Brand Name	**ISA®-CHROM 80[1)]**
Material Code	**2.4869**
Abbreviation	**NiCr8020**

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

Ni Rem.	**Cr** 20				

Features and Application Notes
ISA®-CHROM 80 is especially characterized by high resistivity and high resistance to oxidation and chemical corrosion. ISA®-CHROM 80 is non-magnetic. It possesses a relatively low temperature coefficient. ISA®-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 +1,200 °C when used for heating wires. Oxidized wires display better insulation properties than other alloys of this kind.

Form of Delivery
ISA®-CHROM 80 is supplied in the form of round wires in the range 0.01 to 1.00 mm Ø in bare, oxide-insulated or enamelled condition. The delivery program also includes stranded and flat wires.

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

Electrical Resistance in Annealed Condition

Temperature coefficient[2)] of electrical resistance between	Electrical resistivity[3)] in: µΩ x cm (first line) and Ω/CMF (second line) Reference Values					
+20 °C and +105 °C 10^{-6}/K	+20 °C tolerance ±5 %	+100 °C	+200 °C	+300 °C	+400 °C	+500 °C
+50 to +150	**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
					+100 °C	+400 °C	+20 °C
g/cm³	**lb/cub in**	**°C**	**J/g K**	**W/m K**	**10^{-6}/K**	**10^{-6}/K**	**µV/K**
8.30	**0.30**	**+1,400**	**0.42**	**15.00**	**13.00**	**15.00**	**+4.00**

Mechanical Properties at +20 °C in Annealed Condition

Tensile Strength[4)]		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
650	**94,250**	**≈ 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 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. For thinner wires the minimum values will substantially increase, depending on the dimension.

Nominal Diameter	Cross Section	Weight per 1.000 m	DC Resistance Referred to Length at +20 °C Ω/m			
mm	mm²	g	Nominal Value	Tolerance	Minimum Value	Maximum Value
0.010	0.00007854	0.652	13,751		12,376	15,126
0.011	0.00009503	0.789	11,365		10,228	12,501
0.013	0.0001327	1.10	8,137		7,323	8,950
0.014	0.0001539	1.28	7,016	±10 %	6,314	7,717
0.016	0.0002011	1.67	5,372		4,834	5,909
0.018	0.0002545	2.11	4,244		3,820	4,669
0.020	0.0003142	2.61	3,438		3,163	3,713
0.022	0.0003801	3.16	2,841		2,614	3,068
0.025	0.0004909	4.07	2,200		2,024	2,376
0.028	0.0006158	5.11	1,754		1,614	1,894
0.030	0.0007069	5.87	1,528		1,406	1,650
0.032	0.0008042	6.68	1,343		1,235	1,450
0.036	0.001018	8.45	1,061		976	1,146
0.040	0.001257	10.40	859		791	928
0.045	0.001590	13.20	679		625	733
0.050	0.001963	16.30	550	±8 %	506	594
0.056	0.002463	20.40	439		403	474
0.060	0.002827	23.50	382		351	413
0.063	0.003117	25.90	347		319	374
0.070	0.003848	31.90	281		258	303
0.071	0.003959	32.90	273		251	295
0.080	0.005027	41.70	215		198	232
0.090	0.006362	52.80	170		156	183
0.100	0.007854	65.20	138		127	149
0.110	0.009503	78.90	114		108	119
0.112	0.009852	81.80	110		104	115
0.120	0.01131	93.90	95.5		90.7	100
0.125	0.01227	102.00	88.0		83.6	92.4
0.130	0.01327	110.00	81.4		77.3	85.4
0.140	0.01539	128.00	70.2		66.7	73.7
0.150	0.01767	147.00	61.1		58.1	64.2
0.160	0.02011	167.00	53.7		51.0	56.4
0.180	0.02545	211.00	42.4		40.3	44.6
0.200	0.03142	261.00	34.4		32.7	36.1
0.220	0.03801	316.00	28.4		27.0	29.8
0.224	0.03941	327.00	27.4		26.0	28.8
0.250	0.04909	407.00	22.0		20.9	23.1
0.280	0.06158	511.00	17.5		16.7	18.4
0.300	0.07069	587.00	15.3		14.5	16.0
0.315	0.07793	647.00	13.9	±5 %	13.2	14.6
0.350	0.09621	799.00	11.2		10.7	11.8
0.355	0.09898	822.00	10.9		10.4	11.5
0.400	0.1257	1,040.00	8.59		8.16	9.02
0.450	0.1590	1,320.00	6.79		6.45	7.13
0.500	0.1963	1,630.00	5.50		5.23	5.78
0.550	0.2376	1,970.00	4.55		4.32	4.77
0.560	0.2463	2,040.00	4.38		4.17	4.60
0.600	0.2827	2,350.00	3.82		3.63	4.01
0.630	0.3117	2,590.00	3.46		3.29	3.64
0.650	0.3318	2,750.00	3.25		3.09	3.42
0.700	0.3848	3,190.00	2.81		2.67	2.95
0.710	0.3959	3,290.00	2.73		2.59	2.86
0.800	0.5027	4,170.00	2.15		2.04	2.26
0.900	0.6362	5,280.00	1.70		1.61	1.78
1.000	0.7854	6,520.00	1.38		1.31	1.44