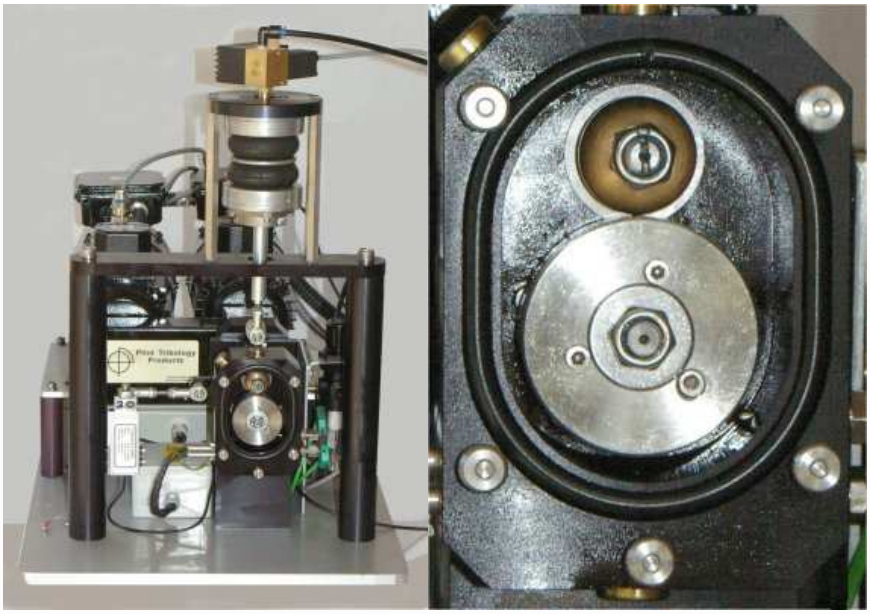
TE 54 MINI TRACTION MACHINE

Description

The TE 54 Mini Traction Machine brings together proven design elements from the long established TE 55 Two Roller Lubricity Test Machine and a scaled-down version of the common DC link AC vector drive system used on the TE 74 Two Roller Machines. The servo pneumatic loading system is taken straight from the TE 67 Pin on Disc/Reciprocating Pin on Plate Machine.



Why Ball on Ring and not Ball on Disc?

Traction coefficient is substantially influenced by spin and shear within the contact and, unless one is specifically interested in these phenomena, a design that potentially introduces spin or skew, as is the case with the ball on disc configuration, is a great nuisance. It requires a very complicated process of adjustment of the position of the ball on the disc in order to eliminate unwanted spin and skew

In order to eliminate spin the axis of the ball shaft must intersect precisely with the point of intersection between the surface of the disc and the axis of the disc.

Adjustments are typically made by running the contact on either side of the zero slide/roll condition with the intention of detecting the zero traction condition. However, this is scientifically indeterminate, because a contact with zero slide/roll but spin will not give zero traction.

A nominal zero may perhaps be presumed with this method, but once done, it is then not possible to determine the exact track diameter on either the ball or the disc, thus introducing further uncertainty.

In addition to this, to avoid skew, the ball shaft must lie precisely along a radius of the disc. To achieve zero skew, the ball shaft position must be adjusted to bring the ball onto the radius line. But of course, doing this once again alters the track radius on the disc.

The ball on disc arrangement is thus complex, expensive and ultimately indeterminate. By comparison, the ball on ring arrangement automatically eliminates any possibility of spin or skew;

it eliminates any uncertainty with regard ball or track diameter; with circumferential grinding, it eliminates all the an-isotropic materials properties associated with preparing disc specimens.

Self-aligning Two Roller

In addition to the ball on disc arrangement, the TE 54 is also supplied with a self-aligning carrier to allow a 25 mm diameter by 8 mm wide roller to be mounted in place of the ball specimen, thus resulting in an 8 mm wide line contact. Thinner rollers can be manufactured in order to produce narrower line contacts.

Control and Data Acquisition

Control and data acquisition are implemented via host PC running COMPEND 2020 Windows compatible software, in conjunction with a Phoenix Tribology USB micro-controller interface.

Automatic control is implemented via user programmable test sequences. Manual control is implemented using on screen toggles. Data is stored to hard disc in either .csv or .tsv file formats.

Pre-programmed test sequences are provided for generating traction and Stribeck curves.