Selection guide

Model	MILA-5000-P-N	MILA-5000-UHV	MILA-5000-P-F
Type	Near-infrared lamp High temperature type	Near-infrared lamp High temperature High vacuum type	Far-infrared lamp Uniform heating type
Temperature range	RT to 1200℃(MAX)	RT to 1200℃(MAX)	RT to 800℃(MAX)
Maximum heating rate ※	50℃/s(50℃~1200℃)in vacuum atmosphere 45℃/s(50℃~1200℃)in nitrogen gas	50℃/s(50℃~1200℃)in vacuum atmosphere 45℃/s(50℃~1200℃)in nitrogen gas	4℃/s(50℃~800℃)in vacuum atmosphere 4℃/s(50℃~800℃)in nitrogen gas
Temperature uniformity※	±2.0℃(ΔT=4℃)at 1200℃ in vacuum atmoshere ±4.5℃(ΔT=9℃)at 1200℃ in nitrogen gas	±2.0℃(ΔT=4℃)at 1200℃ in vacuum atmoshere ±4.5℃(ΔT=9℃)at 1200℃ in nitrogen gas	±1.8℃(ΔT=3.6℃)at 500℃ in vacuum atmoshere ±1.2℃(ΔT=2.4℃)at 500℃ in nitrogen gas
Heating atmoshere	Air, vacuum or inert gas	Air, vacuum or inert gas	Air, vacuum or inert gas
Sample size	MAX W20×L20×t2.0(mm)	MAX W20×L20×t2.0(mm)	MAX W20×L20×t2.0(mm)
Temperature control sensor	Compatible with JIS thermocouple K fixed	Compatible with JIS thermocouple K fixed	Compatible with JIS thermocouple K fixed
Lamp rating	1kW-4-100V/lamp	1kW-4-100V/lamp	250W-4-100V/lamp

※The heating rate and temperature uniformity above are the measured values of a 20mm deep × 20mm wide × 0.5mm thick nickel plate.
※Subject to change depending on material and size.

Specification of temp. program	MILA-5000-P-N	MILA-5000-UHV	MILA-5000-P-F
Program mode	Temperature vs. time setting, Step number 256 Total program 32 MAX Cyclic, hold, advance and other function PID+fuzzy logic control, Auto tuning, USB communication, AUTO/MANUAL available		
Input sensor	Compatible with K-type thermocouple		

Utility requirements	MILA-5000-P-N	MILA-5000-UHV	MILA-5000-P-F
Power requirement	AC200V, single phase, 4kW	AC200V, single phase, 4kW	AC200V, single phase, 1kW
Cooling water	Flow rate : 4ℓ/min, Pressure : 0.3MPa	Flow rate : 4ℓ/min, Pressure : 0.3MPa	Flow rate : 2ℓ/min, Pressure : 0.3MPa
Gas inlet port	1/4-inch Swagelok joint	1/4-inch Swagelok joint	1/4-inch Swagelok joint
Gas discharge port	1/4-inch Swagelok joint	Exhaust from Vacuum port	1/4-inch Swagelok joint
Vacuum port	NW25-KF	ICF-70	NW25-KF
Outside dimensions	W360xD355xH179(mm), (excluding protrusion)	W360xD365xH179(mm), (excluding protrusion)	W360xD355xH179(mm), (excluding protrusion)
Weight	Approx.15kg	Approx.15.5kg	Approx.15kg

Standard safety features	Thermocouple burnout, Overtemperature setting, Furnace body temperature sensor.

Included items ●Instruction Manual ●Programming input support software (compatible with Windows2000/XP, including USB cable)
Attention ※Mains power cable is not including. Select one from the options list below.
※Cooling hose is not including.
※Please prepare for the cooling hose of outside dia. 11× inside dia. 6
※Please make sure of using City water or cooling water unit.

Optional Unit

■Vacuum pumping system(Rotary pump set)
Ultimate pressure
10^{-2}Pa at pump head under no-load
Pumping speed
50ℓ/min
including valve, flexible hose, gauge port and leak port

Power requirement
AC100V 560W
Weight 14kg

■High vacuum pumping system(Diffusion pump set)
Ultimate pressure
10^{-4}Pa at pump head under no-load
Pump speed
50ℓ/s for oil diffusion pump
20ℓ/min for oil rotary pump
including valve, flexible hose, gauge port and leak port

Power requirement
AC100V 600W
Weight 16kg

■Cooling water circulator
Cooling ability
1700/1900kcal/hr.

Power requirement
AC200V, three phase, 50/60Hz
Capacity 3.5kVA
Weight 85kg
Outside dimensions W550×D450×H950

■Carbon susceptor
21×21×t3.5mm(SiC coated)
for using Silicon wafer and glass substrate etc.

■Heated sample observation system
(CCD camera system)
Consisting of CCD camera, macro lens, Color monitor, & viewing window.
Effective No. of picture elements of
CCD camera : 390,000
Magnification on monitor : MAX.180×

■Gas Flow Unit
Float type flowmeter(with stand)
To be fabricated after receipt of customer's specifications, such as the type of gas and gas flow rate.

■Flow Switch for Cooling Water
Installed at the furnace body cooling water outlet.
Turns OFF heating when cooling water supply is stopped or the flow rate is below the set level.

■Relief valve
Installed at the side of gas out and prevent from catching the air.
Relief valve is necessay for vacuum pumping and gas flow.
This equipment is easy to set the position by Swagelok joint.

■Power cable
Vinyl cap tire cord 3.5sq
Three kinds of power cable are prepared.
(3m, 5m, 10m)

● Specifications are subject to change without notice for further improvement.

Agent

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Cat.No.MILA-5000-1Ⓔ/08.06.3000㎡

ULVAC

MINI LAMP ANNEALER

MILA-5000

ULVAC-RIKO, Inc.

Mini Lamp Annealing System

MINI LAMP ANNEALER MODEL **MILA-5000**

Rapid Thermal Processing (RTP) has become an important heating technique for annealing semiconductors, ferroelectrics and other thin film devices. But until recently, only large and expensive production systems were available for this rapid heating/cooling technique, making R&D work difficult to accomplish, especially on small samples. To address this need, ULVAC-RIKO has developed the MILA-5000 Mini Lamp Annealer. This compact table top RTP system is built around gold reflector IR furnace and contains a high precision temperature controller. When equipped with optional pumping and gas inlet equipment the MILA-5000 is able to provide the same performance as larger production scale RTP units on small samples at a fraction of the size and cost.

MILA-5000 RoHS *Compliant*

MILA-5000-UHV
(High Vacuum type)

MILA-5000-P-N
(High temperature type)

MILA-5000-P-F
(Uniform heating type)

Features

Capability of rapid heating and cooling

The maximum heating rate is 50°C/s. This non-insulated cold wall water-cooled optical IR reflector furnace has very little thermal inertia so it also cools rapidly.

Capability of heating in any atmosphere

Vacuum, gas, gas flow or air can be selected as the heating atmosphere during heating and cooling. The sample is housed inside an o-ring sealed transparent quartz protective tube that maintains sample cleanliness.

Capability of observing sample during heating

The sample can be observed through the optional top view port window during heating. Changes in the sample during the heating cycle can be recorded on video by using the optional PC based video camera.

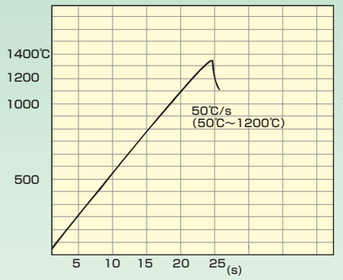
Accurate temperature control

The built-in programmable temperature controller simultaneously displays the actual and the programmed set temperature as the program steps are executed automatically. Programming is straightforward by keystroke entry via the front panel, or via the USB interface to a PC with included software. PID parameter control of temperature ramps permit tight temperature control with little overshoot/undershoot over the wide temperature range from Room Temperature to 1200°C.

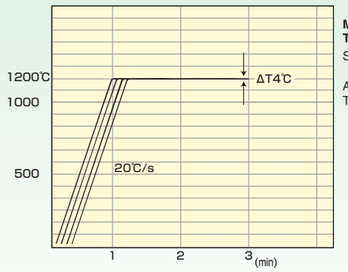
Application

■Electric materials	■Ceramics and inorganic materials	■Metal materials	■Compound materials
●RTA of silicon wafer ●Crystallization of annealing of thin ferroelectrics ●Rapid thermal annealing(RTA) of compound wafer ●Sintering of ohmic electodes ●Heating furnace for thin film deposition ●Substrate heating furnace in optical CVD	●Thermal impact test and thermal cycle test of ceramics ●Thermal fatigue test of ceramics ●Heat resistance evaluation test of coated film ●Annealing of glass substrates in vacuum	●Atmospheric annealing furnace ●Heat treatment in ultrahigh vacuum ●Heat resistance evaluation of surface coated film ●Thermal cycle test of heat resistant steels ●Characteristic evaluation of composite materials	●Heat resistance evaluation of composite materials ●Heat resistance evaluation of composite materials of carbon and metals

High temperature type



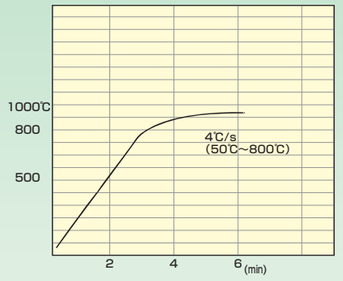
MILA5000-P-N
Maxium heating rate
Sample : W20×L20×t0.5(㎜)
nickel plate
Atmosphere : Vacuum
Rating : 200V 4kW, 100%output



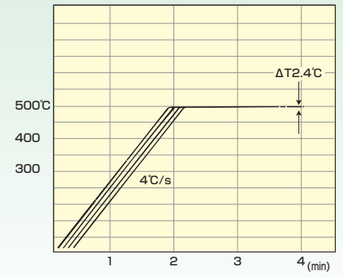
MILA5000-P-N
Temperature uniformity
Sample : W20×L20×t0.5(㎜)
nickel plate
Atmosphere : Vacuum
T・C (K) measuring point

1…2mm point from the edge
2…2mm point from the edge
3…Center point
4…5mm point from the edge

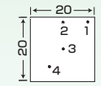
Uniform heating type



MILA5000-P-F
Maxium heating rate
Sample : W20×L20×t0.5(㎜)
nickel plate
Atmosphere : Vacuum
Rating : 200V 1kW, 100%output



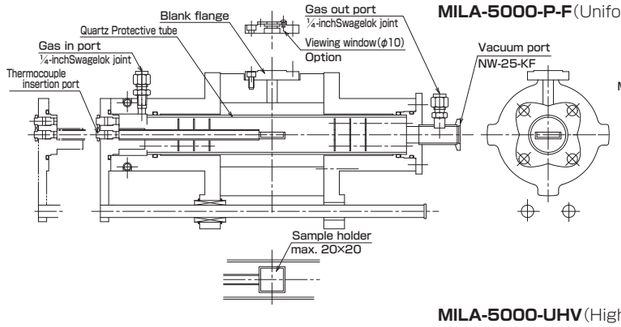
MILA5000-P-F
Temperature uniformity
Sample : W20×L20×t0.5(㎜)
nickel plate
Atmosphere : N_2 gas flowing
T・C (K) measuring point



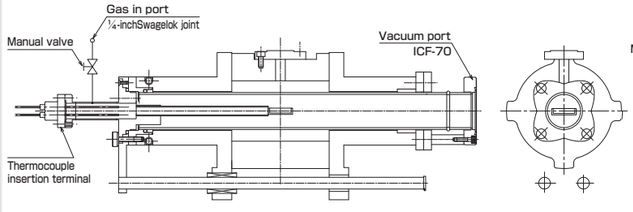
1…2mm point from the edge
2…2mm point from the edge
3…Center point
4…5mm point from the edge

Structure

MILA-5000-P-N(High temperature type)
MILA-5000-P-F(Uniform heating type)



MILA-5000-UHV(High Vacuum type)



Rear View