

ICS 43.020  
CCS T 40

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## **ASSOCIATION STANDARD**

# **T/CSAE 145-2020**

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### **Air conditioning system maximum cooling performance test procedure for passenger vehicle (English Translation)**

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### 1 Scope

This standard specifies the test method for the maximum cooling performance of the vehicle air-conditioning system.

This standard applies to passenger cars driven by internal combustion engines with automotive air conditioners with a maximum design total mass of no more than 3,500 kg.

### 2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this article Pieces. For undated reference documents, the latest version (including all amendments) is applicable to this

document.

GB/T 12534-1990 General rules for road test methods for automobiles GB/T 15089-2001 Classification of motor vehicles and trailers GB/T 18352.6-2016 Light-duty vehicle pollutant emission limits and measurement methods QC/T 720-2004 Automotive Air Conditioning Terminology T/CSAE 114-2019 Environmental wind tunnel test method for cooling capacity of automobile powertrain

### **3 Terms and definitions**

The following terms and definitions defined in QC/T 720-2004 apply to this document.

Vehicle air conditioning system it consists of one or more components of heating device, refrigeration device, ventilation device, air purification device and humidification device and necessary control Components and other components, used to adjust the temperature, humidity, cleanliness, etc. of the air in the passenger compartment, and make it flow directionally in the passenger compartment at a certain speed and distribution, so as to provide a comfortable environment and fresh air system for the driver and passengers.

#### **4.1 Test environment**

The test wind tunnel meets the requirements of Chapter 4 in the T/CSAE 114-2019 Environmental Wind Tunnel Test Method for the Cooling Capacity of Automotive Powertrains.

#### **4.2 Test prototype**

##### **4.2.1**

The test vehicle should meet the technical requirements of the vehicle as required by the manufacturer. The airtightness of the vehicle, the amount of refrigerant filling, leakage and evaporation should be confirmed the anti-frosting of the vehicle should meet the technical requirements of the vehicle, and the basic information of the vehicle should be recorded, including the vehicle, engine, gearbox, cooling system, etc.

information.

##### **4.2.2**

A new car is recommended for the vehicle. The exterior color of the vehicle is recommended to be dark, not white.

#### **5.4 Test condition 2-general cooling**

##### **5.4.1**

The test conditions maintain the ambient temperature, relative humidity and sunshine intensity of the preheating stage 3 in Table 2.

#### 5.4.2

When the average temperature in the passenger compartment meets the requirements, the driver must enter the vehicle quickly and increase the vehicle speed to 50 km/h as quickly as possible.

After the vehicle speed stabilizes, adjust the blower to the maximum gear, and the air conditioning system setting status is shown in Table 4.

#### 5.4.3

When the test starts timing, press the AC button at the same time. The test conditions are carried out in accordance with Table 4 and meet the following requirements.

- a) When the vehicle speed is 50 km/h, priority should be given to the engine speed. Reasonable range of engine speed. the best speed is 1650 rpm, If the optimal speed is not reached, it can be between 1500 and 1800 rpm, but not less than 1500 rpm;
- b) For manual gearbox models. manually select a reasonable gear to keep the engine speed within a reasonable range;
- c) For automatic transmission models with manual mode. if the speed is lower than 1500 rpm in D gear, manual mode can be used to select a reasonable gear to maintain the engine speed within a reasonable range;
- d) For automatic gearbox models without manual mode. if the speed is lower than 1500 rpm in the D gear, the vehicle speed can be changed, but the headwind speed it needs to be maintained at 50 km/h. Vehicle speed selection requirements. the best vehicle speed is selected as the D gear and the vehicle speed when the engine speed is 1650 rpm, If it cannot be satisfied, select the D gear and the vehicle speed when the engine speed is between 1500 and 1800 rpm.

### 5.5 Test condition 3-immersion to idle

#### 5.5.1

The test conditions maintain the ambient temperature, relative humidity and solar radiation intensity in the preheating stage 3 in Table 2.

#### 5.5.2

When the average temperature in the passenger compartment reaches the requirements, the driver must enter the car quickly, start the engine as quickly as possible, and turn the blower Adjust to the maximum gear, and the air conditioning system is set to full cooling, internal circulation, and surface blowing mode.

#### 5.5.3

When the test starts timing, press the AC button at the same time and hold it for 30 minutes, then the test ends.

## **5.6 Other requirements during preheating and test phase**

### **5.6.1**

When an auxiliary cooling system such as a rear evaporator and auxiliary evaporator is equipped, the operation and design of the auxiliary cooling system during the warm-up phase and the test phase are Set in accordance with the settings of the front air conditioner.

### **5.6.2**

Models with rear exhaust air vents also need to be adjusted to the mode with the largest air volume and the lowest temperature.

### **5.6.3**

Seat heating, various glass heating systems (such as rear defrost heating wire, etc.), various auxiliary heating systems and other devices with heating functions the device needs to be kept closed during the entire test.

### **5.6.4**

Average temperature inside the car = (average temperature of all head measurement points in the first two rows, average temperature of all foot measurement points in the first two rows)/2.Among them, the head and the feet are the average of 8 temperature points.

### **5.6.5**

For vehicles with more than two rows of seats, the average temperature inside the vehicle is calculated based on the first two rows.

## **5.7 Test record**

From the beginning of the vehicle warm-up preparation stage to the end of the test, record the parameters of each sensor and equipment; the recommended data collection frequency is 1 s.

## **6 Test report and results**

The test report should include the following.

- a) Test vehicle information (including vehicle model, VIN code, engine model, gearbox model, air conditioner model, test vehicle color Color, other restructuring and modification information, etc.) See Appendix B;
- b) Test environment information and cycle information;
- c) Test commissioning unit (person), test standard, test location, test time, test personnel, etc.;