INDUSTRIAL FURNACE HEATERS AND ALLOYS

Chonray
Alloy & Element

Shanghai Chonray Precision Alloy Co., Ltd

Add: No.1395, Lixue Road, Madong Industrial Park, Jiading Dist.,Shanghai China, 201801
Tel: +86-21-59920889
Fax: +86-21-59557596
Website: www.chonray.com
Email: sales@chonray.com

www.chonray.com

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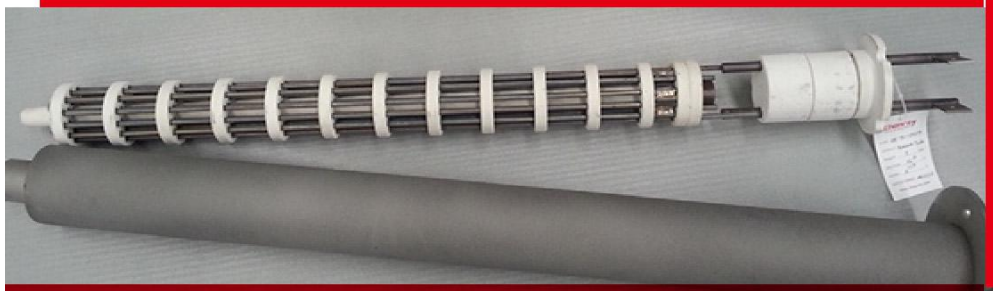
The expert in
electric furnace heating elements and alloys

Company Profile

Shanghai Chonray Precision Alloy Co., Ltd. was founded in Year 2000, comprised of two major business sectors: Electric heating elements for industrial furnaces & specialty alloys .We have a manufacturing base in Shanghai City, specialized in electric heating elements for industrial furnaces. The other manufacturing base in Jiangsu Province is specialized in research and production of specialty alloys, including high resistance alloy, super alloy, corrosion resistant alloy, precision alloy , welding wires, and so on.Based on 15+ years experience of electric heating elements and 20+ years experience of specialty alloys, Chonray has established long-term and strategic cooperation with many well-known companies abroad and at home.

Strictly implementing the quality management system ISO9001:2008 and environment management system ISO14001, Chonray ensures the quality control with the solid technical force and advanced testing and analysis equipment. Our products are widely used in various fields, such as aerospace, chemical processing, medical, glass, oil and gas, power generation, and thermal process.

Guided by the philosophy of being professional, ethical and lawful, environmental and social responsible, Chonray aims to provide best quality electric heating elements for industrial furnace and specialty alloys to customers worldwide. Chonray professional team is fully qualified to satisfy your sales, engineering and logistics requirements. We warmly welcome customers to visit our company.



Furnace Heating Elements

Radiant tubes

Radiant tubes in FeCrAl or NiCr alloys are available as complete ready-to-install assemblies according to almost any customer specification. We also provide, for example, welding of flange and bottom or distance spacers to the radiant tubes.

Specifications

SPEC 1 Effective length 900~2400mm

SPEC 2 Tube outer diameter Ø80~Ø280mm

SPEC 3 Each element power 1Kw~40Kw

SPEC 4 Customized specifications are available upon requests

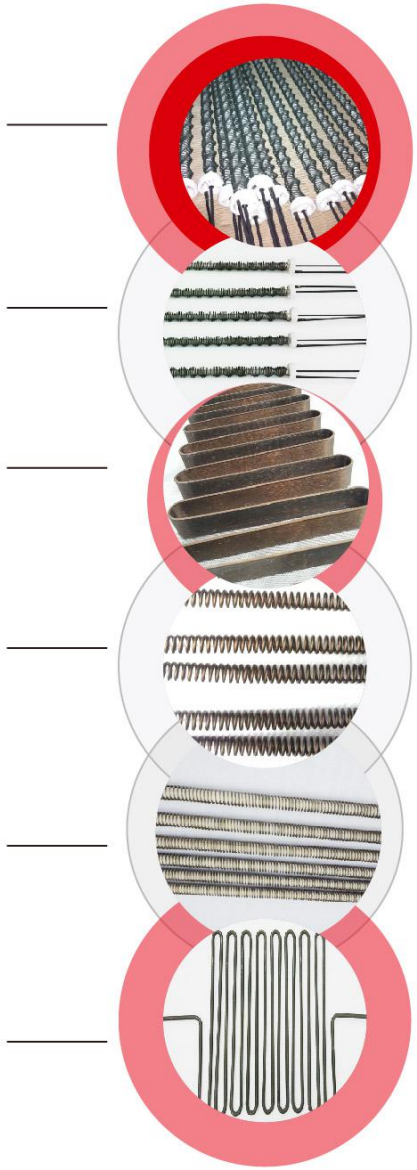
High cost effective radiant tubes using local-made materials

In order to provide our customers with high cost effective products, all the materials we use from local market are well-selected and go through strict quality testing to make sure the quality is reliable while the price is competitive. Combined with our profound experience in dealing with all kinds of application conditions, we are well-prepared to give you professional advice as well as optimized heating solutions.

High performance radiant tubes using advanced materials made by Kanthal

Based on years of strategic partnership with Kanthal, the world leading company in electric heating industry, Chonray also provides a great number of radiant tubes using Kanthal materials, including Kanthal APM and APMT FeCrAl alloys, as well as Kanthal heating elements, to our customers in high-end market, or the severe conditions that require higher mechanical properties and resistance to, for example, carburization, thermal shock, sagging and distortion.

Metallic Heating Elements



Wire elements						
Element type	Spriral	Spiral	Porcupine	Rod over bend	Corrugated	Looped
Supports	Ceramic tubes	grooves	Ceramic tubes	Metallic rods	Metallic staples	Ceramic tubes
Diagrammatic sketch						
Material	Sillimanite	Chamotte Grade 28	Sillimanite	Kanthal APM	U-shaped Kanthal nails	Sillimanite
Max. furnace temperature, ℃/℉	1300/2370	1250/2280	800/1470	1300/1470	1300/2370	1300/2370
Max. wall loading at 1000℃/1830℉ furnace temperature, kW/m2 / kW/ft2	40 /3.7	35/3.3	-	50/4.6	50/4.6	60/5.6
Max. wall loading at 1000℃/1830℉ furnace temperature, W/m2 / W/in2	3-4/19-26	3-4/19-26	-	5-6/32-39	3-6/19-39	5-6/32-39
Wire diamater(d), mm/in	2.0-6.5/ 0.08-0.26	2.0-5.0/ 0.08-0.2	1.0-6.5/ 0.04-0.26	⩾5.0/ ⩾0.2	2.0-5.0/ 0.08-0.2	⩾5.0/ ⩾0.2
Strip thickness(t), mm/in	-	-	-	-	-	-
Strip width (w), mm	-	-	-	-	-	-
Outer coil diameter (D), mm	12~14d	5~6d	-	-	-	-
Max. loop length at 1000℃/1830℉ furnace temperature, mm/in	-	-	-	250/9.8	100/3.9	250/9.8
Min. distance of max. loop length, mm/in	3d	2d	3d	40/1.6	40/1.6	40/1.6

Strip elements				
Element type	Deep-corrugated	Deep-corrugated	Deep-corrugated	Corrugated
Supports	Ceramic cup locks	Ceramic bushes	Ceramic tubes	grooves
Diagrammatic sketch				
Material	Cordierite or mullite	Cordierite or mullite	Sillimanite	Chamotte Grade 28
Max. furnace temperature, ℃/℉	1300/2370	1300/2370	1300/2370	1300/2370
Max. wall loading at 1000℃/1830℉ furnace temperature, kW/m2 / kW/ft2	60/5.6	60/5.6	60/5.6	20-40/1.9-3.7
Max. wall loading at 1000℃/1830℉ furnace temperature, W/m2 / W/in2	5-6/32-39	5-6/32-39	5-6/32-39	3-4/19-26
Wire diamater(d), mm/in	-	-	-	-
Strip thickness(t), mm/in	2.0~3.0/ 0.08-0.12	2.0~3.0/ 0.08-0.12	2.0~3.0/ 0.08-0.12	1.5~3.0/ 0.06-0.12
Strip width (w), mm	8~12t	8~12t	8~12t	8~12t
Outer coil diameter (D), mm	-	-	-	-
Max.loop length at 1000℃/1830℉ furnace temperature, mm/in	250/9.8	250/9.8	250/9.8	2~3w
Min. distance of max. loop length, mm/in	50/2.0	50/2.0	50/2.0	1.5w

Note: The properties above are based on using Kanthal alloy. We can offer the elements using local materials as per your request.

High Resistance Heating Alloys

FeCrAl						
Properties \ Grade		1Cr13Al4	0Cr21Al6	0Cr25Al5	0Cr21Al6Nb	0Cr27Al7Mo2
Main chemical composition	Fe	Rest	Rest	Rest	Rest	Rest
	Cr	12.0~15.0	19.0~22.0	23.0~26.0	21.0~26.0	26.5~27.8
	Al	4.0~6.0	5.0~7.0	4.5~6.5	5.0~7.0	6.0~7.0
	Re	Opportune	Opportune	Opportune	Opportune	Opportune
	Mo	—	—	—	—	1.8~2.2
	Nb	—	—	—	Add the amount 0.5	—
Maximal temperature (°C)		950	1250	1250	1350	1400
Resistivity ρ 20°C (10-6Ω.m)		1.25±0.05	1.42±0.05	1.42±0.05	1.45±0.05	1.53±0.05
Melting point (°C) (approximate)		1450	1500	1500	1510	1520
Resistance temperature correction coefficient (CT)	800°C	1.132	1.046	1.040	0.990	0.970
	1000°C	1.150	1.052	1.040	0.990	0.968
	1200°C	—	1.058	1.047	0.990	0.967
Fast life value.	Tem. (°C)	900	1200	1250	1350	1400
	hour (h)	⩾80	⩾80	⩾80	⩾80	⩾80
Density (g/cm3)		7.4	7.16	7.15	7.1	7.1
Extension rate (%)		⩾16	⩾12	⩾12	⩾12	⩾10
Thermal conductivity (kj/m.h.°C)		52.7	63.2	46.1	46.1	45.2
Specific heat (20°C) j/g.°C		0.490	0.520	0.494	0.494	0.494
Coefficient of linear expansion (20~1000°C) 2*10-6°C		15.4	14.7	16.0	16.0	16.0
Tensile strength (Mpa)		588~735	637~784	637~784	637~784	637~784
Repeatedly bending		⩾5	⩾5	⩾5	⩾5	⩾5
Microscopic structure		Ferrite	Ferrite	Ferrite	Ferrite	Ferrite
Magnetic		Magnetic	Magnetic	Magnetic	Magnetic	Magnetic
*Other specifications can be customized as per your request.						

Size range

Hard-drawn wire	Hot-rolled wire	Ribbon		Cold-rolled strip		Hot-rolled strip		Bar
Ø0.03-10.00mm	Ø5.50-12.00mm	Thickness	width	Thickness	width	Thickness	width	Ø10.00-20.00mm
		0.05-0.35mm	0.50-4.50mm	0.50-2.50mm	5.00-48.00mm	4.00-6.00mm	15.00-38.00mm	

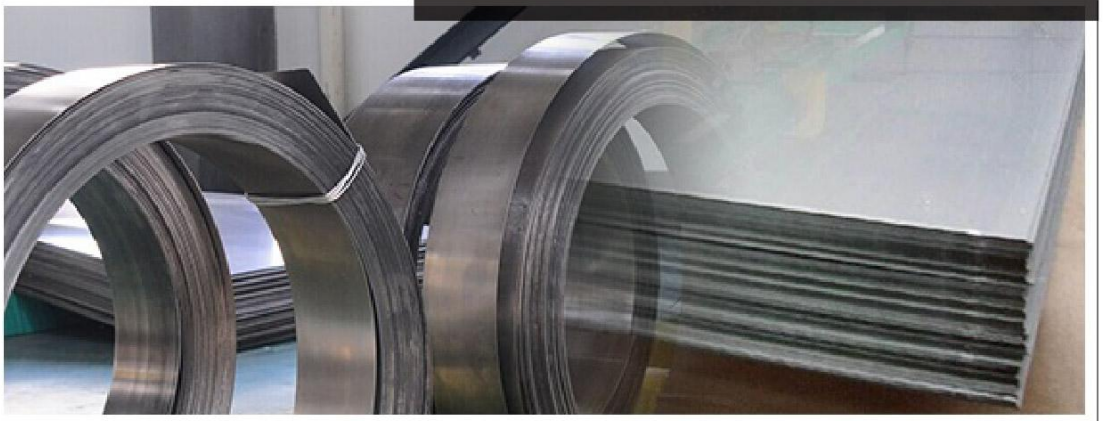
NiCr, NiCrFe						
Properties \ Grade		Cr20Ni80	Cr15Ni60	Cr30Ni70	Cr20Ni35	Cr20Ni30
Chemical composition	Ni	Rest	55.0~61.0	Rest	34.0~37.0	30.0~34.0
	Cr	20.0~23.0	15.0~18.0	28.0~31.0	18.0~21.0	18.0~21.0
	Fe	≤1	Rest	≤1	Rest	Rest
Maximal temperature (℃)		1200	1150	1250	1100	1100
Resistance temperature correction coefficient		1.09±0.05	1.11±0.05	1.18±0.05	1.04±0.05	1.06±0.05
Melting point (℃)		1400	1390	1380	1390	1390
Resistivity ρ 20℃ (10-6Ω.m)	800℃	1.008	1.078	1.028	1.188	1.173
	1000℃	1.014	1.095	1.033	1.219	1.201
	1200℃	1.025	—	1.043	—	—
Fast life value	Tem. (℃)	1175	1100	1200	1050	1050
	hour (h)	≥110	≥100	≥110	≥100	≥100
Specific gravity (g/cm3)		8.40	8.2	8.1	7.90	7.90
Extension rate (%)		≥25	≥25	≥20	≥20	≥20
Thermal (kj/m.h.℃)		60.3	45.2	45.2	43.8	43.8
Specific heat (20℃) j/g.℃		0.440	0.494	0.461	0.500	0.500
Coefficient of linear expansion (20~1000℃) α*10-6℃		18.0	17.0	17.1	19.0	19.0
Tensile strength (kg/mm2)		>85	>85	>85	>85	>85
Repeatedly bending (F/R)		>12	>12	>12	>12	>12
Microscopic structure		Austenitic	Austenitic	Austenitic	Austenitic	Austenitic
*Other specifications can be customized as per your request.						

Size range

Wire	Ribbon		Strip	
Ø0.05-8.00mm	Thickness	Width	Thickness	Width
	0.08-0.40mm	0.50-4.50mm	0.50-2.50mm	5.00-48.00mm

HRE		
Properties \ Grade		HRE
Chemical composition(%)	C	≤0.04
	Si	≤0.40
	Cr	22~24.5
	Al	5.80
	Fe	Balance
Max. operating temperature (℃)		1425
Melting point (℃)		1500
Tensile strength (N/mm2)		750
Elongation at rupture (%)		>14
Resistivity (u.Ω.m)		1.45
Density (g/cm3)		7.10
Temperature factor of the resistivity	800℃	1.03
	1000℃	1.04
	1200℃	1.04
Fast life value	Tem. (℃)	1400
	Hour (h)	≥80
*HRE Series is close to Kanthal A-1		

Specialty Alloys



Super alloy						
China grade	Japan grade	U.S. grade	Germany grade	France grade	Russia	U.K.grade
GH1131	-	-	-	-	Э и126	-
GH1140	-	-	-	-	Э и602	-
GH2036	-	-	-	-	Э и481	-
GH2132	GH132	A-286/ UNSS66286/ AMSS525/ 5731/ SAEHEV7/	X5NiCrTi26-15/1.4980 (1.4944)	Z6NCT25 ATVSMo	Э и786	DTD5026
GH2136	-	V-57	X5NirTi26-15/1.4980	Z3NCT25	-	-
GH2150	-	-	-	-	Э и718	-
GH2696	-	-	-	-	Э и696M	-
GH2706	-	Inconel 706	-	-	-	-
GH2901	-	Inconel 901/ UNS N09901	W.Nr.2.4662	-	-	-
GH3625	-	Inconel 625	-	-	-	-
Gh3030	-	-	-	ATGR/NC20T	Э и435/ ХН78Т	HR5/DTD7033/N203/ N403
GH3039	-	-	-	-	Э и602/ ХН75МБГЮ	-
GH3044	-	-	-	-	Э и868	-
GH3128	-	-	-	-	-	-
GH3536	-	HastelloyX / UNS NO6002	NiCr22FeMo	NC22FeD	-	Nimonic PE13
GH4033	-	-	-	-	Э и437	-
GH4037	-	AMS5829/ SAEHEV6	-	ATGS4/ NC20KTA	Э и617	2HRC/ 2HR202/ DTD747B/ N501/ N503
GH4080A	-	Nimonic 80A	NiCr20TiAl/ 2.4952 (2.4631)	ATGS3 NC20TA	-	2HR1/ 2HR201/ 2HR401/ 3HR601/ DTD736B
GH4133	-	-	-	-	Э и437Ъ	N80A
GH4145	-	Inconel X-750	-	-	-	-
GH4169	-	Inconel 718/AMS5596/5662 /SAEXEV-1	NiCr19NbMo/ 2.4668	ATGC1/NC19FeNb	-	Inconel 18 *
GH4698	-	-	-	-	Э и698	-
GH4163	-	C-263	-	-	-	-
GH4738	-	Waspaloy / UNS N07001	2.4654	NC20K14	-	-
GH4648	-	-	-	-	Э и648	-
R26	-	-	-	-	-	-
Other specifications can be customized as per your request.						

Welding wire

Grade	Chemical composition (%)															
	C	Cr	Ni	W	Mo	Al	Ti	Fe	Nb	V	B	Ce	Mn	Si	P	S
HGH2036	0.34~0.40	11.50~13.50	7.00~9.00	-	1.10~1.40	-	⩽0.12	rest	0.25~0.50	1.25~1.55	-	-	7.50~9.50	0.30~0.80	⩽0.035	⩽0.030
HGH2038	⩽0.10	10.00~12.50	18.00~21.00	-	-	⩽0.50	2.30~2.80	rest	-	-	⩽0.008	-	⩽1.00	⩽1.00	⩽0.030	⩽0.020
HGH2042	⩽0.05	11.50~13.00	34.50~36.50	-	-	0.90~1.20	2.70~3.20	rest	-	-	-	-	0.80~1.30	⩽0.60	⩽0.020	⩽0.020
HGH2132	⩽0.08	13.50~16.00	24.00~27.00	-	1.00~1.50	⩽0.35	1.75~2.35	rest	-	0.10~0.50	0.001~0.010	-	1.00~2.00	0.40~1.00	⩽0.020	⩽0.015
HGH3030	⩽0.12	19.00~22.00	Rest	-	-	⩽0.15	0.15~0.35	⩽1.00	-	-	-	-	⩽0.70	⩽0.80	⩽0.015	⩽0.010
HGH3039	⩽0.08	19.00~22.00	Rest	-	1.80~2.30	0.35~0.75	0.35~0.75	⩽3.00	0.90~1.30	-	-	-	⩽0.40	⩽0.80	⩽0.020	⩽0.015
HGH3044	⩽0.10	23.50~26.50	Rest	13.00~16.00	-	⩽0.50	0.30~0.70	⩽4.00	_	-	-	-	⩽0.50	⩽0.80	⩽0.013	⩽0.013
HGH4033	⩽0.06	19.00~22.00	Rest	-	-	0.60~1.00	2.40~2.80	⩽1.00	-	-	⩽0.01	⩽0.01	⩽0.35	⩽0.65	⩽0.015	⩽0.007
HGH4145	⩽0.08	14.00~17.00	Rest	-	-	0.40~1.00	2.25~2.75	5.00~9.00	0.70~1.20	-	-	-	⩽1.00	⩽0.50	⩽0.020	⩽0.010
HGH4169	⩽0.08	17.00~21.00	50.00~55.00	-	2.8~3.3	0.20~0.60	0.65~1.15	rest	4.75~5.50	-	⩽0.006	-	⩽0.35	⩽0.30	⩽0.015	⩽0.015
Other specifications can be customized as per your request.																

Corrosion resistant alloy

China Grade	Japan	Korea	U.S.		German		U.K.
GB/T	JIS	KS	ASTM	UNS	DIN	W-Nr.	BS
NS111	NCF800	NCF800	Incoloy 800	N08800	X10NiCrAlTi3220	1.4876	NA15
NS112	-	-	Incoloy 800H	N08810	-	1.4876	NA15
NS141	-	-	-	-	-	-	-
NS142	NCF825	NCF825	Incoloy 825	NO8825	NiCr21Mo	2.4858	NA16
NS312	NCF600	NCF600	Inconel 600	N06600	NiCr15Fe	2.4816	NA14
NS313	NCF601	NCF601	-	-	NiCr23Fe	2.4851	-
NS315	-	-	Inconel 690	N06690	-	-	-
NS333,NS334	-	-	Hastelloy C-276	N10276	NiMo16Cr15W	2.4819	NA45
NS336	NCF625	NCF625	Inconel 625	N06625	NiCr22Mo9Nb	2.4856	NA21; NA43
Other specifications can be customized as per your request.							

Precision alloy

China grade	Japan grade	France grade	U.S. grade	Germany grade	Russia garde	U.K. grade
3J1	-	-	-	-	Э и 702/36НХТю	-
4J29	KV-1/ KV-2/ KV-3	Dilver P0/ Dilver P1	Kovar/ Rodar/ Techallony Glasseal 29-17	Vacon 12/ Silvar 48	29НК/ 29НК-В и	Nilo K/ Telcaseal
4J32	SI	Invar/ Superieur	Super Invar/ Super Nilvar	-	32НКД/32НК-В и	-
4J33	KV-4 (Ni33Co17)	-	-	-	33НК (Ni33Co17)	-
4J34	-	-	Ceramvar / Ni27Co25	Vacon 20/ Ni28Co20	31НК/ Ni31Co20/ 24НК/ Ni25Co28	-
4J36	不変钢/Cactus LE/-	Invar Standard/ Fe-Ni36/-	Invar/Nilvar/Unipsan 36	Cacodil 36/ Nilos36	32Н/ 32Н-В и /-	Invar /Nilo36/ 36Ni
4J42	D/NSD	N42	Glass sealing 42/ Uniseal 42	Vacodil 42/ Nilo 42	42Н	Nilo 42/ Invar
4J45	-	Fe-Ni42	Niromet 46/ Ferrovac 46Ni	Vacodil 46	46Н	Nilo 45
4J50	NS-1	N50	FeNi50	Vacodil 50	50Н	Nilo 51
Other specifications can be customized as per your request.						