Test Capabilities

The TE 82 is a modified version of the TE 92 Microprocessor Controlled Rotary Tribometer, using manual dead-weight loading (instead of automatically controlled pneumatic loading) and direct vector motor controlled test start (instead of electro-magnetic clutch). The machine may be used to run tests according to the following standards:

- ASTM D2266 Wear Preventive Characteristics of Lubricating Greases
- ASTM D4172 Wear Preventive Characteristics of Lubricating Fluid
TE 82 with TE 82/RCF Rolling Four Ball Test Assembly

IP 300 Rolling Contact Fatigue Tests for Fluids

TE 82 with TE 82/KRL Shear Stability Test Adapter and TE 82/SM Temperature Control Service Module

- DIN 51350/6 Testing of Shear Stability of Lubricating Oils Containing Polymers
- CEC L-45-A-99 Viscosity Shear Stability of Transmission Lubricants (Taper Roller Bearing Rig)

TE 82 with TE 82/TW Thrust Washer Test Assembly


Description

The TE 82 has dead weight loading, vector controlled motor speed with encoder feedback, SUPERSLIM Serial Link Interface Module and COMPEND 2000 Window compatible control and data acquisition software. The machine is floor-standing.
The test spindle projects downwards and runs in a housing with precision greased for life bearings. The drive motor is connected to a pulley on the test spindle by means of a timing belt.

Vector control of the motor with encoder feedback provides a variable speed turn-down ratio of 100:1. The motor is four-pole providing a constant torque of 14 Nm up to 1,500 rpm and constant power of 1.5 kW from 1,500 to 2,000 rpm. The motor is capable of providing 50% overload for 30 seconds and therefore a maximum torque of 21 Nm is available for this time. The welding limit in 4-ball EP tests is typically 12 Nm.

The TE 82 includes the test adapter for sliding four ball tests. This comprises a test reservoir, clamping nut, thrust face and clamping ring for the three test balls, integral torque arm and thermocouple sensor.
The clamping ring is designed to hold the test balls at the defined contact angle for 4-ball testing. The thread of the clamping nut is designed to provide the correct clamping torque for 4-ball EP testing. The upper ball is placed in a split taper collet, which is a push fit into the spindle taper. The test assembly is also designed to locate on the TE 82/SCOPE Microscope Assembly to allow post-test measurement of wear scars.

Optional Accessories

TE 82/RCF Rolling Four Ball Test Assembly

The TE 82/RCF comprises a test reservoir and precision polished test race. The race is designed to permit the test balls to rotate freely maintaining a defined contact angle with the upper ball fixed in the spindle. In this case there is no torque measurement and the rotation of the adapter is prevented by dowels in the heated pad locating in three holes in the load cross-beam. The upper ball is placed in a split taper collet, which is a push fit into the spindle taper.

TE 82/KRL Shear Stability Test Adapter

The DIN 51350-6 and CEC test methods are for the determination of the shear stability of lubricating oils with polymer additives. For this a taper roller bearing is used to shear the fluid. The purpose of the test is to determine the permanent drop in viscosity caused by mechanical stresses under practical conditions. The test assembly comprises a test reservoir, clamping nut, integral labyrinth for temperature control, torque arm and thermocouple sensor. The temperature of the lubricant is maintained at
60°C by means of the TE 82/SM Temperature Control Service Module, which is a free-standing temperature controlled water circulating system.

**TE 82/TW Thrust Washer Test Assembly**

The test assembly comprises an electrically heated test bath rated to 200°C and a self-aligning hub adapter for carrying standard thrust washer test samples.

- Thrust Washer: 1.125” O/D according to ASTM D 3702
- 2” O/D according to ASTM D 3702

**Instrumentation and Control**

The TE 82 has PC based sequence programmable control and data acquisition. This is provided by an integrated Serial Link Interface Module and **COMPEND 2000** software running on a host PC, operating under Windows. Data is stored to hard disc in standard spread sheet compatible file formats (.csv or .tsv).

Tests are defined by a sequence of steps, each step containing set-point, data recording rates and alarm level information. Set-points may be adjusted by step change or ramp. The test sequence is followed unless interrupted by the operator or an alarm. Set-points may also be adjusted manually using on screen toggles.

**TE 82/SCOPE High Resolution Microscope Assembly**
The TE 82/SCOPE High Resolution Microscope Assembly provides for rapid measurement of the wear scar on the test balls from a sliding four ball test (EP or Wear) without having to removing the balls from the sliding 4-ball test adapter.

The sliding four ball test adapter fits onto the base of the microscope assembly. The microscope is located on angled holder which is set to the standard contact angle of the balls in the machine. This means that the microscope is normal to the centre of the wear scar.

The microscope has a rack and pinion focusing system and the wear scar is illuminated by the internal light source. Each ball may be viewed in turn by rotating the test adapter by hand. Two interchangeable eye pieces are provided with internal graticules as follows:

- Range 2 mm with 0.01 mm divisions
- Range 4 mm with 0.02 mm divisions

The wear scar is measured in one direction and then the eyepiece is twisted 90° to read the second value.

TE 82/SCOPE-IC Digital Image Capture option allows wear scar images to be logged to PC with subsequent on-screen measurement of wear scar dimensions.
### Technical Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size of Test Balls</td>
<td>12.7 mm (0.5&quot;) diameter</td>
</tr>
<tr>
<td>Load Range</td>
<td>10 to 1,000 kg</td>
</tr>
<tr>
<td>Loading Method</td>
<td>Dead Weights</td>
</tr>
<tr>
<td>Rotational Speed</td>
<td>60 to 2,000 rpm</td>
</tr>
<tr>
<td>Temperature Range</td>
<td>Ambient to 200°C</td>
</tr>
<tr>
<td>Heater Power</td>
<td>550 W</td>
</tr>
<tr>
<td>Temperature Sensor</td>
<td>k-type thermocouple</td>
</tr>
<tr>
<td>Interface</td>
<td>Serial Link Interface Module</td>
</tr>
<tr>
<td>Software</td>
<td>COMPEND 2000</td>
</tr>
<tr>
<td>Motor</td>
<td>1.5 kW ac</td>
</tr>
</tbody>
</table>

### Automatically Controlled Parameters

- Rotational Speed
- Temperature
- Test Duration

### Manually Controlled Parameters

- Load

### Measured Parameters

- Rotational Speed
- Friction Torque
- Temperature
- Test Duration
- Friction Coefficient

### Services

- Electricity: 220/240V, single phase, 50 Hz, 3 kW
- 110/120 V, single phase, 60 Hz, 3 kW

### Installation

- Floor-standing machine: 900 x 670 deep x 2000 mm high, 300 kg
- Bench-mounting cabinet: 530 mm x 420 mm x 300 mm high, 20 kg
- Packing Specifications: 2.2 m³, GW 600 kg, NW 450 kg