

## Special Alloy Wire for High Temp Heating or Strength Applications Pure Alloy - MO

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

I = Current  
 C<sub>t</sub> = Temperature factor  
 p = Surface load W/in<sup>2</sup>

**Common Names:** Molybdenum, Moly

**Uses:** Typical uses include High temperature electric furnaces, operating in dry gases including hydrogen, dissociated ammonia, nitrogen, argon, helium, mixtures, or in rich exothermic gas of 78°C dew point or less, or a vacuum, can effectively utilize molybdenum heating elements. Such elements can be formed, by experienced fabricators, and can be expected, under proper conditions, to maintain temperatures up to approximately 1900°C. Molybdenum elements can be welded and spliced, but must be handled with care because such joints may be quite brittle, especially at room temperature. Heat is frequently used to increase ductility during forming especially for thicker sections. Wherever possible, therefore, molybdenum elements should be made of one continuous piece of wire, rod, or ribbon.

### Composition

| Ni         | Cr         | Fe         | Al         | Si         | Mn         | Cu         | C          | Ti         | Mo    | W          |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|------------|
| None/Trace | None/Trace | None/Trace | None/Trace | None/Trace | None/Trace | None/Trace | None/Trace | None/Trace | 99.9% | None/Trace |

### Technical Data

|                                  |               |  |                      |
|----------------------------------|---------------|--|----------------------|
| Resistivity (Ω/cm <sup>2</sup> ) | 31            | Resistivity (Ω/sqmf)                             | 24                   |
| Resistivity (μΩ/cm)              | 5.15          | Nom. Temp. Coeff. of Resistance (TCR)            | 0.00330              |
| Std. Res. Tol. <.020"            | 3%            | Std. Res. Tol. >.020"                            | 5%                   |
| Thermal EMF vs. Cu               | +0.007        | Specific Heat (20°C)                             | 0.0647 cal/g         |
| Density (g/cm <sup>3</sup> )     | 10.20         | Density (lb/in <sup>3</sup> )                    | 0.369                |
| Thermal Conductivity             | 1.397 W/cm/°C | Coeff. of Linear Expansion (X 10 <sup>-6</sup> ) | 5.40 in/in/°C        |
| Approx. Melting Point            | 2610°C        | Max. Continuous Operating Temp.                  | 1900°C               |
| UTS – Hard (KPSI)                | 320           | YTS Tensile – Hard (KPSI)                        | 320                  |
| UTS – Stress Relieved (KPSI)     |               | YTS Tensile – Stress Relieved (KPSI)             |                      |
| UTS – Annealed (KPSI)            | 100           | YTS Tensile – Annealed (KPSI)                    | 100                  |
| Magnetic Attraction              | None          | Emissivity – fully oxidized                      |                      |
| Designations/Specifications      |               | Forms Available                                  | Wire, Ribbon, Square |

### Alloy Data

| Diameter mm | Resistance at 20° C Ω/m | Resistance at 20° C Ω/kg | Weight kg/1000 m | Surface area cm <sup>2</sup> /m | cm <sup>2</sup> /Ω at 20°C |
|-------------|-------------------------|--------------------------|------------------|---------------------------------|----------------------------|
| 10.4049     | 0.0006                  | 0.0007                   | 868.4780         | 326.8804                        | 539327.6143                |
| 9.2658      | 0.0008                  | 0.0011                   | 688.7334         | 291.0952                        | 380882.5911                |
| 8.2515      | 0.0010                  | 0.0018                   | 546.1896         | 259.2276                        | 268985.9455                |
| 7.3481      | 0.0012                  | 0.0028                   | 433.1474         | 230.8486                        | 189962.5778                |
| 6.5437      | 0.0015                  | 0.0045                   | 343.5010         | 205.5765                        | 134154.8939                |
| 5.8273      | 0.0019                  | 0.0071                   | 272.4083         | 183.0710                        | 94742.5317                 |
| 5.1894      | 0.0024                  | 0.0113                   | 216.0293         | 163.0293                        | 66908.8324                 |
| 4.6213      | 0.0031                  | 0.0179                   | 171.3188         | 145.1817                        | 47252.1873                 |
| 4.1154      | 0.0039                  | 0.0285                   | 135.8618         | 129.2880                        | 33370.3209                 |
| 3.6648      | 0.0049                  | 0.0453                   | 107.7431         | 115.1342                        | 23566.7041                 |
| 3.2636      | 0.0062                  | 0.0721                   | 85.4441          | 102.5299                        | 16643.2185                 |
| 2.9063      | 0.0078                  | 0.1146                   | 67.7601          | 91.3054                         | 11753.7319                 |
| 2.5882      | 0.0098                  | 0.1823                   | 53.7361          | 81.3098                         | 8300.6910                  |
| 2.3048      | 0.0124                  | 0.2899                   | 42.6146          | 72.4084                         | 5862.0931                  |
| 2.0525      | 0.0156                  | 0.4609                   | 33.7949          | 64.4815                         | 4139.9126                  |
| 1.8278      | 0.0196                  | 0.7328                   | 26.8005          | 57.4224                         | 2923.6787                  |
| 1.7249      | 0.0221                  | 0.9241                   | 23.8665          | 54.1881                         | 2456.9645                  |
| 1.6277      | 0.0248                  | 1.1653                   | 21.2538          | 51.1361                         | 2064.7530                  |
| 1.5360      | 0.0278                  | 1.4694                   | 18.9270          | 48.2559                         | 1735.1513                  |
| 1.4495      | 0.0312                  | 1.8528                   | 16.8550          | 45.5380                         | 1458.1647                  |
| 1.3679      | 0.0351                  | 2.3364                   | 15.0098          | 42.9731                         | 1225.3942                  |

| Diameter mm | Resistance at 20° C Ω/m | Resistance at 20° C Ω/kg | Weight kg/1000 m | Surface area cm <sup>2</sup> /m | cm <sup>2</sup> /Ω at 20°C |
|-------------|-------------------------|--------------------------|------------------|---------------------------------|----------------------------|
| 1.2908      | 0.0394                  | 2.9461                   | 13.3666          | 40.5527                         | 1029.7814                  |
| 1.2181      | 0.0442                  | 3.7150                   | 11.9033          | 38.2686                         | 865.3948                   |
| 1.1495      | 0.0497                  | 4.6846                   | 10.6002          | 36.1132                         | 727.2496                   |
| 1.0848      | 0.0558                  | 5.9071                   | 9.4397           | 34.0792                         | 611.1569                   |
| 1.0237      | 0.0626                  | 7.4488                   | 8.4063           | 32.1597                         | 513.5964                   |
| 0.9660      | 0.0703                  | 9.3927                   | 7.4860           | 30.3483                         | 431.6097                   |
| 0.9116      | 0.0790                  | 11.8441                  | 6.6665           | 28.6390                         | 362.7108                   |
| 0.8603      | 0.0887                  | 14.9351                  | 5.9367           | 27.0260                         | 304.8103                   |
| 0.8118      | 0.0996                  | 18.8328                  | 5.2868           | 25.5038                         | 256.1527                   |
| 0.7661      | 0.1118                  | 23.7478                  | 4.7080           | 24.0673                         | 215.2624                   |
| 0.7229      | 0.1255                  | 29.9455                  | 4.1926           | 22.7117                         | 180.8995                   |
| 0.6822      | 0.1410                  | 37.7606                  | 3.7336           | 21.4325                         | 152.0221                   |
| 0.6438      | 0.1583                  | 47.6153                  | 3.3249           | 20.2254                         | 127.7544                   |
| 0.6075      | 0.1778                  | 60.0419                  | 2.9609           | 19.0862                         | 107.3606                   |
| 0.5733      | 0.1996                  | 75.7115                  | 2.6367           | 18.0112                         | 90.2224                    |
| 0.5410      | 0.2242                  | 95.4706                  | 2.3481           | 16.9967                         | 75.8200                    |
| 0.5106      | 0.2517                  | 120.3864                 | 2.0910           | 16.0394                         | 63.7166                    |
| 0.4818      | 0.2827                  | 151.8046                 | 1.8621           | 15.1360                         | 53.5454                    |
| 0.4547      | 0.3174                  | 191.4223                 | 1.6583           | 14.2835                         | 44.9978                    |
| 0.4291      | 0.3564                  | 241.3795                 | 1.4767           | 13.4790                         | 37.8147                    |
| 0.4049      | 0.4003                  | 304.3743                 | 1.3151           | 12.7198                         | 31.7782                    |
| 0.3821      | 0.4495                  | 383.8095                 | 1.1711           | 12.0034                         | 26.7054                    |
| 0.3606      | 0.5047                  | 483.9755                 | 1.0429           | 11.3273                         | 22.4423                    |
| 0.3403      | 0.5668                  | 610.2827                 | 0.9287           | 10.6893                         | 18.8598                    |
| 0.3211      | 0.6365                  | 769.5534                 | 0.8270           | 10.0873                         | 15.8492                    |
| 0.2859      | 0.8026                  | 1223.6414                | 0.6559           | 8.9830                          | 11.1930                    |
| 0.2546      | 1.0120                  | 1945.6715                | 0.5201           | 7.9996                          | 7.9047                     |
| 0.2268      | 1.2761                  | 3093.7478                | 0.4125           | 7.1238                          | 5.5824                     |
| 0.2019      | 1.6092                  | 4919.2657                | 0.3271           | 6.3439                          | 3.9424                     |
| 0.1798      | 2.0291                  | 7821.9613                | 0.2594           | 5.6494                          | 2.7842                     |
| 0.1601      | 2.5587                  | 12437.4412               | 0.2057           | 5.0310                          | 1.9662                     |
| 0.1426      | 3.2264                  | 19776.3628               | 0.1631           | 4.4802                          | 1.3886                     |
| 0.1270      | 4.0684                  | 31445.7386               | 0.1294           | 3.9897                          | 0.9807                     |
| 0.1131      | 5.1302                  | 50000.8260               | 0.1026           | 3.5529                          | 0.6926                     |
| 0.1007      | 6.4691                  | 79504.6552               | 0.0814           | 3.1640                          | 0.4891                     |
| 0.0897      | 8.1574                  | 126417.7153              | 0.0645           | 2.8176                          | 0.3454                     |
| 0.0799      | 10.2863                 | 201012.6164              | 0.0512           | 2.5092                          | 0.2439                     |
| 0.0711      | 12.9708                 | 319623.4946              | 0.0406           | 2.2345                          | 0.1723                     |
| 0.0633      | 16.3559                 | 508222.7182              | 0.0322           | 1.9898                          | 0.1217                     |
| 0.0564      | 20.6244                 | 808108.0886              | 0.0255           | 1.7720                          | 0.0859                     |
| 0.0502      | 26.0070                 | 1284945.8702             | 0.0202           | 1.5780                          | 0.0607                     |
| 0.0447      | 32.7942                 | 2043149.8119             | 0.0161           | 1.4053                          | 0.0429                     |
| 0.0398      | 41.3528                 | 3248744.7531             | 0.0127           | 1.2514                          | 0.0303                     |
| 0.0355      | 52.1450                 | 5165721.2847             | 0.0101           | 1.1144                          | 0.0214                     |
| 0.0316      | 65.7538                 | 8213842.0894             | 0.0080           | 0.9924                          | 0.0151                     |
| 0.0281      | 82.9141                 | 13060557.8875            | 0.0063           | 0.8838                          | 0.0107                     |
| 0.0251      | 104.5529                | 20767159.9328            | 0.0050           | 0.7870                          | 0.0075                     |

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