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Diesel Fuel - Specifications of Biodiesel Blend (B5 to B20)

ICS: 75.160.20

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تقديم

وزارة الصناعة والتكنولوجيا المتقدمة هي الجهة المسؤولة عن أنشطة التقييس بالدولة، بموجب المرسوم بقانون اتحادي رقم 20 لسنة 2020 بشأن المواصفات والمقاييس، ومن مهامها إعداد المواصفات القياسية واللوائح الفنية الإماراتية بواسطة لجان فنية وفرق عمل متخصصة.

وقد قامت الوزارة ضمن برنامج عمل اللجنة الفنية الوطنية للنفط والغاز بإعداد مشروع المواصفة القياسية الإماراتية رقم UAE.S: 2026 "وقود الديزل - خصائص مزيج الديزل الحيوي، تراكيز (ب5 - ب20)". وذلك بعد الاطلاع على القوانين والتشريعات الإماراتية، وعلى الاتفاقيات والممارسات الدولية المعتمدة.

وقد اعتمدت هذه اللائحة الفنية لدولة الإمارات العربية المتحدة بموجب قرار مجلس الوزراء رقم (.....) لسنة 2026 والمنشور في الجريدة الرسمية.

Foreword

The Ministry of Industry and Advanced Technology (MoIAT) has a national responsibility for standardization activities. One of MoIAT's main functions is to issue Emirates Standards /Technical regulations through specialized technical committees (TCs) and working groups (WG).

Through National Technical Committee for Oil and Gas, MoIAT has prepared the UAE draft Technical Regulation no. UAE.S: 2026 "Diesel Fuel - Specifications of Biodiesel Blend (B5 to B20)" after reviewing the UAE laws and legislation, and the international agreements and practices adopted and implemented at the international and national levels.

This UAE Technical Regulation has been approved by Ministerial Cabinet No. (.....) date 2026.

Diesel Fuel - Specifications of Biodiesel Blend (B5 to B20)

1. Scope

- 1.1 This specification covers diesel fuel blends containing 5% to 20% biodiesel by volume, in accordance with Biodiesel Specification B100 (UAE.S 5023:2018 + Amd 1: 2020), combined with diesel fuel conforming to UAE.S 477:2021 specification. These blends, designated as B5 to B20, are suitable for use in a wide range of diesel engines.
- 1.2 The biodiesel component (B100) of the blend shall conform to the requirements of Specification UAE.S 5023:2018 + Amd 1: 2020.
- 1.3 The diesel fuel component of the blend shall conform to the requirements of Specification UAE.S 477:2021.

2. Complementary 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.

- 2.1 UAE.S 477:2021 Diesel Fuel (Gas Oil) - Requirements and test methods.
- 2.2 UAE.S 5023:2018 + Amd 1: 2020 Biodiesel Fuels (B100) used for Diesel Oil blending - Requirements and Test Methods.
- 2.3 UAE Regulations: Ministerial Cabinet Decree no (21) year 2015, UAE Regulation for Petroleum Products.
- 2.4 UAE.S GSO ASTM D86 Standard Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure.
- 2.5 UAE.S GSO ASTM D93 Test Method for Flash Point by Pensky - Martens Close Cup Tester.
- 2.6 UAE.S GSO ASTM D97 Standard Test Method for Pour Point of Petroleum Products.
- 2.7 UAE.S GSO ASTM D130 Standard Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test.
- 2.8 UAE.S GSO ASTM D445 Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity).
- 2.9 UAE.S GSO ASTM D482 Standard Test Method for Ash from Petroleum Products.

- 2.10 UAE.S GSO ASTM D664 Standard Test Method for Acid Number of Petroleum Products by Potentiometric Titration.
- 2.11 UAE.S GSO ASTM D974 Standard Test Method for Acid and Base Number by Color-Indicator Titration.
- 2.12 UAE.S GSO ASTM D1298 Standard Test Method for Density, Relative Density, or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method.
- 2.13 UAE.S GSO ASTM D1500 Standard Test Method for ASTM Color of Petroleum Products (ASTM Colour Scale).
- 2.14 UAE.S GSO ASTM D2500 Standard Test Method for Cloud Point of Petroleum Products and Liquid Fuels.
- 2.15 UAE.S GSO ASTM D2622 Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry.
- 2.16 UAE.S GSO ASTM D2624 Standard Test Methods for Electrical Conductivity of Aviation and Distillate Fuels.
- 2.17 UAE.S GSO ASTM D2709 Standard Test Method for Water and Sediment in Middle Distillate Fuels by Centrifuge.
- 2.18 UAE.S GSO ASTM D4052 Standard Test Method for Density, Relative Density, and API Gravity of Liquids by Digital Density Meter.
- 2.19 UAE.S GSO ASTM D4057 Standard Practice for Manual Sampling of Petroleum and Petroleum Products.
- 2.20 UAE.S GSO ASTM D4294 Standard Test Method for Sulfur in Petroleum and Petroleum Products by Energy Dispersive X-ray Fluorescence Spectrometry.
- 2.21 UAE.S GSO ASTM D4530 Standard Test Method for Determination of Carbon Residue (Micro Method).
- 2.22 UAE.S GSO ASTM D5453 Standard Test Method for Determination of Total Sulfur in Light Hydrocarbons, Spark Ignition Engine Fuel, Diesel Engine Fuel, and Engine Oil by Ultraviolet Fluorescence.
- 2.23 UAE.S GSO ASTM D5771 Standard Test Method for Cloud Point of Petroleum Products and Liquid Fuels (Optical Detection Stepped Cooling Method).

- 2.24 UAE.S GSO ASTM D5773 Standard Test Method for Cloud Point of Petroleum Products and Liquid Fuels (Constant Cooling Rate Method).
- 2.25 UAE.S GSO ASTM D5949 Standard Test Method for Pour Point of Petroleum Products (Automatic Pressure Pulsing Method).
- 2.26 UAE.S GSO ASTM D5950 Standard Test Method for Pour Point of Petroleum Products (Automatic Tilt Method).
- 2.27 UAE.S GSO ASTM D6045 Standard Test Method for Color of Petroleum Products by the Automatic Tristimulus Method.
- 2.28 UAE.S GSO ASTM D6371 Standard Test Method for Cold Filter Plugging Point of Diesel and Heating Fuels.
- 2.29 UAE.S GSO ASTM D7042 Standard Test Method for Dynamic Viscosity and Density of Liquids by Stabinger Viscometer (and the Calculation of Kinematic Viscosity).
- 2.30 UAE.S GSO ISO 2049 Petroleum products - Determination of colour (ASTM scale).
- 2.31 UAE.S GSO ISO 2160 Petroleum products - Corrosiveness to copper - Copper strip test.
- 2.32 UAE.S GSO ISO 2719 Determination of flash point - Pensky-Martens closed cup method.
- 2.33 UAE.S GSO ISO 3016 Petroleum and related products from natural or synthetic sources - Determination of pour point.
- 2.34 UAE.S GSO ISO 3104 Petroleum products - Transparent and opaque liquids - Determination of kinematic viscosity and calculation of dynamic viscosity.
- 2.35 UAE.S GSO ISO 3170 Petroleum Liquids - Manual Sampling.
- 2.36 UAE.S GSO ISO 3405 Petroleum and related products from natural or synthetic sources - Determination of distillation characteristics at atmospheric pressure.
- 2.37 UAE.S GSO ISO 3675 Crude petroleum and liquid petroleum products - Laboratory determination of density - Hydrometer method.
- 2.38 UAE.S GSO ISO 3924 Petroleum products - Determination of boiling range distribution - Gas chromatography method.
- 2.39 UAE.S GSO ISO 4264 Petroleum products - Calculation of cetane index of middle-distillate fuels by the four-variable equation.
- 2.40 UAE.S GSO ISO 10370 Petroleum products - Determination of carbon residue - Micro method.

- 2.41 UAE.S GSO ISO 12156-1 Diesel Fuel - Assessment of Lubricity Using the High-frequency Reciprocating Rig (HFRR) - Part 1: Test Method.
- 2.42 UAE.S GSO ISO 12185 Crude petroleum, petroleum products and related products - Determination of density - Laboratory density meter with an oscillating U-tube sensor.
- 2.43 UAE.S GSO ISO 12205 Petroleum products - Determination of the oxidation stability of middle-distillate fuels.
- 2.44 UAE.S GSO ISO 13032 Petroleum and related products - Determination of low concentration of sulfur in automotive fuels - Energy-dispersive X-ray fluorescence spectrometric method.
- 2.45 UAE.S GSO ISO 20846 Petroleum products - Determination of sulfur content of automotive fuels - Ultraviolet fluorescence method.
- 2.46 UAE.S GSO ISO 20884 Petroleum products - Determination of sulfur content of automotive fuels - Wavelength-dispersive X-ray fluorescence spectrometry.
- 2.47 ASTM D976 Standard Test Method for Calculated Cetane Index of Distillate Fuels.
- 2.48 ASTM D2274 Standard Test Method for Oxidation Stability of Distillate Fuel Oil (Accelerated Method).
- 2.49 ASTM D4737 Standard Test Method for Calculated Cetane Index by Four Variable Equation.
- 2.50 ASTM D6079 Standard Test Method for Evaluating Lubricity of Diesel Fuels by the High-Frequency Reciprocating Rig (HFRR).
- 2.51 ASTM D7344 Standard Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure (Mini Method).
- 2.52 ASTM D7345 Standard Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure (Micro Distillation Method).
- 2.53 EN 14078 Liquid petroleum products - Determination of fatty acid methyl ester (FAME) content in middle distillates - Infrared spectrometry method.
- 2.54 IP 196 Petroleum products - Determination of colour (ASTM scale).
- 2.55 IP 309 Diesel and domestic heating fuels - Determination of cold filter plugging point.
- 2.56 IP 450 Diesel fuel - Assessment of lubricity using the high-frequency reciprocating rig (HFRR) - Part 1: Test method.
- 2.57 ISO 6245 Petroleum products - Determination of ash.

3. Definitions

3.1 B5 to B20: Fuel blend consisting of 5 % to 20 % by volume biodiesel conforming to the requirements of Specification UAE.S 5023:2018 + Amd 1: 2020, with the remainder being a light middle or middle distillate grade diesel fuel (UAE.S 477:2021) and meeting the requirements of this specification.

3.1.1 *Discussion:*

The abbreviation BXX represents a specific blend concentration in the range B5 to B20, where XX is the percent volume of biodiesel in the fuel blend.

3.2 Biodiesel: Fuel comprised of mono-alkyl esters of long chain fatty acids derived from vegetable oils or animal fats, designated B100.

4. Characteristics

Following characteristics and requirements must be available in the products of Biodiesel Blends (B5-B20):

4.1 It should be free from water, sediments and any suspended particles.

4.2 It is suitable for use in diesel engines that are compatible with biodiesel.

4.2.1 The user should consult the equipment manufacturer (OEM) or refer to owner manual regarding the suitability of using biodiesel or biodiesel blends in a particular engine or application.

4.3 It should comply with the requirements covered by Table (1) "Requirements for B5 to B20 Biodiesel Blends".

5. Sampling Method

Samples should be obtained from storage tanks for testing and inspection in accordance with standard of sampling according to Standard No. UAE.S GSO ASTM D4057 or No. UAE.S GSO ISO 3170 Petroleum Liquids - Manual Sampling.

6. Testing and evaluation

Testing and evaluation of samples shall be carried out to assess the conformity of the product with its properties and requirements stated in Table (1) in accordance with the testing methods specified in the standard specifications listed in front of each property of biodiesel blends.

Table (1)
Requirements for B5 to B20 Biodiesel Blends

Parameter	Unit	Biodiesel B5 - B20	Test Method
Appearance	Visual	Clear and Bright	-
Colour, ASTM	-	2.0 max.	UAE.S GSO ASTM D1500, UAE.S GSO ASTM D6045, UAE.S GSO ISO 2049, IP196
Ash Content	% (m/m)	0.01 max.	UAE.S GSO ASTM D482, ISO 6245
Carbon Residue (on 10% Distillation Residue)	% (m/m)	0.20 max.	UAE.S GSO ASTM D4530, UAE.S GSO ISO 10370, UAE.S GSO
Acid Number	mg KOH/g	0.30 max.	UAE.S GSO ASTM D974, UAE.S GSO ASTM D664
Cetane Index	-	50 min.	UAE.S GSO ISO 4264, ASTM D976, ASTM D4737
Copper Corrosion (3h at 100°C)	-	No. 1 max.	UAE.S GSO ASTM D130, UAE.S GSO ISO 2160
Density at 15 °C	kg/m ³	810.0 - 845.0	UAE.S GSO ASTM D4052, UAE.S GSO ASTM D1298, UAE.S GSO ISO 3675, UAE.S GSO ISO 12185
Sulphur, Total	mg/kg	10 max.	UAE.S GSO ASTM D5453, UAE.S GSO ASTM D2622, UAE.S GSO ASTM D4294, UAE.S GSO ISO 20884, UAE.S GSO ISO 20846, UAE.S GSO ISO 13032,
Distillation	-	-	UAE.S GSO ASTM D86, UAE.S GSO ISO 3405,
90% recovery or	°C	343 max.	UAE.S GSO ISO 3924, ASTM D7345, ASTM
95% recovery	°C	360 max.	D7344
Flash Point, PMCC	°C	65 min.	UAE.S GSO ASTM D93, UAE.S GSO ISO 2719
Pour Point	°C	Report	UAE.S GSO ASTM D97, UAE.S GSO ASTM D5949, UAE.S GSO ASTM D5950, UAE.S GSO ISO 3016
Cloud Point	°C	Report	UAE.S GSO ASTM D2500, UAE.S GSO ASTM D5771, UAE.S GSO ASTM D5773
CFPP	°C	Report	UAE.S GSO ASTM D6371, IP 309
Water and Sediment	% (V/V)	0.05 max.	UAE.S GSO ASTM D2709

Kinematic Viscosity @ 40 °C	mm ² /s	2.0 - 4.5	UAE.S GSO ASTM D445, UAE.S GSO ASTM D7042, UAE.S GSO ISO 3104
FAME content	% (V/V)	5.0 - 20.0	EN 14078
Lubricity <i>Note 1</i>	microns	520 max.	UAE.S GSO ISO 12156-1, ASTM D6079, IP 450
Oxidation Stability	mg/100ml	2.5 max.	UAE.S GSO ISO 12205, ASTM D2274
Conductivity at 20°C <i>Note 2</i>	pS/m	50 min.	UAE.S GSO ASTM D2624

Note 1 - If the diesel fuel is qualified under Table 1 of UAE.S 477:2021 for lubricity, it is not necessary to measure the lubricity of the blend. This is because the lubricity of the individual blend components will be less than 520 μ so the resulting blend will also be less than 520 μ .

Note 2 - The electrical conductivity of the Biodiesel Blends is measured at the time and temperature of the fuel at the final receiving point of the product. If the conductivity limit of 50 pS/m at the final receiving end is not met, refinery shall increase the conductivity to above 100 pS/m at the loading port.