Ball bearing tester

The BBT enables to test ball bearings for their lifetime under high vacuum up to +300°C.

This facility enables to measure the torque of ball bearings from air to high vacuum. Environments vary from vacuum, non-aggressive gases (e.g. CO₂) under controllable pressures (e.g. to simulate Martian environment) or to air with controlled humidity. The tests can be performed at temperatures from RT to +300°C.

A testbox is available for 7004 bearings with a maximum preload of 40N. The cages can be manufactured of individual composites (e.g. self-lubricated-polymer-composites). The preload will be measured before and after a BBT-test with a tensile-test-machine.

Post-Analysis may cover measurement of wear by profilometry, SEM or microbalance, investigation of surface structure or material transfer by SEM/EDX.

The device is fully PC-controlled. To the control parameters, e.g. sliding distance, motion profiles (uni, oscillating,...), can be selected. On-line-data acquisition offers to post-process data, e.g. for automatic calculation of friction coefficients in running-in- or steady state, as well as endurance of solid lubricant coatings.

Measurement of

- Torque
- Vacuum, temperature
- Residual gas
### Specifications

| Test               | online measurement of  
|                   | • Torque  
|                   | • Environmental Data  
|                   | • residual gas analysis (mass spectrometer of outgassing particles) |
| Temperature       | from RT up to +300 °C, thermal cycles available |
| Loads             | 20 <-> 40 N (other preloads on demand)  
|                   | Pre-load is measured before / after testing |
| Speed / Motion    | Motion selectable from unidirectional to reciprocating (angles selectable)  
|                   | 0,1 to 600rpm |
| Environments      | Vacuum selectable down to 10⁻⁶mbar  
|                   | Air with controlled humidity  
|                   | Gases with controllable pressure (e.g. CO₂ at 6mbar) |
| Samples           | 2 angular ball bearings  
|                   | Testbox available for 7004 bearings, others on demand |
| Accuracy          | Torque ± 0.001 Nm  
|                   | Sample temperature (housing): ±2°C |

This device enables also high temperature testing under vacuum:
HVT: testing up to +650°C under vacuum in ring-ring-geometry