BSI Standards Publication

Printed board assemblies

Part 7: Technical cleanliness of components and printed board assemblies

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National foreword

This Published Document is the UK implementation of IEC TR 61191-7:2020.

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

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Printed board assemblies –
Part 7: Technical cleanliness of components and printed board assemblies

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

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IEC/TR 61191-7, which is a technical report, has been prepared by IEC technical committee 91: Electronics assembly technology.

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

Draft TR	Report on voting
91/1583/DTR	91/1595/RVDTR

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

A list of all parts in the IEC 61191 series, published under the general title *Printed board assemblies*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http//www.webstore.iec.ch" in the data related to the specific document. At this date, the document will be

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- withdrawn,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

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

The Technical Report applies to electric, electronic and electromechanical components, circuit boards and electronic assemblies and describes the resulting level of technical cleanliness that can be expected for products that are manufactured with state-of-the-art standard production methods and processes.

The Technical Report is an informative document which serves to illustrate the technically feasible options and provide a basis for customer and supplier agreements. It is not intended to be regarded as a specification or standard. It does not cover the production of electric motors, batteries, cable harnesses and relays.

Its primary focus is on loose or easily detachable particles (labile particles). Film residues, chemical and biological contamination are also briefly covered. It does not deal with the cleanliness of functional fluids and/or gases.

This Technical Report provides information, how the requirements put down in VDA 19.1 and VDA 19.2 could become reasonably applied in electronic industry It provides information about particle generation considering processes and materials, illustrates their impact on performance and reliability and describes suitable countermeasures as well as procedures for risk assessments.

Related standards issued by the automotive industry and the electronic industry are gathered in the bibliography.

The Technical Report has been prepared based on material provided by the working group on component cleanliness of the ZVEI (Zentralverband Elektrotechnik- und Elektronikindustrie e.V., Germany).

PRINTED BOARD ASSEMBLIES –

Part 7: Technical cleanliness of components and printed board assemblies

1 Scope

This part of IEC 61191 serves as a Technical Report and provides information, how technical cleanliness can be assessed within the electronics assembly industry. Technical cleanliness concerns sources, analysis, reduction and control as well as associated risks of particulate matter, so-called foreign-object debris, on components and electronic assemblies in the electronics industry.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

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

4 Technical cleanliness

4.1 What is technical cleanliness?

The term 'technical cleanliness' was coined by the automotive industry to address particle-related system interruptions in the automotive industry. In contrast to 'optical cleanliness', which relates to the cosmetic or visual appearance, e.g. vehicle coating, technical cleanliness always refers to the performance of components, assemblies and systems.

Particulate contamination in the automotive industry is often not limited to a certain area but may migrate from a previously non-critical to a sensitive location and hence impair performance. For instance, a particle on the lens of a traffic sign detection camera may cause it to malfunction. Similarly, a conductive particle from the aluminum cover of an electronic control unit may cause a short circuit on the circuit board and undermine its performance. This is why the cleanliness requirements of the automotive industry often apply to complete systems, whereby the most particle-sensitive component (weakest link in the chain) determines the cleanliness level and admissible limiting values for the entire system and all components within it. With regard to components, technical cleanliness refers to the specification, observance and verification of limiting values, e.g. according to weight of residual contamination, particle count, type and size. At the same time, the automotive industry tolerates failures only in the ppm range. New stipulations are continuously being added to the existing specifications. These are often tailored to suit the specific requirements of a company or component and its performance. Their scope of application is limited, i.e. they are valid in-house and/or for suppliers.