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MILITARY STANDARD

QUALITY ASSURANCE TERMS AND DEFINITIONS

AMSC N/A AREA QCIC

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FOREWORD

1. This military standard is approved for use by all Departments and Agencies of the Department of Defense.

2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: HQ AFMC/ENSS, 4375 Chidlaw Rd., Ste 6, Wright–Patterson AFB OH 45433–5006, by using the self–addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

3. It is the responsibility of related Department of Defense Quality Assurance organizations to implement policies, including methods, procedures and techniques. To effectively achieve this, a uniform language is essential. Currently, the definitions for Quality, Quality Assurance and related phraseology are quite fluid. This results in misinterpretation as well as misunderstanding. A prerequisite for systematic assurance of quality is certainly commonality in language. This can best be achieved by defining specific terms in a single document. The language herein, shall be reflected throughout all phases of assurance requirements including procurement, construction, repair, overhaul, conversion, storage and stocking.

4. This standard therefore, is a collation and listing of terminology in use the the military and industry. It is not all inclusive, but does include commonly used terms pertaining to the quality program.

5. In view of constantly changing technology and the evolving nature of language itself, a limiting factor exists in the standardization of quality assurance and related terms and definitions. Nevertheless communication can be enormously improved and expedited by widespread adoption of the definitions included in this standard. As new words emerge or older words and phrases take on new meaning, this document will be appropriately revised.

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1. SCOPE

1.1 Purpose. The purpose of this document is to promote the common use of words and phrases pertaining to quality and related programs, thus improving the clarity in communications.

1.2 Scope. This document provides a standardized interpretation of quality assurance terms and definitions to be applied throughout the determination of product quality.

1.3 Application. The terms and definitions contained herein shall be used in specifications, standards, drawings, technical manuals, contracts, quality control inspection, quality assurance audits, and related documents, and in engineering evaluation reports.

2. APPLICABLE DOCUMENTS

2.1 Government documents

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

MIL–Q–9858	Quality Program Requirements
MIL–I–45208	Inspection System Requirements

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Bldg 4D, 700 Robbins Ave., Philadelphia PA 19111–5094.)

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

Federal Acquisition Regulation (FAR)

FAR 52.246	Contractor Inspection Requirements

(Unless otherwise indicated, copies of Federal Acquisition Regulations are available from the U.S. Government Printing Office (GPO), Washington DC 20402–9325.)

2.2 Non–Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN SOCIETY FOR QUALITY CONTROL (ASQC)

ASQC Q90	Quality Management and Quality Assurance Standards – Guidelines for Selection and Use (DoD adopted)
ASQC Q91	Quality Systems – Model for Quality Assurance in Design/Development, Production, Installation, and Servicing (DoD adopted)
ASQC Q92	Quality Systems – Model for Quality Assurance in Production and Installation (DoD adopted)
ASQC Q93	Quality Systems – Model for Quality Assurance in Final Inspection and Test (DoD adopted)
ASQC Q94	Quality Management and Quality System Elements – Guidelines (DoD adopted)

(Application for copies should be addressed to the American Society for Quality Control, 611 East Wisconsin Ave., Milwaukee WI 53202–4606.)

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 8402	Quality – Vocabulary First Edition (DoD adopted)
ISO 9000	Quality management and quality assurance standards – Guidelines for selection and use (DoD adopted)
ISO 9001	Quality systems – Model for quality assurance in design/development, production, installation and servicing (DoD adopted)
ISO 9002	Quality systems – Model for quality assurance in production and installation (DoD adopted)

ISO 9003	Quality systems – Model for quality assurance in final inspection and test (DoD adopted)
ISO 9004	Quality management and quality system elements – Guidelines (DoD adopted)

(Application for copies should be addressed to the American National Standards Institute, 11 West 42nd St., New York NY 10036–8001.)

(Non–Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services. DoD adopted documents are available from the Standardization Documents Order Desk, Bldg 4D, 700 Robbins Ave., Philadelphia PA 19111–5094.)

3. DEFINITIONS

3.1 Acceptability criteria. A limit or limits placed upon the degree of nonconformance permitted in material expressed in definitive operational terms.

3.2 Acceptable quality level (AQL). The maximum percentage or proportion of variant units in a lot or batch that, for the purposes of acceptance sampling, can be considered satisfactory as a process average.

3.3 Acceptance. The act of an authorized representative of the Government by which the Government, for itself or as agent of another, assumes ownership of existing and identified supplies tendered, or approves specific services rendered, as partial or complete performance of the contract on the part of the contractor.

3.4 Acceptance number. The maximum number of defects or defective units in the sample that will permit acceptance of the inspection lot or batch.

3.5 Accreditation. Certification by a duly recognized body of the facilities, capability, objectivity, competence, and integrity of an agency, service, or operational group or individual to provide the specific service(s) or operation(s) needed.

3.6 ANSI/ASQC Q90 Series Quality Standards. U.S. version of commercial quality standards adopted word for word by the American Standards National Institute (ANSI) and the American Society for Quality Control (ASQC) from the ISO 9000 series quality standards (see 3.72).

3.7 Attribute. A characteristic or property which is appraised in terms of whether it does or does not exist, (*e.g.*, go or not-go) with respect to a given requirement.

3.8 Audits. See 3.143.

3.9 Availability. A measure of the degree to which an item is in an operable and committable state at the start of a mission when the mission is called for at an unknown (random) time. The ability of an item to perform its designated function when required for use.

3.10 Average outgoing quality (AOQ). The average quality of outgoing product including all accepted lots or batches, plus all rejected lots or batches after the rejected lots or batches have been effectively 100 percent inspected and all defectives replaced by non-defectives.

3.11 Average outgoing quality limit (AOQL). The maximum of the average outgoing qualities for all possible incoming qualities for a given sampling plan.

3.12 Average sample size curve. The curves that show the average sample sizes which may be expected to occur under the various sampling plans for a given process quality.

3.13 Bailed property. Refers to equipment provided to the contractor by the Government for a special purpose and not for incorporation into deliverable products, *e.g.*, machine tools and production equipment.

3.14 Batch. See 3.77.

3.15 Calibration. Comparison of two instruments or measuring devices, one of which is a standard of known accuracy traceable to national standards, to detect, correlate, report, or eliminate by adjustment any discrepancy in accuracy of the instrument or measuring device being compared with the standard.

3.16 Certificate of compliance. A document signed by an authorized party affirming that the supplier of a product or service has met the requirements of the relevant specifications, contract, or regulation.

3.17 Certificate of conformance. A contractor's written statement, when authorized by contract, certifies that supplies or services comply with contract requirements.

3.18 Certification. The procedure and action by a duly authorized body of determining, verifying, and attesting in writing to the qualifications of personnel processes, procedures, or items in accordance with applicable requirements.

3.19 Characteristic. A physical, chemical, visual, functional, or any other identifiable property of a product or material.

3.20 Clearance number. The number of successively inspected units which must be found free of defects concerned before a certain action to change the inspection procedure can be taken.

3.21 Compliance. An affirmative indication or judgment that the supplier of a product or service has met the requirements of the relevant specifications, contract or regulation; also the state of meeting the requirements.

3.22 Configuration. The functional and physical characteristics of hardware and software as set forth in technical documentation and achieved in a product.

3.23 Configuration control. The systematic proposal, justification, evaluation, coordination, approval or disapproval of proposed changes and the implementation of all approved changes, in the configuration of a CI after establishment of the configuration baseline(s) for the CI.

3.24 Configuration item (CI). A configuration item is an aggregation of hardware or software that satisfies an end use function and is designated by the Government for separate configuration management.

3.25 Conformance grade. An indicator of category or rank related to features or characteristics that cover different sets of needs for products or services intended for the same functional use.

3.26 Conformity. The fulfilling by an item or service of specification requirements.

3.27 Contract. A mutually binding legal relationship obligating the seller to furnish the supplies or services (including construction) and the buyer to pay for them. It includes all types of commitments that obligate the Government to an expenditure of appropriated funds and that, except as otherwise authorized, are in writing, In addition to bilateral instruments, contracts include, but are not limited to, awards and notices of awards; job orders, such as purchase orders, under which the contract becomes effective by written acceptance or performance; and bilateral contract modifications.

3.28 Contract data requirements list (CDRL) (DD Form 1423). A form that specifies the data required to be furnished. The form defines the content–preparation and distribution instructions for each report or other data item.

3.29 Contract quality requirements (CQR). The detailed requisites for quality incumbent on the contractor, consisting of (a) all quality requirements contained in a contract; and (b) the detailed contractual requisites provided by the contract incumbent on the contractor to substantiate conformance of product or service to quality requirements of the contract.

3.30 Contracting officer. A person with the authority to enter into, administer, and/or terminate contracts and make related determinations and findings. The term includes certain authorized representatives of the contracting officer acting within the limits of their authority as delegated by the contracting officer.

3.31 Control chart. A graphic representation of data used to detect, identify, and analyze variation in a given characteristic, process, or product. This statistical tool can be used in problem solving as an indication of whether the system is in or out or control, as determined by computed control limits.

3.32 Control limits. Control limits are criteria that establish maximum variation beyond which action must be taken to investigate and when feasible correct the cause(s) of nonconformance. Control limits do not preclude corrective action when abnormal patterns of variation occur without any individual data exceeding the control limits. Control limits are developed using standard statistical methods or other approved techniques and are based on documented process history. They are established to assist in fulfilling the contractor's responsibility for submitting a conforming item, identifying necessary corrective actions, and reducing nonconformance levels.

3.33 Corrective action (CA). Changes to processes, work instructions, workmanship practices, training, inspections, tests, procedures, specifications, drawings, tools, equipment, facilities, resources, or material that result in preventing, minimizing, or eliminating nonconformances.

3.34 Corrective action board (CAB). A contractor board consisting of management representatives of appropriate contractor organizations with the level of responsibility and authority necessary to ensure the prevention of nonconformances, to manage quality improvement efforts as appropriate, to assess and manage nonconformance cost elimination, to ensure that causes of nonconformances are identified, and that corrective actions are effected throughout the contractor's organization.

3.35 Cost of quality. The cost of those activities directed at achieving appropriate quality and the resultant costs from inadequate controls and can be broadly divided into operational quality costs and external assurance quality cost.

3.36 Cost, appraisal. Costs incurred while conducting inspections, tests, and other planned evaluations to insure requirements are met, *e.g.*, prototype inspection tests, product acceptance, packaging inspection, receiving inspection and testing, process control, status measurement, and reporting.

3.37 Cost, external assurance quality. Costs relating to the demonstration and proof required as objective evidence by customers, *e.g.*, cost of testing for specific safety characteristics by recognized independent testing bodies, third party certification, etc.

3.38 Cost, failure. Costs incurred as a result of the product or service failing to meet requirements, *e.g.*, internal failure costs such as re–performing of service, rework, retest, and scrap, and external failure costs resulting from a product or service failing to meet the quality requirements after delivery such as product service, warranties, returns, product recalls and liability.

3.39 Cost, operating quality. Those costs incurred to attain and ensure specified quality levels and includes the cost of prevention, appraisal and failure.

3.40 Cost, preventive. Costs that are incurred from actions taken to prevent defects within a product or service, *e.g.*, design reviews, product qualification, drawing checking, specification reviews, supplier evaluations, quality training, zero defect programs, quality audits and preventative maintenance.

3.41 Critical defective. A unit of product that contains one or more critical defects and may also contain major and/or minor defects.

3.42 Defects. Any nonconformance of the unit of product with specified requirements or any state or condition of nonconformance to requirements.

3.42.1 Defects, critical. A defect that would result in hazardous or unsafe conditions for individuals using, maintaining, or depending upon the product; or a defect that judgment and experience indicate is likely to prevent performance of the tactical function of a major end item such as a ship, aircraft, tank, missile, space vehicle, communications system, land vehicle, surveillance system, or major part thereof.

3.42.2 Defects, major. A defect, other than critical, that is likely to result in failure, or to reduce materially the usability of the unit of product for its intended purpose.

3.42.3 Defects, minor. A defect that is not likely to reduce materially the usability of the unit of product for its intended purpose, or is a departure from established standards having little bearing on the effective use or operation of the unit.

3.43 Defective. A unit of product which contains one or more defects.

3.44 Defects per hundred units. The number of defects per hundred units of any given quantity of units of product is one hundred times the number of defects contained therein (one or more defects being possible in any unit of product divided by the total number of units of product, *i.e.*:

$$\text{Defects per hundred units} = \frac{\text{Number of defects} \times 100}{\text{Number of units}}$$

3.45 Dependability. A measure of the degree to which an item is operable and capable of performing its required function at any (random) time during a specified mission profile, given item availability at the start of the mission.

3.46 Design of experiments. Methods for changing process inputs in a systematic way, and analyzing the resulting outputs, in order to: (a) Improve a response to an acceptable or optimum value; (b) Find a less expensive design, material, or method which will provide equivalent results; and (c) Understand process sensitivities.

3.47 Design review. A formal, documented, comprehensive, and systematic examination of a design to evaluate the design requirements and the capability of the design to meet these requirements and to identify problems and propose solutions.

3.48 Deviation. (1) A specific written authorization, granted prior to the manufacture of an item, to depart from a particular requirement(s) of an item's current approved configuration documentation for a specific number of units or a specified period of time. (A deviation differs from an engineering change in that an approved engineering change requires corresponding revision of the item's current approved configuration documentation, whereas a deviation does not.) (2) The difference or distance of an individual observation or data value from the center point (often the mean) of the data set distribution.

3.49 Equipment. One or more components capable of performing a complete function.

3.50 Examination. An element of inspection consisting of investigation, without the use of special laboratory appliances, or procedures, supplies or services to determine conformance to those specified requirements which can be determined by such investigations, *i.e.*, examination is generally non–destructive and includes, but is not limited to visual, auditory, olfactory, tactile, gustatory, and other investigations; simple physical manipulation; gaging; and measurement.

3.51 Failure. The inability of an item to perform within previously specified limits.

3.52 Failure analysis. The investigation into the degree of imperfection to which an item has degenerated (or failed) when measured against a previously specified limit.

3.53 Failure diagnosis. The investigation of the facts available (such as an investigation of the failed item itself, of failure mode(s), and of contributory causes) to determine the nature of the failure.

3.54 Fitness for use. The effectiveness of the design, manufacturing, and support processes in delivering a system that meets the operational requirements under all anticipated operational conditions.

3.55 First article. Preproduction models, initial production samples, test samples, first lots, pilot lots, and pilot models.

3.56 First article testing. Testing and evaluating the first article for conformance with specified contract requirements before or in the initial stage of production.

3.57 Formulation of inspection lots. See 3.76.

3.58 Functional testing. A systematic sequence of steps used to check the condition of a completed end item to test its fitness for use.

3.59 Government inspection(s). Inspection(s), *e.g.*, examinations and tests, including in–process inspections, conducted by the Government to ensure that contract requirements are being met.

3.60 Government procurement quality assurance (GPQA). The function by which the Government determines whether a contractor has fulfilled his contract obligations pertaining to quality and quantity. This function is related to and generally precedes the act of acceptance.

3.61 Government quality assurance plan. This describes the government contract quality assurance surveillance of a contractor's performance on a program, contract, or in a facility to determine whether a contractor has fulfilled the contract obligations pertaining to quality and quantity.

3.62 Grade. An indicator of category or rank related to features of characteristics that cover different sets of needs for products or services intended for the same functional use.

3.63 Hardware. End items, physical equipment, or repairable items.

3.64 Industrial special processes (ISP). Special processes where materials being worked or fabricated undergo physical or metallurgical change and the process is used repeatedly in a shop–type environment where conformance to specification by direct inspection is impractical or inadequate without inspection of work operations and processes, *e.g.*, soldering, heat treat, painting, welding, etc.

3.65 Inspection. The examination and testing of supplies and services (including, when appropriate, raw materials, components, and intermediate assemblies) to determine whether they conform to specified requirements.

3.65.1 Inspection, cyclical. A system whereby supplies and equipment in storage are subjected to, but not limited to, periodic, scheduled, special inspection, and continuous action to assure that material is maintained in a ready for issue condition.

3.65.2 Inspection, in–process. Inspection which is performed during the manufacturing or repair cycle in an effort to prevent defectives from occurring and to inspect the characteristics and attributes which are not capable of being inspected at final inspection.

3.65.3 Inspection, original. First inspection of a particular quantity of product.

3.65.4 Inspection, quality conformance. All examinations and tests performed on items or services for the purpose of determining conformance with specified requirements.

3.65.5 Inspection, reduced. Inspection under a sampling plan using the same quality level as for normal inspection, but requiring a smaller sample for inspection.

3.65.6 Inspection, tightened. Inspection under a sampling plan using the same quality level as for normal inspection, but requiring more stringent acceptance criteria.

3.66 Inspection by attributes. Inspection whereby either the unit of product is classified simply as defective or nondefective, or the number of defects in the unit of product is counted, with respect to a given requirement or set of requirements.

3.67 Inspection by variables. Inspection wherein certain quality characteristics of sample are evaluated with respect to a continuous numerical scale and expressed as precise points along this scale. Variables inspection records the degree of conformance or nonconformance of the unit with specified requirements for the quality characteristics involved.

3.68 Inspection level. An indication of the relative sample size for a given amount of product.

3.69 Inspection lot. See 3.77.

3.70 Inspection record. Recorded data concerning the results of inspection action.

3.71 Inspection system requirement. A requirement to establish and maintain an inspection system in accordance with MIL–I–45208, ISO 9000, or ASQC Q90 series standards equivalents, or a contractor's existing inspection system, as determined acceptable by the buying activity or its agent. The requirement is referenced in contracts when technical requirements are such as to require control of quality by in–process as well as final, end item inspection (see 3.72 and 3.86).

3.72 International Organization for Standardization (ISO) quality standards. The technical committee on quality (TC 176) developed the ISO 9000 series of international standards and other related ISO standards for quality assurance and quality management.

3.72.1 ISO 8402. The vocabulary of quality assurance terms for ISO 9000 quality system standards.

3.72.2 ISO 9001/Q91. International/commercial quality system standard which specified a quality system model for use when the contract requires the demonstration of a supplier's capability to design, produce, install, and service a product.

3.72.3 ISO 9002/Q92. International/commercial quality system model for quality assurance in production and installation.

3.72.4 ISO 9003/Q93. International/commercial quality system model for quality assurance in final inspection and testing.

3.72.5 ISO 9004/Q94. International/commercial quality system guidelines for producer organizations to develop and implement a quality system and to determine the extent to which each quality system element is applicable.

3.73 Inventory control point (ICP). An organizational unit or activity within a Department of Defense (DoD) supply system which is assigned the primary responsibility for the supply management of a group of items either for a particular service or the DoD as a whole.

3.74 Item. A non–specific term used to denote any unit or product, including materials, parts, assemblies, equipment, accessories, and computer software.

3.75 Limiting quality (LQ). Limiting quality (LQ) is the maximum defective in product quality (or the worst product quality) that the consumer is willing to accept at a specified probability of occurrence.

3.76 Lot formation. The procedure of collecting, segregating, or delineating production units into homogeneous identifiable groups according to type, grade, class, size, composition, or condition of manufacture.

3.77 Lot or batch. A definite quantity of some product accumulated under conditions that are considered uniform for sampling purposes.

3.78 Lot or batch size. The lot or batch size is the number of units of product in a lot or batch.

3.79 Maintainability. A characteristic of design and installation which is expressed as the probability that an item will be retained in or restored to a specified condition within a given period of time, when the maintenance is performed in accordance with prescribed procedures and resources.

3.80 Maintenance quality assurance. The actions by which it is determined that material maintained, overhauled, rebuilt, modified, and reclaimed conforms to the prescribed technical requirements.

3.81 Major defective. A unit of product which contains one or more major defects, and may also contain minor defects but contains no critical defect.

3.82 Material review board (MRB). A board consisting of representatives of contractor departments necessary to review, evaluate, and determine or recommend disposition of nonconforming materials referred to it.

3.83 Mean–time–between–failure (MTBF). A basic measure of reliability for repairable items. The mean number of life units during which all parts of the item perform within their specified limits, during a particular measurement interval under stated conditions.

3.84 Measurement traceability. The ability to relate individual measurement results through an unbroken chain of calibrations to a common recognized source. This is achieved by tracking a required system or equipment measurement accuracy through a more accurate measurement device that has been calibrated by a higher accuracy standard (as used in a Military Department calibration facility), ultimately reaching a recognized national standard.

3.85 Measuring and test equipment. All devices used to measure, gage, test, inspect, diagnose, or otherwise examine materials, supplies and equipment to determine compliance with technical requirements.

3.86 MIL–I–45208. The military quality system standard intended for use on contracts involving less complex types of military hardware and is the model for a quality system during production and installation.

3.87 MIL–Q–9858. The military quality system standard intended for use in contracts involving more complex types of military hardware and systems to assure quality throughout all areas of contract performance from the design, development, fabrication processing, assembly, test, maintenance, packaging, shipping, storage, and site installation.

3.88 Minor defective. A unit of product that contains one or more minor defects but contains no critical or major defect.

3.89 National qualification authority (NQA). An authority in each NATO country having product qualification responsibility. In the United States, the NQA is the preparing activity of a specification for the particular qualified product. The Office of the Assistant Secretary of Defense for Economic Security, Standardization Program Division (OASD (ES) SPD) is the U.S. NQA for specifications prepared by other NATO nations, and acts as the DoD focal point.

3.90 Nonconformance. The failure of a characteristic to conform to the requirements specified in the contract, drawings, specifications, or other approved product description.

3.91 Nonconformance, critical. A nonconformance that judgment and experience indicate is likely to result in hazardous or unsafe conditions for individuals using, maintaining, or depending upon the supplies or services; or is likely to prevent performance of a vital agency mission.

3.92 Nonconformance, major. A nonconformance, other than critical, that is likely to result in failure, or to materially reduce the usability of the supplies or services for their intended purpose.

3.93 Nonconformance, minor. A nonconformance that is not likely to materially reduce the usability of the supplies or services for their intended purpose, or is a departure from established standards having little bearing on the effective use or operation of the supplies or services.

3.94 Nonconforming material. Any item, part, supplies, or product containing one or more nonconformances.

3.95 Nondevelopmental items (NDI). This is a broad, generic term that covers material available from a wide variety of sources with little or no development effort required by the Government. NDIs include:

a. Items obtained from a domestic or foreign commercial marketplace.

b. Items already developed and in use by the Services, other Defense activities, and government agencies.

c. Items already developed by foreign governments which can be supplied in accordance with mutual defense cooperation agreements and Federal and Department of Defense acquisition regulations.

3.96 Normal inspection. Inspection, under a sampling plan, which is used when there is no evidence that the quality of the product being submitted is better or poorer than the specified quality level.

3.97 Objective quality evidence (OQE). Any statement of fact, either quantitative or qualitative, pertaining to the quality of a product or service based on observations, measurements, or tests which can be verified. (Evidence will be expressed in terms of specific quality requirements or characteristics. These characteristics are identified in drawings, specifications, and other documents which describe the item, process, or procedure.)

3.98 Occurrence. The first time a nonconformance is detected on a specific characteristic of a part or process. All nonconformances attributed to the same cause and identified before the date, item, unit, lot number, or other commitment for effective corrective action are also considered occurrences.

3.99 Off–the–shelf item. An item produced and placed in stock by a contractor, or stocked by a distributor, before receiving orders or contracts for its sale. The item may be commercial or produced to military or federal specifications or descriptions.

3.100 One hundred percent inspection. Inspection in which specified characteristics of each unit of product are examined or tested to determine conformance with requirements.

3.101 Operating characteristic curves (OCC). The curve of a sampling plan which shows the percentage of lots or batches which may be expected to be accepted under the specified sampling plan for a given process quality.

3.102 Overhaul. The process of reconditioning an item to conform to the current technical specifications of the item, and with a life expectancy equal to similarly configured new equipment. Overhaul is accomplished by cosmetic reconditioning; by installation of all approved engineering and field changes; and by repair or replacement of parts and components that have failed or are of marginal quality due to wear, deterioration, or damage so as to preclude premature failure.

3.103 Parts per million (ppm). A term usually used in conjunction with process capability indices (Cp & Cpk) to denote the number of parts nonconforming per million produced.

3.104 Percent defective. The percent defective of any given quantity of units of product is one hundred times the number of defective units of product contained therein divided by the total number of units of product, *i.e.*:

$$\text{Percent defective} = \frac{\text{Number of defectives} \times 100}{\text{Number of units inspected}}$$

3.105 Pre–award survey (PAS). An evaluation of a prospective contractor's capability to perform under the terms of a proposed contract.

3.106 Preliminary review (PR). An evaluation by contractor–appointed quality personnel, assisted by other personnel as required, to determine the disposition of nonconforming material after its initial discovery and prior to referral to the MRB. Preliminary review may result in an authorized disposition of the nonconforming material without referral to the MRB for final disposition.

3.107 Probability of acceptance. That percentage of inspection lots expected to be accepted when the lots are subjected to a specific sampling plan.

3.108 Process. A repeatable set of tasks or activities designed to add value to the specific output of a product/service for a customer

3.109 Process average. The average percent defective or average number of defects per hundred units (whichever is applicable) of product submitted by the supplier for original inspection. Original inspection is the first inspection of a particular quantity of product as distinguished from the inspection of product which has been resubmitted after prior rejection.

3.110 Process capability indices. Indices that compare the statistical aspects of a process (capability and location), to specifications (or customer requirements).

3.111 Process quality audit. An analysis of elements of a process and appraisal of completeness, correctness of conditions, and probable effectiveness.

3.112 Product liability or service liability. A generic term used to describe the onus on a producer or others to make restitution for loss related to personal injury, property damage, or other harm caused by a product or service.

3.113 Product quality audit. A quantitative assessment of conformance to required product characteristics.

3.114 Product quality review. An action by the Government to determine that the quality of supplies or services accepted by the Government do, in fact, comply with specified requirements.

3.115 Qualification. A process in advance and independent of, an acquisition by which a manufacturer's or distributor's products are examined, tested, and approved to determine compliance with the requirements of a specification or a source control drawing.

3.116 Qualified manufacturers list (QML). A list of manufacturers' facilities that have been evaluated and determined to be acceptable based on the testing and approval of a sample specimen and conformance to the applicable specification. The QML includes appropriate products, processes, or technology identification, and test reference with the name and address of the manufacturer's plant.

3.117 Qualified product (QP). A product that has been examined, tested, and listed on or qualified for inclusion on the applicable Qualified Products List.

3.118 Qualified products list (QPL). A list of products that have met the qualification requirements stated in the applicable specification, including appropriate product identification and test or qualification reference with the name and plant address of the manufacturer and distributor, as applicable.

3.119 Qualifying activity. An activity that is either the preparing activity or adopting activity of the specification or its designated agent, as specified in the specification or as directed by the National Qualification Authority (NQA).

3.120 Quality. The composite of all the attributes or characteristics, including performance, of an item or product that bear on its ability to satisfy stated or implied needs.

3.121 Quality assurance (QA). A planned and systematic pattern of all actions necessary to provide adequate confidence that management and technical planning and controls are adequate to:

a. Establish correct technical requirements for design and manufacturing.
b. Create products and services that conform to the established technical requirements.

3.122 Quality assurance evaluator (QAE). A functionally qualified person certified by the functional area chief and appointed by the commander to evaluate and accept base level service contracts.

3.123 Quality assurance letter of instruction (QALI). A letter from the buying office to the contract administration office that provides special instructions for performing government quality assurance actions not already specified in the Federal Acquisition Regulations (FARs).

3.124 Quality assurance manager (QAM). A person fully qualified and certified in quality assurance assigned to ensure that program quality aspects are adequately considered in pre–award, design reviews, configuration audits, production readiness reviews, etc. Defines contract quality assurance requirements, delegates to contract administration office using Quality Assurance Letter of Instructions, memorandum of agreement, etc. Negotiates and approves Quality Assurance Plan. Identifies contract quality assurance process evaluation/proofing, FMECA info, critical characteristics, processes, process evaluation, proofing, process capability, support to design review, configuration audits. Defines contract administration authority for material review, class II engineering changes, minor waivers and material review. Ensures minimum government verifications consistent with program risk and confidence in contractor operations. Performs product oriented survey, quality audits. Acts as program focal point and provides technical assistance on quality assurance matters.

3.125 Quality assurance representative (QAR). The individual directly charged with performance of the Government contract quality assurance function at a contractor facility.

3.126 Quality audit. A systematic and independent examination and evaluation to determine whether quality activities and results comply with planned arrangements and whether these arrangements are implemented effectively and are suitable to achieve objectives.

3.127 Quality control (QC). An overall system of activities, including inspection, whose purpose is to provide a quality of product or service that meets contract requirements.

3.128 Quality engineering. That branch of engineering which deals with the principles and practice of product and service quality assurance and control.

3.129 Quality function deployment (QFD). A system that translates customer requirements (voice of the customer) into technical requirements for each step of development and/or production.

3.130 Quality improvement project (QIP). An activity chartered and monitored by the CAB (or other contractor group senior to the CAB) to investigate technology, methods, and procedures, which is aimed at finding more efficient and effective means of carrying out contractual responsibilities with the objective of enhancing quality and productivity.

3.131 Quality loop/quality spiral. Conceptual model of interacting activities that influence the quality of a product or service in the various stages ranging from the identification of needs to the assessment of whether these needs have been satisfied.

3.132 Quality management. The aspect of the overall management function that determines and implements the quality policy.

3.133 Quality manual. The top level document that describes the overall quality system, states the quality policy, and the commitment to quality. The quality manual also lists authorities, responsibilities, and interrelationships, as well as, describing system implementation.

3.134 Quality measure. A quantitative measure of the features and characteristics of a product or service.

3.135 Quality of conformance. The effectiveness of the design and manufacturing functions in executing the product manufacturing requirements and process specifications while meeting tolerances, process control limits, and target yields for a given product group.

3.136 Quality of design. The effectiveness of the design process in capturing the operational requirements and translating them into detailed design requirements that can be manufactured (or coded) in a consistent manner.

3.137 Quality plan. A document setting out the specific quality practices, resources, and activities relevant to a particular product, process, service, contract, or project.

3.137.1 Quality plan audit See 3.143.

3.138 Quality policy. The overall intentions and direction of an organization as regards quality as formally expressed by top management.

3.139 Quality program (system) requirement. It is the requirement for the establishment and maintenance of a quality program (system) in accordance with applicable contract quality requirements, *e.g.*, MIL-Q-9858, ISO 9000, or ASQC Q90 series standards. MIL-Q-9858, ISO 9000, ASQC Q90 series standards equivalents, or a contractor's quality program, as determined acceptable by the buying activity or its agent, requires that the program shall assure adequate quality throughout all areas of contract performance; for example, design, development, fabrication, processing, assembly, inspection, test, maintenance, packaging, shipping, storage, and site installation. ASQC Q90 series standards require the supplier to establish and maintain a documented quality system as a means of ensuring that product conforms to specified requirements (see 3.72 and 3.87).

3.140 Quality requirements. The technical requirements relating to the quality of the product (supply or service) and contract clauses prescribing quality standards, inspection, and other quality controls incumbent on the contractor, to assure that the product or service conforms to the contractual requirements.

3.141 Quality surveillance. The continuing monitoring and verification of the status of procedures, methods, conditions, products, processes, and services, and analysis of records in relation to stated references to ensure that requirements for quality are being met.

3.142 Quality system. The organization structure, responsibilities, procedures, processes, and resources for implementing quality management.

3.143 Quality system audit. A documented activity performed to verify, by examination and evaluation of objective evidence, that applicable elements of the quality system are suitable and have been developed, documented, and effectively implemented in accordance with specified requirements.

3.144 Quality system review (QSR). A formal evaluation by management of the status and adequacy of the quality system in relation to quality policy and/or new objectives resulting from changing circumstances.

3.145 Quality system standard. A set of guidelines that define the requirements for an effective quality assurance system which includes the organizational structure, responsibilities, procedures and processes, and the resources for implementing quality management.

3.146 Random sample. A sample selected in such a way that each unit of the population has an equal chance of being selected.

3.147 Reduced inspection. Inspection under a sampling plan using the same quality level as for normal inspection, but requiring a smaller sample for inspection.

3.148 Registrar Accreditation Board (RAB). A corporation set up to accredit third party auditing companies in the United States and works with similar organizations in Europe to enhance the recognition of U.S. registered quality systems by the European Community.

3.149 Rejection number. The minimum number of defects or defective units in the sample that will cause rejection of the lot represented by the sample.

3.150 Relative quality. Degree of excellence of a product or service.

3.151 Reliability. (1) The duration or probability of failure–free performance under stated conditions; (2) The probability that an item can perform its intended function for a specified interval under stated conditions.

3.151.1 Reliability assurance. All actions necessary to provide adequate confidence that material conforms to established reliability requirements.

3.151.2 Reliability engineering. That engineering function dealing with the principles and practices related to the design, specification, assessment, and achievement of product or system reliability requirements and involving aspects of prediction, evaluation, production, and demonstration.

3.152 Repair. A procedure which reduces, but not completely eliminates, a nonconformance and which has been reviewed and concurred in by the MRB and approved for use by the Government. The purpose of repair is to reduce the effect of the nonconformance. Repair is distinguished from rework in that the characteristic after repair still does not completely conform to the applicable drawings, specifications, or contract requirements. Except for standard repair procedures, proposed repairs approved by the Government are authorized for use on a one–time basis only.

3.153 Repairable item. An item which, when capable of being serviced, can normally be economically restored to a serviceable condition through repair procedures performed by a Government facility or commercial overhaul facility.

3.154 Replaceable item. A non–repairable item or one that is not economically feasible to repair.

3.155 Resubmitted lot. A lot which has been rejected, subjected to either examination or testing, or both for the purpose of removing all defective units which may or may not be reworked or replaced, and submitted again for acceptance.

3.156 Rework. A procedure applied to a nonconformance that will completely eliminate it and result in a characteristic that conforms completely to the drawings, specifications, or contract requirements. Rework does not require government approval.

3.157 Safety of flight (SOF). Any human, environmental phenomenon (*e.g.*, windshear, clear air turbulence, or lightning strike), or machine/materiel failure which jeopardizes the aircraft or crew while the aircraft is airborne.

3.158 Sample. One or more units of product drawn from a lot or batch. Each unit is selected randomly. The number of units in the sample is the sample size.

3.158.1 Sample, representative. The number of units selected in proportion to the size of sub–lots or sub–batches, or parts of the lot or batch, identified by some rational criterion. When representative sampling is used, the units from each part of the lot or batch shall be selected at random.

3.158.2 Sample size. The number of units of product in the sample selected for inspection.

3.158.3 Sample unit. A unit of product selected to be part of a sample.

3.159 Sampling, biased. Sampling procedures which will not guarantee a truly representative or random sample.

3.160 Sampling frequency (f). The sampling frequency, f, is the ratio between the number of units of product randomly selected for inspection at an inspection station to the number of units of product passing the inspection station.

3.161 Sampling plan. A plan which indicates the number of units of product from each lot or batch which are to be inspected (sample size or series of sample sizes) and the criteria for determining the acceptability of the lot or batch (acceptance and rejection numbers).

3.161.1 Sampling plan, double. A specific type of attributes sampling plan in which the inspection of the first sample leads to a decision to accept, to reject, or to take a second sample. The inspection of a second sample, when required, then leads to a decision to accept or reject.

3.161.2 Sampling plan, multi–level continuous. A specific type of sampling plan in which the inspection periods of 100 percent inspection and two or more levels of sampling inspection are alternated with the sampling frequency remaining constant or changing on the basis of the inspection result.

3.161.3 Sampling plan, multiple. A specific type of attributes sampling plan in which a decision to accept or reject an inspection lot may be reached after one or more samples from that inspection lot have been inspected, and will always be reached after not more than a designated number of samples have been inspected.

3.161.4 Sampling plan, sequential. A specific type of sampling plan in which the sample units are selected one at a time. After each unit is inspected, the decision is made to accept, reject, or continue inspection until the acceptance or rejection decision can be made. The sample size is not fixed in advance, but depends on actual inspection results.

3.161.5 Sampling plan, single. A specific type of sampling plan in which a decision to accept or reject an inspection lot is based on a single sample.

3.161.6 Sampling plan, single–level, continuous. A specific type of sampling plan in which the inspection periods of 100 percent inspection and sampling inspection are alternated with the sampling rate remaining constant.

3.162 Scrap. Nonconforming material that is not suitable for its intended purpose and which cannot be economically reworked or cannot be repaired in a manner acceptable to the Government.

3.163 Screening inspection. Inspection in which each item of product is inspected for designated characteristics and all defective items are removed.

3.164 Six–sigma quality. A term borrowed from the Motorola corporate approach to quality improvement. It denotes a level of quality of no more than 3.4 nonconformances per million opportunities (or parts per million defective). It comes from a process whose variability (plus or minus six sigma) matches the specification limits (C_p=2), and whose mean is centered to within plus or minus 1–1/2 sigma.

3.165 Specification. A document intended primarily for use in procurement, which clearly and accurately describes the essential and technical requirements for items, materials, or services, including the procedures by which it will be determined that the requirements have been met. Specifications for items and materials may also contain preservation, packaging, packing, and marking requirements.

3.166 Standard inspection clause. The contract clause that is inserted in solicitations and contracts for supplies and services to ensure an explicit understanding of the contractor's inspection responsibilities as prescribed in FAR 52.246.

3.167 Standard repair procedure (SRP). A documented technique for repair of a type of nonconformance which has been demonstrated to be an adequate and cost-effective method for repair when properly applied. SRPs are developed by the contractor, reviewed and concurred in by the MRB, and approved by the Government for recurrent use under defined conditions. Defined conditions shall include an expiration date or a finite limit on the number of applications, or both.

3.168 Statistical process control (SPC). SPC is a methodology used to measure the average and variability of any given characteristic within a contractor area, department, part, or process, including but not limited to, machine shop, bonding process, heat treat, and assembly. SPC techniques include control charts and control limits. Properly implemented, SPC offers the ability to improve manufacturing yield and lower production, inspection, and nonconformance costs.

3.169 Statistical quality control (SQC). The application of statistical techniques to the control of quality.

3.170 Storage quality control. Storage quality control is the technical inspection of materiel received from vendors which was not previously inspected at source and for which acceptance at destination is required; inspection of materiel returned from consuming installations for return to stores, forwarding to repair facilities or for release to disposal areas; the examination and testing of samples of supplies selected from storage to assess the overall quality of materiel stored, and the identification of previously unidentified materiel in store; and inspection of materiel prior to shipping to using activities.

3.171 Supplier. The terms subcontractor, supplier, vendor, seller, or any other term, used to identify the source for which the prime contractor obtains support are considered to be synonymous for the purpose of this standard.

3.172 Survey, product oriented. A review and evaluation to determine the adequacy of the technical requirements relating to quality and product conformance to design intent.

3.173 System. A composite of equipment, skills, and techniques capable of performing or supporting an operational role, or both. A complete system includes all equipment, related facilities, material, software, services and personnel required for its operation and support to the degree that it can be considered a self-sufficient unit in its intended operational environment.

3.174 Test accuracy ratio (TAR). The maximum permitted error of the unit to be measured or calibrated divided by the maximum known error of the measuring or generating device used to perform the measurement. For example, if it is required that a system or equipment output parameter be accurate to 8% (maximum permitted error) and the known accuracy (maximum known error) of the measuring device used to measure the output parameter is 2%, then the TAR is 4.

3.175 Testing. An element of inspection that generally denotes the determination by technical means of the properties or elements of supplies, or components thereof, including functional operation, and involves the application of established scientific principles and procedures.

3.176 Testing laboratory. A laboratory having facilities to perform examination and testing. That laboratory may be one of the following: a. A laboratory operated by or under contract to the Government; or b. A laboratory of the manufacturer or distributor either in–plant or under contract.

3.177 Traceability. The ability to trace the history, application, or location of an item or activity and like items or activities by means of recorded identification.

3.178 Unit of product. A unit of product is the thing inspected in order to determine its classification as defective or noneffective or to count the number of defects. It may be a single article, a pair, a set, a length, an area, an operation, a volume, a component of an end product, or the end product itself. The unit of product may or may not be the same as the unit of purchase, supply, production, or shipment.

3.179 Use–as–is. A disposition of material with one or more minor nonconformances determined to be usable for its intended purpose in its existing condition.

3.180 Variability. The natural tendency for a characteristic of a product, process, or service to differ from a norm or specification target.

3.181 Variability reduction. A planned effort to decrease variability of selected, key characteristics.

3.182 Variation. The extent to which a product or service is unlike a given standard. This difference can be traced back to sources such as management, product/process specifications, component specifications, poor supplier materials, operator errors, etc.

3.183 Verification. The art of reviewing, inspecting, testing, checking, auditing, or otherwise establishing and documenting whether items, processes, services, or documents conform to specified requirements.

3.184 Waiver. A written authorization to accept an item, which during manufacture, or after having been submitted for Government inspection or acceptance, is found to depart from specified requirements, but nevertheless is considered suitable for use "as is" or after repair by an approved method.

3.185 Work assignment document. An agreement containing specific terms and conditions that has been agreed to by the requiring activity (buyer) and the performing activity (seller) that is used to administer the requirements of the contract.

3.186 Work control document. An approved form or computer generated document with sequence of steps outlining the procedures used for work control, identification, certification, routing and accountability of items in the production process.

4. GENERAL REQUIREMENTS

This section is not applicable to this handbook.

5. DETAILED REQUIREMENTS

This section is not applicable to this handbook.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. This document is intended to provide a standardized interpretation of quality assurance terms and definitions to be applied throughout the determination of product quality.

6.2 Issue of DoDISS. When this standard is used in acquisition, the applicable issue of the DoDISS must be cited in the solicitation (see 2.1. and 2.2).

6.3 Subject term (key word) listing.

acceptance, probability of
accreditation
assurance, Government procurement quality (GPQA)
board, material review (MRB)
certification
control, statistical process
curves, operating characteristic (OC Curves)
engineering, reliability
evidence, objective quality
experiments, design of
grade, conformance
inspection, quality conformance
inspection, screening
numbers, clearance
permit, deviation
qualification
quality, average outgoing (AOQ)
reduction, variability
requirements, contract quality
sampling, biased
survey, product oriented

6.4 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodian:
Army – CR
Navy – SH
Air Force – 10

Preparing activity:
Air Force – 10

Agent :
Air Force – 11

Review activities:
Army – AR, AV, MI, MR
Navy – AS, EC, SA, OS, YD
Air Force – 11, 16, 30, 69, 80, 82, 84, 85
DLA – CS

Project No. QCIC–0143

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, not to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractural requirements.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL–STD–109C	2. DOCUMENT DATE *(YYMMDD)* 94/08/19

3. DOCUMENT TITLE
QUALITY ASSURANCE TERMS AND DEFINITIONS

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME *(Last, First, Middle Initial)*	b. ORGANIZATION	
c. ADDRESS *(Include Zip Code)*	d. TELEPHONE *(Include Area Code)* (1) Commercial (2) AUTOVON *(If applicable)*	7. DATE SUBMITTED *(YYMMDD)*

8. PREPARING ACTIVITY AF 10 AGENT: AF 11

A. NAME HQ AFMC/ENSS	B. TELEPHONE *(Include Area Code)* (1) Commercial (513) 257–7710; FAX (513) 257–0841 (2) AUTOVON *(If applicable)* 787–7710; FAX 787–0841
C. ADDRESS *(Include Zip Code)* 4375 Chidlaw Rd., Ste 6 Wright–Patterson AFB OH 45433–5006	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church VA 22041–3466 Telephone (703) 756–2340 AUTOVON 289–2340