Kanthal APM Substitute---HJ407

1: HJ407 History

Sandvik once established production line in China in 1980s and abandoned it later. Basing on this production line and over 30 years' research, we developed HJ209 and HJ407 as a substitute of Kanthal A1 and Kanthal APM. They are produced with the same scientific principle–powder metallurgy technology.

2: HJ407's cost effectiveness

The HJ407 Wire's properties are equivalent to Kanthal APM Wire, but its price is only about $28/KG~$50/KG (Final price depends on product size and ordering quantity). The HJ209's properties are equivalent to Kanthal A1 Wire(even better on certain aspects), and much better than Kanthal D Wire. Its price is only $20/KG~$35/KG. Click here for details. Free sample is available for testing!

3: HJ407's Key Features:

1. Low tendency to ageing and low resistance change
2. Small change in resistivity
3. High creep resistance
4. Excellent surface oxidization properties
5. Excellent for high temperature heating, up to 1425°C

4: HJ407 Available Specifications:

- Round Wire Diameter: Φ0.15 ~ 8.0 mm
- Flat Wire Thickness: 0.1 ~ 0.4 mm Width: 0.5 ~ 4.5 mm
- Flat Strip Thickness: 0.5 ~ 2.5 mm Width: 5 ~ 48 mm

5: Delivery Condition

- Wire diameter > φ5.0 mm: Delivered in blue coils.
- Wire diameter range φ1.0 - 5.0 mm: Delivered in golden yellow coils.
- Wire diameter ≤ φ1.0 mm: Delivered in bright spooled form.
- Flat Strip: Delivered in polished condition.
- Other conditions can be custom-produced according to user requirements.

Request for Quotation

More Details

HJ407 has been successfully applied in a range of industrial fields including ceramic sintering, chip manufacturing, automotive glass kilns, industrial kilns with high power density and high temperatures, industrial burners, boiler retrofits, photovoltaic crystal processing, glass annealing, and high-temperature flue gas treatment.

HJ407 Wire takes refined master alloy as raw material, uses powder metallurgy technology to manufacture alloy ingots, and is manufactured by special cold and hot processing and heat treatment process. The product has the advantages of strong oxidation resistance, good corrosion resistance at high temperature, small creep of electro-thermal components, long service life at high temperature and small change of resistance. HJ407 is suitable for high temperature application (max1425 °C), high power density, corrosive atmosphere, carbon atmosphere and other working environments.

HJ407 can be used in ceramic kilns, high temperature heat treatment furnaces, laboratory furnaces, electronic industrial furnaces and diffusion furnaces.

1. Chemical Composition (%Wt):

Elements	Cr	Al	C	Si	Fe	Rare earth elements
Min	20	5.5			Bal.	appropriate amount
Max	22	6.0	<0.04	<0.5	Bal.	

2. Main Physical Properties:

Max. Temp	Resistivity (20°C)	Density	Melting Point	Number of Bends	Magnetic
1425°C	1.45×10^{-6} Ω.m	7.10g/cm3	1500°C	7-12	Yes

3. Resistance Temperature Coefficient（Ct）:

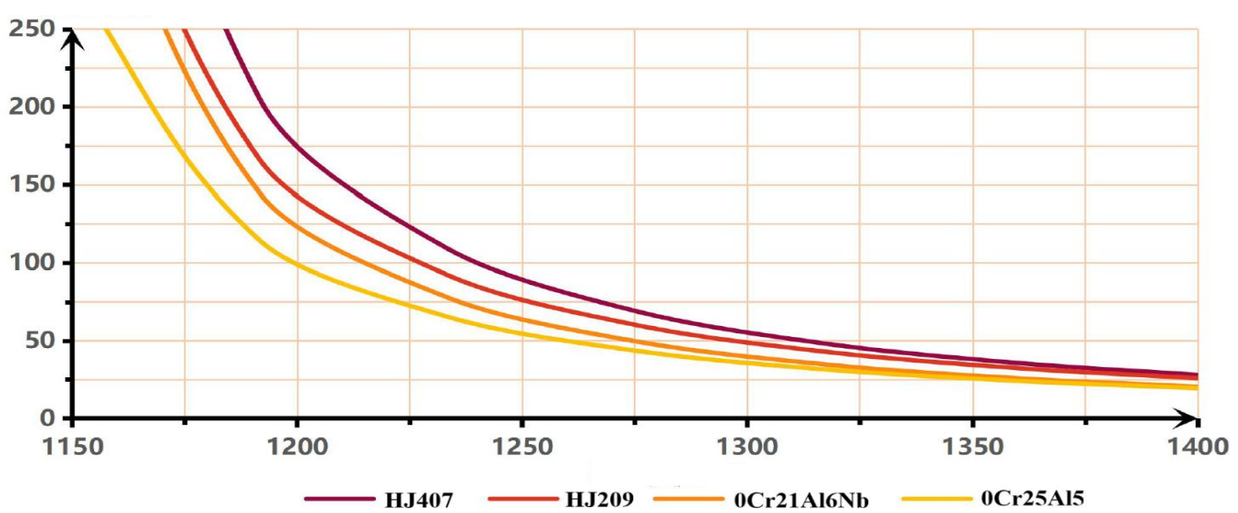
Temperature °C	700	900	1100	1200	1300
C_t	1.02	1.03	1.04	1.04	1.04

4. Average linear expansion coefficient:

20-250°C	20-500°C	20-750°C	20-1000°C
11×10^{-6}/K	12×10^{-6}/K	14×10^{-6}/K	15×10^{-6}/K

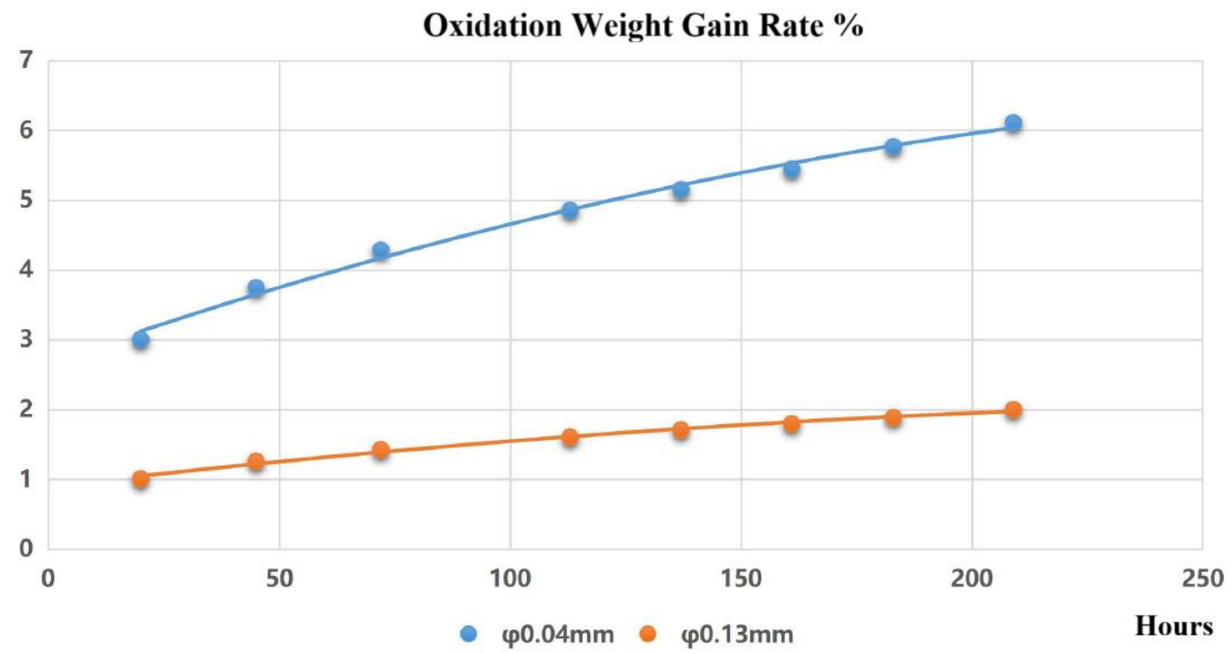
5. Relative Life Test

Rapid test life is the lifespan of the alloy sample wire measured under laboratory conditions according to rapid test standards and methods. China continues to use the former Soviet Union method for assessment, which involves cumulative time until failure under cycles of 2 minutes on and 2 minutes off, using a sample specification of 0.8 mm diameter. Generally, an alloy with a longer rapid test life also has a longer actual service life. **Comparative Life (Cr25Al5 at 1200°C = 100%)**



6. Oxidation Weight Gain of Fine Wires at 1050°C

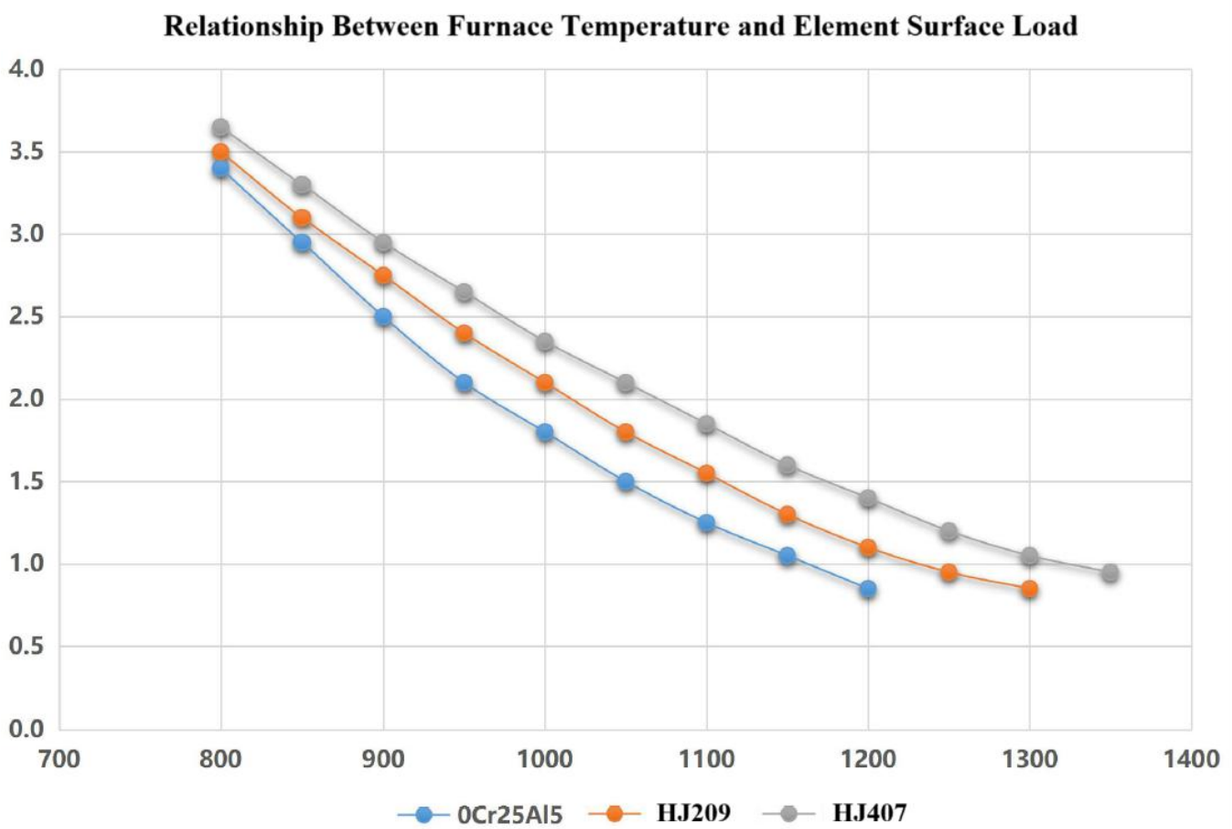
(The oxidation weight gain rate data may vary for different specifications and temperatures)



7. Relationship Between Furnace Temperature and Element Surface Load

A higher selected surface load results in a higher element temperature. Conversely, a lower selected surface load results in a lower element temperature. When the electrical power is determined, selecting a higher surface load will result in smaller element dimensions, saving raw materials. However, the surface load of the element is inversely proportional to its service life.

The surface load is related to the material, specification, construction, operating temperature, heat dissipation conditions, ambient atmosphere, support material, frequency of temperature cycling, etc., of the heating element.



(This is derived from practical experience; adjustments should be made based on actual conditions during design)

8. HJ407 Resistance per Meter / Weight Reference Table

(For reference only. Resistance tolerance ±5%. Weight varies with dimensional accuracy range)

Wire Size mm	Resistance Ω/m	Weight g/m	Wire Size mm	Resistance Ω/m	Weight g/m
1	1.85	5.58	3.7	0.135	76.3
1.1	1.53	6.75	3.8	0.128	80.5
1.2	1.28	8.03	3.9	0.121	84.8
1.3	1.09	9.42	4	0.115	89.2
1.4	0.942	10.9	4.1	0.110	93.7
1.5	0.821	12.5	4.2	0.105	98.4
1.6	0.721	14.3	4.3	0.100	103.1
1.7	0.639	16.1	4.4	0.095	108.0
1.8	0.570	18.1	4.5	0.0912	113
1.9	0.511	20.1	4.6	0.0873	118
2	0.462	22.3	4.7	0.0836	123
2.1	0.419	24.6	4.8	0.0801	128
2.2	0.381	27.0	4.9	0.0769	134
2.3	0.349	29.5	5	0.0739	139
2.4	0.321	32.1	5.1	0.0710	145
2.5	0.295	34.9	5.2	0.0683	151
2.6	0.273	37.7	5.3	0.0657	157
2.7	0.253	40.7	5.4	0.0633	163
2.8	0.235	43.7	5.5	0.0610	169
2.9	0.220	46.9	5.6	0.0589	175
3	0.205	50.2	5.7	0.0568	181
3.1	0.192	53.6	5.8	0.0549	188
3.2	0.180	57.1	5.9	0.0530	194
3.3	0.170	60.7	6	0.0513	201
3.4	0.160	64.5	7	0.0377	273
3.5	0.151	68.3	8	0.0288	357
3.6	0.142	72.3			

9. Flat Strip Resistance per Meter / Weight Reference Table

Width mm	Thickness mm	Resistance Ω/m	Weight g/m	Width mm	Thickness mm	Resistance Ω/m	Weight g/m
8	1	0.191	56.8	8	1.5	0.127	85.2
9	1	0.170	63.9	9	1.5	0.113	95.85
10	1	0.153	71	10	1.5	0.0986	106.5
11	1	0.139	78.1	11	1.5	0.0897	117.15
12	1	0.127	85.2	12	1.5	0.0822	127.8
13	1	0.117	92.3	13	1.5	0.0759	138.45
14	1	0.109	99.4	14	1.5	0.0705	149.1
15	1	0.102	106.5	15	1.5	0.0658	159.75
16	1	0.095	113.6	16	1.5	0.0616	170.4

17	1	0.090	120.7	17	1.5	0.0580	181.05
18	1	0.085	127.8	18	1.5	0.0548	191.7
19	1	0.080	134.9	19	1.5	0.0519	202.35
20	1	0.076	142	20	1.5	0.0493	213
8	1.2	0.159	68.16	8	2	0.0925	113.6
9	1.2	0.141	76.68	9	2	0.0822	127.8
10	1.2	0.127	85.2	10	2	0.0740	142
11	1.2	0.116	93.72	11	2	0.0673	156.2
12	1.2	0.106	102.24	12	2	0.0616	170.4
13	1.2	0.098	110.76	13	2	0.0569	184.6
14	1.2	0.091	119.28	14	2	0.0528	198.8
15	1.2	0.085	127.8	15	2	0.0493	213
16	1.2	0.079	136.32	16	2	0.0462	227.2
17	1.2	0.075	144.84	17	2	0.0435	241.4
18	1.2	0.071	153.36	18	2	0.0411	255.6
19	1.2	0.067	161.88	19	2	0.0389	269.8
20	1.2	0.064	170.4				