BS ISO 2534:2020

BSI Standards Publication

Road vehicles — Engine test code — Gross power

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National foreword

This British Standard is the UK implementation of ISO 2534:2020. It supersedes BS ISO 2534:1998, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee MCE/22, Engines for road vehicles.

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

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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.

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).

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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.

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 34, *Propulsion, powertrain and powertrain fluids*.

This third edition cancels and replaces the second edition (ISO 2534:1998), which has been technically revised. The main changes compared to the previous edition are as follows:

— a requirement for exhaust particulate filter restriction has been added;

— a requirement for engine cooling active thermal management system settings has been added;

— a power correction factor for turbocharged engines with a system compensating the ambient conditions has been added.

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.

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Road vehicles — Engine test code — Gross power

1 Scope

This document specifies a method for testing internal combustion engines for propulsion of road vehicles as defined in ISO 3833. It applies to the evaluation of their performance with a view, in particular, to presenting curves of power and specific fuel consumption at full load as a function of engine speed.

This document is applicable to gross power assessment.

This document concerns internal combustion engines used for propulsion of passenger cars, trucks and other motor vehicles, excluding motorcycles, mopeds and agricultural tractors normally travelling on roads, and included in one of the following categories:

— reciprocating internal combustion engines (spark-ignition or compression-ignition) but excluding free piston engines;

— rotary piston engines.

These engines can be naturally aspirated or pressure charged, either using a mechanical supercharger or turbocharger.

This document is primarily intended for the communication between the engine manufacturer and the manufacturer of the vehicle. If used for advertising purposes, the ratings will clearly state that they are gross power in accordance with 9.2.

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

ISO 7876-1, *Fuel injection equipment — Vocabulary — Part 1: Fuel injection pumps*

ISO 7967-1, *Reciprocating internal combustion engines — Vocabulary of components and systems — Part 1: Structure and external covers*

ISO 7967-2, *Reciprocating internal combustion engines — Vocabulary of components and systems — Part 2: Main running gear*

ISO 7967-3, *Reciprocating internal combustion engines — Vocabulary of components and systems — Part 3: Valves, camshaft drives and actuating mechanisms*

ISO 7967-4, *Reciprocating internal combustion engines — Vocabulary of components and systems — Part 4: Pressure charging and air/exhaust gas ducting systems*

ISO 7967-5, *Reciprocating internal combustion engines — Vocabulary of components and systems — Part 5: Cooling systems*

ISO 7967-8, *Reciprocating internal combustion engines — Vocabulary of components and systems — Part 8: Starting systems*

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ISO 11614, *Reciprocating internal combustion compression-ignition engines — Apparatus for measurement of the opacity and for determination of the light absorption coefficient of exhaust gas*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 2710-1, ISO 7876-1, ISO 7967-1, ISO 7967-2, ISO 7967-3, ISO 7967-4, ISO 7967-5 and ISO 7967-8 and the following definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
gross 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 Table 1

Note 1 to entry: If the power measurement can only be carried out with a mounted gearbox, the losses in the gearbox should be added to the measured power to give the engine power.

3.2
standard production equipment
any equipment provided by the manufacturer for a particular engine application

4 Accuracy of measuring equipment and instruments

4.1 Torque

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

4.2 Engine speed (rotational frequency)

The engine speed (rotational frequency) measuring system shall have an accuracy of ±0,5 %.

4.3 Fuel flow

The fuel flow measuring system shall have an accuracy of ±1 %.

4.4 Fuel temperature

The fuel temperature measuring system shall have an accuracy of ±2 K.

4.5 Air temperature

The air temperature measuring system shall have an accuracy of ±1 K.

4.6 Barometric pressure

The barometric pressure measuring system shall have an accuracy of ±100 Pa.

NOTE 1 Pa = 1 N/m^2.

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4.7 Back pressure in exhaust system

The system used to measure the back pressure in the exhaust system shall have an accuracy of ±200 Pa. The measurement shall be made subject to footnote b of Table 1.

4.8 Depression in inlet system

The system used to measure the depression in the inlet system shall have an accuracy of ±50 Pa. The measurement shall be made subject to footnote a of Table 1.

4.9 Absolute pressure in inlet duct

The system used to measure the absolute pressure in the inlet duct shall have an accuracy of ±2 % of the measured pressure.

Table 1 — Installation of equipment and auxiliaries during test

No.	Equipment and auxiliaries	Fitted for gross power test
1	Inlet system	
	Inlet manifold	Yes, standard production equipment
	Crankcase emission control system	Optional
	Control devices for dual induction inlet manifold system	Yes, standard production equipment
	Air flow meter	Yes, standard production equipment
	Air inlet ductwork[a] Air filter[a] Inlet silencer[a]	Optional
	Speed-limiting device[a]	No
2	Induction heating device of inlet manifold	Yes, standard production equipment If possible, to be set in the most favourable position
3	Exhaust system	
	Exhaust purifier (s)[b] Exhaust manifold Pressure-charging devices	Yes, standard production equipment
	Connecting pipes[c] Silencer[b] Tail pipe[b]	Optional, may use minimum loss bench system
	Exhaust brake[d]	No
4	Fuel supply pump[e]	Yes, standard production equipment
5	Carburation equipment	
	Carburettor Electronic control system, air-flow meter, etc. (if fitted) Equipment for gaseous fuel engines Pressure reducer Evaporator Mixer	Yes, standard production equipment
6	Fuel injection equipment [spark-ignition and compression ignition (diesel)]	
	Prefilter	Optional

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Table 1 *(continued)*

No.	Equipment and auxiliaries	Fitted for gross power test
	Filter	Optional
	Pump High-pressure pipe Injector Air inlet valve (if fitted)[f] Electronic control system, etc. (if fitted) Governor/control system: automatic full-load stop for the control depending on atmospheric conditions	Yes, standard production equipment
7	Liquid cooling equipment	
	Radiator Fan[g] Fan cowl	No
	Water pump	Yes, standard production equipment
	Thermostat or thermal management system[i]	Optional
8	Air cooling	
	Cowl Fan or blower[g] Temperature regulating device	No
9	Electrical or electronic equipment	
	Generator/alternator[j] Spark distribution system Coil(s) Wiring Spark plugs Electronic control system including knock sensor/spark retard system[m]	Yes, standard production equipment
10	Pressure-charging equipment (if fitted)	
	Compressor driven either directly by the engine, and/or by the exhaust gases Boost control[n] Charge-air-cooler[g,h,k] Coolant pump or fan (engine driven) Coolant flow control devices (if fitted)	Yes, standard production equipment
11	Auxiliary test bed fan	Yes, if necessary
12	Anti-pollution devices[l]	Yes, standard production equipment

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