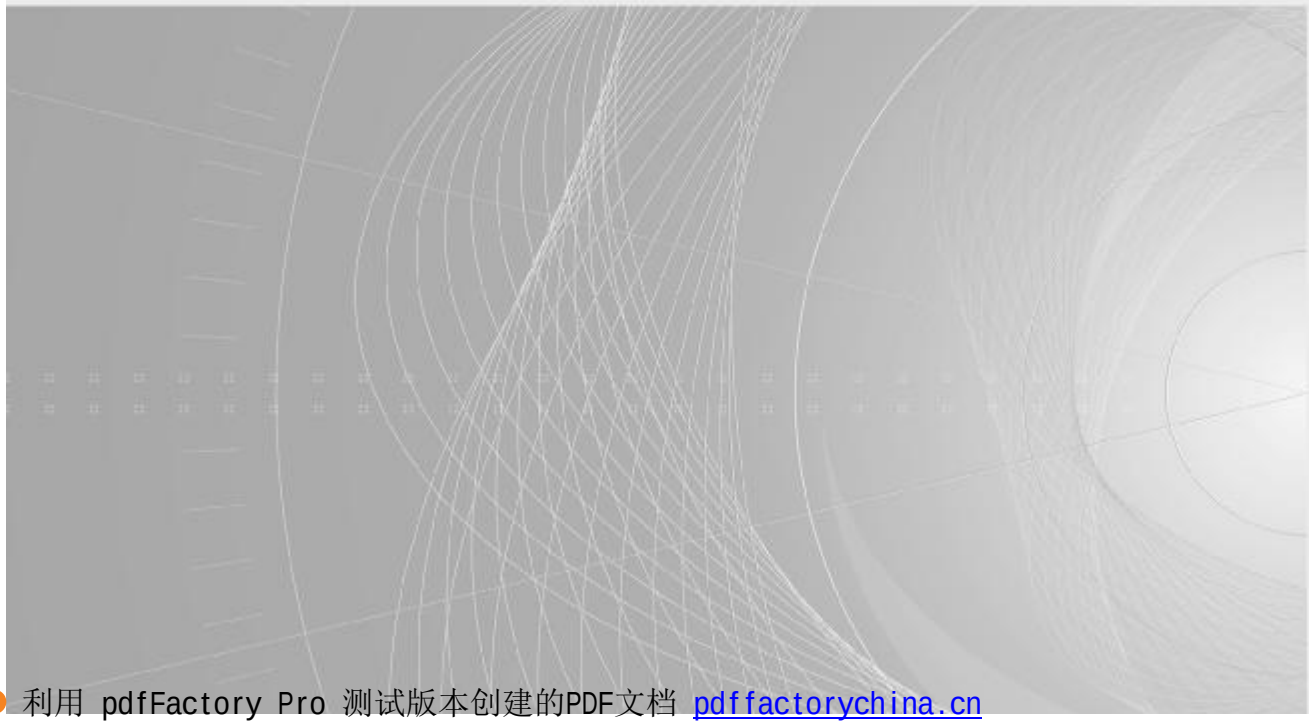
IECQ 03-3-2

Edition 2.0 2014-12

IECQ PUBLICATION

IEC Quality Assessment System for Electronic Components (IECQ System)

Rules of Prodecure –
Part 3-2: IECQ Approved Component Products, Related Materials & Assemblies Scheme, IECQ Approved Component – Automotive Qualification Programme (IECQ AC-AQP)



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IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

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INTERNATIONAL
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

Rules of Procedure – Part 3-2: IECQ Approved Component Products, Related Materials & Assemblies Scheme, IECQ Approved Component – Automotive Qualification Programme (IECQ AC-AQP)

FOREWORD

This publication has been prepared by the Management Committee (MC) of the IECQ.

This publication is directly related to Publication IECQ 03-3 containing the Rules of Procedure for the IECQ Approved Component Scheme. This second edition of IECQ 03-3-2 presents the requirements of the IECQ Automotive Qualification Programme being an integral part of the IECQ Approved Component Scheme applicable to Products, Related Materials & Assemblies dedicated to the Automotive Sector.

This IECQ 03-3-2 needs to be read in conjunction with IECQ 03-3.

This second edition of IECQ 03-3-2 replaces the first edition IECQ 03-3-2. Main changes to the first edition include:

– Clarification of the requirements for an IECQ CB to participate in the IECQ AC-AQP.
– Clarification of the criteria for qualification of IECQ AC-AQP Assessors.
– Clarification of the IECQ AC-AQP assessment man-day requirements.
– Update to the standard test report cover pages content.
– Clarification of subcontracting and use of IECQ Approved Process within the IECQ AC-AQP.
– Clarification on the transfer of IECQ AC-AQP Certification.

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

Document	Report on MC Consultation
IECQ WG08-006A-CA	IECQ MC/304/DL

Full information on the approval by the MC of this publication can be found in the report indicated in the above table.

Rules of Procedure – Part 3-2: IECQ Approved Component Products, Related Materials & Assemblies Scheme, IECQ Approved Component – Automotive Qualification Programme (IECQ AC-AQP)

1 Scope

1.1 General

This publication contains the Rules of Procedure of the Automotive Qualification Programme of the IECQ, hereinafter referred to as the "Rules", for the Approved Component – Automotive Qualification Programme (IECQ AC-AQP or IECQ AQP).

These IECQ Approved Component – Automotive Qualification Programme Rules of Procedure provide the requirements specific to this category of the IECQ Approved Component Scheme and are to be used in conjunction with applicable IECQ System management Basic Rules (IECQ 01), General Rules of Procedure (IECQ 03-1), Approved Component Scheme Rules of Procedure (IECQ 03-3) and Operational Documents (ODs).

Covering electronic components and associated materials and assemblies (including modules) use within and to support the automotive industry

1.2 Application

The Automotive Qualification Programme is intended for use by:

- manufacturers, suppliers, repairers, and maintainers of products to develop processes for the testing and release of conforming automotive electronics that they manufacture, service and purchase, in order to assure their capability of product reliability testing, inspection and the quality of their products; and
- customers (their clients), users may utilize this IECQ AC-AQP to verify whether the characteristics covering both safety and performance, reliability and quality of products purchased are in compliance with the stated technical specification(s) and applicable quality standard(s) for automotive industry.

The requirements of this Programme are in addition to those contained within ISO/TS 16949 and/or ISO 9001.

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.

ISO 9001, *Quality management systems – Requirements*

IECQ 03-3, *IECQ Rules of Procedure – Part 3: IECQ Approved Component Products, Related Materials & Assemblies Scheme*

IECQ OD 010, *Qualification Criteria for Assessors and Lead Assessors according to IECQ (third-party assessment)*

ISO/TS 16949, *Quality management systems - Particular requirements for the application of ISO 9001:2008 for automotive production and relevant service part organizations*

IEC 60410, *Sampling plans and procedures for inspection by attributes*

AEC Q100, *The Qualification requirement for Integrated Circuits of Automotive industries*

AEC Q101, *The Qualification requirement for Discrete Semiconductor of Automotive industries*

AEC Q200, *The Qualification requirement for Passive Components of Automotive industries*

In the event of conflict between the provisions of this document and any other directly or indirectly referenced provisions, the provisions of this document shall take precedence.

3 Terms and definitions

The basic definitions concerning conformity assessment contained in ISO/IEC 17000 apply.

For the purpose of this document the terms and definitions given in IECQ 01, IECQ 02, IECQ 03-1, IECQ 03-3 and the following apply.

3.1
Approval process plan
a pack of documents that describes the approval process, test method and procedure relating to specific components, related materials and assemblies within the scope of the IECQ Approved Component – Automotive Qualification Programme (AC-AQP)

3.2
Equipment list
a list of test and measuring equipment utilized as part of the IECQ AC-AQP process

3.3
Component Specification (CS)
component specification must be generated by the manufacturer directly, or making reference to other industry or association documents, all information necessary to describe a given component, range of components or assembly parts completely to ensure conformance thereof with the requirements for quality assessment

3.4
Primary stage of manufacture
the primary stage of manufacture is the stage of the manufacturing operation at which, and beyond which, the manufacturer shall demonstrate that he has controlled over all aspects of the processes that affect the quality of the finished product

3.5
Product Approval Test Procedure (PATP)
product approval test procedure of a product is a complete series of tests to be carried out on a number of specimens as representative of the type, with the object of determining whether a particular manufacturer can be considered capable of producing products meeting the specification. The specimens should normally be drawn from regular production line

3.6
Quality Conformance Inspection Procedure (QCIP)
quality conformance inspection procedure of a product is a complete series of tests which are performed in a lot-by-lot and/or periodic basis on specimens drawn from production where the quality of product is being maintained

3.7
Quality Conformance Test Schedule (QCTS)
quality conformance test schedule is the outgoing operation procedures for the products being qualified for the IECQ AC-AQP. It includes test items, test methods, sampling plans and acceptable quality levels and QCIP

4 Governing of the IECQ Scheme

Subclause 4 of IECQ 03-3 applies.

5 Principles of the Automotive Qualification Programme

IECQ Approved Component – Automotive Qualification Programme

Subclause 5 of IECQ 03-3 applies except as follows:

5.1 The Automotive Qualification Programme (AQP) provides the means for organizations to obtain an IECQ Approved Component – AQP Certificate. This IECQ AC-AQP Certificate is intended to provide the international automotive manufacturing market assurance that components covered on the Certificate and the respective batch release Declarations of Conformities (DoCs) comply with the technical specification(s) listed. Conformity is demonstrated by way of an organization having implemented processes in accordance with the technical and quality management system requirements of the IECQ Approved Component Scheme and this Automotive Qualification Programme. This is ensured through independent conformity assessment and on-going surveillance by an IECQ Certification Body (CB).

5.2 The Automotive Qualification Programme bases its requirements for the conformity of the organization on those of the ISO/TS 16949. This document needs to be read in conjunction with ISO/TS 16949.

5.3 The IECQ CB shall determine the frequency of IECQ AC-AQP Certification surveillance, inspection, assessment, and testing. The frequency shall not be greater than annually (12 months apart). Such frequency shall take into account whether the organization holds current Quality Management System (QMS) certification/registration by an accredited CB.

6 Organizational structure

The Organization (Client/Applicant/Certificate Holder)

An organization shall have the responsibilities, specified in Subclause 7.2.3 of IECQ 03-1 and the following:

a) The organization shall establish, implement an ISO/TS 16949 Quality Management System, ensuring all requirements have been complied with, before making application for the IECQ AC-AQP. The established ISO/TS 16949 QMS shall be confirmed during the initial IECQ AC-AQP audit and surveillance audits.

b) The organization shall nominate a Designated Management Representative (DMR), who shall be responsible for all matters in connection with the requirements of the IECQ Certificate as defined in IECQ 03-1 Annex A and the following;

   – for maintaining the ISO/TS 16949 QMS of the manufacturer

   – for controlling the quality of the manufacture, inspection and test of products released under the IECQ AC-AQP

   – for suspending release under the IECQ AC-AQP that fails to meet the requirements of a periodic test in the Annual Reliability Testing Plan

- for any required re-inspection of the components/products subject to delayed delivery
- for verifying the accuracy of certified records of released lots and signing the Certificate of Conformity
- for notifying the IECQ CB immediately of any change to an issued product Certificate.

7 IECQ Automotive Qualification Programme Certification, documentation requirements

7.1 IECQ Automotive Qualification Programme Certificate for an Organization

7.1.1 IECQ Automotive Qualification Programme Certificate contents

The IECQ Automotive Qualification Programme Certificate shall have the listed content as detailed in Subclause 8.1.4 of IECQ 03-1 and the following as a minimum:

a) Clear unambiguous detailed description of the scope of activity(ies) (the component or range of components, related materials and/or assemblies and type reference(s) including related technologies, materials and style).

b) Additional or specific criteria, if required to be publicly listed, shall be attached as an “Attached Schedule” to the Certificate utilizing the IECQ templates. For example: nominal parameters – rated voltage, rated current, resistance, capacitance, etc.

c) Clear unambiguous detailed reference to the relevant international accepted standard or specification against which the organization has demonstrated compliance, including revision and date of revision shall be included in the “Scope of Activities” field.

7.2 IECQ Automotive Qualification Programme Assessment (IECQ Approved Component Assessment (ACA) Report)

Evidence of Compliance Summary and Assessment Reporting Form

The IECQ Automotive Qualification Programme IECQ ACA Report shall have the structure of the listed content as detailed in Subclause 7.2 of IECQ 03-3 and the following as a minimum:

7.2.1 Sampling plan

A fixed number of samples shall be drawn for inspection and test samples in the product approval stage according to the applicable standard(s). See Annex A, Table 1 for sampling tables. The quality conformance test is based on the sampling plan levels required in the Component Specification (CS) and the random sampling required by IECQ 03-3.

NOTE IEC 60410 provides guidance when determining sampling plans.

7.2.2 Product Approval Test Procedure (PATP) and test schedule (See Annex A, Table 2)

The PATP and test schedule must include the inspection and test requirements and the following information:

a) Numbers and names of groups and sub-groups and referenced section number of this standard

b) Test items, sample size and acceptable criteria (accept/reject)

c) Periodic test, acceptance criteria (accept/reject), regular destructive and non-destructive tests, and deviation limitation

d) Grouping

- Group 0: Visual inspection, dimension inspection, basic electric performance test, insulation/voltage withstand test and other lot-by-lot test items
- Group 1

  - Subgroup 1A: Mechanical strength test
  - Subgroup 1B: Environmental strength test
- Group 2: Environmental cycling test
- Group 3: Environmental endurance test

Group 0 are for 100 % inspection; Group 1, 2 and 3 are for random inspection with fixed number of samples

e) Test equipment and site

f) Fixed sample number and acceptable quality level

g) Test schedule

NOTE 1 The grouping of PATP is: Group 0, Group 1, Group 2 and Group 3.

NOTE 2 AEC Q100, AEC Q101 and AEC Q200 provide further guidance for product approval requirements covering Integrated circuits, discrete semiconductors and passive components respectively.

7.2.3 Test equipment list

The test and measuring equipment used during the IECQ AQP shall be uniquely identified and its calibration status must be shown.

The test equipment list must include information as shown in Annex A, Table 3.

7.2.4 Standard test record form

The standard test record form shall include the following:

a) Unique identification

b) Dates upon which the tests have been conducted

c) Test group No.

d) Test item

e) Sample quantity

f) Testing date

g) Environment condition

h) Instrument

i) Signature of test operator, DMR and CB auditor

7.3 Component Specification (CS) preparation

7.3.1 No standard format is required for CS. The plant of application must arrange page numbers of the CS according to standard cover shown in Annex C of this standard and the required items in this section. The CS must at least include:

a) Product dimensions – drawing(s) that show(s) the product appearance to be included

b) Related documents – the standards widely recognized internationally and domestically in industrial sector, and/or specified by client which are used for product inspection and tests to be reported

c) Electric characteristics and specification limits

d) Order information – the identification of products and other necessary information, such as packaging requirement, shall be reported to ensure that the products ordered are correct

e) Other information – other information may include wiring diagrams, product drawings, notes, recommended method of use and information of other non-verification items

f) Labelling – the information shown for the approved products shall be provided; if the label is provided in code, the meaning of the code must be elaborated

g) Technical requirement for testing – the CS must include the technical requirements for testing and the Quality Conformance Test Schedule (QCTS)

h) Any information regarding the assembly, pre-test inspection and 100 % inspection during the product approval process, the composition of inspection lot(s) and limits of use

i) Quality Conformance Test Schedule (QCTS) – the schedule shall include test items, test methods, sampling plans, acceptable quality levels, inspection level, and Quality Conformance Inspection Procedure (QCIP)

j) Quality Conformance Inspection Procedure (QCIP) – this procedure must include the test procedure, inspection and test requirements, re-submission of rejected lots, testing on reduced lots and small lots and, if necessary, the manufacture process testing

The test procedure shall include: standard test conditions, visual inspection (including labels), dimension check, electric property tests, environmental and mechanical performance tests, endurance test, safety inspection and other appointed tests.

The standard test conditions shall include: standard atmospheric condition, reference atmospheric condition, post-testing recovery condition, preconditioning, illumination, attachment, mounting, instrument uncertainty, electric input condition and load condition, etc.

The QCIP must include the inspection and test requirements and the following information:

a) Numbers and names of groups and sub-groups and referenced section number of this standard

b) Lot-by-lot test or periodic test

c) Sampling plan, Inspection Levels (ILs)

d) Periodic test, test interval, sample size, and acceptance criteria (accept/reject)

e) Definition of lots

f) Grouping

- Group A: Visual inspection, dimension inspection, basic electric performance test, insulation/voltage withstand test and other lot-by-lot test items
- Group B
  - Subgroup B1: Electric performance test
  - Subgroup B2: Mechanical strength test and other lot-by-lot test items
- Group C
  - Subgroup C1: Environmental strength test
  - Subgroup C2: Environmental cycling test and other periodic destructive test items
- Group D: Endurance Tests

NOTE 1 The grouping in the CS is: Group A, Group B, Group C and Group D.

NOTE 2 Group A and B are for lot-by-lot tests; Group C and D are for periodic sampling tests.

8 IECQ Automotive Qualification Programme Certification procedure

8.1 General

IECQ Approved Component assessments of an organization are based on the requirements of ISO/TS 16949 and requirements within this document.

8.2 Application

IECQ Automotive Qualification Programme may be applied to any electronic component, or range of components (for example, a range of resistors differing only in resistance values, tolerances and/or power ratings), Products, Related Materials & Assemblies when the appropriate specifications are identified to the IECQ Certification Body (CB) to whom the application is made.

The organization shall apply in accordance with Subclause 9.3 of IECQ 03-1 to the IECQ CB, stating the scope of the proposed IECQ AQP Certification, as defined in the appropriate CS, or draft CS, and clearly defining the products/components for which the certification is sought.

8.3 Assessment team requirements for IECQ AC-AQP assessments

The assessment team for IECQ AC-AQP assessments shall be comprised of an IECQ AC-AQP qualified IECQ CB Lead Assessor in accordance with Subclause 12.3 who shall lead the assessment with responsibility for assuring all elements of the assessment plan are covered including IECQ AQP requirements.

NOTE The term “IECQ Lead Assessor” is detailed in IECQ OD 010.

8.4 Assessment man-day requirements for IECQ AC-AQP

The IECQ AC-AQP Lead Assessor shall determine the total man-days required for the initial assessment based on the complexity of the scope, the CS and test plan, as a minimum requirement the following applies:

Stage 1: Document review – 1 man-day

Stage 2: On-site witness test assessments;

– 2 man-days for production line assessment, sampling and lot-by-lot witness test audit, etc.
– 1 man-day on-site shall be used to confirm and evaluate the test result of the period tests.

NOTE Minimum requirements based on one category product/one production line.

The IECQ AC-AQP Lead Assessor shall determine before on-site assessment any required increase to the minimum requirements and shall fully document the justification / reasons in the final report.

Where the conducted audit man-days used falls less than the minimum requirements as below during the actual assessment, the IECQ AC-AQP Lead Assessor shall explain in the audit report the justification.

8.5 Requirements for inspection and tests of production line

8.5.1 Standard atmospheric conditions for measurement and tests

The standard range of atmospheric conditions for carrying out measurements and tests is as follows:

– Temperature: 15 °C to 35 °C
– Relative humidity: 25 % to 75 %
– Air pressure: 86 kPa to 106 kPa

8.5.2 Standard atmospheric conditions

– Temperature: 20 °C
– Air pressure: 101.3 kPa

No requirement for relative humidity is given, as correction by calculation is generally not possible. However in practice, if maintaining specific test temperature, humidity and air pressure is required, the temperature tolerance is ±2 °C, and that of humidity is ±10 %.

8.5.3 Test sequence

The test shall be carried out in the following sequence:

a) Pre-conditioning
b) Initial examination and measurements
c) Conditioning
d) Two-hours recovery
e) Final examination and measurements

8.5.4 Measurement of uncertainty

The measurement of uncertainty associated with each test shall be stated and taken into account when determining pass/fail criteria.

The limits prescribed in specifications are true values. When carrying out the specified tests the organization shall employ sufficient inset from the specified limits to cover the uncertainty of their measurement (see Annex C of IECQ 03-1).

8.5.5 Test method

The inspection and testing must be carried out according to the test method(s) described in standards that are widely recognized internationally, domestically, in industrial sector and/or specified by client. The test method(s) used must be reported in the approval process plan.

8.5.6 Primary stage of manufacture

Control must be in place for the major production processes of the plant of application based on the requirements of applicable standard(s). If no requirement is specified in applicable standard(s), the plant of application must make a proper note in the CS. Before the approval verification starts according to this standard, the DMR of the plant of application must demonstrate that all the quality factors that may have influence on the quality conditions of the initial production process are under control.

8.5.7 Delayed deliveries

Components/parts that have been in stock for a period longer than that specified in the CS have to undergo further tests, before delivery, as specified in the CS.

8.5.8 Product deliveries

The components, piece parts or materials that have undergone the non-destructive test shall be re-tested according to the CS before delivery.

The components, piece parts or materials that have undergone destructive test or repaired shall not be released under the system.

8.6 Basis of product inspection and tests

8.6.1 The plant of application must prepare the approval document according to this standard and the product standards that are widely recognized internationally, domestically in industrial sector and/or specified by client. The approval document is the basis for product inspection and testing. The CS shall specify the quality level equal to or lower than in the approval process plan.

NOTE Reference specifications include but not limited to AEC Q100.

8.6.2 The approval document consists of the approval process/test plan and CS. The approval process plan includes the PATP, sampling plan, test schedule, test equipment list and test records.

8.6.3 CS is the basis for delivery of approved products. Therefore, the product quality criteria set forth in the approval process plan must be better than or equal to those specified in CS.

8.6.4 The application of product approval, documentation, test implementation and maintenance shall be performed according to Subclauses 7 and 8 of IECQ 03-3.

8.7 Document review – Stage 1

Before the production line audit and product approval test, the auditor must perform the document review on the following:

a) To confirm the scope of product approval for the product proposed by the plant of application

b) To confirm that the QMS for the product proposed by the plant of application fulfil ISO/TS 16949

c) To confirm that the DMR has the full knowledge of his/her duties and the duties are documented

d) To confirm that the approval document required in 7.2.1, 7.2.2, 7.2.3, 7.2.4, 7.3 are prepared

e) To confirm that the external independent laboratory fulfils IECQ 03-3 in case that the plant of application entrusts the periodic and/or endurance tests to such an institution

f) To check that the approval document and CS are written as per the standards widely recognized internationally and domestically and/or in industrial sector, and/or specified by client, as well as this standard

g) To check that the accuracy of the test equipment used fulfils the test standard(s)

h) To confirm that the sampling plan of the approval process and the sampling method(s) and levels of CS fulfil the requirements of this standard and Subclause 8.4 of IECQ 03-3

i) To check that the major production processes are reported in the CS, and, if they are outsourced, how DMR demonstrates that all the quality factors that may have influence on the quality conditions of the initial production process are under control

j) To check that the test schedule is arranged in a reasonable fashion that Group 0 and 1 tests and Group 2 and 3 pre-experiment tests can be done by the date of auditing, and that the completion date for periodic tests is reasonable

8.8 Production line assessment – Stage 2a

8.8.1 General requirements

8.8.1.1 The instruments and equipment for inspection and testing shall be enough to certify the parts and products in the manufacturing process pursuant to the standards of certification.

8.8.1.2 Trained operators shall operate the instruments and equipment for inspection and testing. Any of appropriate safety precautions shall be documented.

8.8.1.3 The subcontracting (outsourcing) of any manufacturing, inspection and testing shall be included in the scope of approval and comply with requirements of 8.7.

8.8.1.4 The basis for the manufacturing specifications, drawings and control procedure of production unit for AQP shall be defined and documented, e.g. international/national/industrial standards, customer's standards and supplier's standards, et al.

8.8.1.5 The temperature and humidity control for the laboratory-use equipment and the testing/inspection site shall be defined and documented.

8.8.1.6 The conditions (such as the environment, electric and mechanical characteristics) for demonstrating the capability of laboratory-use equipment used in laboratory shall be fully controlled in accordance with the requirements from relevant specifications.

8.8.1.7 The CB shall be notified for review when any instrument and equipment for testing and inspection has been altered, which led to inconsistent to the instrument list for certification.

8.8.1.8 The ratio of inspection operator over the manufacturing worker shall be notified and agreed by customer if the ratio is less than last audit.

8.8.1.9 There shall be an established system for the inspection batch and the inspection report.

8.8.1.10 It is regulated that the delivery can be released in the name of IECQ provided that product meets a specific standard. A Suppliers Declaration of Conformity should be provided to the lot of delivery.

8.8.1.11 For the records relevant to the quality activities, such as the inspection record, the preservation conditional period shall met customer requirement.

8.8.2 Product analysis/development/assessment procedure

8.8.2.1 Product development/design process

a) Appoint the development member/team.

b) Formulate the product development plan according to customer requirements, standards, and the laws and regulations.

c) The product development plan shall include the duty, target value (including target of reliability) and time schedule.

d) The product development process shall take the following highlights into account: drawings, production operation instruction, inspection specifications, logistic planning, quality objective, product features, process workmanship and technology, supplier qualification, parts confirmation operation and parts list, and requirements of environmental protection, etc.; and ensure the product's testability in the future mass production process.

e) The parts confirmation operation includes the confirmation for parts standard, pattern and model fabrication, simulation and test, characteristic analysis; and when necessary, the electromagnetic compatibility (EMC), electrostatic discharge (ESD), de-rating, stress, heat, mechanical analysis and software, etc. shall be included.

f) Verify the technical specifications for product production that are converted from the customer requirements and the standards, laws and regulations.

g) Plan and confirm the relevant resources in the product development process that include the instruments, equipment, technical ability, human resource conditions, cross-department liaison, the applicability and robustness of design specification and tools, such as the simulation models, etc.

h) The collection and use of data and analysis for previous failures as lessons learned in development process.

i) If applicable, the preparations of obsolescence plan.

8.8.2.2 Validation process at product development/design completion

a) Frame the specifications of validation.

b) Devise the environment and testability test plan.

c) Failure analysis and review of authentication.

8.8.2.3 Review/approval process at product development/design completion

a) Draw up the quality plan that includes the important characteristic parameters, inspection and testing process, instrument and equipment installation, inspection and testing technology preparation, Quality Control (QC) point-of-inspection arrangement in production line, sampling inspection and Acceptable Quality Limit (AQL) setup, packaging and transportation planning, etc.

b) The pilot run plan shall be annotated with the production line planning, pilot-run quantity, person-in-charge of cross-departmental works, test/analysis of pilot-run product, pilot-run document, 100%-inspection requirements, and pilot-run review meeting, etc.

c) The pilot-run review meeting minute shall be annotated with the issues taken place in the pilot-run process, corrective action, product problem, problem analysis and correction, necessity for second pilot-run, productivity determination, and mass production scheduling, etc.

d) If the customer requests, the characteristics of design and manufacturing process shall be reviewed and approved by customer. The test method shall also be approved by the customer, including sample size and test requirement, etc.

8.8.3 Batch production

8.8.3.1 Purchasing, inspection and testing, storage of raw material/parts

a) Define the safety stock, lead time and period to ensure a smooth production line.

b) Must regularly review the raw materials/parts supplied by the approved suppliers in accordance with the formulated Quality Assurance (QA) information to ensure the quality of parts in operation.

c) Monitor the change of raw material/part design and process operation, and handle the quality failure relative to the change.

d) Carry out the operation of material-purchasing, material-receiving, inspection and testing, and storage, etc. per system requirements.

e) The approval operation for parts substitution or change and the notification to customer.

8.8.4 Production operation

a) Define the production shift and allocate the manpower.

b) Plan the internal process audit.

c) The quality confirmation, approval, release and tracing operation for the product at the beginning of mass production.

d) The operation instruction and monitoring method for the production and inspection and testing instruments and equipment in production line.

e) The capability, parameters, tolerance of records, adjustment, maintenance, storage conditions and alarm system for the instruments, equipment and tooling of production and inspection and testing in production line.

f) Annotate and implement the important technology documents and the information and characteristics relevant to the production and inspection and testing documentations.

g) The record, correction, adjustment, revision and validity for the first-article inspection.

h) The establishment, review, audit and mutual coordination of process at each stage of mass production.

i) The status and identification of production and inspection for the parts and components in mass production process.

j) The identification and segregation of defective product, repair-required product and scrapped product.

k) The definition for the lot size of production and inspection.

l) Implement the batch functional test and the periodic test items.

m) The protection and maintenance of work environment and safety, the requirements against hazardous substances and the prevention of pollution.

n) The storage method and conditions for process materials, parts, semi-finished products, finished products and remnant materials.

o) Prevent the batch and material mix-up, ensure the traceability, and remove the invalid identification.

p) Analyze the process capability, efficiency and rationality, improve and review the process.

q) Deliver goods on time, and analyze for feedback and handle the quality complaint together with the relating corrective engineering.

r) Promote the personnel quality that includes the engineering technology, process audit, quality inspection analysis, logistic control, customer service and language ability, etc.

s) The storage environment of instruments, moulds and fixtures.

8.8.5 Reliability test plan for product of mass production

a) Scheduling of the yearly, monthly or quarterly reliability test plan.

b) Review and approval of the plan.

c) Implementation of the yearly reliability test plan.

d) Implementation record of the yearly reliability test plan.

e) Personnel training.

f) Test failure analysis, corrective and verification actions.

g) Tracing, notification and recall operations for the test-failed product.

h) Disposal of test product.

i) Record preservation.

j) Reconfirm the quality of the expired product in storage.

k) Reconfirm the product quality problem fed back from market.

l) Feedback mechanism.

m) Contents of reliability test plan for product of mass production:

- Lot definition
- Sampling plan and acceptable quality level
- Electric and mechanical characteristic parameters

- Test item (lot-by-lot inspection, safety test and periodic test, destructive and non-destructive test) and yearly test scheduling
- Inspection and testing environment requirements and test method
- Standards
- Model number of test product.

8.8.6 Product storage, delivery and transportation

a) Storage limitation and just-in-time condition.

b) Storage time limit.

c) Segregation and identification for the scrap product rework product, remnant materials, semi-finished product and finished product, outgoing finished-product, etc.

d) The logistic process and traceability.

NOTE The samples that were conducted the inspection and/or test shall be retested according to the CS before delivery. The samples that had been conducted the destructive test shall not be delivered to the customer.

8.9 Subcontracting and use of IECQ Approved Process

8.7.1 The primary stage and/or subsequent stages may be carried out by companies who hold approval to IECQ 03-2 (Approved Process) or, under certain conditions, subcontracted (see 8.7.4).

8.7.2 The organization shall only subcontract operations, which are covered by the scope of their IECQ AC-AQP Certification, for which the application summary details the methods of control used.

8.7.3 Standards or specifications (generic or sectional) may

- either forbid this subcontracting on technical grounds, or
- where it is considered necessary, include any special requirements, for example for specified successive stages to be performed by the same manufacturer, or
- permit the subcontracting unreservedly.

Such restrictions do not apply to companies holding IECQ Approved Process certification.

8.7.4 When subcontracting is permitted (for example by the generic or sectional specification), this may be undertaken provided that the DMR is able to demonstrate to the IECQ CB that the process(es) concerned is (are)

- performed in a manner which satisfies the appropriate requirements of the relevant test plan or standard, where such exists, or
- carried out satisfactorily.

8.7.5 To verify the satisfactory conduct of subcontracted operations in accordance with 8.7.4, the manufacturer shall ensure that the IECQ AC-AQP testing and quality conformance testing will be performed under their control in an approved laboratory located in an IECQ member country, or exceptionally in accordance with 8.7.7.

8.7.6 The organization, when applying for IECQ AC-AQP Certification, shall state whether any individual operations of their process(es) are carried out by IECQ AP certified subcontractor(s) in accordance with 8.7.1 or are subcontracted in accordance with 8.7.4 and shall identify these operations.

8.7.7 If subcontractors not approved within the IECQ System are used, the organization shall describe the method of control of all the subcontracted stages or operations.

8.7.8 When the conditions of 8.7.6 apply, the application for IECQ AC-AQP Certification shall contain:

- details of the division of individual operations between the organization and the contractor(s) or subcontractor(s) as per 8.7.6; and
- details of the arrangements that need to be agreed with the IECQ CB for the approval of the quality of subcontracted operations. These details should take into account the transfer of products or services between the organization and the contractor/subcontractor; and in particular
  - the procedures for the assessment of quality of the subcontracted operations; and
  - details of the means whereby changes to the agreed arrangements are communicated to the IECQ CB.

8.7.9 Before tests are carried out by laboratories not approved under the IECQ System, the organization shall take all reasonable steps to ensure that the required service is not available from any approved independent testing laboratory within the IECQ System.

The organization shall demonstrate to the IECQ CB that IECQ approved independent testing laboratories known to be operating in the relevant area of technology are unable to undertake the specified testing.

Where testing laboratories not approved within the IECQ System carries out tests, the organization shall include in their test plan or produce a document that describes the surveillance arrangements by which they shall ensure that the testing to be carried out shall comply with the specification or standard. Where possible, the nominated testing laboratory shall hold accreditation to ISO/IEC 17025 by a Body that is a member of ILAC (International Laboratory Accreditation Co-operation). The document shall define how the nominated testing laboratory

- ensures that its relevant staff possesses the necessary competence and its relevant test facilities are completely adequate for the purpose,
- proposes to operate the test, and
- ensures that it has an adequate system for the calibration of its relevant measurement and test equipment and can provide adequate traceability to national standards.

In establishing the degree of surveillance necessary, account shall be taken of any current accreditations, approvals and/or registrations held by the nominated testing laboratory.

Prior to permitting testing, the organization shall demonstrate to the IECQ CB that his proposed surveillance arrangements comply with the specification.

The organization shall demonstrate to the IECQ CB by any suitable means that the quality and compliance of the final component will not be adversely affected by the use of these subcontracted arrangements.

The IECQ CB of the organization seeking IECQ AC-AQP Certification shall ensure that the specialist contractor's DMR is able to verify the satisfactory maintenance of the quality control procedures performed by their subcontractor.

IECQ CB shall confirm that the details contained in the application for IECQ AC-AQP Certification satisfy the requirements of the Scheme.

The procedures given in this subclause shall be applied separately to any subsequent programme of testing, including those carried out for periodic testing for the maintenance of an approval.

8.10 Product sampling for inspection and tests – Stage 2b

8.10.1 The auditor must confirm the formation of inspection lots, and take enough number of samples in 3 inspection lots produced consecutively from the designated production line according to the PATP. If failure is allowed for 100 % inspection items, spare samples may be prepared. All the 100 % inspection samples shall be numbered for control.

8.10.2 The samples for application testing must be drawn by the auditor in person according to Subclause 8 of IECQ 03-3.

8.10.3 The lot-by-lot test items must be executed by the responsible production unit of the plant.

8.10.4 The items of approval test must be sampled for testing according to the PATP and test schedule prepared by the plant of application.

8.10.5 The auditor must monitor the approval test, and confirm the test result in person.

8.10.6 All the test samples, including the spare ones, shall be given to quality inspection for Group 0 inspections based on the test schedule.

8.10.7 At the beginning of test as the long-term test samples are placed in the test equipment and at the end of test, the auditor shall sign on the test equipment log. The test equipment shall be sealed during the test.

8.10.8 When the test is complete for the approval test of individual items, the test results shall be documented in the record, and tester, DMR and auditor shall sign on the record.

8.10.9 When the Group 0 items are tested for 100 % inspection, Groups 1, 2 and 3 test samples shall be prepared according to the PATP and test schedule.

8.10.10 When Group1, 2 and 3 tests are completed, the basic performance tests shall be conducted after the required period of soaking under room temperature. The test data before and after the test shall be compared, which shall be within the range of specifications.

8.10.11 Green component/product – If lead-free solder is used on the component/product, it must be addressed on the front page of CS. The changes in material characteristics of lead free should be considered throughout the analysis, development and validation activities.

NOTE Whereas the component/product that may have electrostatic discharge and electromagnetic compatibility concern must be considered.

9 Granting of Certification and Surveillance, and expansion of Product Scope

9.1 Granting of Certification

When all the product approval tests are completed, the plant of application must prepare and submit the cover of test report along with the test records, CS, sampling plan, PATP, test schedule and test equipment list to the IECQ CB.

Granting of Certification shall be conducted in accordance with Subclause 8.5 of IECQ 03-3.

9.2 Test report

The cover of test report must provide the following information:

a) Unique identification

b) Dates upon which the tests have been conducted

c) Name, address and contact information of the plant

d) Name and CS number of product of application

e) CB information, including signature of auditor

f) Signature of DMR of plant of application; and

g) Test items, sample numbers, test duration and test results

9.3 Assessment report

The CB assessment report shall include three sections of assessment: Stage 1, Stage 2a and Stage 2b. The Lead auditor shall sign the assessment report after completing the assessment with the recommendation stated and a recommended compliance date if the result meets the requirements of specification. Since the assessment sequence does not allow change, in order to avoid re-assessment, the Lead Auditor should review the result when a stage has been completed.

a) Failure to meet PATP

In case that any items of test result indicate failure to meet the PATP requirement; it is ruled failure to qualify the IECQ Automotive Product Approval test. The plant of application shall re-submit the application according to this standard.

b) Compliance with PATP

When the test result shows fulfilment of the PATP, the auditor is allowed to recommend the plant of application for IECQ Automotive Qualification Programme Certificate of Conformity.

c) Control and issuing of CS

The IECQ CB is responsible for the allocation of a resister CS number; the CS shall be controlled and retained by the IECQ CB. A published CS may be made available from the IECQ website upon request from industry.

d) IECQ AC compliance

The tests of product during the product approval and for delivery under the name of IECQ and the sampling of test samples shall be conducted according to clause 7.2.1.

9.4 Documentation retained

Subclause 9.11 of IECQ 03-1 applies and the following:

The samples tested during the approval audit, test records, and records containing test conditions and other necessary information must be kept for at least 10 years.

9.5 Ensuring conformity

In addition to the requirements in Subclause 9.10 of IECQ 03-1 the following applies:

The organization has the responsibility to ensure that all component(s) product(s), related materials and or assemblies produced under their IECQ Automotive Qualification Programme Certificate is in conformity with the stated specification. Failure to do so could lead to suspension or cancellation of the IECQ Automotive Qualification Programme Certificate.

The operators that have acquired IECQ Automotive Qualification Programme Certification must be audited for annual system and/or product approval maintenance by IECQ CB.

9.5.1 The operators that have acquired IECQ Automotive Qualification Programme Certification must perform the lot-by-lot inspections and periodic tests according to the CS. Or, if the approved products are not delivered under the name of IECQ but the IECQ AQP Certification is still to be maintained, products shall be sampled for tests and inspections according to the annual reliability test plan and CS.

9.5.2 While the auditor is performing the annual auditing of the IECQ Automotive Qualification Programme Certification, it is necessary to confirm that the plant being audited is performing lot-by-lot inspection according to the CS and reliability test according to the annual reliability test plan. The auditor may perform random monitoring and/or review of test results to confirm that the results meet the requirement of the standard.

9.5.3 If the lot-by-lot inspection and periodic tests or the reliability test are not performed according to the CS or the annual reliability test plan, respectively, or the random monitoring result fails to fulfil the requirement, improvement must be done within the given deadline, or suspension or cancellation of approval certificate may be enforced.

9.5.4 Expansion of product scope

If an operator that have acquired IECQ Automotive Qualification Programme Certification wishes to expand the scope and/or items of approved products, related document shall be prepared according to this standard, the DMR shall inform the CB, and CB will decide whether to perform monitoring audit. The test records shall be kept in archive for later review.

10 Supplier's Declaration of Conformity (SDoC)

Lots released by a certified IECQ Automotive Qualification Programme manufacturer shall be unambiguously identified with a Supplier's Declaration of Conformity (SDoC). This SDoC means that the lot has been released in accordance with the requirements of the registered CS under IECQ and in accordance with this IECQ AC-AQP.

11 Transfer of IECQ AC-AQP Certification

Transfer of IECQ AC-AQP Certification to another IECQ CB is not permissible.

Client holding IECQ AC-AQP Certification wishing to obtain IECQ AC-AQP Certification from an alternate IECQ CB shall apply in full.

12 Acceptance of IECQ CB for IECQ AQP

12.1 General

New IECQ CBs or existing IECQ CBs seeking to participate in the IECQ AC-AQP shall comply with the general requirements of IECQ 02, IECQ 03-1, IECQ 03-3, IECQ 03-3-2 plus the following additional requirements:

IECQ CB Application Form: MC/129/Q (www.iecq.org/publications/standardforms/)

Application Extension of Scope: MC/130/Q (www.iecq.org/publications/standardforms/)

12.2 Specific requirements for IECQ AC-AQP

IECQ CBs shall be assessed and approved by the IECQ for specific areas of competence. The general competence, efficiency, experience, familiarity with IECQ System rules, IECQ AC Scheme and the IECQ AC-AQP requirements and competence to carry out qualification certification and ISO/TS 16949 QMS assessments as well as compliance with ISO/IEC 17021 and ISO/IEC 17065 shall be assessed. Acceptance in another IECQ Scheme or accreditation by a recognized national accreditation body shall be taken into account. In those cases, the IECQ Management Committee (MC) shall decide upon the extent of the assessment that is necessary. For a new IECQ CB Application a satisfactory assessment as documented in an IECQ Assessor Report (IECQ OD 013) shall be approved by the IECQ Conformity Assessment Bodies Committee (CABC) and accepted by the IECQ MC.

12.3 IECQ AC-AQP Assessor qualifications

12.3.1 IECQ AC-AQP Assessors shall be qualified in accordance with IECQ OD 010.

12.3.2 IECQ AC-AQP Lead Assessors shall be qualified in accordance with 12.3.1 and the following as a minimum:

- ISO/TS 16949 qualified auditor recognized by IECQ
  - Auditors shall demonstrate competence in the application of ISO/TS 16949, this maybe achieved by successfully completed the ISO/TS 16949 International Automotive Task Force (IATF) recognized lead assessor training course
- Minimum 2 years experience for QC or QA or related working experience in manufacturing in the area of Electrical and Electronic Equipment (EEE)
- Be competent in electronic with mechanical engineering
- Successfully completed an IECQ AC-AQP trained course
- Successfully undergone a witness assessment by an IECQ AC-AQP (IATF recognized) Witness Auditor and the witness report provided to IECQ
- Successful IECQ AC-AQP lead auditor applicants shall be listed on the IECQ website

IECQ AC-AQP (IATF recognized) Witness Auditors shall have been witness assessed by IECQ in accordance with 12.4.

12.4 Witness assessment of an IECQ CB

12.4.1 Initial

The application process for an applicant CB wishing to become an IECQ CB in the IECQ AC-AQP includes a witness assessment conducted by the IECQ. The witness assessment shall be conducted within 12 months of the applicant being accepted as an IECQ CB or acceptance of a scope extension. The witness assessment shall be conducted on the first IECQ AC-AQP client application conducted by the applicant IECQ CB.

The new IECQ CB shall inform the IECQ Secretariat upon receipt of their first IECQ AC-AQP application and the willingness of their applicant to participate in the IECQ witness assessment of the new IECQ CB.

IECQ Secretariat shall appoint an IECQ Assessor(s) to conduct the witness assessment.

During the visit to an applicant IECQ AQP organization, the IECQ Secretariat assigned assessment team shall have access to the documentation referred to in IEC AQP client application and which is relevant to the component qualification and production under review. The earlier provision of this documentation shall be at the organization's discretion. This documentation may be in any language, the candidate being responsible for providing oral translation into one of the official languages of the IEC at the time of the visit.

Annex A
(normative)

The documentation of product approval

Table 1 – Sampling plan

Group No.	Test items	Subclause of spec.	Number of specimens (n)
0			
1A			
1B			
1			
2			
3			

Table 2 – Product approval test procedure and test schedule

Group No. and test items	D or ND	Subclause of spec.	Test equipment	Test place	Sampling size n and pd	Test schedule (date)	Performance requirements
0							
1A							

D: destructive, ND: non-destructive

n: number of specimens, pd: number of permissible defective

Table 3 – Test equipment list

Group No.	Equipment	Manufacturer	Model or type	Inventory or serial No.	Description and use	Equip-ment limits	Accuracy	Date of cal.
0								
1A								

Table 4.1 – Quality conformance inspection procedure (lot-by-lot)

Group No. and test items	D or ND	Condition of test	IL	AQL	Performance requirements
Group A (lot-by-lot)	ND				
Group B (lot-by-lot)	D				

IL: inspection level

AQL: acceptable quality level

Table 4.2 – Quality conformance inspection procedure (periodic)

Group No. and test items	D or ND	Condition of test	Sampling size p n c	Performance requirements
Group C (periodic)				
Group D (endurance)				

p:periodicity (in month)

n:sample size

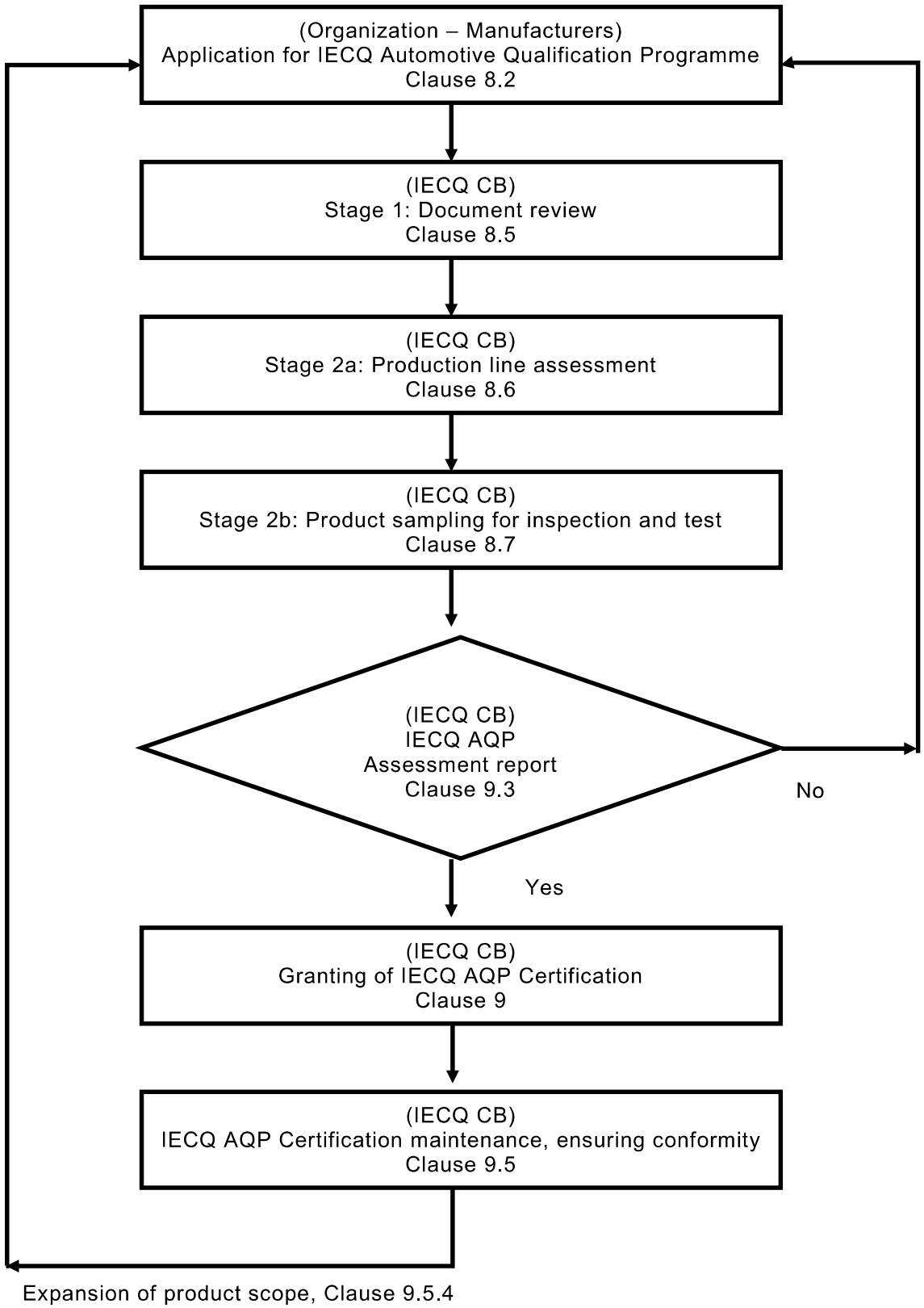
c: permitted number of defectives

D: destructive

ND: non-destructive

Annex B
(normative)

Flowchart for the application for IECQ Automotive Qualification Programme



Annex C
(normative)

The front page of Component Specification

<table>
<tr><td>  Component Specification available from:

☐ Publicly available specifications
– IECQ Certification Body - under whose authority the Components Specification (CS) is published
– IEC webstore
– IECQ website www.iecq.org/publications/specifications/

☐ Proprietary specifications
– IECQ Certification Body - under whose authority the Components Specification (CS) is published
– Other:...</td><td>Component Specification number:
IECQ-CS 033200-XX0001{ed.1.0}en
for use within the IECQ Approved Component Scheme – Automotive Qualification Programme (IECQ AC-AQP)
Edition: 1.0

IECQ Certification Body:</td></tr>
<tr><td>Electronic components of assessed quality Component Specification in according with:</td><td rowspan="2">Product description:</td></tr>
<tr><td>Outline drawing and install information:</td></tr>
<tr><td></td><td>Applicant:</td></tr>
</table>

Guidelines

- Component Specification available from: The category of Component Specification “public” or “proprietary”, other sources of availability maybe be listed under “proprietary” if applicable.
- IECQ Certification Body: The name of the IECQ Certification Body under whose authority the Component Specification is published.
- Component Specification number: The unique identification number allocated by the IECQ CB in accordance with IECQ 03-3 Annex E, and **Edition** status.

- Electronic components of assessed quality Component Specification in according with: The list of standards and or specifications that are utilized within the Component Specification where relevant, these maybe IEC or IECQ or ISO Standard, or generic (and, if appropriate, sectional) specifications or a Technology Approval Schedule (TAS) relevant to the CS or where in the absence of an IEC, IECQ or ISO Standard a national and or industry recognized standard/specification.
- Product description: A brief description of the approved components, piece parts or material.
- Outline drawing and install information: An outline drawing with main dimensions that are of importance for interchangeability and applicable installation information.
- Applicant: The creator of the Component Specification.

Annex D
(normative)

Supplier's Declaration of Conformity

(1) IECQ Certification number:	(2) The Component Specification of product for Automotive Qualification Program (AQP):
(3) Name of manufacturer: Address: Contact information: Telephone: Email: DMR:	
(4) Lot number: Serial number:	(5) Production date:
(6) Quality control:	(7) DMR signature:

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

3 rue de Varembe
PO Box 131
CH-1211 Geneva 20
Switzerland

Tel: + 41 22 919 02 11
info@iec.ch
www.iec.ch

IEC QUALITY ASSESSMENT SYSTEM
FOR ELECTRONIC COMPONENTS

IECQ Secretariat c/o IEC Sydney Office
The Executive Centre
Australia Square, Level 33
264 George Street
Sydney, NSW 2000
Australia

Tel: +61 2 4628 4690
Fx: +61 2 4627 5285
info@iecq.org
www.iecq.org