NICKELIN W

ISABELLENHÜTTE

Brand Name	NICKELIN W
Material Code	2.0890
Abbreviation	CuNi30Mn

Chemical Composition (mass components) in %
Average values of alloy components

Cu	Ni	Mn
Rem.	30	3

Form of Delivery

NICKELIN W is supplied in the form of round wires in the range 8.0 to 0.02 mm Ø in bare, enamelled condition, also with rayon or silk covering. To a limited extent flat wires, stranded wires, ribbons and sheets are also manufactured.

Properties 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.

Electrical Resistance in Annealed Condition

Temperature coefficient of electrical resistance between	Electrical resistivity in: μΩ x cm (first line) and Ω/CMF (second line) Reference Values					
20 °C and 105 °C	20 °C	100 °C	200 °C	300 °C	400 °C	500 °C
10^{-6}/K	tolerance ±5 %					
+80 to +130	40.0	40.4	41.0	41.7	42.4	43.2
	241	243	247	251	255	260

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 20 °C
					100 °C	400 °C	
g/cm³	lb/cub in	°C	J/g K	W/m K	10^{-6}/K	10^{-6}/K	μV/K
8.8	0.32	1180	0.40	25	14.5	16	- 25

Strength Properties at 20 °C in Annealed Condition

Tensile Strength[1]		Elongation (L_0 = 100 mm) % at nominal diameter in mm				
MPa	psi	0.02 to 0.063	>0.063 to 0.125	> 0.125 to 0.5	> 0.5 to 1	> 1
400	58000	≈ 12	≈ 18	≈ 20	≥ 20	≥ 25

1) This value applies to wires of 2 mm diameter. For thinner wires the minimum values will substantially increase, depending on the dimensions.

Notes on Treatment

NICKELIN W can be worked easily. This alloy can be soldered and brazed. All known welding methods can be used.

Nominal Diameter d	Cross Section	Weight per 100 m	DC Resistance Referred to Length at 20 °C Ω / m			
mm	mm²	g	Nominal Value	Tolerance	Minimum Value	Maximum Value
0.02	0.00031416	0.276	1273	± 10 %	1146	1401
0.022	0.00038013	0.335	1052		947	1158
0.025	0.00049087	0.432	815		733	896
0.028	0.00061575	0.542	650		585	715
0.03	0.00070686	0.622	566	± 8 %	521	611
0.032	0.00080425	0.708	497		458	537
0.036	0.001018	0.896	393		362	424
0.04	0.001257	1.11	318		293	344
0.045	0.001590	1.40	252		231	272
0.05	0.001963	1.73	204		187	220
0.056	0.002463	2.17	162		149	175
0.06	0.002827	2.49	142		130	153
0.063	0.003117	2.74	128		118	139
0.07	0.003848	3.39	104		95.6	112
0.071	0.003959	3.48	101		92.9	109
0.08	0.005027	4.42	79.6		73.2	85.9
0.09	0.006362	5.60	62.9		57.8	67.9
0.1	0.007854	6.91	50.9		46.9	55.0
0.11	0.009503	8.36	42.1	± 7 %	39.1	45.0
0.112	0.009852	8.67	40.6		37.8	43.4
0.12	0.01131	9.95	35.4		32.9	37.8
0.125	0.01227	10.8	32.6		30.3	34.9
0.13	0.01327	11.7	30.1		28.0	32.2
0.14	0.01539	13.5	26.0		24.2	27.8
0.15	0.01767	15.6	22.6		21.1	24.2
0.16	0.02011	17.7	19.9		18.5	21.3
0.18	0.02545	22.4	15.7		14.6	16.8
0.2	0.03142	27.6	12.7	± 6 %	12.0	13.5
0.22	0.03801	33.5	10.5		9.9	11.2
0.224	0.03941	34.7	10.2		9.54	10.8
0.25	0.04909	43.2	8.15		7.66	8.64
0.28	0.06158	54.2	6.50		6.11	6.89
0.3	0.07069	62.2	5.66		5.32	6.00
0.315	0.07793	68.6	5.13	± 5 %	4.88	5.39
0.35	0.09621	84.7	4.16		3.95	4.37
0.355	0.09898	87.1	4.04		3.84	4.24
0.4	0.1257	111	3.18		3.02	3.34
0.45	0.1590	140	2.52		2.39	2.64
0.5	0.1963	173	2.04		1.94	2.14
0.55	0.2376	209	1.68	± 4 %	1.62	1.75
0.56	0.2463	217	1.62		1.56	1.69
0.6	0.2827	249	1.41		1.36	1.47
0.63	0.3117	274	1.28		1.23	1.33
0.65	0.3318	292	1.21		1.16	1.25
0.7	0.3848	339	1.04		0.998	1.08
0.71	0.3959	348	1.01		0.970	1.05
0.8	0.5027	442	0.796		0.764	0.828
0.9	0.6362	560	0.629		0.604	0.654
1.0	0.7854	691	0.509		0.489	0.530
1.12	0.9852	867	0.406		0.390	0.422
1.2	1.131	995	0.354		0.340	0.368
1.25	1.227	1080	0.326		0.313	0.339
1.4	1.539	1355	0.260		0.249	0.270
1.5	1.767	1555	0.226		0.217	0.235
1.6	2.011	1769	0.199		0.191	0.207
1.8	2.545	2239	0.157		0.151	0.163
2.0	3.142	2765	0.127		0.122	0.132
2.2	3.801	3345	0.105		0.101	0.109
2.24	3.941	3468	0.102		0.0974	0.106
2.5	4.909	4320	0.0815		0.0782	0.0847
2.8	6.158	5419	0.0650		0.0624	0.0676
3.0	7.069	6220	0.0566		0.0543	0.0589
3.15	7.793	6858	0.0513		0.0493	0.0534
3.2	8.042	7077	0.0497		0.0477	0.0517
3.5	9.621	8467	0.0416		0.0399	0.0432
3.55	9.898	8710	0.0404		0.0388	0.0420
4.0	12.57	11058	0.0318		0.0306	0.0331
4.5	15.90	13996	0.0252		0.0241	0.0262
5.0	19.63	17279	0.0204		0.0196	0.0212
5.5	23.76	20907	0.0168		0.0162	0.0175
5.6	24.63	21675	0.0162		0.0156	0.0169
6.0	28.27	24881	0.0141		0.0136	0.0147
6.3	31.17	27432	0.0128		0.0123	0.0133
8.0	50.27	44234	0.00796		0.00764	0.00828

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