

**MAXIMUM TEMPERATURE RANGE**

**Thermocouple Grade**

- 328 to 1652°F
- 200 to 900°C

**Extension Grade**

- 32 to 392°F
- 0 to 200°C

**LIMITS OF ERROR**

(whichever is greater)

**Standard:** 1.7°C or 0.5% Above 0°C

1.7°C or 1.0% Below 0°C

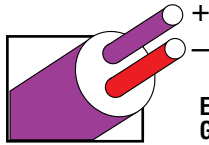
**Special:** 1.0°C or 0.4%

**COMMENTS, BARE WIRE ENVIRONMENT:**

Oxidizing or Inert; Limited Use in Vacuum or Reducing; Highest EMF Change per Degree

**TEMPERATURE IN DEGREES °C**  
**REFERENCE JUNCTION AT 0°C**

**°C**  
**Nickel-Chromium**  
**vs.**  
**Copper-Nickel**



**Revised Thermocouple Reference Tables**

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

IEC color code

ANSI color code

**Thermoelectric Voltage in Millivolts**

°C	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	°C	°C	0	1	2	3	4	5	6	7	8	9	10	°C
-260	-9.835	-9.833	-9.831	-9.828	-9.825	-9.821	-9.817	-9.813	-9.808	-9.802	-9.797	-260	350	24.964	25.044	25.123	25.202	25.281	25.360	25.440	25.519	25.598	25.678	25.757	350
-250	-9.797	-9.790	-9.784	-9.777	-9.770	-9.762	-9.754	-9.746	-9.737	-9.728	-9.718	-250	360	25.757	25.836	25.916	25.995	26.075	26.154	26.233	26.313	26.392	26.472	26.552	360
-240	-9.718	-9.709	-9.698	-9.688	-9.677	-9.666	-9.654	-9.642	-9.630	-9.617	-9.604	-240	370	26.552	26.631	26.711	26.790	26.870	26.950	27.029	27.109	27.189	27.268	27.348	370
-230	-9.604	-9.591	-9.577	-9.563	-9.548	-9.534	-9.519	-9.503	-9.487	-9.471	-9.455	-230	380	27.348	27.428	27.507	27.587	27.667	27.747	27.827	27.907	27.986	28.066	28.146	380
-220	-9.455	-9.438	-9.421	-9.404	-9.386	-9.368	-9.350	-9.331	-9.313	-9.293	-9.274	-220	390	28.146	28.226	28.306	28.386	28.466	28.546	28.626	28.706	28.786	28.866	28.946	390
-210	-9.274	-9.254	-9.234	-9.214	-9.193	-9.172	-9.151	-9.129	-9.107	-9.085	-9.063	-210	400	28.946	29.026	29.106	29.186	29.266	29.346	29.427	29.507	29.587	29.667	29.747	400
-200	-9.063	-9.040	-9.017	-8.994	-8.971	-8.947	-8.923	-8.899	-8.874	-8.850	-8.825	-200	410	29.747	29.827	29.908	29.988	30.068	30.148	30.229	30.309	30.389	30.470	30.550	410
-190	-8.825	-8.799	-8.774	-8.748	-8.722	-8.696	-8.669	-8.643	-8.616	-8.588	-8.561	-190	420	30.550	30.630	30.711	30.791	30.871	30.952	31.032	31.112	31.193	31.273	31.354	420
-180	-8.561	-8.533	-8.505	-8.477	-8.449	-8.420	-8.391	-8.362	-8.333	-8.303	-8.273	-180	430	31.354	31.434	31.515	31.595	31.676	31.756	31.837	31.917	31.998	32.078	32.159	430
-170	-8.273	-8.243	-8.213	-8.183	-8.152	-8.121	-8.090	-8.059	-8.027	-7.995	-7.963	-170	440	32.159	32.239	32.320	32.400	32.481	32.562	32.642	32.723	32.803	32.884	32.965	440
-160	-7.963	-7.931	-7.899	-7.866	-7.833	-7.800	-7.767	-7.733	-7.700	-7.666	-7.632	-160	450	32.965	33.045	33.126	33.207	33.287	33.368	33.449	33.529	33.610	33.691	33.772	450
-150	-7.632	-7.597	-7.563	-7.528	-7.493	-7.458	-7.423	-7.387	-7.351	-7.315	-7.279	-150	460	33.772	33.853	33.934	34.014	34.095	34.175	34.256	34.337	34.418	34.498	34.579	460
-140	-7.279	-7.243	-7.206	-7.170	-7.133	-7.096	-7.058	-7.021	-6.983	-6.945	-6.907	-140	470	34.579	34.660	34.741	34.822	34.902	34.983	35.064	35.145	35.226	35.307	35.387	470
-130	-6.907	-6.869	-6.831	-6.792	-6.753	-6.714	-6.675	-6.636	-6.596	-6.556	-6.516	-130	480	35.387	35.468	35.549	35.630	35.711	35.792	35.873	35.954	36.035	36.116	36.196	480
-120	-6.516	-6.476	-6.436	-6.396	-6.356	-6.316	-6.276	-6.236	-6.196	-6.156	-6.116	-120	490	36.196	36.277	36.358	36.439	36.520	36.601	36.682	36.763	36.844	36.925	37.006	490
-110	-6.107	-6.065	-6.023	-5.981	-5.939	-5.896	-5.853	-5.810	-5.767	-5.724	-5.681	-110	500	37.006	37.087	37.168	37.249	37.330	37.411	37.492	37.573	37.654	37.735	37.816	500
-100	-5.681	-5.637	-5.593	-5.549	-5.505	-5.461	-5.417	-5.372	-5.327	-5.282	-5.237	-100	510	37.816	37.897	37.978	38.059	38.140	38.221	38.302	38.383	38.464	38.545	38.626	510
-90	-5.237	-5.192	-5.147	-5.101	-5.055	-5.009	-4.963	-4.917	-4.871	-4.824	-4.777	-90	520	38.626	38.707	38.788	38.869	38.950	39.031	39.112	39.193	39.274	39.355	39.436	520
-80	-4.777	-4.731	-4.684	-4.636	-4.589	-4.542	-4.494	-4.446	-4.398	-4.350	-4.302	-80	530	39.436	39.517	39.598	39.679	39.760	39.841	39.922	40.003	40.084	40.165	40.246	530
-70	-4.302	-4.254	-4.205	-4.156	-4.107	-4.058	-4.009	-3.960	-3.911	-3.862	-3.813	-70	540	40.246	40.327	40.408	40.489	40.570	40.651	40.732	40.813	40.894	40.975	41.056	540
-60	-3.811	-3.761	-3.711	-3.661	-3.611	-3.561	-3.510	-3.459	-3.408	-3.357	-3.306	-60	550	41.056	41.137	41.218	41.299	41.380	41.461	41.542	41.623	41.704	41.785	41.866	550
-50	-3.306	-3.255	-3.204	-3.152	-3.100	-3.048	-2.996	-2.944	-2.892	-2.840	-2.787	-50	560	41.866	41.947	42.028	42.109	42.190	42.271	42.352	42.433	42.514	42.595	42.676	560
-40	-2.787	-2.735	-2.682	-2.629	-2.576	-2.523	-2.469	-2.416	-2.362	-2.309	-2.255	-40	570	42.676	42.757	42.838	42.919	42.999	43.080	43.161	43.242	43.323	43.404	43.485	570
-30	-2.255	-2.201	-2.147	-2.093	-2.038	-1.984	-1.929	-1.874	-1.820	-1.765	-1.709	-30	580	43.485	43.566	43.647	43.728	43.809	43.890	43.971	44.052	44.133	44.214	44.295	580
-20	-1.709	-1.654	-1.599	-1.543	-1.488	-1.432	-1.376	-1.320	-1.264	-1.208	-1.152	-20	590	44.295	44.376	44.457	44.538	44.619	44.700	44.781	44.862	44.943	45.024	45.105	590
-10	-1.152	-1.095	-1.039	-0.982	-0.925	-0.868	-0.811	-0.754	-0.697	-0.639	-0.582	-10	600	45.105	45.186	45.267	45.348	45.429	45.510	45.591	45.672	45.753	45.834	45.915	600
0	-0.582	-0.524	-0.466	-0.408	-0.350	-0.292	-0.234	-0.176	-0.117	-0.059	0.000	0	610	45.915	45.996	46.077	46.158	46.239	46.320	46.401	46.482	46.563	46.644	46.725	610
0	0.000	0.059	0.118	0.176	0.235	0.294	0.354	0.413	0.472	0.532	0.591	0	620	46.725	46.806	46.887	46.968	47.049	47.130	47.211	47.292	47.373	47.454	47.535	620
10	0.591	0.651	0.711	0.770	0.830	0.890	0.950	1.010	1.071	1.131	1.192	10	630	47.535	47.616	47.697	47.778	47.859	47.940	48.021	48.102	48.183	48.264	48.345	630
20	1.192	1.252	1.313	1.373	1.434	1.495	1.556	1.617	1.678	1.740	1.801	20	640	48.345	48.426	48.507	48.588	48.669	48.750	48.831	48.912	48.993	49.074	49.155	640
30	1.801	1.862	1.924	1.986	2.047	2.109	2.171	2.233	2.295	2.357	2.420	30	650	49.155	49.236	49.317	49.398	49.479	49.560	49.641	49.722	49.803	49.884	49.965	650
40	2.420	2.482	2.545	2.607	2.670	2.733	2.795	2.858	2.921	2.984	3.048	40	660	50.000	50.081	50.162	50.243	50.324	50.405	50.486	50.567	50.648	50.729	50.810	660
50	3.048	3.111	3.174	3.238	3.301	3.365	3.429	3.492	3.556	3.620	3.685	50	670	50.810	50.891	50.972	51.053	51.134	51.215	51.296	51.377	51.458	51.539	51.620	670
60	3.685	3.749	3.813	3.877	3.942	4.006	4.071	4.136	4.200	4.265	4.330	60	680	51.620	51.701	51.782	51.863	51.944	52.025	52.106	52.187	52.268	52.349	52.430	680
70	4.330	4.395	4.460	4.526	4.591	4.656	4.722	4.788	4.853	4.919	4.985	70	690	52.430	52.511	52.592	52.673	52.754	52.835	52.916	53.000	53.081	53.162	53.243	690
80	4.985	5.051	5.117	5.183	5.249	5.315	5.382	5.448	5.514	5.581	5.648	80	700	53.243	53.324	53.405	53.486	53.567	53.648	53.729	53.810	53.891	53.972	54.053	700
90	5.648	5.714	5.781	5.848	5.915	5.982	6.049	6.117	6.184	6.251	6.319	90	710	54.053	54.134	54.215	54.296	54.377	54.458	54.539	54.620	54.701	54.782	54.863	710
100	6.319	6.386	6.454	6.522	6.590	6.658	6.726	6.794	6.8																