

ANALOGUE TENSIONMETER USER MANUAL

▶ INTRODUCTION

Thank you for buying a Sapim Tensiometer. The Sapim tensiometer is a precision tool for determining the spoke tension. For this tensiometer only, the enclosed table is valid, tension tables for other tensiometers are not compatible.

▶ HANDLING

Please keep the tensiometer dry in the supplied wooden box.

The handles of the tensiometer should only be moved as intended and may only be compressed, they should not be pulled apart or have force exerted in any other direction.

Should the tensiometer be dropped, the function must be checked to ensure it is correctly calibrated. This is a precision tool and should therefore be used and handled with care.

▶ CONTENTS OF DELIVERY

- Tensiometer
- The table of spoke tension
- The report on the dial gauge
- High-quality, eco-friendly wooden box
- Allen key used to verify the calibration.

▶ PREPARATION

IMPORTANT! Before using the tensiometer, it should be calibrated prior to each use using the supplied Allen key.

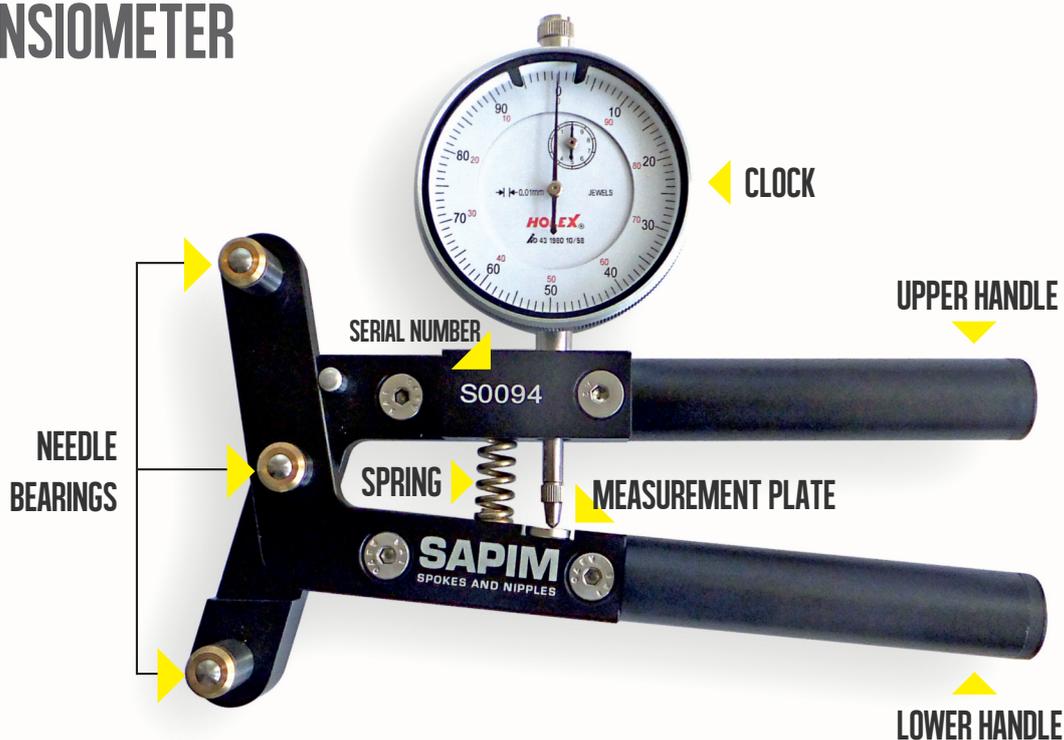
The Allen key should lay directly adjacent to the angle of the bearing (as shown in the image). Measurement should be carried out as described in the chapter 'Measurement procedure'. The read out should match with a tolerance of +/- 4 ticks with the value on the worksheet "value test stick".

Should this not be the case, the tensiometer should be returned to be checked by Sapim.

The Allen key should only be used for checking the calibration. Bending the Allen key will lead to an incorrect measurement. Do not use any other Allen key than the one that was provided in the original box.



TENSIOMETER



▶ EXPLANATION

Needle bearings are used on the tensiometer at the outer ends and the middle to reduce friction to ensure smooth actuation and guarantee accurate readings.

▶ **THE HOLEX CLOCK** is an accurate calibrated measuring instrument, see separate test report. The clock is attached with a locking screw and screw adhesive behind the top grip. Please do not adjust this screw yourself as this will void the warranty. The clock sensor is fitted on a stainless steel measuring plate to avoid incorrect measurements caused by friction and roughness.

▶ **THE SPRING** has been preset with an adjusting screw from the top and is secured with a fixing screw on the back. Do not adjust these screws yourself as this will void the warranty. The small fixing screw on the back is also secured with screw glue.

▶ **THE SERIAL NUMBER** on the tensiometer must match the serial number shown on the tension table.

▶ **THE CALIBRATION** of the tensiometer is only for Sapim spokes. Measurements for spokes from other manufacturers will not necessarily generate the same values because the wire diameter of some producers varies compared to Sapim as well as the strength (N / mm²).



- ▶ **THE PRINCIPLE** of the pressure gauge is to measure the deflection of the spoke with the spring force of the tensiometer.

Low spoke tension - low reading

The spoke is strongly bent



High spoke tension - high reading

The spoke is less flexed



The tensile force of the spoke is indirectly measured by the deformation of the spoke.

The higher the spoke tension, the less the spoke will bend against the spring force of the tensiometer, this means a high spoke tension will carry out a larger measured value. Corresponding spoke tensions by spoke type can be found in the tension table.

- ▶ **TO AVOID MEASUREMENT ERROR**, the tensiometer should always be set in the middle part of the spoke. If used close to the nipple the spoke can be bent due to a non-optimal spoke nipple line, resulting in incorrect measurement. Furthermore do not measure butted or flat spokes near the transition zone where the spoke diameter will be different. The first point of contact with the spoke should be a min. 3 cm after the transition zone.

Similarly the tensionmeter should be used at least 3cm from the point where the spokes cross to avoid incorrect measurements as a result of non-uniform spoke bending. While measuring, the hand should not add any force on the tensiometer. Flat spokes should be measured on the flat side. The clock has been calibrated at room temperature and we recommend using the tensiometer at room temperature.



▶ USAGE

Before measuring please rotate the dial gauge to 0.



Press the handles together and put the tensiometer on the spoke so that the spoke lays between the bearings (see picture).



The spoke should lie on the pliers' surface.

Now release the lower handle and hold the tensiometer with no power in the same position, the tension value will now be displayed on the clock.

The tensiometer is a sensitive power meter and any change in position or force will change the value. Therefore, the tensiometer should be placed in such a way that no additional forces are added on the handles.

Check that you have followed all of the above points to avoid measurement errors. Look up the value in the table for the matching spoke type.

On the left hand side of the tension table, see the associated spoke tension in Newton or kilograms.



▶ SPOKE TENSION

Due to various factors (rim, hub, spokes number) it is impossible to tell you the optimal spoke tension. Nevertheless, some rules should be observed.

1. On one side of the wheel, the spokes should have approximately the same tension.
2. In order to avoid full detensioning of the spoke, the Spoke tension on asymmetrically spoked wheels on the low tension side should reach min. 80 kg. On symmetrically spoked wheels the spoke tension should minimum have 100kg.
3. We as spoke manufacturers like high spoke tensions.
4. Too high spoke tension can damage the flange of the hub or the rim. Too low spoke tension will bring spoke breakage due to fatigue problems. Please also read the mounting instructions for the rim and hub manufacturers.

▶ GUARANTEE

Sapim offers 36 month warranty on the tensiometer under proper use, as described above. Improper use voids the warranty.

If damage is sustained due to the tensionmeter being dropped or other external mechanical or chemical influences, it can be returned at P&K Lie for chargeable repair.

For consequential damages by measurements with the tensiometer Sapim is not to be held responsible.

We hope you will enjoy using our tensiometer.

For further questions please write an email to info@sapim.eu.

your
Sapim team

