PRODUCT DATASHEET / 2026

NICKEL–CHROMIUM–IRON RESISTANCE & HEATING ALLOY · 镍铬铁双牌号合金

Cr20Ni35 / Cr20Ni30

Chromel D · Nikrothal 40 · NiCr 3520

Two GB/T 1234-2012 grades on one sheet: identical physical properties, different nickel content — and a different price.

同一规格下的两个牌号——物理性能完全相同，含镍量与温度系数不同，含镍更低则更具性价比。

Cr20Ni35 and Cr20Ni30 are two GB/T 1234-2012 nickel-chromium-iron grades that share a single specification. The physical properties, the wire table and the available finishes on this sheet apply to both; only the nickel range and the resistance-temperature factor differ — 34–37 % Ni in Cr20Ni35, 30–34 % in Cr20Ni30.

Cr20Ni35 is the stronger of the two in high-temperature stability, corrosion resistance and service life, for premium work. Cr20Ni30 carries roughly four points less nickel, which shows directly in the price and makes it the choice for large-scale, medium-temperature production. Both are interchangeable across 800–1100 °C, so selection comes down to duty and budget.

SPECIFICATION 规格

ALLOY TYPE 合金类型
Austenitic Ni–Cr–Fe

STRUCTURE 晶体结构
Austenite

MAGNETIC 磁性
Non-magnetic

STANDARDS 标准
GB/T 1234-2012

01 CHEMICAL COMPOSITION 化学成份

WT. % · GB/T 1234-2012

Grade	C	P	S	Mn	Si	Cr	Ni	Al	Fe
Cr20Ni35	≤0.08	≤0.02	≤0.015	≤1.0	1.0–3.0	18.0–21.0	34.0–37.0	—	Remainder
Cr20Ni30	≤0.08	≤0.02	≤0.015	≤1.0	1.0–3.0	18.0–21.0	30.0–34.0	—	Remainder

Only the nickel range separates the two grades. Physical properties, the wire table and the supply forms in this datasheet are common to both.

02 PHYSICAL PROPERTIES 物理性能

TYPICAL VALUES

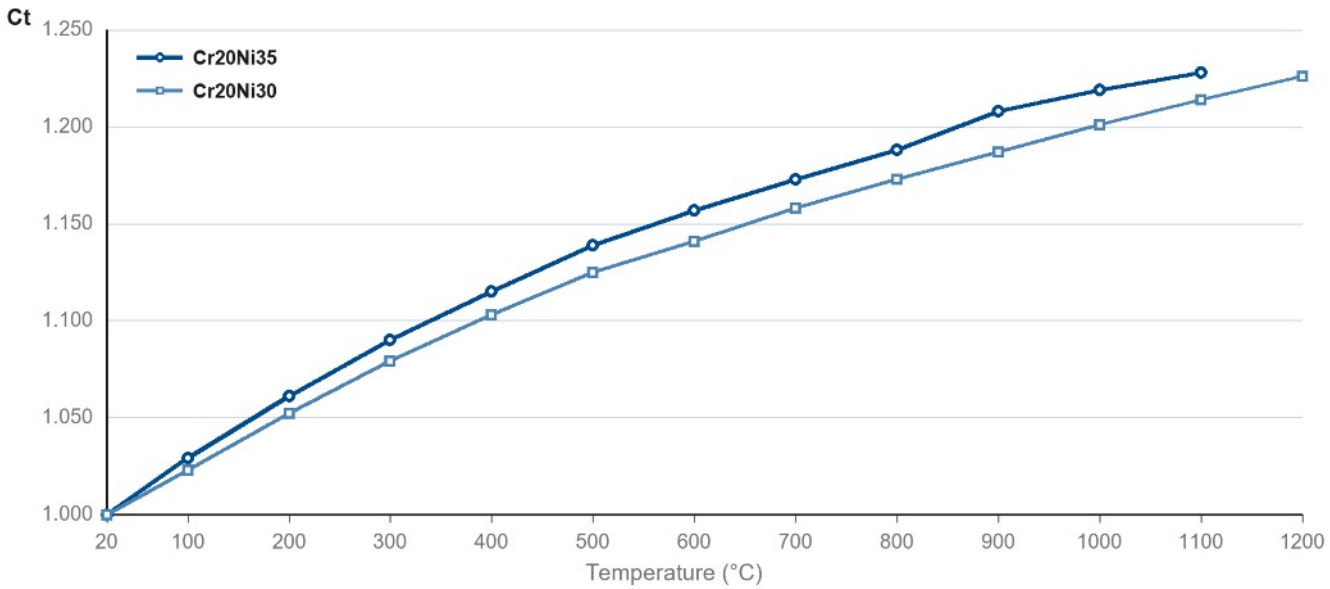
Max. Working Temp.	**1100 °C**	Resistivity at 20 °C (μΩ·m)	**1.04±0.05**
Density	**7.90 g/cm³**	Thermal conductivity (20 °C)	**13 W/(m·K)**
Average linear expansion coefficient (20-1000 °C)	**19.0×10⁻⁶/K**	Specific heat capacity	**0.50 J/(g·K)**
Approx. melting point	**1390 °C**	Elongation after Fracture (A/%)	**Ø≤3.0 mm: ≥20%** **Ø>3.0 mm: ≥25%**
Tensile strength (Rm /MPa)	**≥600**	Accelerated life test	**≥80 h/1100 °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 for both grades ranges from 1.023 to 1.228 (+2.3 % to +22.8 %); 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
Cr20Ni35	1.000	1.029	1.061	1.09	1.115	1.139	1.157	1.173	1.188	1.208	1.219	1.228	—
Cr20Ni30	1.000	1.023	1.052	1.079	1.103	1.125	1.141	1.158	1.173	1.187	1.201	1.214	1.226

05 PERFORMANCE 性能要点

VERIFIED DATA

Shared properties

Max. temperature, resistivity, density and mechanical data are one set of numbers for both grades.

Ct curve

Cr20Ni30 runs slightly lower — 1.173 against 1.188 at 800 °C.

Nickel content

Cr20Ni35 holds 34–37 % Ni, Cr20Ni30 30–34 %; every other element is unchanged.

Cost

Four points less nickel in Cr20Ni30 makes it the volume-production choice.

06 APPLICATIONS 应用领域

SERVICE-PROVEN SECTORS

Medium-temperature furnaces
800–1100 °C elements, either grade

Industrial heaters
air, liquid and process heating

Domestic appliances
ovens and heating units

Resistor banks
power and load resistors

Element rework
elements that must be reused

TRADE NAMES · 商品牌号

Chromel D · Nikrothal 40 · N4 · Chromax · HAI-NiCr 40 · Tophet D · Resistohm 40 · Cronifer III · NiCr 3520 · Alloy D · Nikrothal 4 · MWS-610 · Stablohm 610 · Ni35Cr20

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	529.668	64467.88	0.01551	**1.1**	1.0944	133.20	7.50761
0.06	367.825	44769.36	0.02234	**1.2**	0.9196	111.92	8.93468
0.07	270.239	32891.78	0.03040	**1.3**	0.7835	95.37	10.48584
0.08	206.902	25182.77	0.03971	**1.4**	0.6756	82.23	12.16109
0.09	163.478	19897.49	0.05026	**1.5**	0.5885	71.63	13.96044
0.1	132.417	16116.97	0.06205	**1.6**	0.5173	62.96	15.88388
0.11	109.436	13319.81	0.07508	**1.7**	0.4582	55.77	17.93141
0.12	91.956	11192.34	0.08935	**1.8**	0.4087	49.74	20.10303
0.13	78.353	9536.67	0.10486	**1.9**	0.3668	44.65	22.39875
0.15	58.852	7163.10	0.13960	**2.0**	0.3310	40.29	24.81856
0.17	45.819	5576.81	0.17931	**2.2**	0.2736	33.30	30.03046
0.19	36.681	4464.53	0.22399	**2.4**	0.2299	27.98	35.73873
0.21	30.027	3654.64	0.27362	**2.6**	0.1959	23.84	41.94337
0.25	21.187	2578.72	0.38779	**2.8**	0.1689	20.56	48.64438
0.27	18.164	2210.83	0.45232	**3.0**	0.1471	17.91	55.84176
0.29	15.745	1916.41	0.52181	**3.2**	0.1293	15.74	63.53552
0.31	13.779	1677.10	0.59627	**3.4**	0.1145	13.94	71.72564
0.35	10.810	1315.67	0.76007	**3.6**	0.1022	12.44	80.41214
0.40	8.276	1007.31	0.99274	**3.8**	0.0917	11.16	89.59501
0.45	6.539	795.90	1.25644	**4.0**	0.0828	10.07	99.27424
0.50	5.297	644.68	1.55116	**4.5**	0.0654	7.96	125.64397
0.55	4.377	532.79	1.87690	**5.0**	0.0530	6.45	155.11601
0.60	3.678	447.69	2.23367	**5.5**	0.0438	5.33	187.69037
0.65	3.134	381.47	2.62146	**6.0**	0.0368	4.48	223.36705
0.70	2.702	328.92	3.04027	**6.5**	0.0313	3.81	262.14605
0.80	2.069	251.83	3.97097	**7.0**	0.0270	3.29	304.02737
0.85	1.833	223.07	4.48285	**7.5**	0.0235	2.87	349.01101
0.90	1.635	198.97	5.02576	**8.0**	0.0207	2.52	397.09698
0.95	1.467	178.58	5.59969	**8.5**	0.0183	2.23	448.28526
1.00	1.324	161.17	6.20464	**9.0**	0.0163	1.99	502.57586

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
1.0–12.0 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