EVANOHM® R

Type analysis

Single figures are nominal except where noted

Nickel	73.50 %	**Chromium**	20.00 %	**Aluminum**	2.50 %
Copper	2.00 %	**Manganese**	1.00 %	**Silicon**	1.00 %

Forms manufactured

Wire	**Ribbon**	**Strip**

Description

EVANOHM R is principally a resistance alloy possessing a standard temperature coefficient of ±10 parts per million per °C and a very low thermal EMF versus copper in heavy sizes. It also displays high tensile strength in fine sizes, high corrosion resistance and is nonmagnetic.

EVANOHM R is exceptionally stable (1 to 15 microhms per year). While many other alloys are susceptible to precipitation hardening which changes electrical properties unpredictably, the resistivity of EVANOHM R always increases during heat treatment. Once obtained, its resistivity does not change significantly even when it is used at temperatures as high as 204°C (400 °F).

Key Properties:

- High Electrical Resistivity
- Very Low Temperature Coefficient of Resistivity (TCR)
- High thermal stability
- Tunable TCR with tempering

Applications:

- Power metal strip resistors
- Round wire resistors
- Power metal current sensors

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Corrosion resistance

IMPORTANT NOTE:
The following 4-level rating scale is intended for comparative purposes only. Corrosion testing is recommended; factors that affect corrosion resistance include temperature, concentration, pH, impurities, aeration, velocity, crevices, deposits, metallurgical condition, stress, surface finish, and dissimilar metal contact.

Nitric Acid	Good	**Sulfuric Acid**	Good
Phosphoric Acid	Good	**Acetic Acid**	Good
Sodium Hydroxide	Good	**Salt Spray (NaCl)**	Excellent
Sea Water	Moderate	**Humidity**	Excellent

Physical properties

PROPERTY	At or From	English Units	Metric Units
SPECIFIC GRAVITY	—	8.10	8.10
DENSITY	—	0.2930 lb/in^3	8110 kg/m^3
MEAN COEFFICIENT OF THERMAL EXPANSION	68 to 1212°F (20 to 100°C)	7.22 x 10^{-6} length/length/°F	12.996 x 10^{-6} length/length/°C
ELECTRICAL RESISTIVITY	70°F (21°C)	800 ohm-cir-mil/ft	133 microohm·cm
MELTING RANGE	—	2460°F	1349°C
THERMAL EMF VS. COPPER	32 to 212°F (0 to 100°C)	5.6 x 10^{-4} mV/°F	1.0 x 10^{-3} mV/°C
TEMPERATURE COEFFICIENT OF RESISTIVITY (TCR)	-65°C to 125°C	—	±10 ppm/°C

Magnetic properties

MAGNETIC ATTRACTION	None

Typical mechanical properties

TENSILE STRENGTH			
ANNEALED		COLD WORKED	
ksi	MPa	ksi	MPa
100	689	200	1379

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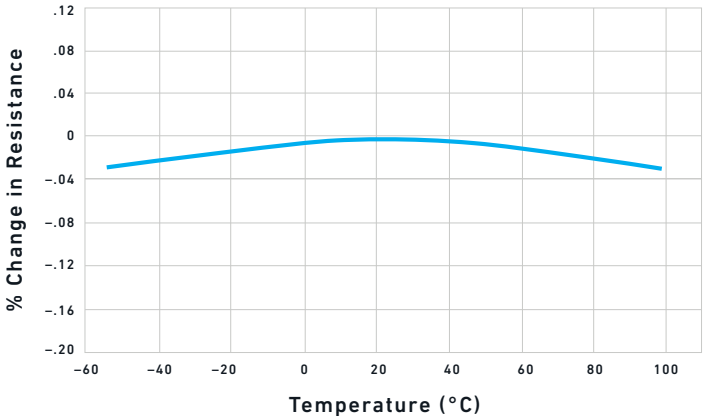
Heat treatment

Heat treatment is generally performed by heating to a temperature below 400-600°C (752-1112°F).

Other information

Applicable specifications	ASTM B267 Class 1A & 1B & 1C

RESISTANCE CHANGE VS. TEMPERATURE



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RESISTANCE AND WEIGHT OF ROUND WIRE

RESISTIVITY EQUALS 800 OHMS PER CIRCULAR MIL FT AT 20˚C (68˚F)

B&S	DIAMETER IN INCHES	OHMS PER FT AT 20˚C (68˚F)	OHMS PER LB BARE WIRE	FT PER LB BARE WIRE	LBS PER M FT
15	.057	0.2462	27.48	111.6	8.961
16	.051	0.3076	42.85	139.3	7.179
17	.045	0.3951	70.56	178.6	5.599
18	.040	0.5000	113.0	226	4.425
19	.036	0.6173	172.7	279.8	3.574
20	.032	0.7813	276.7	354.1	2.824
21	.0285	0.9849	439.7	446.4	2.24
22	.0253	1.250	707.9	566.3	1.766
23	.0226	1.566	1,112.0	709.8	1.409
24	.0201	1.980	1,777.0	897.4	1.114
25	.0179	2.497	2,827.0	1,132.0	.8834
26	.0159	3.164	4,537.0	1,434.0	.6974
27	.0142	3.967	7,133.0	1,798.0	.5562
28	.0126	5.039	11,509.0	2,284.0	.4378
29	.0113	6.265	17,786.0	2,839.0	.3522
30	.01	8.000	29,008.0	3,626.0	.2758
31	.0089	10.10	46,228.0	4,577.0	.2185
32	.008	12.50	70,813.0	5,665.0	.1765
33	.0071	15.87	114,137.0	7,192.0	.139
34	.0063	20.16	184,162.0	9,135.0	.1095
35	.0056	25.51	294,921.0	11,561.0	.0865
36	.005	32.00	464,064.0	14,502.0	.06896
37	.0045	39.51	707,387.0	17,904.0	.05585
38	.004	50.00	1,133,000.0	22,660.0	.04413
39	.0035	65.31	1,932,980.0	29,597.0	.03379
40	.0031	83.25	3,140,778.0	37,727.0	.02651
	.00275	105.8	5,072,264.0	47,942.0	.02086
	.0025	128.0	7,425,280.0	58,010.0	.01724
	.00225	158.0	11,315,486.0	71,617.0	.01376
	.002	200.0	18,128,000.0	90,640.0	.01103
	.00175	261.3	30,934,523.0	1,183,887.0	.008466

RESISTANCE OF RIBBON (FLAT WIRE)

RESISTANCE OF RIBBON IN 628 OHMS PER SQUARE MIL FT AT 20°C (68°F)

THICKNESS		WIDTH IN INCHES								*
B&S	INCHES	*1/64 .0156*	*1/32 .0312*	*3/64 .0468*	*1/16 .0625*	*3/32 .0937*	*1/8 .125*	*3/16 .1875*	*1/4 .250*	*3/8 .375*
11	.091								.0293	.0184
12	.081								.0329	.0206
13	.072								.0371	.0232
14	.064							.0556	.0417	.0261
15	.057							.0625	.0468	.0293
16	.051							.0698	.0523	.0328
17	.045							.0791	.0593	.0372
18	.040						.1336	.0890	.0667	.0418
19	.036						.1485	.0989	.0742	.0465
20	.032						.1669	.1113	.0834	.0523
21	.0285						.1875	.1249	.0937	.0587
22	.0253						.2112	.1408	.1056	.0661
23	.0226						.2365	.1482	.1111	.0740
24	.0201			.7088	.5317	.3544	.2658	.1666	.1249	.0832
25	.0179			.7960	.5970	.3980	.2985	.1871		
26	.0159			.8962	.6721	.4481	.3361	.2106		
27	.0142			1.003	.7525	.5018	.3763	.2357		
28	.0126			1.131	.8482	.5654	.4241	.2658		
29	.0113			1.261	.9457	.6304	.4728	.2963		
30	.010	4.274	2.137	1.424	1.069	.7124	.5343	.3348		
31	.0089	4.803	2.402	1.602	1.201	.8005	.6004	.3762		
32	.008	5.343	2.671	1.781	1.336	.8905	.7564			
33	.0071	6.021	3.010	2.007	1.506	1.003	.8522			
34	.0063	6.785	3.393	2.261	1.696	1.131	.9605			
35	.0056	7.633	3.816	2.544	1.908	1.442	1.081			
36	.005	8.549	4.274	2.850	2.137	1,614	1.210			
37	.0045	9.498	4.749	3.166	2.375	1.794	1.345			
38	.004	10.686	5.343	3.563	3.026	2.018	1.513			
39	.0035	12.213	6.107	4.071	3.458	2.306	1.730			
40	.0031	13.787	6.895	5.206	3.904	2.602				
	.00275	15.548	7.771	5.868	4.402					
	.0025	17.099	8.549	6.454						
	.00225	18.994	9.498	7.172						
	.002	21.370	12.102	8.056						
	.00175	24.423	13.836		.					

**Historically, sizes to the right of the red line are considered square edge. Those to the left are considered round edge, and resistances of these sizes are calculated according to the method advocated by the American Society for Testing Materials. That is, if the width to thickness ratio of a round edge strip is less than 15 to 1, the cross-sectional area shall be considered 6% less than a true rectangle when calculating the resistance. This is true of all sizes above the black line.*

For all sizes below the black line, the width to thickness ratio is greater than 15 to 1, and the cross-sectional area shall be considered 17% less than a true rectangle.

For additional information, please contact your nearest sales office:
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