

Brand Name	RESISTHERM ¹⁾				
Material Code	1)				
Abbreviation	NiFe30				
Chemical Composition (mass components) in % Average values of alloy components					
Ni	Fe	Al	Mn	Cr	
Rem.	30	0.6	0.5	0.3	

Form of Delivery

RESISTHERM is supplied in the form of round wires in the range 0.25 to 0.02 mm Ø in bare, oxidized (non-insulated) or enamelled

condition and also in the form of stranded wires.

Properties and Application Notes

RESISTHERM is well known for having a high temperature coefficient at a relatively high resistivity.

Up to 600 °C, this alloy is ferro-magnetic. It is mainly used in wire form for temperature-dependent resistors. Also for shielded resistors for spark-plug connectors as well as self-regulating heaters.

The maximum working temperature in air is 800 °C.

Electrical Resistance in Annealed Condition

Temperature coefficient of electrical resistance between 20 °C and 105 °C 10 ⁻⁶ /K	Electrical resistivity in: µΩ x cm (first line) and Ω/CMF (second line) Reference Values					
	20 °C tolerance ±5 %	100 °C	200 °C	300 °C	400 °C	500 °C
appr. +3200	33 199	41 247	52 313	64 385	76 457	89 535

Physical Characteristics (Reference Values)

Density at 20 °C		Melting Point °C	Specific heat at 20 °C J/g K	Thermal conductivity at 20 °C W/m K	Average linear thermal expansion coefficient between 20 °C and		Thermal EMF against copper at 20 °C µV/K
g/cm ³	lb/cub in				100 °C 10 ⁻⁶ /K	400 °C 10 ⁻⁶ /K	
8.5	0.31	1400	0.42	25	12	13	- 27

Strength Properties at 20 °C in Annealed Condition

Tensile Strength ²⁾		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
600	87000	≈ 8	≈ 15	≈ 20	≥ 25	≥ 30

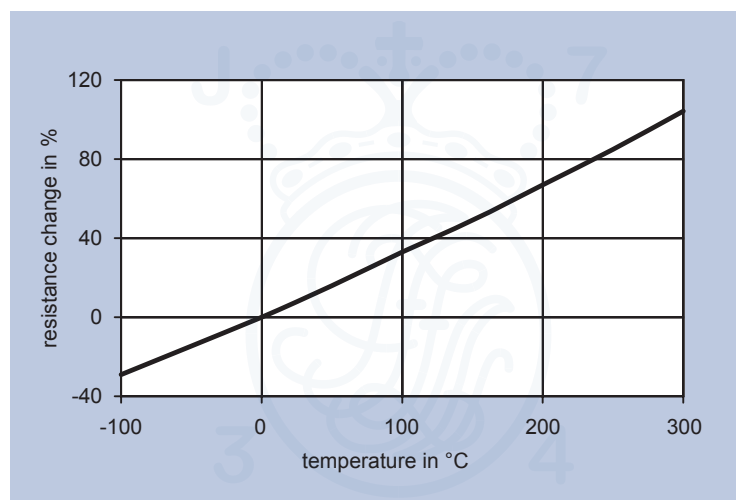
1) RESISTHERM is not a standardized alloy.

2) 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

RESISTHERM can easily be spot-welded. Under certain conditions it can also be soldered and brazed (see Technical Information).

Graph 1:
Electrical resistance vs. temperature



Special Remarks on the Temperature Coefficient

The variation of the electrical resistance vs. temperature in the range between -100 and +300 °C, referred to 0 °C, is shown in graph 1.

* 1 ppm = 10⁻⁶ = 0.0001 %, 1000 ppm = 1 x 10⁻³ = 0.1 %

Nominal Diameter d mm	Cross Section mm ²	Weight per 100 m g	DC Resistance Referred to Length at 20 °C Ω / m			
			Nominal Value	Tolerance	Minimum Value	Maximum Value
0.02	0.0003142	0.267	1050	± 10 %	945	1156
0.022	0.0003801	0.323	868		781	955
0.025	0.0004909	0.417	672		605	740
0.028	0.0006158	0.523	536		482	590
0.03	0.0007069	0.601	467	± 8 %	430	504
0.032	0.0008042	0.684	410		378	443
0.036	0.001018	0.865	324		298	350
0.04	0.001257	1.07	263		242	284
0.045	0.001590	1.35	208		191	224
0.05	0.001963	1.67	168		155	182
0.056	0.002463	2.09	134		123	145
0.06	0.002827	2.40	117		107	126
0.063	0.003117	2.65	106		97.4	114
0.07	0.003848	3.27	85.7		78.9	92.6
0.071	0.003959	3.37	83.4		76.7	90.0
0.08	0.005027	4.27	65.7		60.4	70.9
0.09	0.006362	5.41	51.9		47.7	56.0
0.10	0.007854	6.68	42.0		38.7	45.4
0.11	0.009503	8.08	34.7	± 7 %	32.3	37.2
0.112	0.009852	8.37	33.5		31.2	35.8
0.12	0.01131	9.61	29.2		27.1	31.2
0.125	0.01227	10.4	26.9		25.0	28.8
0.13	0.01327	11.3	24.9		23.1	26.6
0.14	0.01539	13.1	21.4		19.9	22.9
0.15	0.01767	15.0	18.7		17.4	20.0
0.16	0.02011	17.1	16.4		15.3	17.6
0.18	0.02545	21.6	13.0	12.1	13.9	
0.20	0.03142	26.7	10.5	± 6 %	9.87	11.1
0.22	0.03801	32.3	8.68		8.16	9.20
0.224	0.03941	33.5	8.37		7.87	8.88
0.25	0.049087	41.7	6.72		6.32	7.13