



## DRAFT EAST AFRICAN STANDARD

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### Base oil — Specification

## EAST AFRICAN COMMUNITY

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## Foreword

Development of the East African Standards has been necessitated by the need for harmonizing requirements governing quality of products and services in the East African Community. It is envisaged that through harmonized standardization, trade barriers that are encountered when goods and services are exchanged within the Community will be removed.

The Community has established an East African Standards Committee (EASC) mandated to develop and issue East African Standards (EAS). The Committee is composed of representatives of the National Standards Bodies in Partner States, together with the representatives from the public and private sector organizations in the community.

East African Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. Draft East African Standards are circulated to stakeholders through the National Standards Bodies in the Partner States. The comments received are discussed and incorporated before finalization of standards, in accordance with the Principles and procedures for development of East African Standards.

East African Standards are subject to review, to keep pace with technological advances. Users of the East African Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

The committee responsible for this document is Technical Committee EASC/TC 068, *Petroleum and petroleum products*.

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## Base oil — Specification1 Scope

This Draft East Africa Standard specifies requirements, sampling and test methods for base oils composed of hydrocarbons and intended for use in formulating products including automotive and industrial lubricants. This standard does not cover base oils containing detectable levels of esters, animal fats, vegetable oils, or other materials used as, or blended into, lubricants.

## 2 Normative references

The following referenced documents referred to in the text in such a way that some or all of their content constitutes requirements 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.

ASTM D92, *Standard test method for flash and fire points by Cleveland open cup tester*

ASTM D97, *Standard test method for pour point of petroleum products*

ASTM D130, *Standard test method for corrosiveness to copper from petroleum products by copper strip test*

ASTM D445, *Standard test method for kinematic viscosity of transparent and opaque liquids (and calculation of dynamic viscosity)*

ASTM D482, *Standard Test Method for Ash from Petroleum Products*

ASTM D664, *Standard test method for acid number of petroleum products by potentiometric titration*

ASTM D974, *Standard test method for acid and base number by color-Indicator titration*

ASTM D1298, *Standard test method for density, relative density, or API Gravity of crude petroleum and liquid petroleum products by hydrometer method*

ASTM D1500, *Standard test method for ASTM color of petroleum products (ASTM color scale)*

ASTM D1744, *Standard test method for determination of water in liquid petroleum products by Karl Fischer reagent*

ASTM D2270, *Standard Practice for Calculating Viscosity Index from Kinematic Viscosity at 40 and 100°C*

ASTM D2622, *Standard test method for sulfur in petroleum products by wavelength dispersive x-ray fluorescence spectrometry*

ASTM D2896, *Standard Test Method for Base Number of Petroleum Products by Potentiometric Perchloric Acid Titration*

ASTM D3120, *Standard test method for trace quantities of sulfur in light liquid petroleum hydrocarbons by oxidative microcoulometry*

ASTM D4052, *Standard test method for density, relative density, and api gravity of liquids by digital density meter*

ASTM D4059, *Standard test method for analysis of polychlorinated biphenyls in insulating liquids by gas chromatography*

ASTM D4291, *Standard test method for trace ethylene glycol in used engine oil*

ASTM D4294, *Standard test method for sulfur in petroleum and petroleum products by energy dispersive x-ray fluorescence spectrometry*

ASTM D4530, *Standard Test Method for Determination of Carbon Residue (Micro Method)*

ASTM D4628, *Standard Test Method for Analysis of Barium, Calcium, Magnesium, and Zinc in Unused Lubricating Oils by Atomic Absorption Spectrometry*

ASTM D4739, *Standard test method for base number determination by potentiometric hydrochloric acid titration*

ASTM D4927, *Standard test methods for elemental analysis of lubricant and additive components — Barium, calcium, phosphorus, sulfur, and zinc by wavelength-dispersive x-ray fluorescence spectroscopy*

ASTM D4929, *Standard test methods for determination of organic chloride content in crude oil*

ASTM D4951, *Standard test method for determination of additive elements in lubricating oils by inductively coupled plasma atomic emission spectrometry*

ASTM D5185, *Standard test method for determination of additive elements, wear metals, and contaminants in used lubricating oils and determination of selected elements in base oils by inductively coupled plasma atomic emission spectrometry (ICP-AES)*

ASTM D5950, *Standard Test Method for Pour Point of Petroleum Products (Automatic Tilt Method)*

ASTM D 6304, *Standard Test Method for Determination of Water in Petroleum Products, Lubricating Oils, and Additives by Coulometric Karl Fischer Titration*

ASTM D7042, *Standard test method for dynamic viscosity and density of liquids by stabinger viscometer (and the calculation of kinematic viscosity)*

EPA 8120, *Chlorinated hydrocarbons by gas chromatography*

ASTM D4057, *Standard Practice for Manual Sampling of Petroleum and Petroleum Products*

ASTM D4177, *Standard Practice for Automatic Sampling of Petroleum and Petroleum Products*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

ISO Online browsing platform: available at <http://www.iso.org/obp>

**3.1 base oil**  
base stock or blend of two or more base stocks used to produce finished lubricants, usually in combination with additives

**3.2 base stock**  
hydrocarbon lubricant component, other than an additive, that is produced by a single manufacturer to the same specifications (independent of feed source or manufacturer's location), and that is identified by a unique formula number or product identification number, or both.

## 4 Requirements

### 4.1 General requirements

Lubricating base oil shall be free from suspended matter, grit, water or any other foreign matter and impurities

### 4.2 Specific requirements

#### 4.2.1 Physical requirements

Base oil shall comply with the physical requirements given in Table 1 when tested in accordance with the test methods prescribed therein.

**Table 1 — Physical requirements for base oil**

S/N	Physical property	Requirement	Test method
i.	Appearance	Bright and clear	Visual
ii.	ASTM Colour, max.	6	ASTM D1500
iii.	Density at 15 °C ,kg/l, min.	To be reported	ASTM D1298 ASTM D4052
iv.	Flash point, °C, min.(Cleveland open cup)	180	ASTM D92
v.	Kinematic viscosity at 40 °C and 100 °C, mm <sup>2</sup> /s (cSt)	To be reported	ASTM D445 ASTM D7042
vi.	Viscosity index, min.	90	ASTM D2270
vii.	Pour point , °C, max.	-3	ASTM D97 ASTM D5950

### 4.2 Compositional requirements

Base oil shall comply with the compositional requirements given in Table 2 when tested in accordance with the test methods prescribed therein.

**Table 2 — Compositional requirements for base oil**

S/N	Property	Requirement	Test method
i.	Micro carbon residue, %, m/m, max.	0.8	ASTM D4530
ii.	Sulphur, wt, %, max.	1.5	ASTM D2622 ASTM D4294 ASTM D3120

### 4.3 Chemical requirements

Base oil shall comply with the chemical requirements given in Table 3 when tested in accordance with the test methods prescribed therein.



Table 3 — Chemical requirements for base oil

S/N	Property	Requirement	Test method
i.	Acid number, mg KOH/g, max.	0.50	ASTM D974 ASTM D664
ii.	Base number, mg KOH/g, max.	1.2	ASTM D4739 ASTM D2896
iii.	Total chlorine, mg/kg, max.	50	ASTM D4929
iv.	Copper corrosion 3 h at 100°C, max.	1 Classification	ASTM D130
v.	Elemental analysis, mg/kg: - Mg, Na, Ba, Cu, B, Pb, Mn, Ni, Si Al, As, Cd, Ca, Fe, P, Zn, Cr, Sn, Total of all above elements, mg/kg, max.	25	ASTM D5185
vi.	Glycol, mg/kg, max.	5	ASTM D4291
vii.	PCB (polychlorinated biphenyl) content, mg/kg, max.	2	ASTM D4059
viii.	Total volatile organic halogens, mg/kg, max.	5	EPA 8120
ix.	Water, mg/kg, max.	150	ASTM D1744 ASTM D6304
x.	Ash, wt, %, max.	0.01	ASTM D 482

## 5 Packaging

Base oil shall be packaged in a suitable container that will safeguard its quality during transportation and storage.

## 6 Marking

6.1 The following information shall be clearly marked on the container, or on a label affixed to the container:

- name and physical address of the manufacturer or supplier;
- name of the product as “ Base oil” ;
- batch number/identification;
- net content;
- date of manufacture;
- description of the product for example SN150
- country of origin

6.2 For bulk transportation the above information shall be in the documentation accompanying the product.

## 7 Sampling

Sampling of lubricating base oil shall be carried out in accordance with ASTM D4057 or ASTM D4177.

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## Bibliography

KS2491:2021, *Petroleum and Petroleum products—Base oil — Specification*

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