



Brand Name	<b>SPECIAL NICKEL</b>				
Material Code	<b>2.4062</b>				
Abbreviation	<b>Ni 99.4 Fe</b>				
Chemical Composition (mass components) in %. Average values of alloy components					
<b>Ni</b> Rem.	<b>Fe</b> 0.4				

### Features and Application Notes

SPECIAL NICKEL is especially characterized by a high and exactly defined temperature coefficient, standardized in DIN 43760. This alloy is exclusively used for temperature sensors and resistance thermometers. The maximum working temperature in air is +700 °C, for resistance thermometers according to DIN 43760 it is +250 °C.

### Form of Delivery

SPECIAL NICKEL is supplied in the form of round wires in the range 0.03 to 1.00 mm Ø in bare and enamelled condition.

### 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 +105 °C $10^{-6}/\text{K}$	0 °C	+20 °C	50 °C	+100 °C	+150 °C	+200 °C	+250 °C
<b>+6,100 to 6,260<sup>1)</sup></b>	<b>6.88</b>	<b>7.65<sup>2)</sup></b>	<b>8.88</b>	<b>11.1</b>	<b>13.7</b>	<b>3616,6</b>	<b>19.9</b>
	<b>41</b>	<b>46</b>	<b>53</b>	<b>67</b>	<b>82</b>	<b>100</b>	<b>120</b>

### Physical Characteristics (Reference Values)

Density at +20 °C		Melting point °C	Specific heat at +20 °C J/g K	Thermal conductivity <sup>3)</sup> 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 <sup>3</sup>	lb/cub in				+100 °C $10^{-6}/\text{K}$	+400 °C $10^{-6}/\text{K}$	
<b>8.90</b>	<b>0.32</b>	<b>+1,440</b>	<b>0.47</b>	<b>70.00</b>	<b>13.00</b>	<b>14.00</b>	<b>-23.00</b>

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

Tensile Strength <sup>4)</sup> MPa	Elongation ( $L_0 = 100 \text{ mm}$ ) % at nominal diameter in mm					
psi	0.020 to 0.063	> 0.063 to 0.125	> 0.125 to 0.50	> 0.50 to 1.00	> 1.00	
<b>450</b>	<b>≈ 10</b>	<b>≈ 15</b>	<b>≈ 18</b>	<b>≥ 20</b>	<b>≥ 25</b>	

### Notes on Treatment // SPECIAL NICKEL can be worked easily.

This alloy can be soldered and brazed without difficulty. All known welding methods can be used.

1) Standard nominal value =  $+6180 \times 10^{-6}/\text{K}$ .

2) Approximate value, not standardized.

3) As with all pure metals, the thermal conductivity strongly depends on the purity and temperature.

4) 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 mm	Weight per 1.000 m g	DC Resistance Referred to Length at +20 °C Ω/m
0.030	6.29	108
0.040	11.20	60.9
0.050	17.50	39.0
0.060	25.20	27.1
0.070	34.20	19.9
0.080	44.70	15.2
0.090	56.60	12.0
0.100	69.90	9.74
0.120	101.00	6.76
0.140	137.00	4.97
0.150	157.00	4.33
0.160	179.00	3.80
0.180	226.00	3.01
0.200	280.00	2.43
0.300	629.00	1.08
0.400	1,120.00	0.609
0.500	1,750.00	0.390
0.600	2,520.00	0.271
0.700	3,420.00	0.199
0.800	4,470.00	0.152
0.900	5,660.00	0.120
1,000	6,990.00	0.0974

The resistance values per meter of length quoted in the table are not standardized. We deliver them in a range of  $\pm 10\%$ . The resistance values per meter of length shown on the labels of the reels apply to a temperature of +20 °C.

**Basic values in  $\Omega$  at different temperatures in °C for a measuring of nickel according to DIN 43760 (basic value 100  $\Omega$  at 0 °C)**

°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9
-60	69.5									
-50	74.3	73.8	73.3	72.8	72.3	71.9	71.4	70.9	70.5	70.0
-40	79.1	78.6	78.1	77.7	77.2	76.7	76.2	75.7	75.2	74.7
-30	84.1	83.6	83.1	82.6	82.1	81.6	81.1	80.6	80.1	79.6
-20	89.3	88.8	88.3	87.7	87.2	86.7	86.2	85.7	85.2	84.7
-10	94.6	94.0	93.5	93.0	92.5	91.9	91.4	90.9	90.3	89.8
0	100.0	99.5	98.9	98.4	97.8	97.3	96.7	96.2	95.7	95.1
0	100.0	100.5	101.1	101.7	102.2	102.8	103.3	103.9	104.4	105.0
+10	105.6	106.1	106.7	107.2	107.8	108.4	108.9	109.5	110.1	110.7
+20	111.2	111.8	112.4	113.0	113.5	114.1	114.7	115.3	115.9	116.5
+30	117.1	117.7	118.2	118.8	119.4	120.0	120.6	121.2	121.8	122.4
+40	123.0	123.6	124.2	124.8	125.4	126.0	126.7	127.3	127.9	128.5
+50	129.1	129.7	130.3	131.0	131.6	132.2	132.8	133.5	134.1	134.7
+60	135.3	136.0	136.6	137.2	137.9	138.5	139.2	139.8	140.4	141.1
+70	141.7	142.4	143.0	143.7	144.3	145.0	145.6	146.3	146.9	147.6
+80	148.9	148.9	149.6	150.2	150.9	151.6	152.2	152.9	153.6	154.3
+90	154.9	155.6	156.3	157.0	157.7	158.3	159.0	159.7	160.4	161.1
+100	161.8	162.5	163.2	163.9	164.6	165.3	166.0	166.7	167.4	168.1
+110	168.8	169.5	170.2	170.9	171.6	172.4	173.1	173.8	174.5	175.2
+120	176.0	176.7	177.4	178.2	178.9	179.6	180.4	181.1	181.8	182.6
+130	183.3	184.1	184.4	185.6	186.3	187.1	187.8	188.6	189.4	190.1
+140	190.9	191.7	192.4	193.2	194.0	194.7	195.5	196.3	197.1	197.9
+150	198.6	199.4	200.2	201.0	201.8	202.6	203.4	204.2	205.0	205.8
+160	206.6	207.4	208.2	209.0	209.8	210.6	211.5	212.3	213.1	213.9
+170	214.8	215.6	216.4	217.3	218.1	218.9	219.8	220.6	221.5	222.3
+180	223.2	224.0	224.9	225.7	226.6	227.4	228.3	229.2	230.0	230.9
+190	231.8	232.7	233.5	234.4	235.3	236.2	237.1	238.0	238.9	239.8
+200	240.7	241.6	242.5	243.4	244.3	245.2	246.1	247.0	247.9	248.9
+210	249.8	250.7	251.7	252.6	253.5	254.5	255.4	256.3	257.3	258.2
+220	259.2	260.2	261.1	262.1	263.0	264.0	265.0	266.0	266.9	267.9
+230	268.9	269.9	270.9	271.8	272.8	273.8	274.8	275.8	276.8	277.9
+240	278.9	279.9	280.9	281.9	282.9	284.0	285.0	286.0	287.1	288.1
+250	289.2									