

DICTIONARY

QUALITY AND SIX SIGMA DICTIONARY

Simplifying Your Path to
Certification



SANDEEP KUMAR

About This Sample

This is a free promotional sample of *The Quality Management and Six Sigma Dictionary*. The full edition contains over **2,100 entries** spanning the entire alphabet, plus a 0–9 numerical section, three back-matter appendices (Commonly Confused Terms, Japanese Quality Terms, and Acronyms and Abbreviations), hundreds of cross-references and brief etymology notes on the named methods of quality. This sample reproduces only the entries for **letter A**.

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A

A2LA (American Association for Laboratory Accreditation) A non-profit accreditation body that accredits testing and calibration laboratories, inspection bodies and proficiency-test providers to ISO/IEC 17025, 17020 and 17043 in the United States and internationally.

A3 problem solving A Toyota structured one-page report (background, current state, goals, analysis, countermeasures, plan, follow-up) used to communicate problem-solving thinking; named for the A3 paper size.

A3 problem-solving A Toyota structured problem-solving and reporting method captured on a single A3-size sheet (297 × 420 mm); enforces concise thinking and visual communication.

AAMI Association for the Advancement of Medical Instrumentation; develops standards and guidance for medical devices, sterilization and healthcare technology.

Abnormal variation Variation in a process caused by special, non-random sources such as tool wear, operator change or environmental shift. It signals that the process is no longer in statistical control and requires investigation.

Absolute scale A measurement scale whose zero point represents the absolute absence of the quantity being measured (e.g., absolute pressure, Kelvin temperature).

Accelerated Life Testing (ALT) Life testing in which units are subjected to higher-than-normal stress (temperature,

voltage, vibration) to induce failures in a shorter time; results are extrapolated to use conditions through a physics-of-failure model.

Accelerated Stress Testing Generic term for any test that uses elevated stress to compress test time; includes ALT, HALT, HASS and step-stress designs.

Acceleration factor (AF) The ratio of life under normal conditions to life under accelerated stress; the multiplier that converts test results to expected field life.

See also: Arrhenius model.

Acceptable Process Level (APL) The level of process quality, expressed as a fraction defective, that is considered satisfactory and that an acceptance sampling plan is designed to accept with high probability.

Acceptable Quality Limit (AQL) The maximum percentage of nonconforming units (or maximum number of nonconformities per hundred units) that, for the purposes of sampling inspection, can be considered satisfactory as a process average. Used in standards such as ANSI/ASQ Z1.4.

See also: Lot Tolerance Percent Defective (LTPD), Producer's risk (α), Consumer's risk.

Acceptance criteria Pre-defined conditions that a product, service, or deliverable must satisfy to be accepted by the user, customer, or sponsor; central to project closure and verification.

Acceptance number (c) The maximum

number of defective units (or defects) in a sample that will still permit acceptance of the lot under an acceptance sampling plan.

Acceptance number / rejection number The maximum (Ac) or minimum (Re) number of nonconforming items in a sample that determines whether a lot is accepted or rejected; defined by the sampling plan.

Acceptance sampling A statistical quality control technique where a representative sample is inspected to decide whether to accept or reject an entire lot, rather than inspecting every unit.

Acceptance test (software) Formal testing conducted to determine whether a software system satisfies its acceptance criteria and is ready for delivery; includes UAT and operational acceptance test.

Accommodating (conflict style) A Thomas-Kilmann conflict-management style in which a person sets aside their own concerns to satisfy the other party's; useful when the issue is more important to the other side or to preserve harmony.

Accreditation Third-party attestation by an authoritative body (an accreditation body) that a conformity-assessment body (laboratory, certification body, inspection body) is competent to carry out specific tasks; defined in ISO/IEC 17000.

Accreditation body An authoritative body that performs accreditation; examples include ANAB and A2LA in the United States, UKAS in the United Kingdom, NABL in India and DAkkS in Germany. Accreditation bodies themselves are peer-evaluated through IAF and ILAC.

Accreditation scope The defined range of conformity-assessment activities for which a body is accredited (test methods, product categories, management-system

standards); narrower than the body's overall capability.

Accredited The status of a conformity-assessment body that has been formally recognised through accreditation; an accredited test result carries international recognition through IAF/ILAC mutual-recognition arrangements.

Accuracy The closeness of agreement between a measured value and the accepted true (reference) value. Distinguished from precision, which describes repeatability.

See also: Precision, Bias, Calibration.

Accuracy class A formal classification of an instrument's accuracy, expressed as a percentage of full-scale deflection (e.g., Class 0.5 means $\pm 0.5\%$ FSD).

Action item A specific task or follow-up assigned during a meeting or review, with an owner and a target completion date.

Action plan A documented set of tasks, owners, due dates and resources required to achieve a specific objective. A core deliverable of strategic deployment and corrective action processes.

Active listening A communication discipline of fully concentrating on, understanding and responding to a speaker; foundational to coaching, auditing and conflict resolution.

Active listening A communication technique in which the listener fully attends to, understands, responds to and remembers what is being said; demonstrated by paraphrasing, summarising, asking clarifying questions and avoiding interruption.

Active Pharmaceutical Ingredient (API) Any substance intended to furnish pharmacological activity in a finished drug product; subject to ICH Q7 GMP

requirements.

Active redundancy A redundancy scheme in which all units operate simultaneously and share the load; the system survives until enough units have failed.

See also: Standby redundancy, Redundancy.

Activity Network Diagram A graphical tool, also called an arrow diagram, that shows the sequence and dependency of project activities. Used in critical path analysis.

See also: PERT (Program Evaluation and Review Technique), Critical Path Method (CPM).

Activity-Based Costing (ABC) A costing method that assigns overhead and indirect costs to specific activities and then to products or services based on actual consumption, giving a more accurate view of true cost.

Ad-hoc team A team formed for a specific short-term task and disbanded once the task is complete; contrasted with permanent process teams.

ADDIE model An instructional-design framework with five phases: Analyse, Design, Develop, Implement, Evaluate; widely used in training development and competency programmes.

Adequacy audit An evaluation of whether documented quality-system requirements meet the standard against which they are being audited; complements the implementation audit.

Adhocracy culture One of four cultures in the Cameron-Quinn Competing Values Framework; emphasises innovation, agility and risk-taking; common in start-ups and R&D organisations.

Adjourning The fifth and final stage of Tuckman's team-development model: the

team disbands after the work is complete; recognising contributions and capturing lessons learned characterise this stage.

Adjusted R^2 A modified version of the coefficient of determination that penalizes the addition of predictors that do not improve model fit; preferred when comparing regression models with different numbers of variables.

ADKAR model A Prosci change-management model identifying five sequential outcomes a person needs to achieve change: Awareness of the need, Desire to participate, Knowledge of how to change, Ability to implement, Reinforcement to sustain it. Developed by Jeff Hiatt in 2003.

ADLI Baldrige scoring dimensions for the process category: Approach, Deployment, Learning and Integration.

Adult learning theory Malcolm Knowles' theory (1968) that adults learn best when they are self-directed, can draw on prior experience, see immediate relevance and apply learning to real problems.

Adverse event Any untoward medical occurrence in a patient or clinical-investigation subject; reportable to regulators within defined timeframes.

Affinity In the affinity diagram tool, the natural relationship that causes ideas to be grouped together. Affinity grouping is usually performed silently to avoid premature debate.

Affinity diagram A management and planning tool used to organize a large number of ideas, opinions or issues into natural groupings based on their relationships. One of the seven management and planning tools (7MP).

See also: Tree diagram, Matrix diagram.

Aggregate planning A medium-range planning process that determines overall production levels, workforce size and inventory targets, balancing demand against capacity.

Agile An iterative and incremental approach to product or project delivery that emphasizes short cycles, continuous customer feedback and adaptive planning. Often contrasted with the traditional waterfall model.

See also: Scrum, Kanban, Sprint, Agile manifesto.

Agile manifesto The 2001 statement of four values and twelve principles that defined the agile approach to software development; emphasizes individuals, working software, customer collaboration and responding to change.

Aging analysis The systematic study of how equipment degrades with time, cycles or use; supports preventive maintenance scheduling and life-extension decisions.

AIA documents Standardized contract forms published by the American Institute of Architects, widely used to govern owner, architect and contractor relationships in construction.

Air gauge A precision dimensional gauge that measures clearance between a master and a part by sensing back pressure or flow of air; common for bores, slots and OD checks.

ALCOA / ALCOA+ Data-integrity principles in regulated industries: data must be Attributable, Legible, Contemporaneous, Original, Accurate (plus Complete, Consistent, Enduring, Available).

Algorithm A precise, finite sequence of well-defined instructions for solving a problem

or carrying out a computation; the building block of software.

Alias structure In a fractional factorial design, the pattern showing which main effects and interactions are confounded; determines which effects can be estimated independently.

Aliasing (DOE) The condition in fractional factorial designs where two or more effects cannot be distinguished from each other because they share the same column in the design matrix.

Alignment The condition in which the goals, processes and behaviors at every level of an organization are consistent with the strategic direction set by leadership.

Alignment telescope An optical instrument used to establish a straight reference line for aligning machine components, foundations and bores.

Allergen control Documented procedures for handling, labeling and segregating allergenic foods to prevent cross-contact and protect allergic consumers; required by FALCPA.

Allied Signal U.S. industrial conglomerate (now Honeywell) where Larry Bossidy launched a major Six Sigma deployment in 1994, popularising the methodology beyond Motorola.

Allowable cost The maximum cost a product can incur while still meeting target margins given a market-driven price; used in target costing.

Allowable variation The total tolerance permitted in a characteristic, equal to the upper limit minus the lower limit of the specification.

Alpha level Synonym for significance level; the probability of a Type I error chosen by the analyst before testing (commonly 0.05)

or 0.01).

Alpha risk (α) Also called producer's risk or Type I error: the probability of rejecting a lot, hypothesis, or process that is actually acceptable. Common values are 0.05 and 0.01.

Alpha testing Pre-release testing performed by an internal team in a controlled environment, before beta testing by external users.

Alternative hypothesis (H_1) The statement that contradicts the null hypothesis in a statistical test; what the analyst will conclude if the null is rejected. Often expressed as " $\mu \neq \mu_0$." *See also: Null hypothesis (H_0), Hypothesis test.*

American National Standards Institute (ANSI) The U.S. organization that coordinates the development of voluntary consensus standards for products, services, processes and systems, and accredits standards developers.

American Society for Quality (ASQ) The leading global community of quality professionals, publisher of the BoKs underlying the CQA, CQE and CMQ/OE examinations. Founded in 1946 as the ASQC.

Ammeter An instrument that measures electric current in amperes; connected in series with the circuit being measured.

ANAB (ANSI National Accreditation Board) The accreditation body of the American National Standards Institute; accredits certification bodies for ISO 9001, ISO 14001, ISO 45001, ISO 13485, AS9100 and many other management-system standards, as well as laboratories and inspection bodies.

Analog gauge A measuring instrument

that displays its reading by means of a continuous physical quantity such as pointer position, mercury height or fluid level.

Analysis of Means (ANOM) A graphical alternative to ANOVA that compares group means against the overall mean using decision limits, making practical differences easy to see.

Analysis of Variance (ANOVA) A statistical method that partitions total variability in a data set into components attributable to different sources (treatments, blocks, error), used to test whether group means differ significantly.

See also: t-test, F-test, Variance components, Design of Experiments (DOE).

Analysis paralysis A failure mode in which excessive deliberation prevents decisive action; combated by time-boxing, A3 thinking and bias-for-action principles.

Analytical study Per W. E. Deming, a study aimed at improving a future process (cause-and-effect understanding), distinct from an enumerative study aimed at describing a current population.

Anchoring (negotiation) A cognitive bias in which the first number proposed in a negotiation disproportionately influences the final settlement; skilled negotiators control the anchor or reframe the discussion.

ANCOVA Analysis of Covariance: an extension of ANOVA that adjusts comparisons of group means for the effect of one or more continuous covariates.

AND gate A logic gate used in fault tree analysis; the output event occurs only if all input events occur simultaneously.

Anderson-Darling test A goodness-of-fit

test that gives more weight to the tails of a distribution than the Kolmogorov-Smirnov test; popular for assessing normality.

See also: Goodness-of-fit test.

Andon A Japanese term for a visual signal (light, board, sound) used on a production line to alert operators and supervisors to a problem so that it can be addressed immediately.

Japanese for “paper lantern”; in lean manufacturing, a visual signal (often a lighted board) that calls for help when a problem occurs on the line.

See also: Visual management, Jidoka (autonomation).

Andragogy The art and science of teaching adults; assumes learners are self-directed, draw on experience and seek immediate application. Underpins modern quality training design.

Andragogy The theory and practice of adult learning, articulated by Malcolm Knowles in 1968; emphasises self-direction, prior experience as a resource, problem-centred learning and the relevance of immediate application.

Angle plate A right-angle metal block used in inspection and machining to hold workpieces square to a reference surface, usually a surface plate.

Annealing A heat treatment that softens a metal, relieves internal stresses and refines its microstructure; precedes many subsequent operations.

Annex SL The ISO directive that defines a common high-level structure (HLS), identical core text and common terms for all ISO management-system standards (ISO 9001, 14001, 45001, etc.).

Annual Product Review (APR) An annual GMP-mandated review of a drug product’s quality data, deviations,

complaints and changes; the equivalent of EU’s Product Quality Review (PQR).

Annual quality plan A short-term, typically one-year, document that translates the long-range quality strategy into specific objectives, projects and resource commitments.

Anvil (micrometer) The fixed measuring face of a micrometer, against which the spindle closes onto the workpiece.

Anzen Japanese for “safety”; in Toyota’s hierarchy of priorities Anzen (safety) precedes Hinshitsu (quality), Genka (cost) and Noki (delivery) — safety first.

AOQ (Average Outgoing Quality) The expected fraction of nonconforming units in lots that are released after a sampling inspection scheme that includes 100% screening of rejected lots.

AOQL (Average Outgoing Quality Limit) The maximum value of AOQ for a given sampling plan over all incoming quality levels; the worst-case average outgoing quality.

Apathetics In Kano analysis, customers indifferent to a feature: its presence or absence does not change satisfaction.

API (Application Programming Interface) A defined set of functions, protocols and tools that allows software components to communicate; quality of an API is judged by clarity, stability and backward compatibility.

Apportionment (reliability) Synonym for reliability allocation: distributing a system reliability target among components based on complexity, cost, or criticality.

Appraisal costs One of the four cost-of-quality categories: the cost of measuring, evaluating or auditing products and services to verify conformance with quality

requirements. Includes inspection, test and audit costs.

Approved Supplier List (ASL) A controlled list of suppliers that have been qualified to provide specified products or services; receipt from non-ASL suppliers is restricted.

Arbitration A dispute-resolution method in which an impartial arbitrator hears both sides and renders a binding decision; faster and more confidential than litigation, but with limited appeal rights.

Architecture (software) The fundamental organization of a software system embodied in its components, their relationships and the principles guiding its design and evolution.

ARIMA model Autoregressive Integrated Moving Average: a class of statistical models for analyzing and forecasting time-series data with trend and seasonality.

Arrhenius equation A model relating reaction (or failure) rate to absolute temperature: $\lambda = A \exp(-E_a/kT)$; the basis of temperature-acceleration models in ALT.

Arrhenius model A reliability model relating reaction (or failure) rate to temperature, used to extrapolate accelerated-life-test results to normal operating conditions.

See also: Acceleration factor (AF).

Arrow diagram Synonym for activity network diagram. A scheduling tool that depicts activities as arrows and events as nodes, used to identify the critical path.

As-built documentation The set of drawings, specifications and data updated to reflect what was actually constructed or installed; the basis for facility maintenance

and future modifications.

See also: As-built drawings.

As-built drawings Construction drawings revised to reflect changes made during construction so they show the structure as it was actually built; the basis for facility maintenance.

See also: As-built documentation.

As-is process A description of how a process currently operates, mapped before improvements are designed. The counterpart of the “to-be” or future-state process.

AS9100 The international quality management system standard for the aerospace industry, building on ISO 9001 with sector-specific requirements for design, production and service.

AS9100D Aerospace QMS standard published by SAE/IAQG, building on ISO 9001 with sector requirements for risk, configuration management and counterfeit-parts prevention.

Aseptic processing The manipulation of sterile materials in a controlled environment to maintain sterility throughout production; governed by EU Annex 1 and FDA aseptic processing guidance.

ASME B89 The ASME standard for dimensional metrology and the calibration of dimensional measuring equipment; widely referenced in calibration laboratories.

ASQ Code of Ethics The American Society for Quality’s professional code requiring members to act with honesty, integrity, fairness, due diligence and respect for confidentiality.

Assertiveness A communication style that expresses one’s needs and views directly

while respecting others; one of two axes (with cooperativeness) in the Thomas-Kilmann conflict model.

Assessor A person who evaluates an organization, product, system or process against established criteria. In some quality awards the assessor role is distinct from a certification auditor.

Assignable cause Synonym for special cause: a source of variation that is not part of the inherent random variation of a stable process and can be identified and addressed.

See also: Special cause, Common cause, Control chart.

Attribute agreement analysis A measurement-system study for attribute (categorical) data that evaluates how consistently appraisers agree with themselves, with each other, and with a known standard.

Attribute control chart A control chart for attribute data. The four standard types are p, np (proportion / count of nonconforming items) and c, u (count / rate of nonconformities).

Attribute data Qualitative or count data that classifies items into discrete categories such as conforming/nonconforming or counts of defects per unit. Contrasted with variable (measurement) data.

Attribute gauge A go/no-go or limit gauge that classifies a feature as conforming or not without measuring its actual value; the simplest form of inspection device.

Attribute sampling Acceptance sampling using attribute (pass/fail) data; uses ANSI/ASQ Z1.4.

Attribution error A cognitive bias in which observers attribute others' behaviour to disposition while attributing their own to

circumstance; critical to fair root-cause analysis.

Audit A systematic, independent and documented process for obtaining objective evidence and evaluating it to determine the extent to which audit criteria are fulfilled. ISO 19011 definition.

See also: Internal audit (first-party), External audit, Auditor, Auditee, Audit plan, ISO 19011.

Audit checklist A working document used by an auditor that lists planned activities, criteria, and observations to be verified. Helps ensure consistency and completeness of the audit.

See also: Audit plan, Audit.

Audit client The organization or person requesting the audit. May be the auditee itself (internal audit), a customer (second-party) or an independent body (third-party).

Audit closure The final step of an audit: the audit report has been issued, all corrective actions verified and the audit file archived.

Audit criteria The set of policies, procedures, requirements or standards used as the reference against which audit evidence is compared to reach findings.

Audit cycle The period over which all elements of the audit program are exercised; commonly annual for ISO 9001 internal audits, three years for surveillance.

Audit evidence Records, statements of fact or other information that are relevant to the audit criteria and verifiable. May be qualitative or quantitative.

Audit finding The result of evaluating audit evidence against audit criteria; can indicate conformity, nonconformity or an opportunity for improvement.

Audit follow-up Verification that the

auditee has implemented corrective actions for findings; may be on-site or document-based.

Audit objective A statement of what is to be accomplished by an individual audit. Examples include verifying conformity, assessing effectiveness, or identifying improvement opportunities.

Audit objectives The defined purposes of an audit (compliance, improvement, supplier qualification, certification); set during planning and stated in the audit plan.

Audit plan A description of the activities and arrangements for an individual audit, including dates, locations, scope, criteria, team and timing of activities.

See also: Audit program, Audit, Audit checklist.

Audit program Arrangements for a set of one or more audits planned for a specific time frame and directed toward a specific purpose, usually established by top management.

See also: Audit plan, Audit.

Audit report The formal written record of the audit results provided to the audit client. Includes scope, objective, criteria, team, findings, conclusions and any recommendations.

Audit risk The risk that an auditor will issue an inappropriate opinion when the audit evidence is materially misstated; balanced through sample size, sampling method and procedures.

Audit scope The extent and boundaries of an audit, usually described in terms of physical locations, organizational units, activities, processes and the time period covered.

Audit team The auditor or group of auditors performing an audit, led by the lead

auditor; may include technical experts and observers.

Audit team competence The combined knowledge, skills and attributes of the audit team needed to achieve the audit objectives; documented and evaluated under ISO 19011.

Audit team leader The auditor designated to lead an audit team, with overall authority and responsibility for the conduct of the audit and the audit report.

Audit trail A documented sequence of records or activities that allows verification of the path taken during a transaction or process, supporting traceability.

Audit trail (data integrity) A secure, computer-generated, time-stamped electronic record of all GxP-relevant changes to data, including who made the change, when and why.

Auditee The organization being audited.

See also: Auditor, Audit.

Auditor A person with the demonstrated personal attributes and competence to conduct an audit. May be internal (first-party) or external (second-party customer, third-party certification).

See also: Audit.

Authentic leadership A leadership style emphasizing self-awareness, transparency, ethical behavior and balanced processing; popularized by Bill George.

Authority The right to make decisions and direct the actions of others within a defined scope. Differentiated from responsibility (the obligation to perform).

Autocorrelation A statistical condition in which observations within a data series are correlated with their own past values, violating the independence assumption of standard control charts.

Autocorrelation function (ACF) A function describing the correlation between observations in a time series and their lagged values; used to identify time-series structure.

Automation The use of technology to perform tasks with minimal human intervention; in quality, automation reduces variation, error and labor while introducing system-quality risk.

Autonomation (Jidoka) A Toyota Production System pillar in which equipment is given the intelligence to detect abnormality and stop automatically, preventing the production of defects.

Japanese principle of “automation with a human touch,” coined at Toyoda Loom Works in 1924 when Sakichi Toyoda invented a loom that stopped automatically on thread breakage. See also: Jidoka (autonomation), Poka-yoke, Andon.

Availability The probability that a system is in an operable state at any random time. Commonly calculated as $MTBF / (MTBF + MTTR)$.

See also: Reliability, Maintainability.

Average (mean) The arithmetic average of a set of values, calculated by dividing the sum of the values by the count. The most common measure of central tendency.

Average and range method An MSA technique for variable Gauge R&R that computes repeatability from within-appraiser ranges and reproducibility from between-appraiser averages; simpler than the ANOVA method.

Average Outgoing Quality (AOQ) The expected average quality level of outgoing product after an acceptance sampling plan and any associated 100% screening of rejected lots is applied.

Average Outgoing Quality Limit (AOQL) The maximum value of the AOQ curve over all possible incoming quality levels. The worst-case long-run outgoing quality of a rectifying sampling scheme.

Average run length (ARL) The expected number of subgroups plotted on a control chart before an out-of-control signal occurs; used to compare the sensitivity of competing chart designs.

Average Sample Number (ASN) The expected number of units inspected per lot under a sampling plan, considering the possibility that double or sequential plans may stop early.

Average Total Inspection (ATI) The average number of units inspected per lot, including the sample plus any 100% screening that occurs when a lot is rejected.

Avoiding (conflict style) A Thomas-Kilmann conflict-management style in which a person neither pursues their own concerns nor those of the other party; appropriate when the issue is trivial, when more information is needed, or when feelings need to cool.

Awareness training Training designed to ensure that personnel understand the relevance and importance of their activities and how they contribute to achieving the quality objectives.

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