



BSI Standards Publication

Automotive fuels — Report on studies done on cold soak filter blocking tendency (CS-FBT) on fatty acid methyl ester (FAME) as blend component for diesel fuel, and of diesel fuel containing up to 30 % (V/V) of FAME

National foreword

This Published Document is the UK implementation of CEN/TR 17544:2020.

The UK participation in its preparation was entrusted to Technical Committee PTI/13, Petroleum Testing and Terminology.

A list of organizations represented on this committee can be obtained on request to its committee manager.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2020
Published by BSI Standards Limited 2020

ISBN 978 0 539 13893 1

ICS 75.160.20

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 October 2020.

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

TECHNICAL REPORT

CEN/TR 17544

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

September 2020

ICS 75.160.20

English Version

Automotive fuels - Report on studies done on cold soak filter blocking tendency (CS-FBT) on fatty acid methyl ester (FAME) as blend component for diesel fuel, and of diesel fuel containing up to 30 % (V/V) of FAME

Carburants pour automobile - Rapport sur les études relatives à la tendance au colmatage de filtre après macération à froid d'ester méthylique d'acides gras (EMAG) comme composant pour le gazole et de gazole contenant jusqu'à 30 % (V/V) d'EMAG

Kraftstoffe - Bericht über Studien zur cold soak filter blocking tendency (CS-FBT) an Fettsäuremethylester (FAME) als Mischkomponente für Dieselmotorkraftstoff und Dieselmotorkraftstoff, der bis zu 30% (V / V) FAME enthält

This Technical Report was approved by CEN on 7 September 2020. It has been drawn up by the Technical Committee CEN/TC 19.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents		Page
European foreword		2
Introduction		3
1	Scope	4
2	Normative references	4
3	Terms and definitions	4
4	Filter blocking tendency of diesel fuels and FAME	4
4.1	Evolution of diesel fuels and FAME composition	4
4.2	Detail of field issues	5
4.3	FBT test development	5
5	CS-FBT studies	5
5.1	General	5
5.2	Ruggedness studies – 2011 - 2013	6
5.3	Studies on parameter impacts	11
5.4	Comparison FAME data vs results with CS-FBT	14
6	Comparison of CS-FBT with C-FBT	16
6.1	General	16
6.2	Comparison study CS-FBT/C-FBT– 2017	16
7	Conclusion and perspectives on filter blocking tendency	18
Annex A (informative) Description of the different methods		19
Annex B (informative) Ruggedness study 2011– detailed results		20
B.1	Overview of mini ILS	20
B.2	Overview of the results set	21
B.3	Overview of the statistical analysis	21
Annex C (normative) Working draft		24
Annex D (informative) Ruggedness study 2013– detailed results		31
D.1	Preliminary works	31
D.2	Ruggedness study 2013	31
D.3	Results assessment	34
Annex E (informative) CS-FBT for FAME – detailed results		37
Bibliography		38

European foreword

This document (CEN/TR 17544:2020) 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 shall not be held responsible for identifying any or all such patent rights.

Introduction

As reported in CEN/TR 16982^[1], during recent past winters, a wide range of vehicles has been affected in specific European countries and there are possible links with fatty acid methyl esters (FAME) composition, base diesel quality, cold flow additives and oxidation stability effects. In order to solve these issues, some countries have introduced new additional requirements in their national specifications or “best practice” market agreements.

In the UK, developments around the Filter Blocking Tendency test (FBT) has been engaged and in particular a variant of the IP 387^[2] with a Cold Soak step (CS-FBT). This work has been exchanged with CEN/TC19 and the CEN/TC19/WG31 has started several studies in order to evaluate the interest of using this method for neat FAME and diesel fuels containing up to 30 % (V/V) of FAME.

This document reports the content of these studies.

1 Scope

This document describes the studies executed to develop a method to analyse the filter blocking tendency after a cold soak step of fatty acid methyl ester (FAME) as a blend component for diesel and of diesel fuel containing up to 30 % (V/V) of FAME, respectively.

NOTE For the purposes of this document, the term “% (V/V)” is used to represent the volume fraction, φ .

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <http://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1 filter blocking tendency

FBT

dimensionless value that defines the filter blocking tendency of a fuel caused by particulates

Note 1 to entry: The value is calculated using the pressure or volume attained at the end of the test. Depending on the outcome of the test, two different equations are applied (see IP 387^[2], Clause 9 for the calculation of the FBT value).

[SOURCE: IP 387]

3.2 cold soak

CS

exposure of the test portion to a constant reduced temperature for a period of time

[SOURCE: IP PM-EA^[3]]

3.3 cold soak filter blocking tendency

CS-FBT

variant of an FBT determination which includes a cold soak step before testing the sample

4 Filter blocking tendency of diesel fuels and FAME

4.1 Evolution of diesel fuels and FAME composition

In recent years diesel fuels have become more complex as FAME, hydrotreated vegetable oils (HVO), Gas-To-Liquid (GTL), etc. have been increasingly introduced into diesel blends. FAME has evolved from its origins as RME (Rapeseed Methyl Ester) into a wide variety of sources including animal sourced (TME - Tallow Methyl Ester) and used cooking oil (UCOME – Used Cooking Oil Methyl Ester). These changes to fuel composition are considered to have a possible impact to the Filter Blocking Tendency of the fuel.