

# 0Cr20Al3 FeCrAl RESISTANCE WIRE

## DATASHEET

CHANGSHU IPACE INTERNATIONAL CORP

**0Cr20Al3/0Cr21Al4** (with aluminum content approx. 3.0-4.2%) is one of the Fe-Cr-Al alloys with the best cold working properties. Compared to high-aluminum grades (such as 0Cr25Al5 or 0Cr21Al6Nb), its room temperature brittleness is significantly reduced, and elongation is higher (typically >20%). This makes it ideal for manufacturing heating elements requiring complex cold forming, deep drawing, or drawing into extremely fine wires without frequent intermediate annealing. Although its maximum operating temperature (approx. 1100°C) is slightly lower than high-aluminum grades, it offers the most economical solution for most industrial and domestic heating applications below 1100°C, while maintaining the inherent high resistivity and oxidation resistance of Fe-Cr-Al alloys. Despite the slightly lower aluminum content, 0Cr20Al3/0Cr21Al4 still forms a dense Al<sub>2</sub>O<sub>3</sub> protective film at high temperatures. In air environments at 1000-1100°C, its oxidation resistance life is typically superior to Cr20Ni80 nickel-chromium alloys at the same temperature, and it does not suffer from embrittlement due to grain coarsening after long-term high-temperature use like Ni-Cr alloys. With aluminum content controlled around 4%, it avoids the cracking issues common in high-aluminum alloys (>5%) during welding. 0Cr20Al3/0Cr21Al4 can be joined using conventional resistance welding or TIG welding, offering a wider welding process window and higher yield rates compared to 0Cr25Al5.

**0Cr20Al3** also has the following common names: 0Cr21Al4, Resistohm 123, CrAl 193, GFC123 / GFC123W, 0Cr19Al3, FCHW-2 / FCHR-2, CrAl 20 5

### CHEMICAL COMPOSITION

C	P	S	Mn	Si	Cr	Ni	Al	Fe
0.08	0.025	0.02	0.5	≤0.7	18.0~21.0	≤0.6	3.0-4.2	Remainder

### PHYSICAL PROPERTIES

Max. Working Temp.	1100°C	Resistivity at 20°C (μΩ·m)	1.23±0.07
Density	7.35 g/cm <sup>3</sup>	Thermal conductivity (20°C)	13 W/(m·K)
Average linear expansion coefficient(20-1000°C)	13.5×10 <sup>-6</sup> /K	Specific heat capacity	0.49 J/(g·K)
Approx. melting point	1500°C	Elongation after Fracture (A%)	Diameter≤3.0mm: ≥12% Diameter>3.0mm: ≥15%
Tensile strength(R <sub>m</sub> /MPa)	≥580	Accelerated life test	≥80h/1250°C
Micrographic structure	Ferrite	Magnetic properties	Magnetic

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### TEMPERATURE FACTOR OF RESISTIVITY

Temp(° C)	100	200	300	400	500	600	700	800	900	1000	1100	1200
Ct	1.011	1.025	1.042	1.061	1.085	1.12	1.142	1.154	1.164	1.172	1.180	1.186

### 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	626.434	69292.01	0.01443	1.1	1.2943	143.17	6.98493
0.06	435.024	48119.45	0.02078	1.2	1.0876	120.30	8.31265
0.07	319.609	35353.06	0.02829	1.3	0.9267	102.50	9.75582
0.08	244.701	27067.19	0.03695	1.4	0.7990	88.38	11.31444
0.09	193.344	21386.42	0.04676	1.5	0.6960	76.99	12.98851
0.1	156.609	17323.00	0.05773	1.6	0.6118	67.67	14.77804
0.11	129.429	14316.53	0.06985	1.7	0.5419	59.94	16.68302
0.12	108.756	12029.86	0.08313	1.8	0.4834	53.47	18.70346
0.13	92.668	10250.30	0.09756	1.9	0.4338	47.99	20.83934
0.15	69.604	7699.11	0.12989	2.0	0.3915	43.31	23.09069
0.17	54.190	5994.12	0.16683	2.2	0.3236	35.79	27.93973
0.19	43.382	4798.62	0.20839	2.4	0.2719	30.07	33.25059
0.21	35.512	3928.12	0.25457	2.6	0.2317	25.63	39.02326
0.25	25.057	2771.68	0.36079	2.8	0.1998	22.10	45.25775
0.27	21.483	2376.27	0.42083	3.0	0.1740	19.25	51.95404
0.29	18.622	2059.81	0.48548	3.2	0.1529	16.92	59.11216
0.31	16.296	1802.60	0.55475	3.4	0.1355	14.99	66.73208
0.35	12.784	1414.12	0.70715	3.6	0.1208	13.37	74.81382
0.40	9.788	1082.69	0.92363	3.8	0.1085	12.00	83.35738
0.45	7.734	855.46	1.16897	4.0	0.0979	10.83	92.36275
0.50	6.264	692.92	1.44317	4.5	0.0773	8.55	116.89660
0.55	5.177	572.66	1.74623	5.0	0.0626	6.93	144.31679

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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)
0.60	4.350	481.19	2.07816	5.5	0.0518	5.73	174.62332
0.65	3.707	410.01	2.43895	6.0	0.0435	4.81	207.81618
0.70	3.196	353.53	2.82861	6.5	0.0371	4.10	243.89538
0.80	2.447	270.67	3.69451	7.0	0.0320	3.54	282.86091
0.85	2.168	239.76	4.17076	7.5	0.0278	3.08	324.71278
0.90	1.933	213.86	4.67586	8.0	0.0245	2.71	369.45098
0.95	1.735	191.94	5.20984	8.5	0.0217	2.40	417.07552
1.00	1.566	173.23	5.77267	9.0	0.0193	2.14	467.58640

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.