PRODUCT DATASHEET / 2026

NICKEL–CHROMIUM RESISTANCE & HEATING ALLOY · 镍铬高电阻电热合金

Cr20Ni80

DIN W.Nr. 2.4869 · NiCr 80/20 · Nichrome · Nikrothal 8

Oxidation-stable, ductile in service and free of the high-temperature embrittlement that shortens the life of iron-chromium-aluminium elements.

抗氧化、耐高温、不脆化——中高温电热元件的基准材料。

Cr20Ni80 is an austenitic nickel-chromium resistance alloy with 20–23 % chromium and a nickel balance of roughly 80 %. That balance gives a highly reproducible resistivity, a modest temperature coefficient and an oxide scale that stays intact through repeated heating and cooling.

In cyclic service it outlasts conventional nickel-chromium grades: after 100 hours of continuous oxidation at 800 °C the surface oxide measures about 20 µm against roughly 50 µm for a standard alloy. Unlike iron-chromium-aluminium alloys it does not embrittle after long high-temperature exposure, so elements keep their shape and ductility and need replacing far less often.

SPECIFICATION 规格

ALLOY TYPE 合金类型
Austenitic Ni–Cr

STRUCTURE 晶体结构
Single-phase austenite

MAGNETIC 磁性
Non-magnetic

STANDARDS 标准
GB/T 1234-2012 · DIN 2.4869

01 CHEMICAL COMPOSITION 化学成份

WT. % · GB/T 1234-2012

C	P	S	Mn	Si	Cr	Ni	Al	Fe
≤0.08	≤0.02	≤0.015	≤0.6	0.75–1.6	20.0–23.0	Remainder	≤0.5	≤1.0

02 PHYSICAL PROPERTIES 物理性能

TYPICAL VALUES

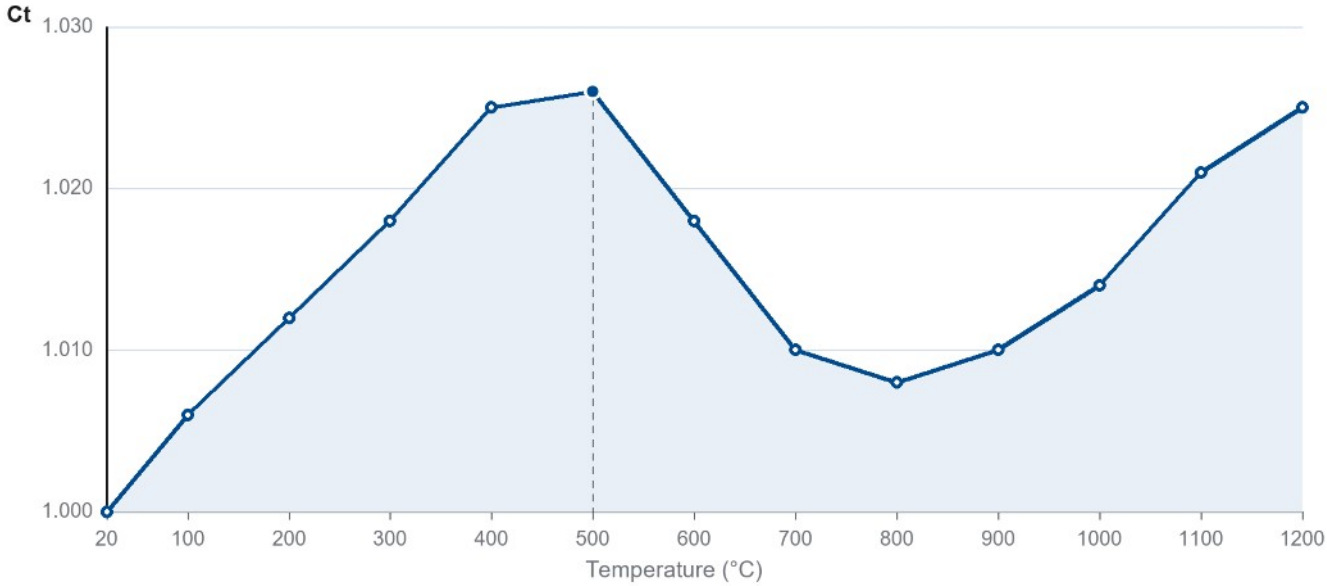
Max. Working Temp.	**1200 °C**	Resistivity at 20 °C (µΩ·m)	**<0.50 mm: 1.09±0.05 0.5–3.0 mm 1.13±0.05 >3.0 mm: 1.14±0.05**
Density	**8.40 g/cm³**	Thermal conductivity (20 °C)	**15 W/(m·K)**
Average linear expansion coefficient (20-1000 °C)	**18.0×10⁻⁶/K**	Specific heat capacity	**0.46 J/(g·K)**
Approx. melting point	**1400 °C**	Elongation after Fracture (A/%)	**Ø≤3.0 mm: ≥20% Ø>3.0 mm: ≥25%**
Tensile strength (Rm /MPa)	**≥650**	Accelerated life test	**≥80 h at 1200 °C**
Micrographic structure	**Austenite**	Magnetic properties	**Non-magnetic**

03 TEMPERATURE BEHAVIOUR 温度特性

CT · GB/T 1234-2012

Resistance rises predictably with temperature

Ct is the factor by which the 20 °C resistance is multiplied at a given temperature. Standards publish it as a table; plotted here, intermediate values can be read at a glance.



Where the curve is used: $R(T) = R_{20} \times Ct$. From 100 to 1200 °C the factor ranges from 1.006 to 1.026 (+0.6 % to +2.6 %); at constant voltage the power at temperature is P_{20} / Ct.

04 CT BY TEMPERATURE 温度系数表

°C · FACTOR

°C	20	100	200	300	400	500	600	700	800	900	1000	1100	1200
Ct	1.000	1.006	1.012	1.018	1.025	1.026	1.018	1.01	1.008	1.01	1.014	1.021	1.025

05 PERFORMANCE 性能要点

VERIFIED DATA

Oxidation resistance

About 20 µm of oxide after 100 h at 800 °C — a quarter of the scale on a standard NiCr alloy.

Stable resistivity

Resistance follows temperature within ±2 %; TCR below +400 × 10^{-6}/K.

Strength at temperature

500–700 MPa cold, still 250–350 MPa between 800 and 1100 °C.

No embrittlement

Ductility survives long high-temperature exposure, unlike FeCrAl grades.

06 APPLICATIONS 应用领域

SERVICE-PROVEN SECTORS

Periodic heat-treatment furnaces
carburizing, bell-type, ammonia-decomposition

Premium heating tubes
tubular, coil and ribbon elements

Domestic electric heaters
radiant, convection and fan heaters

High-temperature resistors
load, braking and discharge banks

Industrial heating equipment
kilns, dryers, process lines

TRADE NAMES · 商品牌号

Nichrome V · Tophet A · Alloy A · Brightray C · Cronix 80 · Nikrothal 8 · Chromalloy · Chromel A · Gilphy 80 · N8 · HAI-NiCr 80 · Resistohm 80 · Protoloy · MWS-650 · Stablohm 650 · 80/20 Nichrome · NiCr 80/20

Several names above are registered trademarks of their respective owners; they are given for cross-reference only.

07 TECHNICAL PARAMETERS 技术参数

GB/T 1234-2012

Metric wire table: resistance, length and mass

Diameter (mm)	Ω/m at 20 °C	m per kg	g per m	Diameter (mm)	Ω/m at 20 °C	m per kg	g per m
0.05	555.133	60630.51	0.01649	**1.1**	1.1891	125.27	7.98278
0.06	385.509	42104.52	0.02375	**1.2**	0.9991	105.26	9.50017
0.07	283.231	30933.93	0.03233	**1.3**	0.8513	89.69	11.14950
0.08	216.849	23683.79	0.04222	**1.4**	0.7341	77.33	12.93078
0.09	171.337	18713.12	0.05344	**1.5**	0.6394	67.37	14.84401
0.1	138.783	15157.63	0.06597	**1.6**	0.5620	59.21	16.88919
0.11	114.697	12526.96	0.07983	**1.7**	0.4978	52.45	19.06631
0.12	96.377	10526.13	0.09500	**1.8**	0.4441	46.78	21.37538
0.13	82.120	8969.01	0.11150	**1.9**	0.3985	41.99	23.81639
0.15	61.681	6736.72	0.14844	**2.0**	0.3597	37.89	26.38936
0.17	48.022	5244.85	0.19066	**2.2**	0.2973	31.32	31.93112
0.19	38.444	4198.79	0.23816	**2.4**	0.2498	26.32	38.00067
0.21	31.470	3437.10	0.29094	**2.6**	0.2128	22.42	44.59801
0.25	22.205	2425.22	0.41233	**2.8**	0.1835	19.33	51.72314
0.27	19.037	2079.24	0.48095	**3.0**	0.1599	16.84	59.37605
0.29	16.502	1802.33	0.55484	**3.2**	0.1417	14.80	67.55675
0.31	14.442	1577.28	0.63400	**3.4**	0.1256	13.11	76.26524
0.35	11.329	1237.36	0.80817	**3.6**	0.1120	11.70	85.50151
0.40	8.674	947.35	1.05557	**3.8**	0.1005	10.50	95.26558
0.45	6.853	748.52	1.33596	**4.0**	0.0907	9.47	105.55742
0.50	5.551	606.31	1.64933	**4.5**	0.0717	7.49	133.59611
0.55	4.756	501.08	1.99570	**5.0**	0.0581	6.06	164.93348
0.60	3.997	421.05	2.37504	**5.5**	0.0480	5.01	199.56950
0.65	3.405	358.76	2.78738	**6.0**	0.0403	4.21	237.50420
0.70	2.936	309.34	3.23270	**6.5**	0.0344	3.59	278.73757
0.80	2.248	236.84	4.22230	**7.0**	0.0296	3.09	323.26961
0.85	1.991	209.79	4.76658	**7.5**	0.0258	2.69	371.10032
0.90	1.776	187.13	5.34384	**8.0**	0.0227	2.37	422.22970
0.95	1.594	167.95	5.95410	**8.5**	0.0201	2.10	476.65774
1.00	1.439	151.58	6.59734	**9.0**	0.0179	1.87	534.38446

Resistance tolerance 0.03–0.06 mm ±10 % · 0.07–0.12 mm ±8 % · 0.13–0.17 mm ±7 % · 0.18–0.32 mm ±6 % · above 0.32 mm ±5 %.

08 SUPPLY FORMS 供货规格

OTHER SIZES ON REQUEST

WIRE
0.025–1.6 mm
Bright, soft annealed

WIRE
1.0–10.0 mm
Acid-pickled / primary colour

ROD
6.0–150.0 mm
Drawn and annealed

FLAT WIRE
0.2–6.0 × 0.08–1.0 mm
Width × thickness

RIBBON
5.0–300 × 0.05–4.0 mm
Width × thickness

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Founded 1990 · formerly Danyang Resistance Wire Factory · ISO 9001:2015 · 1,500 t per year · about half exported