

Brand Name	ISA <sup>®</sup> -CHROM 80 <sup>1)</sup>	
Material Code	2.4869	
Abbreviation	NiCr8020	
Chemical Composition (mass components) in % Average values of alloy components		
Ni	Cr	
Rem.	20	

### Form of Delivery

ISA<sup>®</sup>-CHROM 80 is supplied in the form of round wires in the range 1.0 to 0.01 mm Ø in bare, oxide-insulated or enamelled condition, also with rayon or silk covering.

To a limited extent flat wires and stranded wires are also manufactured.

### Properties and Application Notes

ISA<sup>®</sup>-CHROM 80 is especially characterized by high resistivity and high resistance to oxidation and chemical corrosion. ISA<sup>®</sup>-CHROM 80 is non-magnetic. It possesses a relatively low temperature coefficient.

ISA<sup>®</sup>-CHROM 80 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 1200 °C when used for heating wires. Oxidized wires display better insulation properties than other alloys of this kind.

### Electrical Resistance in Annealed Condition

Temperature coefficient <sup>2)</sup> of electrical resistance between 20 °C and 105 °C 10 <sup>-6</sup> /K	Electrical resistivity <sup>3)</sup> in: μΩ x cm (first line) and Ω/CMF (second line) Reference Values					
	20 °C	100 °C	200 °C	300 °C	400 °C	500 °C
+50 to +150	tolerance ±5 %					
	108	109	110	112	114	116
	650	656	662	674	686	698

### 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
g/cm <sup>3</sup>	°C	J/g K	W/m K	100 °C 10 <sup>-6</sup> /K	400 °C 10 <sup>-6</sup> /K	μV/K
8.3	1400	0.42	15	13	15	+ 4

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

Tensile Strength <sup>4)</sup>		Elongation (L <sub>0</sub> = 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
650	94250	≈ 8	≈ 14	≈ 18	≥ 18	≥ 25

1) ISA<sup>®</sup>-CHROM 80 is a registered trademark of Isabellenhütte Heusler GmbH & Co. KG.

2) These values apply to the state after rapid cooling.

3) The resistivity of nickel-chromium alloys can be modified by special heat treatment (see Technical Information).

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

### Notes on Treatment

ISA<sup>®</sup>-CHROM 80 can easily be spot-welded. Under certain conditions brazing and soldering is possible (see Technical Information).

Nominal Diameter d mm	Cross Section mm <sup>2</sup>	Weight per 100 m g	DC Resistance Referred to Length at 20 °C Ω / m			
			Nominal Value	Tolerance	Minimum Value	Maximum Value
0.01	0.00007854	0.0652	13751	± 10 %	12376	15126
0.011	0.00009503	0.0789	11365		10228	12501
0.013	0.0001327	0.110	8137		7323	8950
0.014	0.0001539	0.128	7016		6314	7717
0.016	0.0002011	0.167	5372		4834	5909
0.018	0.0002545	0.211	4244		3820	4669
0.02	0.0003142	0.261	3438	± 8 %	3163	3713
0.022	0.0003801	0.316	2841		2614	3068
0.025	0.0004909	0.407	2200		2024	2376
0.028	0.0006158	0.511	1754		1614	1894
0.03	0.0007069	0.587	1528		1406	1650
0.032	0.0008042	0.668	1343		1235	1450
0.036	0.001018	0.845	1061		976	1146
0.04	0.001257	1.04	859		791	928
0.045	0.001590	1.32	679		625	733
0.05	0.001963	1.63	550		506	594
0.056	0.002463	2.04	439		403	474
0.06	0.002827	2.35	382		351	413
0.063	0.003117	2.59	347		319	374
0.07	0.003848	3.19	281		258	303
0.071	0.003959	3.29	273	251	295	
0.08	0.005027	4.17	215	198	232	
0.09	0.006362	5.28	170	156	183	
0.10	0.007854	6.52	138	127	149	
0.11	0.009503	7.89	114	± 5 %	108	119
0.112	0.009852	8.18	110		104	115
0.12	0.01131	9.39	95.5		90.7	100
0.125	0.01227	10.2	88.0		83.6	92.4
0.13	0.01327	11.0	81.4		77.3	85.4
0.14	0.01539	12.8	70.2		66.7	73.7
0.15	0.01767	14.7	61.1		58.1	64.2
0.16	0.02011	16.7	53.7		51.0	56.4
0.18	0.02545	21.1	42.4		40.3	44.6
0.20	0.03142	26.1	34.4		32.7	36.1
0.22	0.03801	31.6	28.4		27.0	29.8
0.224	0.03941	32.7	27.4		26.0	28.8
0.25	0.04909	40.7	22.0		20.9	23.1
0.28	0.06158	51.1	17.5		16.7	18.4
0.30	0.07069	58.7	15.3		14.5	16.0
0.315	0.07793	64.7	13.9		13.2	14.6
0.35	0.09621	79.9	11.2		10.7	11.8
0.355	0.09898	82.2	10.9		10.4	11.5
0.40	0.1257	104	8.59	8.16	9.02	
0.45	0.1590	132	6.79	6.45	7.13	
0.50	0.1963	163	5.50	5.23	5.78	
0.55	0.2376	197	4.55	4.32	4.77	
0.56	0.2463	204	4.38	4.17	4.60	
0.60	0.2827	235	3.82	3.63	4.01	
0.63	0.3117	259	3.46	3.29	3.64	
0.65	0.3318	275	3.25	3.09	3.42	
0.70	0.3848	319	2.81	2.67	2.95	
0.71	0.3959	329	2.73	2.59	2.86	
0.80	0.5027	417	2.15	2.04	2.26	
0.90	0.6362	528	1.70	1.61	1.78	
1.00	0.7854	652	1.38	1.31	1.44	