



BSI Standards Publication

# Motorcycles — Measurement method for gaseous exhaust emissions and fuel consumption

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Part 1: General test requirements

## National foreword

This British Standard is the UK implementation of ISO 6460-1:2022. It supersedes BS ISO 6460-1:2007+A1:2015, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee AUE/14, Motor cycles and mopeds.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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**Motorcycles — Measurement method  
for gaseous exhaust emissions and  
fuel consumption —**

Part 1:  
**General test requirements**

*Motorcycles — Méthode de mesure des émissions de gaz  
d'échappement et de la consommation de carburant —*

*Partie 1: Exigences générales d'essai*



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# Contents

	Page
<b>Foreword</b> .....	<b>v</b>
<b>Introduction</b> .....	<b>vi</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Symbols</b> .....	<b>2</b>
<b>5 Standard reference conditions</b> .....	<b>5</b>
<b>6 Tests</b> .....	<b>5</b>
6.1 Measurement of gaseous exhaust emissions.....	5
6.1.1 Average gaseous exhaust emissions during conventional test cycles.....	5
6.1.2 Measurement of gaseous exhaust emissions at an idling speed.....	5
6.2 Measurement of fuel consumption.....	5
6.2.1 Average fuel consumption during conventional test cycles.....	5
6.2.2 Fuel consumption at a constant speed.....	5
<b>7 Measurement equipment</b> .....	<b>5</b>
7.1 General.....	5
7.2 Chassis dynamometer.....	5
7.3 Gas-collection equipment.....	5
7.4 Analytical equipment.....	7
7.5 Cooling equipment.....	8
7.6 Fuel consumption measurement.....	8
7.7 Accuracy of instruments and measurements.....	9
<b>8 Preparing the test</b> .....	<b>9</b>
8.1 Engine fuel and lubricants.....	9
8.2 Description of the test motorcycle.....	9
8.3 Conditioning/preparation of the test motorcycle.....	9
8.4 Calibration and adjustment of analysers.....	10
8.4.1 Calibration of the analysers.....	10
8.4.2 Adjustment of the analysers.....	11
8.4.3 Reference gases and accuracy of the mixing device.....	13
<b>9 CVS system check procedure</b> .....	<b>13</b>
<b>10 Procedure for sampling, analysing and measuring the volume of gaseous exhaust emissions</b> .....	<b>14</b>
10.1 Operations to be carried out before the test motorcycle start up.....	14
10.2 Beginning of sampling and volume measurement.....	17
10.3 End of sampling and volume measurement.....	17
10.4 Analysis.....	17
10.5 Measuring the driving distance.....	18
10.6 Open type CVS system.....	18
<b>11 Determination of the quantity of gaseous exhaust emissions</b> .....	<b>18</b>
11.1 Total diluted exhaust mixture volume corrected to the standard reference conditions.....	18
11.1.1 Total diluted exhaust mixture volume for the CVS system with CFV.....	18
11.1.2 Total diluted exhaust mixture volume for the CVS system with PDP.....	19
11.1.3 Total diluted exhaust mixture volume for the CVS system with SSV.....	19
11.2 Exhaust emissions sampling and the dilution factor.....	20
11.2.1 Exhaust emissions sampling.....	20
11.2.2 Dilution factor.....	20
11.3 Mass of the gaseous exhaust emissions.....	21
11.3.1 Mass of carbon monoxide.....	21

11.3.2	Mass of total hydrocarbons .....	22
11.3.3	Mass of non-methane hydrocarbons .....	22
11.3.4	Mass of nitrogen oxides .....	24
11.3.5	Mass of carbon dioxide .....	25
<b>12</b>	<b>Determination of the fuel consumption .....</b>	<b>25</b>
12.1	Carbon balance method .....	25
12.1.1	Fuel consumption for four-stroke engines .....	25
12.1.2	Calculation of results in litres per 100 km .....	26
12.2	Fuel flow measurement method .....	26
12.2.1	Fuel consumption for four-stroke engines .....	27
12.2.2	Calculation of results in litres per 100 km .....	27
<b>Annex A</b>	<b>(normative) Method and equipment for measuring fuel consumption by the fuel flow measurement method .....</b>	<b>28</b>
<b>Annex B</b>	<b>(informative) Example for record form of test fuel specifications .....</b>	<b>39</b>
<b>Annex C</b>	<b>(informative) Exhaust emissions leakage check procedure for the open type CVS system .....</b>	<b>40</b>
<b>Annex D</b>	<b>(informative) Determination of the dilution factor .....</b>	<b>46</b>
<b>Annex E</b>	<b>(informative) Principle of the carbon balance method for four-stroke engines .....</b>	<b>55</b>
<b>Annex F</b>	<b>(informative) Simplified determination method of the atom number ratio of hydrogen and carbon, and that of oxygen and carbon in gasoline .....</b>	<b>56</b>
<b>Annex G</b>	<b>(informative) CVS system check procedure .....</b>	<b>57</b>
<b>Bibliography</b>	<b>.....</b>	<b>58</b>

## 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 32, *Road vehicles*, Subcommittee SC 38, *Motorcycles and mopeds*.

This second edition cancels and replaces the first edition (ISO 6460-1:2007), which has been technically revised. It also incorporates the Amendment ISO 6460-1:2007/Amd.1:2015.

The main changes are as follows:

- addition of a detailed description of a critical flow venturi (CFV) as a flow measurement principle to the CVS system;
- permission to use of the subsonic venturi (SSV) as a flow measurement principle to the CVS system;
- addition for the measurement of methane (CH<sub>4</sub>) concentration, either a GC-FID (flame ionization detector with gas chromatograph) or an NMC-FID (flame ionization detector with non-methane cutter);
- addition of a calculation method for non-methane hydrocarbons (NMHC);
- permission to determine the ratio of hydrogen and carbon ( $R_{HC}$ ) and the ratio of oxygen and carbon ( $R_{OC}$ ) by the content analysis of fuel;
- addition of calculation methods for the mass of the gaseous exhaust emissions and the fuel consumption when using oxygenated fuels;
- deletion of descriptions related two-stroke engines and diesel fuel.

A list of all parts in the ISO 6460 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

For the measurement of motorcycle fuel consumption, the carbon balance method, where the fuel consumption is calculated from analysis of the carbon quantity in the exhaust emissions, is now widely used in addition to the conventional fuel flow measurement. Therefore, the measurement of exhaust emissions pollutants and fuel consumption are inseparably related to each other.

This document defines the fundamental elements such as the measurement accuracy, test motorcycle conditions and the details of the carbon balance method. The measurement of gaseous exhaust emissions and fuel consumption during test cycles can be conducted by means of this document and ISO 6460-2. Additionally with ISO 6460-3, these three documents provide details of those measurements at a constant speed.

The following revisions are mainly made in this document.

- The detailed description of a critical flow venturi (CFV), adopted by most of the manufacturers as well as a positive displacement pump (PDP), is added as a flow measurement principle to the CVS system. Also, the use of the subsonic venturi (SSV) is also permitted as a CVS flow measurement principle.
- For measurement of methane ( $\text{CH}_4$ ) concentration in the diluted exhaust mixture, either a GC-FID (flame ionization detector with gas chromatograph) or an NMC-FID (flame ionization detector with non-methane cutter) shall be used as the analytical instrument. The formula for calculating non-methane hydrocarbons (NMHC) is also defined.
- Instead of obtaining the ratio of hydrogen and carbon ( $R_{\text{HC}}$ ) and the ratio of oxygen and carbon ( $R_{\text{OC}}$ ) from the exhaust emissions analysis,  $R_{\text{HC}}$  and  $R_{\text{OC}}$  shall be determined by the fuel analysis. In addition, when using the oxygenated fuels such as gasoline (E5) and gasoline (E10), the mass of the gaseous exhaust emissions and the fuel consumption also can be calculated.
- As there has been no need for newly development of two-stroke engines and compression ignition engines in recent years, the description regarding two-stroke engines and diesel fuel is to be deleted. If these are required, see ISO 6460-1:2007.



# Motorcycles — Measurement method for gaseous exhaust emissions and fuel consumption —

## Part 1: General test requirements

### 1 Scope

This document specifies the general test requirements for measurement of the gaseous exhaust emissions from motorcycles, and for determining the fuel consumption of motorcycles as defined in ISO 3833. It is applicable to motorcycles equipped with a spark ignition engine (four-stroke engine or rotary piston engine).

### 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.

ISO 3833, *Road vehicles — Types — Terms and definitions*

ISO 6460-2:2014, *Motorcycles — Measurement method for gaseous exhaust emissions and fuel consumption — Part 2: Test cycles and specific test conditions*

ISO 6460-3:2007, *Motorcycles — Measurement method for gaseous exhaust emissions and fuel consumption — Part 3: Fuel consumption measurement at a constant speed*

ISO 11486:2006, *Motorcycles — Methods for setting running resistance on a chassis dynamometer*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 3833 and the following apply.

ISO and IEC maintain terminological 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

##### **equivalent inertia**

total inertia of the rotating masses of the chassis dynamometer, determined with respect to the reference mass of the test motorcycle, which is total unladen mass of the test motorcycle increased by a uniform figure of 75 kg, which represents the mass of a rider

Note 1 to entry: Total unladen mass of the test motorcycle includes mass of the vehicle with bodywork and all fitted equipment, electrical and auxiliary equipment for normal operation of vehicle, including liquids, tools, fire extinguisher, standard spare parts, chocks and spare wheel, if fitted.

The fuel tank shall be filled to at least 90 % of rated capacity and the other liquid containing systems to 100 % of the capacity specified by the manufacturer.