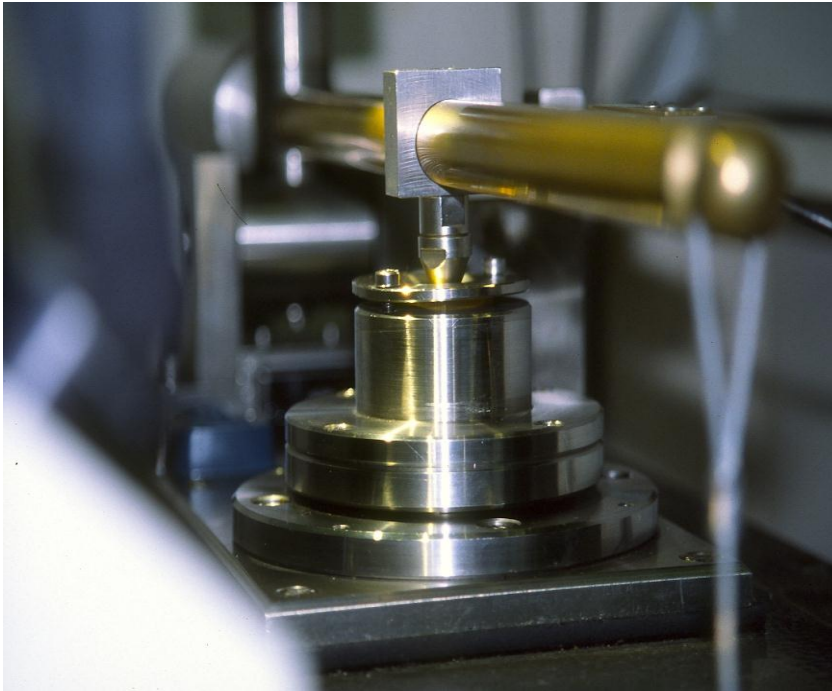


Technical Specification 02.81 v 05

Pin on Disc Tester - PoD2



State of the Art:
PVD & PACVD Coating Systems
Thin Film Test Equipment

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1. Introduction

The TEER-PoD-2 is a computer controlled device for creating wear tracks to provide a quantitative measure of the wear properties of a coating.

The Pin-On-Disc wear tester uses a high torque drive motor to rotate a flat sample under a loaded wear pin. The wear pin is a 5mm diameter ball made either from Cr steel or WC-Co.

The wear pin creates a circular wear track of the required diameter by off-setting the pin relative to the sample's centre of rotation. The sliding motion of the sample under the wear pin provides a frictional force which is a property of the film and is proportional to the load applied. Different wear track diameters allow a number of tests to be performed on one sample. The same linear speed can be used for all tests by adjusting the rotational speed for each diameter.

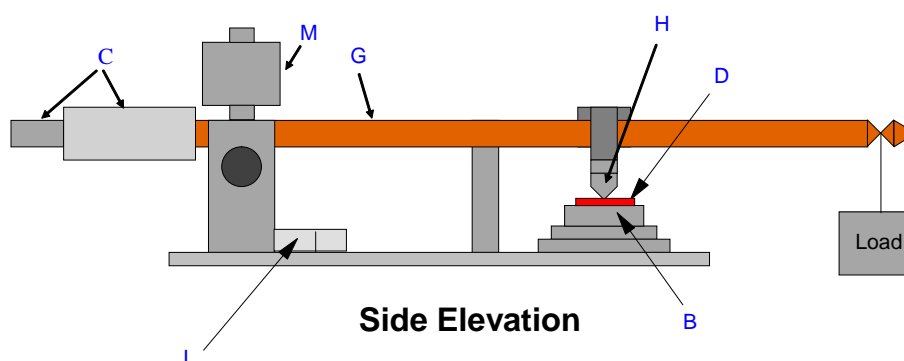
Frictional force is detected by a load cell and recorded by the computer. Examination of the resulting plot of friction versus time gives an indication of the friction characteristics and endurance of a particular coating.

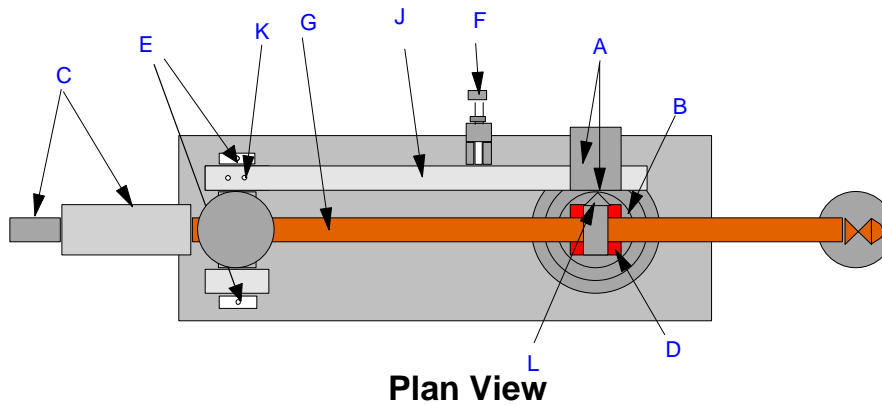
The load can be varied by adjusting the amount of dead weight hung at the end of the loading beam.

The test can be carried out under dry or lubricated conditions.

1.1. Main Components

- A Friction cell pin
- B Rotating sample table
- C Balancing weights
- D Sample
- E Wear track diameter adjustment locknuts
- F Parallel beam adjuster
- G Loading beam
- H Wear pin (ball) & holder
- I Wear track radius micrometer adjustment
- J Fixed beam with friction cell
- K Fixed beam mount bolts
- L Friction force transmission pin
- M Counterweight





2. Test Method

The coated sample is positioned on the sample table.

Values for the following parameters are then selected via the computer control.

- R.P.M. This controls the speed of rotation of the sample.
- Maximum time. This sets the duration of the test.
- Maximum friction force. This sets the maximum friction force (below 10N for a 1kg load cell) at which the test will stop.

The following parameters are set manually:

- Load applied
- Track diameter

Before a test is started, a clean ball surface with no debris is essential. This is ensured by moving the wear pin (ball) in its holder until a clean surface can be seen under a microscope. The ball holder is then tightened to ensure no movement of the ball during testing.

Once the diameter and the load of the test are selected, the loading beam is lowered until the ball is in contact with the coated sample. The test is then started through the computer and data acquisition begins. The test will automatically be stopped if the maximum friction force or maximum time is reached. The software enables the test to be stopped by the operator before this maximum friction or time is reached if the coating is thought to have failed. The time at which coating failure occurs is usually indicated by a rise in friction.

After the pin on disc test is completed, the computer displays a graph of the friction against time. The graph is automatically saved to the hard disc during the test. The recorded data can be further processed after the end of the test.

2.1. Graphical Options

- Time against friction
- Time against friction coefficient

By measuring the amount of coating that is left (for example by a simple ball crater technique), the coating wear rate can be determined.

3. Specification

- Counterpart pin 5mm diameter WC-Co balls (x5); 1 ball holder
- Wear track diameter 4 - 12mm
- Load range 10, 20, 40, 80 and 100N
- Friction force measured from 1 to 50N via a load cell
- Rotational speed variable from 10 - 1000rpm including 5 pre-set manual speeds
- Accuracy reading +/- 0.1%
- Sample holders various sizes available to be used with the following sample thicknesses; 10mm, 7.5mm, 6.35mm, 3.13mm and 1.7mm. All of these provided as standard.

3.1. Load Cell

- Range +/- 5kg
- Accuracy (non linearity and hysteresis) 0.1% of FRO
- Calibration temperature 21°C

4. Computer Control

The master program is fully Windows 9x compatible and has been developed using LabVIEW. The program has a user-friendly interface and displays in 'real-time' graphs selected by the user.

5. Dimensions

The PoD has dimensions 850mm wide x 550mm deep x 1100mm high. Space also needs to be allocated for the computer.

6. Warranty

All equipment manufactured by Teer Coatings is guaranteed against defective workmanship for 12 months. "Bought-in" items assembled onto units are covered under the original manufacturers warranty for a 12 month period.

7. Training

Units are shipped ready for operation and do not require any skilled installation. Training can be provided inclusive of cost at Teer Coatings in Droitwich over a 1-2 day period if required (subsistence and travel costs of personnel to be trained is not included).

An operating manual is supplied with the equipment.

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