Test Report

Client(s): TTP Ltd.
Project Title: Falex Constant Load
Project No.: TP5216
Reference: ASTM D3233-93
Test Fluid(s): CUT-IT500
Date: 19th July 2018
Written by: B Sinclair
Report Reference: TR5216_20180719_BS00

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1.0 Introduction

At the request of Mr Brendan Kennedy, Tough Technology Products Ltd (TTP), Falex Constant Load Test of the following fluid was undertaken;

Test Fluid: Metal Cutting Paste CUT-IT500

All work was carried out in July 2018.

2.0 References

ASTM D 3233-93 Standard Test Methods for Measurement of Extreme Pressure Properties of Fluid Lubricants (Falex Pin and Vee Block Methods)

3.0 Definitions

Run in period A run period of 5 minutes is undertaken at the test start at 300 lb load.

Constant Load Load is increased to 1,300 lb after the run period and maintained for the duration of the test.

4.0 Sample Preparation

A cutting paste sample was provided by TTP Ltd for testing to be conducted in accordance with test method ASTM D 3233-93

4.1 Sample Log

<table>
<thead>
<tr>
<th>Supplier Sample Ref</th>
<th>Fluid Description</th>
<th>SFS Ref</th>
<th>Test Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample 1</td>
<td>TTP, CUT-IT500 Cutting Paste</td>
<td>FS7815</td>
<td>Falex Constant Load Test in accordance with ASTM D 3233-93</td>
</tr>
</tbody>
</table>
5.0 Test Procedure

Testing was carried out in accordance with ASTM D 3233-93.

Cutting Paste sample was provided by TTP Ltd.

Subsea Fluid Services (SFS) carried out the following;

- Pins used are Falex supplied AISI 3135 Steel, HRB 87-91, 5-10 microinch surface finish.
- Vee blocks used are Falex supplied AISI C1137 Steel, HRC 20-24, 5-10 microinch surface finish.
- Cleaning of the Vee blocks & Pins using filtered Acetone.
- Testing of the cutting paste using the Falex Pin & Vee Block Test Machine.
- Test run at 300 lb load then increased to 1,300 lb for the period of the test.
- Report findings.
- Paste disposal.

6.0 Results

No unexplained issues occurred during the testing.

6.1 Results Summary

Test machine runs at 290+/- 10 rpm.

Test was run at constant load for a period of 30 minutes.

Test load of 1,300 lb

Torque was steady throughout indicating the paste was lubricating well.

Test completed at 30 minutes running with pin intact and low torque value.
Appendix 1 Test Equipment & Images

Analysis was undertaken using a Falex Test Machine. The test consists of running a rotating steel journal at 290 +/-10 rpm against two stationary V-Blocks immersed in a lubricant sample.

Falex Tester
Cutting Paste & Immersion Tray

Loaded Sample
Sample in liquid state
Recording PC used for run 2

Appendix 2 Graphs for Analysis
Torque and Temperature as a function of time