

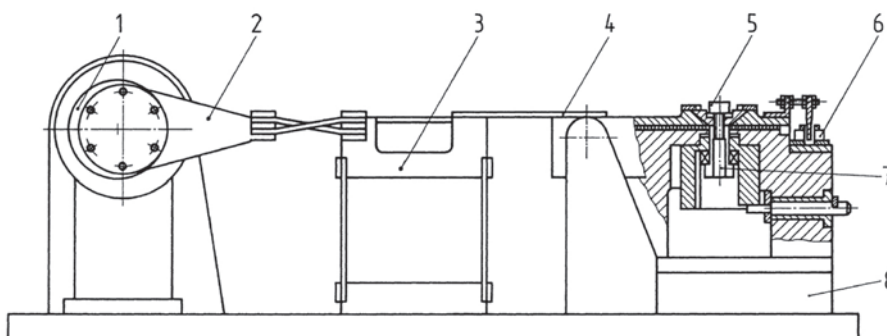
# Vibration test according to DIN 65 151

## SUPERBOLT® Tensioners offer the highest possible safety for bolted connections

An option to test the behavior of bolted connections under dynamic load is the pulsating test, also called vibration test. On a vibrating test table a bolted connection is pre-loaded axially and then loaded at a right angle to the tensioner shaft with a high frequency shearing force. Indicated is the behaviour of the pre-load over time. Loss of pre-load and possible loosening becomes evident.

### Details of the test:

- Test machine: According to DIN 65 151 (FIG 1)
- Bolts: M8 – 10.9
- Tensioner: Piston end – Tensioner SP-M8/W-spc



### Description:

- 1 Adjustable cam
- 2 Connecting rod
- 3 Shearing force gauge
- 4 Connecting plate
- 5 Bolt being tested
- 6 Inductive displacement sensor
- 7 Test adapter
- 8 Test bed

FIG 1: Vibration test table according to DIN 65 151

FIG 2 shows the test results of such a vibration test. The pre-load in kN is shown over the time in seconds. Three tests were carried out with MJT (Multi-Jackbolt Tensioner) with different pre-tension values, and also a comparison with NORD-LOCK-Safety washers was made. The duration of the tests was 14 seconds.

1. Test at 75% of yield strength
  - Pre-load 17.5 kN
  - Initial loosening and then no loss of tension with 16.8kN
2. Test at 60% of yield strength
  - Pre-load 14.2 kN
  - No loosening
3. Test at 40% of yield strength
  - Pre-load 9.3 kN
  - No loosening
4. Test with NORD-LOCK safety bolt
  - Pre-load 15.5 kN
  - Increasing loss of pre-load

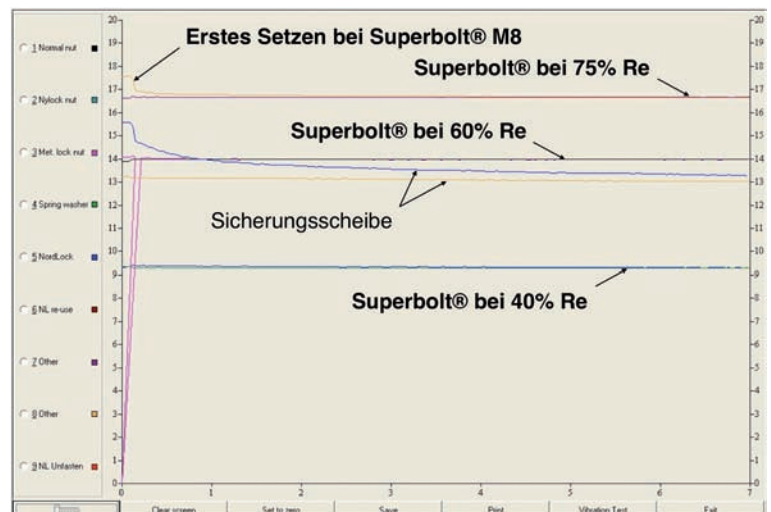


FIG 2: Results of the vibration test

### Summary

With SUPERBOLT® Tensioners, bolted connections do not lose their pre-load, even under extreme dynamic loads. Only under extreme utilization of the yield strength an initial loosening is recognizable. The loss of pre-load was only 4%. Whereas the NORD-LOCK Safety washer lost more than 15% of its pre-load and a non-secured bolt comes loose completely within seconds. SUPERBOLT® Tensioners meet the highest requirements of the industry for safe bolted connections in every aspect.