MMDC 3 (4957) DTZS

ICS 75.160.20

TANZANIA STANDARD

Petroleum Coke — Specification

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TANZANIA BUREAU OF STANDARDS

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First Edition 2026

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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 Mining and Minerals Divisional Standards Committee, *MMDC*. The Technical Committee responsible for the standard is *MMDC 3, Solid mineral fuels and related 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.

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Petroleum Coke — Specification

1 Scope

This draft Tanzania Standard prescribes the technical requirements, sampling methods, and test procedures for Raw Petroleum Coke (RPC) and Calcined Petroleum Coke (CPC**)**. It applies to petroleum coke intended for use in the manufacture of electrodes, carbon and graphite products, carbon anodes, cement production, and other industrial applications.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the edition cited applies; for undated references, the latest edition of the referenced document applies:

***TZS 4**, Rules for rounding off numerical values*

***ISO 18283**, Hard coal and coke — Manual sampling and sample preparation*

***ISO 11722**, Solid mineral fuels — Hard coal — Determination of moisture in the general analysis test sample by drying in nitrogen*

***ISO 1171**, Solid mineral fuels — Determination of ash*

***ISO 562**, Hard coal and coke — Determination of volatile matter*

***ISO 19579**, Solid mineral fuels — Determination of sulfur by IR spectrometry*

***ISO 20884**, Petroleum products — Determination of sulfur content of automotive fuels — Wavelength-dispersive X-ray fluorescence spectrometry*

***ISO 12980**, Carbonaceous materials used in the production of aluminium — Calcined coke — Determination of grain density using xylene by pyknometer*

***ISO 10142**, Carbonaceous materials used in the production of aluminium — Calcined coke — Determination of grain density using toluene by pyknometer*

***ISO 10143**, Carbonaceous materials used in the production of aluminium — Calcined coke — Determination of electrical resistivity of granules*

***ASTM D7582**, Standard Test Methods for Proximate Analysis of Coal and Coke by Macro Thermogravimetric Analysis*

***ASTM D6357**, Standard Test Methods for Determination of Trace Elements in Coal and Coke by ICP-AES / ICP-MS*

***ASTM D6376**, Standard Test Method for Determination of Trace Metals in Petroleum Coke by Wavelength Dispersive X-Ray Fluorescence Spectroscopy*

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3 Terms and Definitions

For the purposes of this document, the terms and definitions given in TZS 1934-2/ISO 1213-2 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 Foreign matter

Any extraneous physical contamination or unwanted substance present in a lot of petroleum coke that is not derived from the original feed or thermal cracking process itself

3.2 Petroleum coke

Carbon-rich, solid material derived from the thermal cracking and refining of heavy petroleum fractions

4 Classification, Types, and Grades

Petroleum coke shall be categorized into the following types and grades based on chemical composition and heat treatment**:**

4.1 Raw Petroleum Coke (RPC)

4.1.1 Premium Grade: Very low sulfur content (≤ 1.0 %m/m).

4.1.2 Grade A: Low sulfur content (1.10 - 1.50 % m/m).

4.1.3 Grade B: High sulfur content (1.60 -2.50 % m/m).

4.2 Calcined Petroleum Coke (CPC)

4.2 Grade A: Low sulfur content (≤1.25 % m/m).

4.3 Grade B: High sulfur content (1.26 - 2.50 % m/m)

5 Requirements

5.1 General Requirements

5.1.1 The material shall be a homogeneous petroleum processing derivative.
5.1.2 Petroleum coke shall be free from all foreign matter, visible impurities, and extraneous inclusions.

5.2 Specific Requirements

Raw Petroleum Coke and Calcined Petroleum Coke shall conform to the limiting values prescribed in ***Table 1*** when tested in accordance with the specified reference methods.

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Table 1 — Technical Requirements for Petroleum Coke

S/No	Characteristic/ Parameter	Raw Petroleum Coke (RPC), Requirements			Calcined Petroleum Coke (CPC), Requirements		Test Method
		Premium	Grade A	Grade B	Grade A	Grade B	
i.	Moisture Content (as received), % m/m, *Max*	10	10	10	To report	To report	ISO 11722
ii.	Moisture Content (after initial drying), % m/m, *Max*	2	2	2	0.1	0.1	ISO 11722
iii.	Total Moisture Content, % m/m, *Max*	12	12	12	0.1	0.1	ISO 11722
iv.	Ash Content, % *m/m*, *Max*	0.45	0.45	0.45	0.5	0.5	ISO 11722
v.	Volatile Matter (dry basis), % *m/m, max*	–16	–16	–16	0.4	0.4	ISO 562
vi.	Vibrated Bulk Density, g/cm^3	To report	To report	To report	To report	To report	ISO 10143
vii.	Real Density, g/cm^3, *Min*	To report	To report	To report	2.03	2.03	ISO 12980
viii.	Fixed Carbon, % *m/m*, *Min*	85	85	85	97	97	Annex B
ix.	Total Sulfur, % *m/m*,	1.0 max	1.1 - 1.5	1.6 - 2.5	1.25, max	1.26 - 2.5	ISO 19579 / ISO 20884
x.	Silicon (Si), % *m/m*, *Max*	To report	To report	To report	0.05	0.05	ASTM D6376 / ASTM D6357
xi.	Iron (Fe), % *m/m*, *Max*	To report	To report	To report	0.04	0.04	ASTM D6357
xii.	Vanadium (V), % m/m, *Max*	To report	To report	To report	0.03	0.03	ASTM D6357
xiii.	Nickel (Ni), % % *m/m*, *Max*	To report	To report	To report	To report	To report	ASTM D6357

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6 Sampling

Sampling of Raw Petroleum Coke and Calcined Petroleum Coke shall be carried out in accordance with TZS 1963/ISO 13909(all relevant parts) to ensure representative samples are obtained for analysis.

7 Packaging, Marking, and Labeling

7.1 Packaging

7.1.1 Petroleum coke shall be supplied either in bulk (loose in vessels, rail wagons, or trucks) or packaged in clean, heavy-duty bags or containers designed to prevent contamination and moisture ingress.

7.1.2 Transport compartments and bags shall be free from previous cargo contamination

7.2 Marking and Labeling

Each bag, container, or bulk consignment dispatch document shall be clearly and indelibly marked with the following information:

a) Name, type, and grade of the product (e.g., Calcined Petroleum Coke — Grade A);

b) Name, initials, or registered trademark of the manufacturer or supplier;

c) Batch, code, or lot identification number;

d) Net content;

e) Country of origin.

Annex A

(Normative)

Rapid Moisture Determination via Automated Moisture Analyzer

A.1 Principle

A known test sample is placed in an automated thermogravimetric moisture balance. The instrument records the initial weight and heats the sample to a controlled temperature of (107 ± 3) ^{o}C. Heating continues until consecutive mass readings indicate constant weight loss.

A.2 Procedure

A. Homogenize the sample thoroughly to ensure no large unrepresentative lumps remain.

B. Tare a clean, dry balance pan and place approximately 20 g of sample on the pan.

C. Initiate the automated heating cycle to maintain (107± 3) ^{0}C.

D. Record the final moisture percentage displayed when constant mass is achieved.

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Annex B

(Normative)

Calculation of Fixed Carbon

Fixed carbon represents the non-volatile solid combustible residue remaining after determining moisture, ash, and volatile matter content. It is calculated as follows:

Fixed Carbon (% m/m) = 100 – (Moisture % + Ash % + Volatile Matter %)

Bibliography

IS 8502: 2025, *Petroleum Coke — Specification (Third Revision)*

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