MAXIMUM TEMPERATURE RANGE

Thermocouple Grade

- 328 to 2282°F - 200 to 1250°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

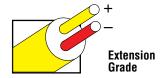
Special: 1.1°C or 0.4%

COMMENTS, BARE WIRE ENVIRONMENT:

Clean Oxidizing and Inert; Limited Use in Vacuum or Reducing; Wide Temperature Range; Most Popular Calibration

TEMPERATURE IN DEGREES °C REFERENCE JUNCTION AT 0°C

Nickel-Chromium VS. Nickel-Aluminum





Revised Thermocouple Reference Tables

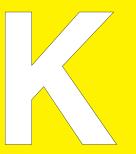
EC color code

code

color

ANSI

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



Thermoelectric Voltage in Millivolts

												301110	onage			•									
°C	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	°C	l °C	0	1	2	3	4	5	6	7	8	9	10	°C
													250	10 153								10.480	10.520	10 561	250
													260									10.889			260
													200												
													270									11.300			270
-260	-6.458	-6.457	-6.456	-6.455	-6.453	-6.452	-6.450	-6.448	-6.446	-6.444	-6.441	-260	280	11.382	11.423	11.465	11.506	11.547	11.588	11.630	11.671	11.712	11.753	11.795	280
-250	-6.441	-6.438	-6.435	-6.432	-6.429	-6.425	-6.421	-6.417	-6.413	-6.408	-6.404	-250	290	11.795	11.836	11.877	11.919	11.960	12.001	12.043	12.084	12.126	12.167	12.209	290
	•							•																	
0.40	C 404	0.000	0.000	c 000	0.000	C 077	0.070	0.004	0.050	0.054	0.044	0.40	000	10.000	10.050	10.001	10 000	10.074	10 410	10 457	10 100	10.540	10 500	10.004	000
-240		-6.399						-6.364			-6.344		300									12.540			300
-230	-6.344	-6.337	-6.329	-6.322	-6.314	-6.306	-6.297	-6.289	-6.280	-6.271	-6.262	-230	310	12.624	12.665	12.707	12.748	12.790	12.831	12.873	12.915	12.956	12.998	13.040	310
-220	-6.262	-6.252	-6.243	-6.233	-6.223	-6.213	-6.202	-6.192	-6.181	-6.170	-6.158	-220	320	13.040	13.081	13.123	13.165	13.206	13.248	13.290	13.331	13.373	13.415	13.457	320
-210									-6.061				1									13.791			330
-200	-6.035	-6.021	-6.007	-5.994	-5.980	-5.965	-5.951	-5.936	-5.922	-5.907	-5.891	-200	340	13.874	13.916	13.958	14.000	14.042	14.084	14.126	14.167	14.209	14.251	14.293	340
-190	-5.891	-5.876	-5.861	-5.845	-5.829	-5.813	-5.797	-5.780	-5.763	-5.747	-5.730	-190	350	14.293	14.335	14.377	14.419	14.461	14.503	14.545	14.587	14.629	14.671	14.713	350
-180	-5 730	-5 713	-5 695	-5 678	-5 660	-5 642	-5 624	-5.606	-5 588	-5 569	-5.550	-180	360	14 713	14 755	14 797	14 839	14 881	14 923	14 965	15 007	15.049	15 091	15 133	360
													370									15.469			370
	-5.550										-5.354		1												
-160	-5.354	-5.333	-5.313	-5.292	-5.2/1	-5.250	-5.228	-5.207	-5.185	-5.163	-5.141	-160										15.891			380
-150	-5.141	-5.119	-5.097	-5.074	-5.052	-5.029	-5.006	-4.983	-4.960	-4.936	-4.913	-150	390	15.975	16.017	16.059	16.102	16.144	16.186	16.228	16.270	16.313	16.355	16.397	390
-140	-4 013	-4 880	-4 865	-4 9/1	-/ Q17	-4 703	-4 768	-4 744	-4.719	-4 604	-4 660	-140	400	16 307	16 /30	16 /82	16 524	16 566	16 608	16 651	16 603	16.735	16 778	16 820	400
-130									-4.463				1									17.158			410
-120	-4.411	-4.384	-4.357	-4.330	-4.303	-4.276	-4.249	-4.221	-4.194	-4.166	-4.138	-120	420	17.243	17.285	17.328	17.370	17.413	17.455	17.497	17.540	17.582	17.624	17.667	420
-110	-4.138	-4.110	-4.082	-4.054	-4.025	-3.997	-3.968	-3.939	-3.911	-3.882	-3.852	-110	430	17.667	17.709	17.752	17.794	17.837	17.879	17.921	17.964	18.006	18.049	18.091	430
-100	-3 852	-3 823	-3 794	-3 764	-3 734	-3 705	-3 675	-3 645	-3.614	-3 584	-3 554	-100	440	18 091	18 134	18 176	18 218	18 261	18 303	18 346	18 388	18.431	18 473	18 516	440
100	0.002	0.020	0.701	0.701	0.701	0.700	0.070	0.010	0.011	0.001	0.001	100		. 0.00			10.210		10.000	10.010	10.000			.0.0.0	
00	0.55	0.500	0.400	0.400	0.40:	0.400	0.000	0.00-	0.000	0.07:	0.040	00	450	10.510	10.550	10.001	10.040	10.000	10.700	10 771	10.010	10.050	10.000	10.041	450
-90									-3.306			-90	450									18.856			450
-80	-3.243	-3.211	-3.179	-3.147	-3.115	-3.083	-3.050	-3.018	-2.986	-2.953	-2.920	-80	460	18.941	18.983	19.026	19.068	19.111	19.154	19.196	19.239	19.281	19.324	19.366	460
-70	-2.920	-2.887	-2.854	-2.821	-2.788	-2.755	-2.721	-2.688	-2.654	-2.620	-2.587	-70	470	19.366	19.409	19.451	19.494	19.537	19.579	19.622	19.664	19.707	19.750	19.792	470
-60									-2.312			-60	480									20.133			480
-50	-2.243	-2.208	-2.1/3	-2.138	-2.103	-2.067	-2.032	-1.996	-1.961	-1.925	-1.889	-50	490	20.218	20.261	20.303	20.346	20.389	20.431	20.474	20.516	20.559	20.602	20.644	490
-40	-1.889	-1.854	-1.818	-1.782	-1.745	-1.709	-1.673	-1.637	-1.600	-1.564	-1.527	-40	500	20.644	20.687	20.730	20.772	20.815	20.857	20.900	20.943	20.985	21.028	21.071	500
-30									-1.231			-30	510									21.412			510
									-0.854																
-20												-20										21.838			520
-10	-0.778	-0.739	-0.701	-0.663	-0.624	-0.586	-0.547	-0.508	-0.470	-0.431	-0.392	-10	530	21.924	21.966	22.009	22.052	22.094	22.137	22.179	22.222	22.265	22.307	22.350	530
0	-0.392	-0.353	-0.314	-0.275	-0.236	-0.197	-0.157	-0.118	-0.079	-0.039	0.000	0	540	22.350	22.393	22.435	22.478	22.521	22.563	22.606	22.649	22.691	22.734	22.776	540
0	0.000	0.039	0.079	0.119	0.150	0.100	0 220	0.277	0.217	0.357	0.207	0	550	22 776	22 010	22 062	22 004	22 047	22 000	22 022	22.075	23.117	22 160	22 202	550
-												-													
10	0.397	0.437	0.477	0.517	0.557	0.597	0.637	0.677	0.718	0.758	0.798	10	560									23.544			560
20	0.798	0.838	0.879	0.919	0.960	1.000	1.041	1.081	1.122	1.163	1.203	20	570	23.629	23.671	23.714	23.757	23.799	23.842	23.884	23.927	23.970	24.012	24.055	570
30	1.203	1.244	1.285	1 326	1 366	1.407	1 448	1 489	1.530	1.571	1 612	30	580	24.055	24.097	24.140	24.182	24.225	24.267	24.310	24.353	24.395	24.438	24.480	580
40								1.899		1.982		40										24.820			590
40	1.012	1.000	1.034	1.733	1.770	1.017	1.000	1.033	1.341	1.302	2.023	40	330	24.400	24.323	24.303	24.000	24.000	24.033	24.700	24.770	24.020	24.003	24.303	330
50	2.023	2.064	2.106	2.147	2.188	2.230	2.271	2.312	2.354	2.395	2.436	50	600	24.905	24.948	24.990	25.033	25.075	25.118	25.160	25.203	25.245	25.288	25.330	600
60	2.436	2.478	2.519	2.561	2.602	2.644	2.685	2.727	2.768	2.810	2.851	60	610	25.330	25.373	25.415	25.458	25.500	25.543	25.585	25.627	25.670	25.712	25.755	610
70	2.851	2.893	2.934	2.976		3.059			3.184	3.225	3.267	70	620	25 755	25 707	25.840	25 882	25 924	25 967	26 000	26.052	26.094	26 136	26 170	620
													020												
80	3.267	3.308	3.350	3.391				3.557		3.640	3.682	80	630									26.517			630
90	3.682	3.723	3.765	3.806	3.848	3.889	3.931	3.972	4.013	4.055	4.096	90	640	26.602	26.644	26.687	26.729	26.771	26.814	26.856	26.898	26.940	26.983	27.025	640
100	4.096	4.138	4.179	4.220	4.262	4.303	4.344	4,385	4.427	4.468	4.509	100	650	27,025	27,067	27,109	27,152	27,194	27,236	27,278	27,320	27.363	27,405	27,447	650
110		4.550	4.591	4.633		4.715			4.838	4.879	4.920	110	660									27.784			660
120	4.920	4.961	5.002	5.043		5.124			5.247	5.288	5.328	120	6/0									28.205			670
130	5.328	5.369	5.410	5.450	5.491	5.532	5.572	5.613	5.653	5.694	5.735	130	680	28.289	28.332	28.374	28.416	28.458	28.500	28.542	28.584	28.626	28.668	28.710	680
140	5.735	5.775	5.815	5.856	5.896	5.937	5.977	6.017	6.058	6.098	6.138	140	690	28.710	28.752	28.794	28.835	28.877	28.919	28.961	29.003	29.045	29.087	29.129	690
150	0 100	C 170	0.010	0.050	0.000	0.000	0.000	C 400	0.400	0.500	0.540	150	700	20 120	20 171	20.212	20.055	20 207	20 220	200	20 422	00.464	20 506	00 E 40	700
150		6.179						6.420		6.500		150												29.548	
160								6.821		6.901		160										29.882			710
170	6.941	6.981	7.021	7.060	7.100	7.140	7.180	7.220	7.260	7.300	7.340	170	720	29.965	30.007	30.049	30.090	30.132	30.174	30.216	30.257	30.299	30.341	30.382	720
	7.340									7.699		180												30.798	
								8.019			8.138													31.213	
190	1./39	1.779	1.019	7.659	7.699	1.939	1.9/9	0.019	0.059	0.099	0.138	190	/40	30.796	JU.04U	JU.001	JU.923	JU.904	31.000	31.04/	31.009	31.130	31.172	01.213	/ 4 U
													1												
200	8.138	8.178	8.218	8.258	8.298	8.338	8.378	8.418	8.458	8.499	8.539	200	750	31.213	31.255	31.296	31.338	31.379	31.421	31.462	31.504	31.545	31.586	31.628	750
210		8.579	8.619	8.659				8.819			8.940	210	760	31.628	31.669	31.710	31.752	31.793	31.834	31.876	31.917	31.958	32.000	32.041	760
220		8.980	9.020	9.061				9.222			9.343													32.453	
																								32.865	
	9.343		9.423	9.464				9.626			9.747		1												
240	9.747	9.788	9.828	9.869	9.909	9.950	9.991	10.031	10.072	10.113	10.153	240	790	32.865	32.906	32.947	32.988	33.029	33.070	33.111	33.152	33.193	33.234	33.275	790
						-		-			40	0.0		_		_	_		-	_	_	_	_	4.0	00
°C	0	1	2	3	4	5	6	7	8	9	10	°C	°C	0	1	2	3	4	5	6	7	8	9	10	°C

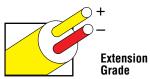
Revised Thermocouple Reference Tables

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





Nickel-Chromium VS. Nickel-Aluminum



MAXIMUM TEMPERATURE RANGE

Thermocouple Grade

- 328 to 2282°F

200 to 1250°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:

Clean Oxidizing and Inert; Limited Use in Vacuum or Reducing; Wide Temperature Range; Most Popular Calibration

TEMPERATURE IN DEGREES °C

REFERENCE JUNCTION AT 0°C

Thermoelectric Voltage in Millivolts

The most of the state of the st																									
°C	0	1	2	3	4	5	6	7	8	9	10	°C	°C	0	1	2	3	4	5	6	7	8	9	10	°C
800	33.275	33.316	33.357	33.398	33.439	33.480	33.521	33.562	33.603	33.644	33.685	800	110	45.11	45.157	45.194	45.232	45.270	45.308	45.346	45.383	45.421	45.459	45.497	1100
810	33.685	33.726	33.767	33.808	33.848	33.889	33.930	33.971	34.012	34.053	34.093	810	111	45.49	45.534	45.572	45.610	45.647	45.685	45.723	45.760	45.798	45.836	45.873	1110
820	34.093	34.134	34.175	34.216	34.257	34.297	34.338	34.379	34.420	34.460	34.501	820	112	45.87	45.911	45.948	45.986	46.024	46.061	46.099	46.136	46.174	46.211	46.249	1120
830	34.501	34.542	34.582	34.623	34.664	34.704	34.745	34.786	34.826	34.867	34.908	830	113	46.24	46.286	46.324	46.361	46.398	46.436	46.473	46.511	46.548	46.585	46.623	1130
			34.989									840			46.660										
850	35.313	35.354	35.394	35.435	35.475	35.516	35.556	35.596	35.637	35.677	35.718	850	115	46.99	47.033	47.070	47.107	47.144	47.181	47.218	47.256	47.293	47.330	47.367	1150
			35.798									860			47.404										
			36,202									870			47.774										
880	36.524	36.564	36,604	36.644	36.685	36.725	36.765	36.805	36.845	36.885	36.925	880	118	48.10	48.142	48.179	48.216	48.252	48.289	48.326	48.363	48.399	48,436	48.473	1180
			37.006									890			48.509										
900	37 326	37 366	37.406	37 446	37 486	37 526	37 566	37 606	37 646	37 686	37 725	900	120	48.83	48.875	48.911	48.948	48.984	49.021	49.057	49.093	49.130	49.166	49.202	1200
			37.805									910	121	49.20	49,239	49.275	49.311	49.348	49.384	49.420	49.456	49.493	49.529	49.565	1210
			38.204									920			49.601										
			38.601									930	123	49.92	49.962	49.998	50.034	50.070	50.106	50.142	50.178	50.214	50.250	50.286	1230
			38.997									940			50.322										
950	39.314	39.353	39.393	39.432	39.471	39.511	39.550	39.590	39.629	39.669	39.708	950	125	50.64	50.680	50.715	50.751	50.787	50.822	50.858	50.894	50.929	50.965	51.000	1250
960	39.708	39.747	39.787	39.826	39.866	39.905	39.944	39.984	40.023	40.062	40.101	960	126	51.00	51.036	51.071	51,107	51.142	51.178	51.213	51.249	51.284	51.320	51.355	1260
970	40.101	40.141	40.180	40.219	40.259	40.298	40.337	40.376	40.415	40.455	40.494	970	127	51.35	51.391	51,426	51,461	51,497	51.532	51.567	51.603	51.638	51.673	51.708	1270
980	40.494	40.533	40.572	40.611	40.651	40.690	40.729	40.768	40.807	40.846	40.885	980	128	51.70	51.744	51.779	51.814	51.849	51.885	51.920	51.955	51.990	52.025	52.060	1280
990	40.885	40.924	40.963	41.002	41.042	41.081	41.120	41.159	41.198	41.237	41.276	990	129	52.06	52.095	52.130	52.165	52,200	52.235	52.270	52.305	52.340	52.375	52.410	1290
1000	41.276	41.315	41.354	41.393	41.431	41.470	41.509	41.548	41.587	41.626	41.665	1000	130	52.41	52.445	52.480	52.515	52.550	52.585	52.620	52.654	52.689	52.724	52.759	1300
1010	41.665	41.704	41.743	41.781	41.820	41.859	41.898	41.937	41.976	42.014	42.053	1010	131	52.75	52.794	52.828	52.863	52.898	52.932	52.967	53.002	53.037	53.071	53.106	1310
1020	42.053	42.092	42.131	42.169	42.208	42.247	42.286	42.324	42.363	42.402	42.440	1020	132	53.10	53.140	53.175	53.210	53.244	53.279	53.313	53.348	53.382	53.417	53.451	1320
1030	42.440	42.479	42.518	42.556	42.595	42.633	42.672	42.711	42.749	42.788	42.826	1030	133	53.45	53.486	53.520	53.555	53.589	53.623	53.658	53.692	53.727	53.761	53.795	1330
1040	42.826	42.865	42.903	42.942	42.980	43.019	43.057	43.096	43.134	43.173	43.211	1040	134	53.79	53.830	53.864	53.898	53.932	53.967	54.001	54.035	54.069	54.104	54.138	1340
1050	43.211	43.250	43.288	43.327	43.365	43.403	43.442	43.480	43.518	43.557	43.595	1050	135	54.13	54.172	54.206	54.240	54.274	54.308	54.343	54.377	54.411	54.445	54.479	1350
1060	43.595	43.633	43.672	43.710	43.748	43.787	43.825	43.863	43.901	43.940	43.978	1060	136	54.47	54.513	54.547	54.581	54.615	54.649	54.683	54.717	54.751	54.785	54.819	1360
1070	43.978	44.016	44.054	44.092	44.130	44.169	44.207	44.245	44.283	44.321	44.359	1070	137	54.81	54.852	54.886									1370
1080	44.359	44.397	44.435	44.473	44.512	44.550	44.588	44.626	44.664	44.702	44.740	1080													
1090	44.740	44.778	44.816	44.853	44.891	44.929	44.967	45.005	45.043	45.081	45.119	1090													
°C	0	1	2	3	4	5	6	7	8	9	10	°C	°(0	1	2	3	4	5	6	7	8	9	10	°C