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English Version

Liquid petroleum products - Middle distillates and fatty acid methyl ester (FAME) fuels and blends - Round Robin report on applicability of Rapid Small Scale Oxidation Test method

Produits pétroliers liquides - Carburants et mélanges des distillats moyens et des esters méthyliques d'acides gras (EMAG) - Réport de Round Robin de l'application de la détermination méthode d'oxydation accélérée petite échelle

Flüssige Petroleum Produkte - Mitteldestilat und Fettsäuremethylester (FAME) Kraftstoffen und Mischungen - Round Robin Rapport der Applikation des beschleunigten kleinen Maßstaben Oxidationstests

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Foreword

This document (CEN/TR 16366:2012) has been prepared by Technical Committee CEN/TC 19 “Gaseous and Liquid fuels, lubricants and related products of petroleum, synthetic and biological origin”, the secretariat of which is held by NEN.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document presents background to EN 16091.

1 Scope

This Technical Report describes a series of round robin test campaigns for precision estimation of EN 16091. Furthermore, this document includes a summary of the results of the RRTs (see Clause 7 and Annex B).

NOTE The identities of the participating laboratories are not displayed in this report. They are, however filed with the original RRT documentation at the CEN/TC 19/JWG1 secretariat.

2 Test method background

The Rapid Small Scale Oxidation Test method (RSSOT¹, EN 16091, [1]) is developed as an additional or parallel test method for the determination of oxidation stability (EN 14112 [2] and EN 15751 [3]) in FAMES according to EN 14214 [5] and diesel fuel – biodiesel blends [4].

Three precision studies (2007-231, 2008-231, 2010-231) have been executed in CEN/TC 19/JWG 1 in order to access the test method precision in terms of repeatability, *r*, and reproducibility, *R*.

NOTE In addition, more RR-testing has been executed in order to compare results with those from other tests like EN 14112, EN 15751 or acid number after ageing. These additional test results are not subject of this precision report but are reported elsewhere. It shall be noted that the Rancimat² and PetroOXY¹ results exhibit a good correlation, obviously indicating that both methods provide good estimations of oxidation stability.

The three precision studies (2007-231, 2008-231, 2010-231) contained the following:

- RRT 2007-231 → pre- study with 10 samples (“B2” .. “B30”) in 5 laboratories;
- RRT 2008-231 → RRT with 23 samples (“B0” .. “B100”) in 19 laboratories;
- RRT 2010-231 → RRT with 7 samples testing the influence of EHN in 11 labs (EHN = Cetane improver = 2-ethyl hexyl nitrate).

The draft version of EN 16091 was sent to the laboratories as the requested test procedure along with the Round Robin instructions. The same test method procedure was used in the three different RRTs. Since no significant modifications had been made which could be precision-relevant, this test procedure remained the same as specified in the final standard (EN 16091:2011).

3 Description of the samples

3.1 RRT 2007-231

There were 10 samples used for the pre-study in 2007. Each sample was randomized, blind coded and distributed by the coordinator of this RRT.

The following samples had been agreed by the CEN/TC 307/WG 1, 10 Bx samples: 1 x B2, 1 x B4, 1 x B5, 1 x B7, 1 x B8, 1 x B12, 1 x B15, 1 x B20, 1 x B30, 1 x B100. The samples have been prepared by blending of one B0 and one B100 (RME/SME (90/10)). Information of the fuel properties are not provided.

1) Also known as the PetroOXY test. PetroOXY is the trade name of a product supplied by Petrotest, Instruments GmbH & Co, Germany. This information is given for the convenience of users of this European Technical Report and does not constitute an endorsement by CEN of the product named.

2) Rancimat is the trade name of a product, model 743, supplied by Metrohm AG, Switzerland and an example of suitable equipment available commercially. This information is given for the convenience of users of this European Technical Report and does not constitute an endorsement by CEN of the product named.