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**Draft Zambian Standard**

**AUTOMOTIVE GAS OIL (AGO): Specification**

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This Draft Standard is for Public Comment **ONLY** and should **NOT** therefore be referred to as a Zambian Standard

**ZAMBIA BUREAU OF STANDARDS**

**Amendments issued since publications**

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## **FOREWORD**

This National Standard has been prepared by the Petroleum Products technical Committee (TC4/14), in accordance with the procedures of ZABS. All users should ensure that they have the latest edition of this publication as standards are revised from time to time.

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Over the past years, technological changes in the Petroleum Products sector have occurred. In endeavouring to match up with the regional and international advancements, it was necessary to revise ZS 369.

## **ACKNOWLEDGEMENT**

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# ZAMBIA BUREAU OF STANDARDS

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## Draft Zambian Standard

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### AUTOMOTIVE GAS OIL (AGO): Specification

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#### 1 SCOPE

This Zambian Standard specifies requirements and methods of sampling and testing for Automotive Gas Oil (AGO).

#### 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.

<b>ZS ASTM D 86</b>	Test Method for Distillation of Petroleum Products.
<b>ZS ASTM D 93</b>	Test Method for Flash Point by Pensky-Martens Closed Cup Tester.
<b>ZS ASTM D 95</b>	Test Method for Water in Petroleum Products and Bituminous Materials by Distillation.
<b>ZS ASTM D 130</b>	Test Method for Detection of Copper Corrosion from Petroleum Products by the Copper Strip Tarnish Test.
<b>ZS ASTM D 445/IP 71</b>	Standard test method for kinematic viscosity of transparent and opaque liquids (the calculation of dynamic viscosity).
<b>ZS ASTM D 473</b>	Test Method for Water and Sediments in Fuel Oils by Filtration (Laboratory Procedure).
<b>ZS ASTM D 482</b>	Test Method for Ash from Petroleum Products.
<b>ZS ASTM D 524</b>	Test Method for Rams bottom Carbon Residue of Petroleum Products.
<b>ZS ASTM D 613</b>	Test Method for Cetane Number of Diesel Fuel Oil.
<b>ZS ASTM D 664</b>	Test Method for Acid Number of Petroleum Products by Potentiometric Titration.
<b>ZS ASTM D 976</b>	Method for Calculated Cetane Index of Distillate Fuels.
<b>ZS ASTM D 1298</b>	Standard Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method.

<b>ZS ASTM D 1500</b>	Test Method for ZS ASTM Colour of Petroleum Products (ZS ASTM Colour Scale)
<b>ZS ASTM D 1552</b>	Standard Test Method for Sulphur in Petroleum Products (High-Temperature Method)
<b>ZS ASTM D 2500</b>	Test Method for Cloud Point of Petroleum Products
<b>ZS ASTM D 2709</b>	Test Method for water and sediments in distillate fuels by the Centrifuge Method (Laboratory Procedure)
<b>ZS ASTM D 4052</b>	Test Method for Density and Relative Density of Liquids by Digital Density Meter
<b>ZS ASTM D 4294</b>	Test Method for Sulphur in Petroleum Products by Energy Dispersive X-Ray Fluorescence Spectroscopy
<b>ZS ASTM D 4377</b>	Standard Test Method for Water in Crude Oils by Potentiometric Karl Fischer Titration
<b>ZS ASTM D 5453</b>	Test Method for the Determination of Total Sulphur in Light Hydrocarbons, Motor Fuels and Oils by Ultraviolet Fluorescence
<b>ZS ASTM D 6078</b>	Test Method for Evaluating Lubricity of Diesel Fuels by the Scuffing Load Ball-on-Cylinder Lubricity Evaluator (SLBOCLE)
<b>ZS ASTM D6217 / IP 440</b>	Standard Test Method for Particulate Contamination in Middle Distillate Fuels by Laboratory Filtration
<b>IP 309</b>	Cold Filter Plugging Point of Distillate Fuels
<b>ISO 12156-1/ZS ASTM D 6079</b>	Diesel fuel Assessment of lubricity using the High-Frequency Reciprocating Rig (HFRR) Part 1: Test method
<b>ZS 396</b>	Sampling Petroleum Products: Part 1: Manual Sampling of Liquid Hydrocarbons

Petroleum Act, Chapter 435 of the Laws of Zambia.

### **3 DEFINITIONS**

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

#### **3.1 Additive**

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

#### **3.2 Clear**

Absence of moisture 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 Gasoil is tested in accordance with the methods of test given in Table 1, it shall be in compliance with the limiting requirements given in the 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 automotive gasoil (ago)**

CHARACTERISTIC		REQUIREMENT	TEST METHOD
Density, 20 °C, kg/m <sup>3</sup>		820 - 880	ZS ASTM D 4052 ZS ASTM D 1298
Appearance		Clear	Visual
Colour, max.		3.0	ZS ASTM D 1500
Cetane Number, min.		45	ZS ASTM D 613
Cetane Index, calc., min.		47	ZS ASTM D 976
Viscosity, at 40 °C, cSt,		2.00-5.50	ZS ASTM D 445
Cloud point, °C, max		4.5	ZS ASTM D 2500
Sulphur, % mass, max.		0.50	ZS ASTM D 1552 ZS ASTM D 2622 ZS ASTM D 4294 ZS ASTM D 5453
Copper Corrosion 3 hrs at 100 °C , max.		1	ZS ASTM D 130
Carbon Residue, 10% Bottoms, max.		0.2	ZS ASTM D 524
Water Content, % Vol, max.		0.05	ZS ASTM D 95 ZS ASTM D 4377
Sediment, % Vol, max..		0.01	ZS ASTM D 473 ZS ASTM D 2709
Ash, % Mass, max.		0.01	ZS ASTM D 482
Flash Point PMCC, °C, min.		60	ZS ASTM D 93
Total Acidity, mg KOH/g, max.		0.3	ZS ASTM D 664
Particulates, mg/Kg, max.		24	ZS ASTM D 6217 IP 440
Distillation Recovery, %, min	At 360 °C	90	ZS ASTM D 86
	From 240 - 310 °C	45	

## **5 PACKAGING AND MARKING**

### **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 Petroleum Act, Chapter 435 of the Laws of Zambia.

### **5.2 Marking**

5.2.1 The following information shall appear in legible and indelible marking on each container or in case of AGO 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., "Automotive Gas Oil"
- (c) the quantity in Litres
- (d) the batch/lot number

5.2.2 The containers may also be marked with the Zambian Standard Certification Mark

## **6 METHODS OF TEST**

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

## **7 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.