

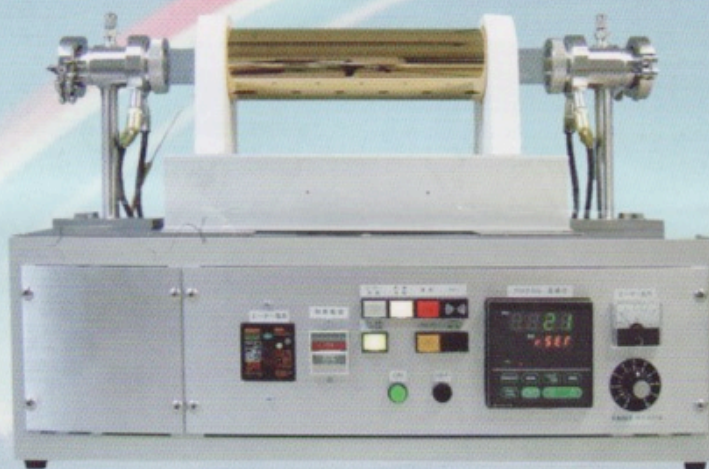
Transparent Electric Furnace

GOLD FURNACE

GFA430 Series

Compact

Uniform Temperature Heat Treatment System



GFA430VN

Application

Heat treatment of silicon wafer, ceramics, piezoelectricity material, etc.

Features

- 1 Excellent uniform temperature characteristics ...1000°C ±5°C
- 2 Sample being heated in furnace is observable ...Visual observation and photography as well
- 3 Varied heating condition settings ...Vacuum, air and gas flow
- 4 Rapid heating and cooling ...Heating rate:
From room temperature to 1000°C in approx. 30 min
Cooling rate:
Approx. 60 min in natural cooling and
approx. 30 min in forced air cooling
- 5 Desktop type, small and lightweight ...500H × 600W × 400mmD
- 6 Automatic temperature control ...Optionally programmable.

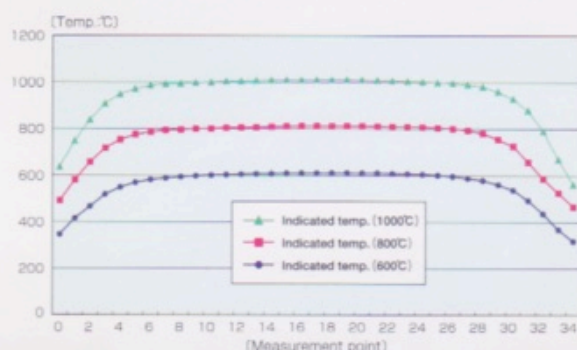


THERMO RIKO CO., LTD.

A transparent electric furnace offers a revolutionary heating furnace.

Gold Furnace

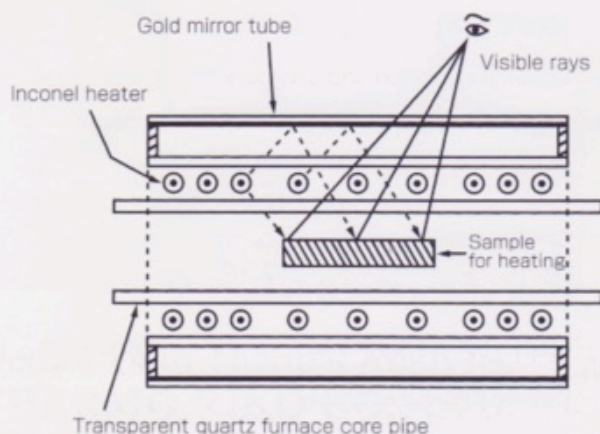
GFA430 Temperature Distribution



The furnace interior is visible.



Construction of Transparent Electric Furnace



Application Product of Advanced Space Technology

Excellent uniform temperature characteristics

For the pitch of INCONEL heater, a heating element, both ends of the furnace are designed to be small, while the central portion is made large. This design contributes to excellent uniform temperature characteristics of $1000^{\circ}\text{C} \pm 5^{\circ}\text{C}$ jointly with the reflected heat from the gold mirror tube. (left diagram)

Sample being heated is visible.

The gold mirror tube that composes the outer cylinder of the transparent electric furnace reflects infrared rays. The direct radiation component of infrared rays emitted from the Inconel heater and the reflected infrared rays jointly irradiate a sample to realize efficient heating. Further, since the gold mirror tube transmits visible rays, the sample inside the furnace can be observed during the heating process.

Energy saving characteristics

With the conventional electric furnace, adiabatic material is used for its outer circumferential section. So it cannot be helped that infrared rays from the heater will be absorbed there. With the transparent electric furnace that incorporates the gold mirror tube, it reflects infrared rays to increase the sample heating efficiency to such an extent that a temperature of 1000°C can be held on mere 3KW power.

※Application product of space technology

On July 20, 1969, U.S. astronaut Neil Armstrong, the first man to set foot on the moon, descended from the "Eagle" lunar landing vehicle of the Apollo 11 spacecraft and stepped onto the moon's surface. At that historic moment he wore a space helmet provided with a lighted front side made of a gold mirror, the same material used in this transparent electric furnace. The fact is that this furnace is an applied item of space technology. Because it uses a gold reflection mirror, the furnace is called a gold furnace.

Transparent electric furnace Specifications · Performance

Model	GFA430	GFB450	GFC650	GFA430-2
Gold mirror tube	81 dia.×305L	81 dia.×508L	110 dia.×508L	81 dia.×305L×2
Furnace interior dimensions	41 dia.×340L	41 dia.×545L	61 dia.×545L	41 dia.×320L×2
Furnace core pipe outside dia. (inside dia.)	40 dia. (approx.36 dia.)	40 dia. (approx.36 dia.)	60 dia. (approx.55 dia.)	40 dia. (approx.36 dia.)
Max. operating temp. (°C)	1000	1000	1000	1000
Uniform temperature volume	* approx. 200L	* approx. 350L	* approx. 300L	2-zone
Power (KW)	3.0	3.0	3.0	3.0×2
Max. voltage (V)	220	220	220	220
Weight (kg)	4.0	4.5	5.4	5.4

*Large furnaces 70 to 120mm in diameter and 600mm to 1 meter in length are also available.

Temperature controller

Standard type: TP20KF Fully automatic program: 2 kinds, 16 stages (dedicated to the transparent electric furnace)

Standard configuration

1. Transparent electric furnace (GFA430)
2. Temperature controller (TP20KF)
3. Vacuum flange (VN40)
4. Quartz furnace core pipe (Q500)
5. Thermocouple for temperature controller (K300L)
6. Safety circuit · Assembly stand

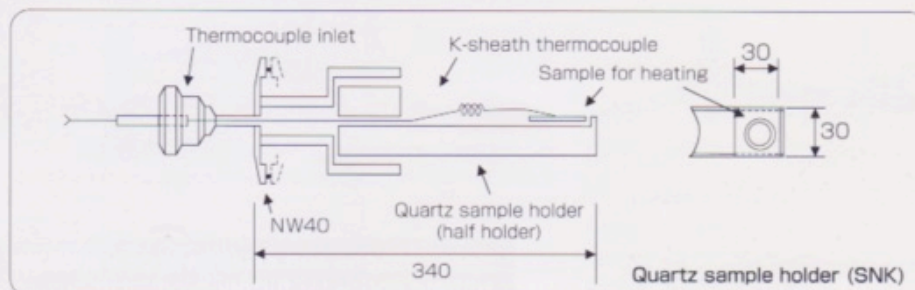
Specification · Performance

- Max. attainable temperature : 1000°C, routinely 900°C
- Uniform temperature cubic volume : Approx. 36 dia.×approx. 200mmL
- Atmosphere : Vacuum, air, gas flow
- Attainable vacuum degree : 5×10^{-4} Pa (10^{-6} torr)*
- Dimensions : 500H×650W×400mmD

*The ultrahigh vacuum type is available also.

Options

1. Quartz sample holder (SNK)
2. Sample holder with current induction terminal (SN8PK)
3. High vacuum exhaust system (TSH/U071)
4. Total pressure type vacuum gauge (PK251)



Installation requirements

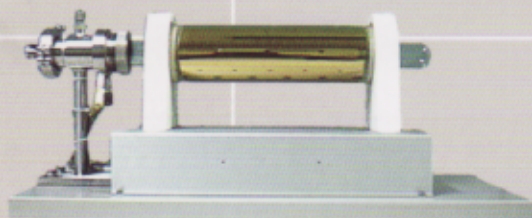
Power supply : 200V 15A, 100V 2A

Cooling water: Tap water, flow rate 1 lit/min

Area occupied: 650×400mm for mounting on worktable

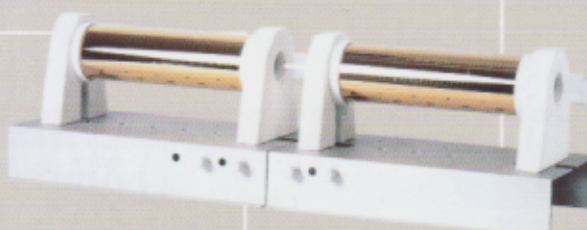
**One-side supported uniform
temperature heat treatment system**

GFA430V V



**Two-zone type transparent
electric furnace**

GFA430-2



High vacuum exhaust system

TSH/U071

High vacuum type
(TSH/U071)
Attainable vacuum
degree: $<10^{-5}$ Pa



Vacuum gauge

PK251



* Measurement range:
Atmospheric pressure
 $\sim 5 \times 10^{-7}$ Pa, continuous
* Mounting: NW25



**Large type uniform temperature
heat treatment system**

GFC650V



**Uniform temperature
heat treatment system**

GFC650UHV



Specifications and external appearance are subject to change
without notice for further product improvement and so on.

Dedicated to Thermal Analysis
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