UAE Standard
First Draft

UAE.S/DS/ 5018: 2020

الغازولين الخالي من الرصاص – المتطلبات وطرق الاختبار
Unleaded Gasoline - Requirements and Test Methods

UNITED ARAB EMIRATES

ICS: 75.160.20

This document is a UAE draft standard circulated for comments. It is, therefore, subject to alteration and modification and may not be referred to as a UAE standard before approved by ESMA Board of Directors.
**Foreword**

Emirates Authority for Standardization & Metrology (ESMA) has a national responsibility for standardization activities in UAE. One of ESMA main functions is to issue Emirates Standards through specialized technical committees (TCs).

ESMA through the technical program of committee "National Technical Committee for Standards of Oil and Gas" have updated the UAE standard no. UAE.S 5018: 2020 “Unleaded Gasoline - Requirements and Test Methods”.

This draft has been circulated to all concerned stakeholders for their valuable comments. The final draft was approved and issued as UAE standard by decision no. ( ) / Year ……, as a mandatory standard implemented on / / 2021. The approved standard will replace and supersedes the previous version no. UAE.S 5018: 2017.
Introduction
Emirates Authority for Standardization and Metrology was established by Federal Law No. 28 in 2001 as a National Standardization Body. Fuel quality plays a prominent role in controlling the emission levels in gasoline vehicle engines. Vehicle exhaust emission is one of the main sources of air pollution in cities all over the world. Based on this reality and with an intention of controlling the emission levels, ESMA is working in parallel to improve the standard specifications of fuel quality and gaseous emission levels of vehicles.

In 2002 ESMA had issued the first UAE standard specification of unleaded gasoline, UAE.S 20001:2002, prepared / proposed by a technical committee consisting of specialists and experts representing the Ministry of Energy, National Oil Companies and Environmental Bodies. At that time, the use of leaded gasoline was phased out in the United Arab Emirates, where lead compounds were used to improve the gasoline octane number. Then, unleaded gasoline was introduced into the market under the specification mentioned, where also there was a reduction in sulfur levels down to 500 ppm.

ESMA, through the National Technical Committee for Standardization of Oil and Gas, made the first review on this standard with an intention to improve the characteristics of unleaded gasoline by reducing the total sulfur content from 500 ppm to 100 ppm along with other parameters. The updated standard was approved and issued as UAE.S 20001:2006.

The National Technical Committee for Standardization of Oil and Gas worked on a second review for the unleaded gasoline standard, in light of the improvement required in gasoline properties. These changes will help the fuel to be more compatible with internal combustion engine vehicles provided with catalyst converters. The main technical changes made in this new version includes reduction of total sulfur content (from 100 ppm to 50 ppm) as well as stating clearly in the standard that it is not allowed to use any metallic additives to improve the octane number other than oxygenated additives (MTBE/ETBE/TAME) The new version of the standard is revised as UAE.S 5018 “Unleaded Gasoline- Requirements and Test Methods”.

The National Technical Committee for Standardization of Oil and Gas worked on a second review for UAE Standard of "Unleaded Gasoline – Requirements and Test Method", in light of the improvement required in gasoline properties. These changes will help the fuel to be more compatible with internal combustion engine vehicles provided with catalyst converters according to Euro 5. The main technical changes made in this new version includes reduction of total sulfur content (from 50 ppm to 10 ppm) as well as well as other properties of Benzene, aromatics and olefins.
Unleaded Gasoline - Requirements and Test Methods

1 Scope
This Emirates standard specifies requirements and test methods for marketed and delivered unleaded gasoline fuels (ULG). It is applicable for use in spark ignited engine vehicles designed to run on ULG. This fuel type contain three grades according to octane numbers-viz, regular 91, special 95 and super 98 in Table of Annex 1.

2 Complementary References
The following referenced documents applicable for the usage 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.

2.1 Standards
2.1.1 UAE.S GSO 1080 Determination of Gum in Gasoline and Aviation Fuel by Jet Evaporation
2.1.2 UAE.S GSO 1086 Methods of Test for Gasoline - Determination of Vapour- Liquid Ratio.
2.1.3 UAE.S GSO ISO 2160 Petroleum Products - Corrosiveness to Copper - Copper Strip Test.
2.1.5 UAE.S GSO ISO 3007 Petroleum Products and Crude Petroleum - Determination of Vapour Pressure - Reid Method
2.1.7 UAE.S GSO ISO 3171 Petroleum Liquids – Automatic pipeline Sampling.
2.1.8 UAE.S GSO ISO 3405 Petroleum Products - Determination of Distillation Characteristics at Atmospheric Pressure.
2.1.9 UAE.S GSO ISO 3675 Crude Petroleum and Liquid Petroleum Products - Laboratory Determination of Density - Hydrometer Method
2.1.11 UAE.S GSO ISO 3837 Liquid Petroleum Products Determination of Hydrocarbon Types - Fluorescent Indicator Adsorption Method
2.1.12 UAE.S GSO ISO 4259 Petroleum Products - Determination and Application of Precision Data in Relation to Methods of Test.
2.1.14 UAE.S GSO ISO 5164 Petroleum products - Determination of Knock Characteristics of Motor Fuels - Research Method
2.1.15 UAE.S GSO ISO 6246 Petroleum Products - Gum Content of Light and Middle Distillate Fuels - Jet Evaporation Method.
2.1.18 UAE.S GSO ISO 20846 Petroleum Products - Determination of Sulfur Content of Automotive Fuels - Ultraviolet Fluorescence Method.
2.1.20 UAE.S GSO ISO 20884 Petroleum Products - Determination of Sulphur Content of Automotive Fuels by Wavelength Dispersive X-Ray Fluorescence Spectrometry.
2.1.22 UAE.S GSO ASTM D130 Standard Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test.
2.1.27 UAE.S GSO ASTM D4815 Standard Method for Determination of MTBE, ETBE, TAME, DIPE, Tertiary-Amyl Alcohol and C1 to C4 Alcohols in Gasoline by Gas Chromatography.
2.1.41 ASTM D5059 Standard Test Methods for Lead in Gasoline by X-Ray Spectroscopy.
2.1.43 ASTM D5453 standard test method for determination of total sulfur in light hydrocarbons, motor fuels and oils by ultraviolet fluorescence.
2.1.44 ASTM D5580 standard test method for determination of benzene, toluene, ethylbenzene, p/m-xylene, o-xylene, c9 and heavier aromatics, and total aromatics in finished gasoline by gas chromatography.
2.1.50 ASTM D7345 standard Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure (Micro Distillation Method).
2.1.51 ASTM D7344 Standard Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure (Mini Method)
2.1.54 UOP 389 trace metals in organics by ICP-OES.

2.2 UAE Regulations
2.2.1 Ministerial Cabinet Decree no (21) / 2015 UAE Regulation for Petroleum Products Control.

3 Definitions and Abbreviations

3.1 Definitions:
3.1.1 Gasoline
Fuel produced by refining crude oil, used in internal combustion engines with spark ignition. These engines are also known as petrol engines /gasoline engines.

3.1.2 Unleaded Gasoline (ULG)
Gasoline produced without addition of lead compounds for improving its octane rating.

3.2 Abbreviations:
ESMA : Emirates Authority for Standardization and Metrology
GSO : GCC Standardization Organization
GCC : Gulf Cooperation Council
ISO : International Organization for Standardization
ASTM : American Society for Testing of Materials
ULG : Unleaded Gasoline
MTBE : Methyl tertiary Butyl Ether
ETBE : Ethyl tertiary Butyl Ether
TAME : Tertiary Amyl Methyl Ether
MMT : Methylcyclopentadienyl Manganese Tricarbonyl
4. Characteristics and Requirements

Following characteristics and requirements shall be available in this type of gasoline:

4.1 It shall be suitable for use as fuel for internal combustion spark ignited engine vehicles and shall be free from any adulterant or contaminant that may render the fuel unacceptable for use in such engines.

4.2 It shall be unleaded.

4.3 It shall be free from water and sediments.

4.4 Additives:

4.4.1 In order to meet the RON requirements, use of ethers as specified under 4.4.2 is allowed. Authorized Gasoline Distribution Companies shall be responsible to follow the norms specified above.

4.4.2 For octane number improvement ether compounds; MTBE, ETBE and TAME are only the permitted additives.

4.4.3 It shall be free of any metal based additives such as MMT and Ferrocene (Iron Carbonyl etc.).

4.4.4 Compounds containing phosphorus shall not be added to unleaded gasoline in order to protect automotive catalyst systems.

4.4.5 The use of dyes and markers is allowed provided if they do not cause harmful side effects to vehicle and fuel distribution systems.

4.5 It shall comply with the requirements covered under the Table/Annex (1) of Characteristics and Requirements for ULG.

4.6 ULG shall be free from any additive, not specified in this standard, which may render the fuel unacceptable for use in spark ignition engines. Any additives other than those specified under clause 4.4.2 shall be approved by ESMA prior to its use.

5. Sampling Methods

Samples shall be obtained for inspection and testing in accordance with standard of sampling, as outlined under clause, 2.1.6, 2.1.7 or 2.1.23.

*Note (1)*: In view of the sensitivity of some test methods referred to in this Standard, particular attention shall be paid to compliance with any guidance on sampling containers, which is included in the test method standard.

*Note (2)*: It is essential that for sampling of ULG the containers used to take and store the samples before testing are not contaminated, especially with lead and/or sulfur.

6. Testing and Inspection

Testing and inspection of samples for determining properties mentioned in Table/Annex (1) carried out according to the said testing methods for every property listed by said table.
7. Pump marking
Labelling shall be clearly visible, easily legible and displayed at any point of pump where ULG. Pump marking shall consist of easily recognised visual symbols that:
7.1 Identify the ULG as complying with this standard.
7.2 The title and colour shall be labelled marking dispenser pumps adequately according to research octane number of ULG, to help customers identify the appropriate fuels for their vehicles as follows:
   - Super [RON 98] Blue colour.
   - Special [RON 95] Green colour.
   - Regular (Eplus) [RON 91] Red colour.

8. Terms of Technical Applications
Gasoline shall be deemed in accordance with this standard, the samples shall be taken as indicated in the testing method referred to under clause 6. If the results of inspection and tests of samples, are found in compliance with the characteristics and requisites mentioned under clause 4. If found inconsistent with one or more of such characteristics it will be then deemed noncompliant.
# Annex 1

## Table

Characteristics and Requirements for Unleaded Gasoline

**Footnotes:**

* It shall be unleaded and free of any metal based additives. No intentional addition of metal based additives is permitted (See also 4.4.3. & 4.4.4).

<table>
<thead>
<tr>
<th>Property</th>
<th>Units</th>
<th>Limits</th>
<th>Test Method</th>
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<tbody>
<tr>
<td>Colour (RON: 91/95/98)</td>
<td></td>
<td>Min.</td>
<td>Max.</td>
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<tr>
<td>Octane Number, Research (RON: 91/95/98)</td>
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<td>91.0/95.0/98.0</td>
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<td>82.5/85.0/88.0</td>
<td>-</td>
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<tr>
<td>Appearance</td>
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<td>Liquid, Clear &amp; Bright</td>
<td>Visual</td>
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<tr>
<td>Odour</td>
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<td>Marketable</td>
<td>Olfactory</td>
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<tr>
<td>Copper Strip Corrosion (3h at 50°C)</td>
<td>Rating</td>
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</tr>
<tr>
<td>Density at 15°C (RON: 91/95/98)</td>
<td>kg/m³</td>
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<td>770.0/790.0/790.0</td>
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<td>Distillation, 10 % (V/V) recovered at °C</td>
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<tr>
<td>50 % (V/V) recovered at °C</td>
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<td>End Point °C</td>
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<td>205.0/215.0/225.0</td>
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<tr>
<td>Residue % (V/V)</td>
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<td>Lead Content mg/l</td>
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<td>*Manganese Content mg/l</td>
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<td>Reid Vapour Pressure at 37.8°C</td>
<td>kPa</td>
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<td>Sulphur, Total mg/kg</td>
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<tr>
<td>Allowed Oxygenate MTBE/ETBE/TAME (if added)</td>
<td>% (V/V)</td>
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Annex 2

References


   Sixth Editions 28 Oct. 2019