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

**Part 5:  
Chemical loads**

iTeh STANDARD PREVIEW

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

*Partie 5: Contraintes chimiques*

[ISO 16750-5:2003](https://standards.iso.org/iso/16750-5:2003)

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 16750-5 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electric and electronic equipment*.

ISO 16750 consists of the following parts, under the general title *Road vehicles — Environmental conditions and testing for electrical and electronic equipment*.

— *Part 1: General*

— *Part 2: Electrical loads*

— *Part 3: Mechanical loads*

— *Part 4: Climatic loads*

— *Part 5: Chemical loads*

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

## Part 5: Chemical loads

### 1 Scope

This part of ISO 16750 specifies the chemical loads that can affect electric and electronic systems and components in respect of their mounting location on or in road vehicles, and specifies the corresponding tests and requirements. It does not cover electromagnetic compatibility (EMC).

### 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 16750-1:2003, *Road vehicles — Environmental conditions and testing for electrical and electronic equipment — Part 1: General*

ISO 16750-4:2003, *Road vehicles — Environmental conditions and testing for electrical and electronic equipment — Part 4: Climatic loads*

ISO 3170, *Petroleum liquids — Manual sampling*

EN 228, *Automotive fuels — Unleaded petrol — Requirements and test methods*

DIN 51604-1, *FAM testing fluid for polymer materials; composition and requirements*

DIN V 51606, *Liquid fuels; diesel fuel of vegetable oil methylester (PME); requirements*

DIN 53245, *Solvents for paints and varnishes; alcohol; supply specification, further properties and methods of test*

SAE J 1709, *European Brake Fluid Technology*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 16750-1 apply.

## 4 General

Components and associated parts that can come into contact with the specified chemical agents shall be resistant to those agents. They shall be tested with all agents they are likely to come into contact with, except for those materials which can be shown by documentary evidence to be immune to the contaminant, which need not be tested. Immunity is defined as no change in properties sufficient to affect material performances over the time and at the temperature specified in Clause 5. Manufacturer and type of chemical agents are to be agreed upon between supplier and vehicle manufacturer.

Resistance against the specified chemical agents shall be considered as early as during the material selection process.

## 5 Tests and requirements

### 5.1 Test

#### 5.1.1 Visual examination

Carry out a visual examination with the naked eye, at a normal strength of vision, with normal colour perception, at the most favourable distance and with suitable illumination. Such visual examination shall allow identification, appearance, workmanship and finish of the item to be checked against the relevant specification.

#### 5.1.2 Preparation

One contaminant shall be applied to each specimen.

It is understood that extra testing may be agreed between manufacturer and user.

Apply the agent in accordance with Table 1 to surfaces that have not been in contact with chemical agents before.

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Use one of the following options for the application of the agent to ensure thorough coverage of all surfaces of the device under test (DUT):

- cotton cloth;
- brush;
- immersion;
- spraying;
- pouring.

Allow excess chemical agent to drip off the DUT after application.

#### 5.1.3 Ageing

After application of the agent, store the DUT for a duration of 24 h at a temperature in accordance with Table 1.

#### 5.1.4 Visual examination

Visually examine the DUT after the ageing (see 5.1.1).

## 5.2 Requirements

After the test, functional status shall be Class C in accordance with ISO 16750-1:2003, Clause 6.

There shall be no changes that could impair normal performance (e.g. sealing function), marking and labelling shall remain visible and legible.

**Table 1 — Chemical agents**

Identification	Chemical agent	Description	Temperature for ageing of DUT <sup>a b</sup>
A	Diesel fuel	According to ISO 3170 (EN 590)	$T_{max}$
B	“bio” Diesel fuel	According to DIN 51606	$T_{max}$
C	Petrol/gasoline (unleaded)	According to ISO 3170 (EN 228)	RT
D	Gasoline with 15 % methanol	According to DIN 53245	RT
E	Test fuel FAM	According to DIN 51604 B	RT
F	Battery fluid	37 % sulphuric acid or KOH	80°C
G	Brake fluid	DOT 4 (see SAE J 1709)	$T_{max}$
H	Coolant additive (undiluted antifreeze fluid)	c	$T_{max}$
I	Protective lacquer	c	$T_{max}$
J	Protective lacquer remover	c	RT
K	Engine oil (multi-grade oil)	See SAE 10 W 50	$T_{max}$
L	Cold-cleaning agent	c	TA
M	Methanol	According to DIN 53245	RT
N	Differential oil	c	$T_{max}$
O	Transmission fluid	c	$T_{max}$
P	Interior cleaner	c	$T_{max}$
Q	Refreshment containing caffeine and sugar	c	$T_{max}$
R	Hydraulic fluid	c	$T_{max}$
S	Car wash chemicals	c	RT
T	Windscreen washer fluid	c	$T_{max}$
U	Glass cleaner	c	$T_{max}$
V	Wheel cleaner	c	$T_{max}$
W	Engine cleaner	c	$T_{max}$
X	Kerosene	c	RT
Y	Denatured alcohol	c	RT
Z	Cavity protection	c	$T_{max}$
0	Additional agents	c	

<sup>a</sup>  $T_{max}$  shall be chosen from ISO 16750-4:2003, Table 1.

<sup>b</sup> RT, see ISO 16750-1:2003, 7.2

<sup>c</sup> Composition to be agreed upon between manufacturer and customer.

## 6 Documentation

For documentation, designations according to ISO 16750-1 shall be used.

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## Annex A (informative)

### Typical chemical loads for equipment, depending on mounting location

Identification	Chemical agent	Mounting location							
		Engine compartment		Passenger area/compartment		Cargo/luggage area/compartment		Mounting on exterior	
	Example for code <sup>a</sup>	A	Z <sub>A</sub> <sup>b</sup>	B	Z <sub>B</sub> <sup>b</sup>	C	Z <sub>C</sub> <sup>b</sup>	D	Z <sub>D</sub> <sup>b</sup>
A	Diesel fuel	X		—		—		—	
B	“bio” Diesel fuel	X		—		—		—	
C	Premium (unleaded) petrol	X		—		—		—	
D	M15	X		—		—		—	
E	FAM test fuel	X		—		—		—	
F	Battery fluid	X		X		X		—	
G	Brake fluid	X		—		—		—	
H	Coolant additive (undiluted antifreeze fluid)	X		—		—		—	
I	Protective lacquer	X		—		—		X	
J	Protective lacquer remover	X		—		—		X	
K	Engine oil (multi-grade oil)	X		—		—		—	
L	Cold-cleaning agent	X		—		X		X	
M	Methanol	X		—		—		—	
N	Differential oil	X		—		—		X	
O	Transmission fluid	X		—		—		—	
P	Interior cleaner	—		X		X		—	
Q	Refreshment containing caffeine and sugar	—		X		X		X	
R	Hydraulic fluid	X		—		X		—	
S	Car wash chemicals	X		—		—		X	
T	Windshield washer fluid	X		—		X		X	
U	Glass cleaner	—		X		X		X	
V	Wheel cleaner	—		—		—		X	
W	Engine cleaner	X		—		—		—	
X	Kerosene	—		—		X		—	
Y	Denatured alcohol	X		X		X		X	
Z	Cavity protection	—		—		—		X	
0	Additional agents								

Chemical loading can vary significantly depending on type and use of the vehicle. Users of this part of ISO 16750 should chose from this list according to the application.

Additional agents may be agreed upon between manufacturer and user.

<sup>a</sup> Depending on the combination.

<sup>b</sup> As agreed upon.