PD IEC TR 63040:2016
Incorporating corrigendum February 2019

BSI Standards Publication

Guidance on clearances and creepage distances in particular for distances equal to or less than 2 mm - Test results of research on influencing parameters

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National foreword

This Published Document is the UK implementation of IEC TR 63040:2016, incorporating corrigendum January 2019.

The UK participation in its preparation was entrusted to Technical Committee GEL/109, Insulation co-ordination for low voltage equipment.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Published by BSI Standards Limited 2019

ISBN 978 0 539 03832 3

ICS 29.080.30

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This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 October 2016.

Amendments/corrigenda issued since publication

Date	Text affected
28 February 2019	Implementation of IEC corrigendum January 2019: Figure 7 replaced

IEC TR 63040

Edition 1.0 2016-09

TECHNICAL REPORT

Guidance on clearances and creepage distances in particular for distances equal to or less than 2 mm – Test results of research on influencing parameters

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.080.30

ISBN 978-2-8322-3656-7

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

GUIDANCE ON CLEARANCES AND CREEPAGE DISTANCES IN PARTICULAR FOR DISTANCES EQUAL TO OR LESS THAN 2 mm – TEST RESULTS OF RESEARCH ON INFLUENCING PARAMETERS

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IEC TR 63040, which is a Technical Report, has been prepared by IEC technical committee 109: Insulation co-ordination for low-voltage equipment.

The text of this Technical Report is based on the following documents:

Enquiry draft	Report on voting
109/140/DTR	109/144/RVC

Full information on the voting for the approval of this Technical Report 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.

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.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

This document provides information on printed board assemblies and other equivalent plane arrangements of insulation, where the clearance and the creepage distance follows the same path along the surface of solid insulation.

This document is based on German research data published in May 1989 [9], [10][1]. SC 28A, the predecessor of TC 109, began analysing this research data in November 1990.

The following points provide background information to the research.

- The research was carried out on test samples that were manufactured with the same technology being used for printed circuit boards (PCBs) with selected spacing of circuit patterns from 0,16 mm to 6,3 mm.
- Ten types of materials were used for the test samples. The influence of manufacturing operations on the surface of a material, for example moulding or machining, was not part of this research project.
- The test samples were placed in different locations, such as large city, rural, industrial, desert, sea side, and periodically exposed to a voltage stress and the data was accumulated over a long period of time.

1 Numbers in square brackets refer to the bibliography.

GUIDANCE ON CLEARANCES AND CREEPAGE DISTANCES IN PARTICULAR FOR DISTANCES EQUAL TO OR LESS THAN 2 mm – TEST RESULTS OF RESEARCH ON INFLUENCING PARAMETERS

1 Scope

This document describes test results of research on dimensioning of clearances and creepage distances, for spacing equal to or less than 2 mm for printed wiring material and other equivalent arrangements of insulation, where the clearance and the creepage distance follows the same path along the surface of solid insulation.

The information contained in this document is the result of research only and cannot be used for dimensioning the clearances and creepage distances for equipment within low-voltage systems, where IEC 60664-1 applies. However distances can be taken into account for functional reasons.

This document provides results of research related to the following criteria:

1) clearances independent from the micro-environment;
2) creepage distances for pollution degree 1, 2 and 3 which extends the use of smaller distances to products having design features similar to printed circuit boards;
3) creepage distances to avoid flashover of the insulating surface;
4) information on minimum creepage distances to maintain minimum insulation resistance.

A test method for the evaluation of the relevant water adsorption group for the surface of any insulating material which has not yet been classified is described.

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 edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60664-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp