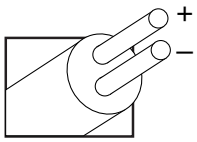
Revised Thermocouple Reference Tables

TYPE R

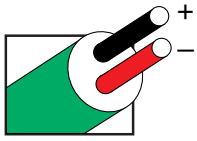
Reference Tables
N.I.S.T. Monograph 175
Revised to ITS-90



Thermocouple Grade

NONE ESTABLISHED

Platinum-13% Rhodium vs. Platinum



Extension Grade

MAXIMUM TEMPERATURE RANGE

Thermocouple Grade
32 to 2642°F
0 to 1450°C

Extension Grade
32 to 300°F
0 to 150°C

LIMITS OF ERROR
(whichever is greater)
Standard: 1.5°C or 0.25%
Special: 0.6°C or 0.1%

COMMENTS, BARE WIRE ENVIRONMENT:
Oxidizing or Inert; Do Not Insert in Metal Tubes; Beware of Contamination; High Temperature

TEMPERATURE IN DEGREES °F
REFERENCE JUNCTION AT 32°F

Thermoelectric Voltage in Millivolts

°F	0	1	2	3	4	5	6	7	8	9	10	°F
2900	18.756	18.764	18.772	18.779	18.787	18.795	18.803	18.810	18.818	18.826	18.834	2900
2910	18.834	18.841	18.849	18.857	18.864	18.872	18.880	18.887	18.895	18.903	18.911	2910
2920	18.911	18.918	18.926	18.934	18.941	18.949	18.957	18.965	18.972	18.980	18.988	2920
2930	18.988	18.995	19.003	19.011	19.018	19.026	19.034	19.042	19.049	19.057	19.065	2930
2940	19.065	19.072	19.080	19.088	19.095	19.103	19.111	19.118	19.126	19.134	19.141	2940
2950	19.141	19.149	19.157	19.165	19.172	19.180	19.188	19.195	19.203	19.211	19.218	2950
2960	19.218	19.226	19.234	19.241	19.249	19.257	19.264	19.272	19.280	19.287	19.295	2960
2970	19.295	19.303	19.310	19.318	19.326	19.333	19.341	19.349	19.356	19.364	19.372	2970
2980	19.372	19.379	19.387	19.395	19.402	19.410	19.418	19.425	19.433	19.440	19.448	2980
2990	19.448	19.456	19.463	19.471	19.479	19.486	19.494	19.502	19.509	19.517	19.525	2990
3000	19.525	19.532	19.540	19.547	19.555	19.563	19.570	19.578	19.586	19.593	19.601	3000
3010	19.601	19.609	19.616	19.624	19.631	19.639	19.647	19.654	19.662	19.670	19.677	3010
3020	19.677	19.685	19.692	19.700	19.708	19.715	19.723	19.730	19.738	19.746	19.753	3020
3030	19.753	19.761	19.769	19.776	19.784	19.791	19.799	19.807	19.814	19.822	19.829	3030
3040	19.829	19.837	19.845	19.852	19.860	19.867	19.875	19.882	19.890	19.898	19.905	3040
3050	19.905	19.913	19.920	19.928	19.936	19.943	19.951	19.958	19.966	19.973	19.981	3050
3060	19.981	19.989	19.996	20.004	20.011	20.019	20.026	20.034	20.041	20.049	20.056	3060
3070	20.056	20.064	20.072	20.079	20.087	20.094	20.102	20.109	20.117	20.124	20.132	3070
3080	20.132	20.139	20.147	20.154	20.162	20.169	20.177	20.184	20.192	20.199	20.207	3080
3090	20.207	20.214	20.222	20.229	20.237	20.244	20.252	20.259	20.266	20.274	20.281	3090
°F	0	1	2	3	4	5	6	7	8	9	10	°F

°F	0	1	2	3	4	5	6	7	8	9	10	°F
3100	20.281	20.289	20.296	20.304	20.311	20.319	20.326	20.333	20.341	20.348	20.356	3100
3110	20.356	20.363	20.371	20.378	20.385	20.393	20.400	20.407	20.415	20.422	20.430	3110
3120	20.430	20.437	20.444	20.452	20.459	20.466	20.474	20.481	20.488	20.496	20.503	3120
3130	20.503	20.510	20.518	20.525	20.532	20.540	20.547	20.554	20.562	20.569	20.576	3130
3140	20.576	20.583	20.591	20.598	20.605	20.612	20.620	20.627	20.634	20.641	20.649	3140
3150	20.649	20.656	20.663	20.670	20.678	20.685	20.692	20.699	20.706	20.714	20.721	3150
3160	20.721	20.728	20.735	20.742	20.749	20.756	20.764	20.771	20.778	20.785	20.792	3160
3170	20.792	20.799	20.806	20.813	20.821	20.828	20.835	20.842	20.849	20.856	20.863	3170
3180	20.863	20.870	20.877	20.884	20.891	20.898	20.905	20.912	20.919	20.926	20.933	3180
3190	20.933	20.940	20.947	20.954	20.961	20.968	20.975	20.982	20.989	20.996	21.003	3190
3200	21.003	21.010	21.016	21.023	21.030	21.037	21.044	21.051	21.058	21.065	21.071	3200
3210	21.071	21.078	21.085	21.092	21.099							3210
°F	0	1	2	3	4	5	6	7	8	9	10	°F

MAXIMUM TEMPERATURE RANGE

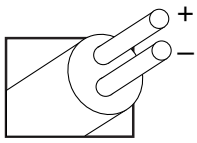
Thermocouple Grade
32 to 3092°F
0 to 1700°C

Extension Grade
32 to 212°F
0 to 100°C

LIMITS OF ERROR
(whichever is greater)
Standard: 0.5°C over 800°C
Special: NOT ESTABLISHED

COMMENTS, BARE WIRE ENVIRONMENT:
Oxidizing or Inert; Do Not Insert in Metal Tubes; Beware of Contamination; High Temperature; Common Use in Glass Industry

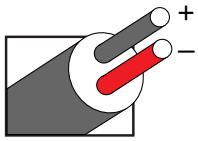
TEMPERATURE IN DEGREES °F
REFERENCE JUNCTION AT 32°F



Thermocouple Grade

NONE ESTABLISHED

Platinum-30% Rhodium vs. Platinum-6% Rhodium



Extension Grade

Revised Thermocouple Reference Tables

TYPE B

Reference Tables
N.I.S.T. Monograph 175
Revised to ITS-90

Z

Thermoelectric Voltage in Millivolts

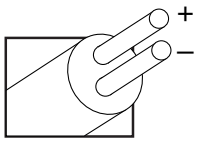
°F	0	1	2	3	4	5	6	7	8	9	10	°F
30			0.000	0.000	0.000	0.000	-0.001	-0.001	-0.001	-0.001	-0.001	30
40	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.002	-0.002	-0.002	-0.002	-0.002	40
50	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	50
60	-0.002	-0.002	-0.002	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	60
70	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.002	-0.002	-0.002	-0.002	70
80	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	80
90	-0.002	-0.002	-0.002	-0.002	-0.002	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	90
100	-0.001	-0.001	-0.001	-0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100
110	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	110
120	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.003	0.004	0.004	120
130	0.004	0.004	0.004	0.005	0.005	0.005	0.005	0.005	0.006	0.006	0.006	130
140	0.006	0.006	0.007	0.007	0.007	0.007	0.008	0.008	0.008	0.009	0.009	140
150	0.009	0.009	0.009	0.010	0.010	0.010	0.011	0.011	0.011	0.012	0.012	150
160	0.012	0.012	0.013	0.013	0.013	0.014	0.014	0.014	0.015	0.015	0.015	160
170	0.015	0.016	0.016	0.016	0.017	0.017	0.017	0.018	0.018	0.019	0.019	170
180	0.019	0.019	0.020	0.020	0.021	0.021	0.021	0.022	0.022	0.023	0.023	180
190	0.023	0.023	0.024	0.024	0.025	0.025	0.026	0.026	0.027	0.027	0.027	190
200	0.027	0.028	0.028	0.029	0.029	0.030	0.030	0.031	0.031	0.032	0.032	200
210	0.032	0.033	0.033	0.034	0.034	0.035	0.035	0.036	0.036	0.037	0.037	210
220	0.037	0.038	0.038	0.039	0.039	0.040	0.041	0.041	0.042	0.042	0.043	220
230	0.043	0.043	0.044	0.044	0.045	0.046	0.046	0.047	0.047	0.048	0.049	230
240	0.049	0.049	0.050	0.050	0.051	0.052	0.052	0.053	0.053	0.054	0.055	240
250	0.055	0.055	0.056	0.057	0.057	0.058	0.059	0.059	0.060	0.060	0.061	250
260	0.061	0.062	0.062	0.063	0.064	0.065	0.065	0.066	0.067	0.067	0.068	260
270	0.068	0.069	0.069	0.070	0.071	0.072	0.072	0.073	0.074	0.074	0.075	270
280	0.075	0.076	0.077	0.077	0.078	0.079	0.080	0.080	0.081	0.082	0.083	280
290	0.083	0.083	0.084	0.085	0.086	0.086	0.087	0.088	0.089	0.090	0.090	290
300	0.090	0.091	0.092	0.093	0.094	0.094	0.095	0.096	0.097	0.098	0.099	300
310	0.099	0.099	0.100	0.101	0.102	0.103	0.104	0.105	0.105	0.106	0.107	310
320	0.107	0.108	0.109	0.110	0.111	0.112	0.112	0.113	0.114	0.115	0.116	320
330	0.116	0.117	0.118	0.119	0.120	0.121	0.121	0.122	0.123	0.124	0.125	330
340	0.125	0.126	0.127	0.128	0.129	0.130	0.131	0.132	0.133	0.134	0.135	340
350	0.135	0.136	0.137	0.138	0.139	0.140	0.141	0.142	0.143	0.144	0.145	350
360	0.145	0.146	0.147	0.148	0.149	0.150	0.151	0.152	0.153	0.154	0.155	360
370	0.155	0.156	0.157	0.158	0.159	0.160	0.161	0.162	0.163	0.164	0.165	370
380	0.165	0.166	0.167	0.168	0.170	0.171	0.172	0.173	0.174	0.175	0.176	380
390	0.176	0.177	0.178	0.179	0.180	0.182	0.183	0.184	0.185	0.186	0.187	390
400	0.187	0.188	0.190	0.191	0.192	0.193	0.194	0.195	0.196	0.198	0.199	400
410	0.199	0.200	0.201	0.202	0.203	0.205	0.206	0.207	0.208	0.209	0.211	410
420	0.211	0.212	0.213	0.214	0.215	0.217	0.218	0.219	0.220	0.222	0.223	420
430	0.223	0.224	0.225	0.226	0.228	0.229	0.230	0.231	0.233	0.234	0.235	430
440	0.235	0.236	0.238	0.239	0.240	0.242	0.243	0.244	0.245	0.247	0.248	440
450	0.248	0.249	0.251	0.252	0.253	0.255	0.256	0.257	0.259	0.260	0.261	450
460	0.261	0.263	0.264	0.265	0.267	0.268	0.269	0.271	0.272	0.273	0.275	460
470	0.275	0.276	0.277	0.279	0.280	0.282	0.283	0.284	0.286	0.287	0.288	470
480	0.288	0.290	0.291	0.293	0.294	0.296	0.297	0.298	0.300	0.301	0.303	480
490	0.303	0.304	0.305	0.307	0.308	0.310	0.311	0.313	0.314	0.316	0.317	490
500	0.317	0.319	0.320	0.321	0.323	0.324	0.326	0.327	0.329	0.330	0.332	500
510	0.332	0.333	0.335	0.336	0.338	0.339	0.341	0.342	0.344	0.345	0.347	510
520	0.347	0.348	0.350	0.352	0.353	0.355	0.356	0.358	0.359	0.361	0.362	520
530	0.362	0.364	0.365	0.367	0.369	0.370	0.372	0.373	0.375	0.377	0.378	530
540	0.378	0.380	0.381	0.383	0.384	0.386	0.388	0.389	0.391	0.393	0.394	540
550	0.394	0.396	0.397	0.399	0.401	0.402	0.404	0.406	0.407	0.409	0.411	550
560	0.411	0.412	0.414	0.416	0.417	0.419	0.421	0.422	0.424	0.426	0.427	560
570	0.427	0.429	0.431	0.432	0.434	0.436	0.437	0.439	0.441	0.443	0.444	570
580	0.444	0.446	0.448	0.449	0.451	0.453	0.455	0.456	0.458	0.460	0.462	580
590	0.462	0.463	0.465	0.467	0.469	0.470	0.472	0.474	0.476	0.478	0.479	590
°F	0	1	2	3	4	5	6	7	8	9	10	°F

°F	0	1	2	3	4	5	6	7	8	9	10	°F
600	0.479	0.481	0.483	0.485	0.486	0.488	0.490	0.492	0.494	0.495	0.497	600
610	0.497	0.499	0.501	0.503	0.505	0.506	0.508	0.510	0.512	0.514	0.516	610
620	0.516	0.517	0.519	0.521	0.523	0.525	0.527	0.529	0.530	0.532	0.534	620
630	0.534	0.536	0.538	0.540	0.542	0.544	0.546	0.547	0.549	0.551	0.553	630
640	0.553	0.555	0.557	0.559	0.561	0.563	0.565	0.567	0.569	0.570	0.572	640
650	0.572	0.574	0.576	0.578	0.580	0.582	0.584	0.586	0.588	0.590	0.592	650
660	0.592	0.594	0.596	0.598	0.600	0.602	0.604	0.606	0.608	0.610	0.612	660
670	0.612	0.614	0.616	0.618	0.620	0.622	0.624	0.626	0.628	0.630	0.632	670
680	0.632	0.634	0.636	0.638	0.640	0.642	0.644	0.646	0.648	0.650	0.653	680
690	0.653	0.655	0.657	0.659	0.661	0.663	0.665	0.667	0.669	0.671	0.673	690
700	0.673	0.675	0.678	0.680	0.682	0.684	0.686	0.688	0.690	0.692	0.694	700
710	0.694	0.697	0.699	0.701	0.703	0.705	0.707	0.709	0.712	0.714	0.716	710
720	0.716	0.718	0.720	0.722	0.725	0.727	0.729	0.731	0.733	0.735	0.738	720
730	0.738	0.740	0.742	0.744	0.746	0.749	0.751	0.753	0.755	0.757	0.760	730
740	0.760	0.762	0.764	0.766	0.769	0.771	0.773	0.775	0.778	0.780	0.782	740
750	0.782	0.784	0.787	0.789	0.791	0.793	0.796	0.798	0.800	0.802	0.805	750
760	0.805	0.807	0.809	0.812	0.814	0.816	0.818	0.821	0.823	0.825	0.828	760
770	0.828	0.830	0.832	0.835	0.837	0.839	0.842	0.844	0.846	0.849	0.851	770
780	0.851	0.853	0.856	0.858	0.860	0.863	0.865	0.867	0.870	0.872	0.875	780
790	0.875	0.877	0.879	0.882	0.884	0.886	0.889	0.891	0.894	0.896	0.898	790
800	0.898	0.901	0.903	0.906	0.908	0.910	0.913	0.915	0.918	0.920	0.923	800
810	0.923	0.925	0.927	0.930	0.932	0.935	0.937	0.940	0.942	0.945	0.947	810
820	0.947	0.950	0.952	0.955	0.957	0.959	0.962	0.964	0.967	0.969	0.972	820
830	0.972	0.974	0.977	0.979	0.982	0.984	0.987	0.989	0.992	0.994	0.997	830
840	0.997	1.000	1.002	1.005	1.007	1.010	1.012	1.015	1.017	1.020	1.022	840
850	1.022	1.025	1.027	1.030	1.033	1.035	1.038	1.040	1.043	1.045	1.048	850
860	1.048	1.051	1.053	1.056	1.058	1.061	1.064	1.066	1.069	1.071	1.074	860
870	1.074	1.077	1.079	1.082	1.085	1.087	1.090	1.092	1.095	1.098	1.100	870
880	1.100	1.103	1.106	1.108	1.111	1.114	1.116	1.119	1.122	1.124	1.127	880
890	1.127	1.130	1.132	1.135	1.138	1.140	1.143	1.146	1.148	1.151	1.154	890
900	1.154	1.157	1.159	1.162	1.165	1.167	1.170	1.173	1.176	1.178	1.181	900
910	1.181	1.184	1.186	1.189	1.192	1.195	1.197	1.200	1.203	1.206	1.208	910
920	1.208	1.211	1.214	1.217	1.220	1.222	1.225	1.228	1.231	1.233	1.236	920
930	1.236	1.239	1.242	1.245	1.247	1.250	1.253	1.256	1.259	1.262	1.264	930
940	1.264	1.267	1.270	1.273	1.276	1.278	1.281	1.284	1.287	1.290	1.293	940
950	1.293	1.296	1.298	1.301	1.304	1.307	1.310	1.313	1.316	1.318	1.321	950
960	1.321	1.324	1.327	1.330	1.333	1.336	1.339	1.342	1.344	1.347	1.350	960
970	1.350	1.353	1.356	1.359	1.362	1.365	1.368	1.371	1.374	1.377	1.379	970
980	1.379	1.382	1.385	1.388	1.391	1.394	1.397	1.400	1.403	1.406	1.409	980
990	1.409	1.412	1.415	1.418	1.421	1.424	1.427	1.430	1.433	1.436	1.439	990
1000	1.439	1.442	1.445	1.448	1.451	1.454	1.457	1.460	1.463	1.466	1.469	1000
1010	1.469	1.472	1.475	1.478	1.481	1.484	1.487	1.490	1.493	1.496	1.499	1010
1020	1.499	1.502	1.505	1.508	1.511	1.515	1.518	1.521	1.524	1.527	1.530	1020
1030	1.530	1.533	1.536	1.539	1.542	1.545	1.548	1.552	1.555	1.558	1.561	1030
1040	1.561	1.564	1.567	1.570	1.573	1.576	1.580	1.583	1.586	1.589	1.592	1040
1050	1.592	1.595	1.598	1.601	1.605	1.608	1.611	1.614	1.617	1.620	1.624	1050
1060	1.624	1.627	1.630	1.633	1.636	1.639	1.643	1.646	1.649	1.652	1.655	1060
1070	1.655	1.659	1.662	1.665	1.668	1.671	1.675	1.678	1.681	1.684	1.687	1070
1080	1.687	1.691	1.694	1.697	1.700	1.704	1.707	1.710	1.713	1.716	1.720	1080
1090	1.720	1.723	1.726	1.729	1.733	1.736	1.739	1.743	1.746	1.749	1.752	1090
1100	1.752	1.756	1.759	1.762	1.765	1.769	1.772	1.775	1.779	1.782	1.785	1100
1110	1.785	1.789	1.792	1.795	1.798	1.802	1.805	1.808	1.812	1.815	1.818	1110
1120	1.818	1.822	1.825	1.828	1.832	1.835	1.838	1.842	1.845	1.849	1.852	1120
1130	1.852	1.855	1.859	1.862	1.865	1.869	1.872	1.875	1.879	1.882	1.886	1130
1140	1.886	1.889	1.892	1.896	1.899	1.903	1.906	1.909	1.913	1.916	1.920	1140
1150	1.920	1.923	1.926	1.930	1.933	1.937	1.940	1.944	1.947	1.950	1.954	1150
1160	1.954	1.957	1.961	1.964	1.968	1.971	1.975	1.978	1.981	1.985	1.988	1160
1170	1.988	1.992	1.995	1.999	2.002	2.006	2.009	2.013	2.016	2.020	2.023	1170
1180	2.023	2.027	2.030	2.034	2.037	2.041	2.044	2.048	2.051	2.055	2.058	1180
1190	2.058	2.062	2.065	2.069	2.072	2.076	2.079	2.083	2.086	2.090	2.094	1190
°F	0	1	2	3	4	5	6	7	8	9	10	°F

Revised Thermocouple Reference Tables

TYPE B

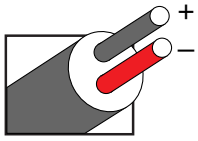
Reference Tables N.I.S.T. Monograph 175 Revised to ITS-90



Thermocouple Grade

NONE ESTABLISHED

Platinum-30% Rhodium vs. Platinum-6% Rhodium



Extension Grade

MAXIMUM TEMPERATURE RANGE

Thermocouple Grade
32 to 3092°F
0 to 1700°C

Extension Grade
32 to 212°F
0 to 100°C

LIMITS OF ERROR
(whichever is greater)
Standard: 0.5°C over 800°C
Special: NOT ESTABLISHED

COMMENTS, BARE WIRE ENVIRONMENT:
Oxidizing or Inert; Do Not Insert in Metal Tubes; Beware of Contamination; High Temperature; Common Use in Glass Industry

TEMPERATURE IN DEGREES °F
REFERENCE JUNCTION AT 32°F

Thermoelectric Voltage in Millivolts

°F	0	1	2	3	4	5	6	7	8	9	10	°F
1200	2.094	2.097	2.101	2.104	2.108	2.111	2.115	2.118	2.122	2.126	2.129	1200
1210	2.129	2.133	2.136	2.140	2.143	2.147	2.151	2.154	2.158	2.161	2.165	1210
1220	2.165	2.169	2.172	2.176	2.179	2.183	2.187	2.190	2.194	2.197	2.201	1220
1230	2.201	2.205	2.208	2.212	2.216	2.219	2.223	2.226	2.230	2.234	2.237	1230
1240	2.237	2.241	2.245	2.248	2.252	2.256	2.259	2.263	2.267	2.270	2.274	1240
1250	2.274	2.278	2.281	2.285	2.289	2.292	2.296	2.300	2.303	2.307	2.311	1250
1260	2.311	2.315	2.318	2.322	2.326	2.329	2.333	2.337	2.341	2.344	2.348	1260
1270	2.348	2.352	2.355	2.359	2.363	2.367	2.370	2.374	2.378	2.382	2.385	1270
1280	2.385	2.389	2.393	2.397	2.400	2.404	2.408	2.412	2.416	2.419	2.423	1280
1290	2.423	2.427	2.431	2.434	2.438	2.442	2.446	2.450	2.453	2.457	2.461	1290
1300	2.461	2.465	2.469	2.472	2.476	2.480	2.484	2.488	2.492	2.495	2.499	1300
1310	2.499	2.503	2.507	2.511	2.515	2.518	2.522	2.526	2.530	2.534	2.538	1310
1320	2.538	2.541	2.545	2.549	2.553	2.557	2.561	2.565	2.569	2.572	2.576	1320
1330	2.576	2.580	2.584	2.588	2.592	2.596	2.600	2.604	2.607	2.611	2.615	1330
1340	2.615	2.619	2.623	2.627	2.631	2.635	2.639	2.643	2.647	2.651	2.654	1340
1350	2.654	2.658	2.662	2.666	2.670	2.674	2.678	2.682	2.686	2.690	2.694	1350
1360	2.694	2.698	2.702	2.706	2.710	2.714	2.718	2.722	2.726	2.730	2.734	1360
1370	2.734	2.738	2.742	2.746	2.750	2.754	2.758	2.762	2.766	2.770	2.774	1370
1380	2.774	2.778	2.782	2.786	2.790	2.794	2.798	2.802	2.806	2.810	2.814	1380
1390	2.814	2.818	2.822	2.826	2.830	2.834	2.838	2.842	2.846	2.850	2.854	1390
1400	2.854	2.859	2.863	2.867	2.871	2.875	2.879	2.883	2.887	2.891	2.895	1400
1410	2.895	2.899	2.903	2.908	2.912	2.916	2.920	2.924	2.928	2.932	2.936	1410
1420	2.936	2.940	2.944	2.949	2.953	2.957	2.961	2.965	2.969	2.973	2.978	1420
1430	2.978	2.982	2.986	2.990	2.994	2.998	3.002	3.007	3.011	3.015	3.019	1430
1440	3.019	3.023	3.027	3.032	3.036	3.040	3.044	3.048	3.052	3.057	3.061	1440
1450	3.061	3.065	3.069	3.073	3.078	3.082	3.086	3.090	3.094	3.099	3.103	1450
1460	3.103	3.107	3.111	3.116	3.120	3.124	3.128	3.132	3.137	3.141	3.145	1460
1470	3.145	3.149	3.154	3.158	3.162	3.166	3.171	3.175	3.179	3.183	3.188	1470
1480	3.188	3.192	3.196	3.200	3.205	3.209	3.213	3.218	3.222	3.226	3.230	1480
1490	3.230	3.235	3.239	3.243	3.248	3.252	3.256	3.261	3.265	3.269	3.273	1490
1500	3.273	3.278	3.282	3.286	3.291	3.295	3.299	3.304	3.308	3.312	3.317	1500
1510	3.317	3.321	3.325	3.330	3.334	3.338	3.343	3.347	3.352	3.356	3.360	1510
1520	3.360	3.365	3.369	3.373	3.378	3.382	3.386	3.391	3.395	3.400	3.404	1520
1530	3.404	3.408	3.413	3.417	3.422	3.426	3.430	3.435	3.439	3.444	3.448	1530
1540	3.448	3.452	3.457	3.461	3.466	3.470	3.474	3.479	3.483	3.488	3.492	1540
1550	3.492	3.497	3.501	3.506	3.510	3.514	3.519	3.523	3.528	3.532	3.537	1550
1560	3.537	3.541	3.546	3.550	3.555	3.559	3.563	3.568	3.572	3.577	3.581	1560
1570	3.581	3.586	3.590	3.595	3.599	3.604	3.608	3.613	3.617	3.622	3.626	1570
1580	3.626	3.631	3.635	3.640	3.644	3.649	3.653	3.658	3.662	3.667	3.672	1580
1590	3.672	3.676	3.681	3.685	3.690	3.694	3.699	3.703	3.708	3.712	3.717	1590
1600	3.717	3.722	3.726	3.731	3.735	3.740	3.744	3.749	3.753	3.758	3.763	1600
1610	3.763	3.767	3.772	3.776	3.781	3.786	3.790	3.795	3.799	3.804	3.809	1610
1620	3.809	3.813	3.818	3.822	3.827	3.832	3.836	3.841	3.845	3.850	3.855	1620
1630	3.855	3.859	3.864	3.869	3.873	3.878	3.882	3.887	3.892	3.896	3.901	1630
1640	3.901	3.906	3.910	3.915	3.920	3.924	3.929	3.934	3.938	3.943	3.948	1640
1650	3.948	3.952	3.957	3.962	3.966	3.971	3.976	3.980	3.985	3.990	3.994	1650
1660	3.994	3.999	4.004	4.009	4.013	4.018	4.023	4.027	4.032	4.037	4.041	1660
1670	4.041	4.046	4.051	4.056	4.060	4.065	4.070	4.075	4.079	4.084	4.089	1670
1680	4.089	4.093	4.098	4.103	4.108	4.112	4.117	4.122	4.127	4.131	4.136	1680
1690	4.136	4.141	4.146	4.151	4.155	4.160	4.165	4.170	4.174	4.179	4.184	1690
1700	4.184	4.189	4.194	4.198	4.203	4.208	4.213	4.217	4.222	4.227	4.232	1700
1710	4.232	4.237	4.242	4.246	4.251	4.256	4.261	4.266	4.270	4.275	4.280	1710
1720	4.280	4.285	4.290	4.295	4.299	4.304	4.309	4.314	4.319	4.324	4.328	1720
1730	4.328	4.333	4.338	4.343	4.348	4.353	4.358	4.362	4.367	4.372	4.377	1730
1740	4.377	4.382	4.387	4.392	4.397	4.401	4.406	4.411	4.416	4.421	4.426	1740
1750	4.426	4.431	4.436	4.441	4.445	4.450	4.455	4.460	4.465	4.470	4.475	1750
1760	4.475	4.480	4.485	4.490	4.495	4.500	4.504	4.509	4.514	4.519	4.524	1760
1770	4.524	4.529	4.534	4.539	4.544	4.549	4.554	4.559	4.564	4.569	4.574	1770
1780	4.574	4.579	4.584	4.589	4.593	4.598	4.603	4.608	4.613	4.618	4.623	1780
1790	4.623	4.628	4.633	4.638	4.643	4.648	4.653	4.658	4.663	4.668	4.673	1790
°F	0	1	2	3	4	5	6	7	8	9	10	°F

°F	0	1	2	3	4	5	6	7	8	9	10	°F
1800	4.673	4.678	4.683	4.688	4.693	4.698	4.703	4.708	4.713	4.718	4.723	1800
1810	4.723	4.728	4.733	4.738	4.743	4.748	4.754	4.759	4.764	4.769	4.774	1810
1820	4.774	4.779	4.784	4.789	4.794	4.799	4.804	4.809	4.814	4.819	4.824	1820
1830	4.824	4.829	4.834	4.839	4.844	4.850	4.855	4.860	4.865	4.870	4.875	1830
1840	4.875	4.880	4.885	4.890	4.895	4.900	4.905	4.911	4.916	4.921	4.926	1840
1850	4.926	4.931	4.936	4.941	4.946	4.951	4.957	4.962	4.967	4.972	4.977	1850
1860	4.977	4.982	4.987	4.992	4.998	5.003	5.008	5.013	5.018	5.023	5.028	1860
1870	5.028	5.034	5.039	5.044	5.049	5.054	5.059	5.065	5.070	5.075	5.080	1870
1880	5.080	5.085	5.090	5.096	5.101	5.106	5.111	5.116	5.121	5.127	5.132	1880
1890	5.132	5.137	5.142	5.147	5.153	5.158	5.163	5.168	5.173	5.179	5.184	1890
1900	5.184	5.189	5.194	5.199	5.205	5.210	5.215	5.220	5.225	5.231	5.236	1900
1910	5.236	5.241	5.246	5.252	5.257	5.262	5.267	5.273	5.278	5.283	5.288	1910
1920	5.288	5.294	5.299	5.304	5.309	5.315	5.320	5.325	5.330	5.336	5.341	1920
1930	5.341	5.346	5.351	5.357	5.362	5.367	5.373	5.378	5.383	5.388	5.394	1930
1940	5.394	5.399	5.404	5.410	5.415	5.420	5.425	5.431	5.436	5.441	5.447	1940
1950	5.447	5.452	5.457	5.463	5.468	5.473	5.479	5.484	5.489	5.495	5.500	1950
1960	5.500	5.505	5.511	5.516	5.521	5.527	5.532	5.537	5.543	5.548	5.553	1960
1970	5.553	5.559	5.564	5.569	5.575	5.580	5.585	5.591	5.596	5.601	5.607	1970
1980	5.607	5.612	5.618	5.623	5.628	5.634	5.639	5.644	5.650	5.655	5.661	1980
1990	5.661	5.666	5.671	5.677	5.682	5.688	5.693	5.698	5.704	5.709	5.715	1990
2000	5.715	5.720	5.725	5.731	5.736	5.742	5.747	5.752	5.758	5.763	5.769	2000
2010	5.769	5.774	5.780	5.785	5.790	5.796	5.801	5.807	5.812	5.818	5.823	2010
2020	5.823	5.828	5.834	5.839	5.845	5.850	5.856	5.861	5.867	5.872	5.878	2020
2030	5.878	5.883	5.888	5.894	5.899	5.905	5.910	5.916	5.921	5.927	5.932	2030
2040	5.932	5.938	5.943	5.949	5.954	5.960	5.965	5.971	5.976	5.982	5.987	2040
2050	5.987	5.993	5.998	6.004	6.009	6.015	6.020	6.026	6.031	6.037	6.042	2050
2060	6.042	6.048	6.053	6.059	6.064	6.070	6.075	6.081	6.086	6.092	6.098	2060
2070	6.098	6.103	6.109	6.114	6.120	6.125	6.131	6.136	6.142	6.147	6.153	2070
2080	6.153	6.159	6.164	6.170	6.175	6.181	6.186	6.192	6.197	6.203	6.209	2080
2090	6.209	6.214	6.220	6.225	6.231	6.237	6.242	6.248	6.253	6.259	6.264	2090
2100	6.264	6.270	6.276	6.281	6.287	6.292	6.298	6.304	6.309	6.315	6.320	2100
2110	6.320	6.326	6.332	6.337	6.343	6.349	6.354	6.360	6.365	6.371	6.377	2110
2120	6.377	6.382	6.388	6.394	6.399	6.405	6.410	6.416	6.422	6.427	6.433	2120
2130	6.433	6.439	6.444	6.450	6.456	6.461	6.467	6.473	6.478	6.484	6.490	2130
2140	6.490	6.495	6.501	6.507	6.512	6.518	6.524	6.529	6.535	6.541	6.546	2140
2150	6.546	6.552	6.558	6.563	6.569	6.575	6.580	6.586	6.592	6.597	6.603	2150
2160	6.603	6.609	6.615	6.620	6.626	6.632	6.637	6.643	6.649	6.655	6.660	2160
2170	6.660	6.666	6.672	6.677	6.683	6.689	6.695	6.700	6.706	6.712	6.718	2170
2180	6.718	6.723	6.729	6.735	6.740	6.746	6.752	6.758	6.763	6.769	6.775	2180
2190	6.775	6.781	6.786	6.792	6.798	6.804	6.809	6.815	6.821	6.827	6.833	2190
2200	6.833	6.838	6.844	6.850	6.856	6.861	6.867	6.873	6.879	6.884	6.890	2200
2210	6.890	6.896	6.902	6.908	6.913	6.919	6.925	6.931	6.937	6.942	6.948	2210
2220	6.948	6.954	6.960	6.966	6.971	6.977	6.983	6.989	6.995	7.000	7.006	2220
2230	7.006	7.012	7.018	7.024	7.030	7.035	7.041	7.047	7.053	7.059	7.065	2230
2240	7.065	7.070	7.076	7.082	7.088	7.094	7.100	7.105	7.111	7.117	7.123	2240
2250	7.123	7.129	7.135	7.141	7.146	7.152	7.158	7.164	7.170	7.176	7.182	2250
2260	7.182	7.187	7.193	7.199	7.205	7.211	7.217	7.223	7.229	7.234	7.240	2260
2270	7.240	7.246	7.252	7.258	7.264	7.270	7.276	7.281	7.287	7.293	7.299	2270
2280	7.299	7.305	7.311	7.317	7.323	7.329	7.335	7.340	7.346	7.352	7.358	2280
2290	7.358	7.364	7.370	7.376	7.382	7.388	7.394	7.400	7.406	7.412	7.417	2290
2300	7.417	7.423	7.429	7.435	7.441	7.447	7.453	7.459	7.465	7.471	7.477	2300
2310	7.477	7.483	7.489	7.495	7.501	7.507	7.512	7.518	7.524	7.530	7.536	2310
2320	7.536	7.542	7.548	7.554	7.560	7.566	7.572	7.578	7.584	7.590	7.596	2320
2330	7.596	7.602	7.608	7.614	7.620	7.626	7.632	7.638	7.644	7.650	7.656	2330
2340	7.656	7.662	7.668	7.674	7.680	7.686	7.692	7.698	7.704	7.710	7.716	2340
2350	7.716	7.722	7.728	7.734	7.740	7.746	7.752	7.758	7.764	7.770	7.776	2350
2360	7.776	7.782	7.788	7.794	7.800	7.806	7.812	7.818	7.824	7.830	7.836	2360
2370	7.836	7.842	7.848	7.854	7.860	7.866	7.872	7.878	7.884	7.891	7.897	2370
2380	7.897	7.903	7.909	7.915	7.921	7.927	7.933	7.939	7.945	7.951	7.957	2380
2390	7.957	7.963	7.969	7.975	7.981	7.987	7.994	8.000	8.006	8.012	8.018	2390
°F	0	1	2	3	4	5	6	7	8	9	10	°F

MAXIMUM TEMPERATURE RANGE

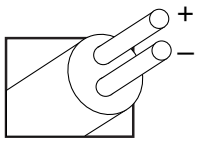
Thermocouple Grade
32 to 3092°F
0 to 1700°C

Extension Grade
32 to 212°F
0 to 100°C

LIMITS OF ERROR
(whichever is greater)
Standard: 0.5°C over 800°C
Special: NOT ESTABLISHED

COMMENTS, BARE WIRE ENVIRONMENT:
Oxidizing or Inert; Do Not Insert in Metal Tubes; Beware of Contamination; High Temperature; Common Use in Glass Industry

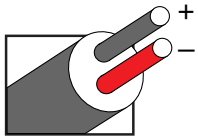
TEMPERATURE IN DEGREES °F
REFERENCE JUNCTION AT 32°F



Thermocouple Grade

NONE ESTABLISHED

Platinum-30% Rhodium vs. Platinum-6% Rhodium



Extension Grade

Revised Thermocouple Reference Tables

TYPE B

Reference Tables
N.I.S.T. Monograph 175
Revised to ITS-90

Z

Thermoelectric Voltage in Millivolts

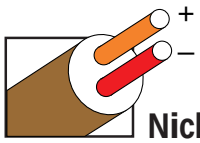
°F	0	1	2	3	4	5	6	7	8	9	10	°F
2400	8.018	8.024	8.030	8.036	8.042	8.048	8.054	8.060	8.066	8.073	8.079	2400
2410	8.079	8.085	8.091	8.097	8.103	8.109	8.115	8.121	8.127	8.134	8.140	2410
2420	8.140	8.146	8.152	8.158	8.164	8.170	8.176	8.182	8.188	8.195	8.201	2420
2430	8.201	8.207	8.213	8.219	8.225	8.231	8.237	8.244	8.250	8.256	8.262	2430
2440	8.262	8.268	8.274	8.280	8.286	8.293	8.299	8.305	8.311	8.317	8.323	2440
2450	8.323	8.329	8.336	8.342	8.348	8.354	8.360	8.366	8.372	8.379	8.385	2450
2460	8.385	8.391	8.397	8.403	8.409	8.416	8.422	8.428	8.434	8.440	8.446	2460
2470	8.446	8.453	8.459	8.465	8.471	8.477	8.483	8.490	8.496	8.502	8.508	2470
2480	8.508	8.514	8.521	8.527	8.533	8.539	8.545	8.551	8.558	8.564	8.570	2480
2490	8.570	8.576	8.582	8.589	8.595	8.601	8.607	8.613	8.620	8.626	8.632	2490
2500	8.632	8.638	8.644	8.651	8.657	8.663	8.669	8.675	8.682	8.688	8.694	2500
2510	8.694	8.700	8.707	8.713	8.719	8.725	8.731	8.738	8.744	8.750	8.756	2510
2520	8.756	8.763	8.769	8.775	8.781	8.787	8.794	8.800	8.806	8.812	8.819	2520
2530	8.819	8.825	8.831	8.837	8.844	8.850	8.856	8.862	8.869	8.875	8.881	2530
2540	8.881	8.887	8.894	8.900	8.906	8.912	8.919	8.925	8.931	8.937	8.944	2540
2550	8.944	8.950	8.956	8.962	8.969	8.975	8.981	8.988	8.994	9.000	9.006	2550
2560	9.006	9.013	9.019	9.025	9.031	9.038	9.044	9.050	9.057	9.063	9.069	2560
2570	9.069	9.075	9.082	9.088	9.094	9.101	9.107	9.113	9.119	9.126	9.132	2570
2580	9.132	9.138	9.145	9.151	9.157	9.164	9.170	9.176	9.182	9.189	9.195	2580
2590	9.195	9.201	9.208	9.214	9.220	9.227	9.233	9.239	9.245	9.252	9.258	2590
2600	9.258	9.264	9.271	9.277	9.283	9.290	9.296	9.302	9.309	9.315	9.321	2600
2610	9.321	9.328	9.334	9.340	9.347	9.353	9.359	9.366	9.372	9.378	9.385	2610
2620	9.385	9.391	9.397	9.404	9.410	9.416	9.423	9.429	9.435	9.442	9.448	2620
2630	9.448	9.454	9.461	9.467	9.473	9.480	9.486	9.492	9.499	9.505	9.511	2630
2640	9.511	9.518	9.524	9.530	9.537	9.543	9.550	9.556	9.562	9.569	9.575	2640
2650	9.575	9.581	9.588	9.594	9.600	9.607	9.613	9.619	9.626	9.632	9.639	2650
2660	9.639	9.645	9.651	9.658	9.664	9.670	9.677	9.683	9.690	9.696	9.702	2660
2670	9.702	9.709	9.715	9.721	9.728	9.734	9.741	9.747	9.753	9.760	9.766	2670
2680	9.766	9.772	9.779	9.785	9.792	9.798	9.804	9.811	9.817	9.824	9.830	2680
2690	9.830	9.836	9.843	9.849	9.856	9.862	9.868	9.875	9.881	9.888	9.894	2690
2700	9.894	9.900	9.907	9.913	9.920	9.926	9.932	9.939	9.945	9.952	9.958	2700
2710	9.958	9.964	9.971	9.977	9.984	9.990	9.996	10.003	10.009	10.016	10.022	2710
2720	10.022	10.028	10.035	10.041	10.048	10.054	10.061	10.067	10.073	10.080	10.086	2720
2730	10.086	10.093	10.099	10.105	10.112	10.118	10.125	10.131	10.138	10.144	10.150	2730
2740	10.150	10.157	10.163	10.170	10.176	10.183	10.189	10.195	10.202	10.208	10.215	2740
2750	10.215	10.221	10.228	10.234	10.240	10.247	10.253	10.260	10.266	10.273	10.279	2750
2760	10.279	10.286	10.292	10.298	10.305	10.311	10.318	10.324	10.331	10.337	10.344	2760
2770	10.344	10.350	10.356	10.363	10.369	10.376	10.382	10.389	10.395	10.402	10.408	2770
2780	10.408	10.414	10.421	10.427	10.434	10.440	10.447	10.453	10.460	10.466	10.473	2780
2790	10.473	10.479	10.485	10.492	10.498	10.505	10.511	10.518	10.524	10.531	10.537	2790
2800	10.537	10.544	10.550	10.556	10.563	10.569	10.576	10.582	10.589	10.595	10.602	2800
2810	10.602	10.608	10.615	10.621	10.628	10.634	10.641	10.647	10.653	10.660	10.666	2810
2820	10.666	10.673	10.679	10.686	10.692	10.699	10.705	10.712	10.718	10.725	10.731	2820
2830	10.731	10.738	10.744	10.751	10.757	10.763	10.770	10.776	10.783	10.789	10.796	2830
2840	10.796	10.802	10.809	10.815	10.822	10.828	10.835	10.841	10.848	10.854	10.861	2840
2850	10.861	10.867	10.874	10.880	10.887	10.893	10.900	10.906	10.913	10.919	10.925	2850
2860	10.925	10.932	10.938	10.945	10.951	10.958	10.964	10.971	10.977	10.984	10.990	2860
2870	10.990	10.997	11.003	11.010	11.016	11.023	11.029	11.036	11.042	11.049	11.055	2870
2880	11.055	11.062	11.068	11.075	11.081	11.088	11.094	11.101	11.107	11.114	11.120	2880
2890	11.120	11.127	11.133	11.140	11.146	11.153	11.159	11.166	11.172	11.179	11.185	2890
°F	0	1	2	3	4	5	6	7	8	9	10	°F

°F	0	1	2	3	4	5	6	7	8	9	10	°F
2900	11.185	11.192	11.198	11.205	11.211	11.218	11.224	11.231	11.237	11.244	11.250	2900
2910	11.250	11.257	11.263	11.270	11.276	11.282	11.289	11.295	11.302	11.308	11.315	2910
2920	11.315	11.321	11.328	11.334	11.341	11.347	11.354	11.360	11.367	11.373	11.380	2920
2930	11.380	11.386	11.393	11.399	11.406	11.412	11.419	11.425	11.432	11.438	11.445	2930
2940	11.445	11.451	11.458	11.464	11.471	11.477	11.484	11.490	11.497	11.503	11.510	2940
2950	11.510	11.516	11.523	11.529	11.536	11.542	11.549	11.555	11.562	11.568	11.575	2950
2960	11.575	11.582	11.588	11.595	11.601	11.608	11.614	11.621	11.627	11.634	11.640	2960
2970	11.640	11.647	11.653	11.660	11.666	11.673	11.679	11.686	11.692	11.699	11.705	2970
2980	11.705	11.712	11.718	11.725	11.731	11.738	11.744	11.751	11.757	11.764	11.770	2980
2990	11.770	11.777	11.783	11.790	11.796	11.803	11.809	11.816	11.822	11.829	11.835	2990
3000	11.835	11.842	11.848	11.855	11.861	11.868	11.874	11.881	11.887	11.894	11.900	3000
3010	11.900	11.907	11.913	11.920	11.926	11.933	11.939	11.946	11.952	11.959	11.965	3010
3020	11.965	11.972	11.978	11.985	11.991	11.998	12.004	12.011	12.017	12.024	12.030	3020
3030	12.030	12.037	12.043	12.050	12.056	12.063	12.069	12.076	12.082	12.089	12.095	3030
3040	12.095	12.102	12.108	12.115	12.121	12.128	12.134	12.141	12.147	12.154	12.160	3040
3050	12.160	12.166	12.173	12.179	12.186	12.192	12.199	12.205	12.212	12.218	12.225	3050
3060	12.225	12.231	12.238	12.244	12.251	12.257	12.264	12.270	12.277	12.283	12.290	3060
3070	12.290	12.296	12.303	12.309	12.316	12.322	12.329	12.335	12.342	12.348	12.355	3070
3080	12.355	12.361	12.368	12.374	12.381	12.387	12.394	12.400	12.407	12.413	12.420	3080
3090	12.420	12.426	12.433	12.439	12.446	12.452	12.458	12.465	12.471	12.478	12.484	3090
3100	12.484	12.491	12.497	12.504	12.510	12.517	12.523	12.530	12.536	12.543	12.549	3100
3110	12.549	12.556	12.562	12.569	12.575	12.582	12.588	12.595	12.601	12.607	12.614	3110
3120	12.614	12.620	12.627	12.633	12.640	12.646	12.653	12.659	12.666	12.672	12.679	3120
3130	12.679	12.685	12.692	12.698	12.704	12.711	12.717	12.724	12.730	12.737	12.743	3130
3140	12.743	12.750	12.756	12.763	12.769	12.776	12.782	12.789	12.795	12.801	12.808	3140
3150	12.808	12.814	12.821	12.827	12.834	12.840	12.847	12.853	12.860	12.866	12.872	3150
3160	12.872	12.879	12.885	12.892	12.898	12.905	12.911	12.918	12.924	12.931	12.937	3160
3170	12.937	12.943	12.950	12.956	12.963	12.969	12.976	12.982	12.989	12.995	13.001	3170
3180	13.001	13.008	13.014	13.021	13.027	13.034	13.040	13.047	13.053	13.059	13.066	3180
3190	13.066	13.072	13.079	13.085	13.092	13.098	13.104	13.111	13.117	13.124	13.130	3190
3200	13.130	13.137	13.143	13.149	13.156	13.162	13.169	13.175	13.182	13.188	13.194	3200
3210	13.194	13.201	13.207	13.214	13.220	13.227	13.233	13.239	13.246	13.252	13.259	3210
3220	13.259	13.265	13.271	13.278	13.284	13.291	13.297	13.304	13.310	13.316	13.323	3220
3230	13.323	13.329	13.336	13.342	13.348	13.355	13.361	13.368	13.374	13.380	13.387	3230
3240	13.387	13.393	13.400	13.406	13.412	13.419	13.425	13.432	13.438	13.444	13.451	3240
3250	13.451	13.457	13.464	13.470	13.476	13.483	13.489	13.496	13.502	13.508	13.515	3250
3260	13.515	13.521	13.527	13.534	13.540	13.547	13.553	13.559	13.566	13.572	13.579	3260
3270	13.579	13.585	13.591	13.598	13.604	13.610	13.617	13.623	13.630	13.636	13.642	3270
3280	13.642	13.649	13.655	13.661	13.668	13.674	13.680	13.687	13.693	13.700	13.706	3280
3290	13.706	13.712	13.719	13.725	13.731	13.738	13.744	13.750	13.757	13.763	13.769	3290
3300	13.769	13.776	13.782	13.789	13.795	13.801	13.808	13.814	13.820			3300
°F	0	1	2	3	4	5	6	7	8	9	10	°F

Revised Thermocouple Reference Tables

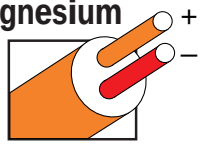
TYPE N

Reference Tables
N.I.S.T. Monograph 175
Revised to ITS-90



Thermocouple Grade

Nickel-14.2% Chromium-1.4% Silicon vs. Nickel-4.4% Silicon-0.1% Magnesium



Extension Grade

MAXIMUM TEMPERATURE RANGE
Thermocouple Grade
– 450 to 2372°F
– 270 to 1300°C
Extension Grade
32 to 392°F
0 to 200°C

LIMITS OF ERROR
(whichever is greater)
Standard: 2.2°C or 0.75% Above 0°C
2.2°C or 2.0% Below 0°C
Special: 1.1°C or 0.4%

COMMENTS, BARE WIRE ENVIRONMENT:
Alternative to Type K; More Stable at High Temperatures

TEMPERATURE IN DEGREES °F
REFERENCE JUNCTION AT 32°F

Thermoelectric Voltage in Millivolts

°F	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	°F
-450							-4.345	-4.345	-4.345	-4.344	-4.344	-450
-440	-4.344	-4.344	-4.343	-4.343	-4.342	-4.342	-4.341	-4.341	-4.340	-4.340	-4.339	-440
-430	-4.339	-4.338	-4.337	-4.337	-4.336	-4.335	-4.334	-4.333	-4.332	-4.331	-4.330	-430
-420	-4.330	-4.329	-4.327	-4.326	-4.325	-4.324	-4.322	-4.321	-4.319	-4.318	-4.316	-420
-410	-4.316	-4.315	-4.313	-4.312	-4.310	-4.308	-4.306	-4.305	-4.303	-4.301	-4.299	-410
-400	-4.299	-4.297	-4.295	-4.293	-4.291	-4.288	-4.286	-4.284	-4.282	-4.279	-4.277	-400
-390	-4.277	-4.275	-4.272	-4.270	-4.267	-4.264	-4.262	-4.259	-4.256	-4.254	-4.251	-390
-380	-4.251	-4.248	-4.245	-4.242	-4.239	-4.236	-4.233	-4.230	-4.226	-4.223	-4.220	-380
-370	-4.220	-4.217	-4.213	-4.210	-4.206	-4.203	-4.199	-4.196	-4.192	-4.189	-4.185	-370
-360	-4.185	-4.181	-4.177	-4.174	-4.170	-4.166	-4.162	-4.158	-4.154	-4.150	-4.145	-360
-350	-4.145	-4.141	-4.137	-4.133	-4.128	-4.124	-4.120	-4.115	-4.111	-4.106	-4.102	-350
-340	-4.102	-4.097	-4.092	-4.088	-4.083	-4.078	-4.073	-4.068	-4.064	-4.059	-4.054	-340
-330	-4.054	-4.049	-4.043	-4.038	-4.033	-4.028	-4.023	-4.017	-4.012	-4.007	-4.001	-330
-320	-4.001	-3.996	-3.990	-3.985	-3.979	-3.974	-3.968	-3.962	-3.957	-3.951	-3.945	-320
-310	-3.945	-3.939	-3.933	-3.927	-3.921	-3.915	-3.909	-3.903	-3.897	-3.891	-3.884	-310
-300	-3.884	-3.878	-3.872	-3.866	-3.859	-3.853	-3.846	-3.840	-3.833	-3.827	-3.820	-300
-290	-3.820	-3.813	-3.807	-3.800	-3.793	-3.786	-3.779	-3.773	-3.766	-3.759	-3.752	-290
-280	-3.752	-3.745	-3.738	-3.730	-3.723	-3.716	-3.709	-3.702	-3.694	-3.687	-3.679	-280
-270	-3.679	-3.672	-3.665	-3.657	-3.650	-3.642	-3.634	-3.627	-3.619	-3.611	-3.604	-270
-260	-3.604	-3.596	-3.588	-3.580	-3.572	-3.564	-3.556	-3.548	-3.540	-3.532	-3.524	-260
-250	-3.524	-3.516	-3.508	-3.499	-3.491	-3.483	-3.474	-3.466	-3.458	-3.449	-3.441	-250
-240	-3.441	-3.432	-3.424	-3.415	-3.407	-3.398	-3.389	-3.380	-3.372	-3.363	-3.354	-240
-230	-3.354	-3.345	-3.336	-3.327	-3.318	-3.309	-3.300	-3.291	-3.282	-3.273	-3.264	-230
-220	-3.264	-3.255	-3.246	-3.236	-3.227	-3.218	-3.208	-3.199	-3.189	-3.180	-3.171	-220
-210	-3.171	-3.161	-3.151	-3.142	-3.132	-3.123	-3.113	-3.103	-3.093	-3.084	-3.074	-210
-200	-3.074	-3.064	-3.054	-3.044	-3.034	-3.024	-3.014	-3.004	-2.994	-2.984	-2.974	-200
-190	-2.974	-2.964	-2.954	-2.943	-2.933	-2.923	-2.912	-2.902	-2.892	-2.881	-2.871	-190
-180	-2.871	-2.860	-2.850	-2.839	-2.829	-2.818	-2.808	-2.797	-2.786	-2.776	-2.765	-180
-170	-2.765	-2.754	-2.743	-2.733	-2.722	-2.711	-2.700	-2.689	-2.678	-2.667	-2.656	-170
-160	-2.656	-2.645	-2.634	-2.623	-2.612	-2.601	-2.589	-2.578	-2.567	-2.556	-2.544	-160
-150	-2.544	-2.533	-2.522	-2.510	-2.499	-2.488	-2.476	-2.465	-2.453	-2.442	-2.430	-150
-140	-2.430	-2.418	-2.407	-2.395	-2.384	-2.372	-2.360	-2.348	-2.337	-2.325	-2.313	-140
-130	-2.313	-2.301	-2.289	-2.277	-2.265	-2.254	-2.242	-2.230	-2.218	-2.206	-2.193	-130
-120	-2.193	-2.181	-2.169	-2.157	-2.145	-2.133	-2.121	-2.108	-2.096	-2.084	-2.072	-120
-110	-2.072	-2.059	-2.047	-2.035	-2.022	-2.010	-1.997	-1.985	-1.972	-1.960	-1.947	-110
-100	-1.947	-1.935	-1.922	-1.910	-1.897	-1.884	-1.872	-1.859	-1.846	-1.834	-1.821	-100
-90	-1.821	-1.808	-1.795	-1.783	-1.770	-1.757	-1.744	-1.731	-1.718	-1.705	-1.692	-90
-80	-1.692	-1.679	-1.666	-1.653	-1.640	-1.627	-1.614	-1.601	-1.588	-1.575	-1.562	-80
-70	-1.562	-1.549	-1.536	-1.522	-1.509	-1.496	-1.483	-1.470	-1.456	-1.443	-1.430	-70
-60	-1.430	-1.416	-1.403	-1.390	-1.376	-1.363	-1.349	-1.336	-1.323	-1.309	-1.296	-60
-50	-1.296	-1.282	-1.269	-1.255	-1.242	-1.228	-1.214	-1.201	-1.187	-1.174	-1.160	-50
-40	-1.160	-1.146	-1.133	-1.119	-1.105	-1.092	-1.078	-1.064	-1.050	-1.037	-1.023	-40
-30	-1.023	-1.009	-0.995	-0.981	-0.967	-0.954	-0.940	-0.926	-0.912	-0.898	-0.884	-30
-20	-0.884	-0.870	-0.856	-0.842	-0.828	-0.814	-0.800	-0.786	-0.772	-0.758	-0.744	-20
-10	-0.744	-0.730	-0.716	-0.702	-0.688	-0.674	-0.660	-0.646	-0.632	-0.617	-0.603	-10
0	-0.603	-0.589	-0.575	-0.561	-0.546	-0.532	-0.518	-0.504	-0.490	-0.475	-0.461	0
0	-0.461	-0.447	-0.433	-0.418	-0.404	-0.390	-0.375	-0.361	-0.347	-0.332	-0.318	0
10	-0.318	-0.304	-0.289	-0.275	-0.260	-0.246	-0.232	-0.217	-0.203	-0.188	-0.174	10
20	-0.174	-0.159	-0.145	-0.131	-0.116	-0.102	-0.087	-0.073	-0.058	-0.044	-0.029	20
30	-0.029	-0.015	0.000	0.014	0.029	0.043	0.058	0.072	0.087	0.101	0.116	30
40	0.116	0.130	0.145	0.159	0.174	0.188	0.203	0.217	0.232	0.246	0.261	40
50	0.261	0.275	0.290	0.305	0.319	0.334	0.349	0.363	0.378	0.393	0.407	50
60	0.407	0.422	0.437	0.451	0.466	0.481	0.496	0.510	0.525	0.540	0.555	60
70	0.555	0.570	0.584	0.599	0.614	0.629	0.644	0.659	0.674	0.688	0.703	70
80	0.703	0.718	0.733	0.748	0.763	0.778	0.793	0.808	0.823	0.838	0.853	80
90	0.853	0.868	0.883	0.898	0.913	0.928	0.943	0.958	0.974	0.989	1.004	90
°F	0	1	2	3	4	5	6	7	8	9	10	°F

°F	0	1	2	3	4	5	6	7	8	9	10	°F
100	1.004	1.019	1.034	1.049	1.065	1.080	1.095	1.110	1.125	1.141	1.156	100
110	1.156	1.171	1.186	1.202	1.217	1.232	1.248	1.263	1.278	1.294	1.309	110
120	1.309	1.324	1.340	1.355	1.371	1.386	1.402	1.417	1.432	1.448	1.463	120
130	1.463	1.479	1.494	1.510	1.525	1.541	1.557	1.572	1.588	1.603	1.619	130
140	1.619	1.635	1.650	1.666	1.682	1.697	1.713	1.729	1.744	1.760	1.776	140
150	1.776	1.791	1.807	1.823	1.839	1.855	1.870	1.886	1.902	1.918	1.934	150
160	1.934	1.950	1.965	1.981	1.997	2.013	2.029	2.045	2.061	2.077	2.093	160
170	2.093	2.109	2.125	2.141	2.157	2.173	2.189	2.205	2.221	2.237	2.253	170
180	2.253	2.269	2.285	2.301	2.318	2.334	2.350	2.366	2.382	2.398	2.415	180
190	2.415	2.431	2.447	2.463	2.480	2.496	2.512	2.528	2.545	2.561	2.577	190
200	2.577	2.594	2.610	2.626	2.643	2.659	2.676	2.692	2.708	2.725	2.741	200
210	2.741	2.758	2.774	2.791	2.807	2.824	2.840	2.857	2.873	2.890	2.906	210
220	2.906	2.923	2.939	2.956	2.973	2.989	3.006	3.022	3.039	3.056	3.072	220
230	3.072	3.089	3.106	3.123	3.139	3.156	3.173	3.189	3.206	3.223	3.240	230
240	3.240	3.257	3.273	3.290	3.307	3.324	3.341	3.358	3.374	3.391	3.408	240
250	3.408	3.425	3.442	3.459	3.476	3.493	3.510	3.527	3.544	3.561	3.578	250
260	3.578	3.595	3.612	3.629	3.646	3.663	3.680	3.697	3.714	3.731	3.748	260
270	3.748	3.766	3.783	3.800	3.817	3.834	3.851	3.869	3.886	3.903	3.920	270
280	3.920	3.937	3.955	3.972	3.989	4.007	4.024	4.041	4.058	4.076	4.093	280
290	4.093	4.110	4.128	4.145	4.162	4.180	4.197	4.215	4.232	4.250	4.267	290
300	4.267	4.284	4.302	4.319	4.337	4.354	4.372	4.389	4.407	4.424	4.442	300
310	4.442	4.459	4.477	4.495	4.512	4.530	4.547	4.565	4.583	4.600	4.618	310
320	4.618	4.635	4.653	4.671	4.688	4.706	4.724	4.742	4.759	4.777	4.795	320
330	4.795	4.813	4.830	4.848	4.866	4.884	4.901	4.919	4.937	4.955	4.973	330
340	4.973	4.991	5.008	5.026	5.044	5.062	5.080	5.098	5.116	5.134	5.152	340
350	5.152	5.170	5.188	5.206	5.224	5.241	5.259	5.277	5.295	5.314	5.332	350
360	5.332	5.350	5.368	5.386	5.404	5.422	5.440	5.458	5.476	5.494	5.512	360
370	5.512	5.531	5.549	5.567	5.585	5.603	5.621	5.639	5.658	5.676	5.694	370
380	5.694	5.712	5.731	5.749	5.767	5.785	5.804	5.822	5.840	5.858	5.877	380
390	5.877	5.895	5.913	5.932	5.950	5.968	5.987	6.005	6.024	6.042	6.060	390
400	6.060	6.079	6.097	6.116	6.134	6.152	6.171	6.189	6.208	6.226	6.245	400
410	6.245	6.263	6.282	6.300	6.319	6.337	6.356	6.374	6.393	6.411	6.430	410
420	6.430	6.449	6.467	6.486	6.504	6.523	6.542	6.560	6.579	6.597	6.616	420
430	6.616	6.635	6.653	6.672	6.691	6.710	6.728	6.747	6.766	6.784	6.803	430
440	6.803	6.822	6.841	6.859	6.878	6.897	6.916	6.934	6.953	6.972	6.991	440
450	6.991	7.010	7.029	7.047	7.066	7.085	7.104	7.123	7.142	7.161	7.179	450
460	7.179	7.198	7.217	7.236	7.255	7.274	7.293	7.312	7.331	7.350	7.369	460
470	7.369	7.388	7.407	7.426	7.445	7.464	7.483	7.502	7.521	7.540	7.559	470
480	7.559	7.578	7.597	7.616	7.635	7.654	7.673	7.692	7.711	7.731	7.750	480
490	7.750	7.769	7.788	7.807	7.826	7.845	7.865	7.884	7.903	7.922	7.941	490
500	7.941	7.960	7.980	7.999	8.018	8.037	8.057	8.076	8.095	8.114	8.134	500
510	8.134	8.153	8.172	8.191	8.211	8.230	8.249	8.269	8.288	8.307	8.327	510
520	8.327	8.346	8.365	8.385	8.404	8.423	8.443	8.462	8.482	8.501	8.520	520
530	8.520	8.540	8.559	8.579	8.598	8.617	8.637	8.656	8.676	8.695	8.715	530
540	8.715	8.734	8.754	8.773	8.793	8.812	8.832	8.851	8.871	8.890	8.910	540
550	8.910	8.929	8.949	8.968	8.988	9.008	9.027	9.047	9.066	9.086	9.105	550
560	9.105	9.125	9.145	9.164	9.184	9.204	9.223	9.243	9.262	9.282	9.302	560
570	9.302	9.321	9.341	9.361	9.381	9.400	9.420	9.440	9.459	9.479	9.499	570
580	9.499	9.519	9.538	9.558	9.578	9.598	9.617	9.637	9.657	9.677	9.696	580
590	9.696	9.716	9.736	9.756	9.776	9.795	9.815	9.835	9.855	9.875	9.895	590
600	9.895	9.914	9.934	9.954	9.974	9.994	10.014	10.034	10.054	10.073	10.093	600
610	10.093	10.113	10.133	10.153	10.173	10.193	10.213	10.233	10.253	10.273	10.293	610
620	10.293	10.313	10.333	10.353	10.373	10.393	10.413	10.433	10.453	10.473	10.493	620
630	10.493	10.513	10.533	10.553	10.573	10.593	10.613	10.633	10.653	10.673	10.693	630
640	10.693	10.713	10.733	10.753	10.774	10.794	10.814	10.834	10.854	10.874	10.894	640
650	10.894	10.914	10.934	10.955	10.975	10.995	11.015	11.035	11.055	11.076	11.096	650
660	11.096	11.116	11.136	11.156	11.177	11.197	11.217	11.237	11.257	11.278	11.298	660
670	11.298	11.318	11.338	11.359	11.379	11.399	11.419	11.440	11.460	11.480	11.501	670
680	11.501	11.521	11.541	11.561	11.582	11.602	11.622	11.643	11.663	11.683	11.704	680
690	11.704	11.724	11.744	11.765	11.785	11.805	11.826	11.846	11.867	11.887	11.907	690
°F	0	1	2	3	4	5	6	7	8	9	10	°F

MAXIMUM TEMPERATURE RANGE

Thermocouple Grade
– 450 to 2372°F
– 270 to 1300°C

Extension Grade
32 to 392°F
0 to 200°C

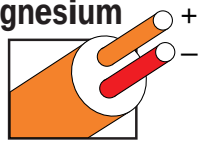
LIMITS OF ERROR
(whichever is greater)
Standard: 2.2°C or 0.75% Above 0°C
2.2°C or 2.0% Below 0°C
Special: 1.1°C or 0.4%

COMMENTS, BARE WIRE ENVIRONMENT:
Alternative to Type K; More Stable at High Temperatures

TEMPERATURE IN DEGREES °F
REFERENCE JUNCTION AT 32°F

Thermocouple Grade

Nickel-14.2% Chromium-1.4% Silicon vs. Nickel-4.4% Silicon-0.1% Magnesium



Extension Grade

Revised Thermocouple Reference Tables

TYPE N

Reference Tables N.I.S.T. Monograph 175 Revised to ITS-90

Z

Thermoelectric Voltage in Millivolts

°F	0	1	2	3	4	5	6	7	8	9	10	°F
700	11.907	11.928	11.948	11.968	11.989	12.009	12.030	12.050	12.071	12.091	12.111	700
710	12.111	12.132	12.152	12.173	12.193	12.214	12.234	12.255	12.275	12.295	12.316	710
720	12.316	12.336	12.357	12.377	12.398	12.418	12.439	12.459	12.480	12.500	12.521	720
730	12.521	12.542	12.562	12.583	12.603	12.624	12.644	12.665	12.685	12.706	12.726	730
740	12.726	12.747	12.768	12.788	12.809	12.829	12.850	12.871	12.891	12.912	12.932	740
750	12.932	12.953	12.974	12.994	13.015	13.036	13.056	13.077	13.098	13.118	13.139	750
760	13.139	13.159	13.180	13.201	13.221	13.242	13.263	13.284	13.304	13.325	13.346	760
770	13.346	13.366	13.387	13.408	13.428	13.449	13.470	13.491	13.511	13.532	13.553	770
780	13.553	13.574	13.594	13.615	13.636	13.657	13.677	13.698	13.719	13.740	13.760	780
790	13.760	13.781	13.802	13.823	13.844	13.864	13.885	13.906	13.927	13.948	13.969	790
800	13.969	13.989	14.010	14.031	14.052	14.073	14.094	14.114	14.135	14.156	14.177	800
810	14.177	14.198	14.219	14.240	14.260	14.281	14.302	14.323	14.344	14.365	14.386	810
820	14.386	14.407	14.428	14.448	14.469	14.490	14.511	14.532	14.553	14.574	14.595	820
830	14.595	14.616	14.637	14.658	14.679	14.700	14.721	14.742	14.763	14.784	14.804	830
840	14.804	14.825	14.846	14.867	14.888	14.909	14.930	14.951	14.972	14.993	15.014	840
850	15.014	15.035	15.056	15.077	15.098	15.119	15.140	15.162	15.183	15.204	15.225	850
860	15.225	15.246	15.267	15.288	15.309	15.330	15.351	15.372	15.393	15.414	15.435	860
870	15.435	15.456	15.477	15.498	15.520	15.541	15.562	15.583	15.604	15.625	15.646	870
880	15.646	15.667	15.688	15.709	15.731	15.752	15.773	15.794	15.815	15.836	15.857	880
890	15.857	15.878	15.900	15.921	15.942	15.963	15.984	16.005	16.027	16.048	16.069	890
900	16.069	16.090	16.111	16.132	16.154	16.175	16.196	16.217	16.238	16.260	16.281	900
910	16.281	16.302	16.323	16.344	16.366	16.387	16.408	16.429	16.450	16.472	16.493	910
920	16.493	16.514	16.535	16.557	16.578	16.599	16.620	16.642	16.663	16.684	16.705	920
930	16.705	16.727	16.748	16.769	16.790	16.812	16.833	16.854	16.875	16.897	16.918	930
940	16.918	16.939	16.961	16.982	17.003	17.025	17.046	17.067	17.088	17.110	17.131	940
950	17.131	17.152	17.174	17.195	17.216	17.238	17.259	17.280	17.302	17.323	17.344	950
960	17.344	17.366	17.387	17.408	17.430	17.451	17.472	17.494	17.515	17.536	17.558	960
970	17.558	17.579	17.601	17.622	17.643	17.665	17.686	17.707	17.729	17.750	17.772	970
980	17.772	17.793	17.814	17.836	17.857	17.879	17.900	17.921	17.943	17.964	17.986	980
990	17.986	18.007	18.028	18.050	18.071	18.093	18.114	18.136	18.157	18.178	18.200	990
1000	18.200	18.221	18.243	18.264	18.286	18.307	18.328	18.350	18.371	18.393	18.414	1000
1010	18.414	18.436	18.457	18.479	18.500	18.522	18.543	18.565	18.586	18.608	18.629	1010
1020	18.629	18.650	18.672	18.693	18.715	18.736	18.758	18.779	18.801	18.822	18.844	1020
1030	18.844	18.865	18.887	18.908	18.930	18.951	18.973	18.994	19.016	19.037	19.059	1030
1040	19.059	19.081	19.102	19.124	19.145	19.167	19.188	19.210	19.231	19.253	19.274	1040
1050	19.274	19.296	19.317	19.339	19.360	19.382	19.404	19.425	19.447	19.468	19.490	1060
1060	19.490	19.511	19.533	19.554	19.576	19.598	19.619	19.641	19.662	19.684	19.705	1060
1070	19.705	19.727	19.749	19.770	19.792	19.813	19.835	19.857	19.878	19.900	19.921	1070
1080	19.921	19.943	19.964	19.986	20.008	20.029	20.051	20.072	20.094	20.116	20.137	1060
1090	20.137	20.159	20.181	20.202	20.224	20.245	20.267	20.289	20.310	20.332	20.353	1090
1100	20.353	20.375	20.397	20.418	20.440	20.462	20.483	20.505	20.527	20.548	20.570	1100
1110	20.570	20.591	20.613	20.635	20.656	20.678	20.700	20.721	20.743	20.765	20.786	1110
1120	20.786	20.808	20.830	20.851	20.873	20.895	20.916	20.938	20.960	20.981	21.003	1120
1130	21.003	21.025	21.046	21.068	21.090	21.111	21.133	21.155	21.176	21.198	21.220	1130
1140	21.220	21.241	21.263	21.285	21.306	21.328	21.350	21.371	21.393	21.415	21.437	1140
1150	21.437	21.458	21.480	21.502	21.523	21.545	21.567	21.588	21.610	21.632	21.654	1150
1160	21.654	21.675	21.697	21.719	21.740	21.762	21.784	21.806	21.827	21.849	21.871	1160
1170	21.871	21.892	21.914	21.936	21.958	21.979	22.001	22.023	22.044	22.066	22.088	1170
1180	22.088	22.110	22.131	22.153	22.175	22.197	22.218	22.240	22.262	22.284	22.305	1180
1190	22.305	22.327	22.349	22.370	22.392	22.414	22.436	22.457	22.479	22.501	22.523	1190
1200	22.523	22.544	22.566	22.588	22.610	22.631	22.653	22.675	22.697	22.718	22.740	1200
1210	22.740	22.762	22.784	22.805	22.827	22.849	22.871	22.893	22.914	22.936	22.958	1210
1220	22.958	22.980	23.001	23.023	23.045	23.067	23.088	23.110	23.132	23.154	23.178	1220
1230	23.176	23.197	23.219	23.241	23.263	23.284	23.306	23.328	23.350	23.372	23.393	1230
1240	23.393	23.415	23.437	23.459	23.480	23.502	23.524	23.546	23.568	23.589	23.611	1240
1250	23.611	23.633	23.655	23.676	23.698	23.720	23.742	23.764	23.785	23.807	23.829	1250
1260	23.829	23.851	23.873	23.894	23.916	23.938	23.960	23.982	24.003	24.025	24.047	1260
1270	24.047	24.069	24.091	24.112	24.134	24.156	24.178	24.200	24.221	24.243	24.265	1270
1280	24.265	24.287	24.309	24.330	24.352	24.374	24.396	24.418	24.439	24.461	24.483	1280
1290	24.483	24.505	24.527	24.548	24.570	24.592	24.614	24.636	24.658	24.679	24.701	1290
°F	0	1	2	3	4	5	6	7	8	9	10	°F

°F	0	1	2	3	4	5	6	7	8	9	10	°F
1300	24.701	24.723	24.745	24.767	24.788	24.810	24.832	24.854	24.876	24.897	24.919	1300
1310	24.919	24.941	24.963	24.985	25.007	25.028	25.050	25.072	25.094	25.116	25.137	1310
1320	25.137	25.159	25.181	25.203	25.225	25.247	25.268	25.290	25.312	25.334	25.356	1320
1330	25.356	25.377	25.399	25.421	25.443	25.465	25.487	25.508	25.530	25.552	25.574	1330
1340	25.574	25.596	25.618	25.639	25.661	25.683	25.705	25.727	25.748	25.770	25.792	1340
1350	25.792	25.814	25.836	25.858	25.879	25.901	25.923	25.945	25.967	25.989	26.010	1350
1360	26.010	26.032	26.054	26.076	26.098	26.119	26.141	26.163	26.185	26.207	26.229	1360
1370	26.229	26.250	26.272	26.294	26.316	26.338	26.360	26.381	26.403	26.425	26.447	1370
1380	26.447	26.469	26.491	26.512	26.534	26.556	26.578	26.600	26.622	26.643	26.665	1380
1390	26.665	26.687	26.709	26.731	26.752	26.774	26.796	26.818	26.840	26.862	26.883	1390
1400	26.883	26.905	26.927	26.949	26.971	26.993	27.014	27.036	27.058	27.080	27.102	1400
1410	27.102	27.124	27.145	27.167	27.189	27.211	27.233	27.254	27.276	27.298	27.320	1410
1420	27.320	27.342	27.364	27.385	27.407	27.429	27.451	27.473	27.495	27.516	27.538	1420
1430	27.538	27.560	27.582	27.604	27.625	27.647	27.669	27.691	27.713	27.735	27.756	1430
1440	27.756	27.778	27.800	27.822	27.844	27.866	27.887	27.909	27.931	27.953	27.975	1440
1450	27.975	27.996	28.018	28.040	28.062	28.084	28.105	28.127	28.149	28.171	28.193	1450
1460	28.193	28.215	28.236	28.258	28.280	28.302	28.324	28.345	28.367	28.389	28.411	1460
1470	28.411	28.433	28.455	28.476	28.498	28.520	28.542	28.564	28.585	28.607	28.629	1470
1480	28.629	28.651	28.673	28.694	28.716	28.738	28.760	28.782	28.803	28.825	28.847	1480
1490	28.847	28.869	28.891	28.912	28.934	28.956	28.978	29.000	29.021	29.043	29.065	1490
1500	29.085	29.087	29.109	29.130	29.152	29.174	29.196	29.218	29.239	29.261	29.283	1500
1510	29.283	29.305	29.327	29.348	29.370	29.392	29.414	29.436	29.457	29.479	29.501	1510
1520	29.501	29.523	29.545	29.566	29.588	29.610	29.632	29.653	29.675	29.697	29.719	I520
1530	29.719	29.741	29.762	29.784	29.806	29.828	29.850	29.871	29.893	29.915	29.937	I530
1540	29.937	29.958	29.980	30.002	30.024	30.046	30.067	30.089	30.111	30.133	30.154	IS40
1550	30.154	30.176	30.198	30.220	30.242	30.263	30.285	30.307	30.329	30.350	30.372	1550
1560	30.372	30.304	30.416	30.437	30.459	30.481	30.503	30.524	30.546	30.568	30.590	1560
1570	30.590	30.611	30.633	30.655	30.677	30.699	30.720	30.742	30.764	30.786	30.807	1570
1580	30.807	30.829	30.851	30.873	30.894	30.916	30.938	30.960	30.981	31.003	31.025	1580
1590	31.025	31.047	31.068	31.090	31.112	31.133	31.155	31.177	31.199	31.220	31.242	1590
1600	31.242	31.264	31.286	31.307	31.329	31.351	31.373	31.394	31.416	31.438	31.459	1600
1610	31.450	31.481	31.503	31.525	31.546	31.568	31.590	31.612	31.633	31.655	31.677	1610
1620	31.677	31.698	31.720	31.742	31.764	31.785	31.807	31.829	31.850	31.872	31.894	1620
1630	31.894	31.916	31.937	31.959	31.981	32.002	32.024	32.046	32.068	32.089	32.111	1630
1640	32.111	32.133	32.154	32.176	32.198	32.219	32.241	32.263	32.284	32.306	32.328	1640
1650	32.328	32.350	32.371	32.393	32.415	32.436	32.458	32.480	32.501	32.523	32.545	1650
1660	32.545	32.566	32.588	32.610	32.631	32.653	32.675	32.696	32.718	32.740	32.761	1660
1670	32.716	32.783	32.805	32.826	32.848	32.870	32.891	32.913	32.935	32.956	32.978	1670
1680	32.978	32.000	32.021	32.043	33.065	35.086	33.108	33.130	33.151	33.173	33.195	1680
1690	33.195	33.216	33.238	33.260	33.281	33.303	33.325	33.346	33.368	33.389	33.411	1690
1700	33.411	33.433	33.454	33.476	33.498	33.519	33.541	33.563	33.584	33.606	33.627	1700
1710	33.627	33.649	33.671	33.692	33.714	33.736	33.757	33.779	33.800	33.822	33.844	1710
1720	33.844	33.865	33.887	33.908	33.930	33.952	33.973	33.995	34.016	34.038	34.060	1720
1730	34.060	34.081	34.103	34.124	34.146	34.168	34.189	34.211	34.232	34.254	34.276	1730
1740	34.276	34.297	34.319	34.340	34.362	34.384	34.405	34.427	34.448	34.470	34.491	1740
1750	34.491	34.513	34.535	34.556	34.578	34.599	34.621	34.642	34.664	34.686	34.707	1750
1760	34.707	34.729	34.750	34.772	34.793	34.815	34.836	34.858	34.879	34.901	34.923	1760
1770	34.923	34.944	34.966	34.987	35.009	35.030	35.052	35.073	35.095	35.116	35.138	1770
1780	35.138	35.160	35.181	35.203	35.224	35.246	35.267	35.289	35.310	35.332	35.353	1780
1790	35.353	35.375	35.396	35.418	35.439	35.461	35.482	35.504	35.525	35.547	35.568	1790
1800	35.568	35.590	35.611	35.633	35.654	35.676	35.697	35.719	35.740	35.762	35.783	1800
1810	35.783	35.805	35.826	35.848	35.869	35.891	35.912	35.934	35.955	35.977	35.998	1810
1820	35.998	35.019	36.041	36.062	36.084	36.105	36.127	36.148	36.170	36.191	36.213	1820
1830	35.213	35.234	36.256	36.277	36.298	36.320	36.341	36.363	36.384	36.406	36.427	1830
1840	36.427	36.449	36.470	36.491	36.513	36.534	36.556	36.577	36.599	36.620	36.641	1840
1850	36.841	36.663	36.684	36.706	36.727	36.748	36.770	36.791	38.813	36.834	36.855	1850
1860	36.855	36.877	36.898	36.920	36.941	36.962	36.984	37.005	37.027	37.048	37.069	1860
1870	37.069	37.091	37.112	37.134	37.155	37.176	37.198	37.219	37.240	37.262	37.283	1870
1880	37.283	37.305	37.326	37.347	37.369	37.390	37.411	37.433	37.454	37.475	37.497	1880
18901	37.497	37.518	37.539	37.561	37.582	37.603	37.625	37.646	37.667	37.689	37.710	1890
°F	0	1	2	3	4	5	6	7	8	9	10	°F