



Brand Name	<b>NICKELIN W</b>				
Material Code	<b>2.0890</b>				
Abbreviation	<b>CuNi30Mn</b>				
Chemical Composition (mass components) in %. Average values of alloy components					
<b>Cu</b> Rem.	<b>Ni</b> 30	<b>Mn</b> 3			

### Features and Application Notes

NICKELIN W is notable for high resistance to oxidation and chemical corrosion, relatively low resistivity and a relatively low temperature coefficient. This alloy is used for resistors of any kind as well as for heating cables and detectors for fuses. The maximum working temperature in air is +500 °C.

### Form of Delivery

NICKELIN W is supplied in the form of round wires in the range 0.02 to 8.00 mm Ø in bare or enamelled condition. To a limited extent flat wires, stranded wires, ribbons and sheets are also manufactured.

### Electrical Resistance in Annealed Condition

Temperature coefficient of electrical resistance between      Electrical resistivity in:  $\mu\Omega \times \text{cm}$  (first line) and  $\Omega/\text{CMF}$  (second line)  
Reference Values

+20 °C and 50 °C 10 <sup>-9</sup> /K	+20 °C tolerance $\pm 5\%$	+100 °C	+200 °C	+300 °C	+400 °C	+500 °C
<b>+80 to +190</b>	<b>40</b>	<b>40,4</b>	<b>41</b>	<b>41,7</b>	<b>42,4</b>	<b>43,2</b>
	<b>241</b>	<b>243</b>	<b>247</b>	<b>251</b>	<b>255</b>	<b>260</b>

### Physical Characteristics (Reference Values)

Density at +20 °C		Melting point	Specific heat at +20 °C	Thermal conductivity at +20 °C	Average linear thermal expansion coefficient between +20 °C and		Thermal EMF against copper at
$\text{g}/\text{cm}^3$	$\text{lb}/\text{cub in}$	°C	J/g K	W/m K	+100 °C	+400 °C	+20 °C
					$10^{-6}/\text{K}$	$10^{-6}/\text{K}$	$\mu\text{V}/\text{K}$
<b>8.80</b>	<b>0.32</b>	<b>+1,180</b>	<b>0.40</b>	<b>25.00</b>	<b>14.50</b>	<b>19.00</b>	<b>-25.00</b>

### Mechanical Properties at +20 °C in Annealed Condition

Tensile Strength<sup>1)</sup>      Elongation ( $L_0 = 100 \text{ mm}$ ) % at nominal diameter in mm

MPa	psi	0.020 to 0.063	> 0.063 to 0.125	> 0.125 to 0.50	> 0.50 to 1.00	> 1.00
<b>400</b>	<b>58,000</b>	<b>~ 12</b>	<b>~ 18</b>	<b>~ 20</b>	<b>≥ 20</b>	<b>≥ 25</b>

**Notes on Treatment** // NICKELIN W can be worked easily. This alloy can be soldered and brazed. All known welding methods can be used.

1) This value applies to wires of 2.0 mm diameter. For thinner wires the minimum values will substantially increase, depending on the dimensions.

Nominal Diameter	Cross Section	Weight per 1.000 m	DC Resistance Referred to Length at +20 °C Ω/m				
mm	mm <sup>2</sup>	g	Nominal Value	Tolerance	Minimum Value	Maximum Value	
0.020	0.00031416	2.76	1.273	±10 %	1,146	1,401	
0.022	0.00038013	3.35	1.052		947	1,158	
0.025	0.00049087	4.32	815		733	896	
0.028	0.00061575	5.42	650		585	715	
0.030	0.00070686	6.22	566		521	611	
0.032	0.00080425	7.08	497		458	537	
0.036	0.001018	8.96	393		362	424	
0.040	0.001257	11.10	318		293	344	
0.045	0.001590	14.00	252		231	272	
0.050	0.001963	17.30	204		187	220	
0.056	0.002463	21.70	162	±8 %	149	175	
0.060	0.002827	24.90	142		130	153	
0.063	0.003117	27.40	128		118	139	
0.070	0.003848	33.90	104		95.6	112	
0.071	0.003959	34.80	101		92.9	109	
0.080	0.005027	44.20	79.6		73.2	85.9	
0.090	0.006362	56.00	62.9		57.8	67.9	
0.100	0.007854	69.10	50.9		46.9	55.0	
0.110	0.009503	83.60	42.1		39.1	45.0	
0.112	0.009852	86.70	40.6		37.8	43.4	
0.120	0.01131	99.50	35.4	±7 %	32.9	37.8	
0.125	0.01227	108.00	32.6		30.3	34.9	
0.130	0.01327	117.00	30.1		28.0	32.2	
0.140	0.01539	135.00	26.0		24.2	27.8	
0.150	0.01767	156.00	22.6		21.1	24.2	
0.160	0.02011	177.00	19.9		18.5	21.3	
0.180	0.02545	224.00	15.7		14.6	16.8	
0.200	0.03142	276.00	12.7		12.0	13.5	
0.220	0.03801	335.00	10.5		9.9	11.2	
0.224	0.03941	347.00	10.2		9.54	10.8	
0.250	0.04909	432.00	8.15	±6 %	7.66	8.64	
0.280	0.06158	542.00	6.50		6.11	6.89	
0.300	0.07069	622.00	5.66		5.32	6.00	
0.315	0.07793	686.00	5.13		4.88	5.39	
0.350	0.09621	847.00	4.16		3.95	4.37	
0.355	0.09898	871.00	4.04		±5 %	3.84	4.24
0.400	0.1257	1,110.00	3.18			3.02	3.34
0.450	0.1590	1,400.00	2.52			2.39	2.64
0.500	0.1963	1,730.00	2.04			1.94	2.14

Nominal Diameter	Cross Section	Weight per 1.000 m	DC Resistance Referred to Length at +20 °C			
mm	mm <sup>2</sup>	g	Nominal Value	Tolerance	Minimum Value	Maximum Value
0.550	0.2376	2,090.00	1.68		1.62	1.75
0.560	0.2463	2,170.00	1.62		1.56	1.69
0.600	0.2827	2,490.00	1.41		1.36	1.47
0.630	0.3117	2,740.00	1.28		1.23	1.33
0.650	0.3318	2,920.00	1.21		1.16	1.25
0.700	0.3848	3,390.00	1.04		0.998	1.08
0.710	0.3959	3,480.00	1.01		0.970	1.05
0.800	0.5027	4,420.00	0.796		0.764	0.828
0.900	0.6362	5,600.00	0.629		0.604	0.654
1.000	0.7854	6,910.00	0.509		0.489	0.530
1.120	0.9852	8,670.00	0.406		0.390	0.422
1.200	1.131	9,950.00	0.354		0.340	0.368
1.250	1.227	10,800.00	0.326		0.313	0.339
1.400	1.539	13,550.00	0.260		0.249	0.270
1.500	1.767	15,550.00	0.226		0.217	0.235
1.600	2.011	17,690.00	0.199		0.191	0.207
1.800	2.545	22,390.00	0.157		0.151	0.163
2.000	3.142	27,650.00	0.127	±4 %	0.122	0.132
2.200	3.801	33,450.00	0.105		0.101	0.109
2.240	3.941	34,680.00	0.102		0.0974	0.106
2.500	4.909	43,200.00	0.0815		0.0782	0.0847
2.800	6.158	54,190.00	0.0650		0.0624	0.0676
3.000	7.069	62,200.00	0.0566		0.0543	0.0589
3.150	7.793	68,580.00	0.0513		0.0493	0.0534
3.200	8.042	70,770.00	0.0497		0.0477	0.0517
3.500	9.621	84,670.00	0.0416		0.0399	0.0432
3.550	9.898	87,100.00	0.0404		0.0388	0.0420
4.000	12.57	110,580.00	0.0318		0.0306	0.0331
4.500	15.90	139,960.00	0.0252		0.0241	0.0262
5.000	19.63	172,790.00	0.0204		0.0196	0.0212
5.500	23.76	209,070.00	0.0168		0.0162	0.0175
5.600	24.63	216,750.00	0.0162		0.0156	0.0169
6.000	28.27	248,810.00	0.0141		0.0136	0.0147
6.300	31.17	274,320.00	0.0128		0.0123	0.0133
8.000	50.27	442,340.00	0.00796		0.00764	0.00828