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

GB/T 42284.3-2022

**Road vehicles - Environmental conditions and testing for
electrical and electronic equipment for drive system of electric
propulsion vehicles - Part 3: Mechanical loads**

道路车辆 电动汽车驱动系统用电气及电子设备的环境条件和试验 第3部分：机械
负荷

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Foreword

This document was issued on 30 December 2022 by the State Administration for Market Regulation; Standardization Administration of the PRC and takes effect on 1 July 2023.

It is a GB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

This document was drafted in accordance with the rules provided in GB/T 1.1-2020

Directives for standardization - Part 1.Rules for the structure and drafting of standardizing documents.

This document is Part 3 of GB/T 42284 Road vehicles - Environmental conditions and testing for electrical and electronic equipment for drive system of electric propulsion vehicles. The following parts have been issued for GB/T 42284.

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

This document adopts ISO 19453-3:2018 Road vehicles - Environmental conditions and testing for electrical and electronic equipment for drive system of electric propulsion vehicles - Part 3. Mechanical loads by modification.

Compared with ISO 19453-3:2018, this document makes the following structural adjustments.

-- Delete Clause 6 of ISO 19453-3:2018.

The technical differences - between this document and ISO 19453-3:2018 - and the reasons are as follows.

-- Remove the ISO and IEC database addresses for standardized maintenance terms, since the terms involved in this document have nothing to do with the ISO and IEC databases for standardized maintenance terms;

-- Add ISO 20567-1:2017 to the normative references (see 4.5.2);

-- Replace IEC 60068-2-27 (see 4.2.1.2) with the normative reference GB/T 2423.5, between which the degree of consistency is identical, to adapt to the technical conditions in China and improve operability;

-- Replace IEC 60068-2-31 (see 4.3.2) with the normative reference GB/T 2423.7, between which the degree of consistency is identical, to adapt to the technical conditions in China and improve operability;

-- Replace IEC 60068-2-14 (see 4.1.1) with the normative reference GB/T 2423.22, between which the degree of consistency is identical, to adapt to the technical conditions in China and improve operability;

-- Replace IEC 60068-2-64 (see 4.1.1, 4.1.2) with the normative reference GB/T 2423.56, between which the degree of consistency is identical, to adapt to the technical conditions in China and improve operability;

-- Replace IEC 60068-2-80 (see 4.1.2) with the normative reference GB/T 2423.58, between which the degree of consistency is identical, to adapt to the technical conditions in China and improve operability;

-- Replace ISO 16750-1 (see Clause 3) with the normative reference GB/T 28046.1;

the degree of consistency between the two documents is modified, to adapt to the technical conditions in China and improve operability;

-- Replace ISO 19453-1 (see Clause 3) with the normative reference GB/T 42284.1, between which the degree of consistency is modified, to adapt to the technical conditions in China and improve operability;

-- Replace ISO 19453-4 (see 4.1.1) with the normative reference GB/T 42284.4, between which the degree of consistency is modified, to adapt to the technical conditions in China and improve operability;

-- Add a test method for gravel bombardment (see 4.5.2).

This document also makes the following editorial modifications.

-- Change, in A.4.1.2, the value substituted into T1 from 60 to 600, when the calculation is based on the Basquin model, known as a theoretical method, to accelerate fatigue tests with equivalent damage, because it is printed incorrectly in the original document;

-- Change 1.10 above the sum in the first column of Table A.16 to 1.15, because it is printed incorrectly in the original document.

Please note that some of the contents of this document may involve patents. The issuing organization of this document is not responsible for identifying patents.

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

This document shall be under the jurisdiction of National Technical Committee of Auto Standardization (SAC/TC 114).

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1 Scope

GB/T 42284.3-2022 covers the mechanical loads that electric drive equipment must survive. The components concerned - the traction inverter, the motor controller, the DC-DC converter, the battery management electronics - operate at voltage class B, the high-voltage domain of an electric vehicle, and they live in a harsh mechanical environment: bolted to the powertrain or the body, they take road-induced vibration for the vehicle's whole life, shocks from potholes and kerbs, and in an accident the loads that decide whether high voltage stays contained. Electric drivetrains also introduce vibration of their own, at frequencies a combustion powertrain never produced, from switching converters and from motors turning far faster than an engine. A component that passes an electrical qualification and then cracks a solder joint after two years of vibration has failed just as completely. This part specifies the mechanical load requirements and the corresponding tests for electrical and electronic equipment in electric propulsion drive systems at voltage class B. Under ICS 43.040.10 and CCS T36, it is written for electric drivetrain component suppliers, vehicle manufacturers and testing laboratories.

This document specifies requirements for the electric propulsion systems and components with maximum working voltages according to voltage class B. This document describes the potential environmental stresses and specifies requirements recommended for mechanical loads under different stress levels on/in the vehicle.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the version corresponding to that date is applicable to this document; for undated references, the latest version (including all amendments) is applicable to this document.