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Petroleum products - Guide for good housekeeping - Part 3: Prevention of cross contamination

Mineralölerzeugnisse - Leitfaden für eine gute Systemwartung - Teil 3 : Vermeidung der wiederkehrigen Verunreinigung

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Produits pétroliers - Guide pour une bonne maîtrise de la qualité du produit - Partie 3 : Prévention des contaminations croisées

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Petroleum products - Guide for good housekeeping - Part 3: Prevention of cross contamination

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Mineralölerzeugnisse - Leitfaden für eine gute Systemwartung - Teil 3 : Vermeidung der gegenseitigen Verunreinigung

This Technical Report was approved by CEN on 15 December 2008. It has been drawn up by the Technical Committee CEN/TC 19.

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CEN/TR 15367-3:2009 (E)

Contents

Foreword

This document (CEN/TR 15367-3:2009) has been prepared by Technical Committee CEN/TC 19 "Gaseous and liquid fuels, lubricants and related products of petroleum, synthetic or 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.

CEN/TR 15367 consists of the following parts, under the general title *Petroleum products – Guide for good housekeeping*:

— *Part 1: Automotive diesel fuels;*

— *Part 2: Automotive petrol fuels;*

— *Part 3: Prevention of cross contamination.*

This part of this Technical Report describes the control of potential sources of contamination of one fuel type by usually small amounts of a different fuel type that was previously transported. For guidance concerning diesel distribution , Part 1 is published to specifically address biodiesel or FAME (according to EN 14214). For guidance concerning distribution of petrol and ethanol (as specified by EN 15376) in specific detail, Part 2 is published.

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Introduction

At its meeting in Naantali, Finland, on the 30th November 2006, CEN/TC 19/WG 21 agreed to adopt the Work Item titled "Fuels supply chain – Guide for preventing cross contamination between petrol and diesel" on its Work Programme with the intention to begin work on a CEN Technical Report in 2007. This resulted from the report of an internal TF that had investigated detection and prevention of the occurrence of high boiling components in petrol and its relation to occurrence of some increased oil dilution problems in bench testing of gasoline engines.

This work has been carried out with support from CONCAWE[1]).

Automotive fuel specifications generally apply at the point of sale to the final customer. To ensure fuel quality at this point in the supply chain, the best practice is to ensure that the product meets specification when it is dispatched from the refinery or terminal (if final blending takes place at the terminal) and to have quality systems in place to ensure that the fuel product does not become contaminated on its way to the final customer. There will typically be more than one method or procedure to control potential sources of contamination throughout the supply chain. For this reason, this document outlines the principles to apply but does not necessarily specify the precise detail of the methods to be adopted in all cases. Nevertheless, it is strongly recommended that all of the procedures or measures to be applied along the supply chain should be defined using a Total Quality Assurance methodology.

Although the term "cross contamination" can suggest the contamination of one fuel by another of the same type, "cross contamination" is used in this Technical Report in a more general sense, that is, the contamination of one fuel type by usually small amounts of a different fuel type that was previously stored, loaded, blended, or transported in the same container, tank, or vessel.

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1) CONCAWE is the oil companies' European association for Environment, Health and Safety in refining and distribution.

1 Scope

This document provides general guidance on automotive fuel handling. It does not pre-empt national or local regulations. It only addresses the issue of cross contamination between petrol and diesel automotive fuels that may occur in the supply chain, during manufacturing, storage, transportation or distribution. There may also be a risk of contamination with other products such as kerosene/jet fuel and off road diesel. The guidance principles described in this document would apply equally to managing these risks although some details may be different.

2 Normative references

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

NOTE   This Technical Report incorporates provisions from other publications based on undated references. These normative references are cited at the appropriate places in the text and the publications are listed in the Bibliography.

EN 228, *Automotive fuels – Unleaded petrol – Requirements and test methods*

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

EN 14214, *Automotive Fuels – Fatty acid methyl esters (FAME) for diesel engines – Requirements and test methods*

EN 15376, *Automotive fuels – Ethanol as a blending component for petrol – Requirements and test methods*

3 Fuels under consideration

Quality requirements for the products under consideration, that need to be fulfilled at the point of supply or sales, are:

— for petrol: EN 228;

— for the petrol component (bio)ethanol: EN 15376;

— for automotive diesel: EN 590; and

— for biodiesel and FAME blending component: EN 14214.

Prevention of contamination with other products, like kerosene or non-road diesel, is of course also included in this document, but no European quality designations exist for these products.

4 Supply chain definition

For the purposes of this document, the supply chain consists of the following four parts:

— refineries, where products are manufactured and mainly exported by ship, pipeline or other means of transport;

— terminals, where trucks are loaded for delivery to filling stations and where some product blending may also take place;

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— filling stations (including retail and industrial customer sites); and

— transportation from refineries to terminals and from terminals to filling stations.

5 Potential sources of cross contamination in the supply chain

Cross contamination can occur at any stage of the supply chain and can be caused by inadequate design of equipment and facilities, by inadequate inspection or maintenance, or by inadequate management of operations. These issues are addressed below.

6 Housekeeping guidelines

6.1 Elements of good housekeeping

6.1.1 Operations

To ensure good quality of the product at the point of delivery to the customer, the best practice is to verify that the product meets specifications when it is dispatched from the refinery and then to have systems and procedures in place that will prevent contamination on its way to the customer. Proper attention to detail during all operations from product manufacturing to final delivery is essential for guaranteeing product quality. For this reason, there should be operating procedures in place covering receipt, delivery, sampling, inspection, testing, documentation and volume accounting. These procedures should be reviewed and updated as required especially when product quality changes are taking place as a result of new regulations, the introduction of new fuel types, or during seasonal transitions. It is essential that personnel involved at each link in the product supply chain, both company employees and contractors, are properly trained so that they are aware of and understand the importance of applying standard operating procedures.

6.1.2 Hardware

Although the age and design of existing hardware along the supply chain can vary widely, it is still reasonable to expect that fuel product quality can be properly controlled with differently engineered installations. Quality control is much easier, however, if hardware is designed to facilitate product segregation as described in the following sections.

6.1.3 Maintenance

Even if an installation is well designed, equipment faults can develop over time if the installation is not inspected and properly maintained. These may eventually affect the ability of the operator to maintain product quality at the required level.

6.2 Detailed recommendations

6.2.1 General

Recommendations are split into four sections, each covering various elements for refineries, terminals, filling stations and transportation. They represent current industry experience and are based on predominantly handling hydrocarbon petrol fuels, but should equally apply to the handling of fuels containing bio-components.

6.2.2 Refineries

6.2.2.1 Testing and sampling

All batches of automotive fuels should be tested to ensure compliance with EN 228, EN 590 or other relevant national product specifications. Test records and samples should be kept for a sufficient period to cover market needs and regulatory requirements.

Imported products should be tested using the same approach as recommended for terminals (see below). An upper, middle and lower sample from fixed off-take storage tanks should be taken for analysis [10]. All three samples should be examined for visual appearance and separately measured to confirm that the tank is well mixed (e.g. by comparing density).

Composite samples may be used for the other routine specification tests unless otherwise specified in the respective test methods. An appropriate settling time after blending and before sampling for specification testing should be provided depending upon the tank configuration, filling level and similar factors. Additional line sampling or on-stream quality monitoring may be taken during delivery to ships or pipelines in order to allow identification of potential contamination problems.

6.2.2.2 Operations

Line up of component or product rundowns or transfers to final product tanks and from product tanks to the point of delivery should be such that incompatible or unwanted oil streams are prevented from entering the petrol or diesel tank, ship or pipeline.

6.2.2.3 Hardware requirements

Storage and piping systems should be designed to minimise cross contamination risk. Dedicated and segregated systems for petrol and diesel are preferred but, if the use of common piping systems is unavoidable (e.g. en-route to multi-product pipelines), proper line clearing facilities should be in place. Double block and bleed systems or twin seal valves should be installed to avoid the ingress of unwanted material and piping systems not in use should be disconnected or positively isolated from the main product streams using blinds. Dead legs are to be avoided.

Tanks should have convenient facilities for taking the following three samples:

— upper sample at one-sixth of the depth of liquid below the maximum level;

— middle sample halfway down the depth of the liquid; and

— lower sample at approximately one-sixth up from the bottom level, representing the product which will be drawn out of the off take system; the precise height for the lower sample should be based on details of tank configuration including the height of the off-take point.

Delivery lines should be fitted with sample points to allow sampling during export to ships or pipelines and should be located as close as possible to the point of custody transfer [11].

6.2.2.4 Maintenance

Control and isolation valves used for product movements should be able to open and close smoothly and shut completely. They should be repaired or replaced when there are signs of malfunctioning.