

Application data sheet #10

Constant temperature incubator **SWING INUBATOR SW-060**

The temperature stability and sample temperature inside an incubator under fluctuating room temperatures



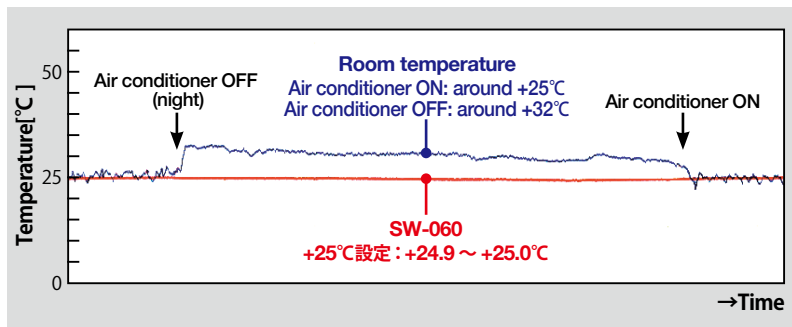
Evidence for use as a precise temperature control incubator using freon-free cooling

Overview

In the application data sheet No. 1 of our constant temperature and defrost incubator HYBRI AND DEFROST INCUBATOR SW-060 ("Product"), we introduced useful basic data when it is necessary to defrost reagents and samples at room temperature (defined as "+25°C ") i.e. ordinary temperature defrosting. In this example, we explained that by taking advantage of this Product's temperature stability and shaker functions under fluctuating room temperatures, defrosting time can be shortened by controlling temperature at 25 °C with this Product rather than simply placing it statically in a room. In this sheet, we indicated measurement data concerning the temperature stability of this Product, which was used for the basis of the previous sheet. In addition, for reference, we will describe sample temperatures against the inside temperature of this Product, in addition to how the inside and sample temperatures will change when the door of this Product is opened and closed.

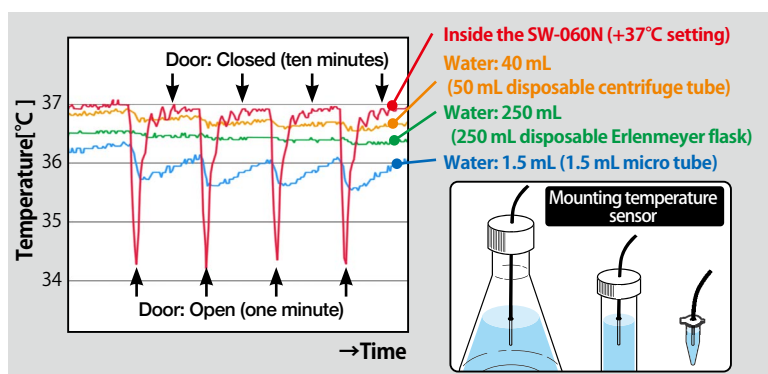
Test method and results

■ Inside temperature stability of SW-060 at fluctuating room temperatures



This Product was installed in a fully air-conditioned room (set at +25 °C) and set to +25 °C . Temperature sensors were installed in the center of the chamber as well as outside the chamber (just next to this Product) to record temperature status. When the air conditioner was turned off at closing time, the recording continued on the status for a few hours after starting time until the following day (conducted between August 28 and 29, 2017). Although the room was fully air-conditioned, the room temperature fluctuated slightly, and when the air conditioner was turned off, the room temperature drastically increased while the inside temperature of this Product was kept almost constant.

■ Changes of the inside and sample temperatures by opening and closing the door



Samples (tap water) in three types of containers were statically placed inside the Product, which was set at +37.0°C . Temperature sensors were mounted inside and on individual samples (for mounting method of the samples, see illustration on the left) and after the temperature became stable, we recorded the status of the internal temperature of the Product and the temperature of each sample when a cycle of opening the door for one minute, and then closing the door and waiting for ten minutes. This operation was repeated four times. When the door was opened for one minute, the inside temperature dropped to nearly +34 °C (setup environment at about +25 °C), but the temperatures of the samples did not drop that much. It

turned out that if a volume to some extent is available, nearly no change took place. For reference, the reason why the sample temperatures did not reach the preset temperature will be explained later.

Results and discussion

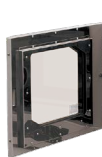
Life science has a protocol of "reactions at room temperature" just like ELISA, but during troubleshooting, we do not see many cases where temperature changes are referred to as one of the causes. However, as described above, even if an air conditioner is fully used, the room temperature fluctuates, and if the equipment is installed in a common equipment room with heat exhausts from other equipment or in seasons like the summer or winter, the room temperature can easily fluctuate by turning on or turning off the air conditioner or its setup temperature. That said, a cooling function is required to precisely reproduce such temperatures around the room temperature of +20 °C and +25 °C in the incubator, while freon-gas type ones have issues such as checkup obligations and disposal procedures. If an incubator is easily affected by an ambient temperature and not a room temperature, such an incubator will not be used. In this test, we were able to reconfirm that this Product can be used as a freon-free, precise temperature control incubator to solve such issues.

Let's look at why the sample temperatures did not reach the preset temperature. Our Product is adjusted so that the inside temperature should be the preset temperature before shipment. This is because container types and sample volumes are different depending on the usage. (Heat absorption with temperature sensors may occur, but as the cable section was about 20 cm inside, it was assumed the influence was not significant.)

If one wants to definitely match the sample temperature with the preset temperature, compensation can be done with the container to be used and sample volumes. (Our Product has a function for adjustment so that the sample temperature becomes the preset temperature.) As to the difference of temperature reached depending on sample volumes, the 40 mL container was the closest, while the 1.5 mL container was the furthest. With a certain volume, deviations from the preset temperature may become relatively large, regardless of whether the volume is larger or smaller from it. (To eliminate any impact from setting methods and materials, each container was made of resin, while no container holders, etc. to cover the whole container were used.) In consideration of this, and as one of the causes, a balance between heating and heat emission could be considered. This was because while the time required for the temperature to be stabilized was shorter as the volume was smaller (no data indicated here), deviations between the sample temperature reached and preset temperature as well as temperature changes while the door was opened were not necessarily proportional to sample volumes. We will continue to pay attention to the relationship between these sample volumes and the temperatures reached, going forward. Please note that, while this test represented the temperature adjustment of samples by air, it is essentially desirable to use different heat mediums (water, heat block or air) depending on reaction times and sample volumes. We must add that in this test result, properties unique to air are likely to be included as a cause.

Now on sale

Constant
temperature
incubator
Swing incubator
SW-060



Example of using an
Inversion stirring Kit



Example of using a
Reciprocal Kit
(Container not included)



Example of using a
Bottle Kit



High-precision temperature control for temperatures near room temperature such as +25°C. Freon-free electronic heating and cooling system. In addition, for use as a precise temperature control incubator, a Shaking Kit for hybridization up to +60°C, etc. is available.

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