



IEC 61193-2

Edition 1.0 2007-08

INTERNATIONAL STANDARD

**Quality assessment systems –
Part 2: Selection and use of sampling plans for inspection of electronic
components and packages**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE

R

ICS 31.190

ISBN 2-8318-9297-X

CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references	6
3 Terms and definitions	6
4 Sampling system	7
4.1 Formation and identification of lots.....	7
4.2 Drawing of samples.....	7
4.2.1 Selection of sample items.....	7
4.2.2 Process of sampling	7
4.3 Sampling plans.....	7
4.3.1 Inspection level	7
4.3.2 Sampling plan for normal inspection	8
4.3.3 Acceptance number.....	8
4.3.4 Tightened or reduced inspection.....	8
5 Acceptance and rejection	9
5.1 Acceptability criteria	9
5.2 Disposition of rejected lots	9
6 Statistical verified quality limit (SVQL).....	9
6.1 General.....	9
6.2 Calculation of the SVQL	10
 Annex A (informative) Estimation of the statistical verified quality limit (SVQL) in nonconforming items per million ($\times 10^{-6}$) at a confidence limit 60 %.....	 11
Annex B (informative) Relationship between this standard and ISO 2859-1.....	15
Annex C (informative) Example of application of this standard (lot-by-lot inspection of assessment level EZ in IEC/TC 40).....	17
 Bibliography.....	 18
 Table 1 – Sample size	 8
Table 2 – Sample size code letters	9
Table 3 – Coefficients for confidence level 60 % (see also A.5)	10
Table A.1 – Statistical verified quality limits in nonconforming items per million ($\times 10^{-6}$)	12
Table A.2 – np with confidence limit of 60 % for accumulated number of non- conforming items and coefficient C_L	14
Table B.1 – Sampling plans corresponding to Table 2-A of ISO 2859-1.....	15
Table B.2 – Tabulated values for operating characteristic curves (p : per cent nonconforming).....	16
Table C.1 – Lot-by-lot inspection of assessment level EZ – IEC/TC 40	17

INTERNATIONAL ELECTROTECHNICAL COMMISSION

QUALITY ASSESSMENT SYSTEMS –

**Part 2: Selection and use of sampling plans
for inspection of electronic components and packages**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61193-2 has been prepared by IEC technical committee 91: Electronics assembly technology.

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

FDIS	Report on voting
91/690/FDIS	91/723/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 the parts in the IEC 61193 series, under the general title *Quality assessment systems*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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.

INTRODUCTION

To obtain a high quality level of products, process controls like 100 % testing of significant characteristics and statistical methods are needed to stabilize, monitor, and improve processes.

Sampling inspection is one of the methods to verify

- whether the process control is effective, and
- the quality level of a supplier's product by a customer or third party.

Today the quality level of products for use in electric and electronic equipment is expected to be equal or close to zero defects. But, the assessment of a quality level close to zero defects by sampling only would lead to an unreasonable increase of cost for inspection. A combination of process control and zero acceptance number sampling plans is indispensable.

This standard provides a sampling system and plans for the inspection of electronic components, packages and modules, manufactured under suitable process control, which prevents the outflow of nonconforming products.

NOTE The sampling system provided by this standard is extracted from ISO 2859-1, and is intended to be used for the inspection of final products, either by the manufacturer, a customer, or a third party.

QUALITY ASSESSMENT SYSTEMS –

Part 2: Selection and use of sampling plans for inspection of electronic components and packages

1 Scope

This part of IEC 61193 applies to the inspection of electronic components, packages, and also modules (referred to as “products” in this standard) for use in electronic and electric equipment. It specifies sampling plans for inspection by attributes on the assumption that the acceptance number is zero ($A_c = 0$), including criteria for sample selection and procedures.

The zero acceptance number sampling plans provided by this standard apply to the inspection of products, that are manufactured under suitable process control with the target of a “zero-defect” quality level before sampling inspection.

In addition, this standard provides a method for the calculation of the expected value of the statistical verified quality limit (SVQL) at a confidence level of 60 %. Amongst other things, this method can be used to verify the effectiveness of the supplier’s process control.

NOTE In this standard the term “module” is used for products which are modules according to the definition in IEC 60194.

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

ISO 2859-1:1999, *Sampling procedures for inspection by attributes – Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

ISO 3534-2:2006, *Statistics – Vocabulary and symbols – Part 2: Applied statistics*