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**Road vehicles — Measurement methods
for exhaust gas emissions during
inspection or maintenance**

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 3929 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 5, *Engine tests*.

This second edition cancels and replaces the first edition (ISO 3929:1976), of which it constitutes a technical revision.

Annexes A and B of this International Standard are for information only.

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Road vehicles — Measurement methods for exhaust gas emissions during inspection or maintenance

1 Scope

This International Standard establishes the test procedures for direct measurement of the concentration of exhaust gas emissions from road vehicles with a maximum authorized total mass (ISO-M08)¹⁾ not exceeding 3,5 t, equipped with controlled ignition engines, excluding those which are supplied with fuel/oil mixture.

It defines the recommended test procedure for

- periodic inspections in official garages;
- official roadside checks (e.g. by police);
- maintenance and diagnostic operations.

These procedures may be used totally or partially.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3930:1993, *Road vehicles — Measurement equipment for exhaust gas emissions during inspection or maintenance — Technical specifications*.

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 idle speed rotational frequency: Engine rotational frequency with fuel system controls (accelerator, choke, etc.) non-operative;

- the gearshift lever in neutral and the clutch engaged for vehicles with manually operated or semi-automatic transmission;
- the gear selector in neutral or park for vehicles with automatic transmission;
- accessories and optional equipment which modify the rotational frequency used in accordance with the manufacturer's recommendations or regulatory requirements.

3.2 accelerated idle speed rotational frequency: Engine rotational frequency specified by the manufacturer or regulatory requirements with

- fuel system controls (accelerator, choke, etc.) in the position to run at accelerated idle;

1) In accordance with ISO 1176:1990, *Road vehicles — Masses — Vocabulary and codes*.

- the gearshift lever in neutral and the clutch engaged for vehicles with manually operated or semi-automatic transmission;
- the gear selector in neutral or park for vehicles with automatic transmission;
- accessories and optional equipment which modify the rotational frequency used in accordance with the manufacturer's recommendations or regulatory requirements.

3.3 after treatment system (ATS): Additional device intended to reduce the exhaust emission level.

4 Instrumentation

4.1 Analyser that conforms to ISO 3930, suitable for the concentrations of exhaust gas emissions from the vehicle under test.

4.2 Engine lubricant temperature meter in the sump or lubricant reservoir with a measurement accuracy of at least ± 2 K between 343 K and 373 K. Readings outside this range shall also be possible.

4.3 Revolution counter (tachometer) to measure engine rotational frequency from the ignition system. Under control conditions the measurement accuracy shall be at least ± 20 min^{-1} between 600 min^{-1} and 1 000 min^{-1} , and ± 50 min^{-1} outside this range.

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4.4 Ambient temperature meter with a measurement accuracy of at least ± 2 K between 278 K and 313 K.

5 Check, maintenance periodicity and precautions for use of instruments

5.1 Check before use

The power supply to the instruments shall conform to the manufacturer's specifications.

Check that the instruments are ready for testing according to the manufacturer's operating instructions in the owner's handbook:

- at least at the beginning of a day of tests;
- when the ambient conditions have changed;
- at the beginning of the tests in each new test site, for official roadside checks.

For the analyser, the zero and span calibration check shall be performed with reference gases or with electronic or electromechanical devices (see ISO 3930:1993, subclause 4.1.4).

5.2 Maintenance periodicity

All accuracy checks shall be carried out according to national regulations.

Periodic maintenance shall be carried out in accordance with the manufacturer's instructions in the maintenance handbook. Operations shall be recorded in this handbook.

5.3 Precautions for use

The working area shall be a firm, horizontal surface. Ambient conditions shall be those defined in ISO 3930:1993, subclauses 4.1.20, 4.1.21 and 4.1.22.

The working area shall not be directly exposed to

- rain, snow or sunlight;
- significant vibration;
- a corrosive and/or polluted atmosphere which might influence the measurement results;
- electromagnetic interference which might influence the measurement results.

6 General verification of vehicle

The exhaust system of the vehicle shall be leakproof. Verify this condition by sealing the exhaust pipe outlet while the engine is idling. No significant leakage of exhaust gases from pipe connections shall be found.

All accessories and optional equipment which modify the idle speed rotational frequency shall be used in accordance with the manufacturer's recommendations or regulatory requirements.

The sampling probe shall be inserted at least 300 mm into the exhaust outlet pipe. If the exhaust pipe shape does not allow such insertion, an exhaust extension pipe shall be provided.

In the case of several exhaust pipes, they shall be connected in a single outlet unless specified otherwise by the manufacturer. If this type of connection is not practicable, the arithmetic average of the concentration values, measured at each outlet, shall be used. In all cases, the device exhaust adaptor used shall not influence engine running.