



## **TANZANIA STANDARD**

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### **Railroad engine oils — specification**

**TANZANIA BUREAU OF STANDARDS**

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## Foreword

This Tanzania Standard was published under the authority of the Board of Director of Tanzania Bureau of Standards.

Tanzania Bureau of Standards (TBS) is the statutory national standards body for Tanzania established by the Standards Act Cap. 130.

Tanzania Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. The Technical Committees work under the supervision of Divisional (sectoral) Committees. The Standards are developed in accordance with the Guide and Procedure for Development of Tanzania Standards and TZS 0, *Guide for presentation of Tanzania Standards*.

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

This Tanzania Standard was developed under the supervision of the Chemical and Healthcare Divisional Standards Committee, CHDC. The Technical Committee responsible for the standard is CHDC 17, *Lubricant and Oils Products*.

The reporting of the results of a test or analysis made in accordance with this Tanzania Standard, if the final value, observed or calculated is to be rounded off, shall be done in accordance with TZS 4.



## Railroad engine oils — specification

### 1 Scope

This draft Tanzania Standard specifies performance requirements, sampling, and test methods for railroad-type internal combustion engine oils intended for use in mainline locomotive diesel engines; this covers both multi-grade and single-grade oils intended for heavy-duty railroad service.

### 2 Normative references

The following documents are 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 D445, *Standard test method for kinematic viscosity of transparent and opaque liquids (and calculation of dynamic viscosity)*

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 D874, *Standard test method for sulfated ash from lubricating oils and additives*

ASTM D2270, *Standard practice for calculating viscosity index from kinematic viscosity at 40 °C and 100 °C*

ASTM D2896, *Standard test method for base number of petroleum products by potentiometric perchloric acid titration*

ASTM D4057, *Standard practice for manual sampling of petroleum and petroleum products*

ASTM D4177, *Standard practice for automatic sampling of petroleum and petroleum products*

ASTM D5185, *Standard test method for multielement determination of used and unused lubricating oils and base oils by inductively coupled plasma atomic emission spectrometry (ICP-AES)*

ASTM D5293, *Standard test method for apparent viscosity of engine oils and grateful base stocks between -5 °C and -35 °C using Cold-Cranking Simulator*

TZS 668, *Petroleum industry — Terminology*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in TZS 668 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses: — ISO Online Browsing Platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <https://www.electropedia.org/>

#### 3.1 LMOA

Performance benchmark for locomotive maintenance officers' association (LMOA) addressing deposit control, emissions compatibility, and wear protection.

### 4 Classification

Railroad engine oils shall be classified by their SAE viscosity grade (e.g., SAE 40, SAE 20W-40)

### 5 Performance Levels

All railroad engine oil products shall meet or exceed the following performance categories:

- a) LMOA Generation 4 (Gen 5).
- c) Compliance with requirements set by manufacturers such as EMD (Progress Rail), GE (Wabtec), or Caterpillar.

### 6 Requirements

#### 6.1 General requirements

The Railroad engine oil shall be clear, homogeneous, and free from suspended matter or sediments that may affect engine performance

#### 6.2 Specific requirements

Railroad engine oil shall conform to the specific requirements given in Table 1. when tested in accordance with the methods prescribed therein.

**Table 1 — Specific requirements for Railroad engine oils**

| S/No | Property                               | Requirement |             | Test Method |
|------|----------------------------------------|-------------|-------------|-------------|
|      |                                        | SAE 40      | 20W-40      |             |
| i.   | Kinematic viscosity at 100 °C, cSt     | 12.5 – 16.3 | 12.5 – 16.3 | ASTM D445   |
| ii.  | Viscosity Index, in                    | 95          | 130         | ASTM D2270  |
| iii. | Total Base Number, mgKOH/g, <i>min</i> | 11          | 11          | ASTM D2896  |
| iv.  | Sulphated ash, %, wt, <i>max.</i>      | 1.0         | 1.0         | ASTM D874   |

|       |                                                           |     |      |            |
|-------|-----------------------------------------------------------|-----|------|------------|
| v.    | Flash point (COC), °C, <i>min.</i>                        | 220 | 220  | ASTM D92   |
| vi.   | Pour point, °C, <i>max</i>                                | -9  | -18  | ASTM D97   |
| vii.  | Zinc content, ppm, <i>max.</i>                            | 10  | 10   | ASTM D5185 |
| viii. | Low temp. cranking viscosity at -15 °C, mPa.s, <i>max</i> | -   | 9500 | ASTM D5293 |

## 6 Packaging, marking and labelling

### 6.1 Packaging

**6.1.1** Railroad engine oil shall be packaged in clean, dry, sound, and securely sealed containers constructed of materials that do not react with or affect the product quality.

**6.1.2** The containers shall protect the fluid against physical damage, atmospheric moisture ingress, oxidation, and contamination during transportation, handling, and storage.

### 6.2 Marking and labelling

Each container shall be legibly and indelibly marked in English and/or Kiswahili with the following minimum information:

- a) Product name
- b) SAE viscosity grade
- c) Commercial brand name or trade mark;
- d) Name and physical address of the manufacturer, blender, or packer;
- e) Net content by volume (in liters, L) or mass (in kilograms, kg);
- f) Performance level (e.g., LMOA Gen 4, API CD/CF)
- g) Batch or lot identification number;
- h) expiration or recommended shelf-life period;
- i) Country of origin.

## 7 Sampling

Sampling of Railroad engine oil for testing and compliance inspection shall be carried out in accordance with **ASTM D4057** (manual sampling) or **ASTM D4177** (automatic sampling).