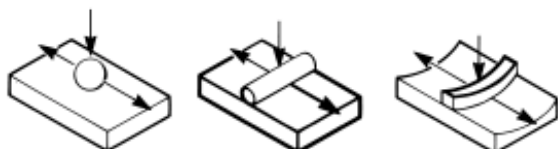


TRIBOLOGY UPDATE: *ISSUE 23 - August 2009*

This is the latest issue of our regular **Tribology Update** newsletter. We can be contacted by e-mail at info@phoenix-tribology.com or by telephone on 44 1635 276064.

WORK IN PROGRESS:

TE 90 – Multi-station Reciprocating Tribometer



Single station multi-function and multi-range test machines may be able to perform a wide variety of different tests, but they can still only perform one experiment at a time. Simpler multi-station test rigs can provide a means for increasing test capacity at a substantially lower cost per test station than the single station solution. The TE 90 is a four, eight or twelve station reciprocating tribometer with test stations configured to meet a range of standard reciprocating test applications.



Test Assemblies include:

Non-instrumented Wear – Atmospheric Pressure – 1 mm Stroke:

- Tests under conditions specified in ASTM D6079 and ISO 12156.
- Reciprocating wear tests with point contact at light loads.

Non-instrumented Wear – Pressurized – 1 mm Stroke:

- Pressurized tests under conditions specified in ASTM D6079.
- Reciprocating wear tests with point contact pressurized at light loads.

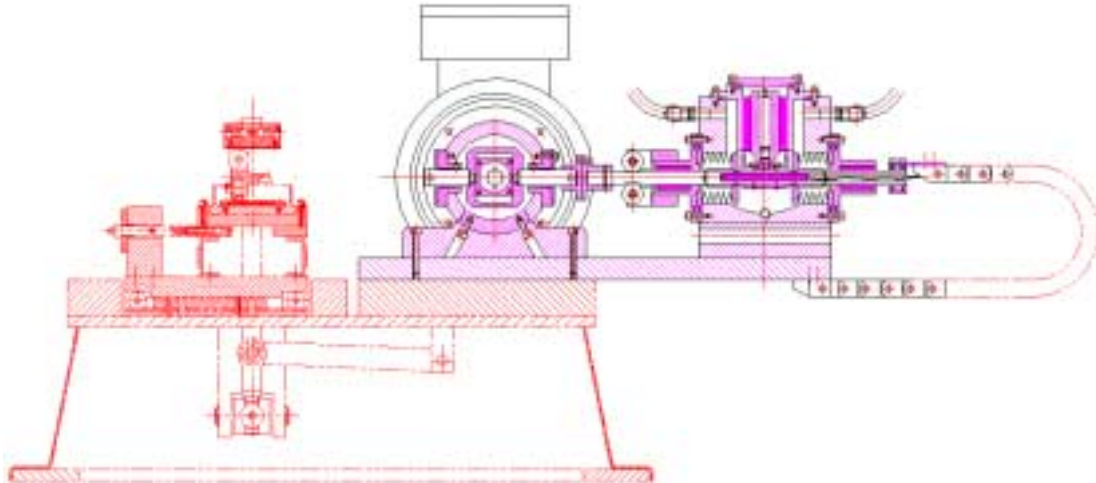
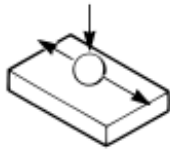
Instrumented Test Assembly – 10 mm Stroke:

- Tests under conditions specified in ASTM G133 and ASTM G181.
- Tests under conditions specified in Draft prEN1071-12.
- Reciprocating tests with point or line contact.

Instrumented Test Assembly – 2 mm Stroke:

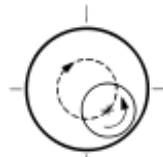
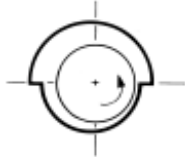
- Tests under conditions specified in ASTM D5706 and ASTM D5707.
- Reciprocating tests with point and line contact.

TE 77 – Pressurized Lubricity Test Adapter



We have designed a test adaptor for the TE 77 High Frequency Friction Machine using the test chamber from the TE 90 Pressurized 1 mm Stroke unit, which was itself developed from the TE 57 Pressurized Lubricity Tester. The assembly fits in place of the standard variable stroke cam assembly and incorporates a fixed 1 mm stroke scotch yoke assembly.

TE 62/TE 63 - Viscometers – Re-introduction?



TE 62 Portable Bench Viscometer



TE 63 Grease Rheometer

During the 1990s we had a brief excursion away from strict tribology in the direction of rheology, developing novel viscometers with two designs resulting in successful patent applications. However, despite being technically successful, sales volumes were disappointing and at the formation of Phoenix Tribology Ltd in 2002, we took the decision to drop the products from our product portfolio.

In recent months we have had a number of enquiries on two subjects, both apparently related to alternative energy applications, one being the measurement of oil viscosity in non-laboratory conditions, the other being low temperature grease rheology and the performance of greases when loaded with water, the former an area addressed by our TE 62 unit, the latter, at temperatures down to -30°C , addressed by our TE 63 unit.

We have no way of telling whether it would be worthwhile resurrecting these products, but if you are interested in details of either product, please let us know.

Diesel Fuel Lubricity Test

The TE 80 Fuel Lubricity Tester consistently produces larger wear scars than the PCS HFRR instrument when running tests in accordance with ISO 12156-1 and ASTM D6079 fuel lubricity standard tests. We anticipate getting similar results with the new TE 90 Multi-station Reciprocating Tribometer.

The effect is particularly marked for the low lubricity reference fluid. This arises for two reasons, firstly from differences in the method of loading between the Phoenix Tribology machines and the PCS HFRR and secondly from the method of actuation.

The TE 80 and TE 90 apply a consistent and absolute load of 200 gm, whereas with the HFRR the load varies with both stroke position and friction.

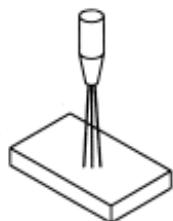
The TE 80 and TE 90 use a mechanical drive mechanism that imposes a precise stroke regardless of resisting force. The HFRR uses an electro-magnetic oscillator, which is a force generating as opposed to a displacement generating device. The resulting stroke length may vary as the frictional resistance of the contact varies and the control system adjusts the driving force to compensate.

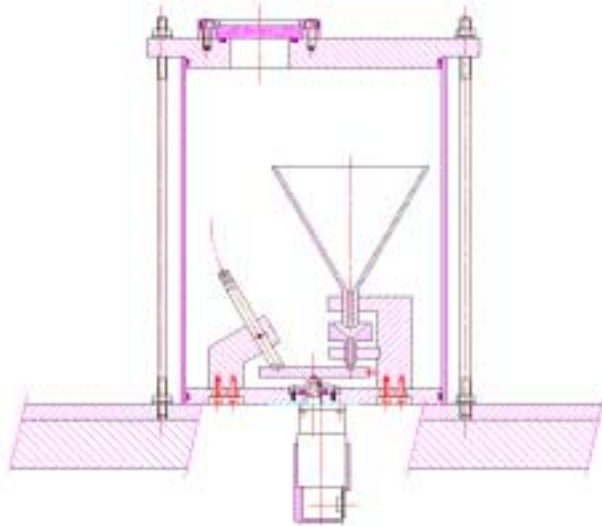
These differences do not represent a problem as the specified test is comparative and the result is a simple offset bias, with the TE 80 producing a larger discrimination between fuels with different lubricities than does the HFRR.

Full details of our dynamic analysis are available on our web site under the heading Diesel Fuel Lubricity Test. A submission on the subject has been made to the relevant ASTM committee.

WORK COMPLETED:

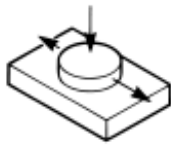
TE 68 Gas Jet Erosion Rig – Increased Speed





We have finally arrived at a simple solution for increasing the particle velocity on the TE 68 gas jet erosion rig, from a nominal maximum of 80 ms^{-1} to 120 ms^{-1} . The increased speed is achieved by enclosing the particle feed assembly in a small chamber and applying a pressure of up to 4 bar. The pressure differential between the mixing chamber and the nozzle discharge remains approximately 1 bar, indicating a pressure drop of 3 bar between the particle feed chamber and venturi injector. We are not entirely sure of precisely how this all works in terms of pressure differentials and mixing flows, but the net result is a measurable increase in particle velocity.

TE 104 Four Station Long Stroke Reciprocating Rig



We have completed the design and manufacture of a four station long stroke reciprocating tribometer for work on materials used in high speed gas compressor seals. The maximum stroke length is 100 mm, with a maximum reciprocating frequency of 20 Hz at 50 mm stroke and a maximum load of 200 N per test station.

OTHER NEWS:

The Cambridge Tribology Course 2009

The 2009 will take place, from Wednesday 16th to Friday 18th September 2009.

Publications Library

In addition to a list of publications by machine, we have added to our web site a selected list of papers written by users of Cameron-Plint, Plint and Phoenix Tribology test machines. We are not permitted to provide copies of these papers, as this would breach copyright. Legal copies can be purchased either direct from the publishers or found on-line using a suitable search engine, such as Google Scholar.

George Plint and David Harris
Phoenix Tribology Ltd