

ICS 75.160.20

English Version

## Diesel blends and fuels - Cold filterability issues

Combustibles et blends pour moteurs diesel (gazole) -  
Problèmes avec filtrabilité en températures bas

Dieselmotorenstoffe und Mischungen - Kaltefiltrierbarkeit  
Problematik

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## European foreword

This document (CEN/TR 16982:2016) 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.

At the plenary meeting in June 2015, CEN/TC 19 took Decision 45-2015 for new work under WG 24 to produce a Technical Report titled “CEN/TR Diesel blends - Cold filterability issues” with the scope to capture the key points raised in the presentations and discussions at the WG 24 Filter Blocking Workshop held on 1 June 2015. Consequently, this Technical Report documents the findings, interpretations and opinions of those involved in presenting the information, and these should not be considered as the opinion of WG 24.

## Introduction

During recent winters, a wide range of vehicles has been affected in specific European countries and there is a possible link with 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 fuel quality specifications or “best practice” market agreements:

- In the UK, a clear correlation between low temperatures and increased vehicle filter blocking was reported, with ambient temperatures below 3 °C thought to be critical. The introduction by fuel suppliers of a voluntary Filter Blocking Test limit of 2,52 in February 2014 seems to have improved the situation, but has not solved the problem.
- In Italy, ENI recommended that ASTM D2709 could be an alternative method for fast evaluation of contaminants in FAME. ENI also suggested, as an intermediate solution, a filtration step in refineries or terminals to improve FAME quality if needed. In ENI’s experience, implementing this quality control “best practice” in Italy, in collaboration with their biofuel suppliers, has resulted in no further vehicle filter blocking incidents being reported in the last two years.
- In France, to solve the diesel fuel filter plugging when the decrease in temperature continues slowly over several days, the saturated methyl ester content in FAME was limited in winter to a maximum of 16 % (m/m) and in summer to a maximum of 30 % (m/m) in national law.

CEN/TC 19/WG 24 organized a workshop on the 1<sup>st</sup> of June 2015 in order to clarify the issue, to gather relevant data and to propose recommendations to CEN/TC 19 with respect to changes to the EN 590 (regular B7 diesel), EN 16734 (B10), EN 16709 (B20/B30) and EN 14214 (B100) standards to protect the market from filter blocking.

At the end of the workshop, it was agreed that a CEN Technical Report should be produced documenting the WG 24 Filter Blocking Workshop held on 01 June 2015 (i.e. this report). It therefore lays down the status-quo of the evidence on filter blocking issues in the European market at that point in time. It should be read as such and later information will still be valuable for CEN/TC 19 specification drafting.

## 1 Scope

This Technical Report provides the latest thinking described during a workshop on 1 June 2015 by national experts involved in the investigations, and proposes possible solutions to solve the diesel fuel filter plugging issues in these countries.

NOTE For the purposes of this Technical Report, the terms “% (m/m)” and “% (V/V)” are used to represent respectively the mass fraction,  $\mu$ , and the volume fraction,  $\varphi$ .

## 2 Background to this Technical Report

A filter blocking workshop was organized by CEN/TC 19/WG 24 on 01 June 2015 in London in response to an increasing number of diesel vehicle filter blocking occurrences in several European countries (Italy, Sweden and the UK), particularly during the winter period. The purpose of the workshop was to share experiences and learnings from each affected country, identify common links and discuss possible solutions. The workshop also considered the development status of the various rig and laboratory tests designed to investigate and prevent low temperature filter blocking. The ultimate aim of the workshop was to make recommendations to WG 24 with respect to changes to the EN 590, EN 16734 (B10), EN 16709 (B30) and EN 14214 standards to protect the end user.

In his introductory comments, the WG 24 convenor advised that a wide range of vehicles is being affected in several European countries and that there is a possible link with FAME composition, base diesel quality, cold flow additives and oxidation stability effects. He also underlined the importance of ensuring that the CEN diesel fuel specifications are robust and protect the consumer.

The workshop included a number of technical presentations on the topics that are described in the Clauses 3 to 6 (order of presentation is followed). Publication of this Technical Report was one of the agreed actions from the workshop (see Clause 7).

## 3 Issues in specific European markets

### 3.1 UK experience

A summary of the diesel vehicle filter blocking trends in the UK over the past few years was provided. The monthly “baseline” level of diesel vehicle breakdowns due to filter blocking since 2009, as reported by the Automobile Association (AA), was around 200. However, during the past three winters, filter blocking breakdowns had risen to 5 times this level, with most of this increase occurring in the regions of Northeast England, Central Scotland, East Anglia and Southeast England.

A clear correlation between low temperatures and increased vehicle filter blocking was reported, with ambient temperatures below 3 °C thought to be critical. The introduction by fuel suppliers of a voluntary FBT limit of 2,52 for Bx diesel in February 2014 seemed to have improved the situation, but has not solved the problem. The UK experienced ~19 % reduction in the number of vehicle breakdowns due to filter blocking in winter 2014/15 compared to the previous winter, despite winter 2014/15 having many more cold nights below 0 °C in the most impacted regions (the minimum nightly temperature averaged for London, Glasgow and Middlesbrough was below 0 °C for 7 nights in winter 2013/14 compared to 30 nights in winter 2014/15).

Data from an extensive UK-wide retail diesel sampling program conducted by a major fuel retailer were presented. In addition, test results from a UK Department for Transport nationwide retail diesel sampling program undertaken between January 2015 to March 2015 were also presented. Data reported by region from both sampling programs included FBT (both ambient by procedure B and cold soak), Total Contamination, FAME content, saturated FAME content and particle counting. To provide a broader European context, FBT results from another retail diesel survey conducted across 8 European countries by a major international fuel retailer were shared.