



BSI Standards Publication

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

Part 1: General

National foreword

This British Standard is the UK implementation of [ISO 16750-1:2018](#). It supersedes [BS ISO 16750-1:2006](#), which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee AUE/32, Electrical and electronic components and general system aspects (Road vehicles).

A list of organizations represented on this committee can be obtained on request to its secretary.

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

Part 1: General

*Véhicules routiers — Spécifications d'environnement et essais de
l'équipement électrique et électronique —*

Partie 1: Généralités





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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 22, *Road Vehicles*, Subcommittee SC 32, *Electrical and electronic components and general system aspects*.

This third edition cancels and replaces the second edition (ISO 16750-1:2006), which has been technically revised.

The main change compared to the previous edition is the extension of the variety of operating modes, so that not only “typical” load may be applied during the test but also maximum and minimum load.

A list of all parts in the ISO 16750 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The concept of the [ISO 16750](#) series is to assist its user in systematically defining and/or applying a set of internationally accepted environmental conditions, tests and operating requirements which are based on the anticipated actual environment in which the equipment will be operated and exposed to during its life cycle.

The following environmental factors have been considered in the development of this document:

- **World geography and climate:** Road vehicles are owned and operated in nearly all land regions of the Earth. Significant variation in environmental conditions due to climatic environment, including diurnal and seasonal cycles, can therefore be expected. Consideration has been given to worldwide ranges in temperature, humidity, precipitation and atmospheric conditions including dust, pollution and altitude.
- **Type of vehicle:** Environmental conditions in and on road vehicles can depend on vehicle design attributes such as engine type, engine size, suspension characteristics, vehicle mass, vehicle size, electrical supply voltage and so on. Consideration has been given to typical types of vehicles including commercial (heavy) trucks, passenger cars and trucks and diesel and gasoline engines.
- **Vehicle use conditions and operating modes:** Environmental conditions in and on the vehicle vary significantly with road quality, type of road surface, road topography, vehicle use (e.g. commuting, towing, cargo transport, etc.) and driving habits. Operating modes such as storage, starting, driving, stopping and so on have been considered.
- **Equipment life cycle:** Electrical and electronic equipment is also resistant to environmental conditions experienced during manufacture, shipping, handling, storage, vehicle assembly and vehicle maintenance and repair. Such conditions and test (e.g. handling drop test) are within the scope of the [ISO 16750](#) series.
- **Vehicle supply voltage:** Supply voltage varies with vehicle use, operating mode, electrical distribution system design and even climatic conditions. Faults within the vehicle electrical system, such as overvoltage alternator and intermittencies in connection systems, can occur. Such conditions are within the scope of the [ISO 16750](#) series.
- **Mounting location in the vehicle:** In current or future car concepts, systems/components are mounted in almost any location of the car. The environmental requirements for each specific application highly depend on its mounting location. Each location in a car has its distinct set of environmental loads. As an example, the range of temperatures in the engine compartment differs significantly from the range in the passenger compartment. This is also true for the vibration loads. But in this case, not only the vibration levels are different, the type of vibration load also varies. Body mount components are typically exposed to random vibrations whereas for engine mount systems/components the additional sine vibration from the engine is considered. Devices installed in doors are exposed to a high number of mechanical shocks from door slamming additionally.

It is desirable for the car manufacturer to group the different environmental load types and levels in a reasonable number of standard requirement sets. This strategy makes it possible to carry systems/components from one car project to another. Furthermore, the exact requirement levels are often unknown when designing a component for a future car concept. The expected environmental loads are usually compiled from other car concepts with similar conditions. The grouping is normally done by mounting location, but it is difficult to define the right number of different mounting locations and respective load profiles, because there is a conflict of aims between having only few requirement classes and tailoring to the requirement levels for each application. The reason is that the environmental loads are not only depending on the mounting location. There are other major factors that affect the stress levels for systems/components. For examples, body styles, drive-train concepts or package densities can create absolutely different requirement levels for devices that are installed in different cars at almost the same location.