



# Four-Ball Friction and Wear Tests

## Four-Ball Wear Test

The Four-Ball geometry was developed in 1933 and has become one of the most widely used wear test procedures. Its self-aligning nature and ready availability of inexpensive high quality test specimens make it ideally suited to being an accurate and repeatable screening test. The most widely used wear test methods for this apparatus are ASTM D 2266 for greases and ASTM D 4172 for lubricants.

## Four-Ball Friction Test

Good anti-wear characteristics do not always correspond to low friction. The Four-Ball apparatus allows accurate real-time measurement of sliding friction at minimal cost. A standard test method to measure friction coefficient in the Four Ball apparatus is defined in ASTM D 5183. However, if need be, friction modifier additives may be evaluated under a very wide range of conditions to simulate different applications.

## Typical Test Conditions:

### ASTM D 4172 Wear Test

Temperature:

- 75 +/- 2°C (167°F)

Speed:

- 1200 +/- 60rpm

Duration:

- 60 +/- 1 minute

Load:

- 392 +/- 2N (40kgf)

### ASTM D 5183 Friction Test

Temperature:

- 75 +/- 2°C (167°F)

Speed:

- 600 rpm

Duration:

- 60 minute wear-in /10 minute test intervals

Load:

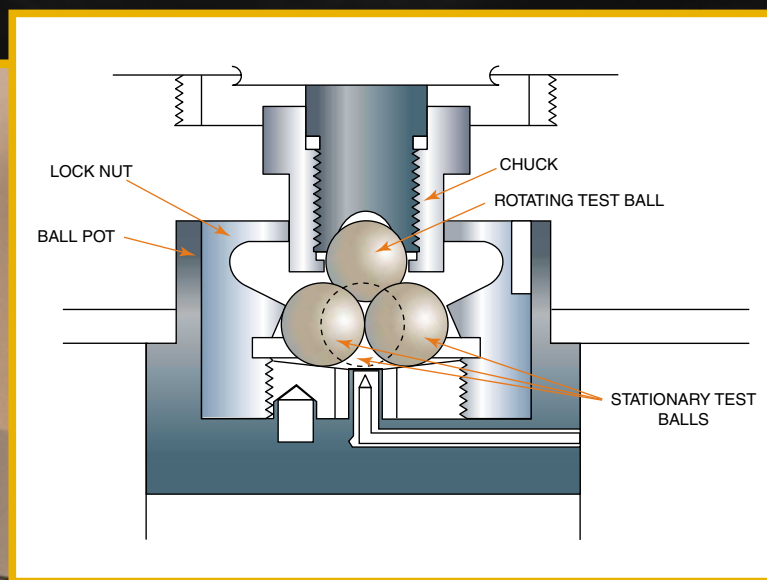
- 392 N (40 kgf) Break In
- 98.1 N (10 kgf) SOT
- 176 N (180 Kgf) Maximum

## Related Test Methods:

- Three-Disk-on-Ball
- ASTM D 2266 Four-Ball Grease



DE136040



**T**he Four-Ball test apparatuses at SwRI were adapted to allow automated operation under computer control, which improves test accuracy and virtually eliminates the possibility of operator error. The applied load mechanism of the SwRI Four-Ball apparatuses were redesigned, resulting in significantly improved accuracy.