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Replacing GB/T 4353-2007

Fuel Consumption for Passenger Vehicles in Operation

载客汽车运行燃料消耗量

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Foreword

This Document was drafted as per the rules specified in GB/T 1.1-2020 *Directives for Standardization – Part 1: Rules for the Structure and Drafting of Standardizing Documents*.

This Document GB/T 4353-2007 *Fuel Consumption for Passenger Vehicles in Operation*. Compared with GB/T 4353-2007, the major technical changes of this Document are as follows besides the structural adjustments and editorial modifications:

- a) Delete the basic operating conditions (see 4.1 of 2007 Edition);
- b) Change the temperature interval; moved the correction coefficient of temperature in the original standard into the temperature interval and fuel consumption correction coefficient of temperature; adjust the coefficient; and change the name and content accordingly (see 4.2 of this Edition; 4.2.2, 5.4.2 of 2007 Edition);
- c) Delete the altitude range (see 4.2.3 of 2007 Edition);
- d) Increased traffic congestion and fuel consumption correction coefficient of traffic congestion (see 4.3 of this Edition);
- e) Delete the passenger vehicle operating mode (see 4.3 of 2007 Edition);
- f) Delete the constant-speed fuel consumption under the curb weight (no load) and total weight (full load) of passenger vehicles (see 5.1 of 2007 Edition);
- g) Change the calculation method of basic fuel consumption and full-load fuel consumption of passenger vehicles (see 5.1 of this Edition; 5.2 of 2007 Edition);
- h) Delete the fuel consumption correction coefficient of passenger vehicles in operation (see 5.4 of 2007 Edition);
- i) Change the classification of vehicle types and corresponding calculation methods for calculating the fuel consumption of passenger vehicles in operation; and adjust the calculation formula (see 5.3 of this Edition; 5.5 of 2007 Edition);
- j) Change the calculation example of fuel consumption of passenger vehicles in operation (see Appendix A of this Edition; Appendix A of 2007 Edition);
- k) Add the calculation example of fuel consumption calculation for passenger vehicles in operation with a maximum total mass of no more than 3500kg (see Appendix B of this Edition).

Please note some contents of this Document may involve patents. The issuing agency of this Document shall not assume the responsibility to identify these patents.

Fuel Consumption for Passenger Vehicles in Operation

1 Scope

This Document specifies the classification of operating conditions and correction coefficient for passenger vehicles, as well as the calculation method of fuel consumption for operation.

This Document is applicable to the calculation of the fuel consumption of passenger vehicles in operation (excluding bus models) that use gasoline or diesel as the single fuel on highways and urban roads, and is used as a reference for the management of fuel consumption quotas for road transport enterprises.

2 Normative References

The provisions in following documents become the essential provisions of this Document through reference in this Document. For the dated documents, only the versions with the dates indicated are applicable to this Document; for the undated documents, only the latest version (including all the amendments) is applicable to this Document.

GB/T 4352 Fuel consumption for trucks in operation

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

JT/T 711 Limits and measurement methods of fuel consumption for commercial vehicle for passenger transportation

3 Terms and Definitions

For the purposes of this Document, the terms and definitions given in GB/T 4352, JT/T 711 and the following apply.

3.1 Fuel consumption for passenger vehicle in operation

The amount of fuel consumed by a passenger car during operation.

NOTE: The unit is L.

3.2 Basic fuel consumption of passenger vehicle

When a passenger vehicle with a total mass of more than 3500kg is under the comprehensive

announcement issued by the competent department of transportation for road transport vehicles, and the unit is L/100km.

5.1.2 Passenger vehicles no more than 3500kg

The value of the basic fuel consumption is the comprehensive fuel consumption obtained under the test cycle conditions given in GB/T 19233 (or checked through the light vehicle fuel consumption label), and the unit is L/100km.

The full load fuel consumption is regarded as the same as the basic fuel consumption, and the unit is L/100km.

5.2 Changes in fuel consumption per unit load of passenger vehicle

5.2.1 Calculation

For passenger vehicles whose basic fuel consumption and full-load fuel consumption are given by vehicle manufacturers, the changes in fuel consumption per unit load of passenger vehicle is calculated according to Formula (1).

$$Q_b = \frac{Q_m - Q_k}{M_p} \dots\dots\dots (1)$$

Where:

Q_b – changes in fuel consumption per unit load of passenger vehicle, in L/(person•100km);

Q_k – basic fuel consumption of passenger vehicle, in L/100km;

Q_m – full load fuel consumption of passenger vehicle, in L/km;

M_p – the total number of rated passengers of the passenger vehicle, in person.

5.2.2 Recommended value

For passenger vehicles with a maximum gross mass of more than 3500kg, when the basic fuel consumption or full-load fuel consumption is not given by the vehicle manufacturer, the recommended value of changes in fuel consumption per unit load of passenger vehicle Q_b shall be in accordance with Table 4.

Appendix A

(Informative)

Calculation Example of Fuel Consumption of Passenger Vehicle in Operation with a Maximum Gross Mass of more than 3500kg

A medium passenger vehicle with a length of 7.2m has a curb mass of 5.28t and is rated to carry 25 passengers. On a Class-III highway on a hilly terrain between cities with an average monthly temperature of 16°C, the vehicle carries 20 passengers and travels 30km. Then carry 25 people to return to the original place; the operation period is the evening rush hour in the city, there is congestion; the average driving speed is 20km/h; and the air conditioner is not turned on during the driving process; find the total fuel consumption of the passenger vehicle in operation.

Method 1: When the basic fuel consumption and full-load fuel consumption are given by the vehicle manufacturer

Calculate as follows:

- The basic fuel consumption of passenger cars Q_k provided by vehicle manufacturers is 12.7 (L/100km); the fuel consumption of full-load passenger vehicle Q_m is 15.2 (L/100km) according to the announcement of qualified vehicle models for road transport issued by the competent department of transportation.
- According to the formula (1), calculate the additional fuel consumption of the mass change of the passenger vehicle Q_b .

$$Q_b = \frac{Q_m - Q_k}{M_p} = \frac{15.2 - 12.7}{25} = 0.1 \quad [\text{L}/(\text{person} \cdot 100\text{km})]$$

- Calculate the fuel consumption of the passenger vehicle in operation according to the Formula (2).

According to the known conditions, the correction coefficient of the Type-2 roads is 1.10; the correction coefficient at the monthly average temperature of 16°C is 1.00; the correction coefficient of traffic congestion at an average driving speed of 20km/h is 1.30; and the correction coefficient of no other influential factors is 1.00; the air conditioner is not used during driving; so the fuel consumption of the go-path operation is as follows:

$$\begin{aligned} Q_1 &= \left(Q_k \cdot \frac{S_1}{100} + Q_b \cdot \frac{P_1 \cdot S_1}{100} \right) \cdot K_{r1} \cdot K_{t1} \cdot K_{v1} \cdot K_{x1} + Q_{a1} \\ &= \left(12.7 \times \frac{30}{100} + 0.1 \times \frac{20 \times 30}{100} \right) \times 1.10 \times 1.00 \times 1.30 \times 1.00 + 0 \approx 6.31 (\text{L}) \end{aligned}$$

Appendix B

(Informative)

Calculation Example of Fuel Consumption of Passenger Vehicle in Operation with Maximum Gross Mass no more than 3500kg

A passenger vehicle with a curb weight of 1.26t and a rated capacity of carrying 4 passengers is driving 30km with 2 passengers on a Class-III highway on plain terrain between cities with an average monthly temperature of 10 °C; and then returns to the original place with 1 passenger. The driving period is the evening rush hour in the city, there is congestion; the average driving speed is 20km/h; and the air conditioner and other energy-consuming equipment are not turned on during the driving process; then find the total fuel consumption of passenger vehicle in operation.

Calculate as follows.

- a) The basic fuel consumption of the passenger vehicle Q_k obtained through checking the light vehicle fuel consumption label is 7.8 (L/100km).
- b) Calculate the fuel consumption of the passenger vehicle in operation according to the Formula (4).

According to the known conditions, the correction coefficient of the Type-2 roads is 1.10; the correction coefficient at the monthly average temperature of 10°C is 1.00; the correction coefficient of traffic congestion at an average driving speed of 20km/h is 1.30; and the correction coefficient of no other influential factors is 1.00; the air conditioner is not used during driving; so the fuel consumption of the go-path operation is as follows:

$$\begin{aligned} Q'_1 &= Q_k \cdot \frac{S_1}{100} \cdot K_{r1} \cdot K_{t1} \cdot K_{v1} \cdot K_{x1} + Q_{a1} \\ &= 7.8 \times \frac{30}{100} \times 1.10 \times 1.00 \times 1.30 \times 1.00 + 0 \approx 3.35(\text{L}) \end{aligned}$$

According to the determined various correction coefficients, the fuel consumption of return-path operation is as follows:

$$\begin{aligned} Q'_2 &= Q_k \cdot \frac{S_2}{100} \cdot K_{r2} \cdot K_{t2} \cdot K_{v2} \cdot K_{x2} + Q_{a2} \\ &= 7.8 \times \frac{30}{100} \times 1.10 \times 1.00 \times 1.30 \times 1.00 + 0 = 3.35(\text{L}) \end{aligned}$$

- c) Calculate the total fuel consumption of passenger vehicle in different operating conditions according to Formula (5).

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