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ASME FAP-1-1995

(REVISION OF ASME FAP-1-1990)

Quality Assurance Program Requirements for Fastener Manufacturers, Distributors, and Testing Laboratories

AN ASME STANDARD



The American Society of Mechanical Engineers

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QUALITY ASSURANCE PROGRAM REQUIREMENTS FOR FASTENER MANUFACTURERS, DISTRIBUTORS, AND TESTING LABORATORIES

PART 1
INTRODUCTION

1-1.0 SCOPE

1-1.1 Part 1 contains the definitions used in this Standard. Parts 2, 3, and 4 contain the requirements necessary to receive accreditation from The American Society of Mechanical Engineers (ASME) which must be met by manufacturers and alteration distributors of fasteners, non-alteration distributors of fasteners, and fastener testing laboratories. Part 5 contains the administrative requirements for obtaining third party accreditation from ASME.

1-1.2 FAP-1 includes all the requirements established by ISO 9001 — Quality Systems — Model for Quality Assurance in design/development, production, installation, and servicing. Also included in FAP-1 are additional requirements for fiscal responsibility. FAP-1 is written in terminology specific to the fastener industry. It is unique in that it provides quality management and quality system elements for fastener distributors.

1-2.0 DEFINITIONS[1]

1-2.1 *Alteration Distributor* — A distributor who alters a fastener prior to sale and assumes the full responsibilities of the Manufacturer's Accreditation Requirements of Part 2 of this Standard.

1-2.2 *Certification* — The procedure by which written assurance is given that the chemistry, dimensional characteristics, mechanical properties, metallurgical properties, and performance characteristics conform to applicable standards and/or specifications and that data exists documenting those statements.

[1]Other definitions which are not used in the body of this Standard but are commonly used in the fastener industry are included in Appendix III.

1-2.3 *Certified Test Report* —A written statement generated by a processor and supplied to the purchaser. This document shall present to the purchaser actual test data assuring that all applicable standards have been met. A Certified Test Report shall contain supplier's name and location, customer name, customer purchase order number, product description, quantity, part number, lot number, specification number, all test values required by the standard, and any other statements required by the customer's standard or purchase order. A Certified Test Report will be issued for performance characteristics. This document shall be signed by a responsible party and, if required by contract, shall be authenticated by some non-counterfeitable means. Where available, the report shall contain the third party accreditation certificate number and laboratory accreditation number.

1-2.4 *Dimensional Inspection* — Actual measurement of product dimensions and/or geometry using as appropriate micrometers, dial indicators, comparators, functional gages, or other devices suitable for measurement or size conformation.

1-2.5 *Distributor* — Purchases mechanical fasteners in finished or semi-finished condition for the purpose of resale. There are two types of distributors for third party accreditation purposes.

1-2.6 *Equipment Calibration* — All testing equipment, measuring devices and gages used to inspect fasteners for conformance to standards/specifications shall be controlled and, at specified periods, checked to assure maintenance of accuracy within specified limits. All checks and calibrations shall be traceable to applicable national or international standards.

1-2.7 *Factory Order* — A document that contains all pertinent information required to manufacture, identify, and package a product in accordance with the provisions

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of the customer's purchase order and/or applicable standards.

1-2.8 *Fastener* — A fastener is a mechanical device designed specifically to hold, join, couple, assemble, or maintain equilibrium of single or multiple components. The resulting assembly may function dynamically or statically as a primary or secondary component of a mechanism or structure. Common families of fasteners include nuts, bolts, rivets, screws, pins, washers, and special parts.

1-2.9 *Fastener Test* — An activity during which chemical, mechanical, physical, metallurgical, or performance characteristics are evaluated to determine if they conform to the requirements of the standards, specification, or purchase order.

1-2.10 *Fastener Testing Laboratory* — An organization that performs testing and/or inspection of dimensional, mechanical, chemical, metallurgical, and performance characteristics of mechanical fasteners and meets the requirements of this Standard.

1-2.11 *Fastener Test Report* — A Fastener Test Report shall include those items which relate to the standards and/or specifications of manufacture. These items may include, as applicable, material certification, heat analysis, heat number, mechanical properties, metallurgical characteristics, performance requirements, and surface discontinuities.

1-2.12 *Inspection* — Inspection of a fastener is the activity to evaluate and measure the required characteristics and properties which, by way of drawings, standards, or specifications, constitute the fastener's engineering definition.

1-2.13 *Lot* — A quantity of fasteners of one part number, from the same coil or heat number as provided by the material producer, fabricated by the same production process and submitted for inspection and test at one time. A lot is identified with an individual, traceable number.

1-2.14 *Lot Number* — A lot number is a unique number/identifier assigned by the manufacturer or alteration distributor to each respective lot and traceable to mill heat number.

1-2.15 *Manufacturer* — The organization or firm which procures a raw material, fabricates it into a mechanical fastener, and then processes it to have certain mechanical properties. In the event of a significant alteration, or an alteration to an item so that it becomes a fastener, the person, firm, or organization that caused the alteration shall be considered the manufacturer. The manufacturer certifies to the purchaser that the mechanical fastener was manufactured, sampled, tested, and inspected and meets all of the specification requirements defined in relevant standards and/or purchase orders.

1-2.16 *Mill Test Report* — A written statement generated by the original manufacturer of the raw material supplied to the purchaser. This document shall present to the purchaser actual test data that all applicable standards and specifications have been met. A Mill Test Report shall contain customer purchase order, material type, heat, lot or batch number, quantity, condition, manufacturer's name and location, chemical analysis, and any other data or information required by the purchaser's specification or purchase order. This document shall be signed by a responsible party and, if required by contract, shall be authenticated by some non-counterfeitable means.

1-2.17 *Non-Alteration Distributor* — A distributor who buys and resells fasteners and does not alter the fastener in any way. This distributor may repackage and shall meet the requirements of Part 3 of this Standard.

1-2.18 *Performance Testing* — Tests conducted to verify that the functional design features of the fasteners which satisfy the specification requirements are present. Performance properties of the fastener may include, but are not limited to, fatigue, corrosion resistance, torque-tension, locking, drilling, thread forming, and sealing.

1-2.19 *Purchase Order* — A contract to purchase fasteners that specifically outlines the fastener's dimensional, performance, and mechanical characteristics. This is accomplished by reference to nationally or internationally recognized standards or a buyer generated specification.

1-2.20 *Responsible Party* — The party considered to be the organization that supplies the fastener to a purchaser, and upon request, can provide certification that the fastener was manufactured, sampled, tested, and inspected in accordance with the applicable standard and/or specifications and it conforms to the purchase order requirements.

1-2.21 *Standards/Specifications* — Fastener standards/specifications define the requirements for a mechanical fastener. These may include, as applicable, the dimensional, chemical, metallurgical, mechanical, and performance characteristics.

1-2.22 *Third Party Accreditation* — An activity by which the manufacturer's, alteration distributor's, non-alteration distributor's, or testing laboratory's claim of conformity to the quality system requirements of this

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specification is validated. A successful completion of an on-site survey and information on continuing capability by The American Society of Mechanical Engineers (ASME) is required.

1-2.23 *Visual Examination* — Macroscopic examinations are those which are used to examine general workmanship and the presence of surface discontinuities such as quench cracks, forging cracks, bursts, shear bursts, seams, folds, voids, tool marks, nicks, and gouges.

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PART 2
MANUFACTURERS AND ALTERATION DISTRIBUTORS

2-1.0 EVIDENCE OF MANAGEMENT RESPONSIBILITY

2-1.1 Quality Commitment

Executive management shall have the ultimate responsibility for and commitment to a company-wide quality policy. Management shall ensure that this policy is published and understood, implemented, and maintained by all company operational groups. The company quality program shall have the quality manual and organization as described in Section 2-6.0 of this Standard.

2-1.2 Fiscal Responsibility

Management shall provide to the third party accreditation auditors evidence of reasonable financial soundness.

2-1.3 Training Responsibility

Management shall be responsible for ensuring that pertinent personnel are adequately trained. The training shall be in accordance with para. 2-6.16 of this Standard.

2-2.0 INQUIRY/QUOTATION

2-2.1 Prior Review

There shall be in place a system for the review of drawings, standards, and specifications at the manufacturer's sales level prior to providing the purchaser with a quotation on his requirements.

2-2.2 Review Interaction

This review shall include input from engineering, manufacturing, production, materials and processes, quality assurance, accounting, and any outside sources deemed necessary.

2-2.3 Written Procedure

This review shall be described in a written procedure.

2-2.4 Ongoing Review

This activity shall be subject to a periodic internal review which will evaluate its ability to respond to the purchaser in a timely manner. An internal review shall be conducted at least quarterly. The results of the review shall be reported to and reviewed by management.

2-3.0 ENGINEERING

2-3.1 Specification Requirements

For products included within recognized standards, there shall be evidence that technical specifications for material, configuration, processing, finishing, packaging, and testing were based upon established requirements specified in these standards and are related to fit, form, and function.

2-3.2 Drawing Requirements

Drawings shall include specification information pertaining to the fastener and adequately define fastener characteristics. The use of sketches, uncontrolled, and red lined changes to drawings, specifications, and process documents shall not be permitted in the purchasing, fabrication, process, test, or inspection operations.

2-3.3 Supplier Evaluation; Sub-Tier

Engineering shall participate as needed for approval of sub-tier sources of materials and services.

2-3.4 Design Change/Configuration Control

A documented procedure shall exist for controlling and authorizing the release, change, use, and control of design documents. The procedure shall be adequate to prevent production of nonconforming fasteners and to implement timely and effective corrective action.

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2-4.0 PROCUREMENT

2-4.1 Responsibilities of Procurement

The system and process for procurement of fastener materials, services, components, and assemblies shall be formally documented, planned, and controlled. The authority and responsibility of the organizations involved in interaction with the management of suppliers shall be established by management and documented. The fastener manufacturer and alteration distributor shall have an active program to verify the performance of suppliers. This program shall be defined in a formal written quality requirements manual.

2-4.2 Procedures for Procurement

2-4.2.1 Technical Requirements. Specifications, drawings, and purchase orders shall define and communicate applicable requirements to the supplier.

2-4.2.2 Source Approvals and Controls. Quality assurance shall, with assistance, as appropriate, from engineering, materials and processes, and procurement departments, formally audit on site the supplier's or source's capability to furnish conforming materials and/or services relevant to supply, manufacture, processing, or alteration of fasteners. Subsequently, the suppliers or sources shall be evaluated on the basis of on-site surveys, physical audits, or current quality history. Such evaluations shall be conducted on an ongoing basis but no less than annually. Evidence of evaluations shall be current and on-site audits shall be conducted at least once every 4 years. Sources or suppliers may be subject to unannounced audits.

2-5.0 PRODUCTION

2-5.1 Production Responsibilities

A manual shall establish a controlled approach for product quality in production encouraging interaction with engineering, procurement, materials and processing, and quality assurance. The manufacturer or alteration distributor shall have in place a production manual defining all elements of production which shall include at least the elements listed under para. 2.5.2.

2-5.2 Production and Planning Elements

2-5.2.1 Capacity. The manufacturer or alteration distributor shall have evidence that production is related to his manufacturing or alteration capacity.

2-5.2.2 Equipment Capability. The manufacturer or alteration distributor shall have evidence that capability studies are being conducted to verify ability to manufacture or alter and to process fasteners to specification requirements.

2-5.2.3 Tooling. Evidence shall be present that a system exists for the design, purchase, inventory, and control of perishable and nonperishable tooling.

2-5.2.4 Equipment Operators. There shall be evidence that equipment operators have appropriate training which is in accord with their specific responsibilities.

2-5.2.5 Repair and Maintenance. Repair and maintenance shall be verifiable. The manufacturer or alteration distributor shall have in place a program for preventative maintenance of pertinent manufacturing and processing equipment. Maintenance shall be performed at prescribed intervals. Records shall be maintained of maintenance and repair on manufacturing and processing equipment.

2-5.2.6 Scheduling. There shall be in place a system to manufacture a product or alter one to meet stated customer requirements, including timeliness.

2-5.2.7 Production Planning. Production shall be carried out in accordance with a production plan of the process. This controlled approach should include tooling, material, processes, specifications, and the sequence of operations.

2-5.2.8 Lot Control/Segregation. There shall be in place a system to identify product in process by lot identifiers traceable to a given mill heat of raw material from which it is manufactured.

2-5.2.9 Inspections. In-process inspection and final verification shall be in place in accordance with paras. 2-6.13.1 and 2-6.13.2, respectively.

2-5.2.10 Processes. Processes such as heat treating, plating, and coating shall have a detailed operating procedure in the respective locations where these processes are carried out. The documentation shall assign responsibility for control and maintenance of these procedures. The documentation shall include process qualification continuance and requalification.

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2-5.2.11 Process and Factory Order Changes. All changes to materials or processes shall be documented in accordance with written procedures. Individuals responsible for materials or process change authorization shall be designated by appropriate management.

2-6.0 QUALITY ASSURANCE PROGRAM

2-6.1 Quality System Elements

The manufacturer or alteration distributor shall have in place a Quality Assurance Manual defining all elements of the quality assurance system.

These elements shall include:

(*a*) Quality System Organization;
(*b*) Quality System Audits;
(*c*) Quality System Records;
(*d*) Document Control;
(*e*) Testing Equipment, Measuring Devices, and Gages;
(*f*) Raw Material Control and Traceability;
(*g*) In-Process Material Control and Traceability;
(*h*) Finished Product Lot Control and Identification;
(*i*) Packaging and Inventory of Finished Product;
(*j*) Control of Nonconforming Material and Product;
(*k*) Corrective Action;
(*l*) Inspection and Testing;
(*m*) Control of Purchased Items and Services;
(*n*) Statistical Methods;
(*o*) Training and Education;
(*p*) Procedures;
(*q*) Change Control.

2-6.2 Quality System Organization

The organizational structure, functional responsibilities, levels of authority, and lines of communication for activities affecting quality shall be documented. The quality assurance manager shall have autonomy from influences by persons responsible for production, processing, or any other operation affecting the quality of the fastener.

2-6.3 Quality System Audits

There shall be in place a system for self-auditing to verify the presence of, the adequacy of, and compliance with all aspects of the quality assurance system and to determine its effectiveness. These audits shall be performed in accordance with written procedures or checklists by personnel who do not have direct responsibility or involvement for performing the activities being audited. Audit results shall be documented, reported to, and reviewed by responsible management. These self-audits shall be conducted at least annually in accordance with the provisions of the Quality Assurance Manual. Documented corrective action shall be taken, where indicated, in a timely manner.

2-6.4 Quality System Records

Records that furnish documentary evidence of conformance and traceability shall be specified, prepared, and maintained. Records shall be legible, identifiable, and retrievable. Records shall be protected against damage, alteration, deterioration, or loss. Requirements and responsibilities for record transmittal, distribution, retention, maintenance, and disposition shall be established and documented.

2-6.5 Document Control

The manufacturer or alteration distributor shall have in place a system governing the preparation, storage, change, distribution, and retrieval of documentation which specifies dimensions, mechanical, chemical, and performance requirements of the fastener. This system shall provide for the assignment of responsibility for preparing, reviewing, approving, and issuing documents. No changes shall be made to any documents by persons other than those so designated.

2-6.6 Testing Equipment, Measuring Devices, and Gages

All testing equipment, measuring devices, and gages used to verify conformance to applicable standards and specifications shall be controlled and, at specified periods, shall be calibrated to maintain accuracy within necessary limits. All calibrations shall be traceable to applicable national or international standards.

Such equipment shall be uniquely numbered/identified and have a documented plan of maintenance, control, and repair actions.

A system shall be in place to identify and retrieve material or product found to be nonconforming because of equipment, measuring devices, or gages significantly out of calibration. Laboratory accreditation by an independent third party shall serve as evidence of conformance with ASME accreditation for this element of the program.

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2-6.7 Raw Material Control and Traceability

The raw material requirements shall be described by a document such as a recognized standard or specification. This description shall include size, type, chemistry, source, condition, and any other information deemed necessary to satisfy the product specification and manufacturing process.

Upon receipt, all raw material shall be identified. This shall reflect as a minimum, quantity, size, type, and heat number of the material.

All raw material shall be accompanied by a mill test report.

A system shall be in place to control the identity, storage, and handling of raw material from receiving to the production operation.

2-6.8 In-Process Material Control and Traceability

A system shall be in place that maintains product traceability back to the original mill heat of raw material. This system shall be capable of maintaining lot identity with respect to factory order, part number, strength levels, manufacturing event, and all subsequent processing inspections and testing events.

2.6.9 Finished Product Lot Control and Identification

Manufacturers and alteration distributors shall have a system in place for the handling, storage, and identification of finished products based on segregation by lot number.

2-6.10 Packaging and Inventory of Finished Product

All products shall be packaged and/or stored to prevent damage during storage and/or shipment. Containers shall be labeled to identify the contents, responsible part, country of origin, and lot number.

The manufacturer or alteration distributor shall be able to issue a certified test report for each lot of fasteners in each respective container.

There shall be in place a system to accurately account for all product with respect to type, quantity, location, and lot number.

Traceability and lot identity shall be maintained throughout in such manner to prevent commingling which is prohibited.

2-6.11 Control of Nonconforming Material and Product

The manufacturer and alteration distributor shall have in place a documented system to facilitate an orderly and timely disposition of nonconforming material or product.

This system shall provide for identification, segregation, evaluation, documentation, and disposition of nonconforming material or products.

This system shall provide for documentation of action taken to correct, scrap, or request variance for any nonconforming material or product.

2-6.12 Corrective Action

There shall be a closed loop system in place to implement corrective actions following the detection, capture, and investigation of nonconforming materials and products.

The identification, cause, and corrective actions shall be taken, documented, and reported to appropriate levels of management.

Follow-up action shall be taken to verify implementation of this corrective action.

2-6.13 Fastener Verification

Inspections and tests required to verify conformance of a fastener to its specification requirements shall be planned, executed, and documented.

2-6.13.1 In-Process Control. At each machine or processing station, the part shall be checked during production for designated characteristics imparted to it by that machine or processing station. In-process control levels, frequency, and sample selection shall be planned.

2-6.13.2 Verification. There shall be a system in place for the verification of each lot of fasteners. The verification is to assure that the lot consists of the ordered parts, to check for mechanical property conformance and mixed stock, and to reinspect certain functionally important characteristics that may have been altered during heat treatment and/or finishing operations. Verification shall also include examination of any applicable characteristics not verified in process. Verification records shall be maintained. Verification levels, frequency, and sample selection shall be in accordance with applicable standards or specifications.

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2-6.14 Control of Purchased Items and Services

Purchased items and services shall be controlled by the applicable provisions of Section 2-4.0.

2-6.15 Statistical Methods

Manufacturers shall use statistical methods for control and continuous improvement. There shall be evidence management is committed to this operating practice. Statistical training and implementation of statistical methods shall be supported by an action plan.

2-6.16 Training and Education

There shall be evidence of continuous training and education in all phases of the manufacturers operation. This program must be documented with respect to subject, material, instructors, attendees, training materials, and length and frequency of the sessions. Management will assure that personnel holding positions with critical job skills requiring government, industry, or professional society qualifications are certified.

2-7.0 CHANGE CONTROL

Any change which would affect the performance of a fastener or otherwise deviates from the specification shall be approved by the customer in writing prior to implementation. The manufacturer or alteration distributor shall have in place a documented system for describing the methods of obtaining approvals and identification from the customer for deviations on the product specification or customer requirements.

2-8.0 DOCUMENT MANAGEMENT

2-8.1 Retention and Disposition

The manufacturer or alteration distributor shall develop and implement a program for the establishment of the retention period for records pertinent to product history and traceability and the method for retiring or disposing of these records. The retention and disposition program shall not violate or conflict with customer requirements stated in the purchase order. Identification of the records to be retained for each functional organization or operation shall be evident. Records shall demonstrate achievement of compliance with customer requirements relating to the required product and services quality. Records shall be protected from damage, deterioration, and loss.

2-8.2 Security and Authentication

Evidence shall exist to ensure that prudent steps have been taken to ensure authenticity and controlled reproduction of certificates of conformance, laboratory test reports, mill certifications, and other relevant documents to prevent unauthorized use, copying, alteration, counterfeiting, or distribution of these documents.

2-8.3 Control

A system shall be in place for recording the receipt, identification of document number and revision level, and distribution of documents within the facilities. The system shall provide for the recall and/or replacement of documents made obsolete by recall, revision, mutilation, marking, obsolescence, wear, or tear. Assurance shall exist to ensure that the appropriate revision level of documents are used in the purchase, receipt, fabrication, verification, and delivery of products.

2-9.0 SERVICING

Mechanical fasteners normally do not require servicing by the supplier. However, should special circumstances require servicing, then that should be provided in accordance with an agreement established at the time of purchase between purchaser and supplier. The supplier shall establish and maintain procedures for performing and verifying that the agreed service requirement is fulfilled.

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PART 3
NON-ALTERATION DISTRIBUTORS

NOTE: The provisions of these requirements are applicable to Distributors buying from accredited sources.

3-1.0 EVIDENCE OF MANAGEMENT RESPONSIBILITY

3-1.1 Quality Commitment

Officers of the distributor shall have the ultimate responsibility for and commitment to a quality assurance policy. This policy will be published and understood by all employees of the distributor. A quality manual shall be available to support this policy.

3-1.2 Fiscal Responsibility

Management shall provide to the third party accreditation auditors evidence of reasonable financial soundness.

3-1.3 Training Responsibility

Management shall be responsible for ensuring that all personnel are adequately trained. The training shall be in accordance with para. 3-3.12 of this Standard.

3-2.0 PROCUREMENT

3-2.1 Responsibilities of Procurement

Technical requirements, including all applicable standards or specifications for chemistry, mechanical properties, performance, dimensions and coatings or platings shall be clearly stated on all purchase orders for fastener procurement.

The system and process for procurement of fasteners shall be formally documented, planned, and controlled. The authority and responsibility of the organizations involved in interaction with the management of suppliers shall be established and documented. The distributor shall have an active program to verify the performance of suppliers. This program shall be defined in a formal quality requirements manual.

3-2.2 Procedures

The non-alteration distributor shall maintain a quality history for each manufacturing or fastener supplier source.

3-2.3 Inquiry/Quotation

3-2.3.1 Prior Review. There shall be in place within the distributor's organization a system for the review of customer drawings, standards, and specifications prior to the issuance of a request for quotation from a manufacturer/manufacturers or fastener supplying source.

3-2.3.2 Source Communication. This review shall determine that sufficient information will be available to the manufacturer or fastener supplying source to generate a quotation to produce a fastener which will meet all of the customer's requirements for dimensional, chemical, mechanical properties, performance characteristics, and coating or plating.

3-2.3.3 Quotation. There shall be in place a system to assure that either the fastener supplier has quoted a part that will fulfill all of the customer's requirements or that all exceptions from the fastener supplier are included in the quotation to the customer.

3-2.3.4 Ongoing Review. This review shall be described in a written procedure.

3-3.0 QUALITY ASSURANCE PROGRAM

3-3.1 Quality System Elements

The non-alteration distributor shall have in place a Quality Assurance Manual defining all elements of the quality assurance system.

These elements shall include:

(*a*) Quality System Organization;

(*b*) Quality System Audits;

(*c*) Quality System Records;

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(*d*) Document Control;
(*e*) Testing Equipment, Measuring Devices, and Gages;
(*f*) Lot Control and Identification;
(*g*) Packaging and Inventory;
(*h*) Control of Nonconforming Product;
(*i*) Corrective Action;
(*j*) Inspection and Testing;
(*k*) Control of Purchases and Services;
(*l*) Statistical Methods;
(*m*) Training and Education;
(*n*) Procedures;
(*o*) Change Control.

All these elements must be addressed and be verifiable for accreditation, unless traceable by authenticated documentation to accredited sources defined by this document.

3-3.2 Quality System Organization

The organization structure, functional responsibilities, level of authority, and lines of communication for activities affecting quality shall be documented. The individual responsible for quality shall be identified.

3-3.3 Quality System Audits

There shall be in place a system for self-auditing to verify compliance with all aspects of the quality assurance system and to determine its effectiveness. These audits shall be performed in accordance with written procedures or checklists by personnel independent of the activities being audited. Audit results shall be documented, reported to, and reviewed by responsible management. These self-audits shall be conducted at least annually in accordance with the provisions of the Quality Assurance Manual. Documented corrective actions shall be noted and taken in a verifiable and timely manner.

3-3.4 Quality System Records

Records that furnish documentary evidence of conformance and traceability shall be specified, prepared, and maintained. Records shall be legible, identifiable, and retrievable. Records shall be protected against damage, alterations, deterioration, or loss. Requirements and responsibilities for record transmittal, distribution, retention, maintenance, and disposition shall be established and documented.

3-3.5 Document Control

3-3.5.1 Procurement. The non-alteration distributor shall have in place a system governing the preparation and change of procurement documents and the storage, distribution, and retrieval of documentation that specify raw materials, dimensions, processes, chemical and mechanical properties, and performance requirements of the fastener as per published specification. This system shall provide for the assignment of responsibility for preparing, reviewing, approving, and issuing of documents. No changes shall be made to any documents.

3-3.5.2 Certifications. The non-alteration distributor shall have in place a system governing the storage, reproduction, distribution, and retrieval of certifications.

3-3.6 Testing Equipment, Measuring Devices, and Gages

If required by contract all testing equipment, measuring devices, and gages used to verify conformance to applicable standards and specifications shall be controlled and, at specified periods, shall be calibrated to maintain accuracy within necessary limits. All calibrations shall be traceable to applicable national or international standards. Such equipment shall be uniquely numbered and have a documented plan of maintenance, control, and repair actions.

3-3.7 Lot Control and Identification

Non-alteration distributors shall have a system in place for the handling, storage, and identification of finished fasteners. The system shall provide for maintenance of lot segregation.

3-3.8 Packaging and Inventory

All products shall be packaged and/or stored to prevent damage during storage and shipment. Such containers shall be labeled to identify the contents and responsible party. The label shall be in compliance with federal laws and include the country of origin and lot number when applicable.

The distributor shall be able to issue a copy of a certified test report of manufacturers information for each lot of fasteners when required. Traceability and lot identity shall be maintained throughout in such manner to prevent commingling which is prohibited.

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3-3.9 Control of Nonconforming Product

The non-alteration distributor shall have in place a documented system to facilitate the quarantine and orderly and timely disposition of nonconforming product. This system shall be a closed loop system which will verify product disposition and action taken regarding corrective action from the source which furnished the nonconforming product.

This system shall provide for identification, segregation, evaluation, documentation, and disposition of nonconforming materials or parts.

3-3.10 Corrective Action

There shall be a closed loop system in place to implement corrective actions following the detection, capture, and investigation of nonconforming products.

The identification, cause, and corrective actions taken shall be documented and reported in writing to appropriate levels of management.

Follow-up action shall verify implementation of corrective action.

3-3.11 Incoming Verification

Unless specified by customer/supplier, all fasteners being received by a non-alteration distributor shall be subject to incoming verification. This shall verify product conformance to its respective purchase order. This must include visual examination and may also include dimensional, chemical, mechanical, and performance testing as required by the specifications for manufacture and purchase. Visual inspection shall at least include the following elements: quantity, type, size, finish, grade or property class marking, manufacturer's or private label distributors identification symbol marking, general workmanship, and the presence of certifications as applicable. Written confirmation of the completion of each incoming inspection and its scope shall be available at any time for review. Safeguards shall be present to prevent product not yet inspected from entering the distributors' system.

3-3.12 Training and Education

Non-alteration distributors shall have evidence of continuous training and education in all phases of the Quality Assurance Manual and all operational procedures. These programs must be documented with respect to subject, material, instructors, attendees, training materials, and length and frequency of sessions.

3-4.0 PROCEDURES

The operations or tasks of the distributor that affects inspection, verification, security, testing, packaging, and lot segregation shall be prescribed by and performed in accordance with documented instructions and procedures. Where lots have been subdivided, evidence shall exist to assure continued traceability.

3-5.0 DOCUMENT MANAGEMENT

3-5.1 Retention and Disposition

A program shall be in place to establish the retention period for records pertinent to product history and traceability including the method which shall be used for retaining or disposing of these records. The retention and disposition program shall not violate or conflict with customer requirements stated in purchase orders. Records shall be protected from damage, deterioration, alteration, or loss in accordance with the retention requirements.

3-5.2 Security and Authentication

An anti-counterfeit system shall exist to protect authenticity and controlled reproduction of certificates of conformance, laboratory test reports, mill certifications, and other relevant documents. These measures are to prevent unauthorized use, copying, alteration, counterfeiting, or distribution of these documents. Further, and as applicable, security should be extended to products and their containers which are intended for use by customers who designate critical applications on purchase order.

3-5.3 Controls Including Closed Loop

A system shall be in place for recording the receipt, identification of a document number, revisions, and distribution within or outside the facilities. Assurance shall be verifiable that purchases are to the contractual published standards and/or specification. Documentation shall allow verification of a closed loop system traceable from the manufacturer through the distributor/inventory to the customer. Purchases less sales plus inventory must balance for those products which require maintenance of lot inventory balance under provisions of para. 3-3.7.

3-5.4 Evidence of Product Alteration

If any evidence is uncovered of product alteration, the applicant must reapply under the provisions of Part 2 of this Standard.

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Any indication of installed capabilities that may be used for product alteration invalidates the application under the provisions of Part 3 of this Standard.

3-6.0 SERVICING

Mechanical fasteners normally do not require servicing by the supplier. However, should special circumstances require servicing, then that should be provided in accordance with an agreement established at the time of purchase between purchaser and supplier. The supplier shall establish and maintain procedures for performing and verifying that the agreed service requirement is fulfilled.

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PART 4
FASTENER TESTING LABORATORIES

4-1.0 ORGANIZATION

The fastener laboratory shall be able to demonstrate technical competency for those tests for which it seeks accreditation. A fastener testing laboratory shall have an organization/structure, functional responsibilities, levels of authority, and lines of communication for activities affecting quality. This shall be documented. The quality assurance manager shall report to the highest operating office in the company, division, or organization, and have autonomy from influences by persons responsible for fastener production. A description of the history of the organization, the type of users served, and geographic areas served shall be available.

4-2.0 STAFF

(*a*) There shall be a written job description for each technical position in the laboratory. The description shall detail necessary education, training, technical knowledge, and experience.

(*b*) A file shall exist for each employee which summarizes education, training, and experience. Additionally, the file shall include evidence of the capability of each employee to perform specific tests, inspections, and measurements.

4-3.0 TRAINING

Training for personnel involved in fastener evaluation shall be organized to reflect disciplines of fastener inspection and testing which are: dimensional, mechanical, performance, chemical, and metallurgical. Where personnel certification is required, evidence of that certification shall be made available to the auditor.

4-4.0 QUALITY SYSTEM

4-4.1 Quality Assurance Documentation

The quality system shall be fully documented in a Quality Assurance Manual. The elements of this manual shall include but not be limited to:

(*a*) organization structure
(*b*) organizational chart
(*c*) quality organizational chart
(*d*) facilities
(*e*) scope of operation
(*f*) outside services
(*g*) statement of quality policy, authority, and frequency of review
(*h*) proficiency testing
(*i*) duties and responsibilities of personnel
(*j*) personnel qualification and training
(*k*) test procedures
(*l*) document and change control
(*m*) equipment list
(*n*) calibration procedures
(*o*) environment
(*p*) control of test samples
(*q*) procedure to handle technical complaints and/or discrepant test results
(*r*) equipment repair and maintenance
(*s*) control of subcontractors
(*t*) audit procedure
(*u*) fraud and falsification control

4-4.2 Standards and Specifications

There shall be evidence that all fasteners are evaluated in accordance with the applicable requirements of the related standards, specifications, or purchase order for conformance.

4.5.0 FASTENER LABORATORY INSPECTION EQUIPMENT AND PROCEDURES

4-5.1 Required Test Capability

A fastener laboratory must have appropriate measuring and testing equipment or access to that equipment and must be able to conduct the inspections or tests according

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to the applicable specifications. This includes but is not limited to the following measuring and testing capabilities.

Fastener geometry	Decarburization/
Proof load	carburization
Surface hardness	Coating thickness
Thread acceptability	Core hardness
Tensile strength	Surface discontinuities

Equipment required shall at least include for applicable characteristics:

Characteristics	**Equipment**
Dimensional	Gage Blocks
Measurements	Outside Micrometers
	Inside Micrometers
	Calipers
	Thread Gaging
Hardness	Rockwell, Vickers, or Brinell Tester
Tensile and Proof	Tensile Tester
Decarburization/ Carburization	Microscopic or micro-hardness
Coating thickness	Microscopic, magnetic, columetric
Surface discontinuities	Per specification

Machining capability shall be in place to prepare test specimens.

4-5.2 Proficiency Testing

Accreditation of a laboratory will require participation in a fastener proficiency testing program that verifies the laboratory's ability to achieve consistently accurate test results on standardized fasteners.

4-5.3 Subcontracting Inspection — Certification Requirement

For fasteners to be certified, they must meet chemical, mechanical, and dimensional requirements as designated in the standards and/or the engineering drawings to which they were manufactured. A laboratory may be accredited even if it does not have all equipment required by the product standard to inspect fasteners, provided it uses exclusively a laboratory accredited in the subcontracted test or measurement. The laboratory ultimately issuing the fastener certification, and doing the majority of the tests is liable for the validity of that entire certification even if it subcontracts part of the inspection. The issuer of the certification is responsible for using only accredited laboratories.

Inspection equipment and specific procedure requirements are determined, at least to a degree, by the specifications governing the fasteners being inspected and tested. For this reason, the laboratory must have a defined procedure to analyze the fastener specifications and demonstrate capabilities to inspect and test to fulfill the requirements of the applicable specifications.

4-5.4 Additional Testing Capabilities

It is recognized that at least 52 separate tests for fasteners exist based on current specification requirements. A list of these tests are included for reference in Appendix I. A summary of mechanical fastener inspection including item for inspection, equipment commonly used, and related specifications is in Appendix II.

4-6.0 CALIBRATION OF EQUIPMENT

A documented equipment calibration system is required for testing laboratories which test or evaluate fasteners.

(*a*) Each piece of measuring and testing equipment shall have a unique identification and be calibrated as appropriate prior to being put into service.

(*b*) The calibration system shall be designed to assure that measurement results are traceable as applicable to national standards and/or international standards. Where applicable national or international standards do not exist, the testing laboratory shall establish and perform tests to prove accuracy of equipment.

(*c*) Reference standards shall be calibrated and be traceable to national or international standards. Reference to traceable standards used for calibration shall not be used for other purposes.

(*d*) Measuring and test equipment and measurement standards shall be calibrated at periodic intervals established on the basis of stability, purpose, and degree of usage. Calibration intervals shall be defined for each type of measuring or testing equipment or measurement standard and documented in written procedures. Calibration intervals shall be reviewed and modified as required based on the evidence of previous calibrations. A program for recalibrating measuring and testing equipment shall be developed. Operational checks of testing equipment prior to use should be made between recalibrations.

(*e*) Calibration records shall be maintained. The records shall identify the schedules and procedures followed. The records shall include a suitably identified individual file of calibration listing at least a description of the testing equipment or measuring system, the calibration interval, date, and results of last calibration.

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(*f*) Testing equipment or measuring systems which require certification of calibrations shall have a calibration report or certificate which identifies it as such.

4-7.0 ENVIRONMENT IN THE LABORATORY

(*a*) Measuring and testing equipment and measurement standards shall be calibrated and used in a controlled environment as applicable. Temperature, humidity, vibration, fumes, dust, illumination, and other controllable factors potentially affecting precision measurements shall be identified and controlled. When applicable, compensating corrections shall be applied to calibration results obtained in an environment different from standard conditions.

(*b*) Adequate storage facilities for equipment, standards, and records shall be provided. Adequate steps shall be taken to ensure good housekeeping in the testing laboratory.

4-8.0 HANDLING TEST SAMPLES

A system for identifying the items to be tested shall be used to ensure that no confusion regarding identity occurs during testing. Each item shall be maintained by manufacturing lot number or a unique number assigned by the testing laboratory traceable to a manufacturing lot number.

There shall be a written policy regarding receipt, retention, and disposal of samples tested.

4-9.0 RECORDS

A system shall be in place to record the dimensional, mechanical, and performance testing event by date, equipment, and operators. Each event shall be traceable to the manufacturer's lot number or purchase order. Records shall be legible, identifiable, and retrievable and shall be retained for ten years. All records and test reports shall be maintained in such manner as to preserve their confidential nature. Adequate steps shall be taken so that tests reports, certificates, and other records are preserved and protected against loss and damage.

4-10.0 CERTIFICATIONS AND TEST REPORTS

4-10.1 Test Reports

Testing laboratory data shall be included in a report which accurately, clearly, and without prejudice presents the recorded parameters, the actual test results, and all other relevant information. This report shall identify the standards and specifications applicable to the particular lot being testing and the number of pieces tested, and, in those cases where the importer or private labeled distributor assumes the responsibility for inspection and testing, a letter from the manufacturing source indicating the standards or specifications to which the lot was manufactured.

4-10.2 Content of Test Report

Each fastener test report shall include at least the following information:

4-10.2.1 Sample Test Report

(*a*) Name and address of testing laboratory

(*b*) Unique identification of report and of each page of the report

(*c*) Name and address of the client

(*d*) Description and identification of the tested item, including manufacturer's name and address which shall be furnished by the source requesting the testing

(*e*) Manufacturer's lot number

(*f*) A statement to the effect that the test results relate only to the items tested

(*g*) Identification of the product specification and test conducted

(*h*) Any deviations, additions to or exclusions from the test specification, and any other information relevant to a specific test

(*i*) Disclosure of any non-standard test method or procedure utilized

(*j*) Statement of conformance or nonconformance to applicable specifications

(*k*) Listing of range of actual test results for given lot samples including the number of samples examined (all actual test results on file)

(*l*) Name and title of person(s) accepting technical responsibility for the test report and the date of issue

(*m*) A statement that the report shall not be reproduced in part or in full without the approval of the testing laboratory, or alternately a system shall be in place to prevent unauthorized test report reproduction.

4-10.2.2 Lot Certification. For lot certification the report shall include all of the information in para. 4-10.2.1 and information which includes lot number, lot size, and sample test size and the basis of that sample selection.

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4-10.3 Presentation of Test Data

Particular care and attention shall be paid to the arrangement of the test report, especially with regard to presentation of the test data and ease of assimiliation by the reader. The format shall be carefully and specifically designed for each type of test carried out, but the headings shall be standardized as far as possible.

4-10.4 Correction After Issuance

Corrections or additions to a test report after issue shall be made only by a further document suitably marked, e.g., "Supplement to test report serial number... (or otherwise identified)," and shall meet the relevant requirements of the preceding paragraphs.

4-10.5 Certifications

The laboratory shall issue a written statement of assurance that the test report is complete and valid, and shall disclose the ASME Certificate number and Certificate expiration date.

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PART 5
ADMINISTRATIVE REQUIREMENTS FOR OBTAINING ASME ACCREDITATION

5-1.0 APPLICATION FOR ASME ACCREDITATION

(*a*) An organization desiring to obtain a Certificate of Accreditation shall apply to the American Society of Mechanical Engineers upon forms[1] issued by the Society.

(*b*) An applicant shall describe the scope and limits of the work for which accreditation is requested.

(*c*) Each applicant shall agree that the Certificate (if one is issued) is at all times the property of the Society, that it will be used according to the rules and regulations of this Standard, and that the Certificate will be promptly returned to the Society upon demand, or in case the applicant discontinues the scope of work covered by the Certificate. The holder of a Certificate shall not permit any other party to use the Certificate issued to the holder.

5-2.0 ESTABLISHING A QUALITY ASSURANCE PROGRAM

(*a*) An applicant for Accreditation shall establish a Quality Assurance Program.

(*b*) The applicant shall be responsible for documenting his Quality Assurance Program. The Program shall be described in a Quality Assurance Manual which shall be the basis for demonstration of compliance with this Standard. The program shall be implemented through documented instructions, procedures, and drawings that may be separate from the manual[2].

5-3.0 EVALUATION OF THE PROGRAM

(*a*) Applicants for a new or renewed certificate require a survey by the Society of their facility. The purpose of the survey is to evaluate the Quality Assurance Program.

(*b*) The Quality Assurance Program will be evaluated on the basis of its compliance with this Standard and within the scope described on the application.

The evaluation consists of the following:

(*1*) Evaluation of the applicant's Quality Assurance Manual and capability of implementation.

(*2*) Evaluation of the applicant's implementation of the program described in his accepted Quality Assurance Manual.

5-4.0 DOCUMENTATION OF THE QUALITY ASSURANCE PROGRAM

(*a*) The Quality Assurance Manual and the Program it describes shall be accepted by the Society prior to the issuance of a certificate. A control copy shall be filed with the Society. The applicant shall make available for on-site review by the Society such procedures, process sheets, or drawings as are necessary to understand the program and demonstrate compliance with this Standard. The manual shall be the Society's guide for auditing the Certificate Holder's continued compliance with the accepted Quality Assurance Program.

(*b*) After implementation, the Quality Assurance Program shall conform to the controlled copy of the Quality Assurance Manual filed with the Society. If the Certificate Holder wishes to change the program to a degree requiring changes to the manual, the Certificate Holder shall submit the proposed changes to the Society, which shall accept or reject them in writing. Organizational changes which affect compliance with this Standard require acceptance by the Society.

5-5.0 ISSUANCE

Accreditation may be granted or withheld by the Society at its discretion. If authorization is given and the proper administrative fee is paid, a Certificate of Accreditation expiring not later than the triannual anniversary date, will be issued to the applicant. Each

[1]Forms may be obtained by request to the Accreditation Department, The American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017.

[2]Detailed technical procedures and processes, such as those for nondestructive examination, are not considered as part of the Manual. The controls of such procedures and processes shall be covered by the Manual.

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Certificate will be signed by duly authorized Society personnel.

5-6.0 SCOPE

The Certificate shall identify the specific location covered and state the scope and limits of any activities for which accreditation is granted. At its discretion, the Society may limit or extend the scope of a certificate.

5-7.0 AUDIT

After initial accreditation the Certificate Holder's Quality Assurance Program shall be subject to unannounced audits by the Society at least twice during the 3-year term of the Certificate of Accreditation.

5-8.0 RENEWAL

Six months prior to the date of expiration of any such Certificate, the applicant shall apply for a renewal of authorization and the issuance of a new Certificate. Failure to apply for renewal of the Certificate in time and with appropriate documentation may cause loss of accreditation until such time as reaccreditation procedures can be undertaken and all requirements for reaccreditation have been met. The Society reserves the right to cancel or refuse to renew accreditation.

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APPENDIX I
FASTENER TESTING

(This Appendix is part of ASME FAP-1-1995 and is placed after the main text for convenience.)

I. Dimensional

II. Mechanical and Performance Testing

(1) Shear
(2) Proof Load
(3) Widening
(4) Tensile
  (a) Wedge
  (b) Axial
(5) Hardness
  (a) Macro
  (b) Micro
(6) Impact
(7) Torsional
(8) Torque/Tension
(9) Ductility
(10) Fatigue
(11) Drive
(12) Elongation
(13) Stress Rupture
(14) Hydrogen Embrittlement
(15) Proof Torque
(16) Torque-To-Clamp Ratio
(17) Pull Through
(18) Push Out
(19) Twist
(20) Compression
(21) Clamp Load Torque
(22) Breakaway Torque
(23) Prevailing Torque
(24) Flow Lines
(25) Macro Etch
(26) Inclusions
(27) Kesternich
(28) Humidity
(29) Salt Spray
(30) Magnetic Particle
(31) Liquid Penetrant
(32) X-ray
(33) Ultrasonic
(34) Eddy Current
(35) Adhesion
(36) Chemical Stripping
(37) Chemical Drop
(38) Creep
(39) Rotational Capacity
(40) Vibration
(41) Drill Screw
(42) Chemical Analysis
(43) Case Depth
(44) Decarburization/Carburization
(45) Grain Size
(46) Minimum Tempering Temperature
(47) Yield
(48) Magnetic Permeability
(49) Reduction of Area
(50) Part Elongation
(51) Thread Laps
(52) Thread Forming

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APPENDIX II
MECHANICAL FASTENER INSPECTION

(This Appendix is part of ASME FAP-1-1995 and is placed after the main text for convenience.)

I. Minimum Requirements

A. DIMENSIONAL INSPECTIONS

Feature	Equipment	Specification
Threads	Indicating Type Ring Gages Plug Gages	ASME B1.3M FED-STD-H28/20 MIL-S-7742 MIL-STD-8879
Linear and Diameter Measurements	Gage Blocks Outside Micrometers Inside Micrometers Calipers Plug Gages Tri Micrometers	MIL STD-120
Angle and Radii	Optical Comparators Functional Gages Radius Charts	MIL-STD-120
Thread Runout	Functional Gages	
Hex Socket Size	Functional Gages	ANSI/ASME B18.3
Wall Thickness	Fixture and Dial Indicator	ANSI/ASME B18.3
Hex Socket Depth	Dial Indicator	ANSI/ASME B18.3

B. PHYSICAL TESTING

Test	Equipment	Specification
Hardness	Rockwell Tester	ASTM-E18 MIL-STD-1312-6
Micro-Hardness	Micro-Hardness Tester Preparation Equipment	ASTM-E92 ASTM-E384 MIL-STD-1312-6 ASTM-E3
Tensile and Proof including specimens	Tensile Tester	ASTM-F606 SAE-J429 SAE-J995 MIL-STD-1312-8

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Test	Equipment	Specification
		ASTM-E340 ASTM-E709 ASTM-E165
Discontinuities	Macro-etch Microscope Magnetic Particle Liquid Penetrant	ASTM-F788 ASTM-F812 SAE-J122 SAE-J123 ASTM-E1444 ASTM-E1417
Stress Durability (Hydrogen (Embrittlement)	Torque Wrenches Test Plates Test Washers	MIL-STD-1312-5 ASTM-F606M
Decarburization/ Carburization	Macro-etch Microhardness	SAE J419 ASTM-A574 ASTM-F606

C. CHEMICAL ANALYSIS

Material	Equipment	Specification
Steel	Carbon Determiner Spectrometer	ASTM-E30

II. Additional Requirements (when applicable)

A. DIMENSIONAL

Feature	Equipment	Specification
Recesses	Recess Penetration Recess Wobble	ANSI/ASME B18.6.4
Straightness	Straightness Gage	IFI-136 ANSI/ASME B18.3 ANSI/ASME B18.2.1
Thread Runout	Thread Runout Gage	IFI-136 ANSI/ASME B18.2.1
Flat Head Protrusion	Protrusion Gage	ANSI/ASME B18.6.4 ANSI/ASME B18.6.2
Hex Head Height (across corners)	Gaging Ring	ANSI/ASME B18.6.4
Slotted Nut	Slot Gage	ANSI/ASME B18-2.2
Coating/Plating Thickness	Various Microscopic Magnetic Tester Coulometric Tester	MIL-STD-1312-12 ASTM-E487 ASTM-B499 ASTM-B504

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B. PHYSICAL TESTING

Test	Equipment	Specification
Shear	Tensile Tester Universal Tester Hydraulic Press	ASTM-F606 MIL-STD-1312-13 MIL-STD-1312-28 MIL-STD-1312-20
Double Shear	Shear Block and Support Block or Fixture	ANSI/ASME B18.8.2

Test	Equipment	Specification
Impact	Impact Tester	ASTM-A540 ASTM-A370
Magnetic Permeability	MU Gage	ASTM A-342
Torsional Strength	Torque Wrench Torque Fixture	ANSI/ASME B18.6.4 ASTM-F738
Hex Socket Strength	Torque Wrench Fixture	ASTM-F880 ASTM-F912
Strength Recess Torsional	Torque Watch Fixture	MIL-B-87114 MIL-STD-1312-25

Test	Equipment	Specification
Ductility	Ductility Block	SAE-J78 SAE-J81 IFI-112 IR-113
Salt Spray	Salt Spray Cabinet	ASTM-B117 MIL-STD-1312-1
Case Depth	Macro-etch Microhardness	SAE-J423
Torque-Tension	Torque Wrenches Load Cells	SAE-J174 IFI-101 MIL-STD-1312-15
Tensile (elevated temp)	Tensile Tester w/ heater	MIL-STD-1312-28
Double Shear (elevated temp)	Tensile Tester or Hydraulic Press w/ heater	MIL-STD-1312-18
Humidity	Humidity Cabinet	MIL-STD-1312-3
Vibration	Vibration Tester	MIL-STD-1312-7
Fatigue	Fatigue Tester	MIL-STD-1312-11
Drill Drive Testing	Drill-Drive Tester	SAE-J78 IFI-113

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Test	Equipment	Specification
Thread Forming	Torque Wrench & Test Block	SAE-J81
Clamp Load Torque	Test Nut. Test Washer Load Measuring Device Torque Measuring Device	IFI-124
Break Away Torque	Test Nut Torque Wrench	IFI-125
Prevailing Torque	Test Bolt Hardened Washer Torque Measuring Device Test Washer	IFI-100/107
Metallographic Analysis: Grain Size Flow Lines Microstructure	Metallographic Equipment	ASTM-E112
Plating Adhesion		ASTM-B571
Panel Fastener Tests: Push-out Tensile Torque-out Shear Pull-up		MIL-STD-1312-22 MIL-STD-1312-23 MIL-STD-1312-24 MIL-STD-1312-26 MIL-STD-1312-27
Fastener Sealing		MIL-STD-1312-19
Stress Relaxation		MIL-STD-1312-17
Stress Corrosion		MIL-STD-1312-9
Blind Rivet Tests		SAE-J1200 IFI-114 IFI-116 IFI-117 IFI-119

C. CHEMICAL

Material	Equipment	Specification
Aluminum and Alloys		ASTM-B316 ASTM-E34 ASTM-E101 ASTM-B211
Brass & Bronze Copper & Copper Alloys		ASTM-E54 ASTM-E53 ASTM-E62 ASTM-E75 ASTM-E76 ASTM-E478
Stainless Steel		ASTM-E353
Titanium		AMS4928 AMS4967 AMS4971
Coating Type	X-Ray	ASTM-B568

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APPENDIX III
DEFINITIONS COMMONLY USED IN THE FASTENER INDUSTRY

(This Appendix is part of ASME FAP-1-1995 and is placed after the main text for convenience.)

Altered Fastener — Any process which may significantly change the fastener's original manufactured surface finish, coating, geometry, mechanical properties, or performance capabilities results in an altered fastener.

Certificate of Compliance — A written statement supplied to the purchaser by the manufacturer or processor presenting assurance that all applicable standards and specifications have been met. No actual test data is presented in a Certificate of Compliance. The Certificate of Compliance shall contain the manufacturer or processor's name and location, customer name, purchase order number, part description, and standard or specification number. The Certificate of Compliance is at best an assurance that the manufacture and processing of the fastener lot has been monitored and controlled to a degree, but does not reflect any specific data pertaining to inspection or test results.

Certified Material Test Report — A written statement generated by the original manufacturer and supplied to the purchaser. This document shall present to the purchaser actual test data assuring that all applicable standards and specifications have been met. For mechanical properties, a Certified Material Test Report shall contain manufacturer's name and location, customer purchase order number, customer name, part description, part number, raw material type, material analysis, specification number, lot number, headmark description, all test values required by that specification, date and location where tests were conducted, and any other statements required by the customer's standards or purchase order. This document shall be signed by a responsible party, contain the Accreditation certificate number and, if required by contract, shall be authenticated by some non-counterfeitable means.

Fastener Precision — The narrowness of its specified limits establishes whether or not it may be considered a "precision" fastener. Quality should not be confused with precision, which is the result of being manufactured to close tolerances.

Fastener Quality — Fastener quality is conformance of a fastener or fastener lot within its specified tolerances, limits, and requirements. Any fastener manufactured completely within its specified limits, regardless of how narrow or broad, is a "quality" fastener.

Inspection Plan — A pre-established combination of in-process and/or final inspection and testing to be performed including frequency, sample size and selection method and acceptance criteria.

Inspection Report — A report generated by the manufacturer, alteration distributor, or distributor and supplied to the purchaser. This document presents to the purchaser actual data gathered as the result of inspection of dimensional characteristics of specific parts from a specific lot. An Inspection Report shall contain the manufacturer, alteration distributor, or distributor's name and location, customer name, customer purchase order number, part description, part number, lot number, lot size, sample size, specification number with revision level, and any other information required by the specification or customer's purchase order. The Inspection Report shall identify all characteristics which do not conform to the specification. This document shall be signed and dated by the person performing the inspection and, if required by contract, shall be authenticated by some non-counterfeitable means.

Mechanical Testing — Verifies the mechanical properties which identify the reaction of a fastener to applied loads. These properties are the result of the manufacturing methods and metallurgical treatments employed for a given material. Typical mechanical tests are tensile (axial/wedge), yield, hardness, proof load, torsional strength, creep, stress rupture, shear, and ductility.

Metallurgical Examination — The evaluation of metal-

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lurgical characteristics imparted to fasteners through material selection, forming, and heat treatments. The evaluation may include such items as chemistry, grain size, microstructure, decarburization, effective case depth, and through-hardness.

Physical Property Testing — These properties are inherent in the basic raw material and generally are unchanged or only slightly altered in the fastener following manufacture. Such properties are typically electrical resistivity, thermal conductivity, density, coefficient of thermal expansion, and magnetic susceptibility.

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