

Revised

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION

R 1585

AUTOMOBILES

ENGINE TEST CODE

NET POWER

1st EDITION

March 1971

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BRIEF HISTORY

The ISO Recommendation R 1585, *Automobiles – Engine test code – Net power*, was drawn up by Technical Committee ISO/TC 22, *Automobiles*, the Secretariat of which is held by the Association Française de Normalisation (AFNOR).

Work on this question led to the adoption of Draft ISO Recommendations No. 1585 and No. 1972, which were circulated to all the ISO Member Bodies in July 1968 and March 1970 respectively. Draft No. 1585 was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Belgium	Italy	Sweden
Chile	Netherlands	Switzerland
Czechoslovakia	Poland	Thailand
France	Portugal	U.A.R.
Germany	Romania	United Kingdom
Hungary	South Africa, Rep. of	U.S.S.R.
Israel	Spain	Yugoslavia

The following Member Bodies opposed the approval of the Draft :

Japan
U.S.A.

Draft No. 1972 was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Australia	Ireland	Sweden
Belgium	Japan	U.A.R.
Czechoslovakia	Netherlands	United Kingdom
France	Peru	U.S.A.
Germany	Poland	U.S.S.R.
Greece	Portugal	
Hungary	South Africa, Rep. of	

The following Member Body opposed the approval of the Draft :

Switzerland

These Draft ISO Recommendations were then combined into a single document. The latter was submitted by correspondence to the ISO Council, which decided to accept it as an ISO RECOMMENDATION.

AUTOMOBILES

ENGINE TEST CODE

NET POWER

1. SCOPE

This ISO Recommendation describes a method for testing engines designed for automobile vehicles, applicable to the measurement of their performances with a view, in particular, to presenting curves of power and specific fuel consumption at full load as a function of engine speed.

2. FIELD OF APPLICATION

This ISO Recommendation concerns internal combustion engines used for propulsion of private cars and other motor vehicles (excluding motor-cycles and agricultural tractors*) normally travelling on roads, included in one of the following categories :

- Internal combustion engine (spark ignition or Diesel) but excluding free piston engines
- Rotary piston engines.

These engines may be fitted with a supercharging device using a mechanical supercharger or a turbo-charger.

It applies only to the net power study.

3. DEFINITIONS

- 3.1 *Net power.* The power obtained on a test bed at the crankshaft or its equivalent, at the engine speed specified by the manufacturer, the engine being equipped with the standard production auxiliaries necessary to its operation for the particular application.
- 3.2 *Auxiliaries.* The equipment and devices listed in Table 1.
- 3.3 *Standard production equipment.* Equipment normally provided by the manufacturer for a particular engine application.

4. ACCURACY OF MEASUREMENTS

4.1 Torque

The dynamometer must be such that the first quarter of its scale is not used. It must give an accuracy within $\pm 0.5\%$ of the maximum scale value (excluding the first quarter).

4.2 Engine speed

Engine speed should be measured preferably with a revolution counter and an automatically synchronized chronometer (or counter timer). The accuracy of the measured value should be $\pm 0.5\%$.

4.3 Fuel consumption

$\pm 1\%$ overall for the apparatus used.

4.4 Engine inlet air temperature

$\pm 1^\circ\text{C}$.

4.5 Barometric pressure

$\pm 0.666\text{ mbar}$.

4.6 Pressure in exhaust extraction duct (see Note (1) to Table 1)

$\pm 0.245\text{ mbar}$.

* ISO Recommendations are to be prepared concerning the specifications relating to engines for motor-cycles and agricultural tractors. ISO Recommendation R 2288, *Engine test code (bench test) for agricultural tractors – Net power*, is at present in the stage of Draft ISO Recommendation.

5. TESTS

5.1 Auxiliaries

During the test, the auxiliaries specified below should be installed on the test bed, as far as possible, in the same position as in the intended application.

The engine should be equipped only with the auxiliaries necessary to make it acceptable for service in the vehicle. (See clauses 5.1.1, 5.1.2 and 5.1.3.)

5.1.1 Auxiliaries to be fitted. The auxiliaries which should be fitted during the test for determination of the net power of the engine are listed in Table 1.

5.1.2 Auxiliaries to be removed. Certain vehicle accessories necessary only for the operation of the vehicle and which may be mounted on the engine should be removed for the test. The following partial list is given as a sample :

- air compressor for brakes;
- power steering compressor;
- suspension compressor;
- air-conditioning system.

Where accessories cannot be removed, the power absorbed by them in the unloaded condition may be determined and added to the measured engine power.

TABLE 1 – Installation of auxiliaries during test
for determination of net power of engine

No.	Auxiliaries	If fitted for net power test
1	Intake system Intake manifold Air filter Intake silencer Crankcase emission control system Speed limiting device	Yes, standard production equipment
2	Induction heating device of intake manifold	Yes, standard production equipment
3	Exhaust system Exhaust purifier Manifold Connecting pipes ⁽¹⁾ Silencer Tail pipe ⁽¹⁾ Exhaust brake ⁽²⁾	Yes, standard production equipment
4	Fuel supply pump ⁽³⁾	Yes, standard production equipment
5	Carburettor	Yes, standard production equipment
6	Fuel injection equipment (petrol and Diesel) Prefilter Filter Pump High pressure pipe Injector Air intake valve, if fitted ⁽⁴⁾	Yes, standard production equipment

TABLE 1 — Installation of auxiliaries during test
for determination of net power of engine (concluded)

No.	Auxiliaries	If fitted for net power test
7	Liquid cooling equipment Engine bonnet Bonnet air outlet Radiator Fan ⁽⁶⁾⁽⁷⁾ Fan cowl Water pump Thermostat ⁽⁸⁾	No Yes ⁽⁵⁾ , standard production equipment
8	Air cooling Cowl Fan ⁽⁶⁾⁽⁷⁾ Auxiliary test bed fan Temperature regulating device	Yes, standard production equipment Yes, if necessary Yes, standard production equipment
9	Electrical equipment	Yes ⁽⁹⁾ , standard production equipment
10	Supercharging equipment (if fitted) Compressor driven either directly or indirectly by the engine, and/or by the exhaust gases Intercooler ⁽¹⁰⁾ Coolant pump or fan (engine driven) Coolant flow control device (if fitted) Auxiliary test bed fan	Yes, standard production equipment Yes, if necessary

NOTES TO TABLE 1

- (1) If it is impracticable to fit the standard exhaust connecting pipe(s), pipes of equivalent lengths and diameters may be fitted for the test.
In the test laboratory, the exhaust extraction system at the point where the vehicle exhaust system is connected should not, with the engine in operation, create at the exhaust extraction duct a pressure differing from the atmospheric pressure by more than ± 7.35 mbar, unless the manufacturer has accepted a higher back pressure prior to the test.
- (2) If an exhaust brake is incorporated in the engine, the throttle valve may be removed or fixed in a fully open position.
- (3) The fuel feed pressure may be adjusted, if necessary, to reproduce pressures existing in the particular engine application (particularly where a "fuel return" system is used).
- (4) The air intake valve is the control valve for the pneumatic governor of the injection pump.
- (5) The radiator, the fan, the fan cowl, the water pump and the thermostat should be located on the test bed in the same relative positions that they will occupy on the vehicle. The cooling liquid circulation should be operated by the engine water pump only.
Cooling may be produced either by the engine radiator or by an external circuit, provided that the pressure loss of this circuit remains substantially the same as that of the engine cooling system. The radiator shutter, if incorporated, should be in the open position.
- (6) Where a disconnectable fan is incorporated, the net power should be determined firstly with the fan disconnected, then with the fan connected.
- (7) Where a fixed fan, electrically or mechanically operated, cannot be fitted on the test bed, the power absorbed by the fan should be determined at the same engine speeds as those used for the measurement of the engine power. This power should be deducted from the corrected power to obtain the net power.
- (8) The thermostat may be fixed in the fully open position.
- (9) Minimum power of the generator : the power of the generator should be limited to that necessary for the operation of accessories which are indispensable for the operation of the engine. There should be no charging of the battery during the test.
- (10) The temperature of the air at the inlet manifold should be that specified by the engine manufacturer, if such a specification is given.

