

# HTA&HTE IMMERSION HEATER

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- Master of high-end materials
- In the global aluminum processing industry

**SGJL<sup>®</sup>**

### **ZHEJIANG SHANGGUI JULI SPECIAL MATERIAL TECHNOLOGY CO., LTD.**

Founded in 2018, Zhejiang ShangGui Juli Special Material Technology Co., Ltd.(SGJL for short) is a high-tech enterprise specializing in R&D and production of special ceramic materials. After several years of rapid development,SGJL has become a high-end material backbone supplier specializing in serving the global aluminum processing industry.

At present, the brand "Shang Gui" has seven series of products with global leading quality:

- **SG-28 Silicon Nitride Ceramic Series**
- **TA-03 Aluminium Titanate Ceramic Series**
- **OS-11 O'Sialon Ceramic Series**
- **SMF-02 Precise Tube Filter Series**
- **HTE High Thermal Conductivity Immersion Heater Series**
- **HTA High Reliability Immersion Heater Series**
- **TP-02 All-Ceramic Pump Parts Series**

SGJL's mission is to provide various high-end material solutions for the global aluminium processing industry and even the non-ferrous metal processing industry. And we will rely on our outstanding technological research and development capabilities to continuously create a leading high-end material foundation for the upgrading of the entire industry.



# HTA & HTE IMMERSION HEATER SERIES

The heating and holding of molten aluminium is the core daily operation in the aluminium processing industry, and due to the material limitation, the progress of molten aluminium heating method has been lack of progress in the past hundred years. SGJL makes full use of the technical advantages in material research and development, achieves great success of producing HTE high thermal conductivity immersion heaters for die casting industry and HTA high reliability immersion heaters for melting and casting industry after several years' effort. These series of products have a very positive significance of upgrading in aluminium processing industry, energy saving and carbon reduction.

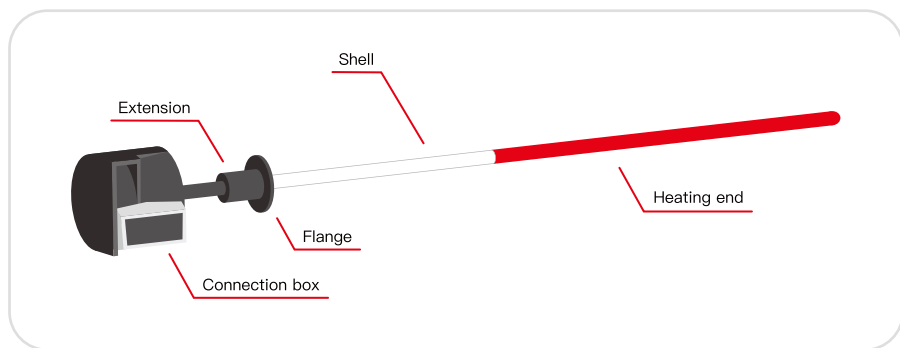
## Performance Comparison Of Heating And Holding Methods In The Aluminum Processing Industry

|                                   | Gas Burner   | Upper<br>Radiation Tube | Silicon Carbide<br>Rod Heater | HTE&HTA<br>Immersion Heater |
|-----------------------------------|--------------|-------------------------|-------------------------------|-----------------------------|
| Heating Type                      | Radiant Type | Radiant Type            | Immersion Type                | Immersion Type              |
| Heating Speed                     | Fast         | Slow                    | Slow                          | Fast                        |
| Energy Consumption                | High         | Medium                  | Medium                        | Low                         |
| Reliability                       | Medium       | Low                     | Low                           | High                        |
| Molten<br>Aluminum Loss           | High         | High                    | Medium                        | Low                         |
| Service Life                      | Long         | Short                   | Short                         | Long                        |
| Temperature<br>Control Accuracy   | Low          | Low                     | Medium                        | High                        |
| Safety                            | Low          | Medium                  | Low                           | High                        |
| Comprehensive<br>Cost Performance | Low          | Low                     | Medium                        | High                        |

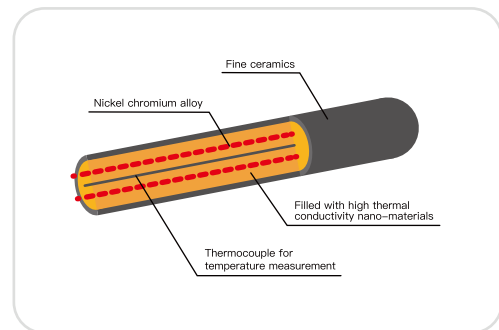
# HTE - HIGH THERMAL CONDUCTIVITY IMMERSION HEATER

Filled with high thermal conductivity Nano-materials, HTE immersion heaters compared with non-filled heaters, the thermal efficiency is increased by more than 15% and saves energy by more than 50% compared with traditional upper radiant heater tubes.

## Construction Of HTE-high Thermal Conductivity Immersion Heater



- The high thermal conductivity heater is made of nickel chromium alloy and high-performance insulation embedded in a silicon nitride ceramic protection tube, which can be directly immersed into the molten metal for heating.
  - The surface heat load is 8–10W/cm<sup>2</sup>, and the interior is filled with high thermal conductivity nano-materials with a thermal conductivity of 79.54W/m•K. Its thermal conductivity is 3400 times that of air.
- \*Air thermal conductivity: 0.023W/m•K

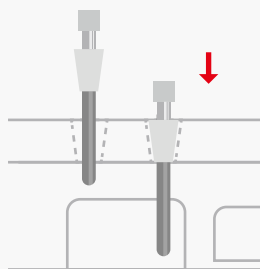


Protection  
Tube Length  
Max.1300mm

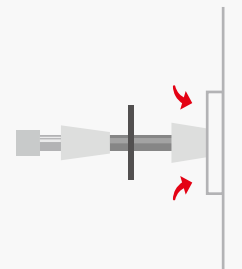
Heating Length  
350mm – 550mm

Corresponding Power  
6kW – 27.5kW

O.D.  
38mm / 66mm



Vertical Installation  
(Top Immersion)



Horizontal Installation  
(Bottom Immersion)

\*Application Scenario

## ADVANTAGES AND FEATURES

- High heating efficiency >98%; High thermal conductivity solid filling, far higher than air radiation conduction.
- Electric heating is more energy-saving, environmental, and easier to precisely control.
- High thermal conductivity immersion heaters are more **efficient**, **safe**, **advanced**, And easier to be operated and maintained.

SMALLER SIZE

MORE POWER SUPPLY

## APPLICATION SCOPE

HTE Immersion Heaters Can Be Used For:

Melting & Holding Furnace / Holding Furnace / Degassing Unit / Molten Aluminum Transfer Ladle / Plate Furnace / Filtration Box (Deep Bed)

## PRODUCT VALUE

- We can help your factory achieve energy-saving and decarbonization goals.
- We can provide a wide range of rated power, sizes, and customized heating end power solutions.
- We can provide a one-year warranty service.

| Power Supply (kW) | Voltage       | Heating Length (mm) | O.D. (mm) | Protection tube length (mm) | Remark                  |
|-------------------|---------------|---------------------|-----------|-----------------------------|-------------------------|
| 6                 | 220V          | 350                 | 38        | 550                         | Vertical Installation   |
| 8                 | 380V          | 500                 |           | 950                         | Horizontal Installation |
| 8                 | 220V          | 250                 | 66        | 550                         | Vertical Installation   |
| 10                | 220V/<br>380V | 300                 |           | 550                         | Vertical Installation   |
| 12                | 220V/<br>380V | 330                 |           | 910                         | Vertical Installation   |
| 18                | 380V          | 500                 |           | 950                         | Horizontal Installation |
| 25                | 380V          | 550                 |           | 950                         | Horizontal Installation |

Basic Parameters

|                                        | Silicon Carbide Rod Heater | Squirrel Cage Heater | High Thermal Conductivity Immersion Heater | Remark         |
|----------------------------------------|----------------------------|----------------------|--------------------------------------------|----------------|
| Heating Method                         | Radiant Type               | Immersion Type       | Immersion Type                             | —              |
| Thermal Efficiency                     | 40–50%                     | 75–85%               | >98%                                       | —              |
| Electricity Consumption per ton (kW/h) | 26–30                      | 10–13                | 8–10                                       | —              |
| Aluminum Loss (kg/year)                | 2000                       | 100–200              | 100–200                                    | Oxidation loss |
| Heating Speed                          | Fast                       | Slow                 | Fast                                       | —              |
| Safety                                 | Medium                     | Low                  | High                                       | —              |
| Service Life                           | Short                      | Medium               | Long                                       | —              |
| Temperature Control Accuracy           | Low                        | Medium               | High                                       | —              |

Comparison Of Data For Three Types Of Heaters

# HTA - HIGH RELIABILITY IMMERSION HEATER

## ○ LOWER SURFACE HEAT LOAD LOWER REACTIVE POWER LOSS

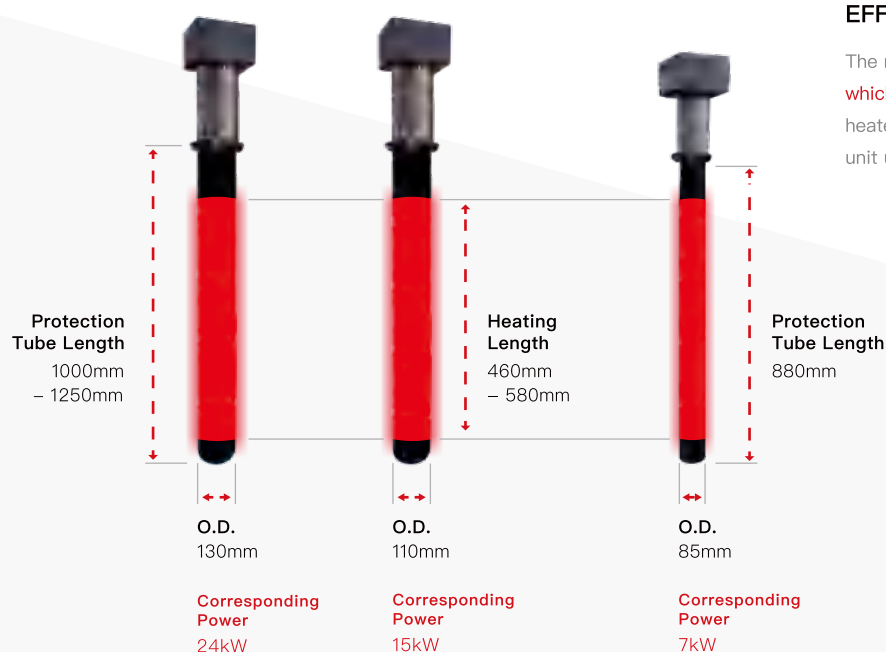
The HTA immersion heater adopts customized heating elements inside, which have lower reactive power loss compared to traditional squirrel cage heaters and can use full 220V voltages. The surface heat load is as low as  $3W/cm^2$  and can be burned at full load unimmersed.

## ○ SELF – DEVELOPED SILICON NITRIDE CERAMIC PROTECTION TUBE

The heater protection tube adopts self-developed SG-28 silicon nitride ceramic. Good high-temperature strength, strong heat resistance and thermal shock resistance, able to withstand long-term erosion from high-temperature heating elements and molten aluminum.

## ○ MORE ENERGY – SAVING EFFICIENT SELECTION

The maximum power of a single heater is **24kW**, which saves 50% energy compared to a radiation heater; The minimum energy consumption per unit under holding is **1–1.5 degrees per hour**.



| Power Supply (kW) | Voltage | Heating Length (mm) | O.D. (mm) | Protection tube length (mm) | Remark                |
|-------------------|---------|---------------------|-----------|-----------------------------|-----------------------|
| 7                 | 220V    | 460                 | 85        | 880                         | Vertical Installation |
| 15                | 220V    | 480                 | 110       | 1000                        | Vertical Installation |
| 24                | 220V    | 580                 | 130       | 1100                        | Vertical Installation |

Basic Parameters

# PRECAUTIONS FOR HTE & HTA SERIES

- 1 During the installation or production, it is strictly prohibited to collide, hit the heater, so as not to cause damage to the heater protection tube.
- 2 The lowest limit of molten aluminium during the use of the heater must be 30mm higher than the position of the heating end.
- 3 The heater control programme is recommended to adopt SGJL 's.
- 4 After removing the heater from molten aluminum, please pack with the refractory cotton to cool down naturally. It is strictly prohibited to expose or use cool wind to rapidly cool down.
- 5 It is prohibited to put the heater directly into molten aluminium without preheating.
- 6 The heater in the normal process of power failure, to remove the heater in time and use insulation cotton wrapped and cool down slowly to prevent the molten aluminium from solidifying and damaging the heater protection tube.
- 7 If the built-in thermocouple of the heater is damaged or malfunctioning, it is strictly prohibited to use it with faults.
- 8 During the use of the heater, control the current output to ensure that the heater does not overload, and it is strictly prohibited to use the heater beyond its rated current.  
The heater is strictly prohibited to use over the rated current.
- 9 When the equipment needs to be shut down or doing maintenance for a long time, the heater should be promptly removed and wrapped with insulation cotton to slowly cool down. After cooling to room temperature, use diamond grinding discs to treat the aluminum slag adhered to the surface of the protection tube for reuse.

**\* If you need to customize the heaters,  
please contact us, thank you!**

**ZHEJIANG SHANGGUI JULI  
SPECIAL MATERIAL TECHNOLOGY CO., LTD.**

TEL: 86-0572-2926332 2926337

FAX: 86-0572-2926335

WEB: <http://www.zjsgjl.com>

<http://www.sgjl-fineceramic.com>

E-MAIL: [sgjl@zjsgjl.com](mailto:sgjl@zjsgjl.com)

ADD: #11 Msmes intelligent industrial park, Huzhou, China

