

**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

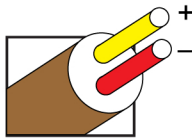
2.2°C or 2.0% Below 0°C

**Special:** 1.1°C or 0.4%

**COMMENTS, BARE WIRE ENVIRONMENT:**

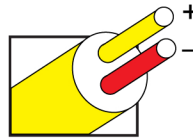
Clean Oxidizing and Inert; Limited Use in Vacuum or Reducing; Wide Temperature Range; Most Popular Calibration

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



**Thermocouple Grade**

**Nickel-Chromium vs. Nickel-Aluminum**



**Extension Grade**

**Revised Thermocouple Reference Tables**

Revised By: Maximilian Ripepi

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

Z

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  |        |        |        |        |        |        |        |        |        |        |        |     |        |        |        |        |        |        |        |        |        |        |        |     |        |        |        |        |        |        |        |        |        |        |        |     |        |        |        |        |        |        |        |        |        |        |        |     |        |        |        |        |        |        |        |        |        |        |        |     |        |        |        |        |        |        |        |        |        |        |        |     |        |        |        |        |        |        |        |        |        |        |        |     |        |        |        |        |        |        |        |        |        |        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|    |     |    |    |    |    |    |    |    |    |    |   |    | 250 | 10.153 | 10.194 | 10.235 | 10.276 | 10.316 | 10.357 | 10.398 | 10.439 | 10.480 | 10.520 | 10.561 | 260 | 10.561 | 10.602 | 10.643 | 10.684 | 10.725 | 10.766 | 10.807 | 10.848 | 10.889 | 10.930 | 10.971 | 270 | 10.971 | 11.012 | 11.053 | 11.094 | 11.135 | 11.176 | 11.217 | 11.259 | 11.300 | 11.341 | 11.382 | 280 | 11.382 | 11.423 | 11.465 | 11.506 | 11.547 | 11.588 | 11.630 | 11.671 | 11.712 | 11.753 | 11.795 | 290 | 11.795 | 11.836 | 11.877 | 11.919 | 11.960 | 12.001 | 12.043 | 12.084 | 12.126 | 12.167 | 12.209 | 300 | 12.209 | 12.250 | 12.291 | 12.333 | 12.374 | 12.416 | 12.457 | 12.499 | 12.540 | 12.582 | 12.624 | 310 | 12.624 | 12.665 | 12.707 | 12.748 | 12.790 | 12.831 | 12.873 | 12.915 | 12.956 | 12.998 | 13.040 | 320 | 13.040 | 13.081 | 13.123 | 13.165 | 13.206 | 13.248 | 13.290 | 13.331 | 13.373 | 13.415 | 13.457 | 330 | 13.457 | 13.498 | 13.540 | 13.582 | 13.624 | 13.665 | 13.707 | 13.749 | 13.791 | 13.833 | 13.874 | 340 | 13.874 | 13.916 | 13.958 | 14.000 | 14.042 | 14.084 | 14.126 | 14.167 | 14.209 | 14.251 | 14.293 | 350 | 14.293 | 14.335 | 14.377 | 14.419 | 14.461 | 14.503 | 14.545 | 14.587 | 14.629 | 14.671 | 14.713 | 360 | 14.713 | 14.755 | 14.797 | 14.839 | 14.881 | 14.923 | 14.965 | 15.007 | 15.049 | 15.091 | 15.133 | 370 | 15.133 | 15.175 | 15.217 | 15.259 | 15.301 | 15.343 | 15.385 | 15.427 | 15.469 | 15.511 | 15.554 | 380 | 15.554 | 15.596 | 15.638 | 15.680 | 15.722 | 15.764 | 15.806 | 15.848 | 15.891 | 15.933 | 15.975 | 390 | 15.975 | 16.017 | 16.059 | 16.102 | 16.144 | 16.186 | 16.228 | 16.270 | 16.313 | 16.355 | 16.397 | 400 | 16.397 | 16.439 | 16.482 | 16.524 | 16.566 | 16.608 | 16.651 | 16.693 | 16.735 | 16.778 | 16.820 | 410 | 16.820 | 16.862 | 16.904 | 16.947 | 16.989 | 17.031 | 17.074 | 17.116 | 17.158 | 17.201 | 17.243 | 420 | 17.243 | 17.285 | 17.328 | 17.370 | 17.413 | 17.455 | 17.497 | 17.540 | 17.582 | 17.624 | 17.667 | 430 | 17.667 | 17.709 | 17.752 | 17.794 | 17.837 | 17.879 | 17.921 | 17.964 | 18.006 | 18.049 | 18.091 | 440 | 18.091 | 18.134 | 18.176 | 18.218 | 18.261 | 18.303 | 18.346 | 18.388 | 18.431 | 18.473 | 18.516 | 450 | 18.516 | 18.558 | 18.601 | 18.643 | 18.686 | 18.728 | 18.771 | 18.813 | 18.856 | 18.898 | 18.941 | 460 | 18.941 | 18.983 | 19.026 | 19.068 | 19.111 | 19.154 | 19.196 | 19.239 | 19.281 | 19.324 | 19.366 | 470 | 19.366 | 19.409 | 19.451 | 19.494 | 19.537 | 19.579 | 19.622 | 19.664 | 19.707 | 19.750 | 19.792 | 480 | 19.792 | 19.835 | 19.877 | 19.920 | 19.962 | 20.005 | 20.048 | 20.090 | 20.133 | 20.175 | 20.218 | 490 | 20.218 | 20.261 | 20.303 | 20.346 | 20.389 | 20.431 | 20.474 | 20.516 | 20.559 | 20.602 | 20.644 | 500 | 20.644 | 20.687 | 20.730 | 20.772 | 20.815 | 20.857 | 20.900 | 20.943 | 20.985 | 21.028 | 21.071 | 510 | 21.071 | 21.113 | 21.156 | 21.199 | 21.241 | 21.284 | 21.326 | 21.369 | 21.412 | 21.454 | 21.497 | 520 | 21.497 | 21.540 | 21.582 | 21.625 | 21.668 | 21.710 | 21.753 | 21.796 | 21.838 | 21.881 | 21.924 | 530 | 21.924 | 21.966 | 22.009 | 22.052 | 22.094 | 22.137 | 22.179 | 22.222 | 22.265 | 22.307 | 22.350 | 540 | 22.350 | 22.393 | 22.435 | 22.478 | 22.521 | 22.563 | 22.606 | 22.649 | 22.691 | 22.734 | 22.776 | 550 | 22.776 | 22.819 | 22.862 | 22.904 | 22.947 | 22.990 | 23.032 | 23.075 | 23.117 | 23.160 | 23.203 | 560 | 23.203 | 23.245 | 23.288 | 23.331 | 23.373 | 23.416 | 23.458 | 23.501 | 23.544 | 23.586 | 23.629 | 570 | 23.629 | 23.671 | 23.714 | 23.757 | 23.799 | 23.842 | 23.884 | 23.927 | 23.970 | 24.012 | 24.055 | 580 | 24.055 | 24.097 | 24.140 | 24.182 | 24.225 | 24.267 | 24.310 | 24.353 | 24.395 | 24.438 | 24.480 | 590 | 24.480 | 24.523 | 24.565 | 24.608 | 24.650 | 24.693 | 24.735 | 24.778 | 24.820 | 24.863 | 24.905 | 600 | 24.905 | 24.948 | 24.990 | 25.033 | 25.075 | 25.118 | 25.160 | 25.203 | 25.245 | 25.288 | 25.330 | 610 | 25.330 | 25.373 | 25.415 | 25.458 | 25.500 | 25.543 | 25.585 | 25.627 | 25.670 | 25.712 | 25.755 | 620 | 25.755 | 25.797 | 25.840 | 25.882 | 25.924 | 25.967 | 26.009 | 26.052 | 26.094 | 26.136 | 26.179 | 630 | 26.179 | 26.221 | 26.263 | 26.306 | 26.348 | 26.390 | 26.433 | 26.475 | 26.517 | 26.560 | 26.602 | 640 | 26.602 | 26.644 | 26.687 | 26.729 | 26.771 | 26.814 | 26.856 | 26.898 | 26.940 | 26.983 | 27.025 | 650 | 27.025 | 27.067 | 27.109 | 27.152 | 27.194 | 27.236 | 27.278 | 27.320 | 27.363 | 27.405 | 27.447 | 660 | 27.447 | 27.489 | 27.531 | 27.574 | 27.616 | 27.658 | 27.700 | 27.742 | 27.784 | 27.826 | 27.869 | 670 | 27.869 | 27.911 | 27.953 | 27.995 | 28.037 | 28.079 | 28.121 | 28.163 | 28.205 | 28.247 | 28.289 | 680 | 28.289 | 28.332 | 28.374 | 28.416 | 28.458 | 28.500 | 28.542 | 28.584 | 28.626 | 28.668 | 28.710 | 690 | 28.710 | 28.752 | 28.794 | 28.835 | 28.877 | 28.919 | 28.961 | 29.003 | 29.045 | 29.087 | 29.129 | 700 | 29.129 | 29.171 | 29.213 | 29.255 | 29.297 | 29.338 | 29.380 | 29.422 | 29.464 | 29.506 | 29.548 | 710 | 29.548 | 29.590 | 29.631 | 29.673 | 29.715 | 29.757 | 29.799 | 29.840 | 29.882 | 29.924 | 29.965 | 720 | 29.965 | 30.007 | 30.049 | 30.090 | 30.132 | 30.174 | 30.216 | 30.258 | 30.299 | 30.341 | 30.382 | 730 | 30.382 | 30.424 | 30.466 | 30.507 | 30.549 | 30.590 | 30.632 | 30.674 | 30.715 | 30.757 | 30.798 | 740 | 30.798 | 30.840 | 30.881 | 30.923 | 30.964 | 31.006 | 31.047 | 31.089 | 31.130 | 31.172 | 31.213 | 750 | 31.213 | 31.255 | 31.296 | 31.338 | 31.379 | 31.421 | 31.462 | 31.504 | 31.545 | 31.586 | 31.628 | 760 | 31.628 | 31.669 | 31.710 | 31.752 | 31.793 | 31.834 | 31.876 | 31.917 | 31.958 | 32.000 | 32.041 | 770 | 32.041 | 32.082 | 32.124 | 32.165 | 32.206 | 32.247 | 32.289 | 32.330 | 32.371 | 32.412 | 32.453 | 780 | 32.453 | 32.495 | 32.536 | 32.577 | 32.618 | 32.659 | 32.700 | 32.742 | 32.783 | 32.824 | 32.865 | 790 | 32.865 | 32.906 | 32.947 | 32.988 | 33.029 | 33.070 | 33.111 | 33.152 | 33.193 | 33.234 | 33.275 |