Irish Standard
I.S. EN 16136:2015

Automotive fuels - Determination of manganese and iron content in unleaded petrol - Inductively coupled plasma optical emission spectrometry (ICP OES) method

I.S. EN 16136:2015

Incorporating amendments/corrigenda/National Annexes issued since publication:

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English Version

Automotive fuels - Determination of manganese and iron content in unleaded petrol - Inductively coupled plasma optical emission spectrometry (ICP OES) method

Carburants pour automobiles - Détermination des teneurs en fer et en manganèse dans les essences sans plomb - Méthode spectrométrique optique par plasma à couplage inductif (ICP OES)

Kraftstoffe für Kraftfahrzeuge - Bestimmung des Gehaltes an Mangan und Eisen in unverbleitem Ottokraftstoff - Optische Emissionsspektrometrie mit induktiv gekoppeltem Plasma (ICP OES)

This European Standard was approved by CEN on 12 December 2014.

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Foreword

This document (EN 16136:2015) 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.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2015, and conflicting national standards shall be withdrawn at the latest by August 2015.

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.

This document supersedes EN 16136:2011.

The major updates are the lowering of the manganese content to allow a specification setting of 2 mg/l of manganese in line with the FQD requirement per 2014-01-01, and the introduction in the scope of determination of iron content, which can be added into petrol as ferrocene.

This document answers requirements originating from the amended Fuels Quality Directive (FQD, [2]).

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: 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 the United Kingdom.

1 Scope

This European Standard specifies a method based on inductively coupled plasma optical emission spectrometry (ICP OES) for the determination of manganese content from about 0,5 mg/l to about 7,5 mg/l and of iron content from about 1,4 mg/l to about 6,0 mg/l in unleaded petrol containing up to 3,7 % (m/m) oxygen.

WARNING — The use of this European Standard may involve hazardous materials, operations and equipment. This European Standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this European Standard to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use.

NOTE 1 Manganese as MMT and iron as ferrocene are added to petrol to increase anti-knock properties.

NOTE 2 Solutions of MMT in petrol are unstable when exposed to light. Low and erratic results are expected if petrol samples are exposed to light prior the analysis.

Iron and manganese contents higher than 6,0 mg/l and 7,5 mg/l respectively may be measured after preliminary dilution of the sample with a suitable solvent. However, the precision has not been established for such a procedure. Further work regarding automotive ethanol (E85) fuel is on-going in CEN.

NOTE 3 For the purposes of this European Standard, the terms "% (m/m)" and "% (V/V)" are used to represent the mass fraction (μ) and the volume fraction (φ) of a material respectively.

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 ISO 1042, *Laboratory glassware — One-mark volumetric flasks (ISO 1042)*

EN ISO 3170, *Petroleum liquids — Manual sampling (ISO 3170)*

EN ISO 3171, *Petroleum liquids — Automatic pipeline sampling (ISO 3171)*

EN ISO 3675, *Crude petroleum and liquid petroleum products — Laboratory determination of density — Hydrometer method (ISO 3675)*

EN ISO 12185, *Crude petroleum and petroleum products — Determination of density — Oscillating U-tube method (ISO 12185)*

3 Principle

A petrol sample is diluted with a hydrocarbon solvent. The solution is introduced directly into the plasma of an ICP OES spectrometer. Iron and manganese contents are calculated by comparison with calibration solutions prepared from suitable iron and manganese compounds. An internal standard is employed to correct viscosity and vapour pressure effects.

4 Reagents

Unless specified otherwise, only chemicals which are known to have a high degree of purity shall be used.

Some ready-made commercial multi-element Standard solutions may be used instead of the single element Standard solution (4.4 and 4.5).