

Constant  
temperature  
Incubator/shaker  
OD Monitor

For cell culture  
related products

Shaker

Mixer  
Rotator  
Stirrer

Bead beater  
homogenizer  
Ultrasonic  
homogenizer

Aluminum  
block Bath  
Mini-size Bath

Water bath  
Shaking Water bath  
Immersion cooler

Hybridization  
Incubator  
Constant temperature  
Chambers

Centrifugal  
concentrators  
Cold Trap

Freeze dryers

Submarine  
Electrophoresis apparatus  
Blotting device for  
hybridization

Constant-temperature  
water circulating  
system [Chiller]

Appendix

## Appendix

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## Connection with power supply

### ■ Power plate seen at a glance

Check the voltage and current capacity before connecting.



### ■ It is dangerous when you mistake the outlet voltage!

TAITEC's products are generally comprised of single-phase AC 100 V products and three-phase AC 200 V products.

The incorrect voltage connection or missing-phase operation may cause equipment failure or fire.



### ■ Pay close attention to the operation of the equipment

When there is a continuous operation for a long time such as in a Constant temperature water bath, pay close attention to the boil-dry of the heater due to the water level drop in the water tank.

Also, if there is a possibility of damage due to an automatic recovery of a power failure after an earthquake, which has been a hot topic in recent years, consider installing seismic-sensitive outlets or other countermeasures.

### ■ It is dangerous when the power plug and outlet are loose

A power plug that is loosely connected to the outlet may cause a fire.

As a possible countermeasure, please use a locking-type outlet to prevent the plug from becoming loose.

Also, multiple connections that exceed the capacity of the outlet may cause a fire.



### ■ Is the ground connection secured?

Be sure to ground the connections to prevent electric shock in the event of equipment failure caused by static electricity or the circuit breaker not tripping during a current leakage.



### ■ Pay attention to the loading limit!

Please note that operating a shaker, etc. with a load in excess of the indicated loading limit (weight) or with an unbalanced load will cause extreme wear and deterioration of each part and lead to expensive repairs such as damage to the motor.

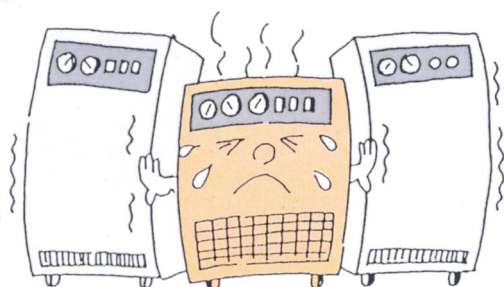
## Suitable operating environment according to product types and usages

### ■ When using heat mediums other than tap water

When using **ultrapure water**, oil, or other non-designated heat mediums with a constant temperature bath or circulator, check whether the material of the wetted parts is compatible with the product. If it is not compatible, equipment failure or corrosion of piping may result in damage that cannot be repaired.

### ■ Installation environment

In the case of an equipment that is equipped with an Air-cooled type, if the installation conditions obstruct the heat exhaust port, there will not be sufficient heat dissipation for cooling, resulting in failure of performance and possible breakdown. Also, in the case of an equipment that is equipped with a Water-cooled type, even if the room environment is suitable, performance may not be achieved due to a rise in the temperature of the cooling water.

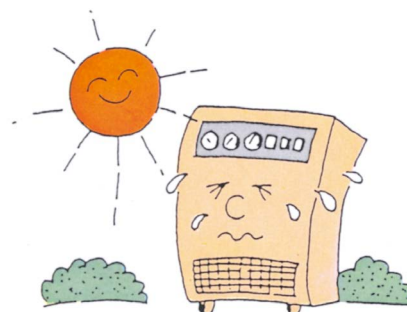


### ■ Installation on a stable place

Be sure to install the equipment in a horizontal environment that can withstand the weight of the equipment during operation. When the equipment is equipped with casters, lock them securely. In addition, please consider measures to prevent the equipment from tipping over in the event of earthquakes or other such events.

### ■ Outdoor use is strictly prohibited

Never install the product where it is exposed to direct sunlight or rain. When you install it indoors, avoid placing it near a window, etc., where it will be exposed to direct sunlight. (Please pay attention to the surrounding heat exhaust environment for Large CH series Separate-type outdoor units and equipment installed outdoors.)



# Safety device and function

*TAITEC products are equipped with safety devices and functions according to their characteristics.*

*The main safety devices have the following functions.*

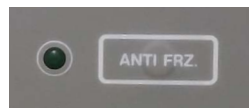
## ■ Earth leakage circuit breaker (with overcurrent detection function)

When the rated value for the leakage current is exceeded, the power supply is cut off to prevent accidents such as an electric shock. It is also used with an Overcurrent breaker, which cuts off the power supply when the rated current is exceeded due to a short circuit or overload in the electric circuit against overcurrent, as well as prevents the damage of secondary parts and accidents.



## ■ Anti-freeze safety device or Low temperature safety device

When a compressor is used, the freezing of the surface of cooling pipes or the heat exchange tank may cause the refrigerator or the circulator to fail or the tank to burst. When water is used and the freezing temperature is reached, the anti-freeze safety device activates, displaying an error and cutting off the compressor power supply.



## ■ Float type boil-dry prevention safety device

Activated to prevent boil-dry before the water in the water bath evaporates as well as before the water level reaches the upper end of the heater's heating part. The heater will not be re-energized if the water is not replenished. Some equipment of the constant temperature bath can also be set to not automatically resume power in the event of a power outage.



Float type safety device for boil-dry prevention (Reference)

## ■ Various optional safety devices

We can also install various safety devices into the equipment according to your request as an option. If there is no mounting space inside the main unit for the safety device, it will be an external one.

### [Various mountable safety devices (example)]

- Fixing the sensor of the Overheat prevention safety device (manual recovery type)
- Installation of additional Earth leakage circuit breaker
- Addition of Emergency stop button

## ■ Others

- Safety devices for a compressor includes Overload safety, High/Low pressure safety, Thermal relay circuit, etc.
- Slow-start circuits, etc. for Shakers
- The constant temperature baths are equipped with a Self diagnosing function to notify errors, a water bath protection plate, etc.

## ■ Thermal protector (sample protection safety device)

Two upper temperature limits on the high temp. side and low temp. side can be set individually for protecting samples such as cultured microorganisms. If the temp. in the storage or water tank rises significantly above the preset temp. due to the failure of the temp. controller etc., the safety device at the high temp. side is then activated (so that the upper limit temp. set is not exceeded). If similarly, the temp. drops significantly, the low temp. side is activated to cut off the compressor circuit.



## ■ High temperature safety device

An independent, temperature-fixed type safety device that activates when the maximum operating temperature of the equipment is exceeded, cutting off the heating circuit. It prevents deterioration or damage of parts due to the high temp. (automatic and manual recovery type are available).



## ■ Safety sticker (Product Liability) on the product

The following stickers are on the applicable parts for safety

<b>回転部位注意</b> 回転軸がありますので触らないで下さい	<b>指挟み注意</b> 必ず運転が停止してから作業して下さい	<b>高温注意</b> 運転中は高温につき触らないで下さい	<b>低温注意</b> 運転中は低温につき触らないで下さい	<b>感電注意</b> 電装部の調整作業は必ず電源を切ってから
<b>Caution on rotating parts</b> Do not touch the rotating shaft.	<b>Caution on finger entrapment</b> Be sure to wait until after operation is stopped before operating the unit.	<b>Caution on high temperature</b> Do not touch during operation due to high temperature.	<b>Caution on low temperature</b> Do not touch during operation due to low temperature.	<b>Caution on electric shock</b> Be sure to turn off the power supply before adjusting electrical components.



Addition of Transmission output terminal  
Installation of sensor for temperature recorder



Addition of Emergency stop button



Example of High/Low pressure safety

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Submarine Electrophoresis apparatus  
Blotting device for hybridization

Constant-temperature water circulating system [Chilled]

Appendix

# Heating medium for high temperature Silicone oil

## Used in Wide temperature range

BARREL Silicone® MA series is a brownish translucent liquid with improved heat resistance and oxidation resistance by taking an advantage of the chemical inertness of silicone oil. This heating medium is extremely excellent in using with a semi-open system closed circuit for long time operation at high temperature. We recommend the following when using it with our constant temperature water bath, etc.

### •BARREL Silicone® MA series MA-50

Can be used up to 230°C for a long time. Suitable for requiring a high accuracy temperature control.

### •BARREL Silicone® MA-100

Can be used up to 230°C for a long time. Suitable for requiring a low evaporation weight loss.

Model	MA-50	MA-100
Appearance	Brownish translucent	Brownish translucent
Density	25 kg/m <sup>3</sup> at 25°C	960
Specific heat	kJ/kg · K at 25°C	964
Thermal conductivity	W/m · K	1.48
Thermal expansion	1/°C	1.47
Evaporation	150°C, 24 h, %	0.151
Flash point	°C	0.00104
		0.00096
Kinematic viscosity	mm <sup>2</sup> /s	<0.3
	25°C	<0.3
	40°C	>330
		50
		100
		15
		31

## Features

- Excellent Thermal and Oxidation stability
- High flash point and Flame retardant
- The working environment can be kept clean thanks to a very low vapor and a less evaporate loss.
- Excellent flowability thanks to a small change in viscosity by temperature and a low pour point
- Odorless and Low toxicity
- Chemically inactive
- The time to replace can be checked by the appearance color change (degradation) of the heating medium as a guide.

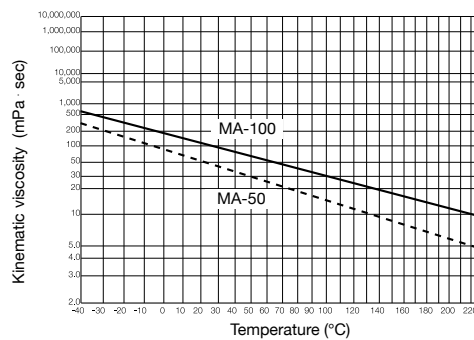
\*The lifetime for the heating medium widely varies depending on the structure of the used equipment and the usage conditions. At present, it is not a Standard for clearly determining the extent of the unit to be used continuously. However, we could examine that by comparing the properties of the heating medium in use with that of a new one. The BARREL Silicone® MA series should be recommended as a replacement when the quality changes as follows.

1. When the flash point drops more 20%
2. When the viscosity at 40°C changes by more 20%
3. When the appearance color changes to Colorless transparent or Black

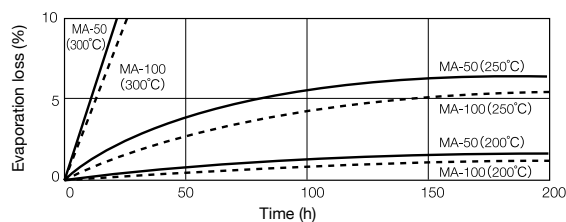
## Precautions/Instructions

- When using the unit at over 100°C or higher, and if there is moisture in the unit, the water vapor will explosively be generated and the heating medium will be scattered. Also, even if moisture enters while operating at over 100°C, the phenomenon will still be the same. Hence, be careful not to get moisture contaminated.
- Make sure to procure MSDS (Material Safety Data Sheet) and confirm the contents for safety.
- Please consider changing the operation or heating method if the liquid is used in a way that may cause a fire.
- Please dispose of the liquid in accordance with all applicable laws and regulations.

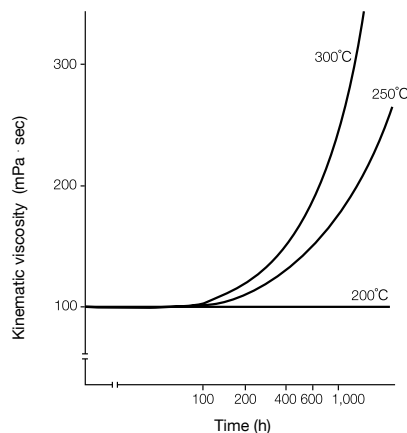
## Temperature-Viscosity characteristics



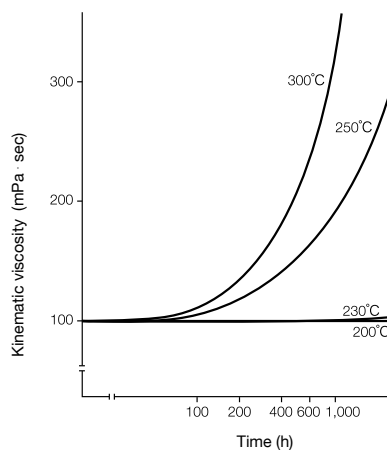
## Relationship between evaporation loss and temperature



## Change in viscosity of MA-50



## Change in viscosity of MA-100





# Validation/ IQ (Installation Qualification) and OQ (Operational Qualification)

*Recently, corporations such as pharmaceuticals, biotechnologies, etc. are widely required to validate with document records whether their equipment used is correctly installed and operated in order to comply with various ministerial ordinances and standards.*

Just for your information: In order to support the validation work that requires time and equipment knowledge, TAITEC has been actively conducting the following **validation services** by fully utilizing our accumulated knowledge on that.

## ■ The contents of TAITEC's main validation work

Implementation items	Timing	Place	Contents
<b>Installation Qualification (IQ)</b>	At delivered At relocated	Usage place	Visual confirmation of product appearance and accessories Confirmation of usage environment (supply voltage, environmental temperature, etc.) Confirmation of the stability and safety of installation locations Confirmation of installation method
<b>Operational Qualification (OQ)</b>	At delivered At relocated Every fixed period	Usage place	Confirmation of electrical insulation and conduction Confirmation of the performance on temperature control (measurement) Confirmation of the performance on shaking speed (measurement)
<b>Calibration before shipment</b>	Before shipment	In-house (TAITEC)	The same as above IQ/OQ

## ■ IQ (Installation Qualification) and OQ (Operational Qualification)

The purpose of IQ is to confirm and record that equipment is used for development, and production processes are properly selected in just proportions as well as properly installed according to the purchase order form.

The purpose of OQ is to confirm and record that the equipment used in the development and manufacturing processes has the designated performance functions under the specified environment. In OQ, the validation is performed by selecting test items and criteria from the specifications of a device.

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