



# National Standard of the People's Republic of China

GB 27999—XXXX  
Replaces GB 27999—2019

---

## Fuel consumption evaluation methods and targets for passenger cars

乘用车燃料消耗量评价方法及指标

*(English Translation)*

Issue date: XXXX – XX – XX

Implementation date: XXXX – XX – XX

---

Issue by     State Administration for Market Regulation of the People's Republic of China  
Standardization Administration of the People's Republic of China



# Contents

Foreword .....	II
1 Scope .....	1
2 Normative References .....	1
3 Terms and Definitions .....	1
4 Evaluation Methods and Targets of Fuel Consumption of Vehicle Type .....	2
5 Calculation Method and Targets of Corporate Average Fuel Consumption .....	4
6 Conformity of Production .....	5
7 Implementation .....	6

## Foreword

This document was drafted in accordance with the provisions given in GB/T 1.1—2020 Directives for Standardization—Part 1: Rules for the Structure and Drafting of Standards.

This document replaces GB 27999—2019 Fuel Consumption Evaluation Methods and Targets for Passenger Cars. Compared with GB 27999—2019, the main technical changes except for the structural adjustment and editorial changes are as follows:

- a) Modified the applicable scope (see Chapter 1 herein, and Chapter 1 of the 2019 version);
- b) Added terms and definitions for the corporate average fuel consumption of traditional passenger cars, corporate average fuel consumption target of traditional passenger cars, and corporate average CO<sub>2</sub> emission (see 3.4, 3.6, 3.8);
- c) Modified the way to determine fuel consumption of vehicle types (see 4.1.2 to 4.1.4 herein, and 4.1.2 to 4.1.3 of the 2019 version);
- d) Modified the target value of fuel consumption of vehicle types (see 4.2 herein, and 4.2 of the 2019 version);
- e) Added the calculation method for the corporate average CO<sub>2</sub> emission, deleted the accounting vehicle type multiple of corporate average fuel consumption (see 5.1.2 herein, and 5.1.2 to 5.1.4 of the 2019 version);
- f) Modified corporate average fuel consumption annual requirements (see 5.3 herein, and 5.3 of the 2019 version);
- g) Added the calculation method of corporate average fuel consumption of traditional passenger cars (see 5.4).

Please note that some content in this document may involve patents. The publishing institution of this document does not assume responsibility for identifying patents.

This document was proposed by and is under the centralized management of the Ministry of Industry and Information Technology of the People's Republic of China.

The previous editions replaced by this document are as follows:

- The first edition was published in 2011 as GB 27999—2011, the first revision was published in 2014 and the second revision in 2019;
- This is the third revision.

# Fuel Consumption Evaluation Methods and Targets for Passenger Cars

## 1 Scope

This document specifies evaluation methods, targets and conformity of production for the fuel consumption of vehicle type of passenger cars and corporate average fuel consumption.

This document applies to category M<sub>1</sub> vehicles, including vehicles using gasoline or diesel fuel, pure electric vehicles, fuel cell vehicles, and vehicles using gas fuel and alcohol ether fuel.

## 2 Normative References

The following normative documents contain provisions which, through reference in this text, constitute indispensable provisions of this document. For dated references, only the dated edition applies to this document. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 18386.1—2021 Test methods for energy consumption and range of electric vehicles—Part 1: Light-duty vehicles

GB/T 19233—2020 Measurement methods of fuel consumption for light-duty vehicles

GB/T 19596 Terminology of electric vehicles

GB/T 19753—2021 Test methods for energy consumption of light-duty hybrid electric vehicles

GB/T 29125 Test methods for fuel consumption of CNG vehicles

GB/T 37340 Conversion methods for energy consumption of electric vehicles

GB/T 38146.1—2019 China automotive test cycle—Part 1: Light-duty vehicles

GB/T 43252—2023 Test methods of energy consumption and range for fuel cell electric vehicles

QC/T 1130—2021 Measurement methods of fuel consumption for methanol vehicles

## 3 Terms and Definitions

Terms and definitions defined in GB/T 19596, GB/T 38146.1—2019, and the following ones apply to this document.

### 3.1

Fuel consumption of vehicle type

Comprehensive fuel consumption of a certain vehicle type that is determined based on the stipulated methods.

### 3.2

Average fuel consumption of vehicle fleet

Average fuel consumption of a group of vehicles that is calculated on a weighted basis as per the number of vehicles that corresponds to the vehicle type.

### 3.3

Corporate average fuel consumption

*CAFC*

Average fuel consumption of passenger cars manufactured or imported by corporates in a certain year that is calculated on a weighted basis as per the corresponding production or import volume of the year.

3.4

Corporate average fuel consumption of traditional passenger cars

*CAFC<sub>tp</sub>*

Average fuel consumption of traditional passenger cars manufactured or imported by corporates in a certain year that is calculated on a weighted basis as per the corresponding production or import volume of the year.

Note: Traditional passenger cars refer to the vehicle using gasoline or diesel fuel and the vehicles using gas fuel and alcohol ether fuel, excluding off-vehicle-chargeable hybrid electric vehicles.

3.5

Corporate average fuel consumption target

*T<sub>CAFC</sub>*

Average fuel consumption of the fuel consumption target of passenger cars manufactured or imported by corporates in a certain year that is calculated on a weighted basis as per the corresponding production or import volume of the year.

3.6

Corporate average fuel consumption target of traditional passenger cars

*T<sub>CAFC<sub>tp</sub></sub>*

Average fuel consumption of the fuel consumption target of traditional passenger cars manufactured or imported by corporates in a certain year that is calculated on a weighted basis as per the corresponding production or import volume of the year.

3.7

Off-cycle technology/device

*OCT/OCD*

Technology/device that has a noticeable effect of energy saving in practice which cannot (fully) be measured in the existing test method.

3.8

Corporate average CO<sub>2</sub> emission

The corporate average CO<sub>2</sub> emission of passenger cars manufactured or imported by corporates in a certain year that is calculated on a weighted basis as per the corresponding production or import volume of the year.

## 4 Evaluation Methods and Targets of Fuel Consumption of Vehicle Type

#### 4.1 Determination of fuel consumption of vehicle type

4.1.1 For gasoline, diesel, bi-fuel and dual-fuel passenger cars, the type approval values of fuel consumption of vehicle type shall be determined based on Worldwide Light-duty Test Procedure (WLTC) as described in GB/T 19233—2020.

4.1.2 For non-off-vehicle-chargeable hybrid electric passenger cars, the type approval values of fuel consumption of vehicle type shall be determined based on WLTC as described in GB/T 19753—2021.

4.1.3 For off-vehicle-chargeable hybrid passenger cars, the type approval values of OVC-HEV fuel consumption and OVC-HEV electricity consumption of vehicle type shall be determined based on WLTC as described in GB/T 19753—2021, and calculate OVC-HEV equivalent fuel consumption according to G.3 in Appendix G in GB/T 19753—2021(with the simple conversion method).

4.1.4 For pure electric passenger cars, the type approval values of energy consumption shall be determined according to GB/T 18386.1—2021, and converted to gasoline fuel consumption with the simple conversion method in GB/T 37340.

4.1.5 For non-off-vehicle-chargeable fuel cell passenger cars, the hydrogen consumption shall be determined according to GB/T 43252—2023; for off-vehicle-chargeable fuel cell passenger cars, the hydrogen consumption and electricity consumption shall be determined according to GB/T 43252—2023, The electricity consumption shall be calculated based on the calculation results in Appendix C, C.2.9 of GB/T 43252—2023, multiplied by the calculation results in Appendix C, C.2.5 of GB/T 43252—2023, and then converted to the corresponding gasoline fuel consumption using the simple conversion method in GB/T 37340. By 2030 and earlier, the hydrogen consumption shall be calculated as zero.

4.1.6 For compressed natural gas passenger cars, a comprehensive cycle fuel consumption test shall be simulated on the chassis dynamometer according to GB/T 29125 to determine gas fuel consumption, which shall be later converted to gasoline fuel consumption according to GB/T 29125.

4.1.7 For liquefied natural gas and liquefied petroleum gas passenger cars, a comprehensive cycle fuel consumption test shall be simulated on the chassis dynamometer according to GB/T 29125 to determine gas fuel consumption, which shall be later converted to gasoline fuel consumption according to GB/T 29125.

4.1.8 For methanol passenger cars, the methanol fuel consumption and equivalent gasoline/diesel fuel consumption shall be determined according to QC/T 1130—2021.

4.1.9 For the vehicles adopting one or more off-cycle technologies/devices (OCT/OCD), the energy consumption of vehicle type may be correspondingly reduced by a certain quota<sup>1)</sup>.

#### 4.2 Fuel consumption target of vehicle type

4.2.1 For the passenger cars with less than three rows of seats<sup>2)</sup>, the fuel consumption target of vehicle type shall be calculated according to formula (1), and the results shall be rounded to two decimal places:

---

1 Specific options, test and evaluation methods, reduced quota of energy consumption and implementation date of off-cycle technology/device are determined separately.

2 A "seat" exists as long as there is a usable seat mounting point.

$$T = \begin{cases} 2.57, (CM \leq 1090) \\ 0.0015 \times (CM - 1580) + 3.30, (1090 < CM \leq 2510) \cdots \cdots \cdots (1) \\ 4.70, (CM > 2510) \end{cases}$$

Where:

$T$  —Fuel consumption target of vehicle type, in L/100 km;

$CM$  —Curb mass of the vehicle, in kilograms (kg).

4.2.2 For passenger cars with three and more rows of seats<sup>2)</sup>, the fuel consumption target of vehicle type shall be added by 0.14 L/100km on the basis of the calculated results in 4.2.1, and the results shall be rounded to two decimal places.

4.2.3 The reference value of CO<sub>2</sub> emission corresponding to the target value shall be calculated according to formula (2), and the results shall be rounded to two decimal places:

$$R_{CO_2} = K_{CO_2} \times T / 100 \cdots \cdots \cdots (2)$$

Where:

$R_{CO_2}$  —The reference value of CO<sub>2</sub> emission corresponding to the fuel consumption target of vehicle type, in g/km;

$K_{CO_2}$  —Conversion factor,  $2.37 \times 10^3$  for the vehicle types using gasoline and  $2.60 \times 10^3$  for those using diesel, in g/L.

$T$  —Fuel consumption target of vehicle type, in L/100 km.

## 5 Calculation Method and targets of Corporate Average Fuel Consumption

### 5.1 Corporate average fuel consumption (CAFC)

5.1.1 As shown in formula (3), the CAFC of a corporate in a certain year shall be calculated by dividing the sum of the product of its fuel consumption of each vehicle type determined in accordance with 4.1 and the corresponding annual production or import volume by its annual total production or import volume of passenger cars:

$$CAFC = \frac{\sum_{i=1}^n FC_i \times V_i}{\sum_{i=1}^n V_i} \cdots \cdots \cdots (3)$$

Where:

$CAFC$  —Corporate average fuel consumption, in L/100 km;

$i$  —Vehicle type number of passenger cars;

$n$  —Annual production or import of passenger car models by the corporate;

$FC_i$  —Fuel consumption of the  $i^{\text{th}}$  vehicle type, in L/100 km;

$V_i$  —Annual production or import volume of the  $i^{\text{th}}$  vehicle type.

5.1.2 The corporate average CO<sub>2</sub> emissions shall be calculated according to formula (4) by dividing the sum of the product of the CO<sub>2</sub> emissions of each vehicle model determined by the corporate according to the corresponding test method in 4.1 and the corresponding annual production or import volume by the total annual production or import volume of passenger cars of the corporate:

$$R_{CA,CO_2} = \frac{\sum_{i=1}^n E_{CO_2,i} \times V_i}{\sum_{i=1}^n V_i} \cdots \cdots \cdots (4)$$

Where:

$R_{CA,CO_2}$  —Corporate average CO<sub>2</sub> emission, in g/km;

$i$  —Vehicle type number of passenger cars;

$n$  —Annual production or import of passenger car models by the corporate;

$E_{CO_2,i}$  —CO<sub>2</sub> emission of the  $i^{\text{th}}$  vehicle type, in g/km;

$V_i$  —Annual production or import volume of the  $i^{\text{th}}$  vehicle type.

For gasoline, diesel, bi-fuel fuel, and dual-fuel passenger cars, the result is the CO<sub>2</sub> type approval value; For non-off-vehicle-chargeable hybrid passenger cars,  $E_{CO_2,i}$  is type approval value of the fuel consumption of vehicle type multiplied by the conversion factor in formula 2, and then divided by 100. For off-vehicle-chargeable hybrid passenger cars,  $E_{CO_2,i}$  is the type approval values of



OVE-HEV fuel consumption of vehicle type multiplied by the conversion factor in formula 2, and then divided by 100; For compressed natural gas (CNG), liquefied natural gas (LNG), liquefied petroleum gas (LPG) and methanol passenger cars, the result is from CO<sub>2</sub> tests; For pure electric and fuel cell passenger cars, CO<sub>2</sub> emissions are calculated as 0.

## 5.2 Corporate average fuel consumption target ( $T_{CAFC}$ )

As shown in formula (5), the corporate average fuel consumption target that a corporate needs to reach in a certain year shall be calculated, based on the fuel consumption target of vehicle type specified in 4.2, by dividing the sum of the product of its fuel consumption target of each vehicle type and the corresponding annual production or import volume by its annual total production or import volume of passenger cars:

$$T_{CAFC} = \frac{\sum_{i=1}^n T_i \times V_i}{\sum_{i=1}^n V_i} \dots \dots \dots (5)$$

Where:

- $T_{CAFC}$  —Corporate average fuel consumption target, in L/100 km;
- $i$  —Vehicle type number of passenger cars;
- $n$  —Annual production or import of passenger car models by the corporate;
- $T_i$  —Fuel consumption target of the  $i^{\text{th}}$  vehicle type, in L/100 km;
- $V_i$  —Annual production or import volume of the  $i^{\text{th}}$  vehicle type.

## 5.3 Annual requirements for corporate average fuel consumption

As of 2026, the ratio of CAFC and  $T_{CAFC}$  shall not be greater than the value specified in Table 1:

**Table 1 Annual Requirements for Corporate Average Fuel Consumption**

Year	Ratio of CAFC to $T_{CAFC}$
2026	130%
2027	124%
2028	117%
2029	109%
2030 and later	100%

## 5.4 Corporate average fuel consumption of traditional passenger cars

5.4.1 As shown in formula (6), the corporate average fuel consumption of traditional passenger cars of a corporate in a certain year shall be calculated by dividing the sum of the product of its fuel consumption of each vehicle type of traditional passenger cars determined in accordance with 4.1 and the corresponding annual production or import volume by its annual total production or import volume of traditional passenger cars:

$$CAFC_{tp} = \frac{\sum_{k=1}^m FC_{tp,k} \times V_{tp,k}}{\sum_{k=1}^m V_{tp,k}} \dots \dots \dots (6)$$

Where:

- $CAFC_{tp}$  —Corporate average fuel consumption of traditional passenger cars, in L/100 km;
- $k$  —Vehicle type number of traditional passenger cars;
- $m$  —Annual production or import of traditional passenger car models by the corporate;
- $FC_{tp,k}$  —Fuel consumption of the  $k^{\text{th}}$  vehicle type of traditional passenger cars, in L/100 km;
- $V_{tp,k}$  —Annual production or import volume of the  $k^{\text{th}}$  vehicle type of traditional passenger cars.

5.4.2 When the ratio of the average fuel consumption of traditional passenger cars of a corporate in a certain year to the product of its corporate average fuel consumption target of traditional passenger cars according to formula (7) and annual requirements is no greater than 1.4, the fuel consumption

target of its traditional passenger cars shall be multiplied by 1.03 based on Article 4.2..

$$T_{CAFC_{tp}} = \frac{\sum_{k=1}^m T_{tp,k} \times V_{tp,k}}{\sum_{k=1}^m V_{tp,k}} \dots \dots \dots (7)$$

- $T_{CAFC_{tp}}$  —Corporate average fuel consumption target of traditional passenger cars, in L/100 km;  
 $k$  —Vehicle type number of traditional passenger cars;  
 $m$  —Annual production or import of traditional passenger car models by the corporate;  
 $T_{tp,k}$  —Fuel consumption target of the  $k^{th}$  vehicle type of traditional passenger cars, in L/100 km;  
 $V_{tp,k}$  —Annual production or import volume of the  $k^{th}$  vehicle type of traditional passenger cars.

## 6 Conformity of Productions

- 6.1 The fuel consumption of gasoline, diesel, bi-fuel and dual-fuel passenger cars shall meet the requirements of GB/T 19233—2020 concerning conformity of production.
- 6.2 The fuel consumption of non-off-vehicle-chargeable hybrid electric passenger cars shall meet the requirements of GB/T 19753—2021 concerning conformity of production.
- 6.3 The fuel consumption and electricity consumption of off-vehicle-chargeable hybrid electric passenger cars shall meet the requirements of GB/T 19753 — 2021 concerning conformity of production.
- 6.4 The energy consumption of pure electric passenger cars shall meet the requirements of GB/T 18386.1—2021 concerning conformity of production.
- 6.5 The test of conformity of production for other vehicles shall be conducted according to the statistical methods and the rules for determining the number of compliance specified in GB/T 19233 —2020.

## 7 Implementation Date

This document come into effect from the date of implementation.