

**Cr20Ni80** (DIN W.Nr. 2.4869) is a nickel-chromium based high-resistance heating alloy. It demonstrates significantly better oxidation resistance compared to standard alloys. Testing shows that after 100 hours of continuous oxidation at 800°C, the surface oxide layer thickness is only 20µm, while comparable standard alloys reach 50µm. The resistance of Cr20Ni80 varies linearly with temperature with an error within ±2%. The temperature coefficient of resistance (TCR) is lower than  $+400 \times 10^{-6}/K$ , providing consistent heating performance across temperature ranges. At room temperature, tensile strength of Cr20Ni80 is 500-700 MPa. Even at high temperatures (800°C-1100°C), it remains at 250-350 MPa, maintaining structural integrity under prolonged heating conditions. Unlike iron-chromium-aluminum alloys, Cr20Ni80 does not become brittle after prolonged high-temperature exposure, extending service life and reducing replacement frequency. At room temperature, it has high plasticity with elongation of 20%-30%, excellent cold stamping and welding performance. The alloy is single-phase austenite after solution treatment with stable microstructure during use. Cr20Ni80 is suitable for periodic heat treatment furnaces below 1000°C (carburizing furnaces, bell furnaces, ammonia decomposition furnaces), premium heating tubes, household electric heaters, high-temperature resistors, and industrial heating equipment.

**Cr20Ni80** also has the following common names: Nichrome V, Tophet A, Alloy A, Bhrigtray C, Cronix 80, Nikrothal 8, Chromalloy, Chromel A, and Gilphy 80, N8, HAI-NiCr 80, Resistohm 80, Protoloy, MWS-650, Stablohm 650, 80/20 Nichrome or NiCr 80/20.

### CHEMICAL COMPOSITION

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

### PHYSICAL PROPERTIES

Max. Working Temp.	1200°C	Resistivity at 20°C ( $\mu\Omega \cdot m$ )	<0.50mm 1.09±0.05 0.5-3.0mm 1.13±0.05 >3.0mm 1.14±0.05
Density	8.40 g/cm <sup>3</sup>	Thermal conductivity (20°C)	15 W/(m·K)
Average linear expansion coefficient(20-1000°C)	$18.0 \times 10^{-6}/K$	Specific heat capacity	0.46 J/(g·K)
Approx. melting point	1400°C	Elongation after Fracture (A/%)	Diameter≤3.0mm: ≥20% Diameter>3.0mm: ≥25%
Tensile strength( $R_m$ /MPa)	≥650	Accelerated life test	≥80h/1200°C
Micrographic structure	Austenite	Magnetic properties	Non-magnetic

# Cr20Ni80 NICHROME RESISTANCE WIRE

## DATASHEET

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### TEMPERATURE FACTOR OF RESISTIVITY

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

### TECHNICAL PARAMETERS

Diameter (mm)	Ohm per meter (20°C Ω/m)	Length per kg (m/kg)	Weight per meter (g/m)	Diameter (mm)	Ohm per meter (20°C Ω/m)	Length per kg (m/kg)	Weight per meter (g/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

# Cr20Ni80 NICHROME RESISTANCE WIRE

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Diameter (mm)	Ohm per meter (20°C Ω/m)	Length per kg (m/kg)	Weight per meter (g/m)	Diameter (mm)	Ohm per meter (20°C Ω/m)	Length per kg (m/kg)	Weight per meter (g/m)
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

Above parameters are based on Chinese National Standard GB/T1234-2012. The tolerance of resistance per meter: 0.03-0.06mm is ±10%; 0.07-0.12mm is ±8%; 0.13-0.17mm is ±7%; 0.18-0.32mm is ±6%; A wire diameter above 0.32mm is ±5%. **We provide various shapes of Nickel-Chromium alloy products, such as wires, ribbons, and rods in the following sizes:**

Bright and soft annealed finish: 0.025 - 1.6mm; Acid-pickled finish or primary color (dark green): 1.0 -12.0mm; Rods: 6.0-150.0mm; Flat wire: width from 0.2 - 6.0mm and thickness from 0.08 - 1.0mm; Heating ribbon: width from 5.0 - 300mm and thickness from 0.05 - 4.0mm

Disclaimer: Recommendations are for guidance only, and the suitability of the materials can only be confirmed once we understand the actual usage conditions. Continuous technological development may result in changes to technical data without notice. Some common names of the alloy are registered trademarks. Their ownership belongs to the registrants. This datasheet was updated on 2019-02-12.