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Precision
High temperature
Energy saving

Electric furnace

高温发热元件-硅钼棒



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二硅化钼电热元件

MoSi₂ Heating Elements

概述

General description

二硅化钼电热元件是一种以硅化钼为基础的电阻发热元件，其在氧化气氛下加热到高温，表面生成一层致密的石英玻璃膜，保护其不再氧化。因此，它具有独特的高温抗氧化性。在氧化气氛下，其最高温度可达1800℃，其适用温度为500~1700℃，可以用作陶瓷、磁性材料、玻璃、冶金、耐火材料等工业高温炉的加热元件。

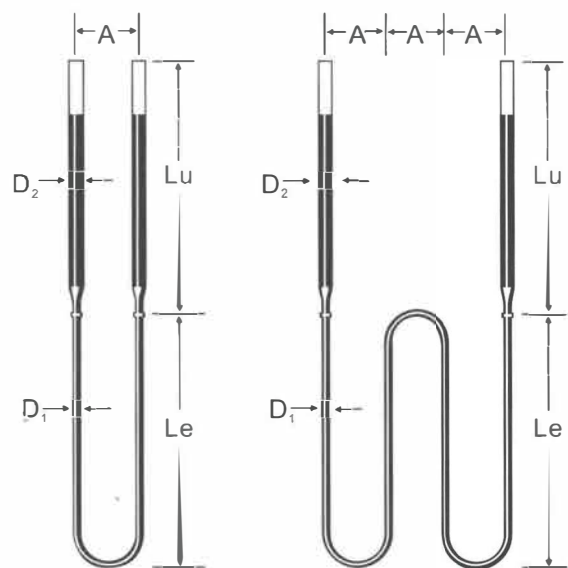
MoSi₂ heating element is a kind of resistance heating element basically made of high pure Molybdenum Disilicide. In oxidizing atmosphere, a layer of compact quartz protective film is formed on the surface of MoSi₂ element owing to the high-temperature combustion, which prevent MoSi₂ from continuously oxidizing. In oxidizing atmosphere, its Max temperature can reach 1800℃, and its applicable temperature is 500~1700℃. It can be widely used in such applications as sintering and heat treatment of ceramics, magnet, glass, metallurgy, refractory, etc. The commercial name of our MoSi₂ heating elements is Songshan Super Heating Elements.

二硅化钼电热元件的机械性质和其它陶瓷制品一样，在常温下属于脆性材料容易断裂，这给运输和安装带来了一定的困难，但只要安装合理和使用得当是可以避免的。

Having the same mechanical character as other ceramic products, MoSi₂ heating elements are brittle materials so that they are easy to rupture at the normal temperature, which brings some difficulties to transport and install, but it may be avoided if they were installed and used correctly.

二硅化钼电热元件的标志法

Dimension marks of elements



材料等级Material Grade: 1700, 1800

直径Diameter: D₁/D₂, mm/mm

热端长度Hot zone length: Le, mm

冷端长度Cold end length: Lu, mm

间距Shank Spacing: A, mm

例如 Examples:

U型Shape, 材料等级Material Grade 1800,

D₁=3mm, D₂=6mm, Le=140mm,

Lu=125mm, A=25mm

表示为Specify as:

Songshan Super MS18,U型Shape,3/6 × 140 × 125 × 25

W型 Shape, 材料等级1700, D₁=6mm, D₂=12mm,

Le=300mm, Lu=250mm, A=50mm

表示为Specify as:

Songshan Super MS17,W型Shape,6/12 × 300 × 250 × 50

二硅化钼电热元件的理化性质

Physical and chemical properties of elements

1. 物理性质 Physical properties

体积密度 Volume density	抗折强度 Bend strength	维氏硬度 Vickers-hardness	气孔率 Porosity rate	吸水率 Water absorption	热伸长率 Hot extensibility
5.5~5.6kg/cm ³	15-25kg/cm ²	(HV)570kg/mm ²	7.4%	1.2%	4%

2. 化学性质 Chemical properties

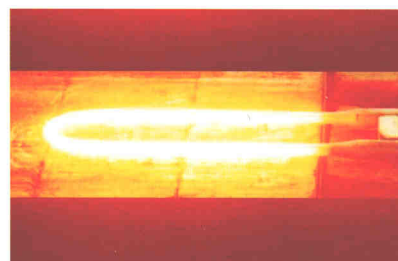
高温抗氧化性：高温氧化气氛下，元件的表面生成一层致密的石英(SiO₂)保护层以防止MoSi₂继续氧化。当元件温度大于1700℃，熔点为1710℃的SiO₂保护层熔融，由于表面的张力的作用，SiO₂熔聚成滴，而失去保护作用。元件在氧化气氛下，再继续使用时，SiO₂保护层重新生成。

Oxygen-resistance under high temperature: in oxidizing atmosphere, a layer of compact quartz (SiO₂) protective film is formed on the surface of element owing to the high-temperature combustion, which prevent MoSi₂ from continuously oxidizing. When the element temperature is higher than 1700℃, the SiO₂ protective film will be fused

because its fusing point is 1710℃ and the SiO₂ is fused into molten drops owing to the action of its surface extension, which cause losing its protective ability. In the oxidizing atmosphere, when the element is continuously used, the protective film forms again.

必须指出的是元件不宜在400-700℃范围内长时间使用。否则元件会因低温的强烈氧化作用而粉化。

It should be pointed out that element cannot be used for rather long time in 400-700℃, otherwise, it will be powdered owing to the strong oxidizing action in low temperature.



3. 不同气氛对元件温度的影响

The Max temperature of elements in different atmospheres

气氛 Atmosphere	最大元件温度Max element temperature	
	Songshan Super MS17	Songshan Super MS18
空气Air	1700℃	1800℃
氮气Nitrogen	1600℃	1700℃
氩气Argon, 氦气Helium	1600℃	1700℃
氢气Hydrogen	1100~1450℃	1100~1450℃
N ₂ /H ₂ 95/5%	1250~1600℃	1250~1600℃
应用领域 General applications	主要用于工业热处理炉、烧结炉、铸造炉、玻璃熔化炉、冶炼炉等 Most types of industrial furnace for heat treatment, forging, sintering, glass melting and refining and for use in radiant tubes	主要用于实验炉、测试设备和高温烧结炉等 Laboratory furnaces, testing equipment and high temperature sintering production furnace

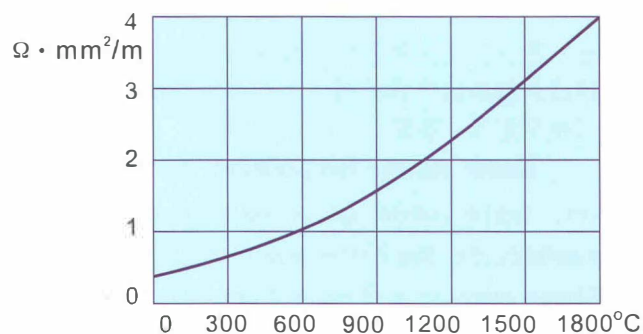
二硅化钼电热元件的电气性质

Electric properties of elements

1. 电阻特性 Resistance properties

二硅化钼电热元件的电阻率随着温度的升高而迅速增加。在正常操作情况下，元件电阻一般不随使用时间的长短而变化。因此，新旧元件可以混合使用。

The resistivity of element rapidly rises along with the temperature rises, under normal operating conditions, generally the element resistance doesn't change with the application time changing. So the old and new elements can be used together.

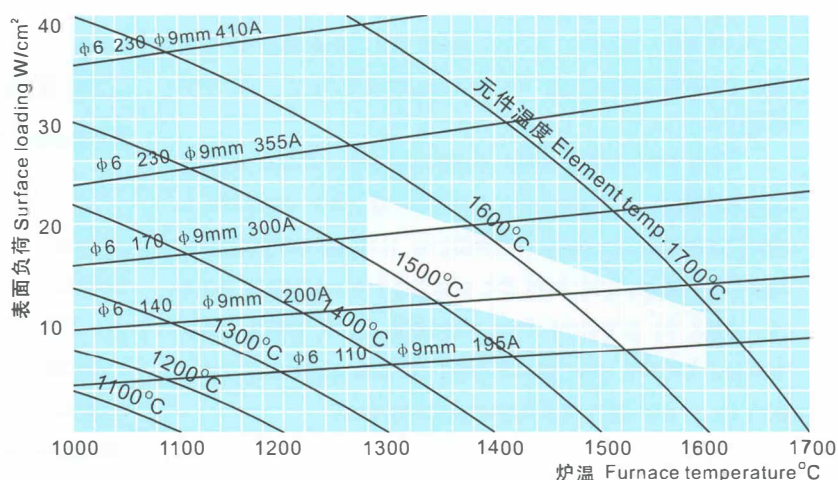


1700等级和1800等级元件的电阻-温度曲线
Resistance vs. Element Temperature for Songshan Super MS17 and MS18 Elements

2. 表面负荷 Surface load

根据炉子的结构、气氛和温度正确地选择元件的表面负荷是达到最好元件寿命的关键。右图示出了元件辐射在不受阻碍情况下的炉温、元件温度与表面负荷间的关系，阴影部分为常用的表面负荷-温度范围。

The key factor to the optimum service life of the element is to select the surface load of the element correctly according to the furnace construction, atmosphere and temperature. Right figure shows the relation between the furnace temperature, the element temperature and the element surface load under the condition that the element radiation isn't



obstructed. The shadow part in the figure shows the surface load-- temperature range in common use. The figure still shows the reference current.

推荐的表面负荷 Recommend surface load:

炉 温 (°C) Furnace Temp.	1400	1500	1600	1650	1700
发热部表面负荷 Surface load of hot zone (W/cm²)	<18	<15	<12	<10	<8

二硅化钼电热元件的安装 Installation of elements

1、垂直悬挂 Vertically hanging

二硅化钼电热元件常温下脆性很大，高温时又有可塑性。所以U型元件的最好安装方法是垂直悬挂。通过固定夹将元件垂直悬挂于炉顶上。这样安装的目的就是避免将机械应力加到元件发热端上，否则容易引起元件断裂。

Under normal temperature, MoSi_2 element is very brittle, while under high temperature it is plasticity. So, the better way for installation of the U Shape element is to hang it vertically to the furnace top by the element holder. Such way is to avoid putting the mechanical stress directly to the element heat-generating end, otherwise, the element will easily be broken.

2、固定夹 Element holder

整个元件的重量都是由固定夹承担，元件的位置也由它决定。因此，必须仔细安装，保证元件垂直悬挂。为避免局部过热，元件下端圆锥部分一定要伸到炉膛内。

The element holder supports the whole weight of the element and the position of the element is also determined by it. Therefore, it must be installed carefully to assure that the element is vertically hung. In order to prevent the element from being over heated locally, the taper part of the element lower end must put into the furnace chamber.

3、连接带 Connection strap

接触元件的连接导线采用铝编织带或多层铝箔。外面的夹子只起夹紧作用，不用来导电。导线的末端与母线联结。为了避免应力传到元件上，导线长度应略大于元件和母线间的直线距离。

The connection strap is made of aluminum braid strap or multi-layer aluminum foil. The outside clamp isn't used for electrical conduction. The end of strap contacts bus, and the length of strap should be a little larger than the linear distance between the element and bus.

安装元件时夹头上的螺丝不要一次拧的太紧，待

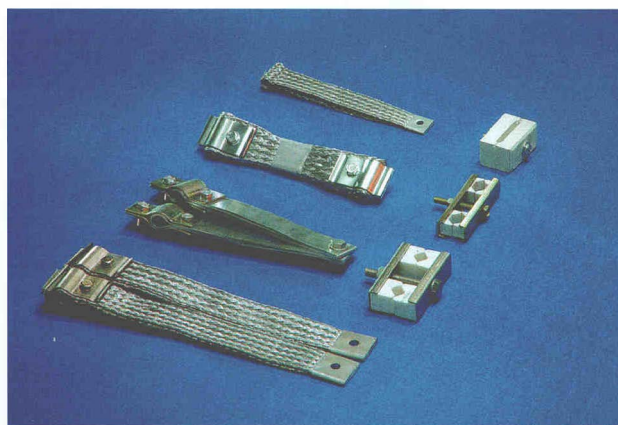
元件升到高温时再次拧紧，因为这时元件有一定塑性不易折断。夹头部分温度一般不要高于 200°C 。因此，夹头导线与元件接触电压应降低 0.1V 。为避免幅射热传到夹头，夹头下端和穿砖上面的距离不应小于 50mm 。为了避免损坏，一般直径 $6/12\text{mm}$ 元件不能长期使用 170A ，直径 $9/18\text{mm}$ 元件不能长期使用 300A 。

When install the element, don't fix the strap too much at one time, it can be tightened when the element rises to high temperature, as the element has some plastic and isn't easily broken. The temperature of the wire clip generally shouldn't be higher than 200°C . Therefore, the contact voltage between the clip wire and element should be lowered to 0.1V . In order to avoid that the radiation heat is conducted to the clip, the distance between the lower end of the clip and upper surface of the through brick should not less than 50mm . Generally for $\Phi 6/12$ element, 170A should not be used long time and for $\Phi 9/18$ element, 300A shouldn't be used for long time.

二硅化钼电热元件的附件 Accessories of element

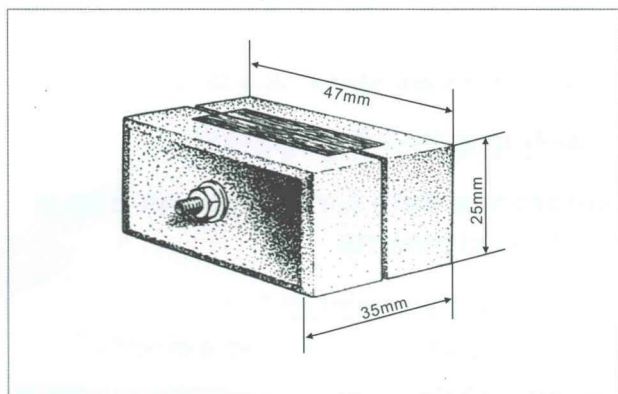
二硅化钼电热元件的标准附件包括元件固定夹和两条带有夹子的铝编织连接带。用于不同直径元件的附件如下：

The nominal accessories of MoSi_2 elements include the element holder and 2 aluminum braid connecting straps. The accessories for different diameter elements are the following:



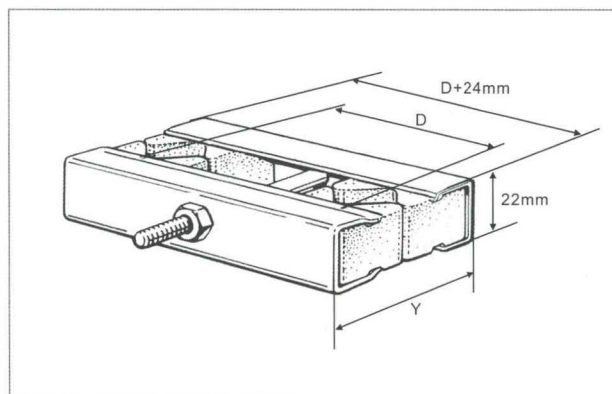
用于3/6和4/9元件的固定夹

Element holders for 3/6 and 4/9 elements



用于6/12和9/18元件的固定夹

Element holders for 6/12 and 9/18 elements

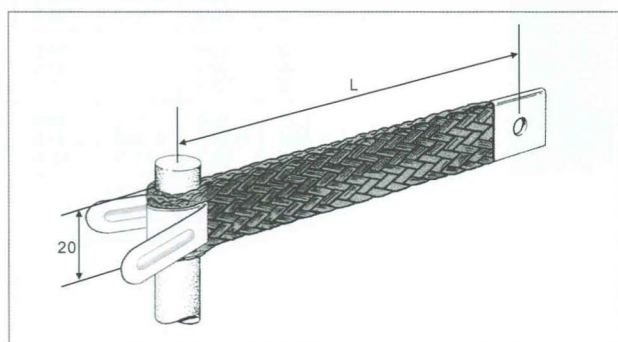


用于3/6和4/9元件的连接带

Connecting straps for 3/6 and 4/9 elements

单环型

Single loop type



用于元件与电源的连接

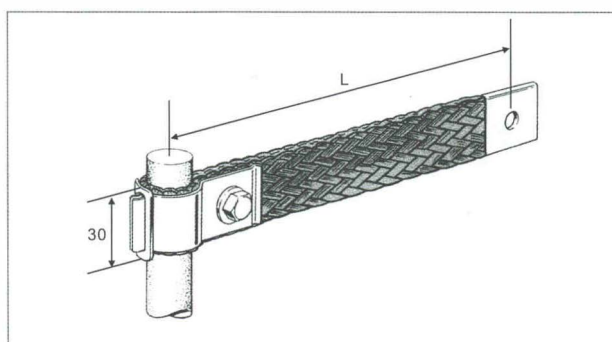
Used for element to power

用于6/12和9/18元件的连接带

Connecting straps for 6/12 and 9/18 elements

单环型

Single loop type

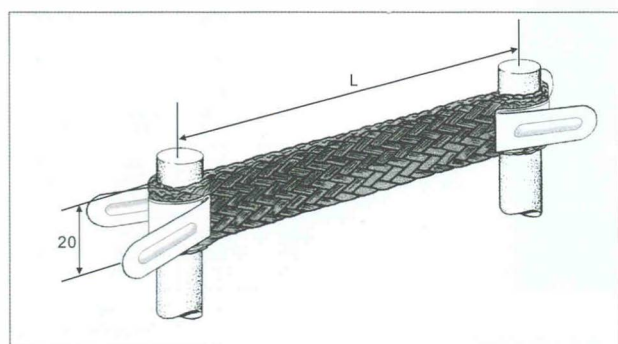


用于元件与电源的连接

Used for element to power

双环型

Double loops type

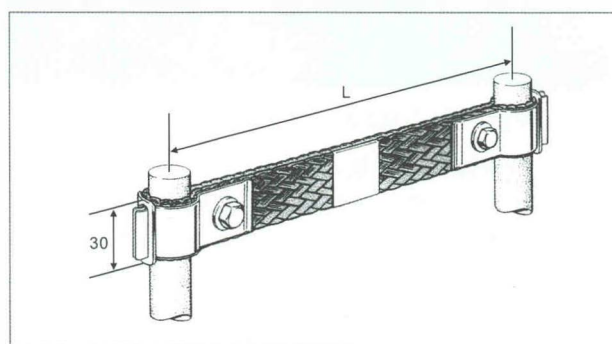


用于元件与元件的连接

Used for element to element

双环型

Double loops type



用于元件与元件的连接

Used for element to element

二硅化钼炉子的操作

Operation of MoSi₂ furnace

1、炉子的干燥 Drying of the furnace

新砌筑或长期不用的炉子在使用前需要干燥。一般干燥温度为100-200℃，而元件长期在低温下使用将会引起低温氧化。小型炉子干燥时间短，几个小时对元件影响不大。大型炉子干燥时间长，需要注意。为了通风，最好将炉门打开，随着温度升高可以半开，到1000℃以上完全关闭炉门。

The new built furnace or the furnace that haven't been used for a long time should be dried before operation. The drying temperature generally is 100-200℃. The element that has been used for a long period under low temperature will cause low-temperature oxidation. For the small-sized furnace, as its drying time is short, several hours will affect the element little, but for the large-sized one, as its drying is long, it should be dried carefully. You'd better open the furnace gate to make it ventilated. The gate may be half-opened with the rising of temperature and fully closed when the temperature rises above 1000℃.

2、炉子的启动 Starting of the furnace

如果炉子干燥好了或不需要干燥就可以启动升温，为了避免过大电流冲击而使电器设备过荷，应采用下列步骤启动：

If the furnace has been dried or needn't to be dried, then it may be started to raise temperature. In order to avoid that it is impacted by over current and the electric device is overloaded, the following steps should be adapted:

小型炉子 Small furnace (功率 power < 100KW)		大型炉子 Large furnace (功率 power 100-500/100KW)	
炉温 Furnace temp.	电压 Voltage	炉温 Furnace temp.	电压 Voltage
20-150℃	1/3工作电压 Working Voltage	20-300℃	1/3工作电压 Working Voltage
150-500℃	2/3工作电压 Working Voltage	300-700℃	2/3工作电压 Working Voltage
500℃-工作温度 Working temp.	全工作电压 Full working voltage	700℃-工作温度 Working temp.	全工作电压 Full working voltage

3、元件的更换 Replacing of element

在操作过程中发现元件损坏应首先确定位置，同时准备好组合元件。然后将损坏的元件夹头导线与母线连结的螺丝松开，清理开陶瓷棉，连用穿砖一起拔出来，再将新组合元件从炉顶插入，连结好导线，堵好陶瓷棉即可升温。

If it is found that one element is damaged during operating, firstly, you should determine where it is, at the same time prepare a made up one. Then

loosen the thread which links the lead wire of the damaged element and the bus, clear out the ceramic cotton and pull out the through-brick. Afterward, insert the new element from the furnace top, link the lead wire, block the gap with ceramic cotton and start to raise temperature.

二硅化钼电热元件参考数据

Reference data for Songshan Super heating elements

1、1800等级3/6mm的U型元件

1800 Grade U type 3/6mm elements

热端 冷端 Le Lu	150	180	200	250	300	350
150	376 0.186 8.4	440 0.217 9.8	483 0.239 10.7	591 0.292 13.1	698 0.345 15.5	805 0.398 17.9
200	391 0.193 8.7	455 0.225 10.1	498 0.246 11.1	605 0.299 13.4	712 0.352 15.8	820 0.405 18.2
250	405 0.200 9.0	470 0.232 10.4	512 0.253 11.4	620 0.306 13.8	727 0.359 16.2	834 0.412 18.5
280	411 0.203 9.1	475 0.235 10.6	518 0.256 11.5	626 0.309 13.9	733 0.362 16.3	840 0.415 18.7
300	420 0.207 9.3	484 0.239 10.8	527 0.260 11.7	634 0.313 14.1	742 0.366 16.5	849 0.419 18.9

条件 Condition:
 元件温度 Element temp. 1700℃
 炉子温度 Furnace temp. 1600℃
 电流 Amperage 45A
 表面负荷 Surface load 11.5 W/cm²

功率 Power:W
 热电阻 Resistance:Ω
 工作电压 Voltage:V

2、1800等级4/9mm的U型元件

1800 Grade U type 4/9mm elements

热端 冷端 Le Lu	150	180	200	250	300	350
150	492 0.116 7.6	579 0.137 8.9	637 0.151 9.8	781 0.185 12.0	925 0.219 14.2	1070 0.253 16.5
200	507 0.120 7.8	594 0.141 9.1	652 0.154 10.0	796 0.188 12.2	940 0.223 14.5	1085 0.257 16.7
250	522 0.124 8.0	609 0.144 9.4	667 0.158 10.3	811 0.192 12.5	955 0.226 14.7	1100 0.260 16.9
280	528 0.125 8.1	615 0.146 9.5	673 0.159 10.3	817 0.193 12.6	961 0.228 14.8	1106 0.262 17.0
300	537 0.127 8.3	624 0.148 9.6	682 0.161 10.5	826 0.195 12.7	970 0.230 14.9	1115 0.264 17.2

条件 Condition:
 元件温度 Element temp. 1700℃
 炉子温度 Furnace temp. 1600℃
 电流 Amperage 65A
 表面负荷 Surface load 11.5 W/cm²

功率 Power:W
 热电阻 Resistance:Ω
 工作电压 Voltage:V

3、1700等级6/12mm的U型元件 1700 Grade U Shape 6/12mm elements

热端 Le 冷端 Lu	150	180	200	250	300	350	400	450	500	550	600		
150	987 0.044 6.6	1152 0.051 7.7	1262 0.056 8.4	1536 0.068 10.2	1810 0.080 12.1	2084 0.093 13.9	功率 Power: W 热电阻 Resistance: Ω 工作电压 Voltage: V						
200	1025 0.046 6.8	1189 0.053 7.9	1299 0.058 8.7	1573 0.070 10.5	1848 0.082 12.3	2122 0.094 14.1						2396 0.106 16.0	
250	1062 0.047 7.1	1227 0.055 8.2	1337 0.059 8.9	1611 0.072 10.7	1885 0.084 12.6	2159 0.096 14.4						2433 0.108 16.2	2708 0.120 18.1
270	1077 0.048 7.2	1242 0.055 8.3	1352 0.060 9.0	1626 0.072 10.8	1900 0.084 12.7	2174 0.097 14.5	2448 0.109 16.3	2723 0.121 18.2	2997 0.133 20.0				
300	1100 0.049 7.3	1264 0.056 8.4	1374 0.061 9.2	1648 0.073 11.0	1923 0.085 12.8	2197 0.098 14.6	2471 0.110 16.5	2745 0.122 18.3	3019 0.134 20.1	3294 0.146 22.0	3568 0.159 23.8		
350	1137 0.051 7.6	1302 0.058 8.7	1412 0.063 9.4	1686 0.075 11.2	1960 0.087 13.1	2234 0.099 14.9	2508 0.111 16.7	2783 0.124 18.6	3057 0.136 20.4	3331 0.148 22.2	3605 0.160 24.0		
400	1175 0.052 7.8	1339 0.060 8.9	1449 0.064 9.7	1723 0.077 11.5	1998 0.089 13.3	2272 0.101 15.1	2546 0.113 17.0	2820 0.125 18.8	3094 0.138 20.6	3369 0.150 22.5	3643 0.162 24.3		
450	条件 Condition: 元件温度 Element temp. 1500℃ 炉子温度 Furnace temp. 1300℃ 电流 Amperage 150A 表面负荷 Surface load 15W/cm²			1377 0.061 9.2	1487 0.066 9.9	1761 0.078 11.7	2035 0.090 13.6	2309 0.103 15.4	2583 0.115 17.2	2858 0.127 19.1	3132 0.139 20.9	3406 0.151 22.7	3680 0.164 24.5
500						1798 0.080 12.0	2073 0.092 13.8	2347 0.104 15.6	2621 0.116 17.5	2895 0.129 19.3	3169 0.141 21.1	3444 0.153 23.0	3718 0.165 24.8
550							2110 0.094 14.1	2384 0.106 15.9	2658 0.118 17.7	2933 0.130 19.6	3207 0.143 21.4	3481 0.155 23.2	3755 0.167 25.0
600							2148 0.095 14.3	2422 0.108 16.1	2696 0.120 18.0	2970 0.132 19.8	3244 0.144 21.6	3519 0.156 23.5	3793 0.169 25.3
650									2733 0.121 18.2	3008 0.134 20.1	3282 0.146 21.9	3556 0.158 23.7	3830 0.170 25.5
700										2771 0.123 18.5	3045 0.135 20.3	3319 0.148 22.1	3594 0.160 24.0

4、1800等级6/12mm的U型元件 1800 Grade U type 6/12mm elements

热端 Le 冷端 Lu	150	180	200	250	300	350	400	450	500	550	600				
150	686 0.048 5.7	800 0.056 6.7	877 0.061 7.3	1068 0.074 8.9	1260 0.087 10.5	1451 0.101 12.1	功率 Power: W 热电阻 Resistance: Ω 工作电压 Voltage: V								
200	711 0.049 5.9	825 0.057 6.9	902 0.063 7.5	1093 0.076 9.1	1285 0.089 10.7	1476 0.103 12.3						1667 0.116 13.9			
250	736 0.051 6.1	850 0.059 7.1	927 0.064 7.7	1118 0.078 9.3	1310 0.091 10.9	1501 0.104 12.5						1692 0.118 14.1	1884 0.131 15.7		
270	746 0.052 6.2	860 0.060 7.2	937 0.065 7.8	1128 0.078 9.4	1320 0.092 11.0	1511 0.105 12.6	1702 0.118 14.2	1894 0.132 15.8	2085 0.145 17.4						
300	761 0.053 6.3	875 0.061 7.3	952 0.066 7.9	1143 0.079 9.5	1335 0.093 11.1	1526 0.106 12.7	1717 0.119 14.3	1909 0.133 15.9	2100 0.146 17.5			2292 0.159 19.1	2483 0.172 20.7		
350	786 0.055 6.5	900 0.063 7.5	977 0.068 8.1	1168 0.081 9.7	1360 0.094 11.3	1551 0.108 12.9	1742 0.121 14.5	1934 0.134 16.1	2125 0.148 17.7			2317 0.161 19.3	2508 0.174 20.9		
400	811 0.056 6.8	925 0.064 7.7	1002 0.070 8.3	1193 0.083 9.9	1385 0.096 11.5	1576 0.109 13.1	1767 0.123 14.7	1959 0.136 16.3	2150 0.149 17.9	2342 0.163 19.5	2533 0.176 21.1				
450		950 0.066 7.9	1027 0.071 8.6	1218 0.085 10.2	1410 0.098 11.7	1601 0.111 13.3	1792 0.124 14.9	1984 0.138 16.5	2175 0.151 18.1	2367 0.164 19.7	2558 0.178 21.3				
500				1243 0.086 10.4	1435 0.100 12.0	1626 0.113 13.6	1817 0.126 15.1	2009 0.140 16.7	2200 0.153 18.3	2392 0.166 19.9	2583 0.179 21.5				
550	条件 Condition: 元件温度 Element temp. 1700℃ 炉子温度 Furnace temp. 1600℃ 电流 Amperage 120A 表面负荷 Surface load 10W/cm²				1460 0.101 12.2	1651 0.115 13.8	1842 0.128 15.4	2034 0.141 16.9	2225 0.155 18.5	2417 0.168 20.1	2608 0.181 21.7				
600					1485 0.103 12.4	1676 0.116 14.0	1867 0.130 15.6	2059 0.143 17.2	2250 0.156 18.8	2442 0.170 20.3	2633 0.183 21.9				
650											1892 0.131 15.8	2084 0.145 17.4	2275 0.158 19.0	2467 0.171 20.6	2658 0.185 22.1
700											1917 0.133 16.0	2109 0.146 17.6	2300 0.160 19.2	2492 0.173 20.8	2683 0.186 22.4

5、1700等级9/18mm的U型元件 1700 Grade U type 9/18mm elements

热端 冷端 Le Lu	150	180	200	250	300	350	400	450	500	550	600	650	700	750	800
250	1596 0.021 5.8	1841 0.024 6.7	2005 0.027 7.3	2414 0.032 8.8	2822 0.037 10.3	3231 0.043 11.7	3640 0.048 13.2	4049 0.054 14.7	4458 0.059 16.2	4866 0.064 17.7	5275 0.070 19.2	5684 0.075 20.7	6093 0.081 22.2	6502 0.086 23.6	6910 0.091 25.1
300	1653 0.022 6.0	1899 0.025 6.9	2062 0.027 7.5	2471 0.033 9.0	2880 0.038 10.5	3289 0.043 12.0	3697 0.049 13.4	4106 0.054 14.9	4515 0.060 16.4	4924 0.065 17.9	5333 0.071 19.4	5741 0.076 20.9	6150 0.081 22.4	6559 0.087 23.9	6968 0.092 25.3
350	1711 0.023 6.2	1956 0.026 7.1	2120 0.028 7.7	2529 0.033 9.2	2937 0.039 10.7	3346 0.044 12.2	3755 0.050 13.7	4164 0.055 15.1	4573 0.060 16.6	4981 0.066 18.1	5390 0.071 19.6	5799 0.077 21.1	6208 0.082 22.6	6617 0.087 24.1	7025 0.093 25.5
400	1768 0.023 6.4	2014 0.027 7.3	2177 0.029 7.9	2586 0.034 9.4	2995 0.040 10.9	3404 0.045 12.4	3812 0.050 13.9	4221 0.056 15.3	4630 0.061 16.8	5039 0.067 18.3	5448 0.072 19.8	5856 0.077 21.3	6265 0.083 22.8	6674 0.088 24.3	7083 0.094 25.8
450		2071 0.027 7.5	2235 0.030 8.1	2644 0.035 9.6	3052 0.040 11.1	3461 0.046 12.6	3870 0.051 14.1	4279 0.057 15.6	4688 0.062 17.0	5096 0.067 18.5	5505 0.073 20.0	5914 0.078 21.5	6323 0.084 23.0	6732 0.089 24.5	7140 0.094 26.0
500			2292 0.030 8.3	2701 0.036 9.8	3110 0.041 11.3	3519 0.047 12.8	3927 0.052 14.3	4336 0.057 15.8	4745 0.063 17.3	5154 0.068 18.7	5563 0.074 20.2	5971 0.079 21.7	6380 0.084 23.2	6789 0.089 24.7	7198 0.095 26.2
550				2759 0.036 10.0	3167 0.042 11.5	3576 0.047 13.0	3985 0.053 14.5	4394 0.058 16.0	4803 0.064 17.5	5211 0.069 19.0	5620 0.074 20.4	6029 0.080 21.9	6438 0.085 23.4	6847 0.091 24.9	7255 0.096 26.4
600				2816 0.037 10.2	3225 0.043 11.7	3634 0.048 13.2	4042 0.053 14.7	4451 0.059 16.2	4860 0.064 17.7	5269 0.070 19.2	5678 0.075 20.6	6086 0.080 22.1	6495 0.086 23.6	6904 0.091 25.1	7313 0.097 26.6
650	功率 Power: W 热电阻 Resistance: Ω 工作电压 Voltage: V					3282 0.043 11.9	3691 0.049 13.4	4100 0.054 14.9	4509 0.060 16.4	4918 0.065 17.9	5326 0.070 19.4	5735 0.076 20.9	6144 0.081 22.3	6553 0.087 23.8	6962 0.092 25.3
700	条件 Condition:					3340 0.044 12.1	3749 0.050 13.6	4157 0.055 15.1	4566 0.060 16.6	4975 0.066 18.1	5384 0.071 19.6	5793 0.077 21.1	6201 0.082 22.6	6610 0.087 24.0	7019 0.093 25.5
750	元件温度 Element temp. 1500℃ 炉子温度 Furnace temp. 1300℃					3806 0.050 13.8	4215 0.056 15.3	4624 0.061 16.8	5033 0.067 18.3	5441 0.072 19.8	5850 0.077 21.3	6259 0.083 22.8	6668 0.088 24.2	7077 0.094 25.7	7485 0.099 27.2
800	电流 Amperage 275A 表面负荷 Surface load 14.5W/cm ²					3864 0.051 14.0	4272 0.056 15.5	4681 0.062 17.0	5090 0.067 18.5	5499 0.073 20.0	5908 0.078 21.5	6316 0.084 23.0	6725 0.089 24.5	7134 0.094 25.9	7543 0.100 27.4

6、1800等级9/18mm的U型元件 1800 Grade U type 9/18mm elements

热端 冷端 Le Lu	150	180	200	250	300	350	400	450	500	550	600	650	700	750	800
250	1106 0.023 5.0	1278 0.026 5.8	1393 0.029 6.3	1679 0.035 7.6	1966 0.041 8.9	2253 0.047 10.2	2540 0.052 11.5	2827 0.058 12.8	3114 0.064 14.2	3401 0.070 15.5	3687 0.076 16.8	3974 0.082 18.1	4261 0.088 19.4	4548 0.094 20.7	4835 0.100 22.0
300	1143 0.024 5.2	1315 0.027 6.0	1430 0.030 6.5	1717 0.035 7.8	2004 0.041 9.1	2291 0.047 10.4	2578 0.053 11.7	2864 0.059 13.0	3151 0.065 14.3	3438 0.071 15.6	3725 0.077 16.9	4012 0.083 18.2	4299 0.089 19.5	4586 0.095 20.8	4872 0.101 22.1
350	1181 0.024 5.4	1353 0.028 6.1	1468 0.030 6.7	1754 0.036 8.0	2041 0.042 9.3	2328 0.048 10.6	2615 0.054 11.9	2902 0.060 13.2	3189 0.066 14.5	3476 0.072 15.8	3762 0.078 17.1	4049 0.084 18.4	4336 0.090 19.7	4623 0.096 21.0	4910 0.101 22.3
400	1218 0.025 5.5	1390 0.029 6.3	1505 0.031 6.8	1792 0.037 8.1	2079 0.043 9.4	2366 0.049 10.8	2653 0.055 12.1	2939 0.061 13.4	3226 0.067 14.7	3513 0.073 16.0	3800 0.079 17.3	4087 0.084 18.6	4374 0.090 19.9	4661 0.096 21.2	4947 0.102 22.5
450		1428 0.029 6.5	1543 0.032 7.0	1829 0.038 8.3	2116 0.044 9.6	2403 0.050 10.9	2690 0.056 12.2	2977 0.062 13.5	3264 0.067 14.8	3551 0.073 16.1	3837 0.079 17.4	4124 0.085 18.7	4411 0.091 20.1	4698 0.097 21.4	4985 0.103 22.7
500			1580 0.033 7.2	1867 0.039 8.5	2154 0.044 9.8	2441 0.050 11.1	2728 0.056 12.4	3014 0.062 13.7	3301 0.068 15.0	3588 0.074 16.3	3875 0.080 17.6	4162 0.086 18.9	4449 0.092 20.2	4736 0.098 21.5	5022 0.104 22.8
550				1904 0.039 8.7	2191 0.045 10.0	2478 0.051 11.3	2765 0.057 12.6	3052 0.063 13.9	3339 0.069 15.2	3626 0.075 16.5	3912 0.081 17.8	4199 0.087 19.1	4486 0.093 20.4	4773 0.099 21.7	5060 0.105 23.0
600				1942 0.040 8.8	2229 0.046 10.1	2516 0.052 11.4	2803 0.058 12.7	3089 0.064 14.0	3376 0.070 15.3	3663 0.076 16.7	3950 0.082 18.0	4237 0.088 19.3	4524 0.093 20.6	4811 0.099 21.9	5097 0.105 23.2
650	功率 Power: W 热电阻 Resistance: Ω 工作电压 Voltage: V					2266 0.047 10.3	2553 0.053 11.6	2840 0.059 12.9	3127 0.065 14.2	3414 0.071 15.5	3701 0.076 16.8	3987 0.082 18.1	4274 0.088 19.4	4561 0.094 20.7	4848 0.100 22.0
700	条件 Condition:					2304 0.048 10.5	2591 0.054 11.8	2878 0.059 13.1	3164 0.065 14.4	3451 0.071 15.7	3738 0.077 17.0	4025 0.083 18.3	4312 0.089 19.6	4599 0.095 20.9	4886 0.101 22.2
750	元件温度 Element temp. 1700℃ 炉子温度 Furnace temp. 1600℃					2628 0.054 11.9	2915 0.060 13.3	3202 0.066 14.6	3489 0.072 15.9	3776 0.078 17.2	4062 0.084 18.5	4349 0.090 19.8	4636 0.096 21.1	4923 0.102 22.4	5210 0.108 23.7
800	电流 Amperage 220A 表面负荷 Surface load 10W/cm ²					2666 0.055 12.1	2953 0.061 13.4	3239 0.067 14.7	3526 0.073 16.0	3813 0.079 17.3	4100 0.085 18.6	4387 0.091 19.9	4674 0.097 21.2	4961 0.102 22.5	5247 0.108 23.9

