

Special Alloy Wire for High Temp Heating or Thermocouple Applications - PTRH10

$$in^2/\Omega = \frac{I^2 C_t}{p}$$

I = Current
 C_t = Temperature factor
 p = Surface load W/in²

Common Names: Platinum Rhodium; Platinum-10% Rhodium

Uses: Bare Thermocouple wire. Oxidizing or Inert. Do not insert in metal tubes. Beware of contamination. High Temperature.

Composition

| Ni | Cr | Fe | Al | Si | Mn | Cu | C | Ti | Pt | Rh |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|-----|---------|
| None/Trace | 10% | Balance |

Technical Data

| | | | |
|-------------------------------------|----------------------|---|----------------------|
| Resistivity (Ω/cm) | 114 | Resistivity (Ω/sqmf) | 89 |
| Resistivity (μΩ/cm) | 18.953 | Nom. Temp. Coeff. of Resistance (TCR) | |
| Std. Res. Tol. <.020" | | Std. Res. Tol. >.020" | |
| Thermal EMF vs. Cu | -2.843 | Specific Heat (20°C) | |
| Density (g/cm³) | 20.55 | Density (lb/in³) | 0.742 |
| Thermal Conductivity | | Coeff. of Linear Expansion (X 10⁻⁶) | |
| Approx. Melting Point | 2315°C | Max. Continuous Operating Temp. | 1450°C |
| UTS – Hard (KPSI) | | YTS Tensile – Hard (KPSI) | |
| UTS – Stress Relieved (KPSI) | | YTS Tensile – Stress Relieved (KPSI) | |
| UTS – Annealed (KPSI) | | YTS Tensile – Annealed (KPSI) | |
| Magnetic Attraction | None | Emissivity – fully oxidized | |
| Designations/Specifications | ANSI/MC96.1 TypeS | Forms Available | Wire, Ribbon, Insul. |

Alloy Data

| Diameter mm | Resistance at 20° C Ω/m | Resistance at 20° C Ω/kg | Weight kg/1000 m | Surface area cm ² /m | cm ² /Ω at 20°C |
|----------------|----------------------------|-----------------------------|---------------------|------------------------------------|-------------------------------|
| 10.4049 | 0.0022 | 0.0013 | 1747.2640 | 326.8804 | 146659.2635 |
| 9.2658 | 0.0028 | 0.0020 | 1385.6414 | 291.0952 | 103573.3362 |
| 8.2515 | 0.0035 | 0.0032 | 1098.8620 | 259.2276 | 73145.3010 |
| 7.3481 | 0.0045 | 0.0051 | 871.4359 | 230.8486 | 51656.4905 |
| 6.5437 | 0.0056 | 0.0082 | 691.0791 | 205.5765 | 36480.7168 |
| 5.8273 | 0.0071 | 0.0130 | 548.0499 | 183.0710 | 25763.3200 |
| 5.1894 | 0.0090 | 0.0206 | 434.6227 | 163.0293 | 18194.5071 |
| 4.6213 | 0.0113 | 0.0328 | 344.6710 | 145.1817 | 12849.2790 |
| 4.1154 | 0.0142 | 0.0521 | 273.3361 | 129.2880 | 9074.3855 |
| 3.6648 | 0.0180 | 0.0829 | 216.7651 | 115.1342 | 6408.4897 |
| 3.2636 | 0.0227 | 0.1318 | 171.9023 | 102.5299 | 4525.7875 |
| 2.9063 | 0.0286 | 0.2096 | 136.3245 | 91.3054 | 3196.1902 |
| 2.5882 | 0.0360 | 0.3332 | 108.1101 | 81.3098 | 2257.2054 |
| 2.3048 | 0.0454 | 0.5298 | 85.7351 | 72.4084 | 1594.0779 |
| 2.0525 | 0.0573 | 0.8424 | 67.9909 | 64.4815 | 1125.7657 |
| 1.8278 | 0.0722 | 1.3395 | 53.9192 | 57.4224 | 795.0354 |
| 1.7249 | 0.0811 | 1.6891 | 48.0164 | 54.1881 | 668.1219 |
| 1.6277 | 0.0911 | 2.1299 | 42.7598 | 51.1361 | 561.4679 |
| 1.5360 | 0.1023 | 2.6858 | 38.0787 | 48.2559 | 471.8394 |
| 1.4495 | 0.1148 | 3.3867 | 33.9100 | 45.5380 | 396.5185 |
| 1.3679 | 0.1290 | 4.2706 | 30.1977 | 42.9731 | 333.2212 |
| 1.2908 | 0.1448 | 5.3851 | 26.8918 | 40.5527 | 280.0283 |
| 1.2181 | 0.1626 | 6.7906 | 23.9478 | 38.2686 | 235.3267 |
| 1.1495 | 0.1826 | 8.5627 | 21.3261 | 36.1132 | 197.7609 |
| 1.0848 | 0.2051 | 10.7974 | 18.9915 | 34.0792 | 166.1918 |
| 1.0237 | 0.2303 | 13.6153 | 16.9124 | 32.1597 | 139.6622 |
| 0.9660 | 0.2586 | 17.1686 | 15.0609 | 30.3483 | 117.3676 |
| 0.9116 | 0.2904 | 21.6493 | 13.4121 | 28.6390 | 98.6319 |
| 0.8603 | 0.3261 | 27.2993 | 11.9438 | 27.0260 | 82.8870 |

| Diameter mm | Resistance at 20° C Ω/m | Resistance at 20° C Ω/kg | Weight kg/1000 m | Surface area cm ² /m | cm ² /Ω at 20°C |
|----------------|----------------------------|-----------------------------|---------------------|------------------------------------|-------------------------------|
| 0.8118 | 0.3661 | 34.4238 | 10.6363 | 25.5038 | 69.6556 |
| 0.7661 | 0.4112 | 43.4077 | 9.4719 | 24.0673 | 58.5363 |
| 0.7229 | 0.4617 | 54.7362 | 8.4349 | 22.7117 | 49.1920 |
| 0.6822 | 0.5185 | 69.0212 | 7.5115 | 21.4325 | 41.3393 |
| 0.6438 | 0.5822 | 87.0342 | 6.6892 | 20.2254 | 34.7402 |
| 0.6075 | 0.6538 | 109.7483 | 5.9569 | 19.0862 | 29.1946 |
| 0.5733 | 0.7341 | 138.3902 | 5.3048 | 18.0112 | 24.5342 |
| 0.5410 | 0.8244 | 174.5071 | 4.7240 | 16.9967 | 20.6177 |
| 0.5106 | 0.9257 | 220.0496 | 4.2069 | 16.0394 | 17.3265 |
| 0.4818 | 1.0395 | 277.4779 | 3.7463 | 15.1360 | 14.5606 |
| 0.4547 | 1.1673 | 349.8936 | 3.3362 | 14.2835 | 12.2362 |
| 0.4291 | 1.3108 | 441.2084 | 2.9710 | 13.4790 | 10.2829 |
| 0.4049 | 1.4720 | 556.3543 | 2.6457 | 12.7198 | 8.6414 |
| 0.3821 | 1.6529 | 701.5508 | 2.3561 | 12.0034 | 7.2620 |
| 0.3606 | 1.8561 | 884.6405 | 2.0981 | 11.3273 | 6.1027 |
| 0.3403 | 2.0843 | 1115.5127 | 1.8685 | 10.6893 | 5.1285 |
| 0.3211 | 2.3405 | 1406.6375 | 1.6639 | 10.0873 | 4.3099 |
| 0.2859 | 2.9513 | 2236.6476 | 1.3195 | 8.9830 | 3.0437 |
| 0.2546 | 3.7216 | 3556.4192 | 1.0464 | 7.9996 | 2.1495 |
| 0.2268 | 4.6928 | 5654.9442 | 0.8299 | 7.1238 | 1.5180 |
| 0.2019 | 5.9175 | 8991.7393 | 0.6581 | 6.3439 | 1.0721 |
| 0.1798 | 7.4619 | 14297.4664 | 0.5219 | 5.6494 | 0.7571 |
| 0.1601 | 9.4093 | 22733.9272 | 0.4139 | 5.0310 | 0.5347 |
| 0.1426 | 11.8649 | 36148.4636 | 0.3282 | 4.4802 | 0.3776 |
| 0.1270 | 14.9614 | 57478.4731 | 0.2603 | 3.9897 | 0.2667 |
| 0.1131 | 18.8660 | 91394.6137 | 0.2064 | 3.5529 | 0.1883 |
| 0.1007 | 23.7896 | 145323.5441 | 0.1637 | 3.1640 | 0.1330 |
| 0.0897 | 29.9982 | 231074.1477 | 0.1298 | 2.8176 | 0.0939 |
| 0.0799 | 37.8270 | 367423.3384 | 0.1030 | 2.5092 | 0.0663 |
| 0.0711 | 47.6991 | 584227.6645 | 0.0816 | 2.2345 | 0.0468 |
| 0.0633 | 60.1475 | 928961.0330 | 0.0647 | 1.9898 | 0.0331 |
| 0.0564 | 75.8447 | 1477110.1288 | 0.0513 | 1.7720 | 0.0234 |
| 0.0502 | 95.6386 | 2348703.8263 | 0.0407 | 1.5780 | 0.0165 |
| 0.0447 | 120.5982 | 3734596.0575 | 0.0323 | 1.4053 | 0.0117 |
| 0.0398 | 152.0717 | 5938257.3301 | 0.0256 | 1.2514 | 0.0082 |
| 0.0355 | 191.7592 | 9442226.0334 | 0.0203 | 1.1144 | 0.0058 |
| 0.0316 | 241.8042 | 15013770.4565 | 0.0161 | 0.9924 | 0.0041 |
| 0.0281 | 304.9099 | 23872898.4588 | 0.0128 | 0.8838 | 0.0029 |
| 0.0251 | 384.4848 | 37959504.0750 | 0.0101 | 0.7870 | 0.0020 |

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