



Brand Name	ISA®-CHROM 30¹⁾			
Material Code	1.4860			
Abbreviation	NiCr3020			
Chemical Composition (mass components) in %. Average values of alloy components				
Fe Rem.	Ni 30	Cr 20		

Features and Application Notes

ISA®-CHROM 30 is especially characterized by high resistivity and relatively low prices when compared with other nickel-chromium alloys. In spite of its relatively high iron content, this alloy is resistant to oxidation and chemical corrosion. ISA®-CHROM 30 is non-magnetic. It is suitable for high-value electrical resistors and for heating wires for any application, also for heating cords and cables. The maximum working temperature in air is +600 °C when used for resistance wires and +1,050 °C when used for heating wires.

Form of Delivery

ISA®-CHROM 30 is supplied in the form of round wires in the range 0.05 to 1.00 mm Ø usually in bare condition. On special request insulated wires and stranded wires can also be manufactured.

Notes on Treatment

ISA®-CHROM 30 can easily be spot-welded. Under certain conditions brazing and soldering is possible.

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 ±10 %	+100 °C	+200 °C	+300 °C	+400 °C	+500 °C
+300 to +400	104	107	111	114	117	120
	626	644	668	686	704	722

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	+400 °C	
7.90	0.29	+1,390	0.50	13.00	14.50	16.00	-3.00

Mechanical Properties at +20 °C in Annealed Condition

Tensile Strength ²⁾		Elongation (L ₀ = 100 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
600	87,000	≈ 8	≈ 14	≈ 18	≥ 18	≥ 25

The specifications of the electrical and physical properties generally reference the following standards:

DIN 17 471	Resistance Alloys – Properties
ASTM B267	Standard specification for wires for the production of wirewound resistors
DIN 17 470	Heating conductor alloys – Technical delivery conditions for round and flat wires
ASTM B344	Standard specification for drawn/rolled nickel-chromium and nickel-chromium-iron wires for electric heating elements

Properties and requirements depend on the material condition (formed, annealed ...) as well as the design (bare, insulated ...) and may deviate from the specified values.

1) ISA®-CHROM 30 is a registered trademark of Isabellenhütte Heusler GmbH & Co. KG.

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

Nominal Diameter mm	Cross Section mm ²	Weight per 1.000 m g	DC Resistance Referred to Length at +20 °C Ω/m			
			Nominal Value	Tolerance	Minimum Value	Maximum Value
0.050	0.001963	15.50	530	±8 %	487	572
0.056	0.002463	19.50	422		389	456
0.060	0.002827	22.30	368		338	397
0.063	0.003117	24.60	334		307	360
0.070	0.003848	30.40	270		249	292
0.071	0.003959	31.30	263		242	284
0.080	0.005027	39.70	207		190	224
0.090	0.006362	50.30	164		150	177
0.100	0.007854	62.00	132		122	143
0.110	0.009503	75.10	109		104	115
0.112	0.009852	77.80	106		100	111
0.120	0.01131	89.30	92.0		87.4	96.6
0.125	0.01227	96.90	84.7		80.5	89.0
0.130	0.01327	105.00	78.4		74.4	82.3
0.140	0.01539	122.00	67.6		64.2	70.9
0.150	0.01767	140.00	58.9		55.9	61.8
0.160	0.02011	159.00	51.7		49.1	54.3
0.180	0.02545	201.00	40.9	38.8	42.9	
0.200	0.03142	248.00	33.1	31.4	34.8	
0.220	0.03801	300.00	27.4	26.0	28.7	
0.224	0.03941	311.00	26.4	25.1	27.7	
0.250	0.04909	388.00	21.2	20.1	22.2	
0.280	0.06158	486.00	16.9	16.1	17.7	
0.300	0.07069	558.00	14.7	14.0	15.4	
0.315	0.07793	616.00	13.3	12.7	14.0	
0.350	0.09621	760.00	10.8	10.3	11.4	
0.355	0.09898	782.00	10.5	9.98	11.0	
0.400	0.1257	993.00	8.28	7.86	8.69	
0.450	0.1590	1,260.00	6.54	6.21	6.87	
0.500	0.1963	1,550.00	5.30	5.03	5.56	
0.550	0.2376	1,880.00	4.38	4.16	4.60	
0.560	0.2463	1,950.00	4.22	4.01	4.43	
0.600	0.2827	2,230.00	3.68	3.49	3.86	
0.630	0.3117	2,460.00	3.34	3.17	3.50	
0.650	0.3318	2,620.00	3.13	2.98	3.29	
0.700	0.3848	3,040.00	2.70	2.57	2.84	
0.710	0.3959	3,130.00	2.63	2.50	2.76	
0.800	0.5027	3,970.00	2.07	1.97	2.17	
0.900	0.6362	5,030.00	1.63	1.55	1.72	
1.000	0.7854	6,210.00	1.32	1.26	1.39	

