

Resistance Wire for Low Temp Heating or Resistors

Pure Nickel Alloy - NI200®

$$I = \text{Current}$$

$$I^2/\Omega = \frac{I^2 C_t}{p} \quad C_t = \text{Temperature factor}$$

$$p = \text{Surface load W/in}^2$$

Common Names: Nickel 200, Alloy 200, Alloy K205

Uses: Used for everything from resistors, heating applications, mechanical components, food-handling equipment, magnetically actuated parts, sonar devices, electrical and electronic leads, and springs. Commercially pure wrought Nickel with good mechanical properties over a wide range of temperature and excellent resistance to many corrosives, in particular hydroxides. Good resistance to corrosion in acids and alkalis and is most useful under reducing conditions. Outstanding resistance to caustic alkalis up to and including the molten state. In acid, alkaline and neutral salt solutions the material shows good resistance, but in oxidizing salt solutions severe attack will occur. Resistant to all dry gases at room temperature and in dry chlorine and hydrogen chloride may be used in temperatures up to 550°C. Resistance to mineral acids varies according to temperature and concentration and whether the solution is aerated or not. Corrosion resistance is better in de-aerated acid.

Composition

Ni	Cr	Fe	Al	Si	Mn	Cu	C	Ti	Mo	W
99.0% Min.	None/Trace	None/Trace	None/Trace	None/Trace	None/Trace	None/Trace	None/Trace	None/Trace	None/Trace	None/Trace

Technical Data

Resistivity (Ω/cm)	60	Resistivity (Ω/sqmf)	47
Resistivity (μΩ/cm)	9	Nom. Temp. Coeff. of Resistance (TCR)	0.00470
Std. Res. Tol. <.020"	5%	Std. Res. Tol. >.020"	3%
Thermal EMF vs. Cu	-0.022	Specific Heat (20°C)	0.109 cal/g
Density (g/cm³)	8.90	Density (lb/in³)	0.322
Thermal Conductivity	0.70 W/cm/°C	Coeff. of Linear Expansion (X 10⁻⁶)	13.30 in/in/°C
Approx. Melting Point	1450°C	Max. Continuous Operating Temp.	500°C
UTS – Hard (KPSI)	135	YTS Tensile – Hard (KPSI)	105
UTS – Stress Relieved (KPSI)	115	YTS Tensile – Stress Relieved (KPSI)	80
UTS – Annealed (KPSI)	60	YTS Tensile – Annealed (KPSI)	60
Magnetic Attraction	Strong	Emissivity – fully oxidized	
Designations/Specifications	ASTM = B160	Forms Available	Wire, Ribbon

Alloy Data

Diameter mm	Resistance at 20° C Ω/m	Resistance at 20° C Ω/kg	Weight kg/1000 m	Surface area cm²/m	cm²/Ω at 20°C
10.4049	0.0012	0.0015	757.8588	326.8804	278652.6007
9.2658	0.0015	0.0025	601.0085	291.0952	196789.3388
8.2515	0.0019	0.0039	476.6207	259.2276	138976.0718
7.3481	0.0024	0.0062	377.9769	230.8486	98147.3319
6.5437	0.0030	0.0099	299.7489	205.5765	69313.3618
5.8273	0.0037	0.0157	237.7113	183.0710	48950.3080
5.1894	0.0047	0.0250	188.5134	163.0293	34569.5634
4.6213	0.0059	0.0398	149.4977	145.1817	24413.6301
4.1154	0.0075	0.0632	118.5569	129.2880	17241.3325
3.6648	0.0095	0.1006	94.0198	115.1342	12176.1304
3.2636	0.0119	0.1599	74.5609	102.5299	8598.9962
2.9063	0.0150	0.2543	59.1294	91.3054	6072.7615
2.5882	0.0190	0.4043	46.8917	81.3098	4288.6903
2.3048	0.0239	0.6429	37.1868	72.4084	3028.7481
2.0525	0.0301	1.0222	29.4904	64.4815	2138.9549
1.8278	0.0380	1.6254	23.3869	57.4224	1510.5673
1.7249	0.0427	2.0496	20.8266	54.1881	1269.4316
1.6277	0.0479	2.5845	18.5466	51.1361	1066.7891
1.5360	0.0538	3.2591	16.5162	48.2559	896.4948
1.4495	0.0604	4.1096	14.7081	45.5380	753.3851
1.3679	0.0679	5.1821	13.0980	42.9731	633.1203
1.2908	0.0762	6.5345	11.6641	40.5527	532.0537
1.2181	0.0856	8.2399	10.3871	38.2686	447.1206
1.1495	0.0961	10.3903	9.2500	36.1132	375.7456
1.0848	0.1079	13.1020	8.2374	34.0792	315.7644

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
1.0237	0.1212	16.5213	7.3356	32.1597	265.3581
0.9660	0.1361	20.8330	6.5325	30.3483	222.9983
0.9116	0.1528	26.2700	5.8174	28.6390	187.4006
0.8603	0.1716	33.1259	5.1805	27.0260	157.4853
0.8118	0.1927	41.7711	4.6134	25.5038	132.3456
0.7661	0.2164	52.6724	4.1083	24.0673	111.2189
0.7229	0.2430	66.4188	3.6586	22.7117	93.4647
0.6822	0.2729	83.7527	3.2580	21.4325	78.5447
0.6438	0.3064	105.6104	2.9014	20.2254	66.0064
0.6075	0.3441	133.1724	2.5837	19.0862	55.4697
0.5733	0.3864	167.9275	2.3009	18.0112	46.6149
0.5410	0.4339	211.7530	2.0490	16.9967	39.1736
0.5106	0.4872	267.0160	1.8247	16.0394	32.9203
0.4818	0.5471	336.7015	1.6249	15.1360	27.6651
0.4547	0.6144	424.5733	1.4470	14.2835	23.2489
0.4291	0.6899	535.3778	1.2886	13.4790	19.5376
0.4049	0.7747	675.0999	1.1476	12.7198	16.4188
0.3821	0.8700	851.2865	1.0219	12.0034	13.7978
0.3606	0.9769	1073.4540	0.9101	11.3273	11.5952
0.3403	1.0970	1353.6024	0.8104	10.6893	9.7442
0.3211	1.2318	1706.8636	0.7217	10.0873	8.1887
0.2859	1.5533	2714.0272	0.5723	8.9830	5.7830
0.2546	1.9587	4315.4847	0.4539	7.9996	4.0841
0.2268	2.4699	6861.9090	0.3599	7.1238	2.8842
0.2019	3.1145	10910.8940	0.2854	6.3439	2.0369
0.1798	3.9273	17349.0506	0.2264	5.6494	1.4385
0.1601	4.9523	27586.1500	0.1795	5.0310	1.0159
0.1426	6.2447	43863.8221	0.1424	4.4802	0.7174
0.1270	7.8744	69746.4088	0.1129	3.9897	0.5067
0.1131	9.9295	110901.4515	0.0895	3.5529	0.3578
0.1007	12.5208	176340.7198	0.0710	3.1640	0.2527
0.0897	15.7885	280393.5301	0.0563	2.8176	0.1785
0.0799	19.9090	445844.4528	0.0447	2.5092	0.1260
0.0711	25.1048	708922.4776	0.0354	2.2345	0.0890
0.0633	31.6566	1127234.1196	0.0281	1.9898	0.0629
0.0564	39.9183	1792377.5879	0.0223	1.7720	0.0444
0.0502	50.3361	2850000.1569	0.0177	1.5780	0.0313
0.0447	63.4727	4531690.7268	0.0140	1.4053	0.0221
0.0398	80.0377	7205691.1275	0.0111	1.2514	0.0156
0.0355	100.9259	11457530.4792	0.0088	1.1144	0.0110
0.0316	127.2654	18218239.2165	0.0070	0.9924	0.0078
0.0281	160.4789	28968217.9553	0.0055	0.8838	0.0055
0.0251	202.3604	46061402.6159	0.0044	0.7870	0.0039

Information presentation property of Hyndman Industrial Products, Inc., 4031 Merchant Road, Fort Wayne, IN 46818, 260.483.6042, 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: sales@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.uspto.gov or by contacting Hyndman Industrial Products, Inc.