

MIXING SPEED VERIFICATION

The method will be used with all bench top and automation shaking devices from QINSTRUMENTS, e.g., BioShake 3000.

1. Required test equipment

- **BioShake** lab device/automation unit
- Mixing speed measuring device with a measuring range from 0 – 10,000 rpm with an accuracy better than 0.02%

Testo 477 – LED hand stroboscope

item number: # 0563 4770

<https://www.testo.com/en/testo-477/p/0563-4770>

Instruction manual: <https://media.testo.com/media/c4/d4/5d45e1a473a3/testo-477-Instruction-manual.pdf>

The Testo 477 LED hand stroboscope is used when it is necessary to make fast-moving objects appear in slow motion. testo 477 visualizes rotation and vibration movements and allows measurement during continuing operation. The static image enables the inspection and qualitative evaluation of components moving at high frequencies. This allows you to analyze their run-time performances safely and easily. To make an object appear to move in slow motion, you need to strobe it at a rate slightly above or slightly below its actual speed.

- **BioShake operation manual**
<https://www.qinstruments.com/service/downloads/>
- Sample **microplate**



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 shaker is placed firm and secure.

2. Safety standards & Measuring principle

1. Measure the current room temperature (RT). The RT must be between 15-30 °C for a valid measurement.
2. The BioShake unit should be placed and carefully mounted on a horizontal solid workspace by using mounting points and screws as recommended.
3. Plug the external power supply (2) into the BioShake's 24 V socket. Plug the power cable (3) into the power supply (2) and into the wall socket. If necessary, plug the EAI 232 cable (former RS232) into your computer's free port. Switch on. The instrument will do a self-test. Now, the instrument is ready.
4. Set the different mixing values for measuring points.



Warning: Some people, even those who have never had an epileptic seizure, can cause strobe flashes and similar epileptic attacks.

3. Mixing speed measurement and tolerances

1. Set the mixing speed of the device to the mixing point that should be verified (see table) using the mixing buttons (or via RS232 commands) and start the mixing process.
5. Wait 30 seconds to stabilize the process.
6. Place the stroboscope over the moving platform and start the measuring procedure.
2. Calculate the mixing deviation between the set mixing and the measured mixing speed displayed on the testo 477. Compare this deviation with the permitted tolerances (see table).

Mixing measuring points	Permitted tolerance	Measured mixing speed	Determined deviation
1000 rpm	±25 rpm rpmrpm
2000 rpm	±25 rpm rpm rpm
3000 5000 rpm	±25 rpmrpm rpm

4. Evaluation and Support

If your device does not meet the above specifications, please carefully check the correct installation and functions. If your determined deviation exceeds the permitted tolerance, your device needs an adjustment and calibration. If applicable, you can carry out this adjustment and calibration on site.

If you plan to do this, please contact us directly 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 at www.qinstruments.com. To process your request quickly and accurately, please complete the online form completely and send us the most detailed description of your task or problem.