0	42.649	0.07	576	23 884.3	42.584	-2.65
477	19 664.3	42.580	2.68	527	21 795.6	42.649	0.02	577	23 926.9	42.581	-2.71
478	19 706.9	42.583	2.63	528	21 838.3	42.649	-0.04	578	23 969.5	42.578	-2.76
479	19 749.5	42.586	2.58	529	21 880.9	42.649	-0.09	579	24 012.1	42.575	-2.81
480	19 792.1	42.588	2.53	530	21 923.6	42.649	-0.15	580	24 054.7	42.573	-2.86
481	19 834.7	42.591	2.48	531	21 966.2	42.648	-0.20	581	24 097.2	42.570	-2.92
482	19 877.3	42.593	2.43	532	22 008.9	42.648	-0.26	582	24 139.8	42.567	-2.97
483	19 919.9	42.595	2.38	533	22 051.5	42.648	-0.31	583	24 182.4	42.564	-3.02
484	19 962.5	42.598	2.33	534	22 094.2	42.647	-0.37	584	24 224.9	42.561	-3.07
485	20 005.1	42.600	2.27	535	22 136.8	42.647	-0.42	585	24 267.5	42.558	-3.12
486	20 047.7	42.602	2.22	536	22 179.4	42.647	-0.48	586	24 310.0	42.554	-3.18
487	20 090.3	42.605	2.17	537	22 222.1	42.646	-0.53	587	24 352.6	42.551	-3.23
488	20 132.9	42.607	2.12	538	22 264.7	42.646	-0.59	588	24 395.1	42.548	-3.28
489	20 175.5	42.609	2.07	539	22 307.4	42.645	-0.65	589	24 437.7	42.545	-3.33
490	20 218.1	42.611	2.02	540	22 350.0	42.644	-0.70	590	24 480.2	42.541	-3.38
491	20 260.7	42.613	1.96	541	22 392.7	42.644	-0.76	591	24 522.8	42.538	-3.43
492	20 303.3	42.615	1.91	542	22 435.3	42.643	-0.81	592	24 565.3	42.535	-3.48
493	20 345.9	42.617	1.86	543	22 478.0	42.642	-0.87	593	24 607.8	42.531	-3.54
494	20 388.5	42.618	1.80	544	22 520.6	42.641	-0.92	594	24 650.4	42.527	-3.59
495	20 431.2	42.620	1.75	545	22 563.2	42.640	-0.98	595	24 692.9	42.524	-3.64
496	20 473.8	42.622	1.70	546	22 605.9	42.639	-1.03	596	24 735.4	42.520	-3.69
497	20 516.4	42.624	1.65	547	22 648.5	42.638	-1.09	597	24 777.9	42.516	-3.74
498	20 559.0	42.625	1.59	548	22 691.2	42.637	-1.14	598	24 820.4	42.513	-3.79
499	20 601.7	42.627	1.54	549	22 733.8	42.636	-1.20	599	24 863.0	42.509	-3.84
500	20 644.3	42.628	1.49	550	22 776.4	42.635	-1.25	600	24 905.5	42.505	-3.89