

TABLE 13 Type R Thermocouple— thermoelectric voltage as a function of temperature (°C); reference junctions at 0 °C

| °C | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | °C |
|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----|
| Thermoelectric Voltage in Millivolts | | | | | | | | | | | | |
| -50 | -0.226 | | | | | | | | | | | -50 |
| -40 | -0.188 | -0.192 | -0.196 | -0.200 | -0.204 | -0.208 | -0.211 | -0.215 | -0.219 | -0.223 | -0.226 | -40 |
| -30 | -0.145 | -0.150 | -0.154 | -0.158 | -0.163 | -0.167 | -0.171 | -0.175 | -0.180 | -0.184 | -0.188 | -30 |
| -20 | -0.100 | -0.105 | -0.109 | -0.114 | -0.119 | -0.123 | -0.128 | -0.132 | -0.137 | -0.141 | -0.145 | -20 |
| -10 | -0.051 | -0.056 | -0.061 | -0.066 | -0.071 | -0.076 | -0.081 | -0.086 | -0.091 | -0.095 | -0.100 | -10 |
| 0 | 0.000 | -0.005 | -0.011 | -0.016 | -0.021 | -0.026 | -0.031 | -0.036 | -0.041 | -0.046 | -0.051 | 0 |
| 0 | 0.000 | 0.005 | 0.011 | 0.016 | 0.021 | 0.027 | 0.032 | 0.038 | 0.043 | 0.049 | 0.054 | 0 |
| 10 | 0.054 | 0.060 | 0.065 | 0.071 | 0.077 | 0.082 | 0.088 | 0.094 | 0.100 | 0.105 | 0.111 | 10 |
| 20 | 0.111 | 0.117 | 0.123 | 0.129 | 0.135 | 0.141 | 0.147 | 0.153 | 0.159 | 0.165 | 0.171 | 20 |
| 30 | 0.171 | 0.177 | 0.183 | 0.189 | 0.195 | 0.201 | 0.207 | 0.214 | 0.220 | 0.226 | 0.232 | 30 |
| 40 | 0.232 | 0.239 | 0.245 | 0.251 | 0.258 | 0.264 | 0.271 | 0.277 | 0.284 | 0.290 | 0.296 | 40 |
| 50 | 0.296 | 0.303 | 0.310 | 0.316 | 0.323 | 0.329 | 0.336 | 0.343 | 0.349 | 0.356 | 0.363 | 50 |
| 60 | 0.363 | 0.369 | 0.376 | 0.383 | 0.390 | 0.397 | 0.403 | 0.410 | 0.417 | 0.424 | 0.431 | 60 |
| 70 | 0.431 | 0.438 | 0.445 | 0.452 | 0.459 | 0.466 | 0.473 | 0.480 | 0.487 | 0.494 | 0.501 | 70 |
| 80 | 0.501 | 0.508 | 0.516 | 0.523 | 0.530 | 0.537 | 0.544 | 0.552 | 0.559 | 0.566 | 0.573 | 80 |
| 90 | 0.573 | 0.581 | 0.588 | 0.595 | 0.603 | 0.610 | 0.618 | 0.625 | 0.632 | 0.640 | 0.647 | 90 |
| 100 | 0.647 | 0.655 | 0.662 | 0.670 | 0.677 | 0.685 | 0.693 | 0.700 | 0.708 | 0.715 | 0.723 | 100 |
| 110 | 0.723 | 0.731 | 0.738 | 0.746 | 0.754 | 0.761 | 0.769 | 0.777 | 0.785 | 0.792 | 0.800 | 110 |
| 120 | 0.800 | 0.808 | 0.816 | 0.824 | 0.832 | 0.839 | 0.847 | 0.855 | 0.863 | 0.871 | 0.879 | 120 |
| 130 | 0.879 | 0.887 | 0.895 | 0.903 | 0.911 | 0.919 | 0.927 | 0.935 | 0.943 | 0.951 | 0.959 | 130 |
| 140 | 0.959 | 0.967 | 0.976 | 0.984 | 0.992 | 1.000 | 1.008 | 1.016 | 1.025 | 1.033 | 1.041 | 140 |
| 150 | 1.041 | 1.049 | 1.058 | 1.066 | 1.074 | 1.082 | 1.091 | 1.099 | 1.107 | 1.116 | 1.124 | 150 |
| 160 | 1.124 | 1.132 | 1.141 | 1.149 | 1.158 | 1.166 | 1.175 | 1.183 | 1.191 | 1.200 | 1.208 | 160 |
| 170 | 1.208 | 1.217 | 1.225 | 1.234 | 1.242 | 1.251 | 1.260 | 1.268 | 1.277 | 1.285 | 1.294 | 170 |
| 180 | 1.294 | 1.303 | 1.311 | 1.320 | 1.329 | 1.337 | 1.346 | 1.355 | 1.363 | 1.372 | 1.381 | 180 |
| 190 | 1.381 | 1.389 | 1.398 | 1.407 | 1.416 | 1.425 | 1.433 | 1.442 | 1.451 | 1.460 | 1.469 | 190 |
| 200 | 1.469 | 1.477 | 1.486 | 1.495 | 1.504 | 1.513 | 1.522 | 1.531 | 1.540 | 1.549 | 1.558 | 200 |
| 210 | 1.558 | 1.567 | 1.575 | 1.584 | 1.593 | 1.602 | 1.611 | 1.620 | 1.629 | 1.639 | 1.648 | 210 |
| 220 | 1.648 | 1.657 | 1.666 | 1.675 | 1.684 | 1.693 | 1.702 | 1.711 | 1.720 | 1.729 | 1.739 | 220 |
| 230 | 1.739 | 1.748 | 1.757 | 1.766 | 1.775 | 1.784 | 1.794 | 1.803 | 1.812 | 1.821 | 1.831 | 230 |
| 240 | 1.831 | 1.840 | 1.849 | 1.858 | 1.868 | 1.877 | 1.886 | 1.895 | 1.905 | 1.914 | 1.923 | 240 |
| 250 | 1.923 | 1.933 | 1.942 | 1.951 | 1.961 | 1.970 | 1.980 | 1.989 | 1.998 | 2.008 | 2.017 | 250 |
| 260 | 2.017 | 2.027 | 2.036 | 2.046 | 2.055 | 2.064 | 2.074 | 2.083 | 2.093 | 2.102 | 2.112 | 260 |
| 270 | 2.112 | 2.121 | 2.131 | 2.140 | 2.150 | 2.159 | 2.169 | 2.179 | 2.188 | 2.198 | 2.207 | 270 |
| 280 | 2.207 | 2.217 | 2.226 | 2.236 | 2.246 | 2.255 | 2.265 | 2.275 | 2.284 | 2.294 | 2.304 | 280 |
| 290 | 2.304 | 2.313 | 2.323 | 2.333 | 2.342 | 2.352 | 2.362 | 2.371 | 2.381 | 2.391 | 2.401 | 290 |
| 300 | 2.401 | 2.410 | 2.420 | 2.430 | 2.440 | 2.449 | 2.459 | 2.469 | 2.479 | 2.488 | 2.498 | 300 |
| 310 | 2.498 | 2.508 | 2.518 | 2.528 | 2.538 | 2.547 | 2.557 | 2.567 | 2.577 | 2.587 | 2.597 | 310 |
| 320 | 2.597 | 2.607 | 2.617 | 2.626 | 2.636 | 2.646 | 2.656 | 2.666 | 2.676 | 2.686 | 2.696 | 320 |
| 330 | 2.696 | 2.706 | 2.716 | 2.726 | 2.736 | 2.746 | 2.756 | 2.766 | 2.776 | 2.786 | 2.796 | 330 |
| 340 | 2.796 | 2.806 | 2.816 | 2.826 | 2.836 | 2.846 | 2.856 | 2.866 | 2.876 | 2.886 | 2.896 | 340 |
| 350 | 2.896 | 2.906 | 2.916 | 2.926 | 2.937 | 2.947 | 2.957 | 2.967 | 2.977 | 2.987 | 2.997 | 350 |
| 360 | 2.997 | 3.007 | 3.018 | 3.028 | 3.038 | 3.048 | 3.058 | 3.068 | 3.079 | 3.089 | 3.099 | 360 |
| 370 | 3.099 | 3.109 | 3.119 | 3.130 | 3.140 | 3.150 | 3.160 | 3.171 | 3.181 | 3.191 | 3.201 | 370 |
| 380 | 3.201 | 3.212 | 3.222 | 3.232 | 3.242 | 3.253 | 3.263 | 3.273 | 3.284 | 3.294 | 3.304 | 380 |
| 390 | 3.304 | 3.315 | 3.325 | 3.335 | 3.346 | 3.356 | 3.366 | 3.377 | 3.387 | 3.397 | 3.408 | 390 |
| °C | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | °C |

TABLE 13 Type R Thermocouple— thermoelectric voltage as a function of temperature (°C); reference junctions at 0 °C

| °C | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | °C |
|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
| Thermoelectric Voltage in Millivolts | | | | | | | | | | | | |
| 400 | 3.408 | 3.418 | 3.428 | 3.439 | 3.449 | 3.460 | 3.470 | 3.480 | 3.491 | 3.501 | 3.512 | 400 |
| 410 | 3.512 | 3.522 | 3.533 | 3.543 | 3.553 | 3.564 | 3.574 | 3.585 | 3.595 | 3.606 | 3.616 | 410 |
| 420 | 3.616 | 3.627 | 3.637 | 3.648 | 3.658 | 3.669 | 3.679 | 3.690 | 3.700 | 3.711 | 3.721 | 420 |
| 430 | 3.721 | 3.732 | 3.742 | 3.753 | 3.764 | 3.774 | 3.785 | 3.795 | 3.806 | 3.816 | 3.827 | 430 |
| 440 | 3.827 | 3.838 | 3.848 | 3.859 | 3.869 | 3.880 | 3.891 | 3.901 | 3.912 | 3.922 | 3.933 | 440 |
| 450 | 3.933 | 3.944 | 3.954 | 3.965 | 3.976 | 3.986 | 3.997 | 4.008 | 4.018 | 4.029 | 4.040 | 450 |
| 460 | 4.040 | 4.050 | 4.061 | 4.072 | 4.083 | 4.093 | 4.104 | 4.115 | 4.125 | 4.136 | 4.147 | 460 |
| 470 | 4.147 | 4.158 | 4.168 | 4.179 | 4.190 | 4.201 | 4.211 | 4.222 | 4.233 | 4.244 | 4.255 | 470 |
| 480 | 4.255 | 4.265 | 4.276 | 4.287 | 4.298 | 4.309 | 4.319 | 4.330 | 4.341 | 4.352 | 4.363 | 480 |
| 490 | 4.363 | 4.373 | 4.384 | 4.395 | 4.406 | 4.417 | 4.428 | 4.439 | 4.449 | 4.460 | 4.471 | 490 |
| 500 | 4.471 | 4.482 | 4.493 | 4.504 | 4.515 | 4.526 | 4.537 | 4.548 | 4.558 | 4.569 | 4.580 | 500 |
| 510 | 4.580 | 4.591 | 4.602 | 4.613 | 4.624 | 4.635 | 4.646 | 4.657 | 4.668 | 4.679 | 4.690 | 510 |
| 520 | 4.690 | 4.701 | 4.712 | 4.723 | 4.734 | 4.745 | 4.756 | 4.767 | 4.778 | 4.789 | 4.800 | 520 |
| 530 | 4.800 | 4.811 | 4.822 | 4.833 | 4.844 | 4.855 | 4.866 | 4.877 | 4.888 | 4.899 | 4.910 | 530 |
| 540 | 4.910 | 4.922 | 4.933 | 4.944 | 4.955 | 4.966 | 4.977 | 4.988 | 4.999 | 5.010 | 5.021 | 540 |
| 550 | 5.021 | 5.033 | 5.044 | 5.055 | 5.066 | 5.077 | 5.088 | 5.099 | 5.111 | 5.122 | 5.133 | 550 |
| 560 | 5.133 | 5.144 | 5.155 | 5.166 | 5.178 | 5.189 | 5.200 | 5.211 | 5.222 | 5.234 | 5.245 | 560 |
| 570 | 5.245 | 5.256 | 5.267 | 5.279 | 5.290 | 5.301 | 5.312 | 5.323 | 5.335 | 5.346 | 5.357 | 570 |
| 580 | 5.357 | 5.369 | 5.380 | 5.391 | 5.402 | 5.414 | 5.425 | 5.436 | 5.448 | 5.459 | 5.470 | 580 |
| 590 | 5.470 | 5.481 | 5.493 | 5.504 | 5.515 | 5.527 | 5.538 | 5.549 | 5.561 | 5.572 | 5.583 | 590 |
| 600 | 5.583 | 5.595 | 5.606 | 5.618 | 5.629 | 5.640 | 5.652 | 5.663 | 5.674 | 5.686 | 5.697 | 600 |
| 610 | 5.697 | 5.709 | 5.720 | 5.731 | 5.743 | 5.754 | 5.766 | 5.777 | 5.789 | 5.800 | 5.812 | 610 |
| 620 | 5.812 | 5.823 | 5.834 | 5.846 | 5.857 | 5.869 | 5.880 | 5.892 | 5.903 | 5.915 | 5.926 | 620 |
| 630 | 5.926 | 5.938 | 5.949 | 5.961 | 5.972 | 5.984 | 5.995 | 6.007 | 6.018 | 6.030 | 6.041 | 630 |
| 640 | 6.041 | 6.053 | 6.065 | 6.076 | 6.088 | 6.099 | 6.111 | 6.122 | 6.134 | 6.146 | 6.157 | 640 |
| 650 | 6.157 | 6.169 | 6.180 | 6.192 | 6.204 | 6.215 | 6.227 | 6.238 | 6.250 | 6.262 | 6.273 | 650 |
| 660 | 6.273 | 6.285 | 6.297 | 6.308 | 6.320 | 6.332 | 6.343 | 6.355 | 6.367 | 6.378 | 6.390 | 660 |
| 670 | 6.390 | 6.402 | 6.413 | 6.425 | 6.437 | 6.448 | 6.460 | 6.472 | 6.484 | 6.495 | 6.507 | 670 |
| 680 | 6.507 | 6.519 | 6.531 | 6.542 | 6.554 | 6.566 | 6.578 | 6.589 | 6.601 | 6.613 | 6.625 | 680 |
| 690 | 6.625 | 6.636 | 6.648 | 6.660 | 6.672 | 6.684 | 6.695 | 6.707 | 6.719 | 6.731 | 6.743 | 690 |
| 700 | 6.743 | 6.755 | 6.766 | 6.778 | 6.790 | 6.802 | 6.814 | 6.826 | 6.838 | 6.849 | 6.861 | 700 |
| 710 | 6.861 | 6.873 | 6.885 | 6.897 | 6.909 | 6.921 | 6.933 | 6.945 | 6.956 | 6.968 | 6.980 | 710 |
| 720 | 6.980 | 6.992 | 7.004 | 7.016 | 7.028 | 7.040 | 7.052 | 7.064 | 7.076 | 7.088 | 7.100 | 720 |
| 730 | 7.100 | 7.112 | 7.124 | 7.136 | 7.148 | 7.160 | 7.172 | 7.184 | 7.196 | 7.208 | 7.220 | 730 |
| 740 | 7.220 | 7.232 | 7.244 | 7.256 | 7.268 | 7.280 | 7.292 | 7.304 | 7.316 | 7.328 | 7.340 | 740 |
| 750 | 7.340 | 7.352 | 7.364 | 7.376 | 7.389 | 7.401 | 7.413 | 7.425 | 7.437 | 7.449 | 7.461 | 750 |
| 760 | 7.461 | 7.473 | 7.485 | 7.498 | 7.510 | 7.522 | 7.534 | 7.546 | 7.558 | 7.570 | 7.583 | 760 |
| 770 | 7.583 | 7.595 | 7.607 | 7.619 | 7.631 | 7.644 | 7.656 | 7.668 | 7.680 | 7.692 | 7.705 | 770 |
| 780 | 7.705 | 7.717 | 7.729 | 7.741 | 7.753 | 7.766 | 7.778 | 7.790 | 7.802 | 7.815 | 7.827 | 780 |
| 790 | 7.827 | 7.839 | 7.851 | 7.864 | 7.876 | 7.888 | 7.901 | 7.913 | 7.925 | 7.938 | 7.950 | 790 |
| 800 | 7.950 | 7.962 | 7.974 | 7.987 | 7.999 | 8.011 | 8.024 | 8.036 | 8.048 | 8.061 | 8.073 | 800 |
| 810 | 8.073 | 8.086 | 8.098 | 8.110 | 8.123 | 8.135 | 8.147 | 8.160 | 8.172 | 8.185 | 8.197 | 810 |
| 820 | 8.197 | 8.209 | 8.222 | 8.234 | 8.247 | 8.259 | 8.272 | 8.284 | 8.296 | 8.309 | 8.321 | 820 |
| 830 | 8.321 | 8.334 | 8.346 | 8.359 | 8.371 | 8.384 | 8.396 | 8.409 | 8.421 | 8.434 | 8.446 | 830 |
| 840 | 8.446 | 8.459 | 8.471 | 8.484 | 8.496 | 8.509 | 8.521 | 8.534 | 8.546 | 8.559 | 8.571 | 840 |
| 850 | 8.571 | 8.584 | 8.597 | 8.609 | 8.622 | 8.634 | 8.647 | 8.659 | 8.672 | 8.685 | 8.697 | 850 |
| 860 | 8.697 | 8.710 | 8.722 | 8.735 | 8.748 | 8.760 | 8.773 | 8.785 | 8.798 | 8.811 | 8.823 | 860 |
| 870 | 8.823 | 8.836 | 8.849 | 8.861 | 8.874 | 8.887 | 8.899 | 8.912 | 8.925 | 8.937 | 8.950 | 870 |
| 880 | 8.950 | 8.963 | 8.975 | 8.988 | 9.001 | 9.014 | 9.026 | 9.039 | 9.052 | 9.065 | 9.077 | 880 |
| 890 | 9.077 | 9.090 | 9.103 | 9.115 | 9.128 | 9.141 | 9.154 | 9.167 | 9.179 | 9.192 | 9.205 | 890 |
| °C | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | °C |

TABLE 13 Type R Thermocouple— thermoelectric voltage as a function of temperature (°C); reference junctions at 0 °C

| °C | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | °C |
|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| Thermoelectric Voltage in Millivolts | | | | | | | | | | | | |
| 900 | 9.205 | 9.218 | 9.230 | 9.243 | 9.256 | 9.269 | 9.282 | 9.294 | 9.307 | 9.320 | 9.333 | 900 |
| 910 | 9.333 | 9.346 | 9.359 | 9.371 | 9.384 | 9.397 | 9.410 | 9.423 | 9.436 | 9.449 | 9.461 | 910 |
| 920 | 9.461 | 9.474 | 9.487 | 9.500 | 9.513 | 9.526 | 9.539 | 9.552 | 9.565 | 9.578 | 9.590 | 920 |
| 930 | 9.590 | 9.603 | 9.616 | 9.629 | 9.642 | 9.655 | 9.668 | 9.681 | 9.694 | 9.707 | 9.720 | 930 |
| 940 | 9.720 | 9.733 | 9.746 | 9.759 | 9.772 | 9.785 | 9.798 | 9.811 | 9.824 | 9.837 | 9.850 | 940 |
| 950 | 9.850 | 9.863 | 9.876 | 9.889 | 9.902 | 9.915 | 9.928 | 9.941 | 9.954 | 9.967 | 9.980 | 950 |
| 960 | 9.980 | 9.993 | 10.006 | 10.019 | 10.032 | 10.046 | 10.059 | 10.072 | 10.085 | 10.098 | 10.111 | 960 |
| 970 | 10.111 | 10.124 | 10.137 | 10.150 | 10.163 | 10.177 | 10.190 | 10.203 | 10.216 | 10.229 | 10.242 | 970 |
| 980 | 10.242 | 10.255 | 10.268 | 10.282 | 10.295 | 10.308 | 10.321 | 10.334 | 10.347 | 10.361 | 10.374 | 980 |
| 990 | 10.374 | 10.387 | 10.400 | 10.413 | 10.427 | 10.440 | 10.453 | 10.466 | 10.480 | 10.493 | 10.506 | 990 |
| 1000 | 10.506 | 10.519 | 10.532 | 10.546 | 10.559 | 10.572 | 10.585 | 10.599 | 10.612 | 10.625 | 10.638 | 1000 |
| 1010 | 10.638 | 10.652 | 10.665 | 10.678 | 10.692 | 10.705 | 10.718 | 10.731 | 10.745 | 10.758 | 10.771 | 1010 |
| 1020 | 10.771 | 10.785 | 10.798 | 10.811 | 10.825 | 10.838 | 10.851 | 10.865 | 10.878 | 10.891 | 10.905 | 1020 |
| 1030 | 10.905 | 10.918 | 10.932 | 10.945 | 10.958 | 10.972 | 10.985 | 10.998 | 11.012 | 11.025 | 11.039 | 1030 |
| 1040 | 11.039 | 11.052 | 11.065 | 11.079 | 11.092 | 11.106 | 11.119 | 11.132 | 11.146 | 11.159 | 11.173 | 1040 |
| 1050 | 11.173 | 11.186 | 11.200 | 11.213 | 11.227 | 11.240 | 11.253 | 11.267 | 11.280 | 11.294 | 11.307 | 1050 |
| 1060 | 11.307 | 11.321 | 11.334 | 11.348 | 11.361 | 11.375 | 11.388 | 11.402 | 11.415 | 11.429 | 11.442 | 1060 |
| 1070 | 11.442 | 11.456 | 11.469 | 11.483 | 11.496 | 11.510 | 11.524 | 11.537 | 11.551 | 11.564 | 11.578 | 1070 |
| 1080 | 11.578 | 11.591 | 11.605 | 11.618 | 11.632 | 11.646 | 11.659 | 11.673 | 11.686 | 11.700 | 11.714 | 1080 |
| 1090 | 11.714 | 11.727 | 11.741 | 11.754 | 11.768 | 11.782 | 11.795 | 11.809 | 11.822 | 11.836 | 11.850 | 1090 |
| 1100 | 11.850 | 11.863 | 11.877 | 11.891 | 11.904 | 11.918 | 11.931 | 11.945 | 11.959 | 11.972 | 11.986 | 1100 |
| 1110 | 11.986 | 12.000 | 12.013 | 12.027 | 12.041 | 12.054 | 12.068 | 12.082 | 12.096 | 12.109 | 12.123 | 1110 |
| 1120 | 12.123 | 12.137 | 12.150 | 12.164 | 12.178 | 12.191 | 12.205 | 12.219 | 12.233 | 12.246 | 12.260 | 1120 |
| 1130 | 12.260 | 12.274 | 12.288 | 12.301 | 12.315 | 12.329 | 12.342 | 12.356 | 12.370 | 12.384 | 12.397 | 1130 |
| 1140 | 12.397 | 12.411 | 12.425 | 12.439 | 12.453 | 12.466 | 12.480 | 12.494 | 12.508 | 12.521 | 12.535 | 1140 |
| 1150 | 12.535 | 12.549 | 12.563 | 12.577 | 12.590 | 12.604 | 12.618 | 12.632 | 12.646 | 12.659 | 12.673 | 1150 |
| 1160 | 12.673 | 12.687 | 12.701 | 12.715 | 12.729 | 12.742 | 12.756 | 12.770 | 12.784 | 12.798 | 12.812 | 1160 |
| 1170 | 12.812 | 12.825 | 12.839 | 12.853 | 12.867 | 12.881 | 12.895 | 12.909 | 12.922 | 12.936 | 12.950 | 1170 |
| 1180 | 12.950 | 12.964 | 12.978 | 12.992 | 13.006 | 13.019 | 13.033 | 13.047 | 13.061 | 13.075 | 13.089 | 1180 |
| 1190 | 13.089 | 13.103 | 13.117 | 13.131 | 13.145 | 13.158 | 13.172 | 13.186 | 13.200 | 13.214 | 13.228 | 1190 |
| 1200 | 13.228 | 13.242 | 13.256 | 13.270 | 13.284 | 13.298 | 13.311 | 13.325 | 13.339 | 13.353 | 13.367 | 1200 |
| 1210 | 13.367 | 13.381 | 13.395 | 13.409 | 13.423 | 13.437 | 13.451 | 13.465 | 13.479 | 13.493 | 13.507 | 1210 |
| 1220 | 13.507 | 13.521 | 13.535 | 13.549 | 13.563 | 13.577 | 13.590 | 13.604 | 13.618 | 13.632 | 13.646 | 1220 |
| 1230 | 13.646 | 13.660 | 13.674 | 13.688 | 13.702 | 13.716 | 13.730 | 13.744 | 13.758 | 13.772 | 13.786 | 1230 |
| 1240 | 13.786 | 13.800 | 13.814 | 13.828 | 13.842 | 13.856 | 13.870 | 13.884 | 13.898 | 13.912 | 13.926 | 1240 |
| 1250 | 13.926 | 13.940 | 13.954 | 13.968 | 13.982 | 13.996 | 14.010 | 14.024 | 14.038 | 14.052 | 14.066 | 1250 |
| 1260 | 14.066 | 14.081 | 14.095 | 14.109 | 14.123 | 14.137 | 14.151 | 14.165 | 14.179 | 14.193 | 14.207 | 1260 |
| 1270 | 14.207 | 14.221 | 14.235 | 14.249 | 14.263 | 14.277 | 14.291 | 14.305 | 14.319 | 14.333 | 14.347 | 1270 |
| 1280 | 14.347 | 14.361 | 14.375 | 14.390 | 14.404 | 14.418 | 14.432 | 14.446 | 14.460 | 14.474 | 14.488 | 1280 |
| 1290 | 14.488 | 14.502 | 14.516 | 14.530 | 14.544 | 14.558 | 14.572 | 14.586 | 14.601 | 14.615 | 14.629 | 1290 |
| 1300 | 14.629 | 14.643 | 14.657 | 14.671 | 14.685 | 14.699 | 14.713 | 14.727 | 14.741 | 14.755 | 14.770 | 1300 |
| 1310 | 14.770 | 14.784 | 14.798 | 14.812 | 14.826 | 14.840 | 14.854 | 14.868 | 14.882 | 14.896 | 14.911 | 1310 |
| 1320 | 14.911 | 14.925 | 14.939 | 14.953 | 14.967 | 14.981 | 14.995 | 15.009 | 15.023 | 15.037 | 15.052 | 1320 |
| 1330 | 15.052 | 15.066 | 15.080 | 15.094 | 15.108 | 15.122 | 15.136 | 15.150 | 15.164 | 15.179 | 15.193 | 1330 |
| 1340 | 15.193 | 15.207 | 15.221 | 15.235 | 15.249 | 15.263 | 15.277 | 15.291 | 15.306 | 15.320 | 15.334 | 1340 |
| 1350 | 15.334 | 15.348 | 15.362 | 15.376 | 15.390 | 15.404 | 15.419 | 15.433 | 15.447 | 15.461 | 15.475 | 1350 |
| 1360 | 15.475 | 15.489 | 15.503 | 15.517 | 15.531 | 15.546 | 15.560 | 15.574 | 15.588 | 15.602 | 15.616 | 1360 |
| 1370 | 15.616 | 15.630 | 15.645 | 15.659 | 15.673 | 15.687 | 15.701 | 15.715 | 15.729 | 15.743 | 15.758 | 1370 |
| 1380 | 15.758 | 15.772 | 15.786 | 15.800 | 15.814 | 15.828 | 15.842 | 15.856 | 15.871 | 15.885 | 15.899 | 1380 |
| 1390 | 15.899 | 15.913 | 15.927 | 15.941 | 15.955 | 15.969 | 15.984 | 15.998 | 16.012 | 16.026 | 16.040 | 1390 |
| °C | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | °C |

TABLE 13 Type R Thermocouple— thermoelectric voltage as a function of temperature (°C); reference junctions at 0 °C

| °C | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | °C |
|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| Thermoelectric Voltage in Millivolts | | | | | | | | | | | | |
| 1400 | 16.040 | 16.054 | 16.068 | 16.082 | 16.097 | 16.111 | 16.125 | 16.139 | 16.153 | 16.167 | 16.181 | 1400 |
| 1410 | 16.181 | 16.196 | 16.210 | 16.224 | 16.238 | 16.252 | 16.266 | 16.280 | 16.294 | 16.309 | 16.323 | 1410 |
| 1420 | 16.323 | 16.337 | 16.351 | 16.365 | 16.379 | 16.393 | 16.407 | 16.422 | 16.436 | 16.450 | 16.464 | 1420 |
| 1430 | 16.464 | 16.478 | 16.492 | 16.506 | 16.520 | 16.534 | 16.549 | 16.563 | 16.577 | 16.591 | 16.605 | 1430 |
| 1440 | 16.605 | 16.619 | 16.633 | 16.647 | 16.662 | 16.676 | 16.690 | 16.704 | 16.718 | 16.732 | 16.746 | 1440 |
| 1450 | 16.746 | 16.760 | 16.774 | 16.789 | 16.803 | 16.817 | 16.831 | 16.845 | 16.859 | 16.873 | 16.887 | 1450 |
| 1460 | 16.887 | 16.901 | 16.915 | 16.930 | 16.944 | 16.958 | 16.972 | 16.986 | 17.000 | 17.014 | 17.028 | 1460 |
| 1470 | 17.028 | 17.042 | 17.056 | 17.071 | 17.085 | 17.099 | 17.113 | 17.127 | 17.141 | 17.155 | 17.169 | 1470 |
| 1480 | 17.169 | 17.183 | 17.197 | 17.211 | 17.225 | 17.240 | 17.254 | 17.268 | 17.282 | 17.296 | 17.310 | 1480 |
| 1490 | 17.310 | 17.324 | 17.338 | 17.352 | 17.366 | 17.380 | 17.394 | 17.408 | 17.423 | 17.437 | 17.451 | 1490 |
| 1500 | 17.451 | 17.465 | 17.479 | 17.493 | 17.507 | 17.521 | 17.535 | 17.549 | 17.563 | 17.577 | 17.591 | 1500 |
| 1510 | 17.591 | 17.605 | 17.619 | 17.633 | 17.647 | 17.661 | 17.676 | 17.690 | 17.704 | 17.718 | 17.732 | 1510 |
| 1520 | 17.732 | 17.746 | 17.760 | 17.774 | 17.788 | 17.802 | 17.816 | 17.830 | 17.844 | 17.858 | 17.872 | 1520 |
| 1530 | 17.872 | 17.886 | 17.900 | 17.914 | 17.928 | 17.942 | 17.956 | 17.970 | 17.984 | 17.998 | 18.012 | 1530 |
| 1540 | 18.012 | 18.026 | 18.040 | 18.054 | 18.068 | 18.082 | 18.096 | 18.110 | 18.124 | 18.138 | 18.152 | 1540 |
| 1550 | 18.152 | 18.166 | 18.180 | 18.194 | 18.208 | 18.222 | 18.236 | 18.250 | 18.264 | 18.278 | 18.292 | 1550 |
| 1560 | 18.292 | 18.306 | 18.320 | 18.334 | 18.348 | 18.362 | 18.376 | 18.390 | 18.404 | 18.417 | 18.431 | 1560 |
| 1570 | 18.431 | 18.445 | 18.459 | 18.473 | 18.487 | 18.501 | 18.515 | 18.529 | 18.543 | 18.557 | 18.571 | 1570 |
| 1580 | 18.571 | 18.585 | 18.599 | 18.613 | 18.627 | 18.640 | 18.654 | 18.668 | 18.682 | 18.696 | 18.710 | 1580 |
| 1590 | 18.710 | 18.724 | 18.738 | 18.752 | 18.766 | 18.779 | 18.793 | 18.807 | 18.821 | 18.835 | 18.849 | 1590 |
| 1600 | 18.849 | 18.863 | 18.877 | 18.891 | 18.904 | 18.918 | 18.932 | 18.946 | 18.960 | 18.974 | 18.988 | 1600 |
| 1610 | 18.988 | 19.002 | 19.015 | 19.029 | 19.043 | 19.057 | 19.071 | 19.085 | 19.098 | 19.112 | 19.126 | 1610 |
| 1620 | 19.126 | 19.140 | 19.154 | 19.168 | 19.181 | 19.195 | 19.209 | 19.223 | 19.237 | 19.250 | 19.264 | 1620 |
| 1630 | 19.264 | 19.278 | 19.292 | 19.306 | 19.319 | 19.333 | 19.347 | 19.361 | 19.375 | 19.388 | 19.402 | 1630 |
| 1640 | 19.402 | 19.416 | 19.430 | 19.444 | 19.457 | 19.471 | 19.485 | 19.499 | 19.512 | 19.526 | 19.540 | 1640 |
| 1650 | 19.540 | 19.554 | 19.567 | 19.581 | 19.595 | 19.609 | 19.622 | 19.636 | 19.650 | 19.663 | 19.677 | 1650 |
| 1660 | 19.677 | 19.691 | 19.705 | 19.718 | 19.732 | 19.746 | 19.759 | 19.773 | 19.787 | 19.800 | 19.814 | 1660 |
| 1670 | 19.814 | 19.828 | 19.841 | 19.855 | 19.869 | 19.882 | 19.896 | 19.910 | 19.923 | 19.937 | 19.951 | 1670 |
| 1680 | 19.951 | 19.964 | 19.978 | 19.992 | 20.005 | 20.019 | 20.032 | 20.046 | 20.060 | 20.073 | 20.087 | 1680 |
| 1690 | 20.087 | 20.100 | 20.114 | 20.127 | 20.141 | 20.154 | 20.168 | 20.181 | 20.195 | 20.208 | 20.222 | 1690 |
| 1700 | 20.222 | 20.235 | 20.249 | 20.262 | 20.275 | 20.289 | 20.302 | 20.316 | 20.329 | 20.342 | 20.356 | 1700 |
| 1710 | 20.356 | 20.369 | 20.382 | 20.396 | 20.409 | 20.422 | 20.436 | 20.449 | 20.462 | 20.475 | 20.488 | 1710 |
| 1720 | 20.488 | 20.502 | 20.515 | 20.528 | 20.541 | 20.554 | 20.567 | 20.581 | 20.594 | 20.607 | 20.620 | 1720 |
| 1730 | 20.620 | 20.633 | 20.646 | 20.659 | 20.672 | 20.685 | 20.698 | 20.711 | 20.724 | 20.736 | 20.749 | 1730 |
| 1740 | 20.749 | 20.762 | 20.775 | 20.788 | 20.801 | 20.813 | 20.826 | 20.839 | 20.852 | 20.864 | 20.877 | 1740 |
| 1750 | 20.877 | 20.890 | 20.902 | 20.915 | 20.928 | 20.940 | 20.953 | 20.965 | 20.978 | 20.990 | 21.003 | 1750 |
| 1760 | 21.003 | 21.015 | 21.027 | 21.040 | 21.052 | 21.065 | 21.077 | 21.089 | 21.101 | | | 1760 |