

Extreme pressure (EP) properties of oils Report

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Test Method and Materials

Ducom Four Ball Tester



Figure 1. Ducom Four Ball Tester.

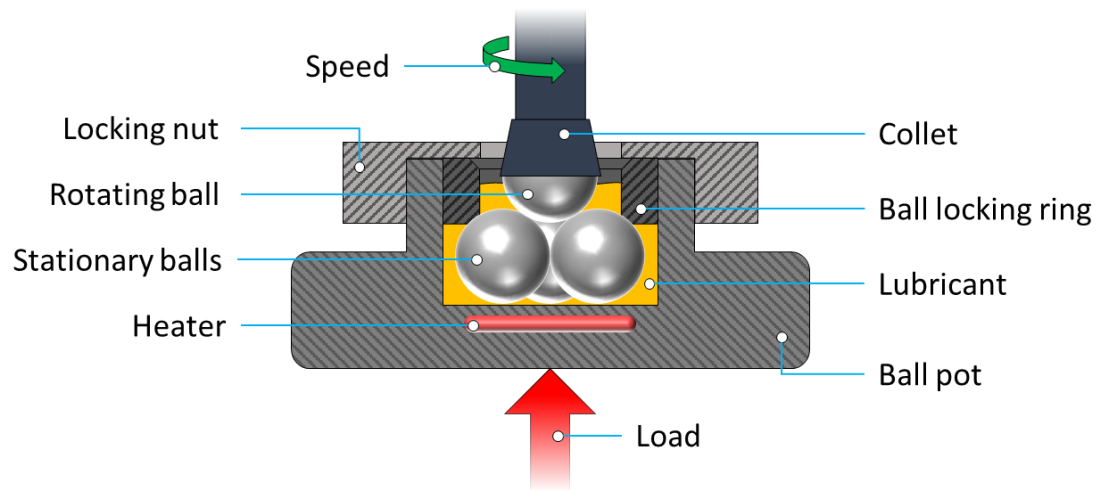


Figure 2. Schematics of the Four Ball Tester test area.

Test Standards

Table 1. ASTM D2783 test parameters.

| Parameter | Unit | Value |
|-------------|---------|-------------|
| Load | N (kgf) | See Table 2 |
| Speed | rpm | 1770 |
| Temperature | °C | 18 to 35 |
| Duration | s | 10 |

Table 2. ASTM D2783 test loads.

| Load | |
|------|------|
| kgf | N |
| 6 | 59 |
| 8 | 78 |
| 10 | 98 |
| 16 | 157 |
| 20 | 196 |
| 24 | 235 |
| 32 | 314 |
| 40 | 392 |
| 50 | 490 |
| 63 | 618 |
| 80 | 784 |
| 100 | 981 |
| 126 | 1236 |
| 160 | 1569 |
| 200 | 1961 |
| 250 | 2452 |
| 315 | 3089 |
| 400 | 3922 |
| 500 | 4903 |
| 620 | 6080 |
| 800 | 7845 |

Table 3. ASTM D4172-B test parameters.

| Parameter | Unit | Value |
|-------------|---------|----------|
| Load | N (kgf) | 392 (40) |
| Speed | rpm | 1200 |
| Temperature | °C | 75 |
| Duration | min | 60 |

Materials

ASTM Standard Test Balls (Ø12.7 mm).

Lubricants

- Shell Helix 5W40
- Slick 50
- TSL
- Yellow Miracle Oil I
- Yellow Miracle Oil II

Results | Extreme Pressure (EP) Tests

Loads

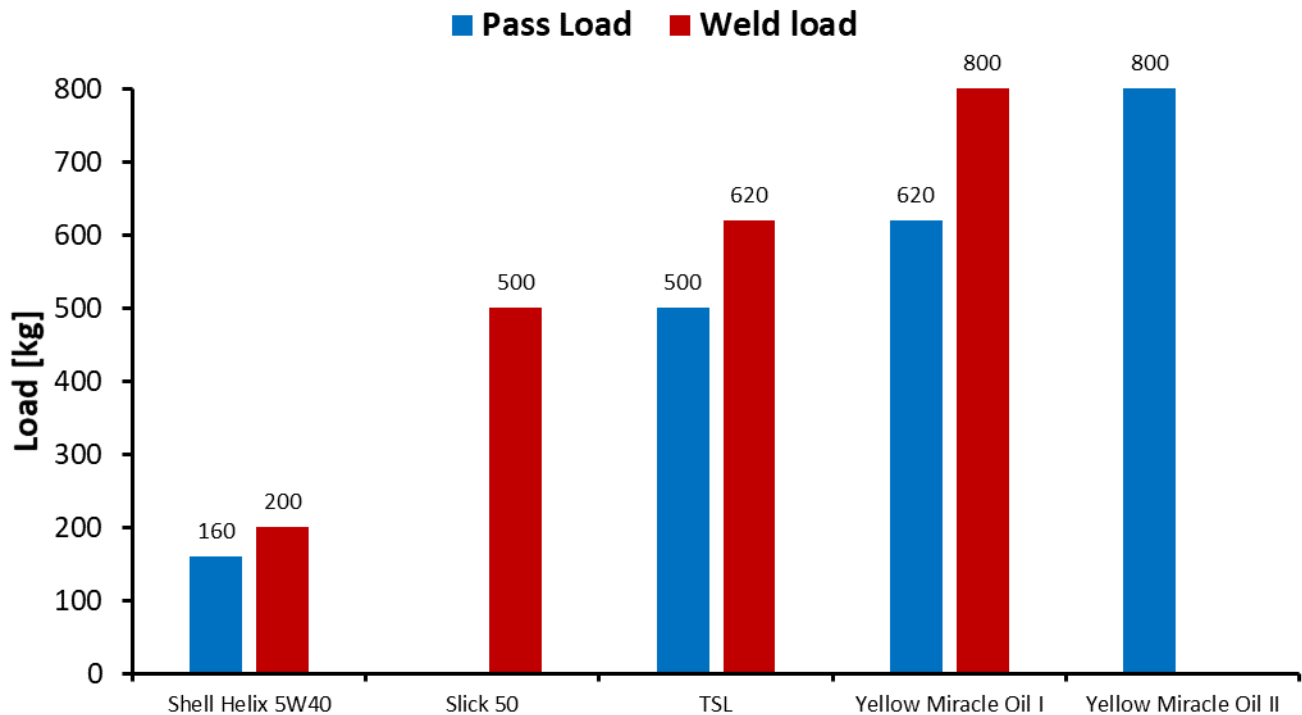


Figure 3. Chart with the highest pass load and weld load for each of the tested oils.

Table 4. Pass load and weld load for each of the tested oils.

| | Pass Load | | Weld load | |
|-----------------------------------|-----------|------|-----------|------|
| | kg | N | kg | N |
| Shell Helix 5W40 | 160 | 1569 | 200 | 1961 |
| Slick 50 (*) | - | - | 500 | 4903 |
| TSL | 500 | 4903 | 620 | 6080 |
| Yellow Miracle Oil I | 620 | 6080 | 800 | 7845 |
| Yellow Miracle Oil II (**) | 800 | 7845 | - | - |

(*) Slick 50 oil was tested only at 500 kg. The test resulted in the welding of the test balls.

(**) The weld load of Yellow Miracle Oil II is not reported since it passed the highest load (800 kg).

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