TECHNICAL REPORT

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# 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 Dieselkraftstoff und Dieselkraftstoff, der bis zu 30% (V / V) FAME enthält

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## 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.

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# 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, $\varphi$.

# 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.