

# HM Wire International, Inc.

Ph: 330-244-8501 Fax: 330-244-8561

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## Alloy 650 - Resistance Heating

### Chemical Composition

Nominal Composition	Cr%	Ni%	Mn%
	19 - 21	Bal.	2.5 Max

### Mechanical Properties

Melting Point	1,400°C (2,552°F)
Max Operating Temp	1,230°C (2,246°F)
Soft Tensile	95 - 125,000 PSI
Elongation	20 - 40%
Yield Point	45 - 65,000 PSI

### Physical Properties

Ω/cir.mil.ft:	650
Conductivity:	14.6 w / m K
Coeffiecent of Linear Expansion , 10 <sup>-6</sup> :	14.0(200°C), 15.0(400°C), 15.5(600°C)
Temp. coeffiecent of Resistance:	0.00009
Weight/Density:	0.301 lbs/cu.in. (8.3 g/cm <sup>3</sup> )
Specific Heat:	0.110 cal./gm @ 20°C
Specific Gravity:	8.41

\*To be used as a guideline only.

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## Resistance Chart

Diameter			Resistance @ 68°F/20°C Ω/ft	Sq. in/Ω	Weight	Ω/lb.	Ft/Lb	Cross Sectional area (in <sup>2</sup> )
AWG	Inches	Mm		68°F	lb/1000 ft			
20	0.032	0.812	0.635	1.900	2.90	216.4	340.9	0.000804
21	0.0285	0.723	0.800	1.342	2.30	344.0	429.9	0.000638
22	0.0253	0.644	1.017	0.938	1.82	554.9	545.6	0.000507
23	0.0226	0.573	1.272	0.670	1.44	869.4	683.5	0.000401
24	0.0201	0.51	1.609	0.471	1.13	1,391	864.5	0.000314
25	0.0179	0.455	2.029	0.333	0.916	2,212	1,090	0.000254
26	0.0159	0.405	2.571	0.233	0.715	3,551	1,381	0.000199
27	0.0142	0.361	3.228	0.166	0.570	5,591	1,732	0.000158
28	0.0126	0.321	4.090	0.116	0.449	8,994	2,199	0.000125
29	0.0113	0.286	5.090	0.084	0.361	13,920	2,734	0.000100
30	0.01	0.255	6.500	0.059	0.283	22,700	3,492	0.0000785
31	0.0089	0.227	8.206	0.041	0.225	36,160	4,407	0.0000626
32	0.008	0.202	10.16	0.030	0.179	55,430	5,456	0.0000496
33	0.0071	0.18	12.90	0.021	0.142	89,330	6,925	0.0000394
34	0.0063	0.16	16.37	0.015	0.112	144,00	8,795	0.0000312
35	0.0056	0.143	20.72	0.010	0.0890	230,600	11,130	0.0000247
36	0.005	0.127	26.00	0.0073	0.0707	363,200	13,970	0.0000196
37	0.0045	0.113	32.09	0.0053	0.0547	553,200	17,240	0.0000152
38	0.004	0.101	40.62	0.0037	0.0452	886,300	21,820	0.0000126
39	0.0035	0.09	53.06	0.0025	0.0352	1,512,000	28,500	0.00000979
40	0.0031	0.08	67.63	0.0017	0.0281	2,458,000	36,340	0.00000779
41	0.0028	0.07	85.98	0.0012	0.0222	3,970,000	46,170	0.00000616
42	0.0025	0.063	104.00	0.00091	0.0175	5,810,000	55,870	0.00000487

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