ASME B18.18.7M-1998

Quality Assurance Plan for Fasteners Produced in a Customer Approved Control Plan

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Quality Assurance Plan for Fasteners Produced in a Customer Approved Control Plan

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FOREWORD

(This Foreword is not part of ASME B18.18.7M-1998.)

The evolution of Quality Assurance Programs within fastener manufacturing plants in North America has been focused on development of in-process controls and prevention techniques which have significantly reduced nonconformances and reduced or eliminated the need for final inspection. In selective applications and products, the traditional final inspection has been replaced by performance testing which assures the completed product fully qualifies for its intended fit, form, and function. It is intended that the purchaser, prior to written agreement, conduct an audit of the manufacturer's plant to verify capability of compliance with an agreed to control plan to comply with this Standard.

In 1996 an IFI task force developed a quality standard for fasteners based on this existing practice and identified it as IFI-151. IFI subsequently proposed to Subcommittee 18 of Standards Committee B18 that IFI-151 serve as the basis for preparation of an ASME Standard.

Following approval by ASME, this Standard was submitted to the American National Standards Institute, which approved it on January 6, 1998.

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ASME B18 STANDARDS COMMITTEE Standardization of Bolts, Nuts, Rivets, Screws, Washers, and Similar Fasteners

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General. ASME Standards are developed and maintained with the intent to represent the consensus of concerned interests. As such, users of this Standard may interact with the Committee by requesting interpretations, proposing revisions, and attending committee meetings. Correspondence should be addressed to: Secretary, B18 Main Committee, The American Society of Mechanical Engineers, Three Park Avenue, New York, New York 10016-5990.

Proposing Revisions. Revisions are made periodically to the Standard to incorporate changes which appear necessary or desirable, as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published periodically.

The Committee welcomes proposals for revisions to this Standard. Such proposals should be as specific as possible: citing the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal including any pertinent documentation.

Interpretations. On request, the B18 Committee will render an interpretation of any requirement of the Standard. Interpretations can only be rendered in response to a written request sent to the Secretary of the B18 Main Committee.

The request for interpretation should be clear and unambiguous. It is further recommended that the inquirer submit his request in the following format:

- Subject: Cite the applicable paragraph number(s) and a concise description.
- Edition: Cite the applicable edition of the Standard for which the interpretation is being requested.
- Question: Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or situation. The inquirer may also include any plans or drawings which are necessary to explain the question; however, they should not contain proprietary names or information.

Requests which are not in this format will be rewritten in this format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME committee or subcommittee. ASME does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, or activity.

Attending Committee Meetings. The B18 Main Committee regularly holds meetings, which are open to the public. Persons wishing to attend any meeting should contact the Secretary of the B18 Main Committee.

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QUALITY ASSURANCE PLAN FOR FASTENERS PRODUCED IN A CUSTOMER APPROVED CONTROL PLAN

1 CUSTOMER APPROVED CONTROL PLANS

1.1 Scope

This plan is based on the concept that a written control plan outlining the fastener manufacturing process and identification of its control points will provide an orderly procedure for controlling and minimizing process and product variation. Factors usually considered when developing a control plan include past history, machine capacity and capability, new or special customer requirement(s), and a PFMEA (potential failure mode and effects analysis). Typically the control plan identifies actions at each phase of the manufacturing process including receiving, in-process manufacturing, and out-going operations. Continuing versus periodic requirements are identified and strategies are provided for continued updating and improvement.

1.2 Written Agreement

The control plan shall define the respective control elements including the characteristics and/or process parameters to be verified and frequency of verification and shall be agreed to in writing between manufacturer and purchaser.

1.3 Process Control Plan

Variations in control strategies and process charting/ controls are common, based on methods used and variables monitored. Variations are based on given machinery, plant layout, sensing devices, plant and product mix. An actual plan may have significant variations depending upon manufacturer and purchaser agreement. A basic plan outline is shown in Fig. 1.

1.4 Part Qualification

Part qualification is a preproduction assessment of parts for their suitability in intended applications. The purchaser assessment varies depending upon part usage and previous product history. Engineering tests of part and joint function are typically completed with appropriate test record maintenance.

1.5 Lot Controls

1.5.1 Raw material shall be supplied to the manufacturer traceable to a mill heat of material.

1.5.2 Subcontracted processes including plating and heat treating shall be controlled to avoid product lot contamination.

1.5.3 Finished lots shall be traceable to raw material supplier and subcontracted processes.

1.6 Plan of Inspection

The manufacturer shall have a document to indicate all points within the manufacturing process where fastener sampling and inspection is carried out including frequency and sample sizes.

1.7 Records of Inspection/Compliance

Records of inspection/compliance shall include written records of evaluation of preproduction parts. All other records will also include those of in-process controls. Evidence of these records and the written control plan agreement shall be deemed compliance to this Standard. Records shall be retained for a minimum of 5 years.

1.8 Control Plan Audit

The control plan shall include a provision for an audit program, including frequency, to verify continuing conformance to the approved written control plan.

1.9 Process Revision or Change

No significant changes which impact the finished product may be made in the process without written customer approval.

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FIG. 1 TYPICAL PROCESS FLOW DIAGRAM

QUALITY ASSURANCE PLAN FOR FASTENERS PRODUCED IN A CUSTOMER APPROVED CONTROL PLAN

2 REFERENCED STANDARDS

- QS 9000, Quality System Requirements
- Publisher: Automotive Industry Action Group, Department 77839, P.O. Box 77000, Detroit, MI 48277
- B18.18.2M, Inspection and Quality Assurance for High-Volume Machine Assembly Fasteners
- B18.18.3M, Inspection and Quality Assurance for Special Purpose Fasteners
- B18.18.4M, Inspection and Quality Assurance for Fasteners for Highly Specialized Engineered Applications
- B18.18.5M, Inspection and Quality Assurance Plan Requiring In-Process Inspection and Controls
- Publisher: The American Society of Mechanical Engineers, Three Park Avenue, New York, NY 10016
- ASTM F 1470, Standard Guide for Fastener Sampling for Specified Mechanical Properties and Performance Inspection
- Publisher: American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428

AMERICAN NATIONAL STANDARDS FOR BOLTS, NUTS, RIVETS, SCREWS, WASHERS, AND SIMILAR FASTENERS

Small Solid Rivets	B18.1.1-1972(R1995)
Large Rivets	B18.1.2-1972(R1995)
Metric Small Solid Rivets	B18.1.3M-1983(R1995)
Square and Hex Bolts and Screws (Inch Series)	B18.2.1-1996
Square and Hex Nuts (Inch Series)	B18.2.2-1987(R1993)
Metric Hex Cap Screws	B18.2.3.1M-1979(R1995)
Metric Formed Hex Screws	B18.2.3.2M-1979(R1995)
Metric Heavy Hex Screws	B18.2.3.3M-1979(R1995)
Metric Hex Flange Screws	B18.2.3.4M-1984(R1995)
Metric Hex Bolts	B18.2.3.5M-1979(R1995)
Metric Heavy Hex Bolts	B18.2.3.6M-1979(R1995)
Metric Heavy Hex Structural Bolts	B18.2.3.7M-1979(R1995)
Metric Hex Lag Screws	B18.2.3.8M-1981(R1991)
Metric Heavy Hex Flange Screws	B18.2.3.9M-1984(R1995)
Square Head Bolts (Metric Series)	B18.2.3.10M-1996
Metric Hex Nuts, Style 1	B18.2.4.1M-1996
Metric Hex Nuts, Style 2	B18.2.4.2M-1979(R1995)
Metric Slotted Hex Nuts.	B18.2.4.3M-1979(R1995)
Metric Hex Flange Nuts	B18.4.4.4M-1982(R1993)
Metric Hex Jam Nuts	B18.2.4.5M-1979(R1990)
Metric Heavy Hex Nuts	B18.2.4.6M-1979(R1990)
Fasteners for Use in Structural Applications.	B18.2.6-1996
Socket Cap, Shoulder, and Set Screws, Hex and Spline Keys (Inch Series)	B18.3-1998
Socket Head Cap Screws (Metric Series)	B18.3.1M-1986(R1993)
Metric Series Hexagon Keys and Bits	
Hexagon Socket Head Shoulder Screws (Metric Series)	B18.3.3M-1986(R1993)
Hexagon Socket Button Head Cap Screws (Metric Series)	B18.3.4M-1986(R1993)
Hexagon Socket Flat Countersunk Head Cap Screws (Metric Series)	B18.3.5M-1986(R1993)
Devend Lload Date (Inch. Carlies)	B 18.3.6M- 1986(K 1993)
Motrie Round Head Chart Source Neek Polta	D19 5 2 1M 1006
Metric Round Head Short Square Neck Bolts	D19 5 2 2M 1092
Bound Head Square Neck Bolts With Large Head (Matrie Series)	D19 E 2 2M 1000
Mond Scrawe (lach Series)	B19 6 1 1091/B1001)
Slotted Head Can Screws Square Head Set Screws and Slotted Headless Set Screws	B18 6 2-1972/B1993)
Machine Screws and Machine Screws Nuts	B18 6 3-1972(B1983)
Thread Forming and Thread Cutting Tapping Screws and	
Metallic Drive Screws (Inch Series)	B18.6.4-1981(B1991)
Metric Thread Forming and Thread Cutting Tapping Screws	B18.6.5M-1986(B1993)
Metric Machine Screws	B18.6 7M-1985(B1993)
General Purpose Semi-Tubular Rivets, Full Tubular Rivets, Solit Rivets	
and Rivet Caps	
Metric General Purpose Semi-Tubular Rivets	B18.7.1M-1984(R1992)
Clevis Pins and Cotter Pins (Inch Series)	B18.8.1-1994
Taper Pins, Dowel Pins, Straight Pins, Grooved Pins, and Spring Pins (Inch Series)	B18.8.2-1995
Spring Pins — Coiled Type (Metric Series)	B18.8.3M-1995
Spring Pins — Slotted (Metric Series)	B18.8.4M-1994
Machine Dowel Pins — Hardened Ground (Metric Series)	B18.8.5M-1994
Cotter Pins (Metric Series)	B18.8.6M-1995
Headless Clevis Pins (Metric Series)	B18.8.7M-1994
Headed Clevis Pins (Metric Series)	B18.8.8M-1994
Grooved Pins (Metric Series)	B18.8.9M-1998
Plow Bolts (Inch Series)	
Track Bolts and Nuts	B18.10-1982(R1992)
Miniature Screws	B18.11-1961(R1992)
Glossary of Terms for Mechanical Fasteners	B18.12-1962(R1991)
Screw and Washer Assemblies — Sems (Inch Series)	B18.13-1996

Screw and Washer Assemblies — Sems (Metric Series)	B18.13.1M-1991			
Forged Eyebolts	B18.15-1985(R1995)			
Mechanical and Performance Requirements for Prevailing-Torque Type	• • •			
Steel Metric Hex Nuts and Hex Flange Nuts	B18.16.1M-1979(R1995)			
Torque-Tension Test Requirements for Prevailing-Torque Type				
Steel Metric Hex Nuts and Hex Flange Nuts	B18.16.2M-1979(R1995)			
Dimensional Requirements for Prevailing-Torque Type Steel				
Metric Hex Nuts and Hex Flange Nuts	B18.16.3M-1982(R1993)			
Wing Nuts, Thumb Screws, and Wing Screws	B18.17-1968(R1983)			
Inspection and Quality Assurance for General Purpose Fasteners	B18.18.1M-1987(R1993)			
Inspection and Quality Assurance for High-Volume Machine Assembly Fasteners	B18.18.2M-1987(R1993)			
Inspection and Quality Assurance for Special Purpose Fasteners	B18.18.3M-1987(R1993)			
Inspection and Quality Assurance for Fasteners for Highly Specialized				
Engineered Applications	B18.18.4M-1987(R1993)			
Inspection and Quality Assurance Plan Requiring In-Process Inspection and Controls	B18.18.5M-1998			
Quality Assurance Plan for Fasteners Produced in a Third Party Accreditation System	B18.18.6M-1998			
Quality Assurance Plan for Fasteners Produced in a Customer Approved Control Plan	B18.18.7M-1998			
Lock Washers (Inch Series)	B18.21.1-1994			
Lock Washers (Metric Series)	B18.21.2M-1994			
Metric Plain Washers	B18.22M-1981(R1990)			
Plain Washers	B18.22.1-1965(R1990)			
Part Identifying Number (Pin) Code System Standard for B18 Externally				
Threaded Products	B18.24.1-1996			
Square and Rectangular Keys and Keyways	B18.25.1M-1996			
Woodruff Keys and Keyways	B18.25.2M-1996			
Helical Coil Screw Thread Inserts (Inch Series)	B18.29.1-1993			

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