

Quality assessment systems - Part 3: Selection and use of sampling plans for printed boards and laminate end-products and in-process auditing (IEC 61193-3:2013)

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**Quality assessment systems -
Part 3: Selection and use of sampling plans for printed board and laminate
end-product and in-process auditing
(IEC 61193-3:2013)**

Système d'assurance de la qualité -
Partie 3: Choix et utilisation de plans
d'échantillonnage pour cartes imprimées
et produits finis stratifiés et audits en
cours de fabrication
(CEI 61193-3:2013)

Qualitätsbewertungssysteme -
Teil 3: Auswahl und Anwendung von
Stichprobenanweisungen für Endprodukte
von Leiterplatten und Laminaten und
fertigungsbegleitende Auditierung
(IEC 61193-3:2013)

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 91/1061/FDIS, future edition 1 of IEC 61193-3, prepared by IEC TC 91 "Electronics assembly technology" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61193-3:2013.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2013-11-28
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2016-02-28

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Endorsement notice

The text of the International Standard IEC 61193-3:2013 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60068-2-20	NOTE	Harmonized as EN 60068-2-20.
IEC 60068-2-38	NOTE	Harmonized as EN 60068-2-38.
IEC 61189-2	NOTE	Harmonized as EN 61189-2.
IEC 61189-3	NOTE	Harmonized as EN 61189-3.
IEC 61193-1	NOTE	Harmonized as EN 61193-1.
IEC 61193-2	NOTE	Harmonized as EN 61193-2.
IEC 62326-1	NOTE	Harmonized as EN 62326-1.
IEC 62326-4-1	NOTE	Harmonized as EN 62326-4-1.
ISO 14001	NOTE	Harmonized as EN ISO 14001.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60194	2006	Printed board design, manufacture and assembly - Terms and definitions	EN 60194	2006
IEC 62326-4	1996	Printed boards - Part 4: Rigid multilayer printed boards with interlayer connections - Sectional specification	EN 62326-4	1997
ISO 9000	2005	Quality management systems - Fundamentals and vocabulary	EN ISO 9000	2005
ISO 14560	2004	Acceptance sampling procedures by attributes - Specified quality levels in nonconforming items per million	-	-

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INTRODUCTION

A clear description in IEC standards and specifications and their reference to sampling plans in order to insure adherence to customer requirements is essential. All the details should be clear as to their implementation or adjustment for evaluation of the product to be shipped, the use of process control and SPC, or the applicability for using these principles in controlled experimentation. The general characteristics of these principles relate to a gradual reduction that might be needed in examining the product being manufactured. As such, they are sometimes referred to as the logical steps to process improvement. These steps are as follows.

- a) STATISTICAL SAMPLING: where, when, and why
 - To determine a proper amount of examples from a given lot of product and using statistics to evaluate the occurrence of anomalies.
- b) ZERO DEFECT STANDARDS: role of specifications
 - To adopt the role of attempting to achieve no defects in a production lot through the recommendations identified in standards or specifications that define the product requirements.
- c) ECONOMICS: AQL versus cost of defects
 - To establishing the highest level of non-conforming product characteristics, determining the cost that is incurred when these are discovered or delivered accidentally to the customer (cost of quality) and establishing an acceptable quality assessment methodology in order to reduce these occurrences.
- d) SPC REDUCED INSPECTION: rules for use and control
 - To create a process control program that is based on reject criteria, followed by controlled experimentation to improve the process and then using statistical analysis in order to determine that the process improvement has reduced the occurrences of these reject criteria.

The explosion of the electronics industry has led to a situation where the design of the printed board mounting structure or the material used to produce the product is so complex, that the quality level of these items delivered with known failures are no longer acceptable. The acceptable number of non-conforming products should be directed toward approaching zero in producer-customer contracts.

This has led to the development of new methods of quality assurance like the application of Statistical Process Control (SPC). The low number of permitted non-conforming product according to the AQL tables caused many to resort to 100 % testing or inspection.

At the same time the quality thinking has developed so that the idea to accept failures has become impossible, and the use of the AQL tables in the traditional way has been diminishing very rapidly.

QUALITY ASSESSMENT SYSTEMS –

Part 3: Selection and use of sampling plans for printed board and laminate end-product and in-process auditing

1 Scope

This part of IEC 61193 establishes sampling plans for inspection by attributes, including sample plan selection criteria and implementation procedures for printed board and laminate end-product and in-process auditing. The principles established herein permit the use of different sampling plans that may be applied to an individual attribute or set of attributes, according to classification of importance with regard to form, fit and function.

2 Normative references

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

IEC 60194:2006, *Printed board design, manufacture and assembly – Terms and definitions*

IEC 62326-4:1996, *Printed boards – Part 4: Rigid multilayer printed boards with interlayer connections – Sectional specification*

ISO 9000:2005, *Quality management systems – Fundamentals and vocabulary*

ISO 14560:2004, *Acceptance sampling procedures by attributes – Specified quality levels in non-conforming items per million*

3 Terms and definitions

For purposes of this document, the terms and definitions given in IEC 60194:2006, ISO 9000:2005 and the following apply.

3.1 attribute

aspect or characteristic of a unit of a defined product in terms of actual requirement and allowable deviation

Note 1 to entry: An actual requirement signifies the following:

- a requirement that is stated as a measurement with an allowable more and/or less deviation;
- a requirement stated as an absolute desired condition with allowable anomalies;
- a requirement stated as an absolute without exception (go/ no-go).

3.1.1 critical attribute

attribute where a defect, that judgment and experience indicate, is likely to result in hazardous or unsafe conditions for individuals using, maintaining, or depending upon the product; or where a defect is likely to prevent performance or function of a major end item such as a ship, aircraft, computer, medical equipment, or telecommunication satellite