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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 37692-2019

**Running mode specific fuel consumption limits and
measurement methods for small spark ignition engines of
non-road mobile machinery**

非道路移动机械用小型点燃式发动机工况法燃料消耗率限值与测量方法

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard was proposed by the China Machinery Industry Federation.

This standard is under the jurisdiction of the National Technical Committee on Internal Combustion Engines of Standardization Administration of China (SAC/TC 177).

The drafting organisations of this standard are the Tianjin Internal Combustion Engine Research Institute, Shandong Huasheng Zhongtian Machinery Group Company Limited, Loncin General Power Company Limited, Chongqing Zongshen General Power Machinery Company Limited, Weima Agricultural Machinery Company Limited, Ningbo Daye Garden Machinery Company Limited, Zhejiang Yaofeng Power Technology Company Limited, Zhejiang Ruixing Carburettor Manufacturing Company Limited, Huayi Electromechanical Company Limited and Linyi Zhaohua Power Machinery Company Limited.

It was issued on 4 June 2019 by the State Administration for Market Regulation together

with the Standardization Administration of the People's Republic of China, and has been in force since 1 January 2020. The /T in the designation marks it as a recommended national standard.

1 Scope

China's national standard for how much fuel a small petrol engine is allowed to burn for the work it does, and for how that figure is to be measured. The engines concerned are the ones nobody thinks of as vehicles: the lawnmower, the chainsaw, the portable generator, the water pump, the brush cutter, the rotary tiller, the rice transplanter, the hedge trimmer, the blower, the snow thrower, the pressure washer, the plate compactor and the power trowel. Individually each burns very little; collectively there are tens of millions of them in China and they run in the open air, often at part load and often for hours, so the aggregate fuel they consume is large and until this document there was no agreed way to compare one engine with another. A single figure taken at full throttle would not describe how these machines are used, so the standard adopts a running mode method: the engine is run over a weighted test cycle of several operating modes and the results are combined into one weighted average specific fuel consumption in grams per kilowatt hour, which is the number that must not exceed the limit. The standard specifies the running mode specific fuel consumption limits and the measurement methods for small spark ignition engines fuelled by petrol and similar fuels, classifies them into seven categories by displacement and by whether they are hand-held, and lays down the equipment and accessories to be fitted for the power measurement, the correction to standard reference conditions, the calculation and the reporting of results. Engine builders, the machinery makers who buy the engines and the test houses that certify them are its users.

This standard specifies the running mode specific fuel consumption limits and the measurement methods for small spark ignition engines of non-road mobile machinery fuelled by petrol and similar fuels (hereinafter referred to as the engine).

This standard applies to engines with a net power not greater than 19 kW used on the following non-road mobile machinery, but is not limited to them: lawnmowers; chainsaws; generating sets; water pumps; brush cutters; rotary tillers; rice transplanters; hedge trimmers; blowers; snow throwers; high-pressure washers; vibratory plate compactors; power trowels.

This standard does not apply to engines for the following uses: engines used to propel vessels; engines for underground mining or for underground mining equipment; engines for emergency rescue equipment; engines for recreational vehicles, for example snowmobiles, off-road motorcycles and all-terrain vehicles; engines manufactured for export; engines manufactured for the export of the end equipment.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition (including all amendments) applies.

GB/T 6072.1 Reciprocating internal combustion engines - Performance - Part 1: Declarations of power, fuel and lubricating oil consumptions, and test methods - Additional requirements for engines for general use

GB/T 8190.4 Reciprocating internal combustion engines - Exhaust emission measurement - Part 4: Steady-state test cycles for different engine applications

GB 17930 Gasoline for motor vehicles

GB 18351 Ethanol gasoline for motor vehicles (E10)

GB 18352.5 Limits and measurement methods for emissions from light-duty vehicles (China 5)

GB/T 21404-2008 Internal combustion engines - Determination and method for the measurement of engine power - General requirements

GB 26133-2010 Limits and measurement methods for exhaust pollutants from small spark ignition engines of non-road mobile machinery (China I, II)

3 Terms and definitions

The terms and definitions given in GB/T 21404-2008 and the following apply to this document. For ease of use, some of the terms and definitions of GB/T 21404-2008 are repeated below.

3.1 Fuel consumption

The quantity of fuel consumed by the engine per unit of time under specified ambient conditions and at a specified power. [GB/T 21404-2008, definition 3.4.1]

3.2 Specific fuel consumption

The quantity of fuel consumed by the engine per unit of power and per unit of time. [GB/T 21404-2008, definition 3.4.1.1]

3.3 Running mode specific fuel consumption

The weighted average of the specific fuel consumption of the engine over several operating modes.

3.4 Net power

The power measured at the end of the crankshaft or at the equivalent component, at the corresponding engine speed, with the engine set up on the test bed with the devices and accessories required by Table A.1 of Annex A fitted.

3.5 Intermediate speed

85 per cent of the rated speed, when the engine is tested according to the G1 cycle.

4.1 Classification of engines

The engine category codes and the corresponding displacements are given in Table 1. Hand-held engines are designated by SH and non-hand-held engines by FSH.

Table 1 - Engine categories, displacement V in cubic centimetres: SH1, V less than 20; SH2, 20 up to but not including 50; SH3, V of 50 and above; FSH1, V less than 66; FSH2, 66 up to but not including 100; FSH3, 100 up to but not including 225; FSH4, V of 225 and above.

4.2 Running mode specific fuel consumption limits

The result of the assessment of the running mode specific fuel consumption of the engine shall not exceed the limits specified in Table 2.

Table 2 - Running mode specific fuel consumption limits, in grams per kilowatt hour: SH1, no limit; SH2, 780; SH3, 600; FSH1, 700; FSH2, 700; FSH3, 600; FSH4, 600.

5 Measurement of the running mode specific fuel consumption

5.1 The measurement of the running mode fuel consumption of the engine shall be carried out according to the test procedure of Annex B.

5.2 The data shall be processed in accordance with the provisions of Annex C. Data measured with a CVS device or valid data tested by other measurement methods may be used.

5.3 The fuel consumption test method for engines of special use shall be carried out in accordance with the provisions of GB/T 6072.1.

5.4 The test data shall be recorded in accordance with the provisions of Annex D.