

TABLE 16 Type S Thermocouple— thermoelectric voltage as a function of temperature (°F); reference junctions at 32 °F



| °F | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | °F |
|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-----|
| Thermoelectric Voltage in Millivolts | | | | | | | | | | | | |
| -50 | -0.218 | -0.220 | -0.222 | -0.224 | -0.227 | -0.229 | -0.231 | -0.233 | -0.236 | | | -50 |
| -40 | -0.194 | -0.197 | -0.199 | -0.201 | -0.204 | -0.206 | -0.208 | -0.211 | -0.213 | -0.215 | -0.218 | -40 |
| -30 | -0.170 | -0.173 | -0.175 | -0.178 | -0.180 | -0.182 | -0.185 | -0.187 | -0.190 | -0.192 | -0.194 | -30 |
| -20 | -0.145 | -0.148 | -0.150 | -0.153 | -0.155 | -0.158 | -0.160 | -0.163 | -0.165 | -0.168 | -0.170 | -20 |
| -10 | -0.119 | -0.122 | -0.124 | -0.127 | -0.129 | -0.132 | -0.135 | -0.137 | -0.140 | -0.142 | -0.145 | -10 |
| 0 | -0.092 | -0.095 | -0.097 | -0.100 | -0.103 | -0.106 | -0.108 | -0.111 | -0.114 | -0.116 | -0.119 | 0 |
| 0 | -0.092 | -0.089 | -0.086 | -0.084 | -0.081 | -0.078 | -0.075 | -0.073 | -0.070 | -0.067 | -0.064 | 0 |
| 10 | -0.064 | -0.061 | -0.058 | -0.056 | -0.053 | -0.050 | -0.047 | -0.044 | -0.041 | -0.038 | -0.035 | 10 |
| 20 | -0.035 | -0.033 | -0.030 | -0.027 | -0.024 | -0.021 | -0.018 | -0.015 | -0.012 | -0.009 | -0.006 | 20 |
| 30 | -0.006 | -0.003 | 0.000 | 0.003 | 0.006 | 0.009 | 0.012 | 0.015 | 0.018 | 0.021 | 0.024 | 30 |
| 40 | 0.024 | 0.027 | 0.030 | 0.033 | 0.037 | 0.040 | 0.043 | 0.046 | 0.049 | 0.052 | 0.055 | 40 |
| 50 | 0.055 | 0.058 | 0.062 | 0.065 | 0.068 | 0.071 | 0.074 | 0.077 | 0.081 | 0.084 | 0.087 | 50 |
| 60 | 0.087 | 0.090 | 0.093 | 0.097 | 0.100 | 0.103 | 0.106 | 0.110 | 0.113 | 0.116 | 0.119 | 60 |
| 70 | 0.119 | 0.123 | 0.126 | 0.129 | 0.133 | 0.136 | 0.139 | 0.143 | 0.146 | 0.149 | 0.153 | 70 |
| 80 | 0.153 | 0.156 | 0.159 | 0.163 | 0.166 | 0.169 | 0.173 | 0.176 | 0.180 | 0.183 | 0.186 | 80 |
| 90 | 0.186 | 0.190 | 0.193 | 0.197 | 0.200 | 0.204 | 0.207 | 0.210 | 0.214 | 0.217 | 0.221 | 90 |
| 100 | 0.221 | 0.224 | 0.228 | 0.231 | 0.235 | 0.238 | 0.242 | 0.245 | 0.249 | 0.252 | 0.256 | 100 |
| 110 | 0.256 | 0.260 | 0.263 | 0.267 | 0.270 | 0.274 | 0.277 | 0.281 | 0.285 | 0.288 | 0.292 | 110 |
| 120 | 0.292 | 0.295 | 0.299 | 0.303 | 0.306 | 0.310 | 0.313 | 0.317 | 0.321 | 0.324 | 0.328 | 120 |
| 130 | 0.328 | 0.332 | 0.335 | 0.339 | 0.343 | 0.346 | 0.350 | 0.354 | 0.357 | 0.361 | 0.365 | 130 |
| 140 | 0.365 | 0.369 | 0.372 | 0.376 | 0.380 | 0.384 | 0.387 | 0.391 | 0.395 | 0.399 | 0.402 | 140 |
| 150 | 0.402 | 0.406 | 0.410 | 0.414 | 0.417 | 0.421 | 0.425 | 0.429 | 0.433 | 0.436 | 0.440 | 150 |
| 160 | 0.440 | 0.444 | 0.448 | 0.452 | 0.456 | 0.459 | 0.463 | 0.467 | 0.471 | 0.475 | 0.479 | 160 |
| 170 | 0.479 | 0.483 | 0.487 | 0.490 | 0.494 | 0.498 | 0.502 | 0.506 | 0.510 | 0.514 | 0.518 | 170 |
| 180 | 0.518 | 0.522 | 0.526 | 0.530 | 0.534 | 0.538 | 0.541 | 0.545 | 0.549 | 0.553 | 0.557 | 180 |
| 190 | 0.557 | 0.561 | 0.565 | 0.569 | 0.573 | 0.577 | 0.581 | 0.585 | 0.589 | 0.593 | 0.597 | 190 |
| 200 | 0.597 | 0.601 | 0.605 | 0.609 | 0.613 | 0.617 | 0.622 | 0.626 | 0.630 | 0.634 | 0.638 | 200 |
| 210 | 0.638 | 0.642 | 0.646 | 0.650 | 0.654 | 0.658 | 0.662 | 0.666 | 0.670 | 0.675 | 0.679 | 210 |
| 220 | 0.679 | 0.683 | 0.687 | 0.691 | 0.695 | 0.699 | 0.703 | 0.708 | 0.712 | 0.716 | 0.720 | 220 |
| 230 | 0.720 | 0.724 | 0.728 | 0.732 | 0.737 | 0.741 | 0.745 | 0.749 | 0.753 | 0.758 | 0.762 | 230 |
| 240 | 0.762 | 0.766 | 0.770 | 0.774 | 0.779 | 0.783 | 0.787 | 0.791 | 0.795 | 0.800 | 0.804 | 240 |
| 250 | 0.804 | 0.808 | 0.812 | 0.817 | 0.821 | 0.825 | 0.829 | 0.834 | 0.838 | 0.842 | 0.847 | 250 |
| 260 | 0.847 | 0.851 | 0.855 | 0.859 | 0.864 | 0.868 | 0.872 | 0.877 | 0.881 | 0.885 | 0.889 | 260 |
| 270 | 0.889 | 0.894 | 0.898 | 0.902 | 0.907 | 0.911 | 0.915 | 0.920 | 0.924 | 0.928 | 0.933 | 270 |
| 280 | 0.933 | 0.937 | 0.942 | 0.946 | 0.950 | 0.955 | 0.959 | 0.963 | 0.968 | 0.972 | 0.977 | 280 |
| 290 | 0.977 | 0.981 | 0.985 | 0.990 | 0.994 | 0.998 | 1.003 | 1.007 | 1.012 | 1.016 | 1.021 | 290 |
| 300 | 1.021 | 1.025 | 1.029 | 1.034 | 1.038 | 1.043 | 1.047 | 1.052 | 1.056 | 1.061 | 1.065 | 300 |
| 310 | 1.065 | 1.069 | 1.074 | 1.078 | 1.083 | 1.087 | 1.092 | 1.096 | 1.101 | 1.105 | 1.110 | 310 |
| 320 | 1.110 | 1.114 | 1.119 | 1.123 | 1.128 | 1.132 | 1.137 | 1.141 | 1.146 | 1.150 | 1.155 | 320 |
| 330 | 1.155 | 1.159 | 1.164 | 1.168 | 1.173 | 1.177 | 1.182 | 1.186 | 1.191 | 1.196 | 1.200 | 330 |
| 340 | 1.200 | 1.205 | 1.209 | 1.214 | 1.218 | 1.223 | 1.227 | 1.232 | 1.237 | 1.241 | 1.246 | 340 |
| 350 | 1.246 | 1.250 | 1.255 | 1.260 | 1.264 | 1.269 | 1.273 | 1.278 | 1.283 | 1.287 | 1.292 | 350 |
| 360 | 1.292 | 1.296 | 1.301 | 1.306 | 1.310 | 1.315 | 1.319 | 1.324 | 1.329 | 1.333 | 1.338 | 360 |
| 370 | 1.338 | 1.343 | 1.347 | 1.352 | 1.357 | 1.361 | 1.366 | 1.371 | 1.375 | 1.380 | 1.385 | 370 |
| 380 | 1.385 | 1.389 | 1.394 | 1.399 | 1.403 | 1.408 | 1.413 | 1.417 | 1.422 | 1.427 | 1.431 | 380 |
| 390 | 1.431 | 1.436 | 1.441 | 1.445 | 1.450 | 1.455 | 1.460 | 1.464 | 1.469 | 1.474 | 1.478 | 390 |
| 400 | 1.478 | 1.483 | 1.488 | 1.493 | 1.497 | 1.502 | 1.507 | 1.512 | 1.516 | 1.521 | 1.526 | 400 |
| 410 | 1.526 | 1.531 | 1.535 | 1.540 | 1.545 | 1.550 | 1.554 | 1.559 | 1.564 | 1.569 | 1.573 | 410 |
| 420 | 1.573 | 1.578 | 1.583 | 1.588 | 1.592 | 1.597 | 1.602 | 1.607 | 1.612 | 1.616 | 1.621 | 420 |
| 430 | 1.621 | 1.626 | 1.631 | 1.636 | 1.640 | 1.645 | 1.650 | 1.655 | 1.660 | 1.664 | 1.669 | 430 |
| 440 | 1.669 | 1.674 | 1.679 | 1.684 | 1.689 | 1.693 | 1.698 | 1.703 | 1.708 | 1.713 | 1.718 | 440 |
| °F | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | °F |



TABLE 16 Type S Thermocouple— thermoelectric voltage as a function of temperature (°F); reference junctions at 32 °F

| °F | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | °F |
|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|
| Thermoelectric Voltage in Millivolts | | | | | | | | | | | | |
| 450 | 1.718 | 1.722 | 1.727 | 1.732 | 1.737 | 1.742 | 1.747 | 1.752 | 1.756 | 1.761 | 1.766 | 450 |
| 460 | 1.766 | 1.771 | 1.776 | 1.781 | 1.786 | 1.790 | 1.795 | 1.800 | 1.805 | 1.810 | 1.815 | 460 |
| 470 | 1.815 | 1.820 | 1.825 | 1.829 | 1.834 | 1.839 | 1.844 | 1.849 | 1.854 | 1.859 | 1.864 | 470 |
| 480 | 1.864 | 1.869 | 1.874 | 1.878 | 1.883 | 1.888 | 1.893 | 1.898 | 1.903 | 1.908 | 1.913 | 480 |
| 490 | 1.913 | 1.918 | 1.923 | 1.928 | 1.933 | 1.938 | 1.942 | 1.947 | 1.952 | 1.957 | 1.962 | 490 |
| 500 | 1.962 | 1.967 | 1.972 | 1.977 | 1.982 | 1.987 | 1.992 | 1.997 | 2.002 | 2.007 | 2.012 | 500 |
| 510 | 2.012 | 2.017 | 2.022 | 2.027 | 2.032 | 2.037 | 2.042 | 2.047 | 2.052 | 2.057 | 2.062 | 510 |
| 520 | 2.062 | 2.067 | 2.072 | 2.076 | 2.081 | 2.086 | 2.091 | 2.096 | 2.101 | 2.106 | 2.111 | 520 |
| 530 | 2.111 | 2.116 | 2.121 | 2.126 | 2.131 | 2.136 | 2.141 | 2.147 | 2.152 | 2.157 | 2.162 | 530 |
| 540 | 2.162 | 2.167 | 2.172 | 2.177 | 2.182 | 2.187 | 2.192 | 2.197 | 2.202 | 2.207 | 2.212 | 540 |
| 550 | 2.212 | 2.217 | 2.222 | 2.227 | 2.232 | 2.237 | 2.242 | 2.247 | 2.252 | 2.257 | 2.262 | 550 |
| 560 | 2.262 | 2.267 | 2.272 | 2.277 | 2.283 | 2.288 | 2.293 | 2.298 | 2.303 | 2.308 | 2.313 | 560 |
| 570 | 2.313 | 2.318 | 2.323 | 2.328 | 2.333 | 2.338 | 2.343 | 2.348 | 2.354 | 2.359 | 2.364 | 570 |
| 580 | 2.364 | 2.369 | 2.374 | 2.379 | 2.384 | 2.389 | 2.394 | 2.399 | 2.404 | 2.410 | 2.415 | 580 |
| 590 | 2.415 | 2.420 | 2.425 | 2.430 | 2.435 | 2.440 | 2.445 | 2.450 | 2.455 | 2.461 | 2.466 | 590 |
| 600 | 2.466 | 2.471 | 2.476 | 2.481 | 2.486 | 2.491 | 2.496 | 2.502 | 2.507 | 2.512 | 2.517 | 600 |
| 610 | 2.517 | 2.522 | 2.527 | 2.532 | 2.538 | 2.543 | 2.548 | 2.553 | 2.558 | 2.563 | 2.568 | 610 |
| 620 | 2.568 | 2.574 | 2.579 | 2.584 | 2.589 | 2.594 | 2.599 | 2.604 | 2.610 | 2.615 | 2.620 | 620 |
| 630 | 2.620 | 2.625 | 2.630 | 2.635 | 2.641 | 2.646 | 2.651 | 2.656 | 2.661 | 2.666 | 2.672 | 630 |
| 640 | 2.672 | 2.677 | 2.682 | 2.687 | 2.692 | 2.697 | 2.703 | 2.708 | 2.713 | 2.718 | 2.723 | 640 |
| 650 | 2.723 | 2.729 | 2.734 | 2.739 | 2.744 | 2.749 | 2.755 | 2.760 | 2.765 | 2.770 | 2.775 | 650 |
| 660 | 2.775 | 2.781 | 2.786 | 2.791 | 2.796 | 2.801 | 2.807 | 2.812 | 2.817 | 2.822 | 2.827 | 660 |
| 670 | 2.827 | 2.833 | 2.838 | 2.843 | 2.848 | 2.854 | 2.859 | 2.864 | 2.869 | 2.874 | 2.880 | 670 |
| 680 | 2.880 | 2.885 | 2.890 | 2.895 | 2.901 | 2.906 | 2.911 | 2.916 | 2.922 | 2.927 | 2.932 | 680 |
| 690 | 2.932 | 2.937 | 2.943 | 2.948 | 2.953 | 2.958 | 2.964 | 2.969 | 2.974 | 2.979 | 2.985 | 690 |
| 700 | 2.985 | 2.990 | 2.995 | 3.000 | 3.006 | 3.011 | 3.016 | 3.021 | 3.027 | 3.032 | 3.037 | 700 |
| 710 | 3.037 | 3.042 | 3.048 | 3.053 | 3.058 | 3.063 | 3.069 | 3.074 | 3.079 | 3.085 | 3.090 | 710 |
| 720 | 3.090 | 3.095 | 3.100 | 3.106 | 3.111 | 3.116 | 3.122 | 3.127 | 3.132 | 3.137 | 3.143 | 720 |
| 730 | 3.143 | 3.148 | 3.153 | 3.159 | 3.164 | 3.169 | 3.174 | 3.180 | 3.185 | 3.190 | 3.196 | 730 |
| 740 | 3.196 | 3.201 | 3.206 | 3.212 | 3.217 | 3.222 | 3.227 | 3.233 | 3.238 | 3.243 | 3.249 | 740 |
| 750 | 3.249 | 3.254 | 3.259 | 3.265 | 3.270 | 3.275 | 3.281 | 3.286 | 3.291 | 3.297 | 3.302 | 750 |
| 760 | 3.302 | 3.307 | 3.313 | 3.318 | 3.323 | 3.329 | 3.334 | 3.339 | 3.345 | 3.350 | 3.355 | 760 |
| 770 | 3.355 | 3.361 | 3.366 | 3.371 | 3.377 | 3.382 | 3.387 | 3.393 | 3.398 | 3.403 | 3.409 | 770 |
| 780 | 3.409 | 3.414 | 3.419 | 3.425 | 3.430 | 3.435 | 3.441 | 3.446 | 3.451 | 3.457 | 3.462 | 780 |
| 790 | 3.462 | 3.468 | 3.473 | 3.478 | 3.484 | 3.489 | 3.494 | 3.500 | 3.505 | 3.510 | 3.516 | 790 |
| 800 | 3.516 | 3.521 | 3.527 | 3.532 | 3.537 | 3.543 | 3.548 | 3.553 | 3.559 | 3.564 | 3.570 | 800 |
| 810 | 3.570 | 3.575 | 3.580 | 3.586 | 3.591 | 3.596 | 3.602 | 3.607 | 3.613 | 3.618 | 3.623 | 810 |
| 820 | 3.623 | 3.629 | 3.634 | 3.640 | 3.645 | 3.650 | 3.656 | 3.661 | 3.667 | 3.672 | 3.677 | 820 |
| 830 | 3.677 | 3.683 | 3.688 | 3.694 | 3.699 | 3.704 | 3.710 | 3.715 | 3.721 | 3.726 | 3.731 | 830 |
| 840 | 3.731 | 3.737 | 3.742 | 3.748 | 3.753 | 3.758 | 3.764 | 3.769 | 3.775 | 3.780 | 3.786 | 840 |
| 850 | 3.786 | 3.791 | 3.796 | 3.802 | 3.807 | 3.813 | 3.818 | 3.823 | 3.829 | 3.834 | 3.840 | 850 |
| 860 | 3.840 | 3.845 | 3.851 | 3.856 | 3.862 | 3.867 | 3.872 | 3.878 | 3.883 | 3.889 | 3.894 | 860 |
| 870 | 3.894 | 3.900 | 3.905 | 3.910 | 3.916 | 3.921 | 3.927 | 3.932 | 3.938 | 3.943 | 3.949 | 870 |
| 880 | 3.949 | 3.954 | 3.959 | 3.965 | 3.970 | 3.976 | 3.981 | 3.987 | 3.992 | 3.998 | 4.003 | 880 |
| 890 | 4.003 | 4.009 | 4.014 | 4.020 | 4.025 | 4.030 | 4.036 | 4.041 | 4.047 | 4.052 | 4.058 | 890 |
| 900 | 4.058 | 4.063 | 4.069 | 4.074 | 4.080 | 4.085 | 4.091 | 4.096 | 4.102 | 4.107 | 4.113 | 900 |
| 910 | 4.113 | 4.118 | 4.123 | 4.129 | 4.134 | 4.140 | 4.145 | 4.151 | 4.156 | 4.162 | 4.167 | 910 |
| 920 | 4.167 | 4.173 | 4.178 | 4.184 | 4.189 | 4.195 | 4.200 | 4.206 | 4.211 | 4.217 | 4.222 | 920 |
| 930 | 4.222 | 4.228 | 4.233 | 4.239 | 4.244 | 4.250 | 4.255 | 4.261 | 4.266 | 4.272 | 4.277 | 930 |
| 940 | 4.277 | 4.283 | 4.288 | 4.294 | 4.299 | 4.305 | 4.310 | 4.316 | 4.321 | 4.327 | 4.332 | 940 |
| °F | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | °F |

TABLE 16 Type S Thermocouple— thermoelectric voltage as a function of temperature (°F); reference junctions at 32 °F



| °F | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | °F |
|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| Thermoelectric Voltage in Millivolts | | | | | | | | | | | | |
| 950 | 4.332 | 4.338 | 4.343 | 4.349 | 4.355 | 4.360 | 4.366 | 4.371 | 4.377 | 4.382 | 4.388 | 950 |
| 960 | 4.388 | 4.393 | 4.399 | 4.404 | 4.410 | 4.415 | 4.421 | 4.426 | 4.432 | 4.437 | 4.443 | 960 |
| 970 | 4.443 | 4.449 | 4.454 | 4.460 | 4.465 | 4.471 | 4.476 | 4.482 | 4.487 | 4.493 | 4.498 | 970 |
| 980 | 4.498 | 4.504 | 4.510 | 4.515 | 4.521 | 4.526 | 4.532 | 4.537 | 4.543 | 4.548 | 4.554 | 980 |
| 990 | 4.554 | 4.559 | 4.565 | 4.571 | 4.576 | 4.582 | 4.587 | 4.593 | 4.598 | 4.604 | 4.610 | 990 |
| 1000 | 4.610 | 4.615 | 4.621 | 4.626 | 4.632 | 4.637 | 4.643 | 4.648 | 4.654 | 4.660 | 4.665 | 1000 |
| 1010 | 4.665 | 4.671 | 4.676 | 4.682 | 4.688 | 4.693 | 4.699 | 4.704 | 4.710 | 4.715 | 4.721 | 1010 |
| 1020 | 4.721 | 4.727 | 4.732 | 4.738 | 4.743 | 4.749 | 4.755 | 4.760 | 4.766 | 4.771 | 4.777 | 1020 |
| 1030 | 4.777 | 4.782 | 4.788 | 4.794 | 4.799 | 4.805 | 4.810 | 4.816 | 4.822 | 4.827 | 4.833 | 1030 |
| 1040 | 4.833 | 4.838 | 4.844 | 4.850 | 4.855 | 4.861 | 4.866 | 4.872 | 4.878 | 4.883 | 4.889 | 1040 |
| 1050 | 4.889 | 4.895 | 4.900 | 4.906 | 4.911 | 4.917 | 4.923 | 4.928 | 4.934 | 4.939 | 4.945 | 1050 |
| 1060 | 4.945 | 4.951 | 4.956 | 4.962 | 4.968 | 4.973 | 4.979 | 4.984 | 4.990 | 4.996 | 5.001 | 1060 |
| 1070 | 5.001 | 5.007 | 5.013 | 5.018 | 5.024 | 5.030 | 5.035 | 5.041 | 5.046 | 5.052 | 5.058 | 1070 |
| 1080 | 5.058 | 5.063 | 5.069 | 5.075 | 5.080 | 5.086 | 5.092 | 5.097 | 5.103 | 5.109 | 5.114 | 1080 |
| 1090 | 5.114 | 5.120 | 5.125 | 5.131 | 5.137 | 5.142 | 5.148 | 5.154 | 5.159 | 5.165 | 5.171 | 1090 |
| 1100 | 5.171 | 5.176 | 5.182 | 5.188 | 5.193 | 5.199 | 5.205 | 5.210 | 5.216 | 5.222 | 5.227 | 1100 |
| 1110 | 5.227 | 5.233 | 5.239 | 5.244 | 5.250 | 5.256 | 5.261 | 5.267 | 5.273 | 5.278 | 5.284 | 1110 |
| 1120 | 5.284 | 5.290 | 5.295 | 5.301 | 5.307 | 5.312 | 5.318 | 5.324 | 5.330 | 5.335 | 5.341 | 1120 |
| 1130 | 5.341 | 5.347 | 5.352 | 5.358 | 5.364 | 5.369 | 5.375 | 5.381 | 5.386 | 5.392 | 5.398 | 1130 |
| 1140 | 5.398 | 5.404 | 5.409 | 5.415 | 5.421 | 5.426 | 5.432 | 5.438 | 5.443 | 5.449 | 5.455 | 1140 |
| 1150 | 5.455 | 5.461 | 5.466 | 5.472 | 5.478 | 5.483 | 5.489 | 5.495 | 5.501 | 5.506 | 5.512 | 1150 |
| 1160 | 5.512 | 5.518 | 5.523 | 5.529 | 5.535 | 5.541 | 5.546 | 5.552 | 5.558 | 5.563 | 5.569 | 1160 |
| 1170 | 5.569 | 5.575 | 5.581 | 5.586 | 5.592 | 5.598 | 5.604 | 5.609 | 5.615 | 5.621 | 5.627 | 1170 |
| 1180 | 5.627 | 5.632 | 5.638 | 5.644 | 5.649 | 5.655 | 5.661 | 5.667 | 5.672 | 5.678 | 5.684 | 1180 |
| 1190 | 5.684 | 5.690 | 5.695 | 5.701 | 5.707 | 5.713 | 5.718 | 5.724 | 5.730 | 5.736 | 5.741 | 1190 |
| 1200 | 5.741 | 5.747 | 5.753 | 5.759 | 5.764 | 5.770 | 5.776 | 5.782 | 5.788 | 5.793 | 5.799 | 1200 |
| 1210 | 5.799 | 5.805 | 5.811 | 5.816 | 5.822 | 5.828 | 5.834 | 5.839 | 5.845 | 5.851 | 5.857 | 1210 |
| 1220 | 5.857 | 5.863 | 5.868 | 5.874 | 5.880 | 5.886 | 5.891 | 5.897 | 5.903 | 5.909 | 5.915 | 1220 |
| 1230 | 5.915 | 5.920 | 5.926 | 5.932 | 5.938 | 5.944 | 5.949 | 5.955 | 5.961 | 5.967 | 5.972 | 1230 |
| 1240 | 5.972 | 5.978 | 5.984 | 5.990 | 5.996 | 6.001 | 6.007 | 6.013 | 6.019 | 6.025 | 6.030 | 1240 |
| 1250 | 6.030 | 6.036 | 6.042 | 6.048 | 6.054 | 6.060 | 6.065 | 6.071 | 6.077 | 6.083 | 6.089 | 1250 |
| 1260 | 6.089 | 6.094 | 6.100 | 6.106 | 6.112 | 6.118 | 6.124 | 6.129 | 6.135 | 6.141 | 6.147 | 1260 |
| 1270 | 6.147 | 6.153 | 6.158 | 6.164 | 6.170 | 6.176 | 6.182 | 6.188 | 6.193 | 6.199 | 6.205 | 1270 |
| 1280 | 6.205 | 6.211 | 6.217 | 6.223 | 6.228 | 6.234 | 6.240 | 6.246 | 6.252 | 6.258 | 6.264 | 1280 |
| 1290 | 6.264 | 6.269 | 6.275 | 6.281 | 6.287 | 6.293 | 6.299 | 6.305 | 6.310 | 6.316 | 6.322 | 1290 |
| 1300 | 6.322 | 6.328 | 6.334 | 6.340 | 6.346 | 6.351 | 6.357 | 6.363 | 6.369 | 6.375 | 6.381 | 1300 |
| 1310 | 6.381 | 6.387 | 6.392 | 6.398 | 6.404 | 6.410 | 6.416 | 6.422 | 6.428 | 6.434 | 6.439 | 1310 |
| 1320 | 6.439 | 6.445 | 6.451 | 6.457 | 6.463 | 6.469 | 6.475 | 6.481 | 6.486 | 6.492 | 6.498 | 1320 |
| 1330 | 6.498 | 6.504 | 6.510 | 6.516 | 6.522 | 6.528 | 6.534 | 6.539 | 6.545 | 6.551 | 6.557 | 1330 |
| 1340 | 6.557 | 6.563 | 6.569 | 6.575 | 6.581 | 6.587 | 6.593 | 6.598 | 6.604 | 6.610 | 6.616 | 1340 |
| 1350 | 6.616 | 6.622 | 6.628 | 6.634 | 6.640 | 6.646 | 6.652 | 6.658 | 6.664 | 6.669 | 6.675 | 1350 |
| 1360 | 6.675 | 6.681 | 6.687 | 6.693 | 6.699 | 6.705 | 6.711 | 6.717 | 6.723 | 6.729 | 6.735 | 1360 |
| 1370 | 6.735 | 6.741 | 6.746 | 6.752 | 6.758 | 6.764 | 6.770 | 6.776 | 6.782 | 6.788 | 6.794 | 1370 |
| 1380 | 6.794 | 6.800 | 6.806 | 6.812 | 6.818 | 6.824 | 6.830 | 6.836 | 6.842 | 6.847 | 6.853 | 1380 |
| 1390 | 6.853 | 6.859 | 6.865 | 6.871 | 6.877 | 6.883 | 6.889 | 6.895 | 6.901 | 6.907 | 6.913 | 1390 |
| 1400 | 6.913 | 6.919 | 6.925 | 6.931 | 6.937 | 6.943 | 6.949 | 6.955 | 6.961 | 6.967 | 6.973 | 1400 |
| 1410 | 6.973 | 6.979 | 6.985 | 6.991 | 6.997 | 7.003 | 7.008 | 7.014 | 7.020 | 7.026 | 7.032 | 1410 |
| 1420 | 7.032 | 7.038 | 7.044 | 7.050 | 7.056 | 7.062 | 7.068 | 7.074 | 7.080 | 7.086 | 7.092 | 1420 |
| 1430 | 7.092 | 7.098 | 7.104 | 7.110 | 7.116 | 7.122 | 7.128 | 7.134 | 7.140 | 7.146 | 7.152 | 1430 |
| 1440 | 7.152 | 7.158 | 7.164 | 7.170 | 7.176 | 7.182 | 7.188 | 7.194 | 7.200 | 7.206 | 7.212 | 1440 |
| °F | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | °F |



TABLE 16 Type S Thermocouple— thermoelectric voltage as a function of temperature (°F); reference junctions at 32 °F

| °F | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | °F |
|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| Thermoelectric Voltage in Millivolts | | | | | | | | | | | | |
| 1450 | 7.212 | 7.218 | 7.224 | 7.230 | 7.236 | 7.242 | 7.249 | 7.255 | 7.261 | 7.267 | 7.273 | 1450 |
| 1460 | 7.273 | 7.279 | 7.285 | 7.291 | 7.297 | 7.303 | 7.309 | 7.315 | 7.321 | 7.327 | 7.333 | 1460 |
| 1470 | 7.333 | 7.339 | 7.345 | 7.351 | 7.357 | 7.363 | 7.369 | 7.375 | 7.381 | 7.387 | 7.393 | 1470 |
| 1480 | 7.393 | 7.399 | 7.405 | 7.411 | 7.418 | 7.424 | 7.430 | 7.436 | 7.442 | 7.448 | 7.454 | 1480 |
| 1490 | 7.454 | 7.460 | 7.466 | 7.472 | 7.478 | 7.484 | 7.490 | 7.496 | 7.502 | 7.508 | 7.514 | 1490 |
| 1500 | 7.514 | 7.521 | 7.527 | 7.533 | 7.539 | 7.545 | 7.551 | 7.557 | 7.563 | 7.569 | 7.575 | 1500 |
| 1510 | 7.575 | 7.581 | 7.587 | 7.593 | 7.600 | 7.606 | 7.612 | 7.618 | 7.624 | 7.630 | 7.636 | 1510 |
| 1520 | 7.636 | 7.642 | 7.648 | 7.654 | 7.660 | 7.667 | 7.673 | 7.679 | 7.685 | 7.691 | 7.697 | 1520 |
| 1530 | 7.697 | 7.703 | 7.709 | 7.715 | 7.721 | 7.728 | 7.734 | 7.740 | 7.746 | 7.752 | 7.758 | 1530 |
| 1540 | 7.758 | 7.764 | 7.770 | 7.776 | 7.783 | 7.789 | 7.795 | 7.801 | 7.807 | 7.813 | 7.819 | 1540 |
| 1550 | 7.819 | 7.825 | 7.832 | 7.838 | 7.844 | 7.850 | 7.856 | 7.862 | 7.868 | 7.874 | 7.881 | 1550 |
| 1560 | 7.881 | 7.887 | 7.893 | 7.899 | 7.905 | 7.911 | 7.917 | 7.923 | 7.930 | 7.936 | 7.942 | 1560 |
| 1570 | 7.942 | 7.948 | 7.954 | 7.960 | 7.966 | 7.973 | 7.979 | 7.985 | 7.991 | 7.997 | 8.003 | 1570 |
| 1580 | 8.003 | 8.010 | 8.016 | 8.022 | 8.028 | 8.034 | 8.040 | 8.047 | 8.053 | 8.059 | 8.065 | 1580 |
| 1590 | 8.065 | 8.071 | 8.077 | 8.083 | 8.090 | 8.096 | 8.102 | 8.108 | 8.114 | 8.121 | 8.127 | 1590 |
| 1600 | 8.127 | 8.133 | 8.139 | 8.145 | 8.151 | 8.158 | 8.164 | 8.170 | 8.176 | 8.182 | 8.189 | 1600 |
| 1610 | 8.189 | 8.195 | 8.201 | 8.207 | 8.213 | 8.219 | 8.226 | 8.232 | 8.238 | 8.244 | 8.250 | 1610 |
| 1620 | 8.250 | 8.257 | 8.263 | 8.269 | 8.275 | 8.281 | 8.288 | 8.294 | 8.300 | 8.306 | 8.312 | 1620 |
| 1630 | 8.312 | 8.319 | 8.325 | 8.331 | 8.337 | 8.343 | 8.350 | 8.356 | 8.362 | 8.368 | 8.375 | 1630 |
| 1640 | 8.375 | 8.381 | 8.387 | 8.393 | 8.399 | 8.406 | 8.412 | 8.418 | 8.424 | 8.431 | 8.437 | 1640 |
| 1650 | 8.437 | 8.443 | 8.449 | 8.455 | 8.462 | 8.468 | 8.474 | 8.480 | 8.487 | 8.493 | 8.499 | 1650 |
| 1660 | 8.499 | 8.505 | 8.512 | 8.518 | 8.524 | 8.530 | 8.537 | 8.543 | 8.549 | 8.555 | 8.562 | 1660 |
| 1670 | 8.562 | 8.568 | 8.574 | 8.580 | 8.587 | 8.593 | 8.599 | 8.605 | 8.612 | 8.618 | 8.624 | 1670 |
| 1680 | 8.624 | 8.630 | 8.637 | 8.643 | 8.649 | 8.655 | 8.662 | 8.668 | 8.674 | 8.680 | 8.687 | 1680 |
| 1690 | 8.687 | 8.693 | 8.699 | 8.706 | 8.712 | 8.718 | 8.724 | 8.731 | 8.737 | 8.743 | 8.749 | 1690 |
| 1700 | 8.749 | 8.756 | 8.762 | 8.768 | 8.775 | 8.781 | 8.787 | 8.793 | 8.800 | 8.806 | 8.812 | 1700 |
| 1710 | 8.812 | 8.819 | 8.825 | 8.831 | 8.837 | 8.844 | 8.850 | 8.856 | 8.863 | 8.869 | 8.875 | 1710 |
| 1720 | 8.875 | 8.882 | 8.888 | 8.894 | 8.900 | 8.907 | 8.913 | 8.919 | 8.926 | 8.932 | 8.938 | 1720 |
| 1730 | 8.938 | 8.945 | 8.951 | 8.957 | 8.964 | 8.970 | 8.976 | 8.983 | 8.989 | 8.995 | 9.001 | 1730 |
| 1740 | 9.001 | 9.008 | 9.014 | 9.020 | 9.027 | 9.033 | 9.039 | 9.046 | 9.052 | 9.058 | 9.065 | 1740 |
| 1750 | 9.065 | 9.071 | 9.077 | 9.084 | 9.090 | 9.096 | 9.103 | 9.109 | 9.115 | 9.122 | 9.128 | 1750 |
| 1760 | 9.128 | 9.134 | 9.141 | 9.147 | 9.153 | 9.160 | 9.166 | 9.172 | 9.179 | 9.185 | 9.192 | 1760 |
| 1770 | 9.192 | 9.198 | 9.204 | 9.211 | 9.217 | 9.223 | 9.230 | 9.236 | 9.242 | 9.249 | 9.255 | 1770 |
| 1780 | 9.255 | 9.261 | 9.268 | 9.274 | 9.281 | 9.287 | 9.293 | 9.300 | 9.306 | 9.312 | 9.319 | 1780 |
| 1790 | 9.319 | 9.325 | 9.331 | 9.338 | 9.344 | 9.351 | 9.357 | 9.363 | 9.370 | 9.376 | 9.382 | 1790 |
| 1800 | 9.382 | 9.389 | 9.395 | 9.402 | 9.408 | 9.414 | 9.421 | 9.427 | 9.434 | 9.440 | 9.446 | 1800 |
| 1810 | 9.446 | 9.453 | 9.459 | 9.465 | 9.472 | 9.478 | 9.485 | 9.491 | 9.497 | 9.504 | 9.510 | 1810 |
| 1820 | 9.510 | 9.517 | 9.523 | 9.529 | 9.536 | 9.542 | 9.549 | 9.555 | 9.561 | 9.568 | 9.574 | 1820 |
| 1830 | 9.574 | 9.581 | 9.587 | 9.594 | 9.600 | 9.606 | 9.613 | 9.619 | 9.626 | 9.632 | 9.638 | 1830 |
| 1840 | 9.638 | 9.645 | 9.651 | 9.658 | 9.664 | 9.671 | 9.677 | 9.683 | 9.690 | 9.696 | 9.703 | 1840 |
| 1850 | 9.703 | 9.709 | 9.716 | 9.722 | 9.728 | 9.735 | 9.741 | 9.748 | 9.754 | 9.761 | 9.767 | 1850 |
| 1860 | 9.767 | 9.773 | 9.780 | 9.786 | 9.793 | 9.799 | 9.806 | 9.812 | 9.819 | 9.825 | 9.831 | 1860 |
| 1870 | 9.831 | 9.838 | 9.844 | 9.851 | 9.857 | 9.864 | 9.870 | 9.877 | 9.883 | 9.889 | 9.896 | 1870 |
| 1880 | 9.896 | 9.902 | 9.909 | 9.915 | 9.922 | 9.928 | 9.935 | 9.941 | 9.948 | 9.954 | 9.961 | 1880 |
| 1890 | 9.961 | 9.967 | 9.973 | 9.980 | 9.986 | 9.993 | 9.999 | 10.006 | 10.012 | 10.019 | 10.025 | 1890 |
| 1900 | 10.025 | 10.032 | 10.038 | 10.045 | 10.051 | 10.058 | 10.064 | 10.071 | 10.077 | 10.084 | 10.090 | 1900 |
| 1910 | 10.090 | 10.097 | 10.103 | 10.110 | 10.116 | 10.123 | 10.129 | 10.136 | 10.142 | 10.149 | 10.155 | 1910 |
| 1920 | 10.155 | 10.162 | 10.168 | 10.175 | 10.181 | 10.188 | 10.194 | 10.201 | 10.207 | 10.214 | 10.220 | 1920 |
| 1930 | 10.220 | 10.227 | 10.233 | 10.240 | 10.246 | 10.253 | 10.259 | 10.266 | 10.272 | 10.279 | 10.285 | 1930 |
| 1940 | 10.285 | 10.292 | 10.298 | 10.305 | 10.311 | 10.318 | 10.324 | 10.331 | 10.337 | 10.344 | 10.350 | 1940 |
| °F | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | °F |

TABLE 16 Type S Thermocouple— thermoelectric voltage as a function of temperature (°F); reference junctions at 32 °F



| °F | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | °F |
|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| Thermoelectric Voltage in Millivolts | | | | | | | | | | | | |
| 1950 | 10.350 | 10.357 | 10.363 | 10.370 | 10.376 | 10.383 | 10.390 | 10.396 | 10.403 | 10.409 | 10.416 | 1950 |
| 1960 | 10.416 | 10.422 | 10.429 | 10.435 | 10.442 | 10.448 | 10.455 | 10.461 | 10.468 | 10.475 | 10.481 | 1960 |
| 1970 | 10.481 | 10.488 | 10.494 | 10.501 | 10.507 | 10.514 | 10.520 | 10.527 | 10.533 | 10.540 | 10.547 | 1970 |
| 1980 | 10.547 | 10.553 | 10.560 | 10.566 | 10.573 | 10.579 | 10.586 | 10.592 | 10.599 | 10.606 | 10.612 | 1980 |
| 1990 | 10.612 | 10.619 | 10.625 | 10.632 | 10.638 | 10.645 | 10.651 | 10.658 | 10.665 | 10.671 | 10.678 | 1990 |
| 2000 | 10.678 | 10.684 | 10.691 | 10.697 | 10.704 | 10.711 | 10.717 | 10.724 | 10.730 | 10.737 | 10.743 | 2000 |
| 2010 | 10.743 | 10.750 | 10.757 | 10.763 | 10.770 | 10.776 | 10.783 | 10.789 | 10.796 | 10.803 | 10.809 | 2010 |
| 2020 | 10.809 | 10.816 | 10.822 | 10.829 | 10.836 | 10.842 | 10.849 | 10.855 | 10.862 | 10.868 | 10.875 | 2020 |
| 2030 | 10.875 | 10.882 | 10.888 | 10.895 | 10.901 | 10.908 | 10.915 | 10.921 | 10.928 | 10.934 | 10.941 | 2030 |
| 2040 | 10.941 | 10.948 | 10.954 | 10.961 | 10.967 | 10.974 | 10.981 | 10.987 | 10.994 | 11.000 | 11.007 | 2040 |
| 2050 | 11.007 | 11.014 | 11.020 | 11.027 | 11.033 | 11.040 | 11.047 | 11.053 | 11.060 | 11.066 | 11.073 | 2050 |
| 2060 | 11.073 | 11.080 | 11.086 | 11.093 | 11.099 | 11.106 | 11.113 | 11.119 | 11.126 | 11.132 | 11.139 | 2060 |
| 2070 | 11.139 | 11.146 | 11.152 | 11.159 | 11.166 | 11.172 | 11.179 | 11.185 | 11.192 | 11.199 | 11.205 | 2070 |
| 2080 | 11.205 | 11.212 | 11.219 | 11.225 | 11.232 | 11.238 | 11.245 | 11.252 | 11.258 | 11.265 | 11.272 | 2080 |
| 2090 | 11.272 | 11.278 | 11.285 | 11.291 | 11.298 | 11.305 | 11.311 | 11.318 | 11.325 | 11.331 | 11.338 | 2090 |
| 2100 | 11.338 | 11.345 | 11.351 | 11.358 | 11.364 | 11.371 | 11.378 | 11.384 | 11.391 | 11.398 | 11.404 | 2100 |
| 2110 | 11.404 | 11.411 | 11.418 | 11.424 | 11.431 | 11.437 | 11.444 | 11.451 | 11.457 | 11.464 | 11.471 | 2110 |
| 2120 | 11.471 | 11.477 | 11.484 | 11.491 | 11.497 | 11.504 | 11.511 | 11.517 | 11.524 | 11.531 | 11.537 | 2120 |
| 2130 | 11.537 | 11.544 | 11.550 | 11.557 | 11.564 | 11.570 | 11.577 | 11.584 | 11.590 | 11.597 | 11.604 | 2130 |
| 2140 | 11.604 | 11.610 | 11.617 | 11.624 | 11.630 | 11.637 | 11.644 | 11.650 | 11.657 | 11.664 | 11.670 | 2140 |
| 2150 | 11.670 | 11.677 | 11.684 | 11.690 | 11.697 | 11.704 | 11.710 | 11.717 | 11.724 | 11.730 | 11.737 | 2150 |
| 2160 | 11.737 | 11.744 | 11.750 | 11.757 | 11.764 | 11.770 | 11.777 | 11.784 | 11.790 | 11.797 | 11.804 | 2160 |
| 2170 | 11.804 | 11.810 | 11.817 | 11.824 | 11.830 | 11.837 | 11.844 | 11.850 | 11.857 | 11.864 | 11.870 | 2170 |
| 2180 | 11.870 | 11.877 | 11.884 | 11.890 | 11.897 | 11.904 | 11.910 | 11.917 | 11.924 | 11.931 | 11.937 | 2180 |
| 2190 | 11.937 | 11.944 | 11.951 | 11.957 | 11.964 | 11.971 | 11.977 | 11.984 | 11.991 | 11.997 | 12.004 | 2190 |
| 2200 | 12.004 | 12.011 | 12.017 | 12.024 | 12.031 | 12.037 | 12.044 | 12.051 | 12.058 | 12.064 | 12.071 | 2200 |
| 2210 | 12.071 | 12.078 | 12.084 | 12.091 | 12.098 | 12.104 | 12.111 | 12.118 | 12.124 | 12.131 | 12.138 | 2210 |
| 2220 | 12.138 | 12.145 | 12.151 | 12.158 | 12.165 | 12.171 | 12.178 | 12.185 | 12.191 | 12.198 | 12.205 | 2220 |
| 2230 | 12.205 | 12.211 | 12.218 | 12.225 | 12.232 | 12.238 | 12.245 | 12.252 | 12.258 | 12.265 | 12.272 | 2230 |
| 2240 | 12.272 | 12.278 | 12.285 | 12.292 | 12.299 | 12.305 | 12.312 | 12.319 | 12.325 | 12.332 | 12.339 | 2240 |
| 2250 | 12.339 | 12.346 | 12.352 | 12.359 | 12.366 | 12.372 | 12.379 | 12.386 | 12.392 | 12.399 | 12.406 | 2250 |
| 2260 | 12.406 | 12.413 | 12.419 | 12.426 | 12.433 | 12.439 | 12.446 | 12.453 | 12.460 | 12.466 | 12.473 | 2260 |
| 2270 | 12.473 | 12.480 | 12.486 | 12.493 | 12.500 | 12.507 | 12.513 | 12.520 | 12.527 | 12.533 | 12.540 | 2270 |
| 2280 | 12.540 | 12.547 | 12.554 | 12.560 | 12.567 | 12.574 | 12.580 | 12.587 | 12.594 | 12.601 | 12.607 | 2280 |
| 2290 | 12.607 | 12.614 | 12.621 | 12.627 | 12.634 | 12.641 | 12.648 | 12.654 | 12.661 | 12.668 | 12.675 | 2290 |
| 2300 | 12.675 | 12.681 | 12.688 | 12.695 | 12.701 | 12.708 | 12.715 | 12.722 | 12.728 | 12.735 | 12.742 | 2300 |
| 2310 | 12.742 | 12.748 | 12.755 | 12.762 | 12.769 | 12.775 | 12.782 | 12.789 | 12.796 | 12.802 | 12.809 | 2310 |
| 2320 | 12.809 | 12.816 | 12.822 | 12.829 | 12.836 | 12.843 | 12.849 | 12.856 | 12.863 | 12.870 | 12.876 | 2320 |
| 2330 | 12.876 | 12.883 | 12.890 | 12.896 | 12.903 | 12.910 | 12.917 | 12.923 | 12.930 | 12.937 | 12.944 | 2330 |
| 2340 | 12.944 | 12.950 | 12.957 | 12.964 | 12.971 | 12.977 | 12.984 | 12.991 | 12.997 | 13.004 | 13.011 | 2340 |
| 2350 | 13.011 | 13.018 | 13.024 | 13.031 | 13.038 | 13.045 | 13.051 | 13.058 | 13.065 | 13.072 | 13.078 | 2350 |
| 2360 | 13.078 | 13.085 | 13.092 | 13.098 | 13.105 | 13.112 | 13.119 | 13.125 | 13.132 | 13.139 | 13.146 | 2360 |
| 2370 | 13.146 | 13.152 | 13.159 | 13.166 | 13.173 | 13.179 | 13.186 | 13.193 | 13.199 | 13.206 | 13.213 | 2370 |
| 2380 | 13.213 | 13.220 | 13.226 | 13.233 | 13.240 | 13.247 | 13.253 | 13.260 | 13.267 | 13.274 | 13.280 | 2380 |
| 2390 | 13.280 | 13.287 | 13.294 | 13.301 | 13.307 | 13.314 | 13.321 | 13.328 | 13.334 | 13.341 | 13.348 | 2390 |
| 2400 | 13.348 | 13.354 | 13.361 | 13.368 | 13.375 | 13.381 | 13.388 | 13.395 | 13.402 | 13.408 | 13.415 | 2400 |
| 2410 | 13.415 | 13.422 | 13.429 | 13.435 | 13.442 | 13.449 | 13.456 | 13.462 | 13.469 | 13.476 | 13.483 | 2410 |
| 2420 | 13.483 | 13.489 | 13.496 | 13.503 | 13.510 | 13.516 | 13.523 | 13.530 | 13.537 | 13.543 | 13.550 | 2420 |
| 2430 | 13.550 | 13.557 | 13.563 | 13.570 | 13.577 | 13.584 | 13.590 | 13.597 | 13.604 | 13.611 | 13.617 | 2430 |
| 2440 | 13.617 | 13.624 | 13.631 | 13.638 | 13.644 | 13.651 | 13.658 | 13.665 | 13.671 | 13.678 | 13.685 | 2440 |
| °F | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | °F |



TABLE 16 Type S Thermocouple— *thermoelectric voltage as a function of temperature (°F); reference junctions at 32 °F*

| °F | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | °F |
|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| Thermoelectric Voltage in Millivolts | | | | | | | | | | | | |
| 2450 | 13.685 | 13.692 | 13.698 | 13.705 | 13.712 | 13.719 | 13.725 | 13.732 | 13.739 | 13.746 | 13.752 | 2450 |
| 2460 | 13.752 | 13.759 | 13.766 | 13.773 | 13.779 | 13.786 | 13.793 | 13.800 | 13.806 | 13.813 | 13.820 | 2460 |
| 2470 | 13.820 | 13.826 | 13.833 | 13.840 | 13.847 | 13.853 | 13.860 | 13.867 | 13.874 | 13.880 | 13.887 | 2470 |
| 2480 | 13.887 | 13.894 | 13.901 | 13.907 | 13.914 | 13.921 | 13.928 | 13.934 | 13.941 | 13.948 | 13.955 | 2480 |
| 2490 | 13.955 | 13.961 | 13.968 | 13.975 | 13.982 | 13.988 | 13.995 | 14.002 | 14.009 | 14.015 | 14.022 | 2490 |
| 2500 | 14.022 | 14.029 | 14.036 | 14.042 | 14.049 | 14.056 | 14.063 | 14.069 | 14.076 | 14.083 | 14.089 | 2500 |
| 2510 | 14.089 | 14.096 | 14.103 | 14.110 | 14.116 | 14.123 | 14.130 | 14.137 | 14.143 | 14.150 | 14.157 | 2510 |
| 2520 | 14.157 | 14.164 | 14.170 | 14.177 | 14.184 | 14.191 | 14.197 | 14.204 | 14.211 | 14.218 | 14.224 | 2520 |
| 2530 | 14.224 | 14.231 | 14.238 | 14.245 | 14.251 | 14.258 | 14.265 | 14.272 | 14.278 | 14.285 | 14.292 | 2530 |
| 2540 | 14.292 | 14.298 | 14.305 | 14.312 | 14.319 | 14.325 | 14.332 | 14.339 | 14.346 | 14.352 | 14.359 | 2540 |
| 2550 | 14.359 | 14.366 | 14.373 | 14.379 | 14.386 | 14.393 | 14.400 | 14.406 | 14.413 | 14.420 | 14.426 | 2550 |
| 2560 | 14.426 | 14.433 | 14.440 | 14.447 | 14.453 | 14.460 | 14.467 | 14.474 | 14.480 | 14.487 | 14.494 | 2560 |
| 2570 | 14.494 | 14.501 | 14.507 | 14.514 | 14.521 | 14.528 | 14.534 | 14.541 | 14.548 | 14.554 | 14.561 | 2570 |
| 2580 | 14.561 | 14.568 | 14.575 | 14.581 | 14.588 | 14.595 | 14.602 | 14.608 | 14.615 | 14.622 | 14.629 | 2580 |
| 2590 | 14.629 | 14.635 | 14.642 | 14.649 | 14.655 | 14.662 | 14.669 | 14.676 | 14.682 | 14.689 | 14.696 | 2590 |
| 2600 | 14.696 | 14.703 | 14.709 | 14.716 | 14.723 | 14.729 | 14.736 | 14.743 | 14.750 | 14.756 | 14.763 | 2600 |
| 2610 | 14.763 | 14.770 | 14.777 | 14.783 | 14.790 | 14.797 | 14.803 | 14.810 | 14.817 | 14.824 | 14.830 | 2610 |
| 2620 | 14.830 | 14.837 | 14.844 | 14.851 | 14.857 | 14.864 | 14.871 | 14.877 | 14.884 | 14.891 | 14.898 | 2620 |
| 2630 | 14.898 | 14.904 | 14.911 | 14.918 | 14.925 | 14.931 | 14.938 | 14.945 | 14.951 | 14.958 | 14.965 | 2630 |
| 2640 | 14.965 | 14.972 | 14.978 | 14.985 | 14.992 | 14.998 | 15.005 | 15.012 | 15.019 | 15.025 | 15.032 | 2640 |
| 2650 | 15.032 | 15.039 | 15.045 | 15.052 | 15.059 | 15.066 | 15.072 | 15.079 | 15.086 | 15.092 | 15.099 | 2650 |
| 2660 | 15.099 | 15.106 | 15.113 | 15.119 | 15.126 | 15.133 | 15.139 | 15.146 | 15.153 | 15.160 | 15.166 | 2660 |
| 2670 | 15.166 | 15.173 | 15.180 | 15.186 | 15.193 | 15.200 | 15.207 | 15.213 | 15.220 | 15.227 | 15.233 | 2670 |
| 2680 | 15.233 | 15.240 | 15.247 | 15.254 | 15.260 | 15.267 | 15.274 | 15.280 | 15.287 | 15.294 | 15.300 | 2680 |
| 2690 | 15.300 | 15.307 | 15.314 | 15.321 | 15.327 | 15.334 | 15.341 | 15.347 | 15.354 | 15.361 | 15.367 | 2690 |
| 2700 | 15.367 | 15.374 | 15.381 | 15.388 | 15.394 | 15.401 | 15.408 | 15.414 | 15.421 | 15.428 | 15.434 | 2700 |
| 2710 | 15.434 | 15.441 | 15.448 | 15.455 | 15.461 | 15.468 | 15.475 | 15.481 | 15.488 | 15.495 | 15.501 | 2710 |
| 2720 | 15.501 | 15.508 | 15.515 | 15.521 | 15.528 | 15.535 | 15.542 | 15.548 | 15.555 | 15.562 | 15.568 | 2720 |
| 2730 | 15.568 | 15.575 | 15.582 | 15.588 | 15.595 | 15.602 | 15.608 | 15.615 | 15.622 | 15.628 | 15.635 | 2730 |
| 2740 | 15.635 | 15.642 | 15.649 | 15.655 | 15.662 | 15.669 | 15.675 | 15.682 | 15.689 | 15.695 | 15.702 | 2740 |
| 2750 | 15.702 | 15.709 | 15.715 | 15.722 | 15.729 | 15.735 | 15.742 | 15.749 | 15.755 | 15.762 | 15.769 | 2750 |
| 2760 | 15.769 | 15.775 | 15.782 | 15.789 | 15.795 | 15.802 | 15.809 | 15.815 | 15.822 | 15.829 | 15.835 | 2760 |
| 2770 | 15.835 | 15.842 | 15.849 | 15.855 | 15.862 | 15.869 | 15.875 | 15.882 | 15.889 | 15.895 | 15.902 | 2770 |
| 2780 | 15.902 | 15.909 | 15.915 | 15.922 | 15.929 | 15.935 | 15.942 | 15.949 | 15.955 | 15.962 | 15.969 | 2780 |
| 2790 | 15.969 | 15.975 | 15.982 | 15.989 | 15.995 | 16.002 | 16.009 | 16.015 | 16.022 | 16.029 | 16.035 | 2790 |
| 2800 | 16.035 | 16.042 | 16.049 | 16.055 | 16.062 | 16.069 | 16.075 | 16.082 | 16.089 | 16.095 | 16.102 | 2800 |
| 2810 | 16.102 | 16.108 | 16.115 | 16.122 | 16.128 | 16.135 | 16.142 | 16.148 | 16.155 | 16.162 | 16.168 | 2810 |
| 2820 | 16.168 | 16.175 | 16.182 | 16.188 | 16.195 | 16.202 | 16.208 | 16.215 | 16.221 | 16.228 | 16.235 | 2820 |
| 2830 | 16.235 | 16.241 | 16.248 | 16.255 | 16.261 | 16.268 | 16.275 | 16.281 | 16.288 | 16.294 | 16.301 | 2830 |
| 2840 | 16.301 | 16.308 | 16.314 | 16.321 | 16.328 | 16.334 | 16.341 | 16.347 | 16.354 | 16.361 | 16.367 | 2840 |
| 2850 | 16.367 | 16.374 | 16.381 | 16.387 | 16.394 | 16.400 | 16.407 | 16.414 | 16.420 | 16.427 | 16.434 | 2850 |
| 2860 | 16.434 | 16.440 | 16.447 | 16.453 | 16.460 | 16.467 | 16.473 | 16.480 | 16.486 | 16.493 | 16.500 | 2860 |
| 2870 | 16.500 | 16.506 | 16.513 | 16.520 | 16.526 | 16.533 | 16.539 | 16.546 | 16.553 | 16.559 | 16.566 | 2870 |
| 2880 | 16.566 | 16.572 | 16.579 | 16.586 | 16.592 | 16.599 | 16.605 | 16.612 | 16.619 | 16.625 | 16.632 | 2880 |
| 2890 | 16.632 | 16.638 | 16.645 | 16.652 | 16.658 | 16.665 | 16.671 | 16.678 | 16.685 | 16.691 | 16.698 | 2890 |
| 2900 | 16.698 | 16.704 | 16.711 | 16.718 | 16.724 | 16.731 | 16.737 | 16.744 | 16.751 | 16.757 | 16.764 | 2900 |
| 2910 | 16.764 | 16.770 | 16.777 | 16.783 | 16.790 | 16.797 | 16.803 | 16.810 | 16.816 | 16.823 | 16.829 | 2910 |
| 2920 | 16.829 | 16.836 | 16.843 | 16.849 | 16.856 | 16.862 | 16.869 | 16.876 | 16.882 | 16.889 | 16.895 | 2920 |
| 2930 | 16.895 | 16.902 | 16.908 | 16.915 | 16.922 | 16.928 | 16.935 | 16.941 | 16.948 | 16.954 | 16.961 | 2930 |
| 2940 | 16.961 | 16.967 | 16.974 | 16.981 | 16.987 | 16.994 | 17.000 | 17.007 | 17.013 | 17.020 | 17.026 | 2940 |

°F 0 1 2 3 4 5 6 7 8 9 10 °F

TABLE 16 Type S Thermocouple— thermoelectric voltage as a function of temperature (°F); reference junctions at 32 °F



| °F | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | °F |
|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| Thermoelectric Voltage in Millivolts | | | | | | | | | | | | |
| 2950 | 17.026 | 17.033 | 17.040 | 17.046 | 17.053 | 17.059 | 17.066 | 17.072 | 17.079 | 17.085 | 17.092 | 2950 |
| 2960 | 17.092 | 17.099 | 17.105 | 17.112 | 17.118 | 17.125 | 17.131 | 17.138 | 17.144 | 17.151 | 17.157 | 2960 |
| 2970 | 17.157 | 17.164 | 17.171 | 17.177 | 17.184 | 17.190 | 17.197 | 17.203 | 17.210 | 17.216 | 17.223 | 2970 |
| 2980 | 17.223 | 17.229 | 17.236 | 17.242 | 17.249 | 17.255 | 17.262 | 17.268 | 17.275 | 17.282 | 17.288 | 2980 |
| 2990 | 17.288 | 17.295 | 17.301 | 17.308 | 17.314 | 17.321 | 17.327 | 17.334 | 17.340 | 17.347 | 17.353 | 2990 |
| 3000 | 17.353 | 17.360 | 17.366 | 17.373 | 17.379 | 17.386 | 17.392 | 17.399 | 17.405 | 17.412 | 17.418 | 3000 |
| 3010 | 17.418 | 17.425 | 17.431 | 17.438 | 17.444 | 17.451 | 17.457 | 17.464 | 17.470 | 17.477 | 17.483 | 3010 |
| 3020 | 17.483 | 17.490 | 17.496 | 17.503 | 17.509 | 17.516 | 17.522 | 17.529 | 17.535 | 17.542 | 17.548 | 3020 |
| 3030 | 17.548 | 17.555 | 17.561 | 17.568 | 17.574 | 17.581 | 17.587 | 17.594 | 17.600 | 17.607 | 17.613 | 3030 |
| 3040 | 17.613 | 17.620 | 17.626 | 17.633 | 17.639 | 17.645 | 17.652 | 17.658 | 17.665 | 17.671 | 17.678 | 3040 |
| 3050 | 17.678 | 17.684 | 17.691 | 17.697 | 17.704 | 17.710 | 17.717 | 17.723 | 17.729 | 17.736 | 17.742 | 3050 |
| 3060 | 17.742 | 17.749 | 17.755 | 17.762 | 17.768 | 17.775 | 17.781 | 17.787 | 17.794 | 17.800 | 17.807 | 3060 |
| 3070 | 17.807 | 17.813 | 17.819 | 17.826 | 17.832 | 17.839 | 17.845 | 17.852 | 17.858 | 17.864 | 17.871 | 3070 |
| 3080 | 17.871 | 17.877 | 17.884 | 17.890 | 17.896 | 17.903 | 17.909 | 17.915 | 17.922 | 17.928 | 17.935 | 3080 |
| 3090 | 17.935 | 17.941 | 17.947 | 17.954 | 17.960 | 17.966 | 17.973 | 17.979 | 17.985 | 17.992 | 17.998 | 3090 |
| 3100 | 17.998 | 18.004 | 18.011 | 18.017 | 18.023 | 18.030 | 18.036 | 18.042 | 18.049 | 18.055 | 18.061 | 3100 |
| 3110 | 18.061 | 18.068 | 18.074 | 18.080 | 18.086 | 18.093 | 18.099 | 18.105 | 18.112 | 18.118 | 18.124 | 3110 |
| 3120 | 18.124 | 18.130 | 18.137 | 18.143 | 18.149 | 18.155 | 18.162 | 18.168 | 18.174 | 18.180 | 18.187 | 3120 |
| 3130 | 18.187 | 18.193 | 18.199 | 18.205 | 18.211 | 18.218 | 18.224 | 18.230 | 18.236 | 18.242 | 18.249 | 3130 |
| 3140 | 18.249 | 18.255 | 18.261 | 18.267 | 18.273 | 18.279 | 18.285 | 18.292 | 18.298 | 18.304 | 18.310 | 3140 |
| 3150 | 18.310 | 18.316 | 18.322 | 18.328 | 18.334 | 18.341 | 18.347 | 18.353 | 18.359 | 18.365 | 18.371 | 3150 |
| 3160 | 18.371 | 18.377 | 18.383 | 18.389 | 18.395 | 18.401 | 18.407 | 18.413 | 18.419 | 18.425 | 18.431 | 3160 |
| 3170 | 18.431 | 18.437 | 18.443 | 18.449 | 18.455 | 18.461 | 18.467 | 18.473 | 18.479 | 18.485 | 18.491 | 3170 |
| 3180 | 18.491 | 18.497 | 18.503 | 18.509 | 18.515 | 18.521 | 18.527 | 18.533 | 18.539 | 18.545 | 18.551 | 3180 |
| 3190 | 18.551 | 18.557 | 18.562 | 18.568 | 18.574 | 18.580 | 18.586 | 18.592 | 18.598 | 18.603 | 18.609 | 3190 |
| 3200 | 18.609 | 18.615 | 18.621 | 18.627 | 18.633 | 18.638 | 18.644 | 18.650 | 18.656 | 18.661 | 18.667 | 3200 |
| 3210 | 18.667 | 18.673 | 18.679 | 18.684 | 18.690 | | | | | | | 3210 |

°F 0 1 2 3 4 5 6 7 8 9 10 °F