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Mopeds — Measurement method for gaseous exhaust emissions and fuel consumption —

Part 2: Test cycles and specific test conditions

Cyclomoteurs — Méthode de mesure des émissions de gaz polluants et de consommation de combustible —
Partie 2: Cyclomoteurs d'essai et conditions d'essai spécifiques

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 6855-2 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 23, *Mopeds*.

ISO 6855-2 cancels and replaces ISO 6855:1983 and ISO 7859:2000, both of which have been technically revised.

ISO 6855 consists of the following parts, under the general title *Mopeds — Measurement method for gaseous exhaust emissions and fuel consumption*:

— *Part 1: General test requirements*

— *Part 2: Test cycles and specific test conditions*

— *Part 3: Fuel consumption measurement at a constant speed*

Introduction

This part of ISO 6855 has been prepared to provide details of the typical test cycles for measurement of exhaust gas and fuel consumption. The measurements can be carried out by referring to this part of ISO 6855 and ISO 6855-1.

Mopeds — Measurement method for gaseous exhaust emissions and fuel consumption —

Part 2: Test cycles and specific test conditions

1 Scope

This part of ISO 6855 defines test cycles for measurement for gaseous exhaust emissions from mopeds, as well as for determining the fuel consumption of mopeds as defined in ISO 3833, equipped with a spark ignition engine (four-stroke engine, two-stroke engine or rotary piston engine).

2 Normative references

The following referenced 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 (including any amendments) applies.

ISO 4164, *Mopeds — Engine test code — Net power*

ISO 6855-1:2012, *Measurement methods for gaseous exhaust emissions and fuel consumption — Part 1: General test requirements*

ISO 7116, *Mopeds — Measurement of maximum speed*

3 Test cycle

3.1 Introduction

The test cycle is equivalent to the test cycle specified in the European Union Commission Directive 97/24/EC [5].

The moped shall be placed on a chassis dynamometer equipped with a brake and flywheel. The test shall be conducted over four elementary urban cycles lasting a total of 448 s without interruption. Immediately before starting the first test cycle, the moped shall undergo four consecutive test cycles, each lasting 112 s, in order to warm up the engine.

During the test the exhaust gases shall be diluted with air so that the flow volume of the mixture remains constant. Throughout the test, a continuous flow of samples of the mixture shall be passed into one or more bags so that concentrations (average test values) of carbon monoxide, unburnt hydrocarbons, oxides of nitrogen and carbon dioxide can be determined.

3.2 Type 1 test

3.2.1 Operating cycle on the chassis dynamometer

3.2.1.1 Description of cycle

The operating cycles on the chassis dynamometer are indicated in 3.2.4.

3.2.1.2 General conditions for carrying out the cycle

Preliminary test cycles shall be carried out if necessary to determine how best to actuate the accelerator and brake controls so as to achieve a cycle approximating to the theoretical cycle within the prescribed limits.

3.2.1.3 Use of the gearbox

The gearbox shall be used in accordance with the manufacturer's instructions. If there are no manufacturer's instructions, the following rules apply.

3.2.1.3.1 Manual gearbox

At a steady speed of 20 km/h, the engine speed shall as far as possible remain between 50 % and 90 % of the maximum speed. If this speed can be achieved using more than one gear, the engine is tested using the highest gear.

During acceleration, the engine shall be tested using the gear which allows maximum acceleration. The next higher gear shall be engaged, at the latest, when the engine speed has reached 110 % of the speed at which the maximum net power output occurs. During deceleration, the next lower gear shall be engaged before the engine begins to vibrate and, at the latest, when the engine speed has fallen to 30 % of the speed of the maximum net power. The first gear shall not be engaged during deceleration.

3.2.1.3.2 Automatic gearbox and torque converter

The drive setting shall be used.

3.2.1.4 Tolerances

3.2.1.4.1 The theoretical speed shall be maintained to a tolerance of ± 1 km/h during all phases. Speed tolerances greater than those prescribed are permitted during phase changes provided that the tolerances are never exceeded for more than 0,5 s on any one occasion, in all cases subject to the provisions of 3.2.2.5.2 and 3.2.2.6.3.

3.2.1.4.2 A tolerance of ± 0,5 s above or below the theoretical times shall be allowed.

3.2.1.4.3 The speed and time tolerances are combined as indicated in 3.2.4.

3.2.1.4.4 The distance travelled during the cycle shall be measured within an accuracy of 10 m.

3.2.2 Procedure for chassis dynamometer tests

3.2.2.1 Special conditions for carrying out the cycle

3.2.2.1.1 The temperature in the premises where the chassis dynamometer bench is situated shall be between 293 K and 303 K throughout the test, and shall be as close as possible to the temperature of the premises where the mopeds were conditioned.

3.2.2.1.2 The moped shall as far as possible be horizontal during the test so as to avoid any abnormal distribution of the fuel.

3.2.2.1.3 During the test, the moped speed shall be plotted against time in order to check that the cycles have been performed correctly.

3.2.2.1.4 The temperatures of the cooling water and the crankcase oil may be recorded.

3.2.2.2 Starting up the engine

3.2.2.2.1 Once the preliminary operations on the equipment for collecting, diluting, analysing and measuring the gases have been carried out, the engine is started up by means of the devices provided for that purpose, such as the choke, the starter valve, etc., according to the manufacturer's instructions.

3.2.2.2.2 The first cycle begins when the taking of samples and the measuring of the pump rotations commence.

3.2.2.3 Use of the manual choke

The choke shall be cut out as soon as possible and in principle before acceleration from 0 to 50 km/h. If this requirement cannot be met, the moment of actual cut-out shall be indicated. The choke shall be adjusted in accordance with the manufacturer's instructions.

3.2.2.4 Idling

3.2.2.4.1 Manual-shift gearbox

3.2.2.4.1.1 During periods of idling the clutch shall be engaged and the gears in neutral.

3.2.2.4.1.2 To enable the accelerations to be performed according to the normal cycle, the vehicle shall be put in first gear, with the clutch disengaged, 5 s before commencement of the acceleration following the idling period in question.

3.2.2.4.1.3 The first idling period at the beginning of the cycle consists of 6 s of idling in neutral with the clutch engaged and 5 s in first gear with the clutch disengaged.

3.2.2.4.1.4 For the idling periods during each cycle, the corresponding times are 16 s in neutral and 5 s in first gear with the clutch disengaged.

3.2.2.4.1.5 The last idling period in the cycle consists of 7 s in neutral with the clutch engaged.

3.2.2.4.2 Semi-automatic gearboxes

The manufacturer's instructions for driving in town or, in their absence, instructions applicable to manual gearboxes, shall be followed.

3.2.2.4.3 Automatic gearboxes

The selector shall not be operated at any time during the test unless the manufacturer specifies otherwise. In the latter case, the procedure for manual gearboxes applies.

3.2.2.5 Accelerations

3.2.2.5.1 Accelerations shall be effected so as to ensure that the rate of acceleration is as constant as possible throughout the operation.

3.2.2.5.2 If the acceleration capacities of the moped are not sufficient to perform the acceleration cycles within the prescribed tolerances, the moped shall be driven with the throttle completely open until the speed prescribed for the cycle has been reached. The cycle may then continue normally.

3.2.2.6 Decelerations

3.2.2.6.1 All decelerations shall be effected by completely closing the throttle, the clutch remaining engaged. The engine shall be disengaged at a speed of 10 km/h

3.2.2.6.2 If the period of deceleration is longer than that prescribed for the corresponding phase, the vehicle's brakes are used to keep to the cycle.

3.2.2.6.3 If the period of deceleration is shorter than that prescribed for the corresponding phase, the timing of the theoretical cycle is restored by a steady-state or an idling period merging into the following steady-state or idling operation. In this case, 3.2.1.4.3 is not applicable.

3.2.2.6.4 At the end of the deceleration period (stopping moped on the rollers), the gear shall be put into neutral and the clutch engaged.

3.2.2.7 Constant speeds

3.2.2.7.1 "Pumping" or the closing of the throttle shall be avoided when passing from acceleration to the following steady speed.

3.2.2.7.2 Periods of constant speed shall be achieved by keeping the accelerator position fixed.

3.2.3 Analysis

The exhaust gases contained in the bag shall be analysed as soon as possible and in any event not later than 20 min after the end of the test cycle.

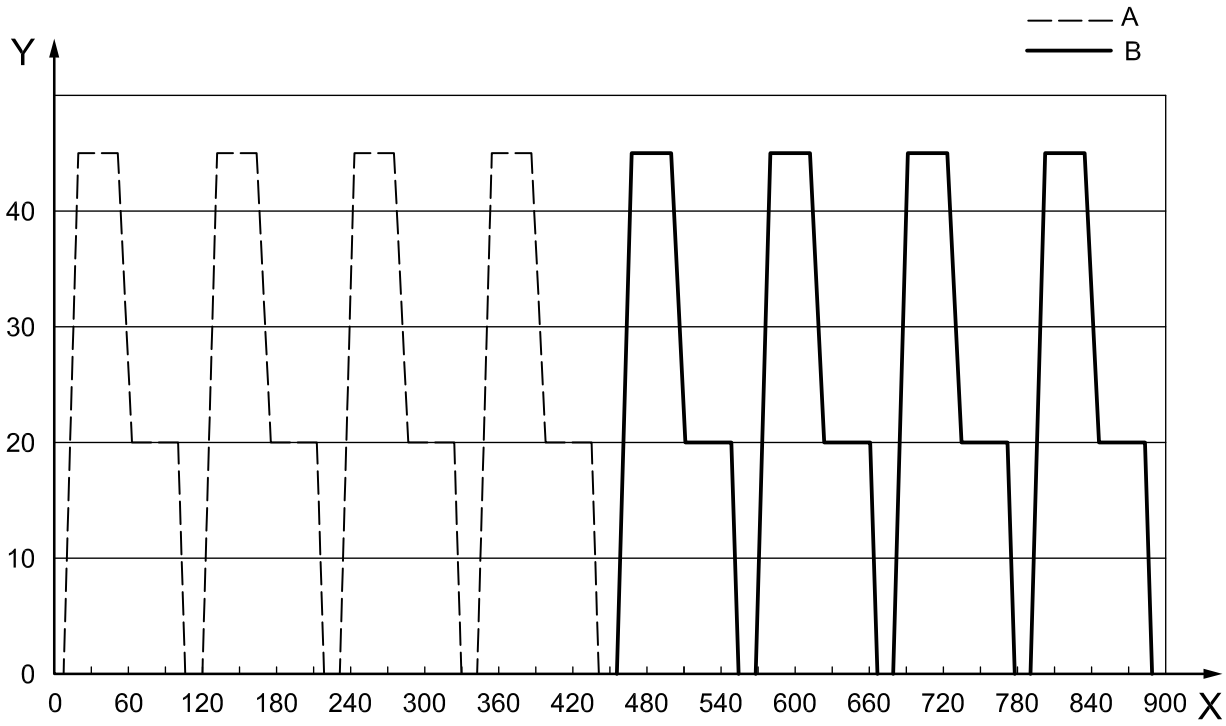
3.2.4 Operating cycle

The operating cycle on the dynamometer is as indicated in Table 1 and plotted in Figure 1.

Table 1 — Operating cycle on the dynamometer

Phase	Operation	Acceleration m/s^2	Speed Km/h	Duration sec	Cumulative time sec
1	Idling	—	0	8	8
2	Acceleration	Full throttle	0 to max	57 [a]	—
3	Steady speed	Full throttle	max		—
4	Deceleration	- 0,56	max to 20		65
5	Steady speed	—	20	36	101
6	Deceleration	- 0,93	20 to 0	6	107
7	Idling	—	0	5	112

[a] Total duration of phases 2 to 4.



Key

X time, s
Y speed, km/h
A warming up
B sampling

Figure 1 — Operating cycle on chassis dynamometer

3.3 Type 2 test

3.3.1 Measurement conditions

The mass of carbon monoxide and the mass of unburnt hydrocarbons emitted with the engine at idling speed shall be measured for one minute.

In the case of mopeds with manual transmission gearboxes, the test shall be carried out with the gear lever in the neutral position and with the clutch engaged.

In the case of mopeds with automatic transmission gearboxes, the test shall be carried out with the clutch engaged and with the driving wheel immobile.

The idling speed of the engine during the idling period shall be adjusted in accordance with the manufacturer's instructions.

3.3.2 Sampling of gases

The electromagnetic valves shall be set in the position for direct analysis of the diluted exhaust gases and the dilution air.

The analyser shall show a steady value within one minute after being connected up to the probe.

The concentrations of HC and CO in the samples of diluted exhaust gases and in the dilution air are determined from the values shown or recorded by the measuring equipment by applying the correct calibration curves.