



BSI Standards Publication

**Liquid petroleum products  
— Investigation on internal  
diesel injector sticking deposits  
mechanisms and the impacts of  
corrosion inhibitors**

**National foreword**

This Published Document is the UK implementation of CEN/TR 16680:2014.

The UK participation in its preparation was entrusted to Technical Committee PTI/2, Liquid Fuels.

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

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 2014. Published by BSI Standards Limited 2014

ISBN 978 0 580 84015 9

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 30 April 2014.

**Amendments issued since publication**

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

---

ICS 75.160.20

English Version

**Liquid petroleum products - Investigation on internal diesel injector sticking deposits mechanisms and the impacts of corrosion inhibitors**

Flüssige Mineralölerzeugnisse - Untersuchung der Mechanismen für die Bildung von Ablagerungen in Dieselinjektionsvorrichtungen und der Auswirkung von Korrosionsschutzinhibitoren

This Technical Report was approved by CEN on 23 December 2013. 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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, 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: Avenue Marnix 17, B-1000 Brussels**

## Contents

page

Foreword.....	3
1 Scope .....	4
2 Normative references .....	1
3 Symbols and abbreviations .....	4
4 Summary.....	5
5 Description of injector sticking problems.....	5
6 FIEM/OEM experience .....	6
7 Changes influencing internal injector deposits .....	7
8 Deposit forming mechanism .....	7
9 Potential sources of sodium in diesel fuel.....	8
10 Corrosion inhibitors .....	9
11 Investigations in France.....	9
12 Investigations in Spain.....	12
13 Investigations in Denmark .....	14
14 Conclusions .....	15
15 Future work .....	16
Bibliography.....	17

## Foreword

This document (CEN/TR 16680:2014) 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.

Currently in preview, click buy full version

## 1 Scope

This Technical Report describes the investigation into diesel vehicle common rail fuel injector sticking problems in a number of countries across Europe since 2005/2006, carried out by the CEN/TC 19/WG 24/IDID Task Force. It provides conclusions following this work that have been adopted by CEN.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 590, *Automotive fuels - Diesel - Requirements and test methods*

## 3 Symbols and abbreviations

For the purposes of this document, the following symbols and abbreviations apply.

Abbreviation	Meaning
AGQM	Arbeitsgemeinschaft Qualitätsmanagement Biodiesel
ACEA	Association des Constructeurs Européens d'Automobiles (European Automobile Manufacturers' Association)
BNPe	Bureau de Normalization au service des membres du Petrole
B7	7 % (V/V) blend of biodiesel (FAME) with diesel fuel meeting the requirements of EN 590
B30	30 % (V/V) blend of biodiesel (FAME) with diesel fuel meeting the requirements of EN 590
CEC	Coordinating European Council
CEN	Comité Européen de Normalization (European Committee for Standardization)
CONCAWE	CONservation of Clean Air and Water in Europe
CRC	Coordinating Research Council
DDSA	Dodecenyls Succinic Acid
EN	European Norm
FAME	Fatty Acid Methyl Ester
FIEM	Fuel Injection Equipment Manufacturer
FTIR	Fourier Transform Infra-Red
HDSA	Hexadecenyl Succinic Acid
ICP-AES	Inductively Coupled Plasma Atomic Emission Spectroscopy
ICP-OES	Inductively Coupled Plasma Optical Emission Spectroscopy
ICP-MS	Inductively Coupled Plasma Mass Spectroscopy
IDJ	Internal Diesel Injector Deposits
MIL	Malfunction Indicator Light
Na	Sodium
OEM	Original Equipment Manufacturer
SPMR	Societe du Pipeline Mediterranee Rhone
TRAPIL	Societe Des Transports Petroliers Par Pipeline
UFIP	Union Francaise des Industries Petrolieres