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HFRR background information

History of development

The HFRR test was first pioneered by Imperial College London. In 1994 Rinaldo Caprotti and one of his colleagues at Exxon Chemical's PARAMINS additive division (which later became part of Infineum), joined with Imperial College, London and Robert Bosch GmbH to develop the technique into a highly reproducible and accurate measurement of lubricity in diesel fuels. The results of this work were presented at the *9th International colloquium, ecological and economic aspects of tribology in 1994*. In this paper, the repeatability of the test was assessed over ten tests on the same Class 1 untreated fuel under the same conditions and using a single batch of test components. The mean wear scar diameter was 651 mm and the standard deviation 10.3 mm. Confidence in the test was further verified by excellent correlation with field trial data.

The test was offered to the petroleum industry for evaluation. In 1995, following a test programme conducted by the International Organisation for Standardisation and the Co-ordinating European Council (CEC), the test was adopted by both organisations as the industry test method for lubricity.

The HFRR test is now used in a number of industry diesel fuel quality standard tests including: CEC F-06-A-96, ASTM D6079, ASTM D7688, ISO 12156-1, BS EN 590, JPI-5S-50-98 and IP 450/2000 to help ensure that diesel fuels are fit for purpose.

The standard HFRR test

In the HFRR test a small sample of the test fuel is placed in a temperature controlled bath, submerging the contact between a steel ball and flat steel disc. The temperature is set to 60°C and the humidity is controlled and noted. The ball is then lightly loaded with two Newton and moved back and forward (reciprocated) over the disc at a set stroke and frequency. The friction coefficient, fuel temperature and electrical contact resistance are monitored throughout the test.

After 75 minutes, the wear scar diameter on the ball is measured in both parallel and perpendicular to the sliding direction and the mean wear scar is taken.

Source: http://www.infineuminsight.com/insight/dec-2013/testing-the-test