

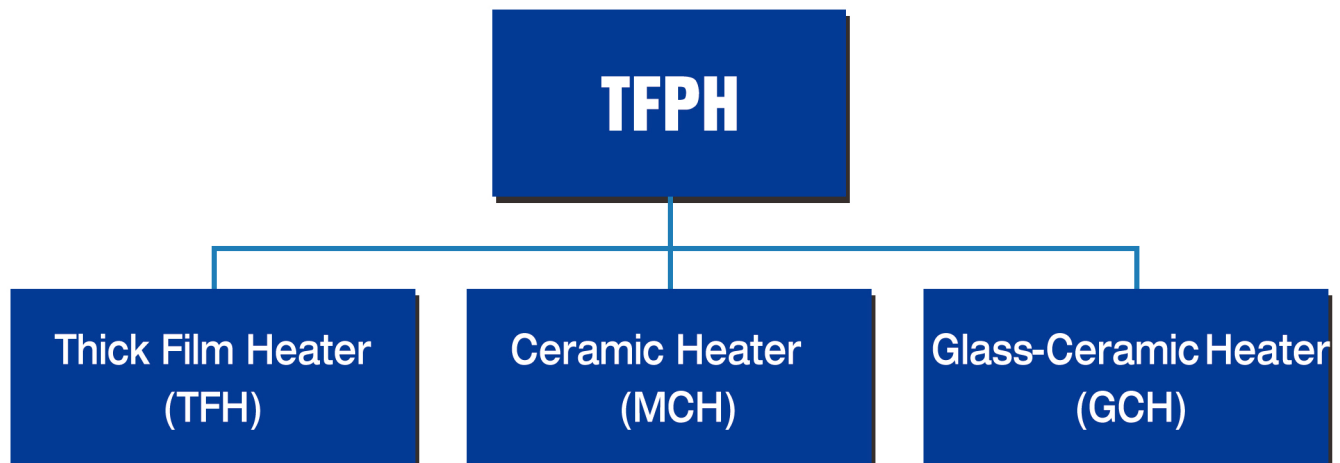




## Company Profile

TFPH Printed Heater is a manufacturer focus on Printed heaters in China. Its predecessor was a family workshop that was founded in 2004 to produce ceramic heaters. After 10 years of development, it has expanded its production scale and product range through acquisitions, equity participation, holdings or new plants.

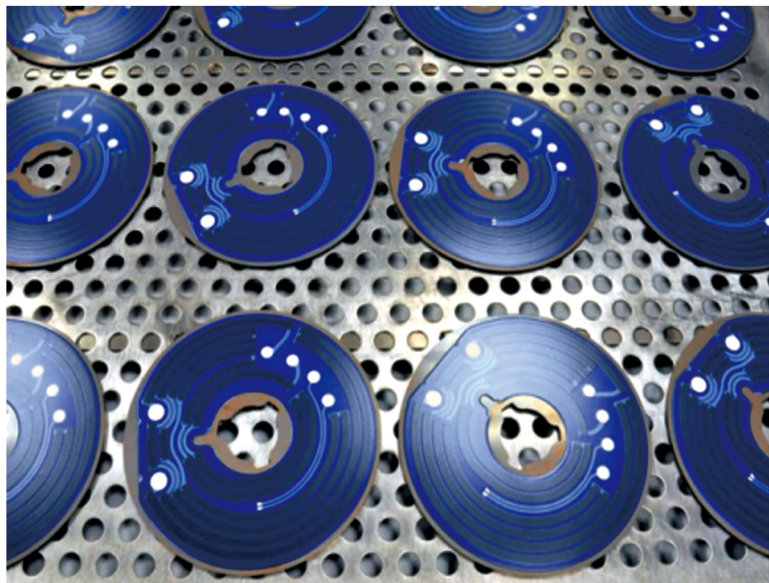
In 2014, it was renamed TFPH Printed Heater, and its products mainly sold to mainland China, North America, Europe and Southeast Asia.



## Trade Policy

Delivery Terms	FOB\CIF\EXW
Bank Account	Hong Kong offshore account
Currency	USD, CNY
Payment	T/T, Escrow
Shipping	Air Transport/Sea Transport/Express
The specific content of the PI shall prevail	





## Thick Film Heater(TFH)

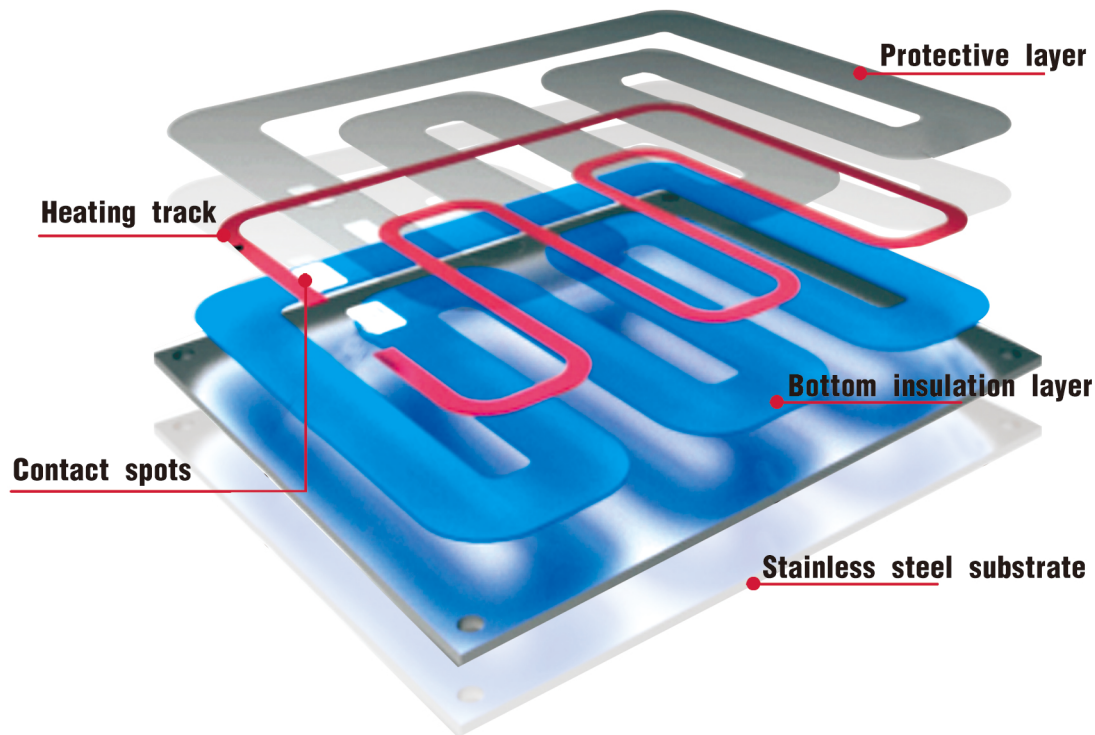
Thick-film electric heater on stainless steel is a new type of heating device that is printed on stainless steel substrate by using a thick-film screen printing process to print insulating materials, heating resistors, conductors, glass protective glazes, etc., and is applied to home appliances, instruments, etc.

## Product Features

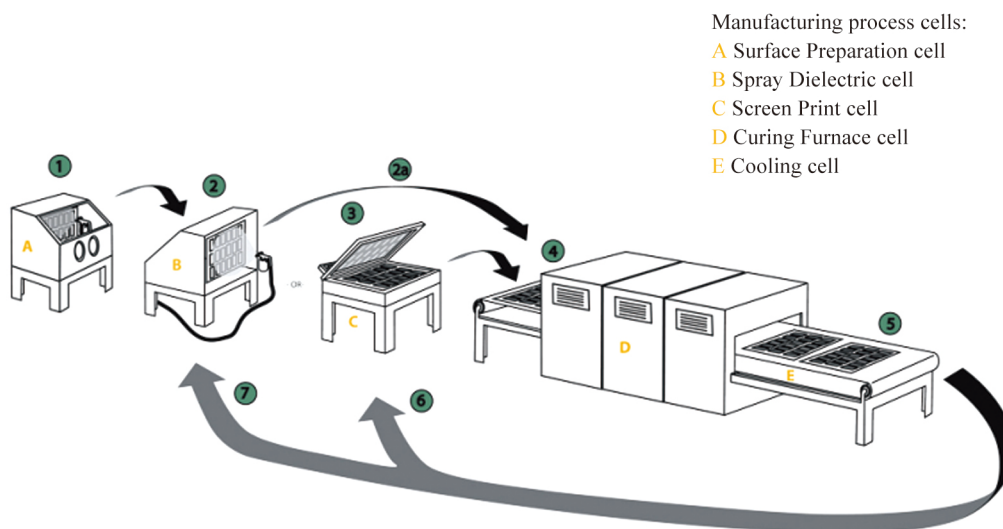
- The element is on a flat sheet thus ensure significantly better heat transfer to flat wall as compared to tubular element
- Quick temperature rise time - energy savings
- Inner surface of heated vessel remain smooth and easily washable
- Very suitable for heating of aggressive liquids
- No need to discharge the vessel content during maintenance
- Heating through sufficiently large area may effectively prevent burning of content to the vessel surface



## Product Structure



## Production Process

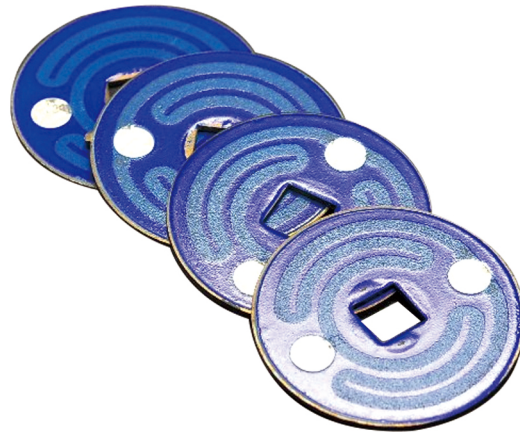
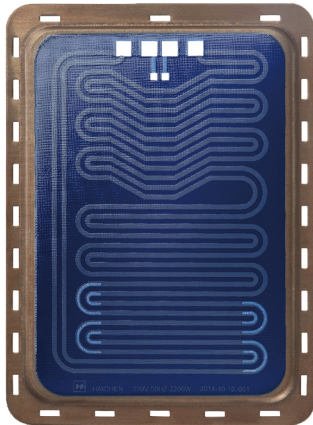


Manufacturing process steps:

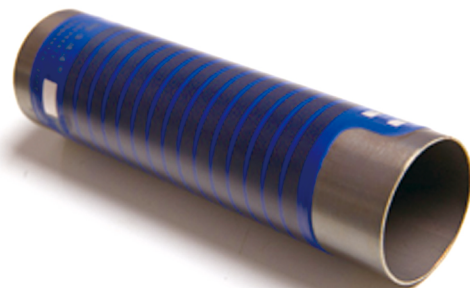
- ① Surface Preparation-sandblast
- ② Spray Dielectric layer
- ③ Dielectric layer Curing step through furnace
- ④ Screen Print conductive layer
- ⑤ Screen Print Curing step through furnace
- ⑥ Cooling heated sub-assembly
- ⑦ Screen Print next resistive layer step&through furnace/cool
- ⑧ Spray Dielectric Top layer
- ⑨ Continue on to Screen Print conductive or resistive layer if desiring more than one resistance

## Product Type

- Thick Film Flat Plate Heater



- Thick Film Tubular Heater





## Product Application

- Home appliances, such as washing machines/dishwashers/electric kettles/electric water heaters,/coffee machines/water dispensers.
- Industrial equipment & industrial equipment/medical equipment/high temperature sterilization equipment.



Coffee machine



Steam Cleaner



Milk Frother

## Technical Data

Substrate material	SUS 430 /440;DIN 1.4016 ;EN 1.4301	Pastes	US ESL& Du Pont
Voltage	0-400v	Maximum Watt Density	60 watts/cm <sup>2</sup>
Input power tolerance	-50	Maximum Temperature	400°C
Insulation Resistance	≥200MΩ	Leakage Current	≤0.25mA
Electric Intensity	1,750V/5mA/60s	Max life test	> 10,000 hours
Environmental Certification	ROSH	Type	Plate & Tube
Diameter	customization	Test Standard	CQC,UL ,SEMKO ,CE,CSA/ EN 60335-1/QB-T4702
Remark	If it is special dimensions or specifications we offer customization		



## Ceramic heater(MCH)

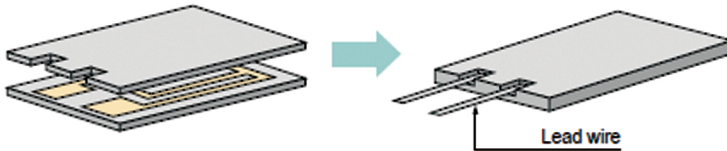
The ceramic heater is a high-melting-point metal heating resistor paste such as metal tungsten or molybdenum manganese printed on a cast ceramic green body according to the requirements of the design of the heating circuit, which is laminated by hot pressing, and then protected under a reducing atmosphere of about 1600 °C. Ceramic heating element sintered together with metal.

## Product Features

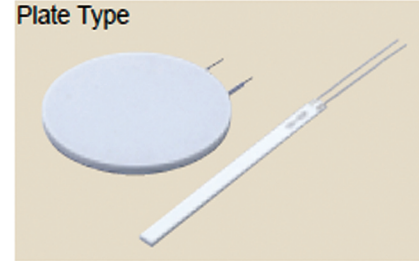
- Energy saving, high thermal efficiency, unit heat consumption is 20 to 30 % less than PTC.
- Surface safety is not charged, good insulation performance: can withstand 4500V/1S withstand voltage test, no breakdown, leakage current <0.5mA.
- Resistance-temperature changes linearly, temperature can be easily controlled by control resistors.
- Fast heating: The heating element 500W power starts 20S temperature to reach 600 °C or above; its component rated power starts 10S temperature can reach 200 °C or above.
- Safe, no open flames, Long service life.

## Product Type

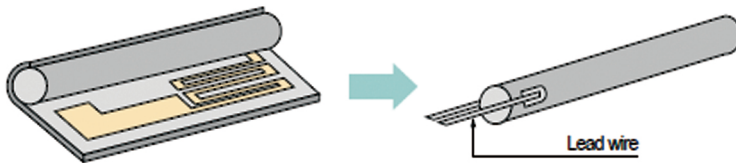
### ●Plate Type



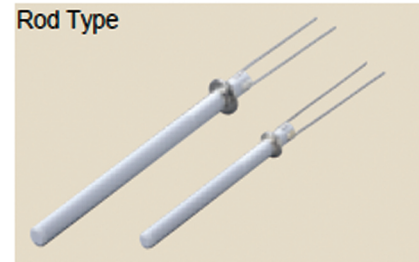
### Plate Type



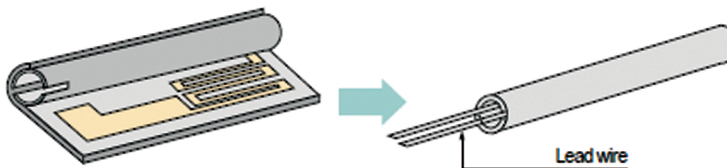
### ●Rod Type



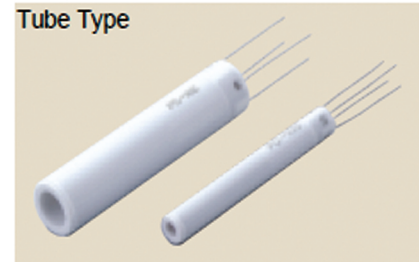
### Rod Type



### ●Tube Type



### Tube Type



## Product Application

- Home appliances: e-cigarette/smart toilet/instant electric kettle/instant water heater/small kitchen treasure/hair straightener/curling iron
- Industrial: mould heating/electric iron/igniter
- Other special industries or fields: medical equipment



E-cigarette



Toilet



Hair straightener



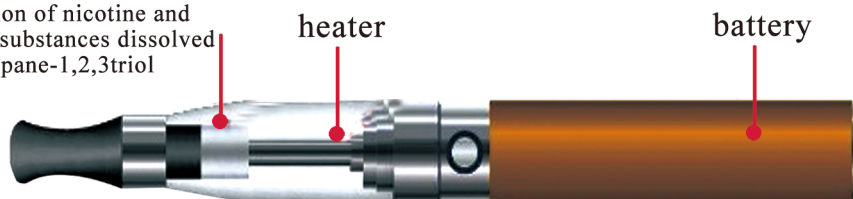
## Technical Data

Substrate material	Alumina ( Al <sub>2</sub> O <sub>3</sub> ) /Zirconia ( ZrO <sub>2</sub> ) /Silicon Carbide	Metal Electronic Pastes	Ruthenium and tungsten series
Voltage	0-400v	Watt Density	50 watts/cm <sup>2</sup>
Resistance Tolerance	±10 %	Maximum Temperatur	800°C
PGA Lead Pull Strength-PGA	horizontal direction: ≥5KGF vertical direction: ≥3KGF	specific heat (20°C)	≥0.78*10 <sup>-3</sup> J/(kg•°C)
Insulation Test	3750v / 10s test, no breakdown	leakage current	≤0.5mA
Insulation Resistance	≥100MΩ	Vickers-hardness	12.3Gpa (load 500g)
Thermal Conductivity	18 W/(m·K),20°C	Max life test	>3000 hours
coefficient of thermal expansion	7.8*10 <sup>-6</sup> //°C(40-800°C)	Type	Plate/Rod /Tube
Diameter	If it is special dimensions or specifications we offer customization	Environmental Crtific ation	ROSH

## Product Case

### 1.E-cigarette Heater

Solution of nicotine and  
other substances dissolved  
in propane-1,2,3triol



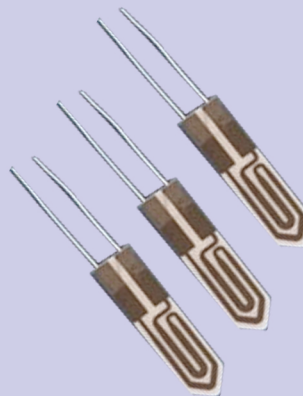
- ① The user inhales.
- ② The heater switches on and warms the solution.
- ③ An aerosol forms. it includes nicotine.
- ④ The user inhales the nicotine—just as in smoking

E-cigarettes ceramic heater is an ideal heating element for electronic cigarettes. At present, non-combustion electric heaters are the research and development direction and focus of TFPH.

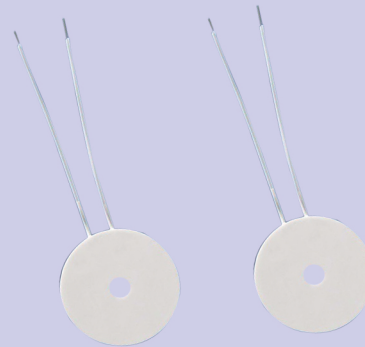
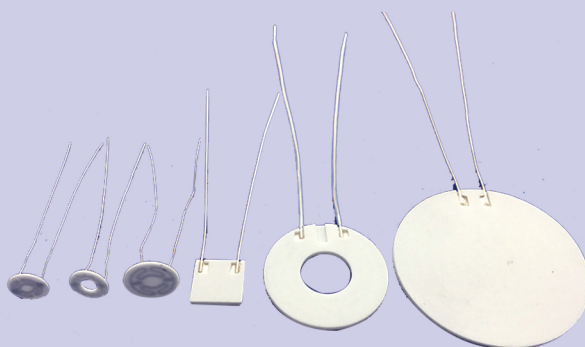
## 1-1 Plate E-cigarette Heater

Regular products and parameters

Configuration	length/mm	Width/mm	Thickness/mm	Resistance Range/ $\Omega$	Voltage/V	Resistance Tolerance
Plate	19	5	0.5	0.6-0.8	3.7	$\pm 10\%$



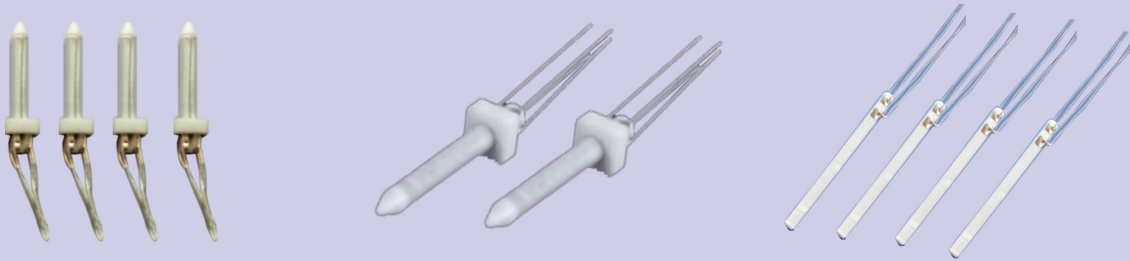
Round	OD/mm	ID/mm	Thickness/mm	Resistance Range/ $\Omega$	Voltage/V	Resistance Tolerance
	7	3	0.5	0.5	3.7	$\pm 10\%$



If it is special dimensions or specifications we offer customization

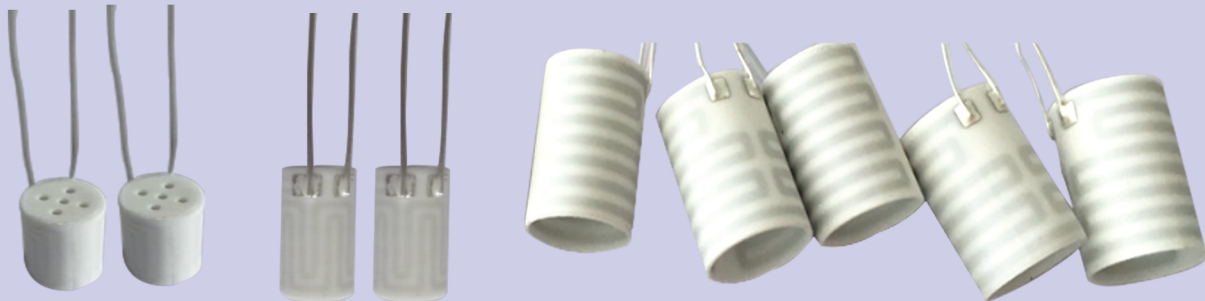


## 1-2 Rod E-cigarette Heater

Configuration	OD/mm	length/mm	Resistance Range/ $\Omega$	Voltage/V	Resistance tolerance
Rod	2.15	19	0.6-1.0	3.7	$\pm 10\%$
					
If it is special dimensions or specifications we offer customization					

## 1-3 Tube or Cup E-cigarette Heater

Regular products and parameters								
序号 No	OD/mm	ID/mm	length	Thickness/mm	Configuration	Resistance Range/ $\Omega$	Voltage/V	Temperature
1	10	8.8	20	0.6	Round	0.6-0.8	3.7	30sec in 200°C
2	10	8.8	15	0.6	Round	0.6-0.8	3.7	30sec in 200°C
3	8.5	7.3	27	0.6	Round	0.6-0.8	3.7	30sec in 200°C
4	20	15	11	0.8	Round	0.6-0.8	3.7	30sec in 200°C
5	14.8	13.6	18.4	0.6	Round	0.4-0.5	7.4	30sec in 200°C



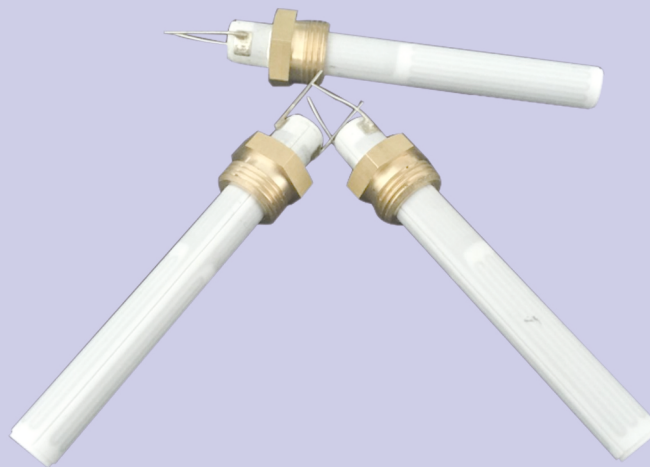
If it is special dimensions or specifications we offer customization

## 2. Toilet Heater

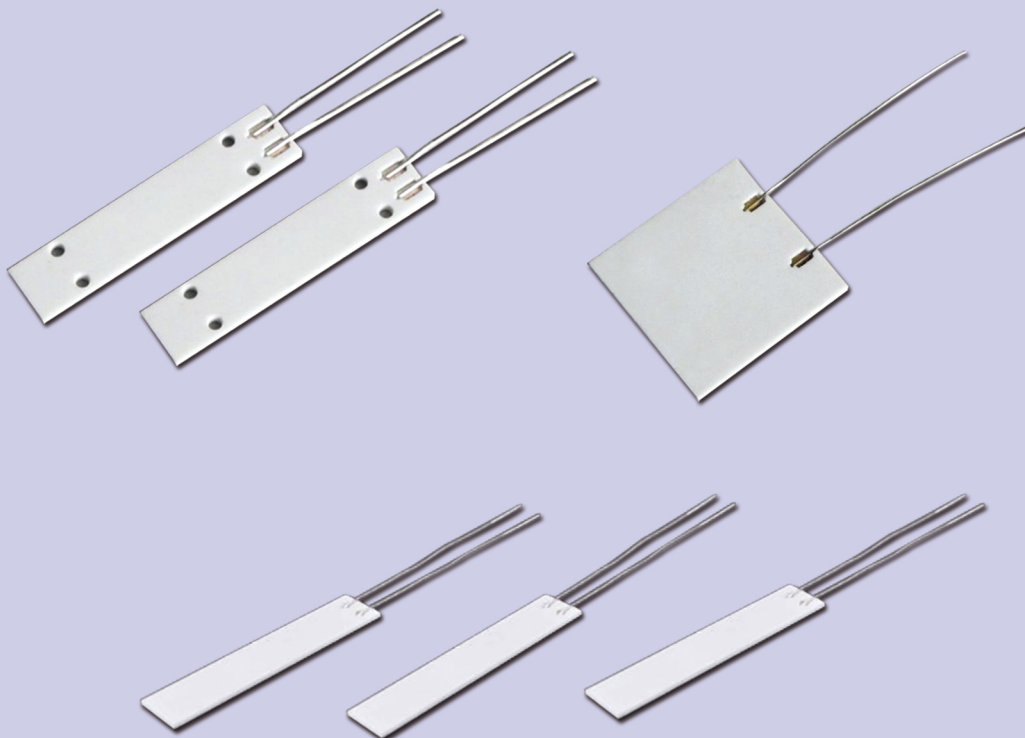
Regular products and parameters

Type	Size			Power/W	Resistance Tolerance
	OD/mm	ID/mm	Length/mm		
Tube Heater	13	8	60-125	1200-1800	±10 %
	11.5	7.1	117	1600	





Flat Heater	Length/mm	Width/mm	Thickness/mm	Power/W	Resistance Tolerance
	70	20-30	1.3-2.0	≤1600	±10%



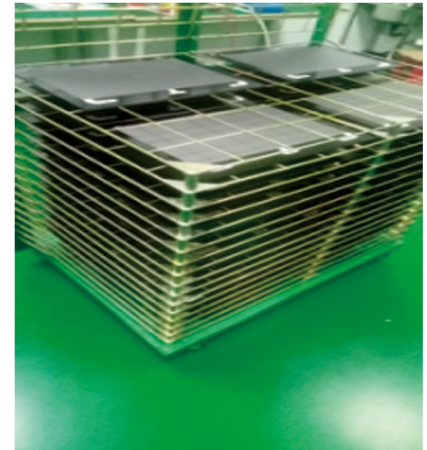
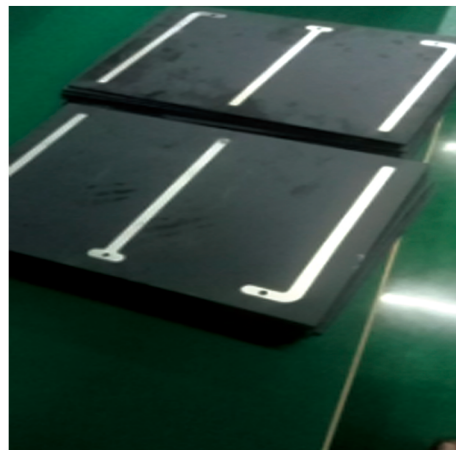
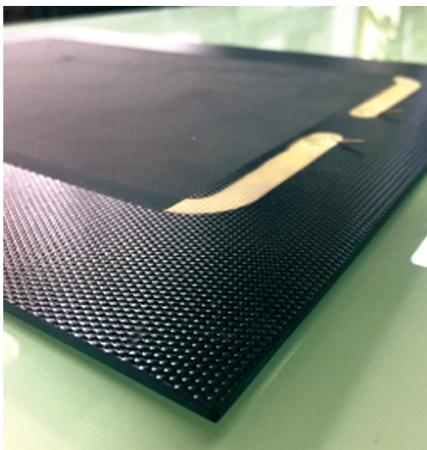
If it is special dimensions or specifications we offer customization



## Glass-Ceramic Heater (GCH)

Glass-Ceramic is a novel ceramic material with high thermal conductivity and no expansion. The ceramic material has high thermal conductivity and thermal expansion coefficient close to zero, no water absorption, good insulation performance, compact and uniform product structure,

impact resistance, wear resistance and resistance. Good performance such as corrosion, smooth and bright appearance, high far-infrared emissivity and other characteristics.



## Product Features

1. No open flame, heat conversion efficiency of 95%, short heating time.
2. Using glass-ceramic as carrier, the expansion coefficient is small, it will not oxidize, and the performance is stable.
3. The flat design is conducive to uniform heat generation, and the heat conduction is carried out by far infrared radiation, which is beneficial to human health.
4. Product life reaches 25,000 hours

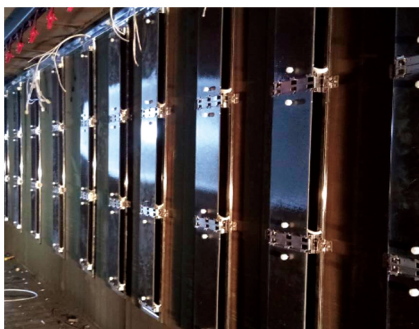


## Product Application

- Kitchen Appliances: oven, kitchen stove, small appliances.
- Industrial: Drying of products, such as industrial ovens/baking of coating lines / drying of food, medicines, herbs.



Kitchen stove



Industrial



Warmers

## Technical Data

Substrate material	Ceramic-Glass	Baseboard Supplier	SCHOTT/AGC/Saint-Gobain
Voltage	0-400v	Standard Size	400*150*4.0mm
Max Power Density	$\leq 0.3\text{W}/\text{cmm}^2$ ( Effective heating zone )	Heat Transfer Direction	Vertical & UP
Input power tolerance	+5 / -10 %	Maximum Temperature	$\leq 500^\circ\text{C}$
Insulation Resistance	$\geq 100\text{M}\Omega$	leakage Current	$\leq 0.5\text{mA}$
Electric Intensity	3750V/1min 0.5mA , No breakdown flashover	Max life test	25,000 hours
Environmental Certification	ROSH	Type	Plate & Arcuate
Emissivity	0.97	Wave Length	2 - 15um
Remark	If it is special dimensions or specifications we offer customization		