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Draft Zambian Standard

LOW SULPHUR GASOIL (LSGO): Specification

*This draft is for Public Comments
ONLY and should, therefore,
NOT be used or referred to as a
Zambian Standard*

ZAMBIA BUREAU OF STANDARDS

Draft for Public Comments

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The preparation of this Zambian Standard was undertaken by the Petroleum Products Technical Committee (TC 4/14) upon which the following organizations were represented:

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Bio Fuels Association of Zambia
BP Zambia Plc
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FOREWORD

This Zambian Standard has been prepared by the Petroleum Products Technical Committee (TC 4/14), in accordance with the procedures of the Zambia Bureau of Standards.

The Petroleum Products Technical Committee, which was facilitated by the Energy Regulation Board (ERB) received concerns from stakeholders on the need for the country to be in line with Original Equipment Manufacturers (OEM) specifications, improve maintenance practices and meet environmental requirements. The aforementioned concerns, together with the need to be abreast with Regional and International trends necessitated the formulation of this standard.

This standard specification for Low Sulphur Gas Oil (LSGO) has been formulated to cater for consumers requiring to use low sulphur diesel fuel and to enhance trade within the region.

Reference has been made to the following publications in preparation of this standard:

ZS 369: 2000 Automotive gasoil (diesel fuel) – specification

SANS 342: 2006 Automotive diesel fuel

ACKNOWLEDGEMENT

The Zambia Bureau of Standards (ZABS) would like to acknowledge the invaluable material and financial support of the Energy Regulation Board in the promulgation of this Standard.

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ZAMBIA BUREAU OF STANDARDS

Draft Zambian Standard

LOW SULPHUR GASOIL (LSGO): Specification

1 SCOPE

This Zambian Standard specifies requirements for Low Sulphur Gas Oil (LSGO).

2 NORMATIVE REFERENCES

The following Publications contain provisions which, through reference in this text, constitute provisions of this standard. All standards are subject to revision and, since any reference to a publication is deemed to be a reference to the latest edition of that publication, parties to agreements based on this standard are encouraged to take steps to ensure the use of the most recent editions of the standards indicated below.

ASTM D 86	Test Method for Distillation of Petroleum Products.
ASTM D 93	Test Method for Flash Point by Pensky-Martens Closed Cup Tester.
ASTM D 95	Test Method for Water in Petroleum Products and Bituminous Materials by Distillation.
ASTM D 4377	Standard Test Method for Water in Crude Oils by Potentiometric Karl Fischer Titration
ASTM D 130	Test Method for Detection of Copper Corrosion from Petroleum Products by the Copper Strip Tarnish Test.
ASTM D 4052	Test Method for Density and Relative Density of Liquids by Digital Density Meter
ASTM D 1298	Standard Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method.
ASTM D 445 – IP 71	Standard test method for kinematic viscosity of transparent and opaque liquids (the calculation of dynamic viscosity).
ASTM D 482	Test Method for Ash from Petroleum Products.
ASTM D 524	Test Method for Ramsbottom Carbon Residue of Petroleum Products.
ASTM D 613	Test Method for Cetane Number of Diesel Fuel Oil.
ASTM D 664	Test Method for Acid Number of Petroleum Products by Potentiometric Titration.
ASTM D 976	Method for Calculated Cetane Index of Distillate Fuels.

ASTM D 1500	Test Method for ASTM Colour of Petroleum Products (ASTM Colour Scale)
ASTM D 473	Test Method for Water and Sediment in Fuel Oils by the Centrifuge Method (Laboratory Procedure).
ASTM D 2709	Test Method for water and sediments in distillate fuels by the Centrifuge Method (Laboratory Procedure)
ASTM D 2274/IP 388	Standard Test Method for Oxidation Stability of Distillate Fuel Oil (Accelerated Method)
ASTM D 2500	Test Method for Cloud Point of Petroleum Products
ASTM D 5453	Test Method for the Determination of Total Sulphur in Light Hydrocarbons, Motor Fuels and Oils by Ultraviolet Fluorescence
ASTM D 4294	Test Method for Sulphur in Petroleum Products by Energy Dispersive X-Ray Fluorescence Spectroscopy
ASTM D 6078	Test Method for Evaluating Lubricity of Diesel Fuels by the Scuffing Load Ball-on-Cylinder Lubricity Evaluator (SLBOCLE)
IP 309	Cold Filter Plugging Point of Distillate Fuels
ASTM D6217 / IP 440	Standard Test Method for Particulate Contamination in Middle Distillate Fuels by Laboratory Filtration
ISO 12156-1/ASTM D 6079	Diesel fuel – Assessment of lubricity using the High-Frequency Reciprocating Rig (HFRR) – Part 1: Test method
ZS 396	Sampling Petroleum Products: Part 1: Manual Sampling of Liquid Hydrocarbons

3 DEFINITIONS

For the purpose of this Standard, the following definitions apply.

3.1 Additive

A compound added to gas oil to improve either the performance or the storage stability or both.

3.2 Clear

Absence of water and suspended matter.

4 REQUIREMENTS

4.1 General

4.1.1 The fuel shall be hydrocarbon oil derived from petroleum. This does not preclude the incorporation of small amounts of additives intended to improve some aspects of performance. The fuel shall be free from inorganic acid and from quantities of grit, fibrous material and other foreign matter likely to interfere with normal operation of equipment.

4.1.2 When LSGO is tested in accordance with the methods of test given in Table 1, it shall be in compliance with the limiting requirements given in that table.

4.2 Storage stability

When stored under conventional storage conditions for a period of 12 months after date of manufacture, the fuel shall still comply with the requirements given in Table 1.

When the fuel is to be stored for longer periods, the stability over a period exceeding 12 months shall be as agreed upon between the supplier and purchaser.

Table 1: Requirements for Low Sulphur Gas Oil (LSGO)

CHARACTERISTICS		REQUIREMENTS	TEST METHODS
Density, 20°C, kg/l		0.800 – 0.880	ASTM D 4052/ASTM D 1298
Appearance		Clear	Visual
Colour, max.		3.0	ASTM D 1500
Cetane Number, min.		42	ASTM D 613
Cetane Index, calc., min.		45	ASTM D 976
Viscosity, at 40°C, cSt,		2.00 - 5.50	ASTM D 445 IP 71
Cloud point, °C, max		+4.5	ASTM D 2500
Cold Filter Plugging Point, °C, max		-4 .0	IP 309
Sulphur, % mass, max.		0.005	ASTM D 4294 ASTM D 5453
Copper Corrosion 3 hrs at 100°C, max.		1	ASTM D 130
Carbon Residue, 10% Bottoms, max.		0.2	ASTM D 524
Water Content, % Vol, max.		0.05	ASTM D 95/ASTM D 4377
Sediment, % Vol, max..		0.01	ASTM D 473/ ASTM D 2709
Ash, % Mass, max.		0.01	ASTM D 482
Flash Point PMCC, °C, min.		60	ASTM D 93
Total Acidity, mg KOH/g, max.		0.3	ASTM D 664
Oxidation Stability, g/m ³ , max		20	ASTM D 2274 IP 388
Lubricity	Load, gms, min	3100	ASTM D6078
	Wear Scar, µm, max	460	ASTM D6079 or ISO12156-1
Particulates, mg/Kg, max.		24	ASTM D 6217 IP 440
Distillation Recovery, %, min	At 360 °C	90	ASTM D 86
	From 240 – 310 °C	45	

5.0 PACKAGING AND LABELLING

5.1 Packaging

The condition of the containers, rail tankers and road tank vehicles shall be such as not to be detrimental to the quality of the fuel during normal transportation and storage. The containers shall be acceptably sealed and in addition shall conform to the relevant legislation pertaining to petroleum products.

5.2 Labelling

The following information shall appear in legible and indelible marking on each container or in case of diesel fuel filled into bulk storage tanks, in the storage and consignment documents of each road tank wagon or rail tank wagon: -

- (a) the suppliers' and receivers' name and address
- (b) the type of fuel, i.e., "Low Sulphur Gas Oil"
- (c) the quantity in litres
- (d) the batch/lot number

6.0 METHODS OF TEST

For all characteristics, use the applicable method listed in Table 1.

7.0 SAMPLING

7.1 Sampling from storage tanks

For the purposes of this standard, all sampling shall be carried out in accordance with the relevant sections of ZS 396 and additionally as detailed in 7.2.

7.2 Sampling from fuel lines

7.2.1 Sampling cans

Sampling cans shall be of 1 litre capacity.

NOTE Attention is drawn to the fact that sampling cans will need to comply with the statutory safety requirements for the classification, packaging and labelling of dangerous substances.

7.2.2 Preparation of cans

A stock of cans shall be kept solely for the purpose of taking fuel samples. Before use, all cans shall be checked to ensure they are sound and free from leaks. A fuel-resistant sealing washer in good condition shall be in position in the cap.

7.2.3 Procedure

From the discharge point, 1 litre of the fuel to be tested shall be carefully drawn into a 1 litre can using a clean dry funnel. The screw cap shall be fully tightened and the can checked to ensure that there are no leaks.

NOTE. If more than 1 litre is needed, the operation should be repeated immediately and before the pump has been used for any other purpose.

7.2.4 Labelling and transportation

Full and legible information relating to the source of the sample shall be attached to the can in such a manner that it will not easily become detached subsequently.

NOTE 1. If required, the sample may be sealed and labelled to maintain its legal integrity.

NOTE 2. If the sample has to be sent to the laboratory by public transport, it will be necessary to comply with the general regulations covering transportation of flammable materials, where appropriate, and with the requirements of the transport authority concerned. Information on the appropriate procedures and type of packaging required should be obtained from the relevant transport authority involved.

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