

# TOSHIBA

Leading Innovation >>>

CATALOGUE Rev.1

## Infrared Halogen Heater



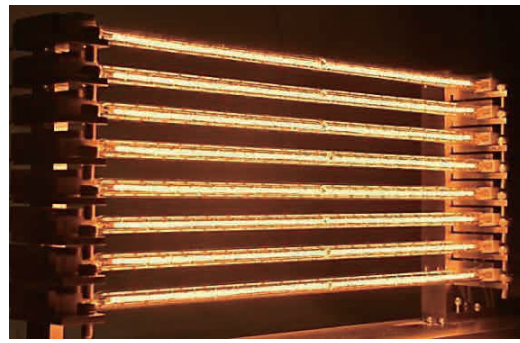
TOSHIBA LIGHTING & TECHNOLOGY CORPORATION

# Infrared Halogen Heater

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## ◇ Applications of Halogen Heater

Halogen heater is a clean source of heat with extremely high efficiency that utilize emitted light as heat. They are widely used as a source of heat for industry. Main applications: Resin molding (e.g. PET), paint drying/curing, film stretching, heating appliances, semiconductor manufacturing, solar panel manufacturing, metal rolling/annealing, paper drying and food warming, etc.

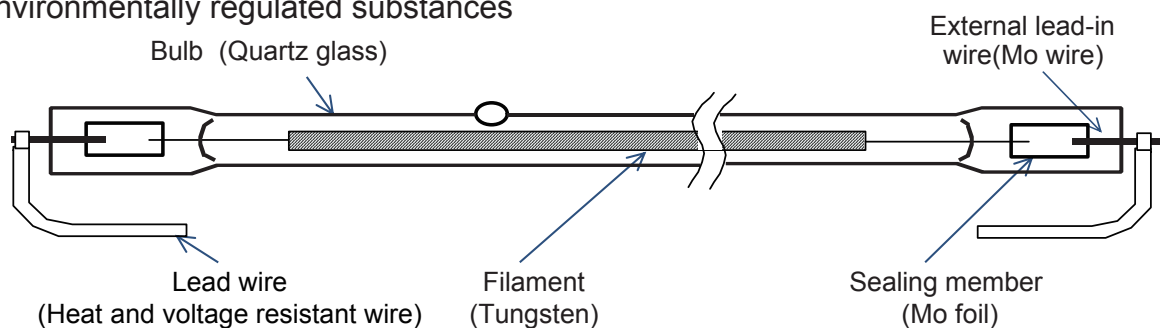


## ◇ Features of Halogen Heater

- **High-efficiency energy source**  
Converts more than about 75% of input energy into thermal energy
- **High-speed heating is possible**  
Rises to more than 85% within 1 to 2 seconds after being turned on
- **Use under low pressure/atmospheric environments is possible**
- **Contactless heating is possible for objects to be heated**  
Does not contaminate the exposed object or the surrounding environment
- **Customization of the heat distribution is possible**  
Customize the layout of the heat distribution in the direction of the heater axis
- **Long-life heater**  
Maintains initial output up to the end of its lifespan
- **The materials used are RoHS-compliant products that do not contain environmentally regulated substances**

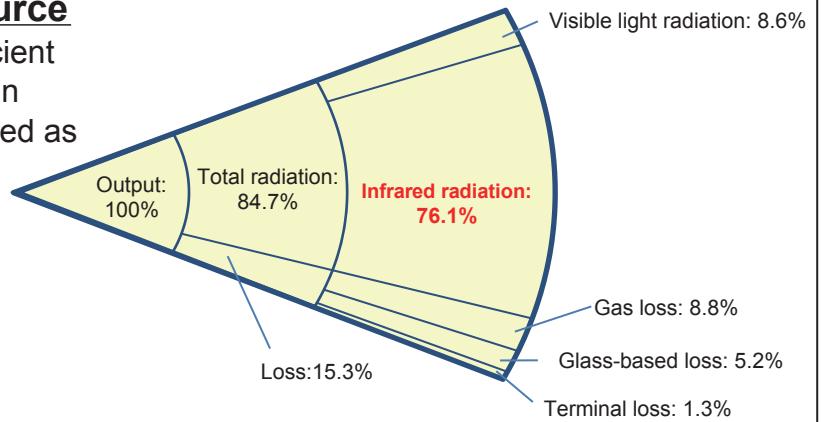
### Heater Structure

The heater is made from materials and heat resistant materials that do not contain environmentally regulated substances



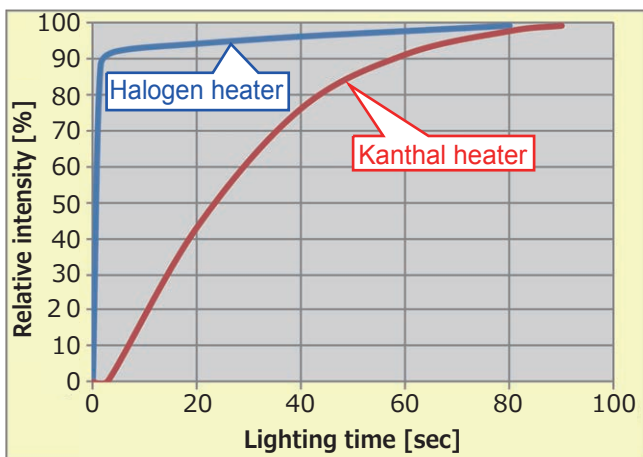
### Highly Efficient Energy Source

Halogen heaters are a highly efficient source of heat for which more than about 75% of input power is emitted as infrared rays.



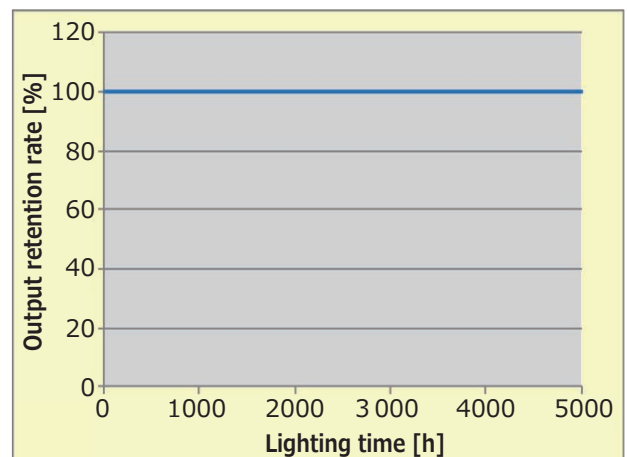
### Fast Rise in Output

The filament that is the source of heat has a small thermal capacity. Therefore, these heaters are capable of emitting infrared rays at the same time as when you turn on the light. This means the rise in output is fast and there is excellent thermal control.



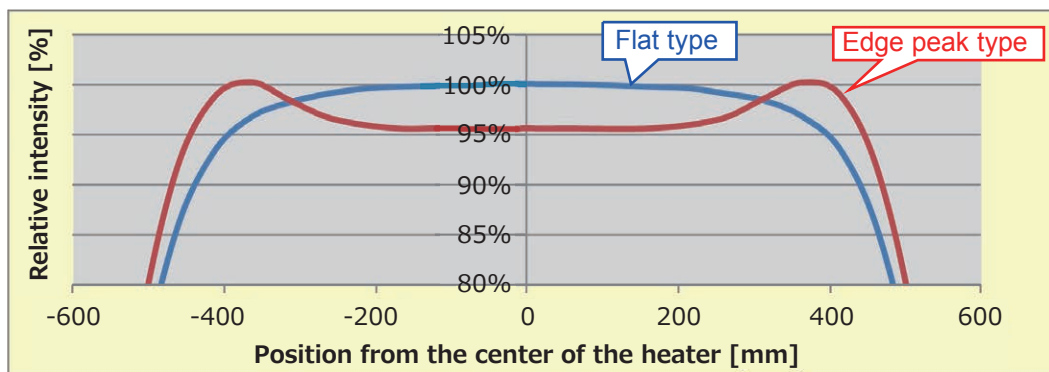
### Long Life Heater

The initial output is maintained until the end of the lifespan of the heater by preventing the blackening that occurs due to the dispersal of the filament (tungsten) with the action of the halogen cycle.



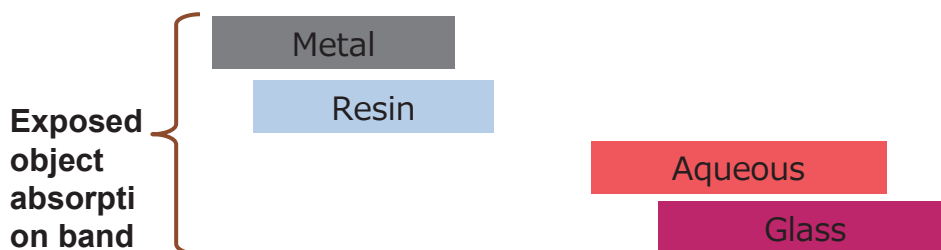
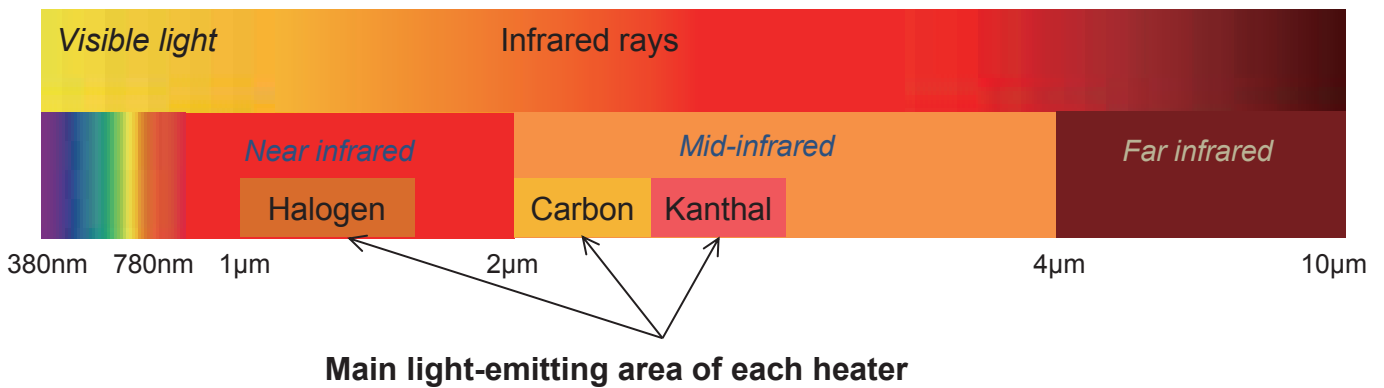
### Heat Distribution Customization

It is possible to customize the heat distribution with the layout of the filament.



## ◇ Comparison of Performance between Halogen Heater and Other Heaters

	Halogen Heater	Carbon Heater	Kanthal Heater
Heating Element Material	Tungsten	Carbon fiber	Kanthal (Cr+Fe+Al)
Rise in Output (Temperature Control)	⊙ (0.5 to 3 sec)	○ (2 to 5 sec)	△ (1 to 2 min)
Cleanliness	⊙	○	○
Space Saving	⊙	○	○
Lifespan	○ 5000h	○ 5000h	⊙ 20000 to 30000h
	Initial output is maintained until the end of the lifespan of the heater	Output decreases over time	
Peak Wavelength	1 to 1.6μm	2 to 2.5μm	2.5 to 3μm

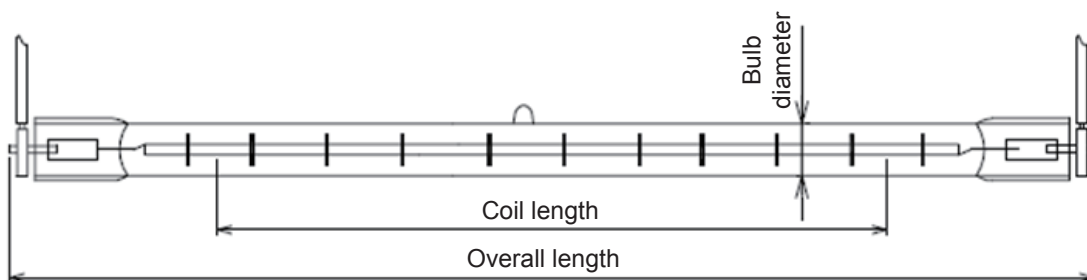
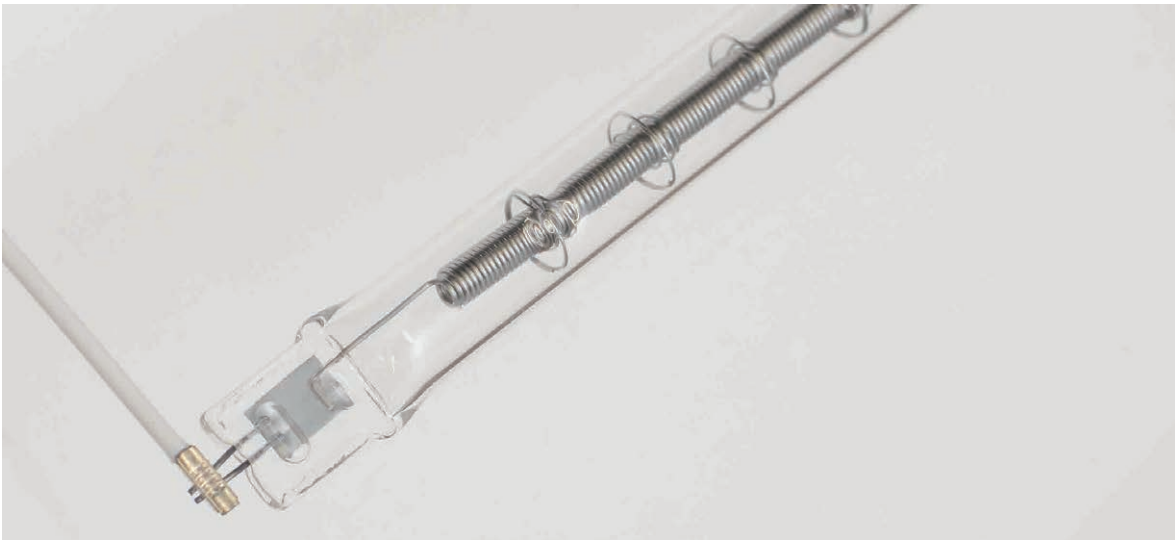


Infrared Halogen Heater

## ◇ Introduction to TOSHIBA Products

### Clear Types: JHS and JHP

These are our standard halogen heaters that emit radiant energy in all directions



Type	Bulb Diameter (mm)	Overall Length (mm)		Coil Length (mm)		Power Density* (W/mm)
		Min.	Max.	Min.	Max.	
JHS JHP (Parallel Winded Coil)	Φ10	160	1600	100	1530	<12
	Φ12		1550		1480	<12.5
	Φ13		1450		1380	<13

\*Note: Power per unit coil length

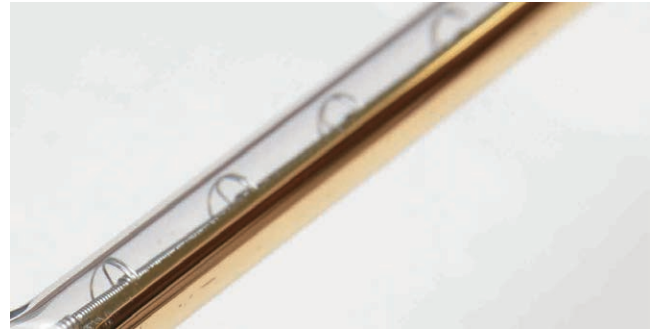
## Types with Reflective Coating

These are our highly efficient heaters that are coated with reflective material to emit radiant heat concentrated in one direction

### White Reflective Coating: JHC/JHE



### Gold Reflective Coating: JHG



#### High Efficiency

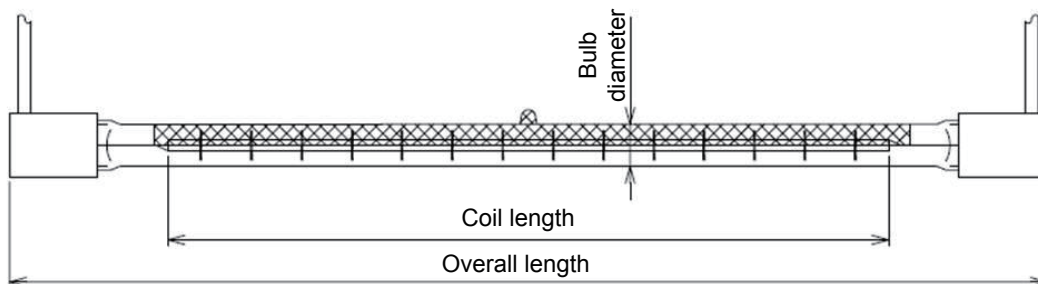
Adopting a highly reflective material (JHE) or a gold reflective coating with the best reflectance increases exposure efficiency

#### Space Saving and Cost Reduction

Miniaturization and cost reduction is achieved by omitting an optical system (e.g. reflector)

#### Cooling System Simplification

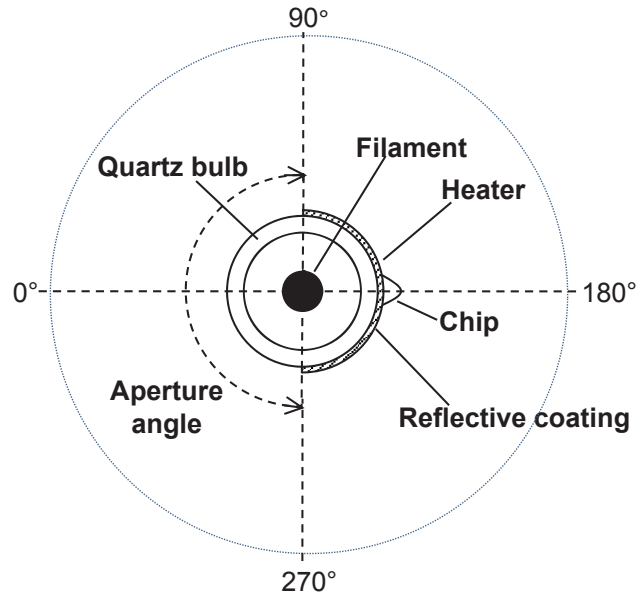
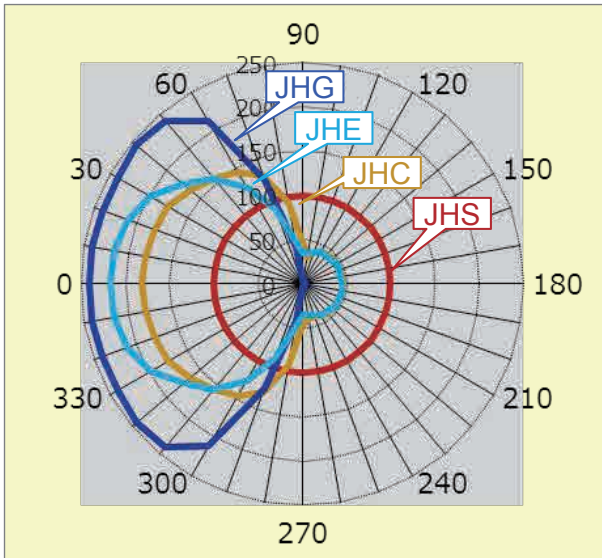
Suppresses temperature increases in the reflector on the reflective coating side



Category	Type	Bulb Diameter (mm)	Overall Length (mm)		Coil Length (mm)		Power Density (W/mm)	Recommended Use Bulb Temperature (°C)			
			Min.	Max.	Min.	Max.					
Type with Reflective Coating	White Reflective Coating	Φ10	160	1600	100	1530	<11	<800			
		Φ12							1450	1480	<11.5
		Φ13									
	Gold Reflective Coating	JHG	Φ10	200	1600	140	1530		<3.5	<600	

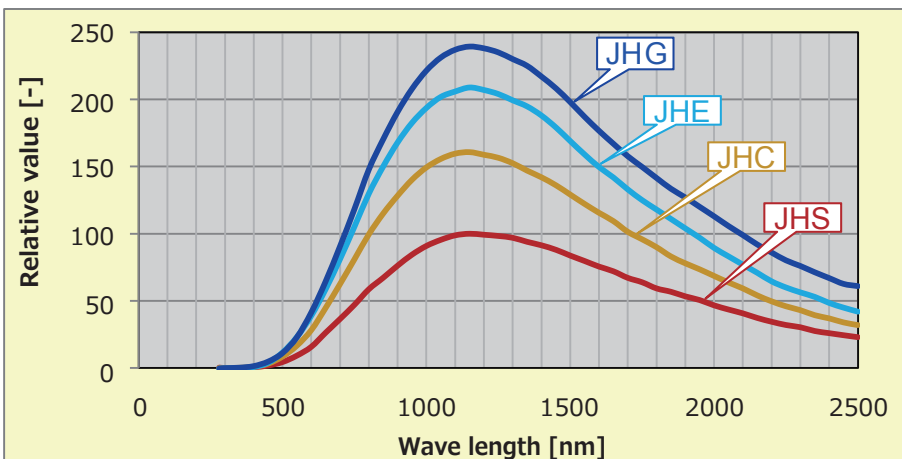
\*Note: We recommend using at a temperature of 600°C or below for gold reflective film. The reflection characteristics will decline if used at 600°C or above.

## Exposure Distribution in the Circumferential Direction



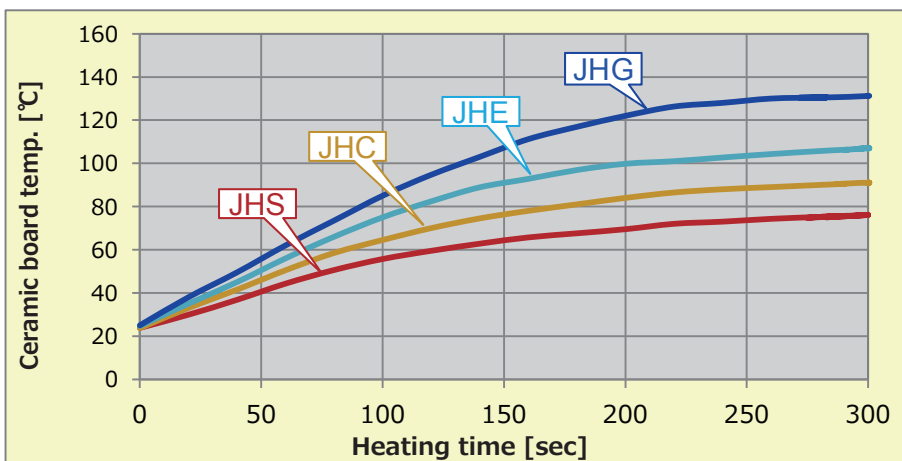
Heater Circumference Cross Section

## Spectral Exposure Characteristics



The exposure intensity on the aperture angle side significantly increases with heaters coated in reflective material. In particular, JHG with gold reflective coating is a high performance heater with an exposure intensity 2.5 times that of JHS.

## Heating Characteristics (Exposed Object: Ceramic Board)



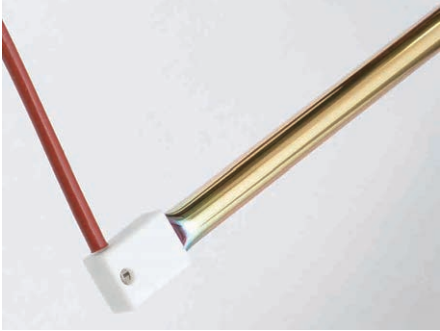
Heaters coated in reflective material are able to significantly reduce the time it takes to reach a certain temperature compared to JHS. This means it is possible to reduce the tact time and to miniaturize devices.



# Low Glare Types

These are our anti-glare heaters that employ multilayer thin film deposition (Gold Coating), ruby tubes and white translucent quartz

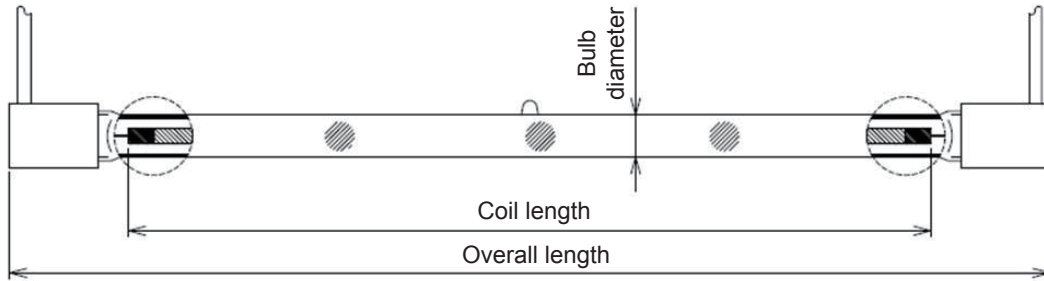
**Gold Coating: JHA**



**Ruby Quartz: JHL**

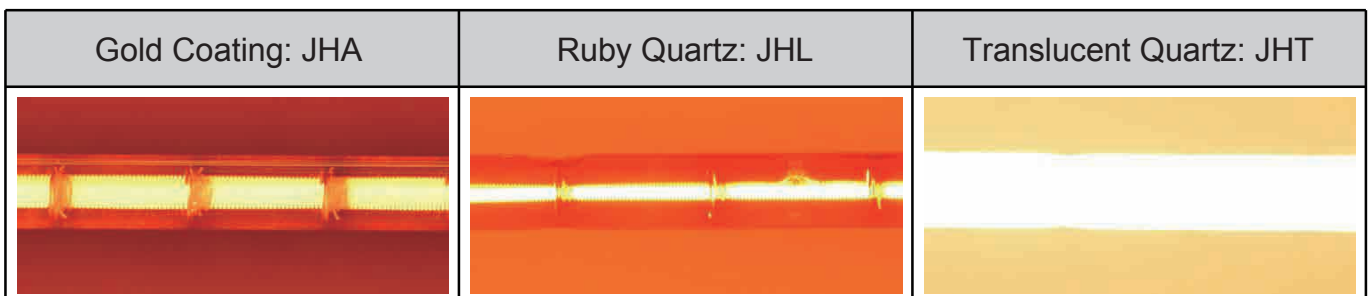


**Translucent Quartz: JHT**



Category	Type	Bulb Diameter (mm)	Overall length (mm)		Coil Length (mm)		Power Density (W/mm)	
			Min.	Max.	Min.	Max.		
Anti-glare Type	Gold Coating	JHA	Φ10	260	355	180	290	<7.2
		JHA						
	Ruby Quartz	JHL	Φ10	160	700	100	635	
Translucent Quartz	JHT	Φ10	160	1000	100	935	<3	

## Lighting State



Infrared Halogen Heater

# Special Types

## U-shape Type: JHU/JHUC

These are our U-shaped heaters with a high output and high color temperature design that is compatible with compact heater units



### High Output

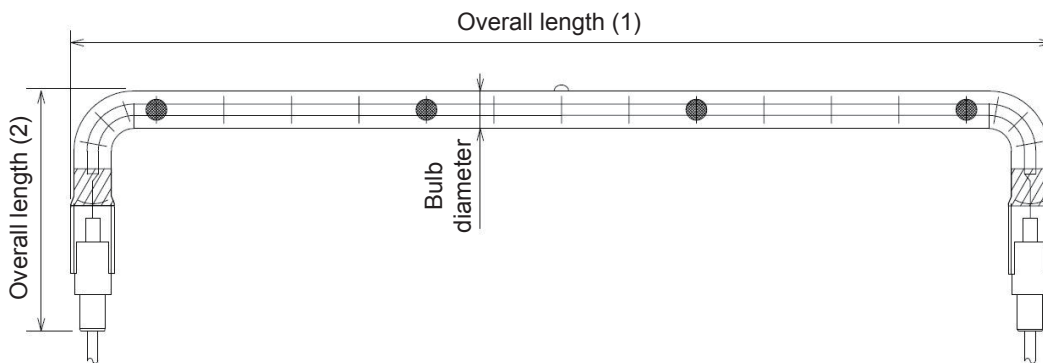
High output of 3500W with a light emitting length of 268mm

### High Color Temperature

Color temperature: 2900K  
Peak wavelength: 1000nm

### Space-saving

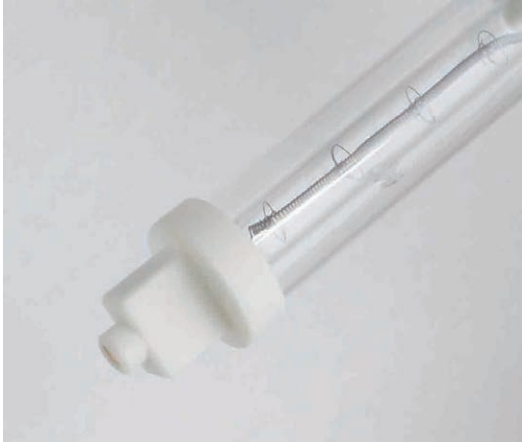
The U-shape makes it possible to miniaturize the heater unit



Category	Type	Bulb Diameter (mm)	Overall length (mm)		Coil Length (mm)	Power Density (W/mm)
			(1)	(2)		
U-shaped	JHU (Clear Type)	Φ10.5	262	60	268	<13
	JHUC (Reflective Coating)					

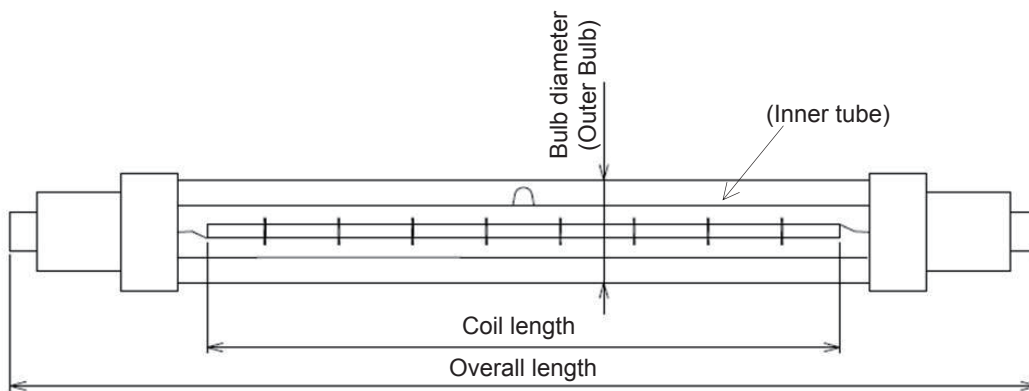
## Double Tube Types: JHDS and JHDL

These are our heaters that have a double tube structure with an outer tube equipped to the heater



### Environmental Resistance

The double tube structure prevents impurities sticking to the heater (inner tube) to improve the durability



Category	Type	Outer Bulb	Bulb Diameter (mm)	Overall Length (mm)		Coil Length (mm)		Power Density (W/mm)
				Min.	Max.	Min.	Max.	
Double Tube	JHDL	Ruby Quartz	Φ20	180	700	100	625	<7
	JHDS	Clear Bulb						<7

## Twin Types: JHX, JHXC and JHXG

These are our heaters with a compact structure that integrates two heaters

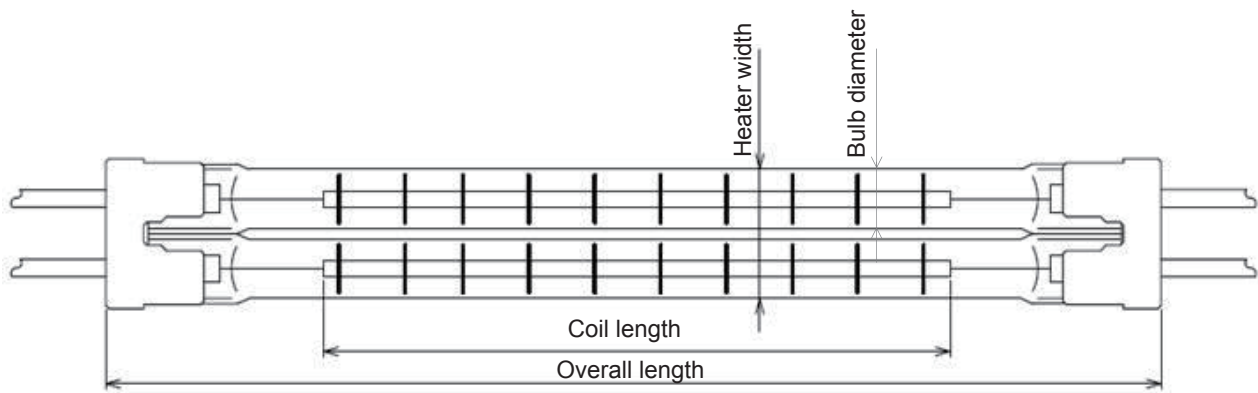


### Space-saving

The two heater base achieves an integrated compact design

### Single Base Type

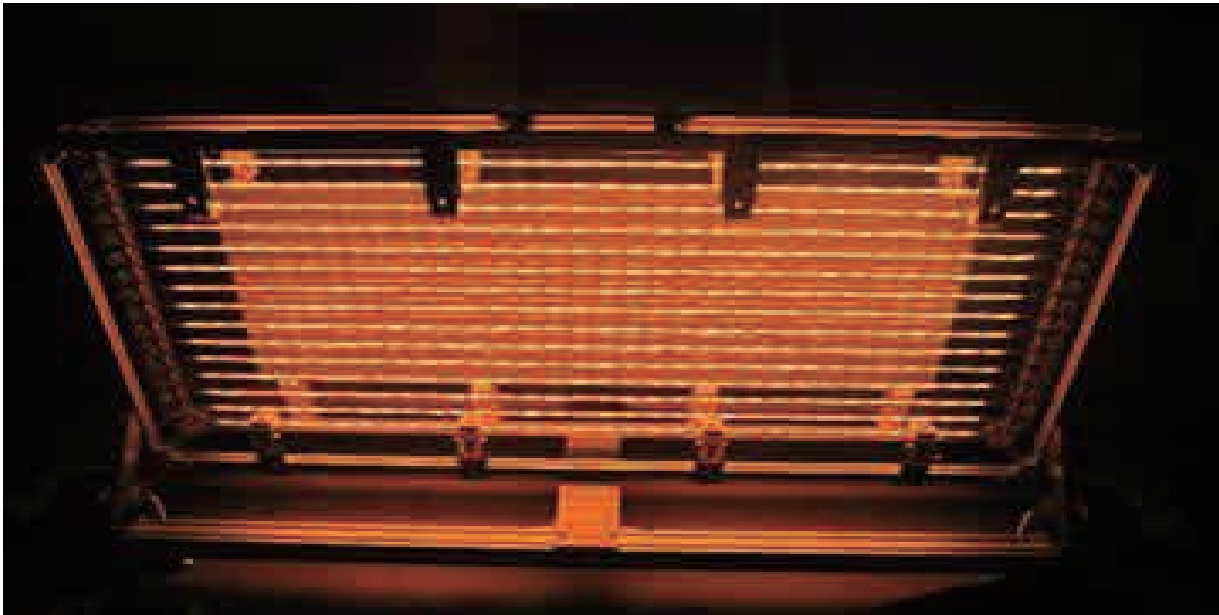
The twin structure achieves a single base type



Category	Type	Heater	Bulb Diameter (mm)	Heater Width (mm)	Overall Length (mm)		Coil Length (mm)		Power Density (W/mm)
					Min.	Max.	Min.	Max.	
Twin	JHX	Clear	Φ10	22	160	1600	100	1530	<10
	JHXC	White Reflective Coating							<9
	JHXG	Gold Reflective Coating							<2.5

# Heater Unit

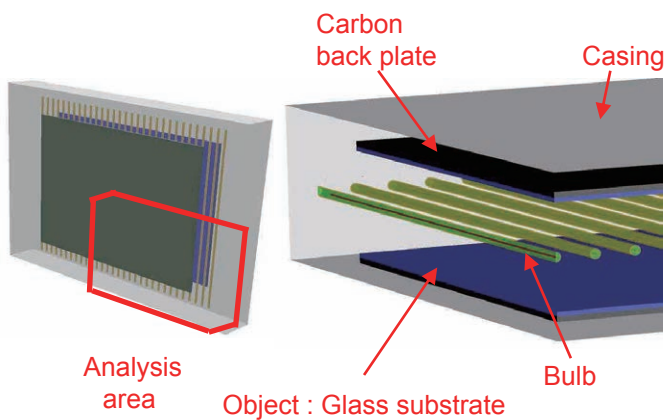
- It is available to heat for various areas by an abundant products lineup
- Heater design corresponding to the demand temperature distribution
- Achieve a high thermal uniformity at the optimum unit design by thermal simulation



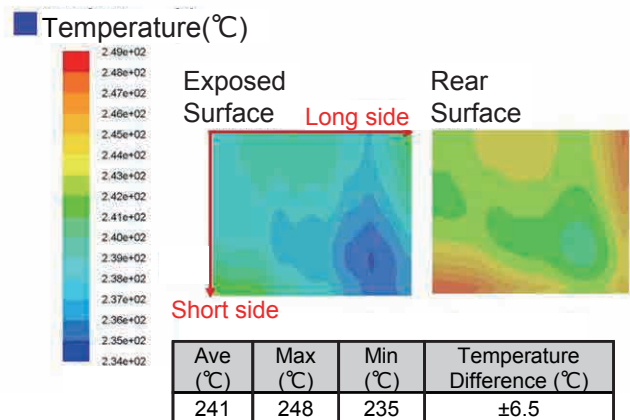
## Simulation analysis (Example)

With a glass substrate heating simulation, Toshiba heater unit can be designed for thermal variety less than 2.7% of heating area.

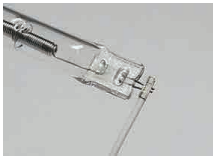




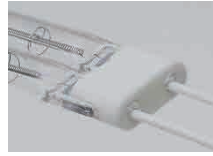
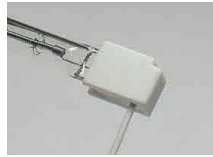



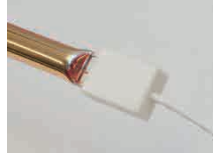






### Simulation model



### Simulation result



## ◇ Standard Base-Terminal

Type	Appearance	Type	Appearance
T		Rs	
B		Rw	
Bf		K	
BE		Vj	
By		Vs	
BO		J	
Gw		Jc	
Gs		Y	
N			

## ◇ Standard Harness

### 【Insulation coated wire】

Insulation material	Approval standards	Core AWG	Working Voltage	Working temperature	Color
PTFE	UL10344	AWG18	600V	250℃	White, Black
Glass braid	UL3122	AWG16,18	300V	200℃	White






### 【Metal wire】

Conductor material	Conductor configuration
Ni (nickel)	φ0.2mm×70wires.(Sq 2.2mm <sup>2</sup> )

### 【Protective tube】

Material	Working Voltage	Working temperature	color
Glass braid	600V	250℃	Brick red

## ◇ Standard Harness Terminal

Type	Appearance	Type	Appearance
Strip		Fork terminal	 JST SAB51T-5
Splice terminal	 Nippon Tanshi19101-0	Faston terminal	 JST STO-61-T-250N
Ring terminal	 JST SRA-51T-4		

## ◇ Standard Products

### 【Clear Type : JHS】

Product name	voltage (V)	wattage (W)	Overall length (mm)	Coil length (mm)	Base/ Terminal	Harness		Lighting direction
						Length (mm)	Terminal	
JHS100V500W155	100	500	255	155	Rw	150	Strip	Universal
JHS235V2000W280	235	2000	350	280	T	112	Splice	Universal
JHS235V3000W280	235	3000	350	280	T	120	Ring	Universal
JHS400V2000W280	400	2000	350	280	T	112	Splice	Universal
JHS400V2500W315	400	2500	378	315	BE	350	Splice	Horizontal
JHS400V3000W315	400	3000	378	315	BE	375	Splice	Horizontal
JHS200V1000W418	200	1000	480	418	N	200	Splice	Universal
JHS200V1200W500	200	1200	600	500	Rs	—	—	Universal
JHS230V2700W408	230	2700	806	408	N	1800	Strip	Horizontal
JHS480V4900W1245	480	4900	1380	1245	N	145	Splice	Universal
JHP200V3300W1500	200	3300	1600	1500	Bf	50	Ring	Horizontal

### 【White Reflective Coating Type : JHC, JHE】

Product name	voltage (V)	wattage (W)	Overall length (mm)	Coil length (mm)	Base/ Terminal	Harness		Lighting direction
						Length (mm)	Terminal	
JHC240V800W190	240	800	256	190	Rs	—	—	Horizontal
JHC235V1000W272	235	1000	352	272	Bf	200	Ring	Universal
JHC235V2000W280	235	2000	353	280	Bf	400	Strip	Universal
JHC235V2500W280	235	2500	353	280	Bf	210	Fork	Horizontal
JHC235V3000W280	235	3000	353	280	Bf	400	Strip	Horizontal
JHC400V2500W290	400	2500	355	290	B	200	Fork	Horizontal
JHC400V3000W290	400	3000	355	290	B	200	Fork	Horizontal
JHC400V2500W315	400	2500	378	315	B	230	Splice	Horizontal
JHC400V3000W315	400	3000	378	315	B	230	Splice	Horizontal
JHC400V2000W410	400	2000	508	410	J	—	—	Horizontal
JHC235V2000W700	235	2000	787.5	700	Bf	200	Ring	Horizontal
JHE400V2500W315	400	2500	378	315	B	230	Splice	Horizontal
JHE400V3000W315	400	3000	378	315	B	230	Splice	Horizontal



**【Gold Reflective Coating Type : JHG】**

Product name	voltage (V)	wattage (W)	Overall length (mm)	Coil length (mm)	Base/ Terminal	Harness		Lighting direction
						Length (mm)	Terminal	
JHG400V3000W1000	400	3000	1150	1000	B	230	Splice	Horizontal
JHG200V1200W400	200	1200	470	400	B	230	Splice	Horizontal

**【Gold Coating Type : JHA】**

Product name	voltage (V)	wattage (W)	Overall length (mm)	Coil length (mm)	Base/ Terminal	Harness		Lighting direction
						Length (mm)	Terminal	
JHA235V2000W280	235	2000	353	280	B	600/300	Splice	Universal
JHA235V1500W280	235	1500	353	280	B	600/300	Splice	Universal
JHA120V1500W280	120	1500	353	280	B	600/300	Splice	Universal

**【Ruby Quartz Type : JHL】**

Product name	voltage (V)	wattage (W)	Overall length (mm)	Coil length (mm)	Base/ Terminal	Harness		Lighting direction
						Length (mm)	Terminal	
JHL200V1000W434	200	1000	530	434	Gs	—	—	Universal
JHL200V1200W500	200	1200	602	500	Rs	—	—	Universal

**【Translucent Quartz Type : JHT】**

Product name	voltage (V)	wattage (W)	Overall length (mm)	Coil length (mm)	Base/ Terminal	Harness		Lighting direction
						Length (mm)	Terminal	
JHT100V1000W285	100	1000	360	285	Gw	500/300	Strip	Universal
JHT200V1250W575	200	1250	650	575	Gw	900/400	Strip	Universal

**【U-shape Type : JHU, JHUC】**

Product name	voltage (V)	wattage (W)	Overall length (mm)	Coil length (mm)	Base/ Terminal	Harness		Lighting direction
						Length (mm)	Terminal	
JHU400V2500W268	400	2500	262	268	N	150	Splice	Horizontal
JHUC400V2500W268	400	2500	262	268	Y	—	—	Horizontal
JHU400V3500W268	400	3500	262	268	N	150	Splice	Universal
JHUC400V3500W268	400	3500	262	268	Y	—	—	Universal

**【 Double Tube Types : JHDL】**

Product name	voltage (V)	wattage (W)	Overall length (mm)	Coil length (mm)	Outer Bulb	Base/ Terminal	Lighting direction
JHDL230V1100W290	235	1100	354	290	Ruby	B	Universal

**【Twin Types : JHX, JHXC, JHXG】**



Product name	voltage (V)	wattage (W)	Overall length (mm)	Coil length (mm)	Base/ Terminal	Harness Length (mm)	Connect
JHX400V1200W/1200W500	400	2400	600	500	K	500	1 side
JHXC235V2000W/2000W700	235	4000	850	700	K	500	2 sides
JHXG430V4250W/4250W1300	430	8500	1450	1300	K	500	2 sides

## ◆ Precautions

### Halogen Heaters for Industry: Usage Precautions

- Before using this product, read these “Safety Precautions” thoroughly and use properly.
- The precautions described here are important to those who use halogen heaters for industry, and for preventing injury to other persons and property damage, and for safe use. Gain an understanding of its contents (markings and graphic symbols) and always observe the items mentioned in the text.
- The markings and their meanings are as below.




#### ■ Description of Markings

Mark	Meaning
 <b>WARNING</b>	There is the possibility of minor to moderate injury if not handled properly by the user. In particular, there is the possibility of this leading to serious injury*1 or death.
 <b>CAUTION</b>	There is the possibility of serious to moderate injury if not handled properly by the user. There is also the danger of physical damage *2.

\*1: “Serious injury” indicates injuries with aftereffects such as loss of vision, wounds, burns, electric shocks, broken bones, poisoning, etc. and injuries that require hospital visits or long-term hospital stay for treatment. “Moderate injury” indicates wounds, burns, electric shocks, etc. that do not require hospital visits or long-term hospital stay for treatment.

\*2: “Physical damage” indicates extensive damage related to loss of assets and resources.

#### ■ Example of Graphic Symbols

Symbol	Meaning
 <b>Prohibited</b>	Indicates prohibition (must not be done) The specific contents that are prohibited are indicated by pictures and text near the symbol.
 <b>Instruction</b>	Indicates compulsion of instruction action (always observe) The specific contents that are prohibited are indicated by pictures and text near the symbol.
 <b>Caution</b>	Indicates caution The specific contents that are prohibited are indicated by pictures and text near the symbol.

#### Disclaimers

- We shall not be responsible for damage caused by earthquakes, lightning, and other natural disasters, actions by a third party, user intent or negligence, erroneous use, or use under other abnormal conditions.
- We shall not be responsible for damage caused by failure to observe the items mentioned in the text.
- We shall not be responsible for damage caused by erroneous operation, etc. due to a combination that we did not participate in or intend.
- We shall not be responsible for damage due to repair or modification by the user or an unauthorized third party.
- Our expense burden related to this product shall be within the range stipulated by law (laws applied in Japan).



## WARNING



- Only install, remove and clean the heater after making sure to turn off the power. Failure to do so may cause an electric shock.



- The heater is a glass product. Therefore, do not drop it, hit it, apply excessive force or scratch it. If you damage the heater, broken glass may disperse and cause an injury.
- Do not cover the heater with paper/cloth or put something easily flammable near to it while it is lit. This may cause a fire.



- Use a heater of the power specified by the applicable device (e.g. sockets and transformers). Failure to do so may cause a shorter lifespan, injury due to damage or overheating to the device.
- Make sure to use heaters with a specified lighting direction in that direction. Failure to do so may cause a shorter lifespan or injury due to damage.



## CAUTION

- Use the heater within its specified voltage range. Using the heater with a higher voltage may cause a shorter lifespan, damage and overheating.
- Use the heater while the temperature of the sealing member does not exceed 300°C. Using the heater while the temperature of the sealing member is too high may cause a shorter lifespan, damage and overheating.
- The heater will be hot while it is turned on and directly after it is turned off. Therefore, do not touch it with your hands or skin. This may cause burns. Only make replacements and clean after the heater has sufficiently cooled down and wear protective equipment (e.g. glasses and gloves) while doing so. Failure to do so may cause damage and then an injury.
- Do not touch the heater with bare hands or dirty gloves. In particular, if salt content (e.g. sweat) becomes stuck to the glass, it may react with the glass and lead to major crystallized glass of  $\alpha$ . This may generate cloudiness (devitrification phenomenon), lower the glass strength and result in a damage or a slow leak. This may cause an injury, fire or damage. Use clean gloves. If dirty, wipe with a cloth that has been thoroughly soaked in alcohol or similar.
- Do not gaze at the heater while it is turned on for a long time at a close range. This may hurt your eyes and cause visual impairment.
- Make sure to properly connect the heater to the socket. Failure to do so may cause the heater to fall and overheating/fuming due to a contact failure.
- Do not use the heater in a corrosive atmosphere (e.g. acid) or where there is lots of dust. This may cause a short circuit, a fall and overheating.
- Do not use the heater in an environment that generates components with high ionicity that promotes corrosion (e.g. fluxes). This may cause corrosion (devitrification) of the glass surface and the heater may become dislodged from the socket.
- Do not use where there are water droplets indoors/outdoors or in places with high humidity. This may cause insulation failure, damage and falls.
- Do not use in places where there is an atmosphere in which there is a risk of catching fire (e.g. gasoline, flammable sprays, thinners and dust) or a corrosive atmosphere (e.g. acid). This may cause a fire or explosion.



## CAUTION

- Do not paint the heater. This may cause the heater to overheat and lead to a fire.
- Do not scratch the lead, contacts or connector (housing).
- Check that the contact of the socket is not damaged. If it is damaged, this may cause overheating. If the connector of the socket is deformed or the surface is oxidized, replace the socket.
- Do not subject the heater to vibrations or shocks. This may cause a shorter lifespan, damage or fall.
- When you hold the heater, we recommend you hold the heater glass body. Furthermore, take care not to subject the sealing members, chips, metallic terminals, sockets and similar to localized stress. This may cause damage.
- The heater is a glass product. Therefore, handling heaters while they are bundled together may cause damage. Do not do this.
- Use in a structure in which stress is never applied to the heater when the actual machine is assembled.
- Do not subject the heater to external stress while the actual machine is assembled. This may cause damage
- Layout the device with caution given to the lighting voltage, thermal environment and reflection method. If the surface temperature of the heater exceeds 800°C, the heater glass may expand or curve.
- Setup the parts that come into contact with the lead in a structure so that the heat-resistant guaranteed temperature is 250°C or less while the actual machine is assembled. If you use above the heat-resistant guaranteed temperature, the lead may melt and cause heating and fuming.
- We recommend you replace heaters that have passed their rated lifespan. Failure to do so occasionally cause damage or falls.
- Dispose of used heaters in accordance with the ordinances and regulations of the municipality where you are.

<ul style="list-style-type: none"><li>● Designs and specifications are subject to change without notice.</li><li>● Color of product may be different from the printed picture.</li></ul>	

For regional conformity of our products, contact our sales person.  
This catalog is based on the information as October 2016.