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(REV TZS 983: 2007)

Air Quality - Vehicular Exhaust Emissions Limits

0. Foreword

Emissions from motor vehicles are significant source of air pollution. The problem of vehicular emissions is compounded by the fact that the pollutants are emitted at ground level which is in close proximity to the breathing zones of people.

Vehicular emission contributes significantly to ambient concentrations of pollutants such as carbon monoxide, oxides of nitrogen, sulphur dioxide, and particulates. At sufficiently high concentrations, these pollutants can cause health problems as well as degrading the environment and quality of life.

In particular, diesel-driven vehicles emit particulates that are very fine and a large proportion of them are less than 2.5 microns in size. These fine particulates are generally known as PM2.5 and they can penetrate the deeper recesses of human lungs and cause respiratory problems.

With increasingly growing number of vehicles, it is therefore imperative to have a stringent programme to control smoke emission from vehicles to ensure that ambient air quality remains healthy.

This draft standard together with other initiatives which include the use of cleaner fuel, such as unleaded petrol and diesel with low sulphur content of below 0.05% could enable achieving the goal of having healthy ambient air quality.

In the preparation of this standard, considerable assistance was derived from the following sources

EU Directive 96/69/EC exhaust emissions limits for passenger cars and light commercial vehicles

EU Directive 91/542/EEC Stage II for Heavy Duty Vehicles (Category N_2)

EU Directive 97/24/EC emission limits for motorcycles and scooters

This assistance is gratefully acknowledged.

In reporting the results of a test or analysis made in accordance to this standard, if the final value, observed or calculated is to be rounded off, it shall be done in accordance with TZS 4: 1979 (see Clause 2)

1. Scope

This draft Tanzania Standard gives permissible limits of some common pollutants found in exhaust emissions of motor vehicles, namely carbon monoxide, suspended particulate matters (SPM), oxides of nitrogen, and hydrocarbons. The standard covers all types of vehicles namely, passenger cars, light commercial vehicles, heavy-duty vehicles, and two and four strokes motorcycles and scooters.

2. References

For the purpose of this draft standard the following references shall apply:

TZS 4: 1979: Rounding off Numerical Values

TZS 672: 2001: Unleaded petrol (gasoline) for motor vehicles - Specification.

TZS 674: 2001: Automotive diesel fuel – Specification

TZS 698: 2003: **Road vehicles** – Code of practice for inspection and testing of used motor vehicles for road worthiness.

TZS 836 – 1: 2004: **Air Quality – General Considerations** – *Vocabulary.*

TZS 836 – 2: 2004: **Air Quality – General Considerations** – *Particle size fraction definitions for health –related sampling.*

EMDC 2 (1163) Part 7/ISO 3929 – **Road vehicles** – Measurement methods for exhaust gas emissions during inspection or maintenance

ISO 3930/OIML (R 99[1]), Instruments for measuring vehicle exhaust emissions

3. Terminology

For the purpose of this draft standard, the following definitions shall apply:

Ambient air: An outdoor air to which people, plants, animals or material may be exposed.

Suspended particulate matter*:* Airborne particles of 10 microns or less in diameter.

NOTE
This is also the inhalable fraction (PM 10)

Black smoke: Visible (black) aerosol usually resulting from combustion.

Emission Limit*:* Highest permissible quantity of pollutants released into the air from a pollution source, expressed as the concentration of pollutants in relation to one unit of production or to the degree of air pollution caused by these sources (e.g., dark color of smoke).

Immission: Transfer of pollutants from the atmosphere to a receptor

4. Vehicular exhaust emission limits

Table 1
Emission Limits for Passenger Cars (>2.5 tonnes)

***Note*: Limits shall be determined by methods conforming to**
TZS 985/ISO 3929 and/or Flue gas analyzers conforming of TZS 986/ISO 3930

Compound	**Limit (g/km)**	
	Diesel	**Petrol (Gasoline)**
Carbon Monoxide (CO)	2.72	2.72
Hydrocarbons (HC)	–	0.20
Hydrocarbons and Nitrogen Oxides (HC+NOx)	0.97	0.97
NOx	0.50	0.15
Particulate Matters (PM)	0.14	-

Table 2
Emission Limits for Light Commercial Vehicles, g/km

***Note*: Limits shall be determined by methods conforming to**
TZS 985/ISO 3929 and/or flue gas analyzers conforming of TZS 986/ISO 3930

Compound	**Limit (g/km)**	
Category 1 (<1305 kg)		
	Diesel	**Petrol (Gasoline)**
CO	2.72	2.72
HC	-	0.20
HC+NOx	0.97	0.50
NOx	0.50	0.15
PM	0.14	-
Category 2 (1305-1760 kg)		
	Diesel	**Petrol (Gasoline)**
CO	5.17	5.17
HC	-	0.40
HC+NOx	1.40	1.40
NOx	0.65	0.30
PM	0.19	-

Table 3
Emission Limits for Medium Commercial Vehicles, (>1760 kg)

***Note*: Limits shall be determined by methods conforming to**
TZS 985/ISO 3929 and/or flue gas analyzers conforming of TZS 986/ISO 3930

Compound	**Limit (g/km)**	
	Diesel	**Petrol (Gasoline)**
CO	6.90	6.90
HC+NOx	1.70	1.70
NOx	0.78	0.78
PM	0.25	-

Table 4

Emission Limits for Heavy Duty (HD) Diesel Engines

***Note*: Limits shall be determined by methods conforming to**
TZS 985/ISO 3929 and/or flue gas analyzers conforming of TZS 986/ISO 3930

Pollutant	**Limit (g/kWh)**
CO	4.5
NOx	1.1
HC	8.0
PM	0.612
Smoke	0.15*

*The unit should be gm^{-1}

Table 5
Exhaust Emission Limits for 3 and 2-Wheel Vehicles

***Note*: Limits shall be determined by methods conforming to**
TZS 985/ISO 3929 and/or flue gas analyzers conforming of TZS 985/ISO 3930

Emission Limits for 3 - Wheel Gasoline Vehicles	
Pollutant	**Limit (g/km)**

CO	4.0
HC+NOx	2.0
Emission Limits for 2 - Wheel Gasoline Vehicles	
Pollutant	**Limit (g/km)**
CO	2.00
HC+NOx	3.60

ANNEX 1 Informative

Vehicle Emission Test Types and Equipment

Acceleration Simulation Mode (ASM-2 test)- An emissions test for vehicles Model Year 1995 and older that uses a dynamometer (a set of rollers on which a test vehicle's tires rest) which applies an increasing load or resistance to the drive train of a vehicle, thereby simulating actual tailpipe emissions of a vehicle as it is moving and accelerating. The ASM-2 is comprised of two phases:

PHASE A: The 50/15 mode-in which the vehicle is tested on the dynamometer simulating the use of 50% of the vehicle's available horsepower at a constant speed of 15 mph

PHASE B: The 25/25 mode-in which the vehicle is tested on the dynamometer simulating the use of 25% of the vehicle's available horsepower at a constant speed of 25 mph

On-Board Diagnostics (OBD)- Computer system installed in a vehicle by the manufacturer which monitors the performance of the emission control equipment, fuel metering system, and ignition system to detect malfunction or deterioration in performance that would be expected to cause the vehicle not to meet emissions standards.

Two Speed Idle (TSI)- A tailpipe test that tests vehicles for carbon dioxide (CO_2) in addition to hydrocarbons (HC) and carbon monoxide (CO) and is comprised of two phases: (1) high speed test [2200-2800 Revolution Per Minutes (RPMs)] for the first phase of the emissions test; then, (2) tested at idle (350-1200 RPMs.)