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ASME B18.18.7M-1998

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

AN AMERICAN NATIONAL STANDARD



The American Society of Mechanical Engineers

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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 In selective applications and products, the traditional final inspection has been replaced by performance testing which assures the completed product fully qualifies for its intended fit, form, and function.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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Standardization of Bolts, Nuts, Rivets, Screws, Washers, and Similar Fasteners

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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.

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CONTENTS

Foreword iii
Standards Committee Roster v
Correspondence With B18 Committee vii

1 Customer Approved Control Plans 1

2 Referenced Standards 2

Figure
1 Typical Process Flow Diagram 2

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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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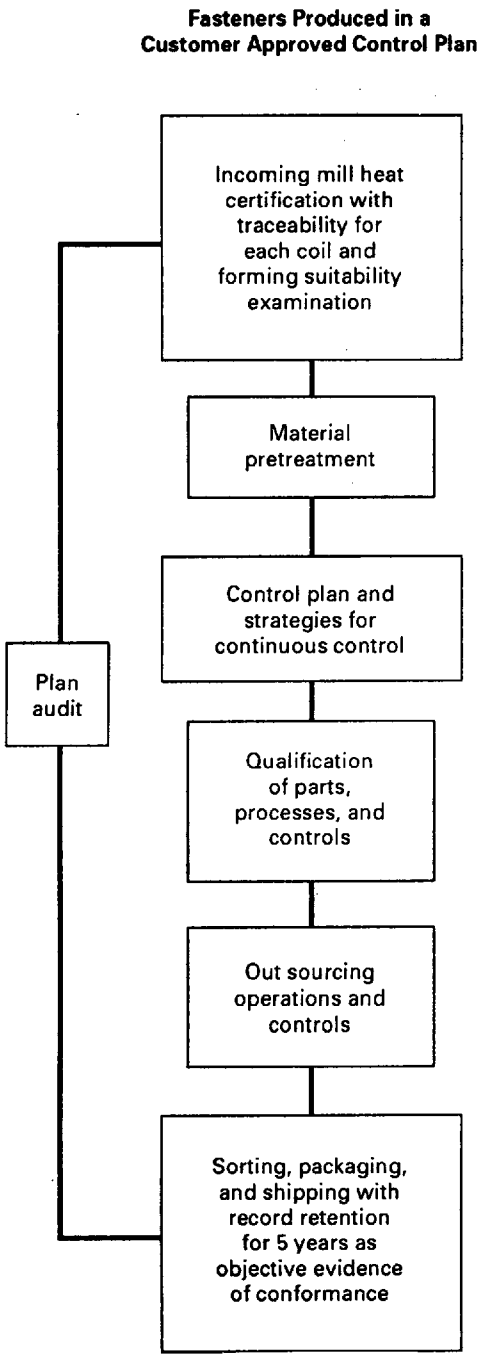

FIG. 1 TYPICAL PROCESS FLOW DIAGRAM

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

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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 ..... B18.3.2M-1979(R1990)
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)
Metric Series Socket Set Screws ..... B18.3.6M-1986(R1993)
Round Head Bolts (Inch Series) B18.5-1990
Metric Round Head Short Square Neck Bolts B18.5.2.1M-1996
Metric Round Head Square Neck Bolts B18.5.2.2M-1982
Round Head Square Neck Bolts With Large Head (Metric Series) B18.5.2.3M-1990
Wood Screws (Inch Series) ..... B18.6.1-1981(R1991)
Slotted Head Cap Screws, Square Head Set Screws, and Slotted Headless Set Screws ..... B18.6.2-1972(R1993)
Machine Screws and Machine Screw Nuts ..... B18.6.3-1972(R1983)
Thread Forming and Thread Cutting Tapping Screws and Metallic Drive Screws (Inch Series) ..... B18.6.4-1981(R1991)
Metric Thread Forming and Thread Cutting Tapping Screws ..... B18.6.5M-1986(R1993)
Metric Machine Screws ..... B18.6.7M-1985(R1993)
General Purpose Semi-Tubular Rivets, Full Tubular Rivets, Split Rivets and Rivet Caps ..... B18.7-1972(R1992)
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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
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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
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Miniature Screws ..... B18.11-1961(R1992)
Glossary of Terms for Mechanical Fasteners ..... B18.12-1962(R1991)
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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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