

0Cr20Al6RE FeCrAl RESISTANCE WIRE

DATASHEET

CHANGSHU IPACE INTERNATIONAL CORP

0Cr20Al6RE is one of the most technologically advanced Fe-Cr-Al heating alloys in the GB/T 1234-2012 standard. By adding trace rare earth elements, it solves the three major pain points of traditional Fe-Cr-Al alloys: easy scale spalling, grain coarsening, and short thermal cycling life. Although its creep resistance is slightly inferior to 0Cr21Al6Nb, it excels in oxidation resistance and thermal fatigue resistance. The core advantage of 0Cr20Al6RE is the significant improvement in oxidation resistance brought by the "Reactive Element Effect"(REE). The addition of trace rare earth elements creates the renowned "Reactive Element Effect" (REE): Enhanced Oxide Scale Adhesion and Inhibition of Harmful Impurity Diffusion. At high temperatures of 1200-1300°C, its oxidation resistance life is typically 1.5 to 2 times that of standard 0Cr25Al5, making it particularly suitable for conditions with frequent start-stop cycles (thermal cycling). Standard Fe-Cr-Al alloys tend to experience rapid grain coarsening after long-term high-temperature use, leading to embrittlement and even fracture. Fine oxide particles formed by rare earth elements (such as La_2O_3 , CeO_2) are dispersed at grain boundaries, acting as Zener Pinning agents that effectively inhibit grain growth at high temperatures. This allows 0Cr20Al6RE to maintain better toughness and strength after prolonged high-temperature operation, reducing the risk of accidental fracture due to coarse grains. Due to strong oxide scale adhesion and refined grains, 0Cr20Al6RE performs far better than standard alloys during repeated heating and cooling (thermal shock). Standard alloys are prone to scale spalling during thermal cycling, exposing fresh metal and accelerating oxidation failure; whereas the oxide scale of 0Cr20Al6RE adheres tightly to the matrix, expanding and contracting with it without easy spalling. Therefore, it is particularly suitable for scenarios with large temperature fluctuations, such as batch-type industrial furnaces and laboratory muffle furnaces. Although the addition of rare earths makes it slightly more expensive than standard 0Cr25Al5 (approx. 10-20% higher), the extension of service life (especially thermal cycling life) often offsets the increased material cost. For critical heating equipment requiring long life and high reliability, the reduction in replacement frequency and maintenance costs results in a lower Total Cost of Ownership (TCO). Compared to expensive nickel-chromium alloys or niobium-containing alloys (0Cr21Al6Nb), it still offers a significant price advantage.

CHEMICAL COMPOSITION

C	P	S	Mn	Si	Cr	Ni	Al	Fe	RE
≤									
0.04	0.025	0.02	0.5	≤0.4	19.0~21.0	≤0.6	5.0~6.0	Remainder	0.04~1.0

PHYSICAL PROPERTIES

Max. Working Temp.	1300°C	Resistivity at 20°C ($\mu\Omega \cdot m$)	1.40±0.07
Density	7.2 g/cm ³	Thermal conductivity (20°C)	13 W/(m·K)

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Average linear expansion coefficient(20-1000°C)	14.0×10 ⁻⁶ /K	Specific heat capacity	0.48 J/(g·K)
Approx. melting point	1500°C	Elongation after Fracture (A%)	Diameter≤3.0mm: ≥12% Diameter>3.0mm: ≥15%
Tensile strength(R _m /MPa)	≥600	Accelerated life test	≥80h/1300°C
Micrographic structure	Ferrite	Magnetic properties	Magnetic

TEMPERATURE FACTOR OF RESISTIVITY

Temp(° C)	100	200	300	400	500	600	700	800	900	1000	1100	1200
Ct	1.002	1.005	1.010	1.015	1.021	1.029	1.035	1.039	1.042	1.044	1.046	1.047

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	713.015	70735.59	0.01414	1.1	1.4732	146.15	6.84238
0.06	495.149	49121.94	0.02036	1.2	1.2379	122.80	8.14300
0.07	363.783	36089.59	0.02771	1.3	1.0548	104.64	9.55672
0.08	278.521	27631.09	0.03619	1.4	0.9095	90.22	11.08353
0.09	220.066	21831.97	0.04580	1.5	0.7922	78.60	12.72344
0.1	178.254	17683.90	0.05655	1.6	0.6963	69.08	14.47645
0.11	147.317	14614.79	0.06842	1.7	0.6168	61.19	16.34255
0.12	123.787	12280.48	0.08143	1.8	0.5502	54.58	18.32175
0.13	105.476	10463.84	0.09557	1.9	0.4938	48.99	20.41405
0.15	79.224	7859.51	0.12723	2.0	0.4456	44.21	22.61945
0.17	61.679	6119.00	0.16343	2.2	0.3683	36.54	27.36953
0.19	49.378	4898.59	0.20414	2.4	0.3095	30.70	32.57201
0.21	40.420	4009.95	0.24938	2.6	0.2637	26.16	38.22687
0.25	28.521	2829.42	0.35343	2.8	0.2274	22.56	44.33412
0.27	24.452	2425.77	0.41224	3.0	0.1981	19.65	50.89376

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0.29	21.195	2102.72	0.47557	3.2	0.1741	17.27	57.90579
0.31	18.549	1840.16	0.54343	3.4	0.1542	15.30	65.37020
0.35	14.551	1443.58	0.69272	3.6	0.1375	13.64	73.28701
0.40	11.141	1105.24	0.90478	3.8	0.1234	12.25	81.65621
0.45	8.803	873.28	1.14511	4.0	0.1114	11.05	90.47779
0.50	7.130	707.36	1.41372	4.5	0.0880	8.73	114.51096
0.55	5.893	584.59	1.71060	5.0	0.0713	7.07	141.37155
0.60	4.951	491.22	2.03575	5.5	0.0589	5.85	171.05958
0.65	4.219	418.55	2.38918	6.0	0.0495	4.91	203.57503
0.70	3.638	360.90	2.77088	6.5	0.0422	4.19	238.91792
0.80	2.785	276.31	3.61911	7.0	0.0364	3.61	277.08824
0.85	2.467	244.76	4.08564	7.5	0.0317	3.14	318.08599
0.90	2.201	218.32	4.58044	8.0	0.0279	2.76	361.91117
0.95	1.975	195.94	5.10351	8.5	0.0247	2.45	408.56378
1.00	1.783	176.84	5.65486	9.0	0.0220	2.18	458.04382

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 Iron-Chromium-Aluminum alloy products, such as wires, ribbons and rods in the following sizes:**

Bright and soft annealed finish: 0.05 - 1.6mm; Acid-pickled finish: 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.