

ICS 91.100.01

English Version

**Liquid petroleum products - Oxygenates blending in line with
actual EN 228 requirements**

Produits pétroliers liquides - Oxygenates blending par
exigences actuelles d'EN 228

Flüssige Mineralölerzeugnisse - Zumischung von
sauerstoffhaltigen Verbindungen entsprechend den
bestehenden Anforderungen nach EN 228

This Technical Report was approved by CEN on 25 September 2012. It has been drawn up by the Technical Committee CEN/TC 19.

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Foreword

This document (CEN/TR 16435:2012) 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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1 Scope

This Technical Report provides information to the blender on all the effects when blending oxygenates and alcohols in order to fulfil legal limitations put in place through the revised Fuels Quality Directive and in order to remain in line with EN 228 unleaded petrol requirements.

This Technical Report is published as background information.

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

2 Background

The purpose of this Technical Report is to provide guidance when blending oxygenates while meeting the requirements of EN 228:2012 [3] for both oxygenates and oxygen content as listed in Table 1 and Table 2 of that European Standard.

Selected properties of some commonly used oxygenates and examples of six oxygenated blends are reported to demonstrate the relationship between the concentration of oxygenated blending components and oxygen content.

The data given in this document are based on the properties of pure chemical products. If impurities, by-products or unreacted feedstocks are present in the oxygenates, these data may differ slightly from those for commercial oxygenates.

3 General issues

The relationship between oxygenate contents expressed in % (m/m) and % (V/V) depends on the density of the individual components and their possible non-linear interactions (effects such as volume change) when blended.

Changes in density can be caused by variations in the composition of the oxygenate components (e.g. the purity of the oxygenate) as well as by the measurement temperature. These density changes will also be reflected in the % (V/V) range of the final product. This means that the limits for oxygenate content in % (V/V) will depend on all of these variations so that accurate limits are not very easily specified in practical terms.

Therefore, accurate relationships between the oxygenates content in % (V/V) and the oxygen content in % (m/m) can only be given when all of the influencing factors are precisely described.

4 Reference data

Tables 1 and 2 of EN 228:2012 list the different oxygenates that are allowed for blending in petrol for which reference data [4, 5, 6, 7] are given in Table 1 below.

NOTE 1 Table 1 and its requirements also include other oxygenates: other mono-alcohols and ethers with a final boiling point not higher than 210 °C. Reference data have not been included.

NOTE 2 Reference data have been included for several ethers even though they all fall under the single definition and limits of “ethers (five or more C atoms)”.