

## Properties of Major Alloys

MATERIAL	CHEMICAL COMPOSITION (%)	RESISTIVITY AT 20°C		COEFFICIENT OF LINEAR EXPANSION BETWEEN 20-100°C	TENSILE STRENGTH (PSI AT 20C)		SPECIFIC GRAVITY	POUNDS PER CUBIC INCH	MAGNETIC ATTRACTION	APPROX. MELTING POINT (°C)
		OHMS/CMF	TCR 0-100°C		MIN.	MAX.				
MWS-875	22.5 Cr, 5.5 Al, .5 Si, .1 C, bal. Fe	875	.00002	.000012	105,000	175,000	7.10	.256	Strong	1520
MWS-800	75 Ni, 20 Cr, 2.5 Al, 2.5 Cu	800	.0002	.000014	100,000	200,000	8.10	.293	None	1350
MWS-675	61 Ni, 15 Cr, bal. Fe	675	.00013	.0000137	95,000	175,000	8.247	.2979	Faint	1350
MWS-650	80 Ni, 20 Cr	650	.00010	.0000132	100,000	200,000	8.412	.3039	None	1400
ALLOY 42	42 Ni, bal. Fe	390	.0010	.0000029	70,000	150,000	8.10	.295	Strong	1425
MWS-294	55 Cu, 45 Ni	294	.00002*	.0000149	60,000	135,000	8.90	.321	None	1210
MWS-294R	29 Ni, 17 Co, bal. Fe	294	.0033	.0000033	65,000	150,000	8.36	.302	Strong	1450
Manganin	13 Mn, 4 Ni, bal. Cu	290	.000015**	.0000187	40,000	90,000	8.192	.296	None	1020
ALLOY 52	50.5 Ni, bal. Fe	260	.0029	.0000049	70,000	150,000	8.25	.301	Strong	1425
MWS-180	23 Ni, bal. Cu	180	.00018	.0000159	50,000	100,000	8.90	.321	None	1100
MWS-120	70 Ni, 30 Fe	120	.0045	.000015	70,000	150,000	8.46	.305	Strong	1425
MWS-90	12 Ni, bal. Cu	90	.0004	.0000161	35,000	75,000	8.90	.321	None	1100
MWS-60	6 Ni, bal. Cu	60	.0005	.0000163	35,000	70,000	8.90	.321	None	1100
MWS-30	2 Ni, bal. Cu	30	.0013	.0000165	30,000	60,000	8.90	.321	None	1100
Nickel 205	99 Ni	57	.0048	.000013	60,000	135,000	8.90	.321	Strong	1450
Nickel 270	99.97 Ni	45	.0067	.000013	48,000	95,000	8.89	.321	Strong	1452

\*TCR at 25-105°C

\*\*TCR at 15-35°C

Note: Available bare or insulated. See pages 2 and 3 for available insulations.

## Trade Name Cross Reference

MWS WIRE IND.	CARPENTER TECH.	DRIVER-HARRIS	HARRISON	HOSKINS	JELLIFF	KANTHAL	MOLECU
MWS-875	Alchrome 875		HAI-FeCr Al 25	Alloy 875		Kanthal A-1	
MWS-800	Evanohm	Karma	HAI-431	Chromel R	Alloy 800	Nikrothal L	Moleculoy
MWS-675	Tophet C	Nichrome	HAI-NiCr 60	Chromel C	Alloy C	Nikrothal 6	Electroloy
MWS-650	Tophet A	Nichrome V	HAI-NiCr 80	Chromel A	Alloy A	Nikrothal 8	Protoloy
MWS-294	Cupron	Advance	HAI-CuNi 102	Copel	Alloy 45	Cuprothal 294	Neutroloy
MWS-294R	Kovar		HAI-373				
MWS-180	180 Alloy	Midohm	HAI-180	Alloy 380	Alloy 180	Cuprothal 180	
MWS-120	Balco	Hytemco	HAI-380		Alloy 120		Pelcoloy
MWS-90	90 Alloy	#95 Alloy	HAI-90	Alloy 290	Alloy 90	Cuprothal 90	
MWS-60	60 Alloy	Lohm	HAI-60	Alloy 260	Alloy 60	Cuprothal 60	
MWS-30	30 Alloy	#30 Alloy	HAI-30	Alloy 230	Alloy 30	Cuprothal 30	

## Major Alloy Resistance Data

SIZE (AWG)	DIA. (INCHES)	NOMINAL OHMS PER LINEAR FOOT AT 20°C												
		NI 270*	NI 205	MWS-875	MWS-800	MWS-675	MWS-650	MANGANIN	MWS-294	ALLOY 180	MWS-120	ALLOY 90	ALLOY 60	ALLOY 30
4	.204	.001081	.001442	.02103	—	.01622	.01562	.006968	.0070	—	.002884	—	—	—
5	.182	.001358	.001811	.02642	—	.02038	.01962	.008755	.0088	—	.003622	—	—	—
6	.162	.001715	.002286	.03334	—	.02572	.02476	.01105	.0112	—	.004572	—	—	—
7	.144	.002170	.002894	.04220	—	.03255	.03135	.01399	.0142	—	.005788	—	—	—
8	.128	.002747	.003662	.05341	—	.04120	.03967	.01770	.0180	.01099	.007324	.00549	.003662	.00183
9	.114	.003463	.004617	.06733	—	.05194	.05001	.02231	.0226	.01385	.009234	.006925	.004617	.00230
10	.102	.004325	.005767	.08410	—	.06488	.06248	.02787	.0283	.01730	.01153	.00865	.005767	.00288
11	.091	.005434	.007246	.10566	—	.08151	.07849	.03502	.0355	.02174	.01449	.01082	.007246	.00362
12	.081	.006859	.009145	.13336	—	.1029	.09907	.04420	.0448	.02744	.01829	.01372	.009145	.00457
13	.072	.008681	.01157	.1688	—	.1302	.1254	.05594	.0567	.03471	.02314	.01735	.01157	.00578
14	.064	.010986	.01465	.2136	—	.1684	.1587	.07080	.0717	.04395	.02930	.02194	.01465	.00732
15	.057	.013850	.01847	.2693	.2462	.2078	.2000	.08926	.0905	.05541	.03694	.02770	.01847	.00923
16	.051	.017301	.02307	.3364	.3076	.2595	.2499	.1115	.1130	.06921	.04614	.03460	.02307	.01153
17	.045	.022222	.02963	.4321	.3951	.3333	.3209	.1432	.1452	.08889	.05926	.04444	.02963	.01482
18	.040	.028125	.03750	.5469	.5000	.4219	.4062	.1813	.1837	.1125	.0750	.0562	.03750	.01825
19	.036	—	.04630	.6752	.6173	.5208	.5015	.2238	.2268	.1389	.0926	.06945	.04630	.02315
20	.032	.043945	.05859	.8545	.7813	.6592	.6347	.2832	.2871	.1758	.1171	.0879	.05859	.02924
21	.0285	.055400	.07387	1.077	.9849	.831	.8002	.3570	.3619	.2216	.1477	.1108	.07387	.03693
22	.0253	.07030	.09374	1.367	1.250	1.055	1.017	.4531	.4590	.2812	.1860	.1406	.09374	.04687
23	.0226	.08810	.1175	1.713	1.566	1.322	1.272	.5678	.5756	.3525	.2350	.1762	.1175	.05875
24	.0201	.11138	.1485	2.166	1.980	1.671	1.609	.7178	.7280	.4455	.2970	.2227	.1485	.07425
25	.0179	.14044	.1873	2.731	2.497	2.107	2.029	.9051	.9176	.5619	.3746	.2809	.1873	.09365
26	.0159	.1780	.2373	3.461	3.164	2.670	2.571	1.147	1.163	.7119	.4746	.3554	.2373	.11865
27	.0142	.2232	.2976	4.339	3.967	3.348	3.228	1.438	1.458	.8928	.5952	.4464	.2976	.14880
28	.0126	.2834	.3778	5.511	5.039	4.251	4.090	1.826	1.852	1.133	.7556	.5665	.3778	.18890
29	.0113	.3524	.4699	6.853	6.265	5.286	5.090	2.271	2.302	1.401	.9398	.7001	.4669	.23494
30	.0100	.4500	.6000	8.750	8.00	6.750	6.500	2.900	2.940	1.800	1.200	.9000	.6000	.30000
31	.0089	.5681	.7576	11.047	10.10	8.523	8.206	3.662	3.710	2.273	1.515	1.1365	.7576	.37830
32	.0080	.7031	.9375	13.672	12.50	10.55	10.16	4.531	4.594	2.813	1.875	1.4065	.9375	.46875
33	.0071	.8927	1.190	17.358	15.87	13.39	12.90	5.754	5.833	3.572	2.380	1.786	1.1905	.59525
34	.0063	1.1338	1.511	22.046	20.16	17.00	16.37	7.305	7.408	4.534	3.022	2.267	1.5113	.75565
35	.0056	1.4349	1.913	27.902	25.51	21.52	20.72	9.247	9.375	5.740	3.826	2.870	1.9132	.9566
36	.0050	1.8000	2.400	35.000	32.00	27.00	26.00	11.60	11.76	7.200	4.800	3.600	2.400	1.2000
37	.0045	2.2222	2.963	43.210	39.51	33.33	32.09	14.32	14.52	8.889	5.926	4.444	2.963	1.4815
38	.0040	2.8125	3.750	54.688	50.00	42.19	40.62	18.13	18.37	11.25	7.500	5.625	3.750	1.8750
39	.0035	3.6735	4.898	71.429	65.31	55.10	53.06	23.67	24.00	14.69	9.796	7.345	4.898	2.4490
40	.0031	4.6826	6.243	91.051	83.25	70.24	67.63	30.18	30.59	18.72	12.49	9.360	6.240	3.1200
41	.00275	5.9504	7.937	115.702	105.8	89.29	85.98	38.36	38.87	233.97	15.86	11.985	7.937	3.9635
42	.0025	7.2000	9.600	140.000	128.0	108.0	104.00	46.40	47.04	28.80	19.20	14.400	9.60	4.800
43	.00225	8.8889	11.85	172.840	158.0	133.4	128.5	57.31	58.07	35.58	23.70	17.790	11.86	5.930
44	.0020	11.2500	15.00	218.750	200.0	168.8	162.5	72.50	73.50	45.00	30.00	22.500	15.00	7.500
45	.00175	14.6939	19.59	285.714	261.3	220.6	212.4	94.69	96.00	58.83	39.18	29.915	19.61	9.805
46	.0015	20.0000	26.66	388.889	355.6	300.0	288.9	128.9	130.66	—	53.33	—	—	—
47	.0014	22.9592	—	446.429	408.2	344.4	331.6	148.0	150.00	—	61.22	—	—	—
48	.0013	26.6272	—	517.752	473.4	399.6	384.6	171.6	174.00	—	71.01	—	—	—
49	.0012	31.2500	—	607.639	555.0	468.7	451.4	201.4	204.00	—	83.33	—	—	—
50	.0011	37.1901	—	723.140	661.2	557.8	537.2	239.7	243.00	—	99.17	—	—	—
51	.0010	45.0000	—	875.000	800.0	675.0	650.0	290.0	294.0	—	120.0	—	—	—
52	.0009	55.5556	—	1080.247	987.7	833.3	802.0	—	—	—	—	—	—	—
53	.0008	70.3125	—	1367.188	1250.0	1054.6	1016.0	—	—	—	—	—	—	—
54	.0007	91.8367	—	1785.714	1633.0	1377.5	1327.0	—	—	—	—	—	—	—
55	.0006	125.0000	—	2430.556	2222.0	1875.0	1806.0	—	—	—	—	—	—	—
56	.0005	180.0000	—	3500.000	3200.0	2700.0	2600.0	—	—	—	—	—	—	—

\*Using 45 OHMS/CMF