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

**中华人民共和国国家标准**

GB/T 28046.3-2011

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**Road vehicles—Environmental conditions and testing  
for electrical and electronic equipment—**

**Part 3: Mechanical loads**

**道路车辆 电气及电子设备的环境条件和试验**

**第 3 部分：机械负荷**

(ISO 16750-3: 2007, MOD)

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China**

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## Foreword

GB/T 28046 *Road vehicles—Environmental conditions and testing for electrical and electronic equipment* consists of five parts:

- Part 1: General;
- Part 2: Electrical loads;
- Part 3: Mechanical loads;
- Part 4: Climatic loads;
- Part 5: Chemical loads.

This is Part 3 of GB/T 28046.

This Part is drafted by rules given in GB/T 1.1-2009.

This Part is formulated according to redraft method and revision of ISO 16750-3: 2007 *Road vehicles — Environmental conditions and testing for electrical and electronic equipment — Part 3: Mechanical loads*.

Technical differences and reasons between this Part and ISO 16750-3: 2007 are as follows:

- Deleted the description on Clause 6 in original standard on account of no guiding significance;
- In order to unify the context and comprehension, added “test and requirements agreed by supplier and buyer” into Sub-clause 4.5;
- -40 in Figure 1 and -40 in Table 1 are apparent error in previous standard, in order to maintain mutual corresponding and coordinating of serial standards, deleted -40 in Figure 1 and replaced the -40 in table 1 by  $T_{\min}$ . meanwhile added footnote into table 1: for  $T_{\min}$ , see GB/T 28046.4;
- Test standard is not given in previous standard 4.1.2.9.2 test. According to other test method, carry out test according to GB/T 2423.10.

# Road vehicles—Environmental conditions and testing for electrical and electronic equipment—

## Part 3: Mechanical loads

### 1 Scope

This part describes the potential mechanical environmental stresses and specifies tests and requirements recommended for the specific mounting location on/in the road vehicle.

This part applies to electrical and electronic systems/components for road vehicles.

### 2 Normative References

The articles contained in the following documents have become this standard when they are quoted herein. For the dated documents so quoted, all the modifications (Including all corrections) or revisions made thereafter shall be applicable to this Standard.

GB/T 2423.6 Environmental testing for electric and electronic products—Part 2: Test methods—Test Eb and guidance: Bump (GB/T 2423.6-1995, IEC 60068-2-29:1987, IDT)

GB/T 2423.8 Environmental testing for electric and electronic products Part 2:Test methods Test Ed: Free fall (GB/T 2423.8-1995, IEC 60068-2-32:1995, IDT)

GB/T 2423.10 Environmental testing for electric and electronic products - Part 2: Tests methods - Test Fc: Vibration (sinusoidal) (GB/T 2423.10-2008, IEC 60068-2-6:1995, IDT)

GB/T 2423.56 Environmental testing for electric and electronic products - Part 2: Test methods - Test Fh: Vibration、broad-band random(digital control) and guidance (GB/T 2423.56-2006, IEC 60068-2-64:1993, IDT)

GB/T 2423.58 Environmental testing for electric and electronic products - Part 2: Tests -Test Fi: Vibration - Mixed Mode (GB/T 2423.58-2008, IEC 60068-2-80:2005, IDT)

GB/T 28046.1 Road vehicles—Environmental conditions and testing for electrical and electronic equipment—Part 1: General (GB/T 28046.1-2011, ISO 16750-1:2006, MOD)

GB/T 28046.4 Road vehicles—Environmental conditions and testing for electrical and electronic equipment—Part 4: Climatic loads (GB/T 28046.4-2011, ISO 16750-4:2006, MOD)

### **3 Terms and definitions**

For the purposes of this document, the terms and definitions given in GB/T 28046.1 apply.

## **4 Tests and requirements**

### **4.1 Vibration**

#### **4.1.1 General**

The vibration test methods specified consider various levels of vibration severities applicable to on-board electrical and electronic equipment. It is recommended that vehicle manufacturer and supplier choose the test method, the environmental temperature and vibration parameters depending on the specific mounting location.

The specified values apply to direct mounting in defined mounting locations. The use of a bracket for mounting can result in higher or lower loads. If the device under test (DUT) is used in the vehicle with a bracket, then all vibration and mechanical shock testing shall be done with this bracket.

Carry out the vibration test with the DUT suitably mounted on a vibration table. The mounting method(s) used shall be noted in the test report. Carry out the frequency variation by logarithmic sweeping of 0,5 octave/minute for sinusoidal tests and the sinusoidal part of sine on random tests. The objective of the recommended vibration tests is to avoid malfunctions and breakage mainly due to fatigue in the field. Testing for wear has special requirements and is not covered in this part.

Loads outside the designated test frequency ranges shall be considered separately.

NOTE Deviations from the load on the DUT can result if vibration testing is carried out in accordance with this part of ISO 16750 on a heavy and bulky DUT, as mounting rigidity and dynamic reaction on the vibrator table excitation are different compared to the situation in the vehicle. This deviation can be

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