

| | |
|---|--|
| Resistance Heating Wire Nickel-Chromium Alloy 80% Nickel / 20% Chromium - N8 | $in^2/\Omega = \frac{I^2 C_t}{p}$ <p style="margin: 0;">I = Current C_t = Temperature factor p = Surface load W/in²</p> |
| Common Names: Chromel A, Nikrothal 80, N8, Nichrome V, HAI-NiCr 80, Tophet A, Resistohm 80, Cronix 80, Protoloy, Nikrothal 8, Alloy A, MWS-650, Stablohm 650 | |

Uses: Typical applications include flat irons, ironing machines, water heaters, plastic molding dies, soldering irons, metal sheathed tubular elements, cartridge elements, quartz tube heaters, etc. N8 has a low temperature coefficient of resistance and a low change in resistance during its service life that combine to assure faster heat-up times, more uniform operating temperatures, and a longer useful life. Its lack of reactivity with MgO refractories make it the most suitable alloy for enclosed heating elements, especially those operating in the higher temperature ranges. The oldest and most common electric heating alloy, N8 is long established as the world standard of quality among all metallic heating element materials. Its excellent mechanical stability minimizes variables in element design, assures even stretch in coiled form, and eliminates problems of shrinkage, growth, sag, or distortion in use.

Composition

| Ni | Cr | Fe | Al | Si | Mn | Cu | C | Ti | Mo | W |
|-----|-----|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 80% | 20% | None/Trace | None/Trace | None/Trace | None/Trace | None/Trace | None/Trace | None/Trace | None/Trace | None/Trace |

Technical Data

| | | | |
|-------------------------------------|-----------------|---|----------------------|
| Resistivity (Ω/cm) | 650 | Resistivity (Ω/sqmf) | 511 |
| Resistivity (μΩ/cm) | 108 | Nom. Temp. Coeff. of Resistance (TCR) | 0.000085 |
| Std. Res. Tol. <.020" | 3% | Std. Res. Tol. >.020" | 5% |
| Thermal EMF vs. Cu | +0.006 | Specific Heat (20°C) | 0.10987 cal/g |
| Density (g/cm³) | 8.42 | Density (lb/in³) | 0.304 |
| Thermal Conductivity | 0.113 W/cm/°C | Coeff. of Linear Expansion (X 10⁻⁶) | 14.50 in/in/°C |
| Approx. Melting Point | 1400°C | Max. Continuous Operating Temp. | 1200°C |
| UTS – Hard (KPSI) | 200 | YTS Tensile – Hard (KPSI) | |
| UTS – Stress Relieved (KPSI) | 175 | YTS Tensile – Stress Relieved (KPSI) | |
| UTS – Annealed (KPSI) | 100 | YTS Tensile – Annealed (KPSI) | |
| Magnetic Attraction | None | Emissivity – fully oxidized | 0.88 |
| Designations/Specifications | ASTM = B344-B26 | Forms Available | Wire, Ribbon, Insul. |

Temperature Factor – To obtain resistance at working temperature multiply by the factor C_t, in the following table:

| °C | 20 | 100 | 200 | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
|-------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| N8 C_t | 1.00 | 1.01 | 1.02 | 1.03 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.05 | 1.06 | 1.07 |

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 | 0.0127 | 0.0178 | 715.4940 | 326.8804 | 25721.7785 |
| 9.2658 | 0.0160 | 0.0282 | 567.4118 | 291.0952 | 18165.1697 |
| 8.2515 | 0.0202 | 0.0449 | 449.9773 | 259.2276 | 12828.5605 |
| 7.3481 | 0.0255 | 0.0714 | 356.8477 | 230.8486 | 9059.7537 |
| 6.5437 | 0.0321 | 0.1135 | 282.9927 | 205.5765 | 6398.1565 |
| 5.8273 | 0.0405 | 0.1805 | 224.4231 | 183.0710 | 4518.4900 |
| 5.1894 | 0.0511 | 0.2871 | 177.9754 | 163.0293 | 3191.0366 |
| 4.6213 | 0.0644 | 0.4564 | 141.1407 | 145.1817 | 2253.5659 |
| 4.1154 | 0.0812 | 0.7258 | 111.9295 | 129.2880 | 1591.5076 |
| 3.6648 | 0.1024 | 1.1540 | 88.7640 | 115.1342 | 1123.9505 |
| 3.2636 | 0.1292 | 1.8350 | 70.3929 | 102.5299 | 793.7535 |
| 2.9063 | 0.1629 | 2.9178 | 55.8241 | 91.3054 | 560.5626 |
| 2.5882 | 0.2054 | 4.6394 | 44.2704 | 81.3098 | 395.8791 |
| 2.3048 | 0.2590 | 7.3770 | 35.1080 | 72.4084 | 279.5767 |
| 2.0525 | 0.3266 | 11.7300 | 27.8419 | 64.4815 | 197.4420 |
| 1.8278 | 0.4118 | 18.6514 | 22.0796 | 57.4224 | 139.4370 |
| 1.7249 | 0.4624 | 23.5191 | 19.6624 | 54.1881 | 117.1783 |

| 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 |
|-------------|-------------------------|--------------------------|------------------|---------------------------------|----------------------------|
| 1.6277 | 0.5193 | 29.6570 | 17.5099 | 51.1361 | 98.4728 |
| 1.5360 | 0.5831 | 37.3969 | 15.5930 | 48.2559 | 82.7534 |
| 1.4495 | 0.6548 | 47.1567 | 13.8859 | 45.5380 | 69.5432 |
| 1.3679 | 0.7353 | 59.4636 | 12.3658 | 42.9731 | 58.4419 |
| 1.2908 | 0.8257 | 74.9823 | 11.0120 | 40.5527 | 49.1127 |
| 1.2181 | 0.9272 | 94.5510 | 9.8065 | 38.2686 | 41.2727 |
| 1.1495 | 1.0412 | 119.2268 | 8.7329 | 36.1132 | 34.6842 |
| 1.0848 | 1.1692 | 150.3425 | 7.7769 | 34.0792 | 29.1475 |
| 1.0237 | 1.3129 | 189.5786 | 6.9255 | 32.1597 | 24.4946 |
| 0.9660 | 1.4743 | 239.0546 | 6.1673 | 30.3483 | 20.5845 |
| 0.9116 | 1.6556 | 301.4427 | 5.4922 | 28.6390 | 17.2985 |
| 0.8603 | 1.8591 | 380.1128 | 4.8909 | 27.0260 | 14.5371 |
| 0.8118 | 2.0876 | 479.3141 | 4.3555 | 25.5038 | 12.2165 |
| 0.7661 | 2.3443 | 604.4048 | 3.8787 | 24.0673 | 10.2664 |
| 0.7229 | 2.6325 | 762.1414 | 3.4541 | 22.7117 | 8.6275 |
| 0.6822 | 2.9561 | 961.0439 | 3.0759 | 21.4325 | 7.2503 |
| 0.6438 | 3.3195 | 1211.8558 | 2.7392 | 20.2254 | 6.0929 |
| 0.6075 | 3.7276 | 1528.1241 | 2.4393 | 19.0862 | 5.1203 |
| 0.5733 | 4.1858 | 1926.9317 | 2.1723 | 18.0112 | 4.3029 |
| 0.5410 | 4.7004 | 2429.8195 | 1.9345 | 16.9967 | 3.6160 |
| 0.5106 | 5.2782 | 3063.9502 | 1.7227 | 16.0394 | 3.0388 |
| 0.4818 | 5.9271 | 3863.5753 | 1.5341 | 15.1360 | 2.5537 |
| 0.4547 | 6.6557 | 4871.8855 | 1.3662 | 14.2835 | 2.1460 |
| 0.4291 | 7.4739 | 6143.3430 | 1.2166 | 13.4790 | 1.8035 |
| 0.4049 | 8.3927 | 7746.6236 | 1.0834 | 12.7198 | 1.5156 |
| 0.3821 | 9.4245 | 9768.3260 | 0.9648 | 12.0034 | 1.2736 |
| 0.3606 | 10.5831 | 12317.6493 | 0.8592 | 11.3273 | 1.0703 |
| 0.3403 | 11.8841 | 15532.2912 | 0.7651 | 10.6893 | 0.8995 |
| 0.3211 | 13.3450 | 19585.8856 | 0.6814 | 10.0873 | 0.7559 |
| 0.2859 | 16.8278 | 31142.8670 | 0.5403 | 8.9830 | 0.5338 |
| 0.2546 | 21.2194 | 49519.2400 | 0.4285 | 7.9996 | 0.3770 |
| 0.2268 | 26.7573 | 78738.9012 | 0.3398 | 7.1238 | 0.2662 |
| 0.2019 | 33.7403 | 125200.1154 | 0.2695 | 6.3439 | 0.1880 |
| 0.1798 | 42.5458 | 199076.5511 | 0.2137 | 5.6494 | 0.1328 |
| 0.1601 | 53.6494 | 316545.0213 | 0.1695 | 5.0310 | 0.0938 |
| 0.1426 | 67.6507 | 503327.7399 | 0.1344 | 4.4802 | 0.0662 |
| 0.1270 | 85.3061 | 800324.7459 | 0.1066 | 3.9897 | 0.0468 |
| 0.1131 | 107.5692 | 1272569.8351 | 0.0845 | 3.5529 | 0.0330 |
| 0.1007 | 135.6424 | 2023471.0889 | 0.0670 | 3.1640 | 0.0233 |
| 0.0897 | 171.0421 | 3217454.2685 | 0.0532 | 2.8176 | 0.0165 |
| 0.0799 | 215.6805 | 5115967.3228 | 0.0422 | 2.5092 | 0.0116 |
| 0.0711 | 271.9684 | 8134729.9647 | 0.0334 | 2.2345 | 0.0082 |
| 0.0633 | 342.9464 | 12934764.3218 | 0.0265 | 1.9898 | 0.0058 |
| 0.0564 | 432.4480 | 20567139.7560 | 0.0210 | 1.7720 | 0.0041 |
| 0.0502 | 545.3076 | 32703126.8000 | 0.0167 | 1.5780 | 0.0029 |
| 0.0447 | 687.6212 | 52000157.2986 | 0.0132 | 1.4053 | 0.0020 |
| 0.0398 | 867.0756 | 82683725.4925 | 0.0105 | 1.2514 | 0.0014 |
| 0.0355 | 1093.3637 | 131472649.6319 | 0.0083 | 1.1144 | 0.0010 |
| 0.0316 | 1378.7081 | 209050299.7813 | 0.0066 | 0.9924 | 0.0007 |
| 0.0281 | 1738.5213 | 332403948.3574 | 0.0052 | 0.8838 | 0.0005 |
| 0.0251 | 2192.2381 | 528544493.8330 | 0.0041 | 0.7870 | 0.0004 |

Information presentation property of Hyndman Industrial Products, Inc., 3205 Cannongate Drive, Fort Wayne, IN 46808-4518, 888.496.3626, www.resistancewire.com

(Disclaimer) This information is provided for information purposes only "As is." Hyndman Industrial Products, Inc. makes no warranty of any kind with respect to the subject matter or accuracy of the information. Hyndman Industrial Products, Inc. specifically disclaims all warranties, expressed, implied or otherwise, including without limitation, all warranties of merchantability and fitness for a particular purpose. This publication may include technical inaccuracies or typographical errors; changes may be made to the information herein. If errors are found, please submit the correction via e-mail to: webmaster@resistancewire.com. Include correction, and page address if possible. All trademarks referenced are the property of their respective owners. Ownership can be researched at www.marksonline.com or by contacting Hyndman Industrial Products, Inc.