HYNDMAN

Alloy Datasheet –
HYNDMAN.NI201.DATASHEET.MET

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Resistance Wire for Low Temp Heating or Resistors
Pure Nickel Alloy - NI201

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

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

Common Names: Nickel 201, Alloy 201, Alloy K270

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 550ºC. 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/cmf)	51	**Resistivity (Ω/sqmf)**	37
Resistivity (μΩ/cm)	7.98	**Nom. Temp. Coeff. of Resistance (TCR)**	0.00600
Std. Res. Tol. <.020"	5%	**Std. Res. Tol. >.020"**	3%
Thermal EMF vs. Cu	-0.016	**Specific Heat (20°C)**	0.13 cal/g
Density (g/cm³)	8.90	**Density (lb/in³)**	0.322
Thermal Conductivity	0.79 W/cm/°C	**Coeff. of Linear Expansion (X 10^{-6})**	13.10 in/in/°C
Approx. Melting Point	1450°C	**Max. Continuous Operating Temp.**	500°C
UTS – Hard (KPSI)	110	**YTS Tensile – Hard (KPSI)**	
UTS – Stress Relieved (KPSI)	90	**YTS Tensile – Stress Relieved (KPSI)**	
UTS – Annealed (KPSI)	50	**YTS Tensile – Annealed (KPSI)**	
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 cm^2/m	cm^2/Ω at 20°C
10.4049	0.0009	0.0012	757.8588	326.8804	348315.7509
9.2658	0.0012	0.0020	601.0085	291.0952	245986.6735
8.2515	0.0015	0.0031	476.6207	259.2276	173720.0898
7.3481	0.0019	0.0050	377.9769	230.8486	122684.1648
6.5437	0.0024	0.0079	299.7489	205.5765	86641.7023
5.8273	0.0030	0.0126	237.7113	183.0710	61187.8851
5.1894	0.0038	0.0200	188.5134	163.0293	43211.9543
4.6213	0.0048	0.0318	149.4977	145.1817	30517.0376
4.1154	0.0060	0.0506	118.5569	129.2880	21551.6656
3.6648	0.0076	0.0805	94.0198	115.1342	15220.1630
3.2636	0.0095	0.1279	74.5609	102.5299	10748.7453
2.9063	0.0120	0.2034	59.1294	91.3054	7590.9518
2.5882	0.0152	0.3235	46.8917	81.3098	5360.8629
2.3048	0.0191	0.5143	37.1868	72.4084	3785.9351
2.0525	0.0241	0.8178	29.4904	64.4815	2673.6936
1.8278	0.0304	1.3003	23.3869	57.4224	1888.2092
1.7249	0.0341	1.6397	20.8266	54.1881	1586.7895
1.6277	0.0383	2.0676	18.5466	51.1361	1333.4863
1.5360	0.0431	2.6072	16.5162	48.2559	1120.6185
1.4495	0.0484	3.2877	14.7081	45.5380	941.7314
1.3679	0.0543	4.1457	13.0980	42.9731	791.4004
1.2908	0.0610	5.2276	11.6641	40.5527	665.0671
1.2181	0.0685	6.5919	10.3871	38.2686	558.9008
1.1495	0.0769	8.3123	9.2500	36.1132	469.6820
1.0848	0.0863	10.4816	8.2374	34.0792	394.7055

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	0.0970	13.2171	7.3356	32.1597	331.6977
0.9660	0.1089	16.6664	6.5325	30.3483	278.7479
0.9116	0.1223	21.0160	5.8174	28.6390	234.2507
0.8603	0.1373	26.5007	5.1805	27.0260	196.8567
0.8118	0.1542	33.4169	4.6134	25.5038	165.4319
0.7661	0.1731	42.1380	4.1083	24.0673	139.0236
0.7229	0.1944	53.1351	3.6586	22.7117	116.8309
0.6822	0.2183	67.0022	3.2580	21.4325	98.1809
0.6438	0.2451	84.4883	2.9014	20.2254	82.5080
0.6075	0.2753	106.5379	2.5837	19.0862	69.3371
0.5733	0.3091	134.3420	2.3009	18.0112	58.2686
0.5410	0.3471	169.4024	2.0490	16.9967	48.9671
0.5106	0.3898	213.6128	1.8247	16.0394	41.1503
0.4818	0.4377	269.3612	1.6249	15.1360	34.5814
0.4547	0.4915	339.6586	1.4470	14.2835	29.0611
0.4291	0.5519	428.3023	1.2886	13.4790	24.4220
0.4049	0.6198	540.0799	1.1476	12.7198	20.5234
0.3821	0.6960	681.0292	1.0219	12.0034	17.2472
0.3606	0.7815	858.7632	0.9101	11.3273	14.4940
0.3403	0.8776	1082.8820	0.8104	10.6893	12.1803
0.3211	0.9855	1365.4909	0.7217	10.0873	10.2359
0.2859	1.2427	2171.2218	0.5723	8.9830	7.2288
0.2546	1.5670	3452.3877	0.4539	7.9996	5.1051
0.2268	1.9759	5489.5272	0.3599	7.1238	3.6053
0.2019	2.4916	8728.7152	0.2854	6.3439	2.5461
0.1798	3.1418	13879.2405	0.2264	5.6494	1.7981
0.1601	3.9618	22068.9200	0.1795	5.0310	1.2699
0.1426	4.9957	35091.0577	0.1424	4.4802	0.8968
0.1270	6.2995	55797.1271	0.1129	3.9897	0.6333
0.1131	7.9436	88721.1612	0.0895	3.5529	0.4473
0.1007	10.0167	141072.5759	0.0710	3.1640	0.3159
0.0897	12.6308	224314.8241	0.0563	2.8176	0.2231
0.0799	15.9272	356675.5622	0.0447	2.5092	0.1575
0.0711	20.0838	567137.9821	0.0354	2.2345	0.1113
0.0633	25.3253	901787.2957	0.0281	1.9898	0.0786
0.0564	31.9346	1433902.0703	0.0223	1.7720	0.0555
0.0502	40.2689	2280000.1255	0.0177	1.5780	0.0392
0.0447	50.7782	3625352.5815	0.0140	1.4053	0.0277
0.0398	64.0302	5764552.9020	0.0111	1.2514	0.0195
0.0355	80.7407	9166024.3833	0.0088	1.1144	0.0138
0.0316	101.8123	14574591.3732	0.0070	0.9924	0.0097
0.0281	128.3831	23174574.3642	0.0055	0.8838	0.0069
0.0251	161.8884	36849122.0927	0.0044	0.7870	0.0049