

TEMPERATURE VERIFICATION

The method will be used with all benchtop and automatic temperature control devices from QINSTRUMENTS, e.g., BioShake 3000-T, BioShake Q1, and BioShake iQ.

1. Required test equipment

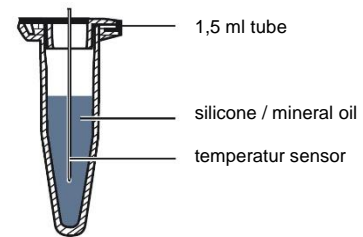
- Temperature measuring device with a measuring range from 0 - 120 °C, with an accuracy ≤ 0.2 °C
(for example, TESTO 735-1, 3-channel temperature measuring device, item number: #0560 7351, www.testo.de)
- Temperature sensor with a low heat capacity, e.g. Temperature sensor (max diameter: 1.5 mm)
(for example, TESTO Needle Probe TE type T, diameter 1.4 mm, article number: #0628 0027, www.testo.de
IMPORTANT: Non-immersed surface of the thermocouple must be insulated from the environment.)
- BioShake adapter for 24 x 1.5 ml tubes
(QINSTRUMENTS, article number: #1808-1062)
- 1.5 ml tube
(for example, Eppendorf Safelock 1.5 ml EP, article number: # 0030-120.086)
- Silicone or mineral oil (heat resistant up to 120 °C)
- Clock (or stopwatch)
- Operation manual



Please use only approved and calibrated measuring and test equipment that meets the requirements for the verification test. Avoid changes in ambient conditions and drafts during the measurement. Make sure that the adapter & the tube are placed firm and secure.

2. Preparation

1. Measure the current room temperature (RT). For a valid measurement, the RT must be between 15 - 30 °C.
2. Mount the BioShake adapter on the device.
3. Drill a small hole in the lid of the 1.5 ml tube. The hole should not be larger than the diameter of the temperature sensor.
4. Fill the 1.5 ml tube with approx. 1 ml of silicone/mineral oil.
5. Close the lid of the 1.5 ml tube.
6. Place the 1.5 ml tube in the BioShake Adapter. Pay attention to a secure and firm seat.
7. Insert the temperature sensor through the drill hole as shown, approx. to the middle of the 1.5 ml tube.



The mixing function must always be switched off during the measuring process to avoid damage to the measuring system. Ensure that the temperature sensor's position remains constant during the entire measuring process.

3. Temperature measurement and tolerances

1. Set the temperature of the device to the temperature that should be verified (see table) using the temperature buttons (or via RS232 commands) and start the heating process.
2. After reaching the set temperature, wait another 10 minutes.
3. Now note the temperature displayed on the temperature measuring device.
4. Calculate the deviation between the set temperature and the temperature displayed on the meter. Compare this deviation with the permitted tolerances (see table).

Temp. measuring point	Permitted tolerance	Measured temperature	Determined deviation
40 °C	$\pm 0,5$ °C bis 40°C °C °C
75 °C	$\pm 0,8$ °C bis 75°C °C °C
90 °C	$\pm 1,0$ °C bis 95°C °C °C

4. Evaluation and Support

If your device does not meet the specifications described above, please carefully check the firm seating of the 1.5 ml tube in the BioShake adapter. Inadequate contact of the 1.5 ml tube with the well of the BioShake adapter may lead to measurement errors. If your determined deviation exceeds the permitted tolerance, your device needs an adjustment and calibration. If applicable, you can perform this adjustment and calibration yourself and on-site.

If you plan to do this, please contact us at +49 3641 55430 or support@Qinstruments.com. You can reach us during regular business hours from Monday to Friday between 9:00 and 17:00 CET / CEST.

Maintenance & Calibration & Repair

Do you need a repair, maintenance or calibration of your laboratory device? Please use our online form for your inquiry and order: <http://www.qinstruments.com>
To process your request quickly and accurately, please complete the online form thoroughly and send us the most detailed description of your task or problem. We will contact you as soon as possible.