0Cr21Al6Nb

GB/T 1234-2012

Niobium-bearing Fe-Cr-Al alloy: precipitation-hardened creep resistance above 1000 °C plus stability in reducing and low-oxygen atmospheres.

1350 °C	1.45 μΩ·m	7.10 g/cm³	≥50 h
MAX. WORKING TEMPERATURE	RESISTIVITY AT 20 °C	DENSITY	ACCELERATED LIFE AT 1350 °C

PRODUCT OVERVIEW

0Cr21Al6Nb carries roughly 0.5 % niobium. Niobium forms fine intermetallic Laves-phase particles with aluminium and iron, and the resulting precipitation hardening gives creep and sag resistance far above that of niobium-free grades such as 0Cr25Al5 or 0Cr20Al3 once the temperature passes 1000 °C.

The niobium addition also changes the alloy's behaviour in hostile atmospheres. Standard Fe-Cr-Al material is prone to green rot — embrittlement from selective chromium oxidation — when heated in hydrogen-bearing gas such as dissociated ammonia or endothermic atmosphere. 0Cr21Al6Nb is markedly more stable under reducing or low-oxygen-partial-pressure conditions, which opens up atmosphere-controlled heat-treatment and bright annealing furnaces where standard 0Cr25Al5 tends to fail.

Because niobium refines the grain and slows high-temperature grain growth, ductility and toughness survive long service and the risk of coarse-grain fracture drops; service life is typically 1.5 to 2 times that of standard Fe-Cr-Al grades. Niobium makes the alloy dearer than 0Cr25Al5, but it remains well below nickel-chromium — the balanced answer for duty above 1300 °C or in difficult atmospheres.

ALSO KNOWN AS

Kanthal A-1 · Aluchrom O · Alchrome 875 · Alloy 875 · Icralloy 25 · Resistohm 145 · Alferon 25 · MWS-875 · Stablohm 875

CHEMICAL COMPOSITION

C	P	S	Mn	Si	Cr	Ni	Al	Fe	Nb
≤0.05	≤0.025	≤0.02	≤0.5	≤0.6	21.0–23.0	≤0.6	5.0–7.0	Bal.	0.5

Values in weight %. Balance (Bal.) is iron. Composition based on GB/T 1234-2012.

TYPICAL APPLICATIONS

- Atmosphere-controlled heat-treatment furnaces
- Bright annealing furnaces
- Dissociated ammonia / endothermic gas atmospheres
- Horizontal elements above 1000 °C
- Long-life service above 1300 °C

PHYSICAL & MECHANICAL PROPERTIES

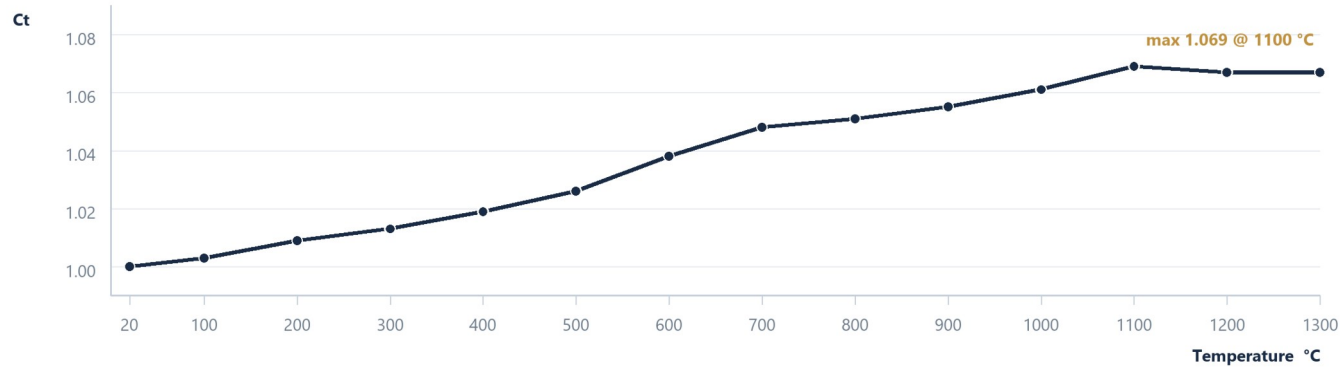
Property	Value	Property	Value
Max. working temperature	1350 °C	Resistivity at 20 °C (μΩ·m)	1.45 ± 0.07
Density	7.10 g/cm³	Thermal conductivity (20 °C)	13 W/(m·K)
Mean linear expansion 20–1000 °C	16.0 × 10^{-6} /K	Specific heat capacity	0.49 J/(g·K)
Approx. melting point	1510 °C	Elongation after fracture A/%	≤3.0 mm: ≥10 % >3.0 mm: ≥12 %
Tensile strength Rm	≥650 MPa	Accelerated life test	≥50 h at 1350 °C
Micrographic structure	Ferrite	Magnetic properties	Magnetic

TEMPERATURE FACTOR OF RESISTIVITY

Ct is applied to the 20 °C resistivity to obtain the value at working temperature:

R (T) = R (20 °C) × Ct

Temp. °C	20	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300
Ct	1.000	1.003	1.009	1.013	1.019	1.026	1.038	1.048	1.051	1.055	1.061	1.069	1.067	1.067



AVAILABLE FORMS & SUPPLY RANGE

Form	Surface / finish	Size range
Wire	Bright, soft annealed	0.05 – 1.6 mm
Wire	Acid-pickled	1.0 – 12.0 mm
Wire	Golden surface	1.2 – 3.9 mm
Wire	Blue surface	4.0 – 10.0 mm
Rod	Oxidized, acid-pickled or bright finish	6.0 – 150.0 mm
Flat wire	Bright & soft annealed	width 0.2 – 6.0 mm · thickness 0.08 – 1.0 mm
Heating ribbon	Oxidized, acid-pickled or bright finish	width 5.0 – 300 mm · thickness 0.05 – 4.0 mm

TECHNICAL PARAMETERS

Standard diameters 0.05 – 9.0 mm: resistance, yield length and weight per metre. Calculated to GB/T 1234-2012.

Ø mm	Ω/m at 20 °C	m/kg	g/m	Ø mm	Ω/m at 20 °C	m/kg	g/m
0.05	738.480	71731.87	0.01394	1.1	1.5258	148.21	6.74735
0.06	512.833	49813.80	0.02007	1.2	1.2821	124.53	8.02990
0.07	376.775	36597.89	0.02732	1.3	1.0924	106.11	9.42398
0.08	288.469	28020.26	0.03569	1.4	0.9419	91.49	10.92959
0.09	227.926	22139.46	0.04517	1.5	0.8205	79.70	12.54673
0.1	184.620	17932.97	0.05576	1.6	0.7212	70.05	14.27538
0.11	152.578	14820.63	0.06747	1.7	0.6388	62.05	16.11557
0.12	128.208	12453.45	0.08030	1.8	0.5698	55.35	18.06728
0.13	109.243	10611.22	0.09424	1.9	0.5114	49.68	20.13052
0.15	82.053	7970.21	0.12547	2.0	0.4615	44.83	22.30529
0.17	63.882	6205.18	0.16116	2.2	0.3814	37.05	26.98940
0.19	51.141	4967.58	0.20131	2.4	0.3205	31.13	32.11962
0.21	41.864	4066.43	0.24592	2.6	0.2731	26.53	37.69594
0.25	29.539	2869.27	0.34852	2.8	0.2355	22.87	43.71837
0.27	25.325	2459.94	0.40651	3.0	0.2051	19.93	50.18690
0.29	21.952	2132.34	0.46897	3.2	0.1803	17.51	57.10154
0.31	19.211	1866.07	0.53588	3.4	0.1597	15.51	64.46229
0.35	15.071	1463.92	0.68310	3.6	0.1425	13.84	72.26914
0.40	11.539	1120.81	0.89221	3.8	0.1279	12.42	80.52209
0.45	9.117	885.58	1.12921	4.0	0.1154	11.21	89.22116
0.50	7.385	717.32	1.39408	4.5	0.0912	8.86	112.92053
0.55	6.103	592.83	1.68684	5.0	0.0738	7.17	139.40806
0.60	5.128	498.14	2.00748	5.5	0.0610	5.93	168.68375
0.65	4.370	424.45	2.35600	6.0	0.0513	4.98	200.74760
0.70	3.768	365.98	2.73240	6.5	0.0437	4.24	235.59962
0.80	2.885	280.20	3.56885	7.0	0.0377	3.66	273.23979
0.85	2.555	248.21	4.02889	7.5	0.0328	3.19	313.66813
0.90	2.279	221.39	4.51682	8.0	0.0288	2.80	356.88462
0.95	2.046	198.70	5.03263	8.5	0.0256	2.48	402.88928
1.00	1.846	179.33	5.57632	9.0	0.0228	2.21	451.68210

TOLERANCE OF RESISTANCE PER METRE

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 %

Applies to the resistance values listed in the technical parameter table above.

NOTICE

Recommendations are given for guidance only. Suitability of the material can only be confirmed once the actual service conditions are known. Continuous technical development may lead to changes in these data without notice. Some of the common names listed are registered trademarks of their respective owners. Issued October 2026.