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DRAFT EAST AFRICAN STANDARD

Heavy fuel oils — Specification

EAST AFRICAN COMMUNITY

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Foreword

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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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Heavy fuel oils — Specification

1 Scope

This Draft East Africa Standard specifies requirements, sampling and test methods for heavy fuel oils intended for oil-fired furnaces and boilers for industrial use

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 D93, *Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester*

ASTM D95, *Standard Test Method for Water in Petroleum Products and Bituminous Materials by Distillation*

ASTM D97, *Standard Test Method for Pour Point of Petroleum Products*

ASTM D189, *Standard Test Method for Conradson Carbon Residue of Petroleum Products*

ASTM D445, *Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)*

ASTM D473, *Standard Test Method for Sediment in Crude Oils and Fuel Oils by the Extraction Method*

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

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 D3228, *Standard Test Method for Total Nitrogen in Lubricating Oils and Fuel Oils by Modified Kjeldahl Method*

ASTM D4294, *Standard Test Method for Sulfur in Petroleum and Petroleum Products by Energy Dispersive X-ray Fluorescence Spectrometry*

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

ASTM D 4868, *Standard Test Method for Estimation of Net and Gross Heat of Combustion of Hydrocarbon Burner and Diesel Fuels*

ASTM D5184, *Standard Test Methods for Determination of Aluminum and Silicon in Fuel Oils by Ashing, Fusion, Inductively Coupled Plasma Atomic Emission Spectrometry, and Atomic Absorption Spectrometry*

IP 143, *Determination of asphaltenes (heptane insolubles) in crude petroleum and petroleum products*

IP 375, *Petroleum products — Total sediment in residual fuel oils — Part 1: Determination by hot filtration*

IP 390, *Petroleum products — Total sediment in residual fuel oils — Part 2: Determination using standard procedures for ageing*

IP 470, *Determination of aluminium, silicon, vanadium, nickel, iron, calcium, zinc and sodium in residual fuel oil by ashing, fusion and atomic absorption spectrometry*

IP 500, *Determination of the phosphorus content of residual fuels by ultra-violet spectrometry*

IP 501, *Determination of aluminium, silicon, vanadium, nickel, iron, sodium, calcium, zinc and phosphorous in residual fuel oil by ashing, fusion and inductively coupled plasma emission spectrometry*

ISO 8217, *Petroleum products — Fuels (class F) — Specifications of marine fuels* ASTM D4057, *Standard Practice for Manual 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>

additive

material added to fuel oils usually in small amounts, to impart or enhance desirable properties or to suppress undesirable properties

4 Requirements

4.1 General requirements

4.1.1 The heavy fuel oils shall be hydrocarbon oils derived from petroleum or shale.

4.1.2 The heavy fuel oil shall be free from grit and other foreign impurities.

4.1.3 The fuel oils shall consist of liquid hydrocarbons oil derived from petroleum. Small amounts of additives of hydrocarbons or non-hydrocarbons may be added to improve other characteristics.

4.1.4 The heavy fuel oils shall be free from inorganic acids, excessive amounts of solid and fibrous foreign matter, and shall remain uniform in normal storage and not separated.

4.1.5 The heavy fuel oils shall be free from any contaminants such as lubricating oils or any other contaminant

4.1.6 Heavy fuel oil containing residual components shall remain uniform in normal storage and not separate by gravity into light and heavy oil components outside the viscosity limits

4.2 Specific requirements

The material shall comply with the requirements prescribed in Table 1, when tested accordance with the test methods prescribed therein.

Table 1 — Specific requirements for heavy fuel oils

S/N	Property	Requirement	Test method
i	Viscosity at 50 °C, cSt, max.	180	ASTM D445
ii	Density at 20 °C, kg/l, max.	0.990	ASTM D1298
iii	Conradson carbon residue, % wt., max.	15	ASTM D189
iv	Sulphur content, % wt., max.	2	ASTM D4294
v	Vanadium content, mg/kg, max.	100	IP 501
vi	Asphaltenes, % wt., max.	10	IP 143
vii	Ash content, % wt., max.	0.12	ASTM D482
viii	Sodium content, mg/kg, max.	1/3 vanadium	IP 501
ix	Water content, % vol, max.	0.5	ASTM D95
x	Pour point, °C, max.	15	ASTM D97
xi	Flash point, °C, min.	66	ASTM D93
xii	Aluminium silicon+ silicon, mg/kg, max.	50	ASTM D5184
xiii	Net calorific value, MJ/kg, min.	40.5	ASTM D 4868
xiv	CCAI (calculated carbon aromatic index)	To be reported	ISO 8217
xv	Nitrogen content, % wt., max.	0.4	ASTM D3228
xvi	Sediment by extraction, % wt., max.	0.15	ASTM D473
xvii	Existent sludge, % m/m, max.	0.1	IP 375 Part 1 IP 390 Part 2
xvii	Potential sludge, % m/m, max.	0.1	IP 375 Part 1 IP 390 Part 2
xix	Neutralization strong acid number, mg KOH/g	Nil	ASTM D974
xx	Calcium, mg/kg, max.	30	IP 470, IP 501
xxi	Phosphorus, mg/kg, max.	15	IP 500, IP 501
xxii	Zinc, mg/kg, max.	15	IP 470, IP 501

5 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 or leak proof, clean and free from materials soluble in fuel oil as applicable.

6 Labelling

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

- manufacturer's/ supplier's name and address;
- name of product as "Heavy fuel oil";
- net content;

- d) batch/lot number;
- e) word "FLAMMABLE MATERIAL"; and
- f) warning "DANGER FUEL OIL".
- g) country of origin
- h) viscosity

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

7 Sampling

Sampling of heavy fuel oils shall be carried out in accordance with ASTM D4057 or ASTM D4177.

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Bibliography

- [1] KS 1310:2020, *Petroleum and petroleum products-Fuel oils — Specification*
- [2] TZS 673:2017, *Fuel oils — Specification*

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