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**Motorcycles — Engine test code — Net  
power**

*Motorcycles — Code d'essai des moteurs — Puissance nette*

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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 4106 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 22, *Motorcycles*.

This third edition cancels and replaces the second edition (ISO 4106:1993), which has been technically revised.

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## Introduction

The third edition of ISO 4106 has been prepared in the framework of ISO engine power measurement standards. By applying this framework, the disadvantages of the existence of many similar, but different, ISO standards for the definition and determination of engine power can be avoided.

This framework uses the “Core” and “Satellite” approach. The “Core” standard contains the requirements that are common to all engine applications described in the scope and the “Satellite” standards contain those requirements that are necessary to tailor power measurement and declaration to suit a particular engine application. ISO 4106 is a “Satellite” standard and is only applicable in conjunction with the “Core” standard, in order to completely specify the requirements for the particular engine application — in this case, motorcycle engines. The “Core” standard therefore, is not a document that can stand alone but only represents addenda to the particular “Satellite” standard, used to create a complete standard together with the said “Satellite” standard.

The advantage of this approach is that the use of standards for the same or similar engines used in different applications will be rationalized and the harmonization of standards in the course of revision or development will be ensured.

ISO 15550 is the “Core” standard. It was prepared in order to serve as the “Core” standard for making engine power measurements. It was drafted in close co-operation between ISO/TC 70, *Internal combustion engines*, and ISO/TC 22, *Road vehicles*, ISO/TC 23, *Tractors and machinery for agriculture and forestry*, ISO/TC 127, *Earth-moving machinery* and ISO/TC 188, *Small craft*. The prerequisite for any future modification of ISO 15550 will be the formal approval of all the above technical committees. Together with the “Satellite” standard for each engine application, the “Core” standard serves as the basis for engine power declaration and measurement. Each technical committee is fully responsible for the administration of its own “Satellite” standard(s).

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# Motorcycles — Engine test code — Net power

## 1 Scope

This International Standard specifies methods for evaluating the performance of engines designed for motorcycles as defined in ISO 3833, in particular with a view to the presentation of power curves and specific fuel consumption at full load as a function of engine speed, for net power assessment. Used in conjunction with ISO 15550, it is applicable to reciprocating internal combustion engines (spark-ignition or compression-ignition) — excluding free-piston engines — and rotary piston engines, either naturally aspirated or pressure-charged and equipped with either mechanical pressure-charger or turbocharger.

## 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 2710-1:2000, *Reciprocating internal combustion engines — Vocabulary — Part 1: Terms for engine design and operation*

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

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ISO 15550:2002, *Internal combustion engines — Determination and method for the measurement of engine power — General requirements*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 2710-1, ISO 15550 and the following apply.

### 3.1

#### **net power**

power obtained on a test bed at the end of the crankshaft or its equivalent at the corresponding engine speed with the equipment and auxiliaries listed in column 2 and required in column 3 (fitted for engine net power test) of ISO 15500:2002, Table 1

NOTE Adapted from ISO 15550:2002.

### 3.2

#### **net torque**

torque transmitted on a test bed at the end of the crankshaft or its equivalent at the corresponding engine speed with the equipment and auxiliaries listed in column 2 and required in column 3 (fitted for engine net power test) of ISO 15500:2002, Table 1

NOTE Adapted from ISO 15550:2002.

**3.3  
specific fuel consumption**

amount of fuel consumed by an engine per unit of power and time

NOTE 1 The amount of lubricants for 2-stroke cycle engines is excluded.

NOTE 2 Adapted from ISO15550:2002.

**3.4  
auxiliaries**

equipment and devices necessary to make the engine acceptable for service in the intended application

**4 Symbols**

The symbols and their subscripts according to ISO 15550:2002, Tables 2 and 3, apply, except for the following:

$T_y$  temperature of air inducted into the engine<sup>1)</sup>.

**5 Standard reference conditions**

The standard reference conditions shall be according to ISO 15550:2002, Clause 5.

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**6 Test method**

**6.1 General**

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This test method is used for verifying the net power of an engine type with the declared values. It presents engine performance at full power/torque as a function of engine speed by generating curves of power and fuel consumption.

**6.2 Measuring equipment and instrument accuracy**

**6.2.1 Torque**

The dynamometer torque-measuring system shall have an accuracy of  $\pm 1\%$  in the range of scale values required for the test.

The torque-measuring system shall be calibrated to take into account friction losses. The accuracy may be  $\pm 2\%$  for measurements carried out at a power less than 50 % of maximum power.

**6.2.2 Engine speed**

The engine-speed measuring system shall have an accuracy according to ISO 15550:2002, 6.3.2.2.

**6.2.3 Fuel flow**

The fuel-flow measuring system shall have an accuracy according to ISO 15550:2002, 6.3.2.3.

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1) In ISO 15550, this symbol is instead used to designate "ambient air thermodynamic temperature during test".



### 6.2.4 Fuel temperature

The fuel-temperature measuring system shall have an accuracy according to ISO 15550:2002, 6.3.2.4.

### 6.2.5 Engine inlet air temperature

The air-temperature measuring system shall have an accuracy of  $\pm 1$  K.

### 6.2.6 Barometric pressure

The barometric-pressure measuring system shall have an accuracy of  $\pm 70$  Pa.

### 6.2.7 Back pressure in exhaust system

The system used to measure the back pressure in the exhaust system shall have an accuracy of  $\pm 25$  Pa.

### 6.2.8 Test-room humidity

The test-room-humidity measuring system shall have an accuracy of  $\pm 11$  % in relative humidity.

NOTE A relative humidity measurement accuracy of  $\pm 11$  % corresponds to a wet and dry bulb thermometer measurement accuracy of  $\pm 1$  K.

## 6.3 Setting and test conditions

### 6.3.1 Equipment and auxiliaries

During the test, the auxiliaries shall be installed on the test bench in accordance with Table 1, and according to ISO 15550:2002, Table 1, as far as possible in the same position as in the intended application.

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**Table 1 — Equipment and auxiliaries**

No.	Equipment and auxiliaries	To be fitted during the test
1	<b>Inlet system</b> Electro-control devices	Yes, if SPE
2	<b>Exhaust system</b> Electro-control devices	Yes, if SPE
3	<b>Liquid-cooling equipment</b> Engine cowling	No
4	<b>Oil cooler</b>	Yes, if SPE

### 6.3.2 Setting conditions

The setting conditions shall be according to ISO 15550:2002, 6.3.3.