

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Railway applications – Insulation coordination –
Part 1: Basic requirements – Clearances and creepage distances for all electrical
and electronic equipment**

**Applications ferroviaires – Coordination de l'isolement –
Partie 1: Exigences fondamentales – Distances d'isolement dans l'air et lignes
de fuite pour tout matériel électrique et électronique**



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CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	8
4 Basis for insulation coordination	11
4.1 Basic principles	11
4.1.1 General	11
4.1.2 Insulation coordination with regard to voltage	11
4.1.3 Insulation coordination with regard to environmental conditions	12
4.2 Voltages and voltage ratings	12
4.2.1 General	12
4.2.2 Rated insulation voltage (U_{Nm})	12
4.2.3 Rated impulse voltage (U_{Ni}).....	13
4.3 Time under voltage stress	14
4.4 Pollution	14
4.5 Insulating material	14
4.5.1 General	14
4.5.2 Comparative tracking index (CTI)	14
5 Requirements and dimensioning rules for clearances	15
5.1 General.....	15
5.2 Minimum clearances.....	15
5.2.1 Functional insulation.....	15
5.2.2 Basic and supplementary insulation.....	16
5.2.3 Reinforced insulation	16
5.3 Contingency	16
6 Dimensioning rules for creepage distances.....	16
6.1 General.....	16
6.2 Minimum creepage distances	17
6.2.1 Functional, basic and supplementary insulations	17
6.2.2 Reinforced insulation	17
7 Tests and measurements	17
7.1 General.....	17
7.2 Measurement of creepage distances and clearances.....	18
7.2.1 Method and values	18
7.2.2 Acceptance criteria.....	18
7.3 Verification of clearances by impulse test.....	18
7.3.1 Method and values	18
7.3.2 Test acceptance criteria	18
7.4 Verification of clearances by power-frequency test.....	18
7.4.1 Method and values	18
7.4.2 Test acceptance criteria	18
7.5 Verification of clearances by d.c. voltage test.....	19
7.5.1 Method and values	19
7.5.2 Test acceptance criteria	19
8 Specific requirements for applications in the railway field	19

8.1	General	19
8.2	Specific requirements for signalling	19
8.2.1	Overvoltage categories	19
8.2.2	Rated impulse voltages	20
8.2.3	Induced voltages	20
8.2.4	Installation instructions	20
8.2.5	Pollution degrees	20
8.3	Specific requirements for rolling stock	20
8.3.1	Determination of U_{Ni} by method 1	20
8.3.2	Creepage distances	21
8.3.3	Roof installations	21
8.4	Specific requirements for fixed installations	21
8.4.1	Determination of the rated impulse voltage U_{Ni} by method 1	21
8.4.2	Distances of outdoor insulators	22
Annex A (normative)	Tables	23
Annex B (normative)	Provisions for type and routine dielectric tests for equipment	31
Annex C (normative)	Methods of measuring creepage distances and clearances	33
Annex D (normative)	Correlation between U_n and U_{Nm}	39
Annex E (informative)	Macro-environmental conditions	40
Annex F (informative)	Application guide	41
Bibliography	51
Figure F.1	– Determination of minimum clearances and creepage distances	43
Figure F.2	– Example for types of insulation	46
Figure F.3	– Monitoring circuit showing examples of sections	48
Figure F.4	– Drawing of monitoring device	48
Table A.1	– Rated impulse voltage U_{Ni} for low voltage circuits not powered directly by the contact line	23
Table A.2	– Rated impulse voltages (U_{Ni}) for circuits powered by the contact line and for traction power circuits in thermo-electric driven vehicles	24
Table A.3	– Minimum clearances in air (in mm) based on the rated impulse voltage U_{Ni}	25
Table A.4	– Definition of pollution degrees	26
Table A.5	– Minimum creepage distances (in mm) based on rated insulation voltage U_{Nm} up to 1 000 V for printed wiring material and associated components	27
Table A.6	– Minimum creepage distances (in mm) for low values of rated insulation voltage U_{Nm} for materials other than printed wiring material	28
Table A.7	– Minimum creepage distances (in mm/kV) for high values of rated insulation voltage U_{Nm}	29
Table A.8	– Test voltages for verifying clearances in air for an altitude of 2 000 m above sea level, not to be used for routine dielectric tests	30
Table B.1	– Dielectric test for equipments – Short-duration power-frequency (a.c.) test levels U_a (kV r.m.s.) based on the rated impulse voltage U_{Ni} (kV)	32
Table C.1	– Minimum dimensions of grooves	33
Table D.1	– Correlation between nominal voltages of the railway power distribution system and the required insulation voltages for circuits of equipment which are intended to be connected to these systems	39
Table F.1	– Example for the determination of clearances and creepage distances	49

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**RAILWAY APPLICATIONS –
INSULATION COORDINATION –**

**Part 1: Basic requirements –
Clearances and creepage distances
for all electrical and electronic equipment**

FOREWORD

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International Standard IEC 62497-1 has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

This standard is based on EN 50124-1.

The text of this standard is based on the following documents:

FDIS	Report on voting
9/1335/FDIS	9/1358/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of IEC 62497, under the general title *Railway applications – Insulation coordination*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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INTRODUCTION

Special conditions occurring in railway applications and the fact that the equipment here concerned falls into the scope of both IEC 60071 (prepared by IEC technical committee 28) and IEC 60664-1 (prepared by IEC technical committee 109), led to the decision to draw from these documents and from IEC 60077-1 (prepared by IEC technical committee 9), a single document of reference for all standards applicable to the whole railway field.

IEC 62497 consists of two parts:

- IEC 62497-1: Part 1: Basic requirements – Clearances and creepage distances for all electrical and electronic equipment;
- IEC 62497-2: Part 2: Overvoltages and related protection.

This Part 1 allows, in conjunction with IEC 62497-2, to take into account advantages resulting from the presence of overvoltage protection when dimensioning clearances.

RAILWAY APPLICATIONS – INSULATION COORDINATION –

Part 1: Basic requirements – Clearances and creepage distances for all electrical and electronic equipment

1 Scope

This part of IEC 62497 deals with insulation coordination in railways. It applies to equipment for use in signalling, rolling stock and fixed installations up to 2 000 m above sea level.

Insulation coordination is concerned with the selection, dimensioning and correlation of insulation both within and between items of equipment. In dimensioning insulation, electrical stresses and environmental conditions are taken into account. For the same conditions and stresses these dimensions are the same.

An objective of insulation coordination is to avoid unnecessary overdimensioning of insulation.

This standard specifies:

- requirements for clearances and creepage distances for equipment;
- general requirements for tests pertaining to insulation coordination.

The term equipment relates to a section as defined in 3.3; it may apply to a system, a sub-system, an apparatus, a part of an apparatus, or a physical realisation of an equipotential line.

This standard does not deal with :

- distances through solid or liquid insulation;
- distances through gases other than air;
- distances through air not at atmospheric pressure;
- equipment used under extreme conditions.

Product standards have to align with this generic standard.

However, they may require, with justification, different requirements due to safety and/or reliability reasons, e.g. for signalling, and/or particular operating conditions of the equipment itself, e. g. overhead lines which have to comply to established standards or regulations such as EN 50119.

This standard also gives provisions for dielectric tests (type tests or routine tests) on equipment (see Annex B).

NOTE For safety critical systems, specific requirements are needed. These requirements are given in the product specific signalling standard IEC 62425.

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.

IEC 60060-1, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60071-1, *Insulation co-ordination – Part 1: Definitions, principles and rules*

IEC 60112, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60507, *Artificial pollution tests on high-voltage insulators to be used on a.c. systems*

IEC 60587, *Electrical insulating materials used under severe ambient conditions – Test methods for evaluating resistance to tracking and erosion*

IEC 60850, *Railway applications – Supply voltages of traction systems*

IEC 61245, *Artificial pollution tests on high-voltage insulators to be used on d.c. systems*

IEC 61992-1:2006, *Railway applications – Fixed installations – DC switchgear – Part 1: General*

IEC 62236 (all parts), *Railway applications – Electromagnetic compatibility*

EN 50119, *Railway applications – Fixed installations – Electric traction overhead contact lines*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE For the purpose of this standard the following definitions apply according to the following priority order:

- the definition given here-under;
- the definition given in IEC 60664-1;
- the definition given in the documents mentioned in Clause 2 other than IEC 60664-1.

3.1

clearance

the shortest distance in air between two conductive parts

3.2

creepage distance

the shortest distance along the surface of the insulating material between two conductive parts

3.3

sections

3.3.1

section

part of an electrical circuit having its own voltage ratings for insulation coordination

Sections fall into two categories:

3.3.2

earthed section

a section connected to earth or to the car body through a circuit for which interruption is not expected