

TOKAI KONETSU

Products Catalogue

EREMA Heating Elements

Silicon Carbide Heating Elements

EREMA heating elements are composed of high-purity recrystallized SiC and are the first silicon carbide heating elements marketed in Japan. Since the initial market release in 1927, we have continued to promote innovative research taking advantage of our rich wealth of experience. We have integrated our own unique development technology with other technologies from diverse sources both domestic and international. Tokai Konetsu has continuously pursued improvements and upgrades in quality and now enjoys an excellent reputation for the largest production scale in the industry and products of optimal quality.

1. Features

- Heating elements that are able to withstand a surface temperature of 1500°C (1600°C in the case of SG and SGR models)
- Extremely large heat generation per unit area (5-10 times greater than nichrome heating elements)
- Products with a variety of coatings are available to cope with moisture vapor or noxious gases
- Easy to handle
- High strength and outstanding thermal shock resistance
- Outstanding chemical stability
- Heat source that generates no air contamination or noise

2. Models

Type E, E-DV, F

An economical heating element able to withstand severe high temperature usage conditions and currently the most widely used model.



Type SG

This is a heating element for use in high temperature furnaces with spiral grooves in the heat-generating unit with a long lifespan and little aged increase in resistance.



Type SGR

Though having the same characteristics as type SG, this model features energy conservation and easy mounting because of the single end terminals.



Type U

This is a model with 2 type E elements that is energy efficient and easy to mount due to the single end terminals.



Type W

This is a model with 3 type E elements and single end terminals for 3-phase applications.



Type W-D6

Thanks to its larger surface area than the type W cited, it can handle a higher power capacity.

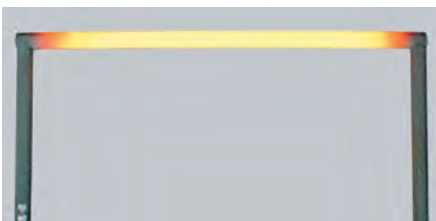


3. Application

Industry	Applications
Electronics	Ceramic condenser firing, alumina steatite ceramic sintering, IC substrate firing, piezoelectric element firing, ferrite calcinations and firing
Metals	Powder metallurgical sintering, steel part hardening, tempering, carburizing and nitriding, bright annealing, brazing, aluminum alloy melting and holding
Ceramics	Glass melting and holding, ceramic fiber production, enamel baking, ceramic firing, whetstone firing
Chemical	Fluorescent substance firing, pigment firing, catalyst firing
Other	High temperature testing, petroleum and gas device ignition, localized heating

4. EREMA special heaters

Type M



Type U3



Type SDL



RECRYTE

SiC Ceramic High Temperature Materials

RECRYTE is a high-temperature SiC ceramic material developed using our many cumulated years of experience and technology in the production of silicon carbide heating elements.

1. Types

RS230 : For SiC general-purpose use, thin and with small thermal capacity, outstanding thermal shock resistance, chemical corrosion resistance and high temperature strength

RS420 : A SiC product with its pores filled with metallic silicon, characterized by high density, strong abrasion resistance and low air permeability

RS900 : SiC material with outstanding high density and high strength utilizing reactive sintering, characterized by the realization of a higher level of quality than conventional reactive sintered products

RS1000 : An extremely dense pressureless sintered SiC material with superlative high temperature strength, thermal resistance and corrosion resistance

2. Characteristics

Characteristic items	Unit	RS230	RS420	RS900	RS1000	
Chemical composition	SiC	%	> 98.0	> 79.0	> 85.0	> 99.0
	Si	%	—	< 20.0	< 15.0	—
	SiO ₂	%	< 2.0	< 0.2	< 0.2	< 0.2
	C	%	—	—	< 0.2	< 0.1
Apparent porosity	%	20	< 1	< 1	< 5	
Bulk specific gravity		2.50	3.00	3.05	3.00	
Bending strength	RT	MPa	130	260	315	350
	1000°C	MPa	120	260	300	350
Modulus of elasticity		GPa	187	366	379	300
Thermal shock resistance	Δ T	°C	300	300	300	300
Co/thermal expansion	1000°C	10 ⁻⁶ /°C	4.2	5.0	4.5	4.1
Specific heat	RT	kJ/kg · K	0.7	0.5	0.7	0.8
Co/thermal conductivity	RT	W/mK	139	180	207	130
Max operating temperature	°C	1500	1350	1400	1600	

Note : The above values are typical, measured in conformance with JIS R1601.

3. Uses

■ Industrial furnace roller material

It is used as roller material in roller hearth furnaces primarily for the purpose of rapidly heating the material being processed and has outstanding high temperature strength and thermal shock resistance.



■ Protection tube

RECRYTE protection tube is a densified silicon carbide sintered product with outstanding thermal resistance, corrosion resistance, abrasion resistance and thermal shock resistance and with high temperature strength.



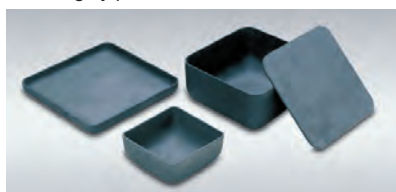
■ Burner nozzles

Since there are virtually no pores, it has excellent oxidation resistance and, due to the high coefficient of thermal conductivity, it has outstanding thermal shock resistance. Being cast formed, it can be produced with complex structure.



■ Sheaths and crucibles

It is light in weight because of the thin structure and has outstanding thermal shock resistance, chemical corrosion resistance, etc.. It can be used as firing containers for fluorescent bodies and other, if it is highly purified.



■ Thermal radiators (Ceramic charcoal)

Since it has extremely outstanding properties as an SiC material thermal radiator, it is suitable for ceramic charcoal, isothermal plates and other uses.

■ Structure materials

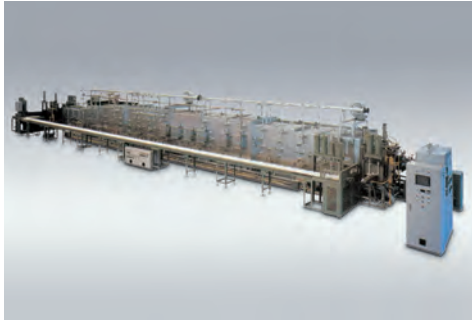
Since long, complex and thin shapes can all be produced with excellent precision, it can be used for everything from beams, pillars and structural materials to sintering setters for electronic parts or ceramics, shelves, base plates and so forth.

Industrial Furnaces & Heating Equipments

Heating equipment such as electric, gas and other industrial furnaces are used for heat treatment of metals, ceramics and other materials. We have built an abundant track record in the design and production of heating equipment for such heat treatment operations and contribute to the industrial world with comprehensive state-of-the-art technology as a manufacturer of the heating elements and refractories that are essential in these industrial furnaces.

Tunnel type atmospheric kiln for condenser firing

- 244kW
- 1400°C



Graphite kiln

- 55kW
- 2300°C



High temperature tammann kiln

- 40kW
- 3000°C



Atmosphere roller hearth kiln

- 1800kW
- 1400°C



Tower kiln (drop type rapid firing kiln)

- Required firing time: 1 ~ 20 sec
- 1350°C (max)
- 5 ~ 10kg/h



Atmospheric kiln for condenser firing (ERHG-700)

- 47kW
- 1400°C
- gross capacity :50kg/charge



Rack heater kiln

- 40kW
- 1400°C
- 1.5kg/h



Horizontally-long vacuum atmospheric kiln (TV7000)

- 422kW
- 2200°C (max)
- Gross capacity: 900kg/charge



EREMA Resistors

Because EREMA resistors are sintered at very high temperature, they can be used under severe conditions in which other products cannot be used. They are the optimal choice for applications in the miniaturization of transmitting and receiving devices and those circuits that are used for protection purpose or require high-level reliability.

1. Features

- High reliability with no short circuits
- Small size and usable with high electrical power
- Usable in high temperatures
- High voltage resistance
- Non-inductive
- Thermally and chemically stable
- Usable in water, moisture vapor and oil

AS and ASH resistors

Due to the large thermal capacity of AS type resistors, they have exceptionally high shock voltage tolerance and outstanding durability and are suitable for use in high voltage circuits.



■ **Uses :** For use in shock voltage generators, condenser charging and discharging, x-ray generators, electrostatic precipitator protection, rectifier protection, dummy loads, high frequency circuits, surge absorption, disconnectors grounding resistance, nuclear fusion devices, particle accelerators and other high voltage circuits.

SP resistors

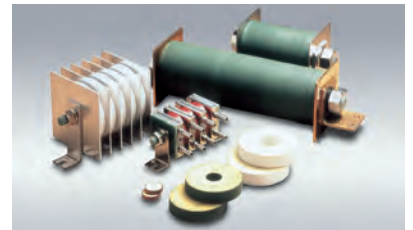
Since SP resistors are coated internally and externally with special glass, they have excellent durability and, since it is also possible to apply considerably high power although it is small in size, they are suitable for use in high power circuits.



■ **Uses :** For use in current circuits, dummy loads, parasitic oscillation prevention circuits, PT protection, high frequency circuits, particle accelerators other large electrical power circuits, ultrasonic devices, examples include : FIR heaters · microwave absorbers

Disk resistors (models ASD & ASW)

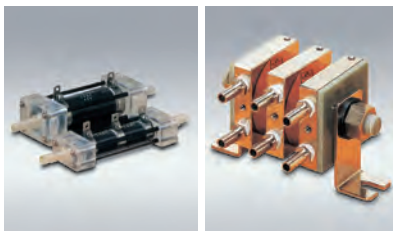
This is a one-of-a-kind resistor in Japan, providing outstanding features in circuits requiring high voltage and current.



■ **Uses :** Opening and closing SF6 gas breakers, control of shock voltage generators, condenser discharging, transformer under-load tap changing, surge absorption, NGR and other uses requiring high voltage and current circuits.

Direct and indirect contact water-cooled resistors (models W & WD)

Newly developed product for use as resistors for thyristor device protection.



Indirect-contact water-cooled resistors (model WS)

Low-resistance high-capacity water-cooled resistors newly developed as resistors for thyristor device protection and superconducting coil discharging.



Far-Infrared Ceramic Heating Element

With outstanding features capable of direct power conduction owing to the use of conductive ceramics and with average emissivity of 0.9, which is close to that of black -bodies, these far-infrared heaters are suitable for a wide diversity of uses.

1. Features

- Fast heat-up time
- Excellent temperature distribution properties
- Resistant to thermal shock



A series of horizontal dotted lines for writing, spanning the width of the page.

A series of horizontal dotted lines for writing, spanning the width of the page.

[Line of Business]

■ Heating Elements

EREMA Heating Elements

EREMA Igniter (EIG)

Far-Infrared Ceramic Heating Elements

■ RECRYTE (SiC Ceramics High Temperature Materials)

Roller materials for Industrial Furnaces

Protective Tubes

Sleeves, Crucible

Various High Temperature Heat-resistant Structure Materials

■ Industrial Furnaces & Heating Equipments

Various Electric Furnaces

Automated Control Energy Saving Equipment

Engineering

■ Refractory products

■ EREMA Resistors

Carbon Group (Type AS & ASW)

Metal Silicon Group (Type SP & SPW)



TOKAI KONETSU KOGYO CO.,LTD

■ Head Office

3F Aoyama Bldg., 1-2-3, Kitaaoyama, Minato-ku, Tokyo, 107-0061, Japan

■ TEL.(+81)3-5772-8228 FAX.(+81)3-5772-8266

URL http://www.tokaikonetsu.co.jp/english/index_en.html

