Hyndman Industrial Products Inc.

3508 Independence Drive
Fort Wayne, IN 46808
Toll Free: 888.496.3626
www.resistancewire.com

Alloy Data Table –
ADT2001.12.17.N7.MET

Resistance Heating Wire Nickel-Chromium Alloy 70% Nickel / 30% Chromium - N7

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

I = Current
C_t = Temperature factor
p = Surface load W/in^2

Common Names: Nikrothal 70, Chromel 70/30, N7, Hytemco, HAI-NiCr 70, Balco, Tophet 30, Resistohm 70, Cronix 70, Stablohm 710

Uses: Used for corrosion resistant electric heating elements in industrial furnaces with reducing atmospheres. Highly resistant to "green rot" - a preferential intergranular oxidation of the chromium that is commonly experienced with other alloys under certain environmental conditions. Highly resistant to oxidation in air. Not recommend for use in MgO sheathed heating elements, or applications using nitrogen or carburizing atmospheres.

Composition

Ni	Cr	Fe	Al	Si	Mn	Cu	C	Ti	Mo	W
70%	30%	None/Trace	None/Trace	None/Trace	None/Trace	None/Trace	None/Trace	None/Trace	None/Trace	None/Trace

Technical Data

Resistivity (Ω/cmf)	710	**Resistivity (Ω/sqmf)**	557
Resistivity (μΩ/cm)	118	**Nom. Temp. Coeff. of Resistance (TCR)**	0.000089
Std. Res. Tol. <.020"	3%	**Std. Res. Tol. >.020"**	5%
Thermal EMF vs. Cu		**Specific Heat (20°C)**	0.11 cal/g
Density (g/cm^3)	8.11	**Density (lb/in^3)**	0.293
Thermal Conductivity	0.137 W/cm/°C	**Coeff. of Linear Expansion (X 10^{-6})**	12.19 in/in/°C
Approx. Melting Point	1380°C	**Max. Continuous Operating Temp.**	1250°C
UTS – Hard (KPSI)	200	**YTS Tensile – Hard (KPSI)**	
UTS – Stress Relieved (KPSI)	175	**YTS Tensile – Stress Relieved (KPSI)**	
UTS – Annealed (KPSI)	120	**YTS Tensile – Annealed (KPSI)**	
Magnetic Attraction	None	**Emissivity – fully oxidized**	0.88
Designations/Specifications	UNS = N06008	**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
N7 C_t	1.00	1.01	1.02	1.03	1.04	1.05	1.05	1.04	1.04	1.04	1.05	1.05	1.06

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	0.0139	0.0201	689.6045	326.8804	23548.1071
9.2658	0.0175	0.0320	546.8804	291.0952	16630.0850
8.2515	0.0221	0.0509	433.6953	259.2276	11744.4568
7.3481	0.0278	0.0809	343.9355	230.8486	8294.1407
6.5437	0.0351	0.1287	272.7529	205.5765	5857.4672
5.8273	0.0443	0.2046	216.3025	183.0710	4136.6457
5.1894	0.0558	0.3253	171.5355	163.0293	2921.3716
4.6213	0.0704	0.5173	136.0336	145.1817	2063.1237
4.1154	0.0887	0.8225	107.8794	129.2880	1457.0140
3.6648	0.1119	1.3079	85.5521	115.1342	1028.9688
3.2636	0.1411	2.0796	67.8458	102.5299	726.6757
2.9063	0.1779	3.3068	53.8041	91.3054	513.1911
2.5882	0.2243	5.2580	42.6685	81.3098	362.4245
2.3048	0.2829	8.3605	33.8376	72.4084	255.9505
2.0525	0.3567	13.2938	26.8344	64.4815	180.7567
1.8278	0.4498	21.1380	21.2806	57.4224	127.6536
1.7249	0.5051	26.6545	18.9509	54.1881	107.2759

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	0.5672	33.6108	16.8763	51.1361	90.1512
1.5360	0.6370	42.3825	15.0288	48.2559	75.7601
1.4495	0.7153	53.4434	13.3835	45.5380	63.6663
1.3679	0.8032	67.3910	11.9183	42.9731	53.5031
1.2908	0.9019	84.9786	10.6136	40.5527	44.9623
1.2181	1.0128	107.1562	9.4517	38.2686	37.7848
1.1495	1.1373	135.1217	8.4169	36.1132	31.7532
1.0848	1.2771	170.3855	7.4955	34.0792	26.6843
1.0237	1.4341	214.8525	6.6749	32.1597	22.4246
0.9660	1.6104	270.9244	5.9442	30.3483	18.8449
0.9116	1.8084	341.6298	5.2934	28.6390	15.8367
0.8603	2.0307	430.7878	4.7139	27.0260	13.3086
0.8118	2.2804	543.2142	4.1979	25.5038	11.1841
0.7661	2.5607	684.9815	3.7383	24.0673	9.3988
0.7229	2.8755	863.7469	3.3291	22.7117	7.8984
0.6822	3.2290	1089.1663	2.9646	21.4325	6.6376
0.6438	3.6259	1373.4153	2.6401	20.2254	5.5780
0.6075	4.0717	1731.8472	2.3510	19.0862	4.6876
0.5733	4.5722	2183.8222	2.0937	18.0112	3.9393
0.5410	5.1343	2753.7529	1.8645	16.9967	3.3104
0.5106	5.7654	3472.4232	1.6604	16.0394	2.7820
0.4818	6.4742	4378.6511	1.4786	15.1360	2.3379
0.4547	7.2701	5521.3850	1.3167	14.2835	1.9647
0.4291	8.1638	6962.3479	1.1726	13.4790	1.6511
0.4049	9.1674	8779.3712	1.0442	12.7198	1.3875
0.3821	10.2944	11070.5985	0.9299	12.0034	1.1660
0.3606	11.5599	13959.7869	0.8281	11.3273	0.9799
0.3403	12.9810	17602.9915	0.7374	10.6893	0.8235
0.3211	14.5768	22196.9942	0.6567	10.0873	0.6920
0.2859	18.3811	35294.7042	0.5208	8.9830	0.4887
0.2546	23.1782	56120.9386	0.4130	7.9996	0.3451
0.2268	29.2272	89236.0432	0.3275	7.1238	0.2437
0.2019	36.8548	141891.2728	0.2597	6.3439	0.1721
0.1798	46.4731	225616.6069	0.2060	5.6494	0.1216
0.1601	58.6016	358745.4838	0.1634	5.0310	0.0859
0.1426	73.8954	570429.2958	0.1295	4.4802	0.0606
0.1270	93.1805	907020.7045	0.1027	3.9897	0.0428
0.1131	117.4986	1442223.5401	0.0815	3.5529	0.0302
0.1007	148.1632	2293231.8185	0.0646	3.1640	0.0214
0.0897	186.8307	3646391.8577	0.0512	2.8176	0.0151
0.0799	235.5894	5798006.7574	0.0406	2.5092	0.0107
0.0711	297.0732	9219218.2493	0.0322	2.2345	0.0075
0.0633	374.6030	14659173.1752	0.0256	1.9898	0.0053
0.0564	472.3663	23309065.0824	0.0203	1.7720	0.0038
0.0502	595.6437	37062971.3232	0.0161	1.5780	0.0026
0.0447	751.0939	58932601.4771	0.0127	1.4053	0.0019
0.0398	947.1133	93706775.0606	0.0101	1.2514	0.0013
0.0355	1194.2896	149000035.1618	0.0080	1.1144	0.0009
0.0316	1505.9735	236920014.2022	0.0064	0.9924	0.0007
0.0281	1899.0002	376718656.9360	0.0050	0.8838	0.0005
0.0251	2394.5985	599007842.2102	0.0040	0.7870	0.0003